

Provincial Caribou Recovery Program Herd Planning Disclaimer



The following herd plans are a result of Phase One planning and are an incomplete product. Additionally, the documents are 'living' reports and will be updated regularly as Phase Two progresses.

Phase Two planning is currently underway for some herds however still at its early stages of development; many plans reflect this as they are in different stages along their scheduled project continuum.

One of the cornerstone guiding principles to the Caribou Recovery Program (the Program) is to use consistent, fact-based approaches for all woodland caribou herds in the province. The Program has refined and adopted a new format to herd planning that will effectively:

- ❖ Provide a consistent approach to managing all woodland caribou herds in BC
- ❖ Recognize the unique circumstances of each herd
- ❖ Build from current (legacy) caribou management plans
- ❖ Consider First Nations' and stakeholder interests and ideas
- ❖ Be included in larger regional plans

Completed herd plans will describe the status of each herd, and the threats faced by that particular herd. The plans will take note of previous actions, and actions that are planned to take place in the future. As we implement the herd plans, the Program will carefully monitor to which extent and magnitude the caribou respond, and modify its actions as accordingly. Herd plans will help us document our decisions and discuss issues with First Nations and with stakeholders.

Phase One consisted of:

- ✓ Status of herd or sub-population
- ✓ Identified threats
- ✓ Literature
- ✓ Previous work completed

Phase Two will consist of input from:

- Engagement with Indigenous communities
- Provincial Caribou Science Team
- Stakeholders
- Decision-support tools

WOODLAND CARIBOU PLAN

Telkwa Subpopulation

Telkwa Local Population Unit



BRITISH
COLUMBIA

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EXECUTIVE SUMMARY

DRAFT

TABLE OF CONTENTS

Executive Summary.....	ii
1 Background.....	1
1.1 Introduction to the Program.....	1
2 Population Description	1
2.1 Distribution.....	1
2.2 Habitat and Behaviour	2
2.3 Population Size and Trend.....	2
3 Threats and Limiting Factors.....	4
3.1 Predation.....	4
3.2 Food Limitation	5
3.3 Human Activities.....	5
3.3.1 Industrial.....	5
3.3.1.1 Forestry.....	5
3.3.1.2 Mining	5
3.3.1.3 Oil and Gas	6
3.3.1.4 Clean Energy	6
3.3.1.5 Other.....	6
3.3.2 Recreation.....	6
3.3.2.1 Snowmobile.....	6
3.3.2.2 Heli-ski /Cat Ski	6
3.3.2.3 Other.....	6
3.3.3 Other	7
3.3.3.1 Agriculture.....	7
3.3.3.2 Highway Corridors	7
3.3.3.3 Linear Features	7
3.3.3.4 Hunting.....	7
3.4 Natural Disturbance.....	8
3.5 Parasites and Diseases	8
3.6 Climate Change	8
3.7 Small Population Size Effects	9
4 Management History	9

Woodland Caribou Plan for the Telkwa Subpopulation

4.1	Habitat	9
4.1.1	Protection.....	9
4.1.2	Enhancement and Restoration	10
4.2	Recreation and Access Management.....	10
4.2.1	Snowmobile	10
4.2.2	Heli Ski / Cat Ski	11
4.2.3	Summer Recreation	11
4.3	Predators	11
4.3.1	Wolf Management	11
4.3.2	Cougar Management.....	11
4.3.3	Other	11
4.4	Primary Prey	11
4.4.1	Moose Management	11
4.4.2	Deer Management.....	12
4.4.3	Other	12
4.5	Population Reinforcement	12
4.5.1	Maternity Penning	12
4.5.2	Captive Breeding	12
4.5.3	Translocation	12
4.5.4	Other	12
4.6	Stewardship/Outreach.....	12
4.7	Research and Monitoring.....	13
5	Implications to Other Wildlife.....	13
6	Implications to Other Values.....	13
7	Partners / Neighbours	14
8	Recommended Actions.....	15
8.1	Short Term (Within 6-12 Months).....	15
8.2	Medium Term (Within 12-24 Months).....	16
8.3	Long Term (Within 24-48 Months).....	16
9	Literature Cited.....	16

1 BACKGROUND

1.1 INTRODUCTION TO THE PROGRAM

All caribou within British Columbia are Woodland Caribou (*Rangifer tarandus caribou*). The Telkwa caribou are a subpopulation of the Northern caribou ecotype within the Southern Mountain National Ecological Area (SMNEA), are listed as Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and appear on Schedule 1 of the Federal Species at Risk Act (SARA) (EC, 2014; MCTAC, 2002). These caribou herds are blue listed in British Columbia and are included in the Provincial Identified Wildlife Management Strategy (IWMS) under the provincial Forest and Range Practices Act (FRPA).

In 2011, COSEWIC defined 12 designatable units (DUs) for caribou in Canada, which represent discrete and evolutionarily-significant units of caribou. Northern ecotype caribou in BC that are included in the SMNEA were reorganized into the central and northern caribou DUs. The Telkwa subpopulation falls into the northern caribou DU (DU7) (COSEWIC, 2014).

The northern caribou DU was assessed as special concern in May 2014 (COSEWIC, 2014). This recommended down-listing of DU7 was submitted to the Federal Minister of the Environment for listing consideration under SARA in fall 2014. The updated listing SARA listings have not yet been amended to follow this recommendation and the Telkwa subpopulation remain listed as SMNEA caribou and threatened under SARA.

Woodland Caribou are further divided into Local Population Units (LPU's) by Environment Canada. Within the proposed Northern Mountain Caribou group there are seven Local Populations. The Telkwa subpopulation is alone in the Telkwa Local Population Unit (EC, 2014).

Recovery plans are required for all woodland caribou populations that will be designated as threatened or endangered in Canada (ECCC, 2016). While the designation for the Telkwa subpopulation will be “special concern”, current monitoring indicates that it has suffered recent declines, is currently at low numbers, and in need of comprehensive recovery planning.

This document spans the divide between these disparate designations provincially and federally, compiling past research, knowledge and management actions into guidance for the management and recovery of the Telkwa Northern Mountain caribou subpopulation.

2 POPULATION DESCRIPTION

2.1 DISTRIBUTION

The Telkwa subpopulation of caribou inhabits the Bulkley Ranges of the Hazelton Mountains approximately 20 km south of Smithers, B.C (Figure 1). The 2290 km² area includes the entire habitat between the Telkwa, Bulkley, and Morice Rivers to the north, east, and south and the height of land of the Howson Range to the west (MFLNRO Skeena, 2017). Elevations range from 600 meters to 2300 meters above sea level (Google Earth, 2017). The Telkwa caribou subpopulation does not border directly on any other caribou subpopulations however the Tweedsmuir – Entiako subpopulation range begins after a 30km gap to the south and the Takla subpopulation lies 100 km to the northeast.

2.2 HABITAT AND BEHAVIOUR

The Telkwa caribou subpopulation spends most of the year at high elevations, foraging for terrestrial lichens on wind swept alpine ridges and for arboreal lichens within subalpine forests (van Drimmelen, 1986; Theberge & Oosenbrug, 1977). These caribou do not migrate, but may move from high elevation habitats to lower elevation forests in response to forage supply and changing weather conditions. Individual caribou also move between the east and west ranges of the Telkwa Mountains. Calving takes place at high elevations (MFLNRO Skeena, 2017).

Telemetry data indicates that the highest habitat use, both summer and winter, has shifted in the past 20 years from the eastern part of their range to the western part. In the west summer use was more concentrated in the south with winter use in the north, although analysis of satellite GPS collar data indicates a high degree of overlap between summer and winter range use in both the east and west (MFLNRO Skeena, 2017)

2.3 POPULATION SIZE AND TREND

The earliest estimate of the Telkwa population (approximately 60 caribou) was obtained in 1949 during a survey on horseback (Cox, 1977). The population was surveyed a total of ten times between 1956 and 1984 and estimates ranged from 34 (1968) to 271 (1965) animals. The first significant population decline was recorded in 1966 and 1967 when the herd was near extirpation. Conservation Officers at the time attributed the decline to game laws which allowed hunters to use helicopters for access and to transport wildlife (van Drimmelen, 1986). The Telkwa caribou herd was fully closed to hunting in 1973 and subsequent surveys recorded consistent population growth (MFLNRO Skeena, 2017).

A second decline was detected in 1993 when only 11 caribou were located. Subsequent monitoring flights in 1994, 1996 and 1997 resulted in total counts of 10, 13 and 6 caribou respectively. The population was augmented with 32 animals from the Chase-Sustat herd in 1997 and 1998. Eighty-three caribou were located in March 2007 and the population was estimated at more than 100 animals. Calf recruitment was moderate to high with 29 and 23% calves in 2006 and 2007, respectively (MFLNRO Skeena, 2017).

The population began to decline again between 2007 and 2009 and calf recruitment rates were recorded as below the 15% rate recommended to achieve population stability (Bergerud, 1988; Bergerud, 1996; Bergerud, 1992). Although there is no definitive cause for the drop in population from >100 animals to <20 animals over a 10 year period, the early snow events and rain-on-snow events in 2006/2007 would have made foraging more difficult for caribou while increasing the travel efficiency for predators. Poor winter-nutrition could have contributed to the lower rates of calf recruitment during subsequent years (MFLNRO Skeena, 2017).

The Telkwa population remained relatively stable between 2012 and 2015 with surveys locating 11-16 animals and calf recruitment rates of >25%. Adult survival has also been relatively strong over the past several years. There were 18 animals observed in an October 2016 survey, including 3 calves (MFLNRO Skeena, 2017) and 22 minimum, possibly 24 in 2017 (J. Campbell, pers. comm., 2017).

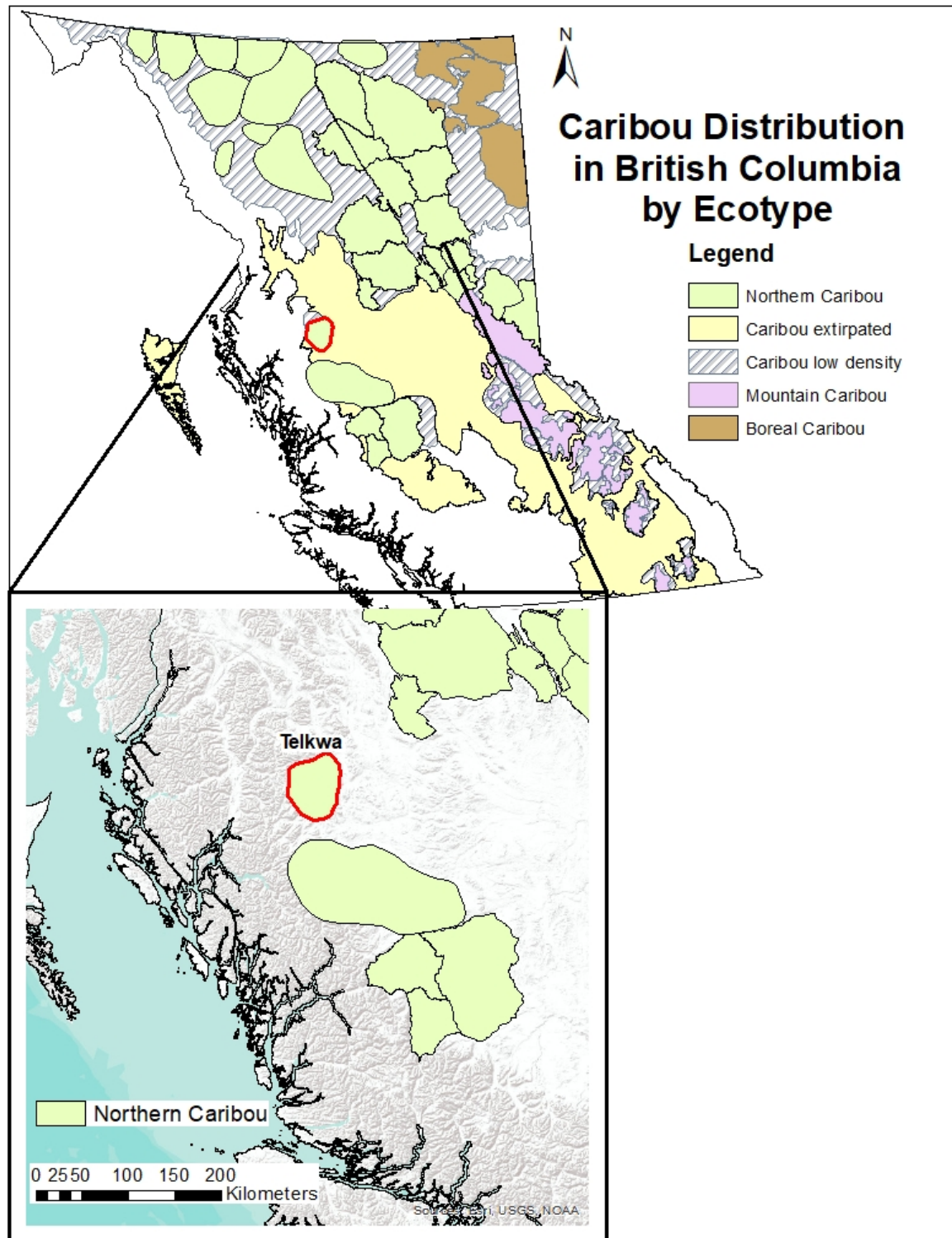


Figure 1. Caribou distribution in BC by ecotype . The Telkwa subpopulation is outlined in red.

3 THREATS AND LIMITING FACTORS

Current declines in woodland caribou populations have been ultimately attributed to direct and indirect effects of human activities and climate change (Vors & Boyce, 2009; EC, 2014; Festa-Bianchet, et al., 2011). These effects have resulted in lowered rates of adult female survival and/or juvenile recruitment, two demographic rates that have high influence on caribou population dynamics (DeCesare, et al., 2012). For most populations, these effects have led to unsustainable rates of predation (McLoughlin, et al., 2003; Wittmer, et al., 2005b; Apps, et al., 2013). Compared to other ungulates, caribou are particularly vulnerable to increasing predation because they have low reproductive rates (Bergerud, 2000). To reduce predation risk, caribou generally occur at low densities and have evolved to live in low productivity habitats that spatially separate them from other ungulates and their generalist predators (Bergerud, 1992). Effects from human activities and climate change likely compromise this spacing strategy by changing the abundance and spatial distribution of these other ungulates and predators, increasing the likelihood of caribou-predator encounters and consequently increasing predation rates (Festa-Bianchet, et al., 2011).

The federal *Recovery Strategy* for SM caribou (EC, 2014) identified a number of threats potentially affecting caribou populations and their habitat. These threats, in descending order of importance, included: predation, industrial activities, roads and other linear features, recreational activities, natural disturbances (e.g. fire), hunting, climate change and parasites and diseases. This section follows a similar approach, discussing these threats – and others – though their order does not reflect their relative importance to a specific population. Note that while threats are discussed individually, they are not mutually exclusive as they may interact and their effects on caribou population dynamics are likely cumulative (Sorensen, et al., 2008; Johnson, et al., 2015).

3.1 PREDATION

Multiple GPS and radio telemetry studies throughout BC have indicated that the dominant, proximal cause of woodland caribou mortality is predation (Wittmer, et al., 2013). Woodland caribou have evolved with their predators and have persisted despite millennia of predation. Their impact on woodland caribou populations has increased due to the result of three dominant processes: apparent competition mediated by increased alternative prey abundance (Hebblewhite, et al., 2007), apparent competition mediated by expanding alternative prey distribution (Wittmer, et al., 2007; DeCesare, et al., 2009; Latham, et al., 2011b), and enhanced predator access to woodland caribou habitat mediated by roads and other industrial developments (James & Stuart-Smith, 2000; Latham, et al., 2011a).

More generally, Bergerud (2007) has calculated that wolf densities greater than 6.5 wolves/1000 km² will result in woodland caribou declines. Wolf surveys are planned but have not yet been conducted for the Telkwa caribou subpopulation so the wolf densities and distribution are unknown; however wolves are known to be the primary cause of caribou mortality for the Telkwa caribou (Cichowski, 2014) and anecdotal evidence suggests a relatively high wolf population (MFLNRO Skeena, 2017).

While not specific to the Telkwa caribou subpopulation, studies have demonstrated that bears negatively impact calf recruitment and may impact adult survival (Adams, et al., 1995; Wittmer, et al., 2005a). Cougars are not thought to be major predators of caribou in northern BC (Wittmer, et al., 2005a).

3.2 FOOD LIMITATION

Lichens form the main part of caribou's winter diet, while in the summer a variety of vegetation is consumed. A comprehensive study of mountain caribou using bone marrow fat of deceased collared caribou suggests that population declines are linked to excessive predation, not body condition (McLellan, et al., 2012). However the result of supplemental feeding on the Kennedy Siding subpopulation suggests that caribou movements to reduce predation risk may reduce food intake and therefore lower nutritional condition (Heard & Zimmerman, 2017).

3.3 HUMAN ACTIVITIES

3.3.1 INDUSTRIAL

3.3.1.1 FORESTRY

Woodland caribou are an old-growth forest dependent species (Bergerud, 2000; Theberge & Oosenbrug, 1977) hence forest management affects their distribution and populations. Although some populations live seasonally in treeless, alpine ecosystems, all spend some of the year in forests. For this reason, forestry will affect woodland caribou populations. Forestry effects include very general "habitat loss" that reduces the amount of old-growth forest, to reduction in forest-based food resources to creating more, early seral forest habitat for apparent competitors such as deer and moose (Simpson & Woods, 1987; Cichowski, 1989; Seip, 1990; Stevenson, 1991). Factors such as the type of forest (Cichowski, 1989) and the size of cutblocks (Edmonds & Bloomfield, 1984) play a role in the effect of forestry practices on woodland caribou populations.

Within the Telkwa caribou subpopulation boundaries large scale clearcut forest harvesting prior to 1970 has resulted in early-seral forests (>50 years old) over approximately 28-40% of the low elevation portions of the Telkwa range (MFLNRO Skeena, 2017). Forest harvesting continues at lower elevations (Google Earth, 2017), while mid to high elevations have been protected since 2016.

3.3.1.2 MINING

Mine sites deter caribou both for the activities that occur there when they are active as well as for the habitat they destroy. Mines have a 2 km ZOI when they are active, but this shrinks to the physical footprint of the mine site when mines are dormant, inactive or abandoned (Polfus, et al., 2011). This physical footprint usually includes linear features such as roads, which increase predator travel efficiency, thus increasing the predation risk to the caribou (Latham, et al., 2011a; DeMars & Boutin, 2017).

The geology underlying most of the Telkwa caribou range has high metallic mineral values. Much of the area was extensively explored over the past century. Historic exploration activities and developed prospects resulted in road access from valley bottom to alpine habitat. Mineral exploration is currently an infrequent occurrence but valid mineral tenures are still held throughout the Telkwa range and there is recent interest in the development potential of a coking coal deposit in the East Telkwa range (MFLNRO Skeena, 2017).

Woodland Caribou Plan for the Telkwa Subpopulation

3.3.1.3 OIL AND GAS

The potential impacts on caribou of oil and gas development would likely be similar but possibly more extensive than mining. However currently the oil and gas potential is low in this area. A proposed gas transmission line would cross the southern edge of this area; more details are in the linear corridor section below.

3.3.1.4 CLEAN ENERGY

Clean energy projects could include large hydroelectric dams and reservoirs, smaller run of the river hydroelectric projects, wind farms, and solar power generating projects.

Research in southern British Columbia correlated hydroelectric development with declines in caribou populations (Simpson, 1987b). There are no current hydroelectric reservoirs, run of the river hydroelectric, wind, or solar power generating installations or proposals in the Telkwa caribou subpopulation area.

3.3.1.5 OTHER

No other forms of industrial development are currently planned or underway within the Telkwa subpopulation area.

3.3.2 RECREATION

Recreational activities, both motorized and non-motorized, can impact caribou populations by displacing individuals into sub-optimal habitats (Seip, et al., 2007), increasing stress levels (Freeman, 2008) and / or facilitating predator movement into caribou habitat (Whittington, et al., 2011). Unnecessary movements can deplete critical fat reserves, potentially decreasing the likelihood of successful parturition and calf rearing the following summer and potentially decreasing the ability to avoid predators (Seip, et al., 2007). Additional winter movements may also increase the amount of exposure to steep terrain, increasing the risk of mortality due to avalanches (Simpson, 1987a; Seip, et al., 2007). High-use areas are in the southeast (Grizzly Plateau) and the west-central (Starr Basin) (MFLNRO Skeena, 2017).

3.3.2.1 SNOWMOBILE

The Telkwa Mountains offer good snowmobiling opportunities and are adjacent to significant human populations in the Houston / Smithers corridor. Conflicts between caribou and snowmobiles in the Telkwa Mountains were first recognized in 1975 (Bustard, 1977 and Hodson 1977 in (Skeena Fish and Wildlife Branch, 1980)) and continue to this day (MFLNRO Skeena, 2017).

3.3.2.2 HELI-SKI / CAT SKI

There are no commercial helicopter or snowcat skiing operators within the Telkwa caribou subpopulation boundaries (HeliCat Canada, 2017).

3.3.2.3 OTHER

Recreation values are high in the Telkwa range. Backcountry skiing, snowshoeing, ATV use, hiking, mountain biking, and other similar activities could also stress or displace caribou from preferred habitat (MFLNRO Skeena, 2017).

3.3.3 OTHER

3.3.3.1 AGRICULTURE

Agricultural development can impact caribou populations in several ways. These include the direct losses of habitat as forests are converted to fields and the supplementation of natural food sources for alternate prey such as elk and deer potentially increasing their populations, which in turn may support increased numbers of predators, increasing the predation risk to the caribou. In addition, domestic livestock could harbour diseases and parasites. Transmission to caribou has not been established within British Columbia (Martin, et al., 2011; Vors & Boyce, 2009).

The Bulkley Valley, which is situated along the northeastern edge of the Telkwa caribou recovery area, has experienced significant agricultural development (Cichowski, 2014) over the past century.

3.3.3.2 HIGHWAY CORRIDORS

Direct mortality from collisions with vehicles is the most obvious threat when highways pass through caribou habitat. Less obvious threats include direct loss of habitat along highway right of ways; fragmentation of habitat, especially if traffic volumes form a crossing barrier (Apps & McLellan, 2006); the maintenance of permanent early seral along highway edges supporting alternate prey and therefore predators; improved travel efficiencies for predators increasing predation risk; and improving human access for recreational use.

Highway 16 skirts the northeast corner of the Telkwa caribou range for approximately 40 km between the communities of Houston and Telkwa however the caribou do not regularly use the fringes and the highway is not considered a threat of collision mortalities. However the highway corridor is maintained in permanent early seral conditions and could contribute to alternate prey support.

3.3.3.3 LINEAR FEATURES

Linear features could include roads as mentioned above but could also include powerlines, pipelines, railways, and seismic lines. These features often result in direct loss of habitat, create permanent early seral conditions that benefit alternate prey and their predators, and improve travel and therefore hunting efficiency for predators (DeMars & Boutin, 2017). Avoidance by caribou may extend the area of impact well beyond the physical footprint (Vistnes & Nellemann, 2008).

A mainline railway and several electrical transmission lines skirt the northeast corner of the Telkwa herd range for approximately 40 km between the communities of Houston and Telkwa. One of the electrical transmission lines continues for another 45 km along the complete northern boundary (Google Earth, 2017). In addition, the proposed Coastal GasLink project (CGL) has plans to construct a pipeline along the southern edge of the area (MFLNRO LNG, 2015).

3.3.3.4 HUNTING

Excessive hunting of caribou is likely responsible for the initial declines in populations throughout the southern two thirds of the province (Spalding, 2000), including the Telkwa Mountains. Overhunting was likely the cause of extirpation of caribou from the nearby Babine Mountains in the 1940's (Theberge & Oosenbrug, 1977). Hunting of caribou in the Telkwa Mountains was closed in 1947, but then reopened in the 1950's due to an increasing population. The advent of using helicopters for hunter access in the mid 1960's is thought to have contributed to significant caribou declines. In 1968 the female season was closed, in 1971 the use of helicopters to support

caribou hunting was prohibited, and in 1973 the hunting season for Telkwa caribou was closed completely (Theberge & Oosenbrug, 1977; BVCRB, 2015).

Moose, deer, and goat hunting continues within the Telkwa caribou sub-population range (BC Government, 2016a; BC Government, 2016c). While reduction in alternative prey can be beneficial to woodland caribou, active hunting on caribou winter range may also contribute to accidental death by hunters who misidentify their prey. The specific impact to the Telkwa caribou sub-population is unknown.

3.4 NATURAL DISTURBANCE

Caribou populations are subject to impacts from a number of natural disturbances. Being dependent on old-growth forests, caribou are impacted by forest fires. In northern and boreal habitats, it takes 80 years for a forest to recover from a fire to become caribou habitat again. In addition the early seral habitat created post-fire may facilitate population increases in alternate prey and their predators. Although caribou are likely adapted to the natural forest fire regime within and adjacent to their ranges, effects of forest fire may act cumulatively with human-mediated disturbances to negatively impact caribou demography (Sorensen, et al., 2008). Caribou may also be affected by insect or disease outbreaks that affect forest stand condition. For example, mountain pine beetle outbreaks can highly impact old-growth pine stands, affecting lichen availability (Cichowski & Haeussler, 2015) – a primary forage resource for caribou – and increasing the likelihood of fire (Lynch, et al., 2006). For mountain-dwelling caribou, avalanches constitute another type of natural disturbance that can potentially impact demography, though under normal conditions their importance as a mortality should be small unless population sizes are small (Hebblewhite, et al., 2007; Seip & Cichowski, 1996).

The magnitude of the annual impact of wildfires on the Telkwa caribou subpopulation's habitat, and the change in this impact due to a warming climate, has not been calculated. Similarly salvage forest harvesting in response to the recent mountain pine beetle outbreak is also a concern that is not well quantified .

3.5 PARASITES AND DISEASES

Caribou can be impacted by a range of native and introduced diseases and parasites (Bergerud, et al., 2008; Schwantje, et al., 2014). Disease and parasite outbreaks can limit caribou populations by affecting survival and reproductive rates (Albon, et al., 2002; Klein, 1991) and effects of disease and parasites may interact with other limiting factors such as predation and nutrition. Threats from disease and parasites are predicted to increase with climate change (see *Section 3.6* below), particularly if spatial overlap between caribou and other ungulate species increases (Bradley, et al., 2005; Dobson, 2009; Kutz, et al., 2005). For example, increasing expansion of white-tailed deer into caribou range may increase the prevalence of meningeal worm in caribou, a parasite that is highly pathogenic to caribou and whose usual host is white-tailed deer (Anderson, 1972).

Impacts from parasites and disease on the population dynamics of the Telkwa caribou subpopulation are not well studied. Evidence to date from an extensive study involving the mountain caribou ecotype suggests that mortality from natural causes (i.e. diseases and nutrition) is low (McLellan, et al., 2012; Apps, et al., 2013) and diseases and parasites are not thought to be a major driver of current declines in populations of southern mountain caribou (EC, 2014).

3.6 CLIMATE CHANGE

Climate change can potentially exert numerous effects on caribou population dynamics. Warmer winters may impact forage availability by increasing icing events and / or causing poor snow conditions that limit the ability of

caribou to access lichens (Hansen, et al., 2011). A warming climate may also change the abundances and distribution of alternate prey and their generalist predators, potentially increasing rates of caribou predation (Latham, et al., 2011b; Dawe & Boutin, 2016). Climate change may alter the spatial and temporal distribution of insects, diseases and parasites, potentially affecting individual fitness and population dynamics (Bradley, et al., 2005). Changes to the natural disturbance regime (e.g. fire interval, fire intensity, avalanche frequency) may further impact caribou through mechanisms outlined in *Section 3.4*.

There is no specific information on how climate change may be affecting the Telkwa subpopulation of caribou, although the mountain pine beetle infestation described above has likely been exuberated by warmer winters (COSEWIC, 2014).

3.7 SMALL POPULATION SIZE EFFECTS

Caribou subpopulations that are small and isolated may be subject to negative demographic effects that can occur as a result of their small size (Caughley, 1994). Such effects include inbreeding depression, genetic isolation from population fragmentation (Serrouya, et al., 2012), demographic stochasticity (e.g. all offspring produced are of one sex), environmental stochasticity (e.g. the population is extirpated by a random natural disturbance such as an avalanche; (Hebblewhite, et al., 2010)), and Allee effects (e.g. lowered demographic performance with decreasing population size; (Courchamp, et al., 1999)). For group-living ungulates such as caribou, McLellan et al. documented a predation-mediated Allee effect where the predation rate may increase with declining population size because group size declines at a faster rate than the number of groups in the population and the number of groups dictates the rate of caribou-predator encounters (McLellan, et al., 2010).

4 MANAGEMENT HISTORY

4.1 HABITAT

In 1977 the BC Government sponsored an assessment of designating portions of the Telkwa Mountains as an Ecological Reserve primarily to protect caribou habitat (Theberge & Oosenbrug, 1977). The resulting report recommended a 55,400 ha ecological reserve in addition to an 87,500 ha provincial park for a total of 142,700 ha of caribou habitat protection (Theberge & Oosenbrug, 1977). No action was taken at the time. In 1998 the BC Government developed the first recovery plan for the Telkwa subpopulation of caribou (BVCRB, 2015). This plan recommended habitat protection measures related to both the logging and mining industries (MELP, 1998).

4.1.1 PROTECTION

The ecological reserve recommended in 1977 to date has not been acted upon. However the 34,536 ha Tazdli Wyiez Bin/ Burnie-Shae Provincial Park was formed in 2008 (BC Parks, 2010). In 2015 a 229,000 ha Wildlife Habitat Area (WHA) was established over the remainder of the Telkwa caribou range (MFLNRO-WHA, 2016).) The WHA, established under the Government Action Regulation (GAR) provides two levels of habitat protection under the Forest and Range Practices Act (FRPA); the no harvest zone (129,253ha) covers the alpine tundra and most of the subalpine forests (Englemann spruce-Subalpine fir biogeoclimatic zone) and provides complete habitat protection for high elevation core habitat. A modified harvest zone encompasses the surrounding sub-boreal spruce forests, and extends from the no harvest zone to the Morice, Bulkley and Telkwa rivers to the south, east and north, respectively, and to the height of land to the west. Requirements within this zone limit the amount of early-seral forests and the distribution of

roads within the matrix habitat. The WHA designation is also applicable oil and gas activities permitted under the Oil and Gas Activities Act (OGAA). Under the Environmental Protection and Management Regulation (EPMR), OGGA-regulated activities must not cause a material adverse impact to caribou or to caribou habitat within the WHA area (MFLNRO Skeena, 2017).

The Wildlife Habitat Area order also contains legal Best Management Practices for minimizing the impacts of mineral development on caribou and caribou habitat within the WHA (MFLNRO Skeena, 2017).

4.1.2 ENHANCEMENT AND RESTORATION

Caribou habitat enhancement and restoration relates both to recreating or improving habitats for caribou seasonal range as well as managing linear disturbances (roads, seismic lines, pipelines, transmission rights of way) to prevent facilitated predator access (Alberta Woodland Caribou Recovery Team, 2005; Dickie, et al., 2017; Dickie, et al., 2016). As well, habitat enhancement and restoration must be accompanied by protection to be effective (Schneider, et al., 2010). Restoration of caribou habitat takes place naturally through succession from early seral stages to mature and old forest. Standard silviculture practices could aid this process. Further habitat enhancement and / or restoration has not taken place within the Telkwa caribou subpopulation area.

4.2 RECREATION AND ACCESS MANAGEMENT

Snowmobile closures in the Telkwa Mountains were first recommended in 1980 (Skeena Fish and Wildlife Branch, 1980). An Order in Council to prohibit motorized use in the Telkwa Mountains was approved in 1981 however it fell through due to opposition from the local snowmobile clubs and the local Member of Legislated Assembly (MLA) (Cichowski, 1989). In 1998 the BC government requested that the public voluntarily refrain from pursuing motorized recreation activities in certain areas of caribou habitat (MELP, 1998). The establishment of the Voluntary Recreational Access Management Group (VRAMG) in 2002 helped guide these efforts (BVCRB, 2015). However by 2006 voluntary compliance was eroding and the VRAMG recommended in 2006 and 2009 that the BC government legislate summer closures to recreational use in the Telkwa mountains (BVCRB, 2015).

Motorized vehicles are not permitted in Wyiez Bin/ Burnie-Shae Provincial Park during the summer months (BC Parks, 2010).

4.2.1 SNOWMOBILE

Many of the past proposed actions in regards to recreation access in the Telkwa Mountains included summer activities and thus were not specific to snowmobile use. See paragraph above. The BC government is currently pursuing Stewardship Management Agreements (SMA's) with local snowmobile clubs (J. Campbell, pers. comm. 2017). SMA's could include a combination of areas open and areas closed to snowmobile use.

Snowmobile use is not permitted in the northern half of Wyiez Bin/ Burnie-Shae Provincial Park (BC Parks, 2010). The use of snowmobiles for hunting year round is prohibited however snowmobiles may be used for hunting support (BC Government, 2016a).

4.2.2 HELI SKI / CAT SKI

The helicopter and cat skiing industry is guided by best management practices. However there are no commercial helicopter or snowcat skiing operators within the Telkwa caribou subpopulation boundaries (HeliCat Canada, 2017).

4.2.3 SUMMER RECREATION

See 4.2 Recreation and Access Management heading above.

4.3 PREDATORS

4.3.1 WOLF MANAGEMENT

Population surveys for wolves have not been carried out within the Telkwa caribou subpopulation area. Wolves are managed as general open seasons through the provincial hunting regulations. The limit on the number of wolves harvested per person annually (annual bag limit) for the Telkwa caribou subpopulation area (Management Units (MUs) 6-9) is 3 (BC Government, 2016a). Wolves are also trapped by registered trappers for their fur. There is no requirement for compulsory inspection or compulsory reporting of wolves harvested in Region 6 (BC Government, 2016a).

Hunting and trapping does not usually result in the removal of complete packs, remaining pack members can reproduce and recover within one year providing food resources are available. Partial pack removal can also splinter packs, resulting in more wolves as their territorial system is compromised (B. McLellan, pers. comm. 2017). Complete pack removal, usually carried out from a helicopter, would likely be more effective. An aerial wolf cull has not been carried out within Telkwa caribou subpopulation area.

4.3.2 COUGAR MANAGEMENT

Cougar populations are thought to be low within the Telkwa caribou subpopulation area. The annual bag limit for cougar in Region 6 is one (BC Government, 2016a). There is a requirement for compulsory inspection of all cougars harvested in British Columbia (BC Government, 2016a).

4.3.3 OTHER

Bear and wolverine predation can also have a significant impact on caribou populations (Wittmer, et al., 2005a). However bears and wolverine populations are likely not greater than historic levels, instead grizzly bears and wolverines themselves may be at risk in some areas (BC Conservation Data Centre, 2017). In addition, as bears are more abundant than caribou and only a small portion of the diet of any one bear would be caribou, a very large number of bears would have to be killed to have an effect (MFLNRO LNG, 2015).

4.4 PRIMARY PREY

Managing the abundance and distribution of other ungulate species (e.g. moose and deer) has been a fundamental recommendation for recovering southern mountain caribou (MCTAC, 2002; Messier, et al., 2004; MCST, 2006; EC, 2014; Boutin & Merrill, 2016).

4.4.1 MOOSE MANAGEMENT

A moose population survey is planned for the Bulkley Valley Landscape Unit. While not centered on the Telkwa Mountains, the survey boundary does include the Telkwa caribou range area and will provide a broad estimate of the moose population in adjacent landscapes (MFLNRO Skeena, 2017).

Hunting moose in MU 6-9 is managed through a combination of general open seasons and limited entry hunts (BC Government, 2016a). There have not been changes to hunting management of moose for caribou recovery purposes.

4.4.2 DEER MANAGEMENT

Both mule deer and white tail deer are present within the Telkwa caribou subpopulation area. There is a general open season for both white tail and mule deer bucks (BC Government, 2016a).

4.4.3 OTHER

Elk are not abundant in the Telkwa Mountains and there is no general open or limited entry hunting seasons (BC Government, 2016a).

4.5 POPULATION REINFORCEMENT

4.5.1 MATERNITY PENNING

Maternal penning to increase calf recruitment is a tool that has not been used with the Telkwa caribou subpopulation. However with a current population of 22 – 24 animals a maternal penning project could produce significant results providing most or all of the females are penned and female survival is greater than 85% (DeMars, 2017).

4.5.2 CAPTIVE BREEDING

Captive breeding is defined as “keeping and selectively breeding caribou in captivity, usually at an ex-situ facility, over a relatively long period of time with the purpose of releasing individuals back into the wild” (Hayek, et al., 2016). To date, captive breeding of caribou has not been implemented and is not in the plans as a management tool for conserving wild caribou populations.

4.5.3 TRANSLOCATION

Translocation, or population augmentation, refers to the movement of individuals from one population (or subpopulation) to another (Hayek, et al., 2016). Numerous translocation efforts for caribou have taken place across North America (Bergerud & Mercer, 1989; Hayek, et al., 2016) including the translocation of 32 caribou from the Chase-Sustat subpopulation to the Telkwa subpopulation in 1997 and 1998. The Telkwa subpopulation may have been as low as 6 caribou prior to the augmentation, ten years later it was estimated to be greater than 100 (MFLNRO Skeena, 2017).

4.5.4 OTHER

Predator exclusion fencing or other forms of population reinforcement have not been implemented for the Telkwa caribou subpopulation.

4.6 STEWARDSHIP/OUTREACH

Stewardship Management Agreements (SMA's) are in place for many caribou subpopulation areas that also experience high recreational snowmobile use. The general concept is that while key areas of caribou are closed to snowmobile use, the snowmobiling community will act as stewards in implementing best management practices in other areas of caribou habitat that remain open to snowmobile use. Considerable outreach efforts at industry

trade shows, snowmobile retailers, etc. may also be undertaken. As mentioned above SMA's are currently being pursued in the Telkwa Mountains.

4.7 RESEARCH AND MONITORING

There have been decades of research into caribou biology and conservation. This body of work has informed scientists and policy makers of the key factors that contribute to caribou population dynamics, important threats and potential solutions. Key findings have been the proximate role of predation and apparent competition in caribou population fluctuations and the ultimate role of habitat destruction in caribou population declines. While these factors are well understood in a broad sense, ongoing research is necessary to fine tune caribou responses to ecological stimuli and human disturbance.

The Telkwa caribou subpopulation may have the longest research and monitoring history in the province, with surveys dating back to the 1940's (Theberge & Oosenbrug, 1977). Research and monitoring has continued since that time (van Drimmelen, 1986; Skeena Fish and Wildlife Branch, 1980; Roberts, et al., 2003; MELP, 1998; Stronen, et al., 2007; Houwers, 1996; Cox, 1977; Thiessen, 2013; Thiessen, 2014)

5 IMPLICATIONS TO OTHER WILDLIFE

Management actions focused on conserving caribou will necessarily have impacts on other wildlife species. Caribou require landscapes where densities of other ungulates and predators are low; thus, management actions undertaken for caribou may result in population sizes of moose, deer, and wolf that are much lower than those currently experienced (Serrouya, et al., 2015; Serrouya, et al., 2017). Reducing the populations of these species may occur from either direct management actions (e.g. lethal control) or through environmental changes (e.g. habitat restoration for caribou) that lowers the extent of suitable habitat.

Conserving caribou will likely benefit a myriad of other species co-occurring within old-growth forests. In this context, caribou may be considered an "umbrella" species (Bichet, et al., 2016). Such species generally have large spatial requirements and are sensitive to environmental changes, both attributes associated with caribou. Meeting the habitat requirements of caribou will therefore result in the habitat needs of many other species also being met.

6 IMPLICATIONS TO OTHER VALUES

Enacting measures to conserve caribou will likely have impacts on social, political and economic values. Most woodland caribou populations occur in working landscapes managed for natural resource extraction. Conserving caribou in these landscapes will likely require limits on these activities, which will likely invoke socioeconomic costs (Schneider, et al., 2011). To effectively mitigate these impacts while conserving caribou in multi-use landscapes, conservation planning will need to incorporate both economic costs and the biological needs of caribou in a spatially-explicit modelling framework (Schneider, et al., 2011; Schneider, et al., 2012).

In many caribou ranges, reducing the current densities of other ungulate species will be fundamental to conserving caribou (Serrouya, et al., 2015). Lowered populations of big-game species such as moose will result in reduced hunting opportunities. While incorporating hunters in the initial lowering of these populations can be advantageous and seen as a "win-win" (Serrouya, et al., 2015), the long-term suppression of these populations will likely require support from the regional hunting community.

Caribou have evolved a life history strategy that is dependent on large landscapes of intact wilderness (Bergerud, 2000). For many, such landscapes have inherent and intangible value. Intact wilderness also has economic benefits, including climate regulation, sedimentation control and nutrient cycling (Balmford, et al., 2002).

Caribou conservation can also elicit ethical issues. For many small and rapidly declining populations, management actions may include direct control of predators and other ungulates (Hervieux, et al., 2014). Such actions can elicit considerable controversy and, consequently, require substantial scientific support and justification for their implementation (Boertje, et al., 2010).

7 PARTNERS / NEIGHBOURS

Partners are bodies, currently existing or with strong future potential, that can assist in some aspect of management, such as expertise, financial contribution, in-kind support or moral support.

Neighbours are bodies within in the caribou subpopulation area that are currently not participating in caribou management that could be affected by caribou management, such as local governments, industry tenure holders, and recreation groups. These neighbours could potentially become future partners.

8 RECOMMENDED ACTIONS

8.1 SHORT TERM (WITHIN 6-12 MONTHS)

Activity	Timeline	Cost	FTE
Maintain X number of collars on caribou to monitor mortality cause and census sightability	Winter 2017 / 2018	TBD	0.05
Caribou census	Winter 2017 / 2018	\$20,000	0.03
Moose Survey	Winter 2017 / 2018	\$40,000	0.05
Wolf surveys / collaring / monitoring / control	Winter 2017 / 2018	\$100,000	0.5
Grizzly bear survey	2018	TBD	TBD
Supplemental Feeding	Winter 2017 / 2018	\$40,000	0.1
Establish Motor Vehicle Closure Areas under the Wildlife Act for areas of the Telkwas.	Regulation change proposal submitted Fall 2017	\$4000	0.4
Implement the Wet'suwet'en Guardian Program	Initiate Winter 2017 Find funding to support beyond 2017.	\$147,000 over 2 years Funded from HSP	0.6
Outreach and stakeholder engagement through regular TRAM meetings	Ongoing	TBD	0.01
Establish a Stewardship Management Agreement for the Grizzly Plateau area with the Houston Snowmobile Club	Ongoing	TBD	0.01
Establish conditions for permitted recreation access to Starr Basin (summer and winter) with the Smithers Snowmobile Club, Bulkley Valley Quad Riders Society, and Houston Snowmobile Club	Immediately	TBD	0.05
Monitor MVC compliance (in partnership with the Conservation Officer Service)	Ongoing	\$15,000	0.05
Open communication with local governments (District of Houston, Village of Telkwa, Town of Smithers and Regional District of Bulkley Nechako)	On demand or annually		

Woodland Caribou Plan for the Telkwa Subpopulation

Open communication with recreation community.	On demand or annually		
Continue to build collaborative management partnership with the Office of the Wet'suwet'en	Ongoing		
WHA implementation	On demand		0.05
Establish Reserves		TBD	TBD
Workshops with regulatory agencies		TBD	0.05

8.2 MEDIUM TERM (WITHIN 12-24 MONTHS)

Activity	Timeline	Cost	FTE
Increase moose cow / calf LEH authorizations if moose density becomes greater than \times moose / km ²			0.01
Maternal Penning	Winter 2019 / 2019	\$400,000 annually	1.0
Environmental mitigation policy implementation	TBD	TBD	0.01
Website	TBD	TBD	TBD

8.3 LONG TERM (WITHIN 24-48 MONTHS)

Activity	Timeline	Cost	FTE
Augmentation	TBD	\$100,000	0.2
Ecosystem Restoration Plan	TBD	TBD	0.01

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