THE GREAT CARIBOU RAINFOREST CONSERVATION AREA

A HARMONY FOUNDATION PUBLICATION AND PROPOSAL

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CANADA

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EXECUTIVE SUMMARY

This research arose out of profound concern for the survival of Deep-Snow Mountain Caribou (DSMC) and the urgent need for a stronger effort to secure their future. These majestic caribou are unique in the world to the southern interior mountain ranges of British Columbia, and they are in trouble.

As recently as the past two decades there were approximately 17 DSMC herds in B.C. Six have been extirpated, leaving 11 herds. Of these 11 herds, three have less than 10 individuals and only five consist of more than 100 caribou. Fewer than 1,500 animals remain in total, a 50% decline in the last few generations. Little time remains to save this iconic species. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designates them endangered and B.C. has them on the provincial Red List, both the highest level of endangerment.

Three of the five largest remaining herds are covered by this report and proposal. Much of their habitat has been severely damaged demanding urgent action. However, logging continues apace despite compelling evidence that habitat loss is the primary reason for their decline.

In 2007 the B.C. government introduced its Mountain Caribou Recovery Implementation Plan (updated in 2009). Although the decline was primarily attributed to habitat loss and fragmentation the plan heavily relied on aggressive predator control while continuing to permit large-scale logging of lower-elevation early-winter habitat. As a result, the plan's goal of recovering caribou to pre-1995 numbers within 20 years has failed.

The worsening decline compelled the Canadian Minister of Environment and Climate Change in 2018, to issue an Imminent Threat Analysis (ITA). While the ITA recognized the crisis, it was not accompanied by an emergency order to stop logging in DSMC habitat, thereby failing to ensure the necessary protection of sufficient habitat for self-sustaining herds. Instead, B.C. continues to emphasize predator control, some maternal penning and occasional relocation of remnant herd members none of which has been shown to provide more than temporary benefit.

In February 2020 B.C. and Canada signed a Partnership Agreement with the West Moberly and Salteaux First Nations for the Conservation of several of the Southern Mountain Caribou herds. While laudable, the agreement does not afford any protection to the endangered DSMC. Therefore, we propose, as explained in this report, the establishment of **The Great Caribou Rainforest Conservation Area** with permanent high-level protection for DSMC and their habitat.

THE GREAT CARIBOU RAINFOREST CONSERVATION AREA

To identify the best location for a DSMC conservation area we examined herd status and the overlap of range with parks and other protected areas. The proposed location was chosen for several compelling reasons.

- It is home to three of the five largest remaining DSMC herds: North Cariboo, Wells Gray North, and Wells Gray South.
- The proposed conservation area is anchored by 794,585 hectares of established provincial parks: Bowron Lake, Cariboo Mountains and Wells Gray.
- Surrounding these parks is additional habitat, some without any protection but more with some level of protection.
- At least two of the parks and surrounding protected areas were primarily set aside for DSMC.

We have designated three Areas of Interest (AOIs) for conservation upgrades. These AOIs connect the three anchor parks to smaller provincial parks and other protected areas also found within the range of these three DSMC herds.

These AOIs are made up of 529,275 ha of existing protections such as Wildlife Habitat Areas (WHAs), Ungulate Winter Range (UWRs) and Old-Growth Management Areas (OGMAs). Only 231,872 ha of land (14% of the entire proposed area) needs to be upgraded from unprotected to a conservation status to create a 1,629,238-hectare conservation area. This relatively small addition of unprotected land outside these designations would effectively "stitch together" the patchwork of WHAs, UWRs, OGMAs and anchor and smaller parks to create contiguous habitat in a world-class conservation area. That would increase value for caribou and other wildlife and produce other important social, economic and ecological benefits presented in this report.

These three herds have maintained higher numbers, in part, because of habitat overlap with existing parks. However, to recover and become self-sustaining they require their entire habitat to be protected.

While some of their range has been logged, in some areas heavily, the federal recovery strategy for caribou makes it clear that unoccupied caribou range cannot be eliminated from conservation strategies and herds must be given the opportunity to recover in every range. That cannot happen unless sufficient habitat protections are provided.

The 2014 federal recovery strategy set out different management thresholds depending on the type of critical habitat and whether the relevant caribou herd is in the southern, central or northern group. High elevation winter and summer ranges have a "minimal disturbance" threshold for all three groups (i.e. essentially a 100% undisturbed / 0% disturbance threshold). For the southern group, including DSMC, the relevant thresholds are minimal disturbance for high elevation winter and summer ranges and for low elevation early winter and/or spring ranges (Government of Canada, 2017).

Enabling self-sustaining DSMC populations is important on its own merit as recognized by both B.C. and Canada.

However, the case for establishment of The Great Caribou Rainforest Conservation Area is strengthened by the significant contribution it will make to meeting commitments by B.C. and Canada on indigenous rights, biodiversity, climate and old-growth forests described herein.

In pursuing establishment of the conservation area, the rights of First Nations must be recognized, integral and respected. Therefore, discussions have begun with First Nations in the AOIs to identify Nations seeking caribou conservation and to explore collaborative work. This report has not been written to be prescriptive about land use in unceded territories, but to address the state of caribou in this region, and to accelerate discussions on ways to pursue greater protections with expertise and leadership from First Nations.

Another topic explored in the report is the importance of economic diversification both for the environment and the local economy. The B.C. logging industry is in decline, and viable economic alternatives will be key for local communities whether they are implemented soon, with a reasonable chance

of caribou survival, or after the last mill has closed and both caribou and jobs are gone. The natural attributes of the area offer significant opportunities in training and programming in ecotourism, indigenous tourism, sustainable forestry, wildlife habitat restoration, and value-added production of forest products. A regional ecotourism strategy and development of a conference/education center are discussed.

Finally, recommendations are presented: 1) creation of **The Great Caribou Rainforest Conservation Area**, 2) immediate action to eliminate threats to DSMC, and 3) changes in government priorities, strategies and decision-making to enhance caribou recovery.

It is time for bold and innovative action, for B.C. and Canada to meet their responsibilities for caribou recovery, reducing greenhouse emissions, preserving old-growth forests and biodiversity and respecting the rights of indigenous people. Establishment of **The Great Caribou Rainforest Conservation Area** will significantly contribute to meeting these commitments and enhance the reputation of both Canada and B.C. for leadership on the environment and indigenous rights.

Finally, it is important to make clear here that while this report focuses on establishing a conservation area for the North Cariboo, Wells Gray North, and Wells Gray South DSMC herds that should not be misconstrued as an endorsement of the triage approach. To the contrary, action must be taken to enable all herds in B.C., surviving or recently extirpated, to achieve self-sustaining status.

INTRODUCTION

PURPOSE

This report proposes urgent action and an innovative plan to help save British Columbia's endangered Deep Snow Mountain Caribou (*Rangifer tarandus caribou*) while helping to meet commitments made by B.C. and Canada on climate, biodiversity, Indigenous rights, and old-growth forests. These caribou are unique to B.C.'s southern interior mountain ranges; their decline has been known and largely neglected for decades. There are only 11 remaining Deep-Snow Mountain Caribou (DSMC) herds in B.C. all of which are endangered and require urgent protection. We have chosen to focus on the three herds within the proposed conservation area, North Cariboo, Wells Gray North, and Wells Gray South, because they have a good chance of being self-sustaining over the long term if their habitat is protected within and outside of Bowron Lake, Cariboo Mountains, and Wells Gray Provincial Parks. However, without immediate action to protect and restore their habitat, these icons of Canadian mountain wilderness will almost certainly continue to decline toward extirpation in the foreseeable future.

CLARIFYING NOMENCLATURE, HERD NUMBERS AND HABITAT DESCRIPTORS

CARIBOU

Various terms are used for the woodland caribou ecotype referred to here as the Deep Snow Mountain Caribou (DSMC). The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) refers to them as Southern Mountain Caribou of Designatable Unit 9, while the B.C. and Canadian governments refer to them as the southern group of Southern Mountain Caribou. They also are referred to interchangeably as woodland, forest-dwelling, or mountain caribou. Because different government agencies designate specific DSMC populations using different terms (sub-populations, herds or Local Population Units (LPUs) we use all three terms interchangeably where most appropriate.

In this report we use *caribou* to denote B.C.'s caribou generally, *mountain caribou* for generalizations about northern, central, and southern mountain caribou, and ***Deep-Snow Mountain Caribou***—the focus of this report—for caribou herds in Designatable Unit 9.

HERD NUMBERS

Another area where it is hard to be consistent is herd numbers which have ranged from 15-20, depending on the source (B.C. Caribou Recovery Program, 2020; COSEWIC, 2014). The variance then and now may be attributable to herd splitting or lumping or other historic practices. Unless reference is made to a specific source, we've adopted herd numbers from the B.C. Caribou Recovery Program which lists 17 herds historically. To the best of our knowledge, six of these herds are now extirpated and three have fewer than 10 individuals. This leaves eight herds, of which only five have more than 100 caribou; and of these five,

three of the largest remaining herds are covered by this proposal.

CRITICAL AND MATRIX HABITAT

DSMC depend on different habitats throughout the year. Our use of the terms "critical habitat" and "matrix habitat" follow Environment Canada, 2014, whereby: "Critical habitat is defined as the habitat necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species"). Matrix habitat is typically adjacent to critical habitat and is either used transiently or acts as a buffer. Protection of both habitat types, as well as linking corridors, is critical for the long-term sustainability of DSMC.

WHAT MAKES DEEP-SNOW MOUNTAIN CARIBOU UNIQUE

In Canada no caribou ecotype is more threatened than DSMC, whose entire range is restricted to the mountains of southeast B.C. (Figure 1). When snowpack is deepest in mid-winter to late spring DSMC must either descend to valley bottoms to feed on ground vegetation or else subsist on arboreal lichens which can only be reached by using the deep snowpack as a platform. These seasonal migrations between higher and lower elevations are unique among caribou (and reindeer). Little more than a century ago, DSMC ranged from B.C. south into Washington, Idaho, and Montana. Currently their range covers less than half of this area.

A BRIEF HISTORY OF DEEP-SNOW MOUNTAIN CARIBOU CONSERVATION AND DECLINE

No animal is more evocative of B.C.'s mountains than mountain caribou. These iconic animals are in serious trouble throughout their range (Harding et al., 2020; Ministry of Forests Lands, n.d.).

Early provincial parks provided some sanctuary for DSMC, notably Wells Gray Park, established in 1939 partly in response to a sharp decline in herd numbers. The Park boundary was twice extended southward in an effort to encompass more of the annual range of the local herd. Later parks such as Bowron Lake and Cariboo Mountains provided additional protection but more remains to be done to ensure contiguous range sufficient for self-sustaining herds.

As long ago as 1954, biologist Ralph Edwards reported that caribou had alarmingly declined throughout B.C. Edwards and Ritcey (1959) continued to raise concerns about their endangerment. Their concerns were amplified by Freddy (1974) and Bloomfield (1979) who implicated the cumulative impacts of industrial resource extraction, increasing public access and other human disturbance. In 2021 it was reported again that the primary threat to mountain caribou populations today is habitat loss due to logging and access roads (Nagy-Reis et al., 2021).

Notwithstanding these early concerns, caribou were the last of the wild ungulates in B.C. to receive consideration for management and research (Fish and Wildlife Branch, 1979). Despite the 1979 Management Plan advocating for improved forestry, caribou continued to be neglected by government and industry while the old-growth forests they depend upon for survival were steadily logged. (Antifeau, 1987; Bloomfield, 1979).

A February 1999 B.C. Lands and Forests Publication on mountain caribou similarly stated that "Probably the most important management action is maintaining large tracts of habitat in a condition suitable for their needs. This means having parks or other no-logging zones, surrounded by areas in which some selective timber harvest may occur, but a high percentage of old-growth forest is retained. (Kinley, 1999, p.2).

Today, despite decades of forewarning, all of B.C.'s remaining DSMC herds have decreased to a fraction of their former numbers. Indeed, six herds including George Mountain, Purcells South and South Selkirks already have become extirpated. Most of the remaining herds are experiencing serious decline and face extinction (Nagy-Reis et al., 2021).

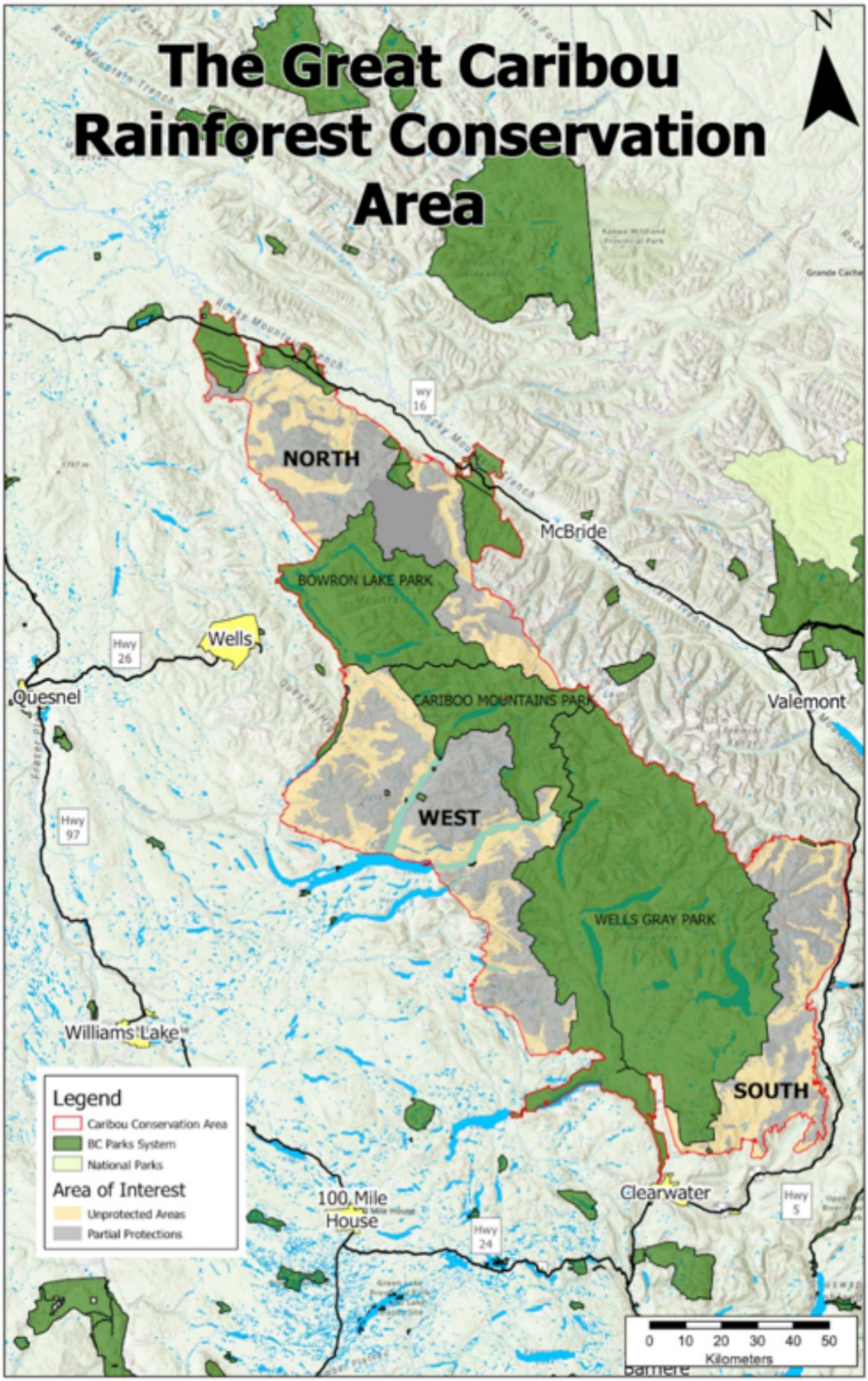


Figure 1. Map of Caribou Conservation Area and surrounding communities.

In May 2000, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2002) designated DSMC as threatened, and about one year later B.C. placed this ecotype on the provincial Red List (Hatter et al., 2004). While B.C. has more species at risk than any other province it is one of the few provinces in Canada without a specific law that protects endangered wildlife (Cox, 2019; Nixon et al., 2012).

In 2007 the B.C. government introduced its Mountain Caribou Recovery Implementation Plan (updated in 2009) reporting that some sub-populations had declined by 50% within the past 10 years (Office of the Assistant Deputy Minister Environmental Stewardship Division, 2009). The decline was attributed to habitat loss and fragmentation, and mortality from predation, with secondary effects associated with motorized backcountry recreation. The plan committed to recovering caribou to pre-1995 numbers within 20 years. Unfortunately, the plan predominantly relied on aggressive predator control while continuing to permit large-scale logging of lower-elevation early-winter habitat. **It's time for a habitat-based plan.**

The net result of the Recovery Implementation Plan has been further rapid decline. The goal of recovery to pre-1995 numbers has not been achieved. While specifics requested for DSMC were not provided, in 2018/2019 alone 180 wolves were killed in the ranges of seven of B.C.'s caribou herds at a cost of $824,900.

Although not directly related to DSMC, the July 2010 petition by the Beaver Lake Cree Nation, Enoch Cree Nation, Chipewyan Prairie Dene First Nation, and Athabasca Chipewyan First Nation for an emergency order under the Federal Species at Risk Act (SARA) to protect woodland caribou in northeastern Alberta (CBC News, 2010) was a milestone for all caribou. Pressure for recovery was further accelerated when, in September 2010, First Nations with support from environmental organizations filed parallel federal lawsuits to force Canada's Environment Minister to protect critical caribou habitat

In 2012, the federal government published the Recovery Strategy for the Woodland Caribou boreal population (*Rangifer tarandus caribou*) in Canada (Environment Canada, 2012), which was amended in 2020. The recovery strategy identified an expectation that provinces and territories would develop range plans for all boreal caribou herds within three to five years, by October 2017. The five-year deadline came and went without a single range plan being published by any province.

While range plans are not required under SARA, they are identified as an urgent priority in the federal recovery strategy under actions needed to address the threats to boreal caribou and to achieve population and distribution objectives for each range. Each jurisdiction with primary responsibility for boreal caribou management is expected to outline how critical habitat is being protected in each range.

The goal of the 2014 federal recovery strategy is to provide each herd a legitimate chance of being naturally self-sustaining. The recovery strategy identified habitat alteration (habitat loss, degradation and fragmentation) from both anthropogenic and natural sources, and increased predation for the continued decline of caribou populations. It also expressed serious concern that to meet the recovery goal of maintaining or achieving self-sustaining local populations throughout their current distribution in Canada sufficient habitat must be protected.

The recovery strategy set out different management thresholds depending on the type of critical habitat and whether the relevant caribou herd is in the southern, central or northern group. High elevation winter and summer ranges have a "minimal disturbance" threshold for all three groups (i.e. essentially a 100% undisturbed / 0% disturbance threshold). For the southern group (DSMC), the relevant thresholds are minimal disturbance for high elevation winter and summer ranges and for low elevation early winter and/or spring ranges (see Table 1, Government of Canada, 2017).

In May 2014, COSEWIC updated the status of DSMC from 'threatened' to 'endangered', based on a 45% decline over two generations from about 2501 to only 1,356 mature individuals (COSEWIC, 2014).

Table 1. Summary of Critical Habitat Categories and Disturbance Thresholds from the 2014 federal recovery strategy.

<table>
<tr><th>Category of Critical Habitat Range</th><th>Northern Group</th><th>Central Group</th><th>Southern Group</th></tr>
<tr><td>High Elevation Winter Range</td><td colspan="3" rowspan="2">Minimal disturbance</td></tr>
<tr><td>High Elevation Summer Range</td></tr>
<tr><td>Low Elevation Winter Range</td><td colspan="2">Minimum 65% undisturbed</td><td>n/a</td></tr>
<tr><td>Low Elevation Summer Range</td><td>Minimal disturbance</td><td>n/a</td><td>n/a</td></tr>
<tr><td>Low Elevation Early Winter and/or Spring Range</td><td colspan="2">n/a</td><td>Minimal disturbance</td></tr>
<tr><td>Type 1 Matrix</td><td colspan="2">Minimum 65% undisturbed</td><td>Wolf densities of <3/1000km^2</td></tr>
<tr><td>Type 2 Matrix</td><td colspan="3">Wolf densities of <3/1000km^2</td></tr>
</table>

This included a 27% decline since the last assessment in 2002. Surveys have shown consistently high adult mortality and low calf recruitment, accelerating population decline while human threats to DSMC were escalating.

In June 2014 the federal Species at Risk Public Registry released a caribou recovery plan for mountain caribou, identifying all DSMC (referred to as the Southern Group of the Southern Mountain Caribou) as threatened (Environment Canada, 2014). Around the same time B.C. reported approximately 1,213 caribou in 11 herds (B.C. Caribou Recovery Program, 2020). Despite significant decline, the Minister of Environment and Climate Change still has not adopted COSEWIC's recommendation of up-listing DSMC from threatened to endangered.

In 2018, four petitions filed under Section 80 of SARA by concerned citizen groups requesting emergency orders under Section 80 of SARA triggered an Imminent Threat Analysis (ITA) by Canada's Minister of Environment and Climate Change, Catherine McKenna. The ITA determined that eight herds warranted emergency protection—seven of which were either already or soon to be extirpated.

Also in 2018, B.C. released a new recovery plan which, like its 2007 plan, emphasized control of predators and their primary prey, deer and moose, to reduce wolf expansion into caribou habitat. At the same time the plan adopted use of maternity pens (Cox, 2018a) while continuing to permit logging of DSMC late-winter habitat to continue despite the ITA.

THE GREAT CARIBOU RAINFOREST CONSERVATION AREA

As described above, B.C.'s DSMC herds are in serious decline. They are designated as 'endangered' by COSEWIC, as 'threatened' under the federal Species at Risk Act (Species at Risk Public Registry, 2014) and they are red-listed in B.C.

It is well established that DSMC are poorly adapted to those portions of their range substantially

altered by industrial forestry (Nagy-Reis et al., 2021). Indeed, it seems reasonable to assume that most remaining herds will disappear within the foreseeable future largely for this reason (Wittmer et al., 2005; Stevenson et al., 2001). Arguably, the only herds with a good chance of being self-sustaining over the long term are those whose ranges substantially overlap with protected areas.

The area under consideration is occupied by three such herds: the North Cariboo herd with some of its range in Bowron Lake Provincial Park (B.C. Caribou Recovery Team, n.d.-a), the Wells Gray North herd with much of its area covered by Wells Gray and Cariboo Mountains Provincial Parks (B.C. Caribou Recovery Team, n.d.-b), and the Wells Gray South herd, with the western half of its range in Wells Gray Provincial Park (B.C. Caribou Recovery Team, n.d.-c).

For this reason, we propose establishment of **The Great Caribou Rainforest Conservation Area,** an area anchored by the three provincial parks—Bowron Lake, Cariboo Mountains and Wells Gray—and encompassing critical DSMC habitat surrounding the parks, much of which already has some protected status in the form of smaller parks, Wildlife Habitat Areas (WHAs), Ungulate Winter Ranges (UWRs) and Old-Growth Management Area (OGMAs).

In the remainder of this report, we make the case for establishing this conservation area because it is the best remaining opportunity to ensure the long-term persistence of DSMC, that is assuming that Canada and B.C. are serious about sustaining these iconic animals. We also submit that adoption of our proposal will help Canada and B.C. meet commitments on climate, biodiversity, old-growth forests, as well as Indigenous rights enshrined in the United Nations Declaration on the Rights of Indigenous Peoples (Ministry of Indigenous Relations and Reconciliation, n.d.).

In February 2020 Canada, B.C., and the Saulteaux and West Moberly First Nations signed their Partnership Agreement for the Conservation of the Southern Mountain Caribou. This historic agreement is laudable especially for the leadership role of the Saulteaux and West Moberly First Nations. However, it only involves a few herds within the Pine, Quintette, and Narraway population units, none of which include or overlap with endangered DSMC. In any case, one conservation agreement for mountain caribou in B.C. is not enough. There is an urgent need for a conservation area specifically for DSMC with full and permanent high-level protection.

It is important to make clear here that while this report focuses on establishing a conservation area for these three DSMC herds that should not be misconstrued as an endorsement of the triage approach (e.g., Gilbert et al. 2019). To the contrary, action must be taken, as SARA prescribes, to enable all herds, surviving or recently extirpated, to achieve self—sustaining status.

Wells Gray Park was established in 1939 in large part to give sanctuary to DSMC, which were declining in the years leading up to this park's establishment. Since then, its southern boundary has been extended on two separate occasions—in 1955 and 1997—primarily as a means of incorporating additional critical DSMC habitat. Bowron Lake Park, established 1961, and Cariboo Mountain Park in 1995, each protect a portion of the diverse ecology of the region and DSMC habitat. However, while these parks include some of the old-growth, lichen bearing rain/snow forests required by DSMC, they alone do not provide sufficient habitat for the herds they are meant to protect.

Recognizing that these parks alone do not provide sufficient protection, the B.C. government, under its 2009 Mountain Caribou Recovery Implementation Plan set aside several WHAs and UWRs for caribou adjacent to these parks (Office of the Assistant Deputy Minister Environmental Stewardship Division, 2009). We propose uniting these three parks with

adjacent caribou range, much of it already semi-protected, as a permanent conservation area dedicated to the long-term sustainability of DSMC.

Valhalla Wilderness Society (2019) previously proposed the Quesnel Lake Wilderness Park. Their recommended boundaries lie within our proposed conservation area - west of Wells Gray and Cariboo Mountains Park, surrounding the north and east arms of Quesnel Lake. Their work emphasizes the tremendous biological richness of the area as well as its cultural significance to the Secwepemc First Nations. We respect the work the Valhalla Wilderness Society has done https://www.vws.org/projects/quesnel-lake-wilderness-protection/ and endorse their proposal within our proposed conservation area.

BENEFITS BEYOND SELF-SUSTAINING DEEP SNOW CARIBOU HERDS

Enabling self-sustaining DSMC populations is important on its own merit as recognized by both B.C. and Canada. However, the case for establishment of **The Great Caribou Rainforest Conservation Area** is strengthened by the significant contribution it will make to meeting commitments made by B.C. and Canada on indigenous rights, biodiversity, climate and old-growth forests.

HELPING B.C. AND CANADA MEET THEIR COMMITMENTS ON INDIGENOUS RIGHTS

Canada has recognized that Indigenous peoples have the right to own, use, develop, and control their own lands. In 2014 B.C. affirmed the rights of First Nations to their lands by establishing the first legal recognition of Aboriginal land title in Canada (Opalka, 2014). In 2019, B.C. became the first jurisdiction in Canada to affirm the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) (Declaration on the Rights of Indigenous Peoples Act, 2019). Indigenous peoples have an essential leadership role to play in the conservation area including exercising their rights over their traditional lands and other culturally important areas. The UNDRIP explicitly states that First Nations peoples "have the right to the conservation and protection of the environment and the productive capacity of their lands."

HELPING B.C. AND CANADA MEET THEIR COMMITMENTS ON BIODIVERSITY

Biodiversity is declining faster than at any other time in human history. As a signatory to the Convention on Biological Diversity, Canada made a commitment to protect 17% of land by 2020 (Environment and Climate Change Canada, 2010). About 12% of Canada has some kind of protected status, requiring

Photo: Jim Lawrence

an increase in the pace and amount of protection in B.C. and across the country (Government of Canada, 2021a). Although B.C. affords about 15% of the land base some protected designation, most occurs within long established provincial and national parks. Only 0.4% of B.C. is protected by other models such as Indigenous Protected and Conserved Areas (IPCAs), provincial or federal wildlife areas, or privately conserved lands.

Despite existing protections, the Office of the Auditor General of British Columbia (OAGBC, 2021) found that B.C. is not doing enough to address this loss of biodiversity with its current Conservation Lands Program (Office of the Auditor General of British Columbia, 2021), and habitat loss is the primary reason for population decline in 80% of at-risk species. Among its recommendations are greater collaboration with Indigenous People and "resolving threats to the most at-risk conservation lands" (OAGBC, 2021, p.4).

More recently, the Government of Canada committed to protecting 30% of oceans and lands by 2030, recognizing that biodiversity and ecosystem function should be considered when deciding which land to protect (CBC Radio, 2021).

HELPING B.C. AND CANADA MEET THEIR COMMITMENTS ON CLIMATE

Under the Paris Agreement, Canada committed to reducing Greenhouse Gas (GHG) emissions by 30% below 2005 levels by 2030. In its 2020 report, the United Nations Environment Program (2020) advised that under current policies, Canada is not on track to meet its current emission targets. In fact, Canada has "never achieved a single climate target that [was] set" (Andersen, 2021).

B.C.'s emission target requires greenhouse gases to be 16% below 2007 levels by 2025. The provincial government has legislated targets for 2030, 2040 and 2050 of 40%, 60% and 80% below 2007 levels, respectively and promised legislation to ensure B.C. reaches net-zero emissions by 2050.

Photo: Jeff Wendorff

In 2021, Canada updated its commitment, promising to reduce Canada's GHG emissions by 40 to 45% below 2005 levels by 2030, and seeks net-zero emissions by 2050. (Government of Canada 2021b).

Along with reducing GHG emissions, nature-based climate solutions should play a key role in the climate strategy for both B.C. and Canada. The harrowing 2021 report of the UN's Intergovernmental Panel on Climate Change made that very clear.

HELPING B.C. AND CANADA MEET THEIR COMMITMENTS ON OLD-GROWTH FORESTS

British Columbia has committed to implementing the 14 recommendations from the Old Growth Strategic Review the government released in April 2020 (Gorley & Merkel, 2020). To date, B.C. has not fully implemented any of the recommendations and citizens are increasingly demanding a paradigm shift in the industry itself. A generous estimate is that around 23% of B.C.'s forests comprise old trees. However, 80% of B.C.'s forests contain only small trees. Perhaps three percent of B.C. 's forests support very large trees, and of that only 2.7% of original high-productivity old-growth remains intact (Price et al., 2020, 2021).

These large, old forests are what most people understand as they visualize old-growth. The proposed conservation area would help achieve many of the ecological and societal changes recommended in the Old Growth Strategic Review such as:

"1. Engage the full involvement of Indigenous leaders and organizations to review this report and any subsequent policy or strategy development and implementation.
[...]
10. Update the targets for retention and management of old and ancient forest" (Gorley & Merkel, 2020).

SUPPORTING TRANSITION FROM RESOURCE DEPENDENT TO LOW-CARBON ECONOMY

Over-dependence on extractive industries, along with mechanization and market volatility, has led to declines in jobs, local economies and DSMC. The situation demands urgent action to diversify the regional economy and transition it to the low-carbon, knowledge-based economy of the future (please see section Transitioning Regional Economy).

CREATING A WORLD CLASS INITIATIVE

Most of all, this report urges the government to save DSMC from extinction before it's too late. It proposes a bold and innovative pathway to do so by creating a world class initiative, **The Great Caribou Rainforest Conservation Area**.

Photo: David Moskowitz

METHODOLOGY (IN BRIEF)

This report is based on information gathered from multiple sources. GIS analyses were performed using publicly available data, with the exception of one sensitive dataset obtained from the provincial government for habitat mapping. Caribou habitat was examined with GIS using publicly available Critical/Matrix Habitat, Forest type, Disturbance, and Land Designation among other data sets. Historic caribou herd numbers were obtained via Freedom of Information requests and were used to calculate herd growth rates using the regression methods recommended by Dennis et al., 1991 and Morris & Doak (2002). Both historical and more recent literature and government reports were reviewed to evaluate the decline and current status of DSMC in the proposed Caribou Conservation Area (CCA). Government staff, academics, First Nations representatives and other knowledgeable people were contacted, and in many cases shared additional information unavailable by other means. **A more detailed account of methods and analyses can be found in Appendix I.**

CONSERVATION AREA DESIGN

Evidence that habitat destruction is the root cause for the decline of caribou is irrefutable. Continued emphasis on non-habitat measures, such as killing wolves, maternity penning, and translocation are treating symptoms rather than the underlying problem. If habitat continues to be logged, the entire DSMC population is likely to become extinct in the foreseeable future.

Several DSMC herds—South Selkirks, Purcells South, Purcells Central, Monashee, and Central Rockies—mostly in the southern half of their range, have become extirpated within the past 15 years. The George Mountain herd has been extirpated in the northern half of their range (B.C. Caribou Recovery Program, 2020). That leaves only five herds with 100 or more individuals. The Columbia North and the Hart Ranges herds currently are stable but have lost much habitat to industrial logging in recent years and seem likely to decline over the long term without greater protection of their habitat too. The remaining three herds, North Cariboo, Wells Gray North, and Wells Gray South are covered by our proposal to create **The Great Caribou Rainforest Conservation Area**.

THE SETTING

The Interior Wetbelt is a moist region found 500 km inland from the Pacific Ocean. It stretches from central B.C. to northern Washington, Idaho, and Montana (Coxson et al., 2019). Prior to the 1900s, DSMC were found abundantly throughout this region. However, their numbers and range since then have greatly diminished until today they are largely confined to a final refuge in B.C.'s Inland Temperate Rainforest.

The Inland Temperate Rainforest, a distinct part of the Interior Wetbelt, is cooler and wetter than much of the Interior Wetbelt and has a coast-type climate. The Inland Temperate Rainforest ranges from about Revelstoke to north of Prince George and is surrounded by the Interior Wetbelt in all but the northern extent of its range. The Inland Temperate Rainforest also has been dubbed the Caribou Rainforest owing to its high-quality habitat for DSMC (Apps & McLellan, 2006). We adopt this term here.

The Caribou Rainforest sustains a rich variety of plants and animals, and formerly consisted almost entirely of old-growth forests, consistent with the scarcity of wildfire in this humid region. The canopy is characterized by western redcedar and western hemlock, and the understory is a mix of boreal and coastal rainforest species. While DSMC spend half or more of their time in high-elevation, subalpine forests, their survival is also closely tied to essential old-growth cedar-hemlock at lower elevations—an observation first made sixty years ago by Edwards & Ritcey (1959).

Caribou depend on old-growth forest both as a source of copious hair lichens—their exclusive winter food—and for predator avoidance. Predators include cougars (*Puma concolor*) and wolverines (*Gulo gulo*), but especially wolves (*Canis lupus*).

Deep snowpacks of 2-5 metres accumulate at upper elevations in the Caribou Rainforest and have given rise to a behavioural ecology unique to DSMC (COSEWIC, 2014). In the winter, in contrast to Boreal Caribou who primarily dig through the snow to reach terrestrial lichens, DSMC use their large hooves as snowshoes walking atop deep snowpacks to reach arboreal (tree-dwelling) lichens. These lichens, especially *Bryoria* but also to some extent *Alectoria* (aka Horsehair and Witch's Hair lichens), are called "hair lichens" owing to their capillary growth form. To provide DSMC's caloric requirements large tracts of forest at least 150 years old are essential to support production of sufficient lichen loads.

In addition to supporting essential dietary requirements, large expanses of old-growth forests allow DSMC to avoid predators more easily (Seip 1992). Predators tend to follow preferred prey such as moose and deer (*Odocoileus* sp.) into younger and deciduous forests. However, industrial logging and other human disturbance are shifting the balance by creating habitat "islands" in an ocean of clearcuts.

Persistent logging of old-growth forests results in an ever-increasing preponderance of young, deciduous forests on the landscape. This increases both the habitat availability for and population density of other ungulates such as moose and deer. In classic predator-prey dynamics this also increases predator populations, resulting in increased incidental caribou mortality. The removal and fragmentation of old-growth means that DSMC are forced into younger forests with an increased chance of encountering wolves. With the addition of linear features such as haul roads (and seismic lines in central and northern mountain caribou range), predators travel efficiently throughout the altered landscape increasing the number of predator-caribou encounters. Over time, these cumulative effects make it increasingly unlikely that DSMC can long persist in industrialized forest landscapes.

The introduction provided a clear rationale for The Great Caribou Rainforest Conservation Area, to secure sufficient habitat for three of the five largest remaining DSMC herds—North Cariboo, Wells Gray North, and Wells Gray South.

In order for this to be accomplished, protection needs to be expanded beyond the boundaries of the three anchor parks to encompass as much of the traditional range of these DSMC as possible. Thus, we recommend permanent protection for three adjacent areas of interest (AOIs) (Figure 2), specific to the three DSMC herds dependent upon these parks and surrounding habitat (Table 2).

The total area of the proposed CCA is 1,629,238 hectares, 53% of which already has sufficient protection designations in the B.C. Parks system. Another 33% of this area is currently under one of several conservation designations outside of the B.C. Parks system, which offer partial, but not complete, habitat protection (details on these other protections below). This means only 14%, about 231,872 hectares of currently unprotected land needs to be upgraded to conservation status to create the large-scale protected habitat required for self-sustaining DSMC.

The northern AOI would help protect the North Cariboo herd, connecting the anchor parks to several smaller protected areas, i.e., West Twin Park and Protected Area, Ptarmigan Creek Park and Ptarmigan Protected Area, Erg Mountain Park, Ancient Forest/Chun T'oh Whudujut Park, and Sugarbowl-Grizzly Den Park and Protected Area. The western AOI roughly corresponds to Valhalla Wilderness Society's Quesnel Lakes Wilderness Park Proposal (see page 10) and would protect critical habitat for the Wells Gray North herd while at the same time encompassing Cariboo River Park and Long Creek Park. Finally, the southern AOI would protect habitat essential for the Wells Gray South herd and incorporate Caligata Lake Park.

CARIBOU HABITAT

Caribou are foragers; they need large areas of habitat to sustain themselves on lichens and deciduous plants. Our three AOIs contain high and low elevation habitats that together encompass four Biogeoclimatic

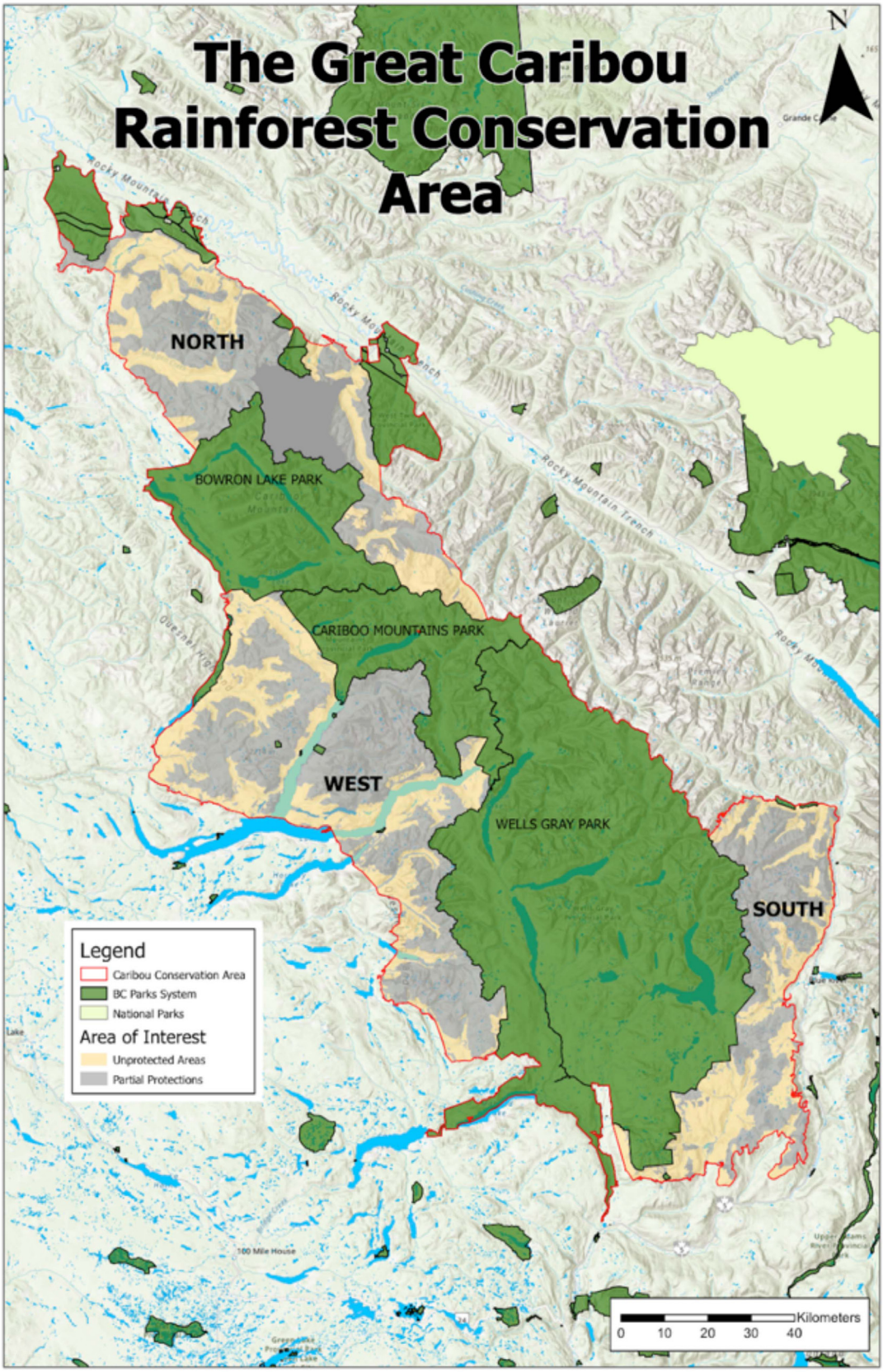


Figure 2. Map of the Caribou Conservation Area.

zones, i.e., the Interior Mountain-heather Alpine Zone (IMA), the Engelmann Spruce-Subalpine Fir Zone (ESSF), the Sub-Boreal Spruce Zone (SBS), and the Interior Cedar-Hemlock Zone (ICH). DSMC need this range of elevation and forest types as seasonal habitat, which they migrate up and down mountains to reach (Edwards & Ritcey, 1959).

The proposed AOIs are congruent with DSMC critical and matrix habitat as mapped by the Government of Canada (2014). As noted in Table 3, between 63% and 82% of the area involved qualifies as formally designated critical habitat, whereas the remainder consists overwhelmingly of essential matrix habitat.

Consistent with the importance of these AOIs to DSMC, the B.C. government included large portions of them in its 2007 Recovery Implementation Plan; however, these protections are overwhelmingly at upper forested elevations, despite these caribou requiring old-growth forests at all elevations, especially in wetter portions of their range. As a result, much crucial low-elevation habitat has been lost to industrial logging in recent years.

Table 3 summarizes the areal extent of each of our three AOIs as well as the percent of this area with complete protection under the BC Parks Act, or partial protection in the form of Wildlife Habitat Areas (WHAs), Ungulate Winter Range (UWRs), and Old-Growth Management Areas (OGMAs). As already mentioned, a compelling feature of our proposal is that a large majority of the area already has some form of protection.

The northern AOI is 242,625 hectares, 71% of which already has some form of protection (Table 4). Sixty-four percent of the 339,696-hectare western AOI and 79% of the 178,826-hectare southern AOI also contain protections. Because some of these protections overlap, the sums of each these categories do not in all cases equate with the percent protected.

Table 2. Land designations within the proposed Caribou Conservation Area and AOI.

Land Designation	**Hectares**	**% of CCA**	
Total area (CCA)	1,629,238	100%	
Existing adequate protections (BC Parks system)	868,091	53.28%	
Areas Of Interest	761,147	46.72%	
SUBSET OF AOI			
Land Designation	**Hectares**	**% of CCA**	**% of AOI**
Existing partial protections (WHA, UWR, OGMA)	529,275	32.48%	69.54%
Unprotected	231,872	14.23%	30.46%

Table 3. Federally designated critical and matrix caribou habitat within each Area of Interest.

Caribou Habitat	**North**	**West**	**South**
Total Land (hectares)	242,625	339,696	178,826
High/Low Elevation Critical Habitat	**69.15 %**	**62.84%**	**81.80%**
Matrix Habitat	**27.00%**	**37.16%**	**17.53%**
Neither	3.85%	0.00%	0.67%

Table 4. Land designations and protections within each Area of Interest.

Land Classification of AOI's	North	West	South
Total Land (hectares)	242,625	339,696	178,826
Existing Protections	**71.12%**	**63.64%**	**78.58%**
• Wildlife Habitat Area	Sensitive data*	58.53%	0.00%
• Ungulate Winter Range	67.13%	0.00%	74.85%
• Legal Old Growth Management Area	7.14%	9.54%	15.00%
• Non-Legal Old Growth Management Area	0.03%	0.00%	0.01%
Lakes	0.46%	4.98%	0.53%

* data is provided on restricted basis

We were unable to assess the current percentage of old-growth loss to logging or wildfire/disease in our three AOIs owing to the incomplete state of the BC government's forest inventory program.

It is important to note that WHAs, UWRs and OGMAs are meant to be a dynamic framework that can be tailored to fit a given conservation goal. This means not all WHAs, UWRs, or OGMAs have the same legal protections as others of the same category, and therefore, each protection order must be reviewed to understand protections within and to determine the degree of protection it affords.

Generally, "Wildlife Habitat Areas are mapped areas that are necessary to meet the habitat requirements of [a specified animal]" (Ministry of Environment, n.d.). Ungulate Winter Range (UWR) is similar but limited to winter requirements. Although logging is limited, some WHAs and UWRs allow portions of forest to be clear-cut within their boundaries.

Finally, while OGMAs are a legal requirement within a Forest Stewardship Plan by licensees to avoid or reduce logging (and, in some cases, oil & gas activity) within them, in practice they are problematic. Forest licensees are permitted to log within them as long as they replace the logged area with another area with equivalent old-growth characteristics. However, it seems the current location of legal OGMAs is uncertain. That is the BC government has essentially lost track of which portions of most OGMAs have been logged and where replacement OGMAs have been located.

Therefore, the problem with OGMAs, whether legal or non-legal, spatial or aspatial is that they typically provide poor and unreliable protection for caribou and other at-risk species (Bezzola & Coxson, 2020). Rather than relying on often transient OGMAs to provide protection for at-risk species OGMAs should be upgraded to stronger conservation designations (e.g. ecological reserves, provincial parks, IPCAs).

While these protections are not as robust as a park or conservancy, their existence acknowledges the importance of the lands for caribou.

Crucially we note that a relatively small addition of currently unprotected land outside these designations (Orange area in Figure 1) could effectively stitch together the patchwork of WHAs, UWRs, OGMAs, with smaller and anchor parks to create contiguous habitat. Upgrading these protections by inclusion into a permanent conservation area would increase their value to caribou and other wildlife, and pro-

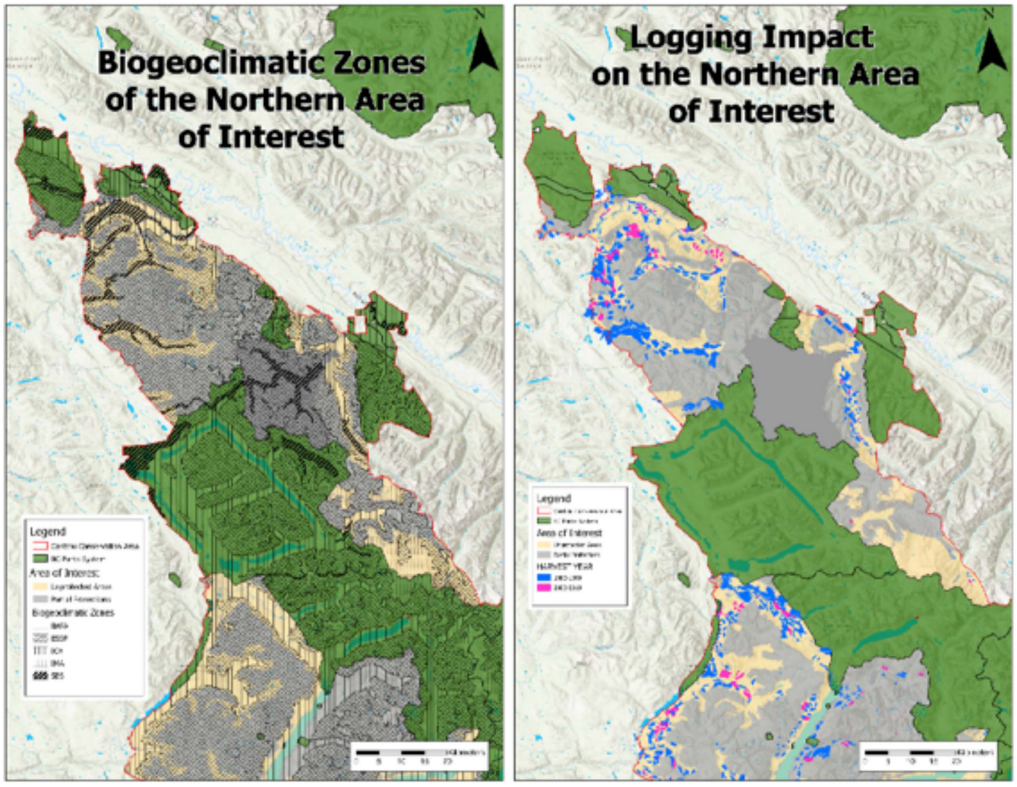


Figure 3. Biogeoclimatic Zones and Logging impact on the Northern Area of Interest.

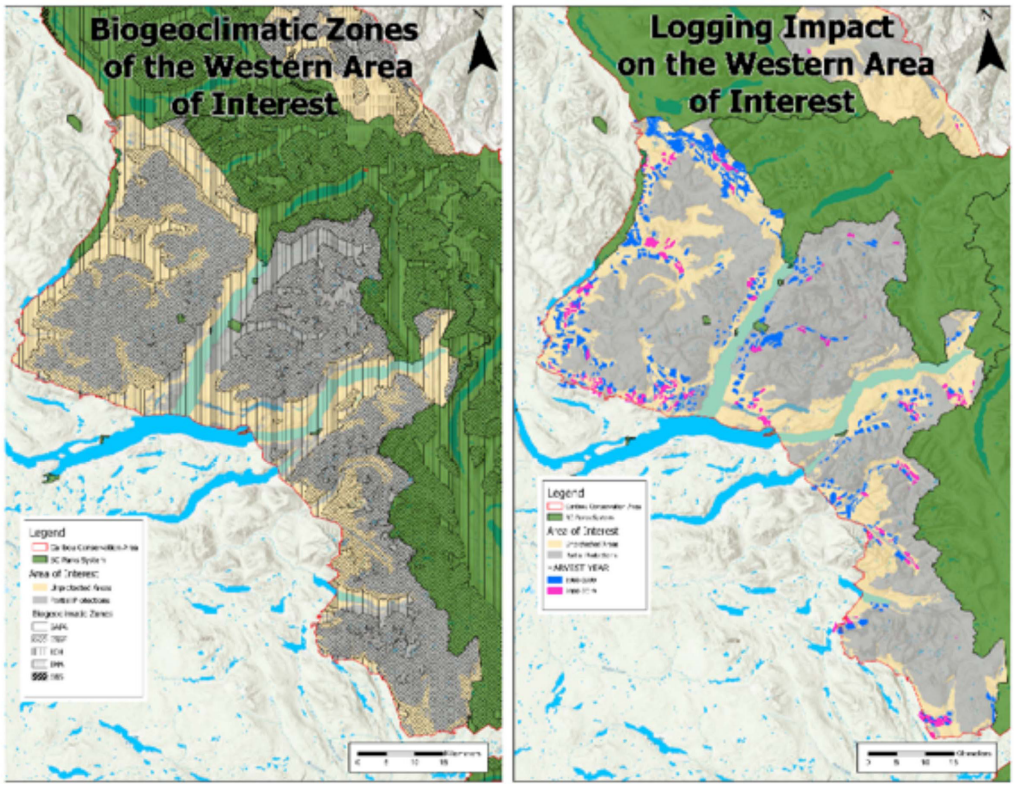


Figure 4. Biogeoclimatic Zones and Logging impact on the Western Area of Interest.

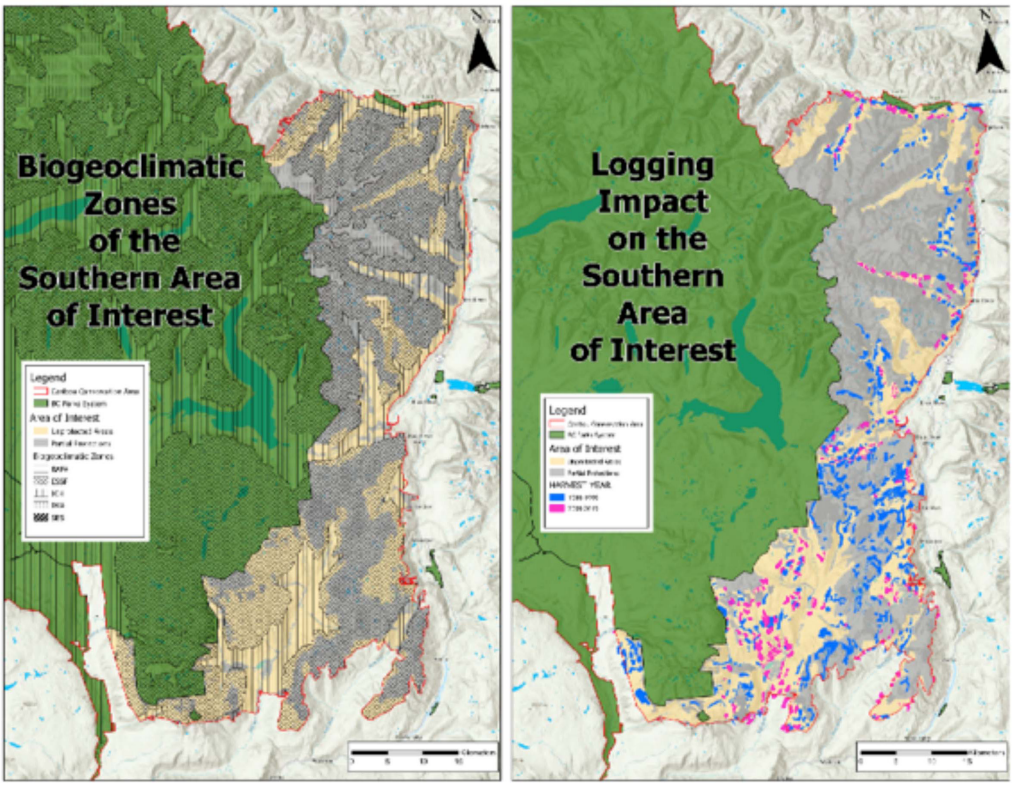


Figure 5. Biogeoclimatic Zones and Logging impact on the Southern Area of Interest.

duce other social, economic and ecological benefits presented in this report.

Unfortunately, valley bottoms in all three AOIs have been impacted by logging. Spruce and Subalpine Fir forests, especially in the northern third of the northern AOI have been heavily disturbed (Figure 3), as have the Interior Cedar-Hemlock forests of the western AOI (Figure 4.) Most severely impacted, however, is the southern AOI, where high- and mid-elevation old-growth forests have been largely clear-cut (Figure 5).

This proposal identifies viable opportunities for long-term provision for the needs of DSMC. Notably, each of the three AOIs is ballasted by one or more existing large protected areas which already provides a degree of habitat protection not replicated elsewhere within the range of these DSMC. We emphasize that even these three openings for DSMC conservation are rapidly closing—a claim supported by the logged areas denoted in pink in Figures 3-5, all of which have been cut down since 2000, that is, during the time DSMC were formally classified as threatened (COSEWIC 2002).

While it is true, as a Caribou Recovery Program staffer noted to us, "you can't grow an old-growth forest in a couple of years," the long-term management of DSMC requires the inclusion of significant critical habitat recently lost to industrial logging: first because such areas can in time become buffers against predators; and second because their eventual return to old-growth status is crucial to the long-term well-being of the respective herds and to ameliorating biodiversity loss and climate change. Finally, the federal recovery strategy makes it clear that maintaining protections on recent historic caribou range is necessary, in fact, crucial for caribou recovery—even if caribou do not currently use some of these areas (Environment Canada, 2014).

In summary, this proposal focuses on the North Cariboo, Wells Gray North, and Wells Gray South herds for two primary reasons. First, these are three of the largest remaining DSMC herds (Figure 6) with

a correspondingly increased chance of long-term persistence. And second, their ranges significantly overlap with three large protected areas unaffected by logging or other forms of human disturbance, i.e., Bowron Lake, Cariboo Mountains and Wells Gray Provincial Parks. However, in order to provide long-term sanctuary for DSMC, these three parks need to be augmented to capture critical portions of their range currently without full and permanent protection. These expansions require legislated protection at the highest level.

HERD POPULATIONS

It is important to stress that two of the three herds included in this proposal have been in decline for a considerable period. The North Cariboo herd has been decreasing over the past 27 years, while the Wells Gray South herd also has dramatically declined, becoming stable again only in the past 2-5 years (B.C. Caribou Recovery Program, 2020). Only the Wells Gray North herd, though fluctuating, has remained stable since the 1990s.

Increased habitat protection is therefore required to prevent decline in two of the three herds, while for the third herd it seems unreasonable to expect that numbers would long remain stable with continued habitat loss to industrial forestry (Environment Canada, 2014; Nagy-Reis et al., 2021). While other conservation tools may be needed to help sustain these herds until such time as their habitat recovers from logging; further comment is generally beyond the scope of this proposal. However, the recommendation section does recommend that the use of these tools be reviewed.

We have calculated the long-term annual population growth rates (λ) for our three herds of interest (Table 5). A population growth rate of 1λ means the herd is expected to neither increase nor decrease over time, a growth rate greater than 1λ suggests that a population will increase over time, and with a growth rate less than 1λ a population will decrease over time. The Wells Gray North herd, as stated by the B.C. Caribou Recovery team, is stable, but that means a population shift at this time could significantly change future population numbers for this herd. The North Cariboo herd and Wells Gray South herd populations are expected to decrease as their long-term annual population growth rates are 0.98 and 0.97, respectively. This means if their situation does not improve, they will continue to decrease over time. (There is a 95% probability the population growth rate (λ) for each herd will lie between its 95% confidence interval).

Herd management should be based on sound scientific and ethical considerations including their importance to First Nations. Government commitments on climate and conserving biodiversity are also vitally important considerations. In any case, the federal recovery strategy for caribou makes it clear that unoccupied caribou range cannot be eliminated from conservation strategies (Environment Canada, 2014). Herds must be given the opportunity to recover, and they cannot do that in the absence of adequate habitat and protections.

BIODIVERSITY

The Caribou Rainforest is home to many species dependent upon old-growth ecosystems. The multi-tiered canopy and presence of standing and fallen dead trees creates a wide variety of physical niches filled by plants and animals that would clearly benefit from large-scale conservation. Recent floristic inventories in the Robson Valley just outside our AOIs have highlighted this region as globally significant

Table 5. Long-term annual Population Growth Rate for three of the largest remaining DSMC herds.

	North Cariboo	Wells Gray North	Wells Gray South
Population Growth Rate (λ)	0.98	1.00	0.97
95% Confidence Interval	0.95 – 1.00	0.91 – 1.10	0.93 – 1.00

for vascular plants, lichens and bryophytes, with total flora exceeding 2,400 species (Björk, 2018).

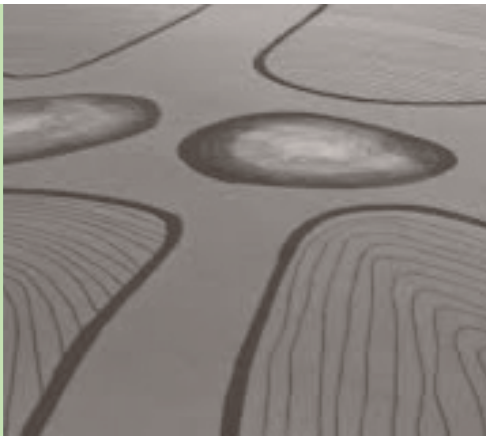
Laliberte and Ripple (2004) identified six carnivore and ungulate species that are most associated with areas of low human disturbance. Of these six, five are found in the Caribou Rainforest: grizzly bear (*Ursus arctos*), gray wolf (*Canis lupus*), marten (*Martes americana*), wolverine (*Gulo gulo*) and caribou (*Rangifer tarandus caribou*). The presence of five animals with extensive habitat requirements highlights the high significance of this region for mammals.

Several salmon species including sockeye (*Oncorhynchus nerka*), coho (*O. kisutch*), and chinook (*O. tshawytscha*), as well as Bull trout (*Salvelinus confluentus*) live at least part of their lives in the Caribou Rainforest (Stevenson et al., 2011). *Oncorhynchus spp.* benefit from the shade of old-growth canopies during their long migration from the Pacific Ocean to spawn.

(Björk (2018) and others have noted that clear-cuts contribute little to regional species richness, highlighting "the importance of protecting the remaining wild landscapes from economic development."

Photo: Jim Lawrence

RESPECTING INDIGENOUS RIGHTS AND TITLE, KNOWLEDGE AND LEADERSHIP



This proposal includes traditional territories of the Simpcw, Lheidli T'enneh, Lhatko Dené of the Southern Dakelh Nation Alliance and Tsq'ēsceń (Canim Lake), Stswēceḿc/Xgāt'tem (Canoe-Dog Creek), Xatśūll Cmetem' (Soda-Deep Creek), and T'ēxelc (Williams Lake) of the Northern Shuswap Tribal Council First Nations. The stewardship offices of each of these Nations was contacted to discuss concerns about the decline of DSMC, learn about their relationship with caribou and the land, and to explore opportunities for working together for the environment and people. Their rights must be respected and their knowledge and leadership would be invaluable to the development and management of the conservation area. The 2021 report from the Office of the Auditor General of British Columbia found that "B.C. is not doing enough to address this loss of biodiversity" and recommended "greater collaboration with Indigenous People."

INDIGENOUS PROTECTED AND CONSERVED AREAS

Indigenous Protected and Conserved Areas (IPCAs) are one dynamic approach to conservation that can be used to accomplish a variety of goals (Staveley, 2020). IPCAs can be part of a provincial or federal government's existing conservation network, for example a park or conservancy within the B.C. Parks system or a Wildlife Habitat Area. They can also be independent of such systems, for instance a Tribal Park, although Tribal Parks may or may not be formally recognized by government. Indigenous leadership determines the degree to which other entities such as governments and environmental non-governmental organizations may be involved in the creation and management of the conservation area. A United Nations' report on declines of biodiversity recognizes the vital role that Indigenous Peoples play in protecting lands that we all depend upon (Secretariat of the Convention on Biological Diversity, 2020).

We have begun the engagement process with leadership from First Nations in our AOIs. Our goal is to learn from Nations aspiring to pursue caribou conservation and work with them in appropriate ways, such as pursuing opportunities for collaborative scientific work. We recognize many Nations are overrun with referrals from external interests (logging, oil and gas, etc.), for resource extraction in their territory and the importance of supporting their capacity building for conservation initiatives. This report has been written not to be prescriptive about land use in unceded territories, but to document the state of caribou in this region, and to open urgent discussions on ways to pursue greater protections. We think an IPCA could be an appropriate path forward for the good of caribou and out of respect for Indigenous governance.

The Central Mountain Caribou Partnership Agreement between the Saulteaux and West Moberly First Nations and the governments of B.C. and Canada is

Photo: Aboriginal and Eco Tours

a promising development. It recognizes and supports the leadership role First Nations have exhibited in caribou conservation. Unfortunately, it took lawsuits to get the attention of the provincial and federal governments. In the future we hope B.C. and Canada will be more receptive to Indigenous-led conservation and to working with conservation groups. However, we are concerned that some may see the partnership agreement as "ticking" the caribou conservation box in government's mandate and that there are no plans for future habitat protection agreements. Unquestionably, one caribou conservation agreement is not enough especially since it does not protect DSMC. We have focused on the Caribou Rainforest as a candidate for the DSMC's iteration of a conservation agreement because it provides an exceptional opportunity.

Many traditional practices can be upheld in ecologically successful conservation areas. If self-sustaining caribou herds are achieved, then traditional harvests of caribou could be reinstated into Indigenous culture, a goal for some of the aforementioned First Nations.

INDIGENOUS GUARDIAN PROGRAMS

Indigenous Guardian programs can be established to put eyes on the ground and to conduct important stewardship programs. Some First Nations, for example the Nuxalk, traditionally had designated guardians for their salmon bearing streams. Today Australian Indigenous Guardian programs are being used as a model to implement contemporary Guardian roles in Canada. Successful programs include a network of Coastal Guardian Watchmen in the Great Bear Rainforest and the Innu Guardians in Newfoundland and Labrador. These programs demonstrate a net-benefit ecologically, socially, culturally and economically.

Within the context of caribou conservation, West Moberly and Saulteaux Guardians care for animals in the Klinse-za Caribou Maternity Pen. They monitor and repair the pen and deter predators as needed. Hand-picked lichen and pellets are fed to the mothers and calves by the Guardians (Cox, 2018b).

Elsewhere, ecological monitoring is performed by the Coastal Guardian Watchmen collecting consistent data sets across their respective territories (Marine Plan Partnership, 2020). These stewardship roles, in addition to having a positive presence in their territories, allows First Nations to reclaim their rights and responsibilities for their traditional territories.

In a pilot project the Government of Canada has funded an additional 10 First Nation communities to implement Indigenous Guardians Programs. The T'ēxelc (Williams Lake) First Nation of the Northern Shuswap Tribal Council is one of these communities.

SITES OF ARCHAEOLOGICAL SIGNIFICANCE

Using the Remote Access to Archaeological Data (RAAD), a public servant in the Archaeology Branch of the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) identified six known archaeological sites within our AOIs. This is a sensitive dataset that can only be accessed by archaeologists, First Nations or governments, so we do not know the exact locations of these sites. This data set is not necessarily exhaustive and only represents the existence of known sites.

Three sites within our AOIs consist of surface lithics, where stone tools and/or flakes of stone were produced by making stone tools. Three previous building sites were identified: one is the depression of a cache pit, another is the depression of a house pit, and a third site consists of two depressions—one cache pit and one house pit. Because the locations have not been shared with us, we do not know the history of each of the sites.

Although archaeological sites have some existing protection, setting aside land from logging would increase the chances of more sites being located and preserved. B.C. Parks (2015) noted the high potential to find more archaeological sites near our western AOI. Technologies such as Light Detection and Ranging (LiDAR) have the potential to confirm First Nations history by decreasing the search time for additional sites.

FURTHER DISCUSSIONS

Future plans include further discussions with each of the four First Nations governing bodies. We have discussed the conservation area with their stewardship offices and hope this report will spark discussions within interested Nations and/or Bands. We found interest in pursuing caribou conservation and offer this report as the basis for ongoing discussions.

Throughout the duration of our work a host of significant events have slowed the outreach process. Everyone did their best while respecting COVID restrictions, wildfire complications and staff changes. The rediscovery of tragedies in the Residential School system is ongoing, and we express our deep sympathy to all First Nations.

TRANSITIONING REGIONAL ECONOMY

The B.C. government has been repeatedly urged to abandon economic policies responsible for deforestation and the decline of caribou. Mountain caribou survival depends upon restraining human activity in their range in order to maintain ample intact habitat (Ray, et al., 2015; Festa-Bianchet, et.al, 2011).

BC Timber Sales (BCTS), the logging agency under FLNRORD, continues to sell logging licenses in caribou habitat. For instance, as recently as June 29, 2021, BCTS started an auction of habitat essential for Southern Mountain Caribou (Timber Sale Number #TA0647, BC Bid, 2021). As a result, caribou continue to be pushed towards extinction, and B.C. commitments on biodiversity, climate, Indigenous rights and protection of old-growth forests are being undermined. This is not an isolated example.

While the heavy dependence on resource extraction has worsened the caribou decline, the chronic lack of economic diversification also has had serious social and economic consequences. Communities dependent upon the resource economy have seen significant loss of employment caused by mechanization, market volatility, and declining supply. Overdependence on the extractive industries has failed as an effective long-term strategy. Accelerating logging to bolster a declining industry is a stop-gap measure with ominous consequences for caribou and the regional economy.

Forestry used to be the top economic contributor to the province's GDP. In 2000, the economic contribution from forestry and logging accounted for about 5% of GDP in B.C. (only including goods-producing industries), and in 2019 it dropped to 2.6% (Government of British Columbia, 2020). That is a nearly 50% drop within less than 20 years.

Employment in the B.C. forestry industry also has dropped significantly from almost 100,000 in 1991 to about 50,000 in 2019 (See Figure 1 in Appendix II). WorkBC (2019) forecast that jobs in the forest industry will keep declining and the employment reduction rates in Cariboo and Thompson-Okanagan regions will be higher than other parts of B.C. Broadland (2020) reported that jobs provided by the forest industry in B.C. dropped from 5.2% of the work force in 2000 to 1.8% in 2019. He further estimated that with that rate of decline, the remaining jobs in the forest industry could disappear by 2031.

The issue, therefore, is not jobs versus caribou but rather building a healthy economy not dependent on natural resource extraction by adopting policies and practices that:

- Respect the value of natural capital and mature forests as carbon sinks
- Diversify the local economy and extend the production chain
- Advance research, education and training on climate and biodiversity
- Provide training and employment opportunities in alternative endeavours that are environmentally sustainable
- Help build the low carbon, knowledge-based economy of the future

- Provide economic and leadership opportunities for local indigenous communities
- End subsidies for failing enterprises and link future support to environmental performance (Details described in Appendix II)

The narrative of "jobs-versus-environment" has misled the public and too often been used to halt the protection of endangered species. Protecting caribou and developing a healthy economy in B.C. are twinned goals that can be achieved through environmentally sustainable development. It requires diversification of the economy, engaging Indigenous communities, and adopting precautionary application of the risk-based disturbance threshold with careful monitoring and adaptive management. The current approach is failing workers and the environment.

Options expounded upon in Appendix II include:

EXTENDING PRODUCTION CHAIN THROUGH LOCAL MANUFACTURING OF VALUE-ADDED PRODUCTS

Each year millions of cubic metres of unprocessed logs are shipped out of B.C. Value-added products will increase the number of local jobs per cubic metre harvested. Both B.C. Premier John Horgan and Forests Minister Katrine Conroy have stated value-added products must be part of B.C. 's paradigm shift in forestry. Adoption of this approach must include replacing clear-cut logging with strictly controlled selective harvesting that respects both the needs of caribou and the rights of First Nations.

CREATING JOBS IN THE RESTORATION ECONOMY

Research shows that restoring one hectare of logged forest land provides 0.077 employment and 0.034 employment for each hectare of restored seismic area (Anielski, 2019). A report examining the economic benefits of restoring boreal caribou habitat in the Bistcho and Yates Ranges in Alberta presents some interesting ideas about restoration activities (Power & Power, 2018). Although, for a different caribou ecotype in a different habitat it demonstrates that restoration work can create significant economic benefits and considerable jobs over decades. The key in this case will be to develop reforestation practices that mimic forest habitat complexity specifically required for DSMC.

INDIGENOUS-LED CONSERVATION & RESTORATION

The government of B.C. stated in its 2021 discussion paper *Modernizing Forest Policy in British Columbia* that "we need to increase economic and land management opportunities for Indigenous Peoples." Opportunities include Guardian programs, conservation and restoration endeavours, and tourism based on environmental stewardship and traditional

Painting: Luisa Rivera (Yale E360)

knowledge and culture. The Simpcw First Nation are currently undertaking a road rehabilitation project in their territory that has the potential to decrease landscape fragmentation and disturbance. This effort and similar projects need to be supported on a much larger scale.

RESEARCH AND TRAINING FACILITIES

Since 1994, Thompson Rivers University (TRU) has operated the Wells Gray Education and Research Centre, in Wells Gray Park. In November 2020, a new four-season facility was opened to accommodate year-round visits. Annually over 1,200 user days are recorded at the Centre, TRU faculty, students and visitors. Simon Fraser University (SFU) recommended Clearwater build a conference center to serve organizations in Kamloops, Prince George and beyond (Chaland, et.al, 2019). The conference centre also can be used as a training facility for local community members to learn sustainable forestry management, wildlife habitat restoration, tourism and other job-related skills. Expanding these programs and facilities will bring additional opportunities, and government support should encourage active local participation, including First Nations.

ECO-TOURISM AND INDIGENOUS TOURISM

Both eco-tourism and Indigenous tourism are rapidly expanding in Canada and B.C. The Thompson Okanagan Tourism Association (TOTA) includes sustainability and Indigenous tourism as priorities in its strategy plan for 2012-2022 (Mandziuk, Mattock & Amos, 2019). The incredible landscapes and distinctive ecosystems in the proposed CCA are great attractions for eco-tourists.

Indigenous tourism business in B.C. has increased 170% between 2003 and 2020 (Indigenous Tourism BC, 2021). Tourism provides jobs for Indigenous people with focus on their cultural knowledge, talents, and skills. Indigenous tourism associates local cultural heritage with visitors' experience, which strengthens the industry's competitive advantage through its authenticity and the uniqueness of its tourism destinations.

With sound management, eco-tourism and Indigenous tourism activities can be compatible with conservation. A regional tourism strategy should be developed through collaboration among municipalities, First Nations, ENGOs, existing enterprises and the parks in the region.

CARBON OFFSETS

Carbon offsets present a promising economic alternative to logging forests and are important to meeting the province's carbon reduction goals. NatureBank Asset Management Inc (NatureBank) completed a high-level pre-feasibility assessment for our proposed CCA to estimate carbon offsets resulting from changes in land management to protect caribou habitat. They assessed that roughly 230,000 hectares of forest in the CCA, the lands outside parks and other protected areas, could qualify for carbon offsets. Their assessment recommended several options including a scenario to protect 100% of the current forest harvesting land base. This does not preclude a small amount of selective logging for environmentally sound, value-added initiatives. Considering a scenario with 100% protection, offset estimates indicate a potential volume of 103,390 tCO2e (tonnes (t) of carbon dioxide (CO2) equivalent (e)) per year, or half of that under a 50% protection scenario. The projected net saleable volume peaks near the 45-year mark in either scenario. The potential economic opportunities range from $700,000/year to $3.4 million/year. Additional analysis is required to fully understand the full economic opportunity.

RECOMMENDATIONS

Photo: David Moskowitz

With the release of this report the following actions are strongly recommended to the governments of B.C. and Canada.

ESTABLISHMENT OF THE GREAT CARIBOU RAINFOREST CONSERVATION AREA

The province of B.C. should immediately initiate a process to permanently establish the proposed Conservation Area as soon as possible at the highest level of protection. The government of Canada should assist B.C. in every reasonable way. B.C. should expeditiously:

- Review this proposal's merits and meet with Harmony to discuss it
- Consult Canada's Minister of Environment and Climate Change Canada
- Work with Canada, First Nations, local communities, environmental NGOs and other stakeholders towards implementation

IMMEDIATE MEASURES TO PROTECT ALL DEEP-SNOW MOUNTAIN CARIBOU

Review of the Proposal must not impede taking action urgently needed to save DSMC. The following measures should be implemented immediately.

- FLNRORD must halt all logging in critical and matrix DSMC habitat.
- B.C. Timber Sales must stop any further auctions of DSMC habitat.
- If B.C. fails to stop logging in DSMC habitat in a timely manner, then the Canadian Minister of Environment and Climate Change and the federal Cabinet must invoke section 80 of the SARA to create an emergency order for DSMC survival.
- Implement strict controls on snowmobiling and heli-skiing in DSMC winter habitat.
- Implement B.C. Old Growth Review Panel's recommendations, with focus on recommendation No.6: "Until a new strategy is implemented, defer development in old forests where ecosystems are at very high and near-term risk of irreversible biodiversity loss."
- Enact Immediate and permanent closure of all recreational hunting of mountain caribou.
- Implement more rigorous scientific and ethical practices for predator control including independent veterinary oversight.
- Adopt greater cooperation and information sharing with First Nations and ENGOs.
- Improve coordination within and between B.C. and Canadian agencies with responsibilities for caribou and their habitat.
- Standardize names for caribou and their habitat to reduce confusion.
- Update management plans for Wells Gray, Bowron Lakes, and Cariboo Mountains Parks.

IMPROVING CURRENT MANAGEMENT – STEPS FOR THE GOVERNMENT OF B.C. TO IMPLEMENT

DSMC's continued decline indicates that current measures are not sufficient to protect herds from ongoing population declines.

- Enact an endangered species law to protect at-risk species and the habitat they need to survive and recover on provincial lands. B.C. is home to the largest number of endangered species in Canada and is one of only three provinces without its own endangered species law.
- Appoint an independent panel of experts to conduct a strategic review of caribou conservation in B.C. and recommend changes in government priorities, strategies and decision-making, including:
  - Whether or not the Caribou Recovery Program should remain within FLNRORD, a ministry whose primary mandate is in conflict with caribou recovery.
  - What authority should be given to the Caribou Recovery Program to take action when caribou or their habitat are imperiled.
  - Review effectiveness and humaneness of predator control and involve Canadian Veterinary Medical Association and B.C. Society for the Prevention of Cruelty to Animals to improve ethical practices.
  - How to upgrade intergovernmental communication, coordination and decision-making between provincial and federal agencies.
  - How to improve coordination between B.C. ministries and ensure caribou and ecosystem management are led by staff with requisite professional expertise.
  - Ways to improve transparency and inclusivity with First Nations, the public, and environmental NGOs.
  - How to ensure science-based decision making is not subordinated to political and economic considerations.

HARMONY FOUNDATION WILL

- Meet with government officials to discuss next steps.
- Share the report with the media and public to broaden the discussion about the importance of a conservation area for DSMC.
- Present this proposal to First Nations' leadership (Hereditary and/or elected chiefs and councils)
- Conduct further research and enquiries.
- Continue information gathering including field studies.
- Further discussions with First Nations regarding leadership roles.
- Evaluate strength and weaknesses of existing conservation areas, such as West Moberly and Saulteaux First Nations caribou conservation and Great Bear Rainforest agreements.
- Consult the International Union for Conservation of Nature (IUCN) and other national and international agencies.

Drawing: Robert Bateman

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APPENDIX I – METHODOLOGY

GIS ANALYSES

The boundaries of the three Areas of Interest (AOIs) are a combination of Herd Boundary lines from the 2014 COSEWIC report and existing B.C. land designations. The AOIs encompass existing Wildlife Habitat Areas (WHAs), Ungulate Winter Ranges (UWRs), Old-Growth Management Areas (OGMAs), small parks and surrounding unprotected land.

AOI boundaries match existing provincial designations wherever possible. Where no provincial designations exist, boundaries follow natural features such as rivers or heights of land, although straight lines were occasionally used when unavoidable. The area covered by the three AOIs roughly coincides with SARA-designated critical habitat of the North Cariboo herd in the north, the Wells Gray North herd in the west, and the Wells Gray South herd in the south.

Taken together, with the anchor parks (Bowron Lake, Cariboo Mountains and Wells Gray) the three AOIs constitute the Great Caribou Rainforest, which links to 10 smaller parks and protected areas within the B.C. Parks system. The following layers were used to determine land classification and use, and quality of caribou habitat within the AOIs: Wildlife Habitat Area, Ungulate Winter Range, Old-Growth Management Area, private land, Federal Caribou Habitat Mapping (2014), Biogeoclimatic Ecosystem Classification Biogeoclimatic (BEC) zones, Freshwater Atlas, Consolidated Cutblock Layer, B.C. Road Map, Seismic lines, B.C. Wildfires, and existing tenures of Forestry, Mineral Exploration and Mining, Oil & Gas, Heli Skiing, and Guide Outfitters.

CARIBOU POPULATIONS

Historical population trends for Deep-Snow Mountain Caribou (DSMC) herds were obtained from the B.C. Government through a Freedom of Information request. Long-term growth rates (Lambda) for our three herds were calculated using the regression method developed by Dennis et al. (1991) and further recommended by Morris and Doak (2002). Briefly, log(Nt+1)/Nt/(ti+1-ti)^0.5 on an inter annual basis were regressed against (ti+1-ti)^0.5, with the intercept forced through zero. The slope of the regression line is the exponential rate of increase (r), where lambda (λ) = e^r. The regressions error mean square estimates the variance which was used to compute 95% confidence intervals for lambda.

ENGAGEMENT

Out of respect for Indigenous rights and recognition of the unceded traditional territories of First Nations in the area, we contacted four governing bodies: the Simpcw First Nation, Lheidli T'enneh First Nation, Southern Dakelh Nation Alliance, and the Northern Shuswap Tribal Council (Tsq'ēsceń /Canim Lake, Stswēceḿc/Xgāt'tem /Canoe-Dog Creek, Xatśūll Cmetem' /Soda-Deep Creek, and T'ēxelc /Williams Lake).

Additionally, we consulted with government agencies, consulting companies, law firms and academics about caribou, their habitat and management, conservation area design, carbon credits, The Caribou Rainforest and archaeological sites.
We extend our thanks to everyone who assisted us. Special thanks to University of Northern British Columbia (UNBC) professors: Dr. Darwyn Coxson, Dr. Pam Wright and Dr. Chris Johnson; UNBC PhD student: Jacob Bradshaw; EcoJustice: Sean Nixon and Imalka Nimalgoda; Canadian Wildlife Service: Renée Lapointe; Office of the Minister of Environment and Climate Change: Randi Anderson; Sage Legal: Tim Thielmann; West Moberly First Nation: Chief Roland Willson, Tamara Dokkie; Nature Bank: Cornelia Rindt; B.C. Caribou Recovery Program, the Ecosystem Information Section, Archaeology and, Omineca Fish and Wildlife branches of FLNRORD, Cariboo-Thompson Region and Conservation Department of B.C. Parks, David Broadland, Focus Magazine.

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APPENDIX II – TRANSITIONING REGIONAL ECONOMY

To hold the global temperature rise below 2°C, the world has begun an urgent transition from reliance on fossil fuels to renewable energy. Canada's industries face increasing pressure to reduce greenhouse gas emissions, halt deforestation, which is depleting the Earth's supply of carbon sinks, and adopt practices far less damaging to the environment.

Cumulative effects of human activities, such as logging, oil and natural gas extraction, mining as well as sport hunting and motorized winter recreation are the ultimate reasons for the reduction and fragmentation of caribou habitat and the decline of caribou populations. Researchers, environmental NGOs and others have repeatedly urged governments to ensure economic policies and activities do not further the decline of caribou populations and have repeatedly recommended restraining the human footprint in the caribou ranges of western Canada in order to save intact habitat (Ray, et al., 2015; Festa-Bianchet, et.al, 2011, Bloomfield, 1979).

B.C. Timber Sales (BCTS), the logging agency under the Ministry of Forests, Lands, Natural Resource Operations and Rural Development, continues to sell logging licenses in caribou habitat; for instance, as recently as June 29, 2021, BCTS started an auction in critical habitat for Southern Mountain Caribou in Clearwater on B.C. Bid (Timber Sale Number #TA0647, BC Bid, 2021).

The heavy dependence on resource extraction and the chronic lack of economic diversification have worsened the problem, demanding urgent action to create a major Deep-Snow Mountain Caribou (DSMC) conservation area. While communities dependent upon the resource economy may be affected in the short term, they already have been impacted by the decline in employment caused by mechanization, market volatility, and over-dependence on the extractive industries. Over the long term, the depletion of natural resources will further the decline in local economies. It would be much more effective for industry, government and resource dependent communities to initiate planned economic transition and diversification now than to be forced to change during a crisis.

UNDER-EVALUATED NATURAL CAPITAL

Until recently economists, policy-makers and society generally have considered fresh air, clean water and wilderness free and have given no value to ecosystem benefits on the economic balance sheet or while assessing the costs and benefits of economic development. Consequently, natural capital has long been managed for short-term economic gain and under-appreciated and unaccounted for in economic planning and policy making.

To the contrary, a recent report by the Ancient Forest Alliance found that old-growth forests are worth more standing than cut down (Morton, Trenholm, Beukema & Knowler, 2020). The Pembina Institute (2005) estimated that the total non-market values of Canada's Boreal Forest were 13.8 times greater than the net market value of boreal natural capital extraction for forestry, mining, and oil and gas industries. A case study by TD Bank Group and Nature Conservancy of Canada (2017) evaluated Canada's forest ecosystem. Their research found the annual natural capital contribution of forests in B.C. ranged from $24,600 per hectare in Subalpine Forest Region to $46,000 in Columbia Forest Region. Accordingly, the proposed CCA, about 1.63 million hectares, produces $40-$75 billion value annually through its ecosystem services.

Expanding conservation areas involves trade-offs

because the area conserved will not be used for logging, mining and other disruptive industrial or recreational activities. However, the trade-offs will be short-term when coupled with economic diversification and evaluated regionally over the long term. The reality for decision makers is that minimizing conservation opportunities may reduce short-term trade-offs, but at the risk of much higher operating costs for postponed conservation of increasingly damaged and fragmented caribou habitats (Claes, et.al, 2020).

DECLINING FORESTRY INDUSTRY

Forestry used to be the top economic contributor to B.C. GDP. In 2000, the economic contribution from forestry and logging accounted for about 5% of GDP. (Only including goods-producing industries), and in 2019 it dropped to 2.6% (Government of British Columbia, 2020). That is a nearly 50% drop within less than 20 years, and the decline from the days when forestry was king in B.C. has been much greater.

While forestry provides jobs in logging, wood product manufacturing and pulp and paper production, the amount of employment in B.C. forest industries has dropped significantly from almost 100,000 in 1991 to about 50,000 in 2019 (See Figure 7 below). WorkBC (2019) forecast that jobs in the forest industry would keep declining due to "reductions in the annual allowable harvest of timber, continued industry consolidation, and productivity improvements", and the employment reduction rates in Cariboo and Thompson-Okanagan regions will be higher than other parts of B.C (Figure 8). Broadland (2020) reported that jobs provided by the forest industry in B.C. dropped from 5.2% in 2000 to 1.8% in 2019. He further estimated that with that rate of decline, the remaining jobs in the forest industry could disap-

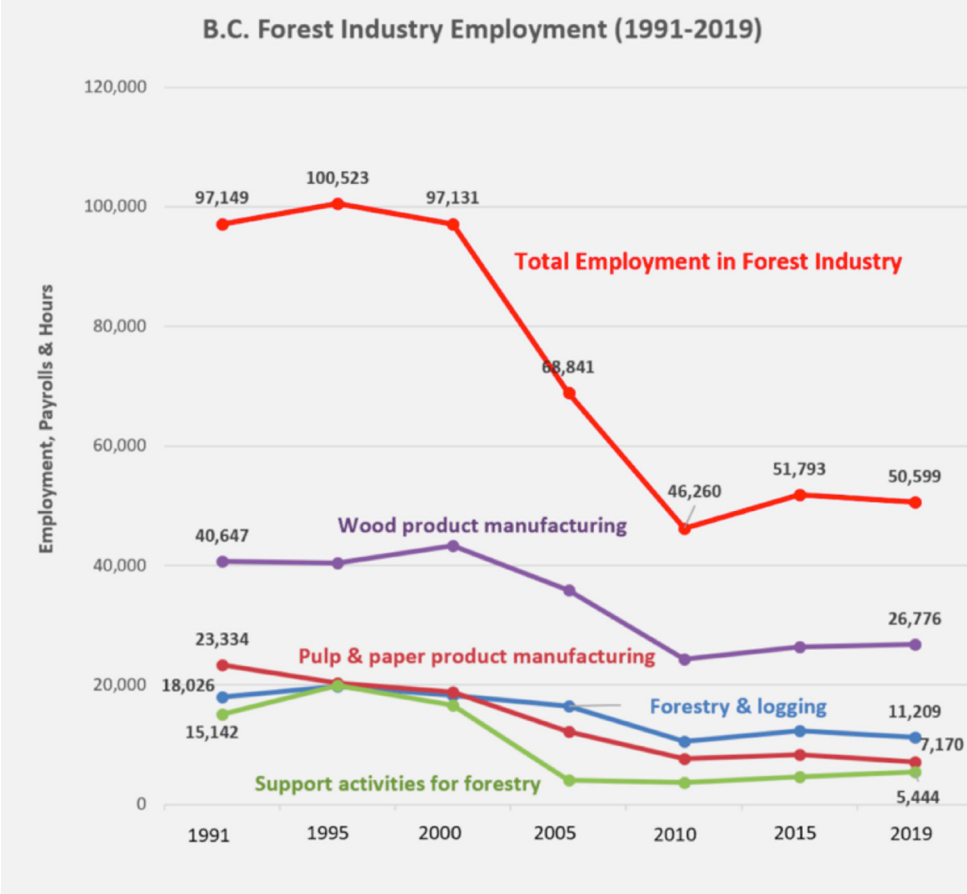


Figure 6. B.C. Forest Industry Employment (1991-2019).

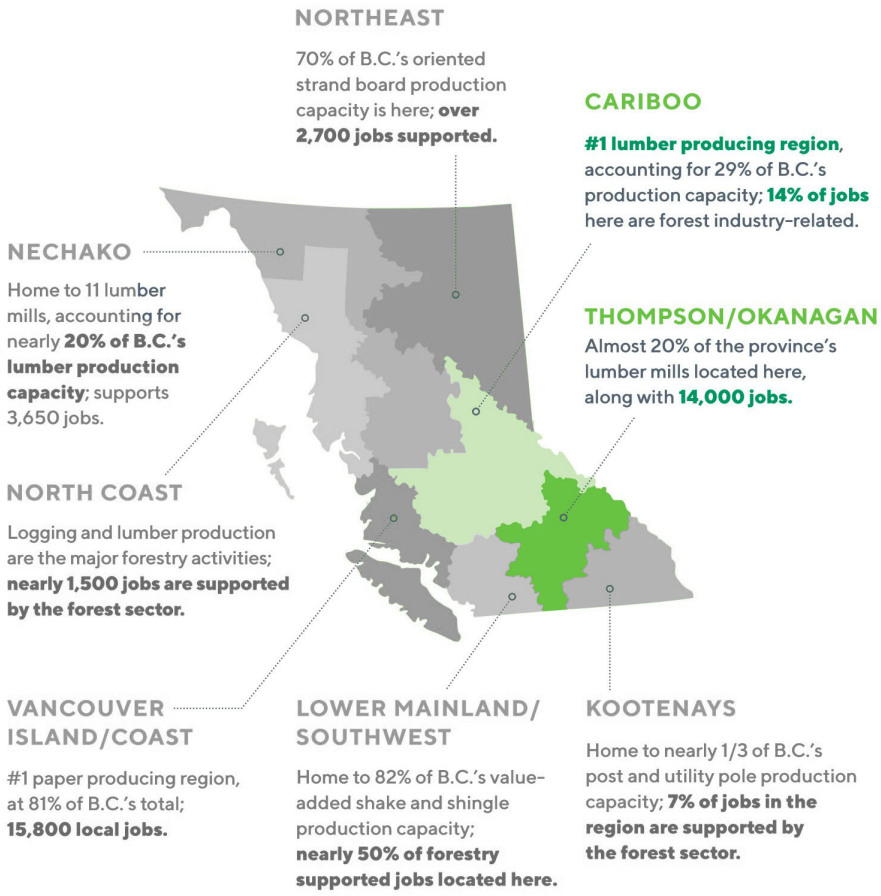


Figure 7. B.C. Forest Jobs in Cariboo & Thompson/Okanagan 2019

pear by 2031. Instead of accelerating deforestation to extend the industry's lifespan another few years, government should be giving priority to conservation and economic diversification for the long-term.

B.C.'S SUBSIDIES FOR FOREST INDUSTRY

While the economic significance of forestry has long been advocated, the amount of subsidy received by the industry is not a widely-known fact. *Focus Magazine* published a report showing that from 2009 to 2019 forest companies operating in B.C. produced revenue of $6.71 billion and claimed expenditures of $10,363,595,000 (Broadland, 2020). That means, the forest industry had a deficit of $3.65 billion in 10 years, much of which was covered by taxpayers through government subsidies. Other costs borne by society are reforestation and fire-fighting, as well as carbon emissions from the industry, the loss of forest carbon sequestration capacity and the preferred rate charged for electricity consumption by big industrial users like pulp mills and sawmills.

Another significant expense is propping up failing enterprises. While it may be reasonable in a crisis to save jobs and communities, repeatedly doing so has led to an unhealthy dependency on bailouts and subsidies. Whether subsidization is for political or economic reasons it is not a justifiable long-term approach.

ACHIEVING TWINNED GOALS THROUGH ENVIRONMENTALLY SUSTAINABLE DEVELOPMENT

The narrative of "jobs-versus-environment" has misled the public and too often halted the protection of endangered species. Protecting mountain

caribou and developing a healthy economy in B.C. are twinned goals that can be achieved through environmentally sustainable development. It requires diversification of the economy, engaging Indigenous communities, and taking precautionary application of the risk-based disturbance threshold with careful monitoring and adaptive management.

CREATE JOBS THROUGH DIVERSIFYING ECONOMY AND EXTENDING PRODUCTION CHAIN

One reason for concern over losing jobs to caribou conservation is that the local economy has heavily relied upon logging. That fear may be misplaced. Protecting and maintaining caribou habitats can help develop economic opportunities that do not harm the environment and have much better long-term prospects. New jobs will be created during the habitat restoration process, through a diversified economy and by extending the production chain within local communities. Research and tourism opportunities also will expand within the area being conserved for its biodiversity, ancient forests and indigeneity.

Over harvesting of trees, mechanization and market volatility already have brought the industry down. Resource-dependent communities are not economically resilient. Simon Fraser University (SFU) conducted a Community Economy Development Assessment for Clearwater in 2019, and recommended that for a small rural town, Clearwater needs to be more innovative and collaborative, and must develop "diverse and flourishing opportunities across a wide array of industries" (Chaland, et.al, 2019). For instance, a regional eco-tourism strategy should be developed through collaboration among municipalities, First Nations, and the three parks.

In the proposed conservation area, many years of clear-cut logging has destroyed habitat, which will require appropriate site-restoration for a long period. Research shows that restoring one hectare of logged forest land provides 0.077 employment, and 0.034 employment for each hectare of restored seismic area (Anielski, 2019). A report examining the economic impact of restoring woodland caribou habitat in the Bistcho and Yates Ranges in Alberta show that seismic line restoration alone could provide employment for the region for 15-20 years (Power & Power, 2018). Although the proposed CCA does not have seismic lines, restoring logged areas and access roads for habitat recovery will provide new job opportunities for local communities.

Each year, millions of cubic metres of unprocessed logs are shipped out of B.C., most of which end up in the Asia Pacific region and the United States. In 2016 alone, 6.3 million cubic metres of raw logs were exported from B.C., enough to frame 134,000 homes. If those logs were processed in B.C., 3,650 jobs could have been created in local communities (Parfitt, 2017). B.C. used to require companies logging trees on publicly owned or Crown lands to mill the trees, but that policy was abandoned in 2003. Since then, many mills have been closed, and raw log exports soared. Raw logs have the lowest value of all forest products.

Clearwater, a small town in the proposed CCA region, is one of many facing the consequences of mill closure. A SFU study recommended Clearwater develop value-added manufacturing with a diversified product portfolio and establish a forestry innovation centre to develop better use of local timber resources (Chaland, et.al, 2019).

INDIGENOUS-LED CONSERVATION & RESTORATION (GUARDIAN)

The B.C. government (2021) stated in its discussion paper *Modernizing Forest Policy in British Columbia'* that "we need to increase economic and land management opportunities for Indigenous peoples. Doing so aligns with the Declaration on the Rights of Indigenous Peoples Act and advances the well-being of Indigenous communities. It also reduces uncertainty and strengthens confidence in the [forest] industry." Indigenous peoples have the right to make decisions on resource management in their territories and should be compensated when industrial activities are harmful to their way of life and culture, especially when those activities are conducted without the First Nations' consent. Unfortunately, Indigenous peoples often do not receive fair compensation and the impacts on wilderness and wildlife have been discounted.

Indigenous peoples should be engaged in the restoration economy. It will create "new employment, better economic opportunities for Indigenous peoples" (Anielski, 2019), reduce resource companies' environmental liability, and improve economic resilience for both Indigenous and other local communities.

Fort Nelson First Nation (FNFN) in northeastern B.C. provides a good example. FNFN benefited from restoration employment opportunities. Guided by their traditional knowledge, FNFN planted native plants and traditional plant species that provide important herbs and medicines. In addition, the traditional-use approach FNFN took ensures a healthy ecosystem will be restored and save millions of dollars companies would spend to spray hazardous substances for vegetation control (Anielski, 2019).

The Guardian Watchmen environment stewardship programs created by Coastal First Nations in B.C. is another success story. Taking both financial and non-financial benefits into consideration through a weighting mechanism, the Guardian Watchmen programs have an annual return on investment ranging from 10-to-1 to 20-to-1 (Figure 8, EcoPlan International Inc., 2016).

RESEARCH AND TRAINING FACILITIES

The three anchor parks are great sites for ecological, biological, archeological, and geological research and study. Since 1994, Thompson Rivers University (TRU) has operated the Wells Gray Education and Research Centre in Wells Gray Park. In November 2020, a new four-season facility was opened to accommodate year-round visits. Annually over 1,200 user days are recorded at the centre, TRU faculty, students and visitors.

SFU recommended Clearwater build a conference center, to enable it to become a conference and retreat destination for organizations from Kamloops, Prince George and beyond (Chaland, et.al, 2019). The conference centre also can be used as an educational facility, including training community members in sustainable forestry management, wildlife habitat restoration, and other job-related skills.

ECO-TOURISM AND INDIGENOUS TOURISM

Tourism is a significant economic contributor in the Thompson Okanagan Region. In 2017, overnight visitors produced $1.9 billion for the Thompson Okanagan tourism region (Mandziuk, Mattock & Amos, 2019, p.7).

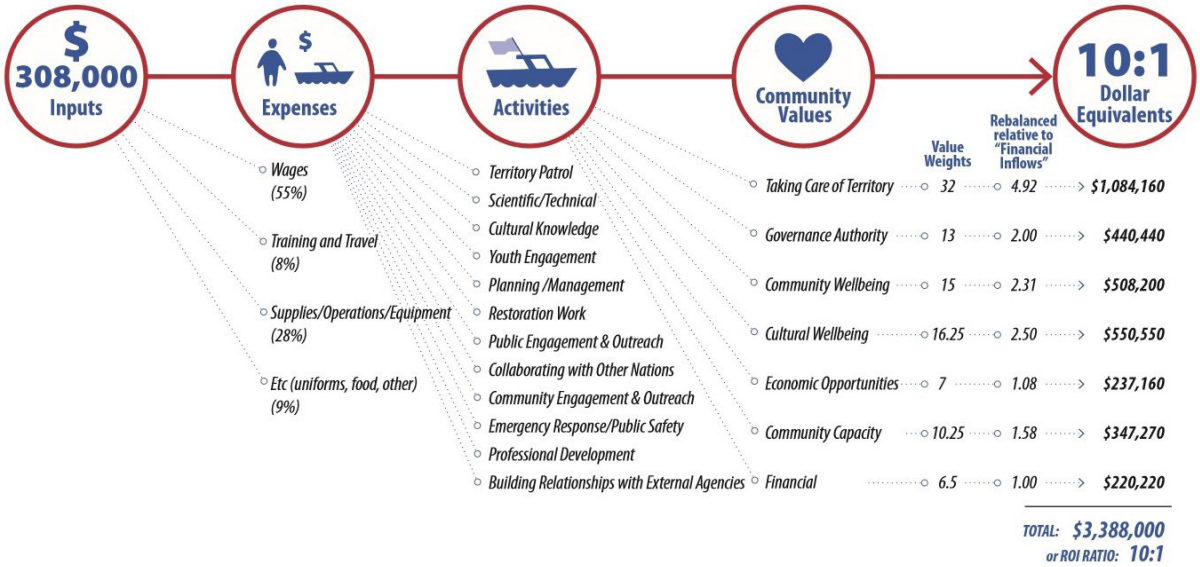


Figure 8. The Guardian Watchmen Environment Stewardship Programs

However, Thompson Okanagan Tourism Association (TOTA) pointed out insufficient "focus on highlighting regional unique selling propositions" and missed the focus on the concept of sustainability in its 2012 regional strategy (Mandziuk, Mattock & Amos, 2019, p.3). In its current 10-year strategy plan for 2012-2022 some new destination management priorities have been set, including sustainability and Indigenous tourism. The incredible landscapes and distinctive ecosystems in the proposed CCA are great attractions for tourists seeking authentic experiences with nature and indigenous culture.

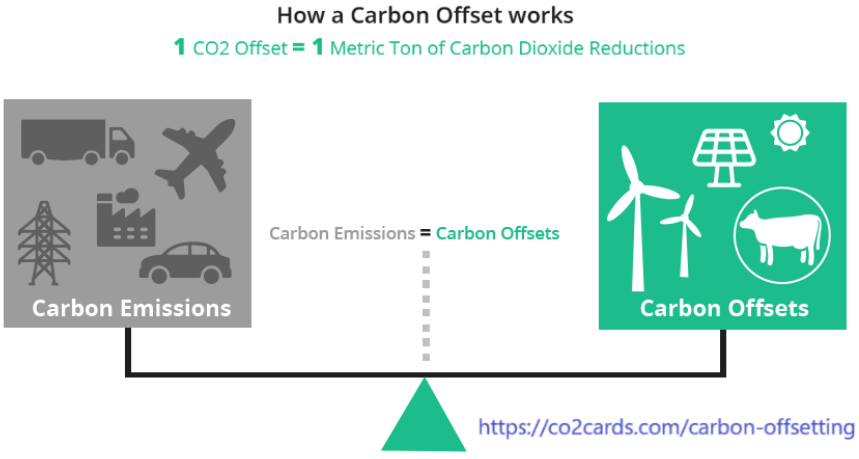
Hiking, or trail tourism, is a rapidly increasing attraction for the many people seeking meaningful connection with nature and genuine culture. Nature enthusiasts are attracted to places where they encounter unique experiences and insights that lend themselves to powerful storytelling, another activity growing in stature. The most sought-after locations provide, low-impact and leisurely experiences that also allow visitors to connect with welcoming communities through unique encounters. Investment in development and maintenance of trails and support services such as appropriate accommodation will attract visitors from around the world. (Mandziuk, Mattock & Amos, 2019, p.3).

The Indigenous tourism sector is also growing rapidly in Canada. The GDP attributed to the Indigenous tourism sector in Canada grew 23% from $1.4 billion in 2014 to $1.7 billion in 2017 and outpaced overall Canadian tourism growth (Indigenous Tourism BC, 2021). Indigenous tourism business in B.C. increased 170% between 2003 and 2020 (Indigenous Tourism BC, 2021). Tourism provides jobs for Indigenous people with focus on their cultural knowledge, talent, and skills. Indigenous tourism associates local cultural heritage with visitors' experience, which strengthens the competitive advantage through the authenticity and uniqueness of its market position for tourism destinations.

Indigenous tourism was highlighted as a key opportunity in Thompson Okanagan Tourism regional strategy for 2012-2022. In fact, TOTA was the first region to partner with Indigenous Tourism BC to provide an Indigenous Tourism Specialist to help develop authentic Indigenous products and services and deliver Indigenous tourism training to local communities (Mandziuk, Mattock & Amos, 2019, p.8). Indigenous tourism has expanded so fast in the region that the number of Indigenous-owned tourism businesses doubled in several years.

CARBON OFFSETS

When a company cannot meet its climate targets, it can purchase carbon credits from others to reduce or capture their carbon emissions. For instance, Microsoft has bought 1.3 million carbon emissions offsets for 2021, most of which are from forestry projects, and the rest from biochar and carbon capture projects (Watson, 2021). In Europe, airlines operating flights between EU member countries use carbon credits to meet the mandatory limits on carbon emission under the EU Emissions Trading Scheme.



Three are three basic types of carbon credit:

- From reduced emissions, e.g. improve energy efficiency.
- From removed emissions, e.g. carbon capture and tree planting.
- From avoiding emissions, e.g. avoid cutting down old-growth forest (Hartmann & Broom, 2020).

To be eligible to be traded, carbon credits must be based on projects that have been independently validated and monitored throughout the project's lifecycle. To date there is no global standard to trade carbon credits or verify the compensating activity behind the credits. In B.C. companies can register greenhouse gas emission offset projects under BC Carbon Registry.

The Great Bear (South Central Coast) Forest Carbon Project, validated in B.C., is an Improved Forest Management project within the B.C. Forest Carbon Offset Protocol. It generates emissions reductions by protecting forested areas that were previously designated, sanctioned or approved for commercial logging. Project activities include changes in land-use legislation that result in the protection of forest areas and reduction of harvest levels across the project area. The project proponents are a group of First Nations that are part of the Nanwakolas Council Society, whose traditional territory exists within the project area. The project area encompasses 1.5 million hectares of land and fresh water and over 780,000 hectares of productive forest land. As a result of the project's activity, a total of 218,000 hectares are now protected in either Conservancies or Biodiversity, Mining and Tourism Areas . The project area is expected to generate 2.36 million tCO2e emissions reductions over 25 years on an ex-ante basis (BC Carbon Registry, 2018).

Carbon offsets present a promising economic alternative to logging forests. A high-level pre-feasibility study was performed by NatureBank Asset Management using only harvestable land within the AOIs, defined as land within the CCA currently without protection, roughly equivalent to the Timber Harvesting Landbase. Additionally, harvestable protections of Non-legal OGMAs, Conditional Harvest UWR, and Modified Harvest WHA were included in the estimates. Non-forested lands were removed from these categories, so roughly 230,000 hectares of forest in the CCA could qualify for carbon offsets. The estimates are based on provincial data from the Vegetation Resources Inventory and used actual harvesting levels from the Forest Harvesting Polygons and Harvest Billing System to determine potential carbon volumes.

NatureBank completed a high level assessment to estimate carbon offsets resulting from changes in land management to protect caribou habitat. Their assessment included a scenario to protect 100% of the current forest harvesting land base. This does not preclude a small amount of selective logging for environmentally sound, value-added initiatives.

Considering a scenario with 100% protection, offset estimates indicate a potential volume of 103,390 tCO_2e per year, or half of that under a 50% protection scenario. The projected net saleable volume peaks near the 45-year mark in either scenario.

Forest carbon projects must be both technically and economically viable. At this time, both the compliant and the voluntary carbon markets could provide potential opportunities for a project in CCA. Potential economic opportunities range from $700,000/year to $3.4 million/year. Additional analysis is required to fully understand the economic opportunity.

While this "pre-feasibility" analysis only provides a rough estimate, it shows potential for generating revenue for First Nations. The assessment included conservative assumptions and considered the default values presented in the draft BC Forest Carbon Offset Protocol. A full feasibility study would be required to obtain a more thorough assessment and address all requirements of the protocol. This could be completed at the request of a First Nation and provide an opportunity to explore different land management scenarios and the potential carbon offsets that each scenario would generate.

MARKET-BASED INCENTIVES

Certification programs such as the Programme for the Endorsement of Forest Certification (PEFC) and Forest

Stewardship Council certification (FSC) are market-based tools that claim to promote environmentally responsible forestry products. Canada is a leader in third party forest certification, and B.C. contributes more than any other province (Naturally: Wood, 2019). However, these programs are not without controversy. They allow clear-cut logging which is incompatible with caribou recovery. Any tree removal in the conservation area must be align with habitat recovery and restoration efforts and involve First Nations in culturally appropriate ways.

While it is envisioned that logging in the proposed conservation will cease as soon as possible, some short period of transition may be likely. In that case, governments must work with industry and public interest groups to apply the strictest caribou protective measures. FSC Canada (2014) does acknowledge that "possible impacts of forest management practices on Species at Risk (SAR), including Woodland Caribou (*Rangifer tarandus caribou*), is an issue of significant concern in Canada." FSC Canada proposed 17 indicators to address conservation of Species at Risk, some are particularly for woodland caribou.

LINK COMPANIES' ENVIRONMENTAL PERFORMANCE TO GRANTS AND SUBSIDIES

In any objective evaluation of the decline of forest biodiversity and carbon capture capacity it is clear that subsidies and the lack of clear consequences for violating the rules has encouraged unsustainable practices driven by economic goals lacking adequate regard for their impact on the environment or the public interest. B.C. should proactively require extractive industries to post performance bonds only to be returned when it has been determined that activities have abided by requirements for environmental protection, site restoration and Indigenous rights.

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APPENDIX III – ABBREVIATIONS

AOI	Area of Interest
BCTS	BC Timber Sales
BEC	Biogeoclimatic
CCA	Caribou Conservation Area
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CWS	Canadian Wildlife Service
DSMC	Deep-Snow Mountain Caribou
ESSF	Engelmann Spruce – Subalpine Fir
FLNRORD	Ministry of Forests, Lands, Natural Resource Operations & Rural Development
FNFN	Fort Nelson First Nation
GHG	Greenhouse Gas
ICH	Interior Cedar – Hemlock
IMA	Interior Mountain – heather Alpine
IPCA	Indigenous Protected and Conserved Area
ITA	Imminent Threat Analysis
IUCN	International Union for Conservation of Nature
LiDAR	Light Detection and Ranging
LPU	Local Population Unit
OAGBC	Office of the Auditor General of British Columbia
OGMA	Old-Growth Management Area
RAAD	Remote Access to Archaeological Data
SARA	Species at Risk Act
SBS	Sub-Boreal Spruce
SFU	Simon Fraser University
TOTA	Thompson Okanagan Tourism Association
TRU	Thompson Rivers University
UNBC	University of Northern British Columbia
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UWR	Ungulate Winter Range
WHA	Wildlife Habitat Area

APPENDIX IV – RECOMMENDED READING LIST

INDIGENOUS PROTECTED AND CONSERVED AREAS

- How to be an Ally of Indigenous-Led Conservation - Land Needs Guardians. https://landneedsguardians.ca/how-to-be-an-ally
- Indigenous Conservation Agreements in Canada - MakeWay. https://makeway.org/wp-content/uploads/2021/04/Indigenous-Conservation-Agreements-in-Canada.pdf?utm_source=AdaptiveMailer&utm_medium=email&utm_campaign=Spring%202021%20Webinar%20Series&org=998&lvl=100&ite=360&lea=50626&ctr=0&par=1&trk=a2r3i000000OGtaAAG

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OLD-GROWTH FORESTS

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- The Inland Temperate Rainforest and Interior Wetbelt Biomes of Western North America. https://www.researchgate.net/publication/337174274_The_Inland_Temperate_Rainforest_and_Interior_Wetbelt_Biomes_of_Western_North_America
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Harmony
FOUNDATION
CANADA

THE GREAT CARIBOU RAINFOREST CONSERVATION AREA