



Caribou Conservation Program

2017 – 2018 Monitoring Report



Table of Contents

Woodland Caribou Monitoring Program	4
Wolf Monitoring Program	6
Caribou Conservation Actions	8
References	11



Parks Canada Agency. 2018. Caribou Conservation Program, 2017-2018 Monitoring Report. Unpublished technical report. Jasper National Park of Canada, Parks Canada Agency. 12pp.

Content (excluding images) may be used without permission, using the credit above.

Également disponible en français sous le titre “Programme de conservation du caribou, Rapport de surveillance 2017–2018.”

Download the 2017-2018 Monitoring Report and find additional program information on our website: www.parkscanada.gc.ca/caribou

Caribou Conservation Program

Jasper National Park
P.O. Box 10
Jasper, Alberta T0E1E0
Phone: 780-883-0391
Email: caribou@canada.ca



Introduction

This report summarizes ongoing population monitoring of woodland caribou, a species at risk in Jasper National Park. Understanding caribou and wolf populations and how they relate to each other is key to supporting healthy populations of both species in the park. Progress reports containing more in depth analysis and conclusions are produced every two years and are available upon request.

Recovery actions for caribou in Jasper are guided by the *Recovery Strategy for the Woodland Caribou, Southern Mountain population* (2014) and the *Multi-species Action Plan for Jasper National Park* (2017), both of which were developed in cooperation with Indigenous partners, local and regional stakeholders, and provincial and federal agencies. These documents can be found on the Species at Risk Public Registry website at sararegistry.gc.ca.

Reviewed and approved by:

David Argument, Resource Conservation Manager
Alan Fehr, Field Unit Superintendent



Woodland Caribou Monitoring Program

Background

Caribou herds in the southern portion of Jasper National park are part of the *Threatened* Southern Mountain woodland caribou population listed on Schedule A of the *Species at Risk Act*; herds in south Jasper are at or below the quasi-extinction threshold, which means that the number of females is so small that the herds are not capable of overcoming baseline threats and recovering on their own. Parks Canada identified five key threats to caribou (altered predator-prey dynamics, facilitated predator access to caribou habitat, direct disturbance of caribou, direct loss of caribou habitat, and small population effects) with altered predator-prey dynamic being the most influential threat (Parks Canada Agency, 2011). We are monitoring caribou and predator-prey dynamics to support the implementation of the management actions to address these threats.

Objectives

- Monitor woodland caribou south of Highway 16 in three areas: the Brazeau, Maligne, and Tonquin (Figure 1).
- Monitor caribou population size, distribution, demographics, genetics, survival, and aspects of predator-prey dynamics that may influence caribou populations.

Methods

Parks Canada biologists monitor caribou population size with aerial surveys and DNA surveys. The aerial surveys provide a count of the minimum number of animals alive. We have used aerial surveys in combination with radio telemetry to provide a mark/recapture population estimate based on radio-collars (a corrected population size that accounts for animals not seen), but as of 2010 no longer radio-collar caribou.

DNA from scat is now used for population estimation (and combined with other sources of information like minimum population size and calf ratios in an integrated population model to give an overall estimate using all available data). During the aerial surveys, biologists collect scat samples that provide DNA to identify individual caribou. Conducting two scat collections within a few weeks provides a means of statistically evaluating DNA results to provide an estimate of total population size in the Tonquin area, plus or minus a calculated degree of error. The Maligne and Brazeau populations are too small to estimate population size using this method, but DNA results are still used to understand immigration/emigration, survival, minimum number alive, and relatedness.

Results

Population Monitoring

The annual aerial and scat caribou surveys were conducted during the rut in 2017 and 2018. In 2017, we counted a minimum of 18 caribou in the Tonquin (7 males, 6 females, 1 unknown adult, and 4 calves), 8 caribou in the Brazeau (3 males, 3 females, and 2 male calves), and only 3 animals in the Maligne (1 female, 1 female calf, and 1 female yearling). In 2018 we observed 27 caribou in the Tonquin (12 females, 8 bulls, 5 male calves, 2 female calves), 10 caribou in the Brazeau herd (3 cows, 4 bulls, 2 male calves), and failed to observe caribou in the Maligne range despite excellent survey conditions. The number we observed in each range is the *minimum count* – it is not corrected to account for caribou we didn't see – and therefore we expect the actual population size to be larger than what was observed (for larger herds; refer to "counts" in Figure 2).

In 2017, we observed 7 calves within the three herds, which is very small number and given that at least 5 were male, this will be insufficient to recover populations as only a small number of new females will be added to already very small populations. This trend continued in 2018, with a total of 9 calves in two herds, 7 of which were male. Nevertheless, Jasper continues to have a relatively high number of calves compared to caribou populations elsewhere, indicating that the source of population decline is not directly related to the survival of young caribou.

Population estimates have not been updated since 2016, as DNA results from 2017 and 2018 were recently scored and are still being error-checked. As of 2016, the Tonquin was estimated at ~31 (including calves), illustrating a decline from 113 animals in 2006 to ~31 in 2016 (there are no indications that the herd has increased through to 2018). We expect natural fluctuations in animal populations, but when caribou herds decline to have <10 reproductive females, they have been shown to have a very low probability of persistence over the next 20 years. This limit of 10 reproductive females is known as the quasi-extinction threshold and is based on population viability analyses from several herds, and with guidance from the IUCN criteria for assessing extinction risk. We estimate there are <10 reproductive females in the Tonquin and, therefore, that all South Jasper caribou herds are at a high risk of imminent extirpation (Figure 2). Although caribou may still exist in South Jasper for years, herds will ultimately continue to decline to extirpation.

We do not estimate population size in the Brazeau and Maligne using scat analysis because the herds are too small; however, we were able to confirm the genotypes of the 3 caribou observed in the Maligne (and a male caribou that was not observed), and collect DNA information from

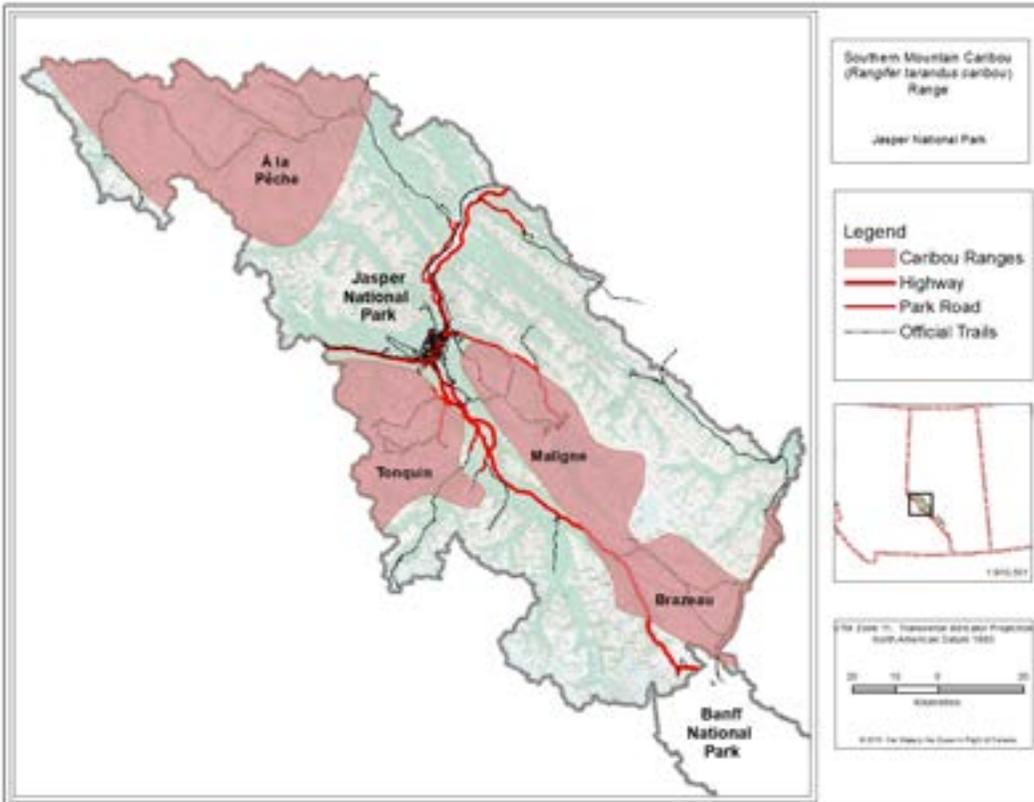


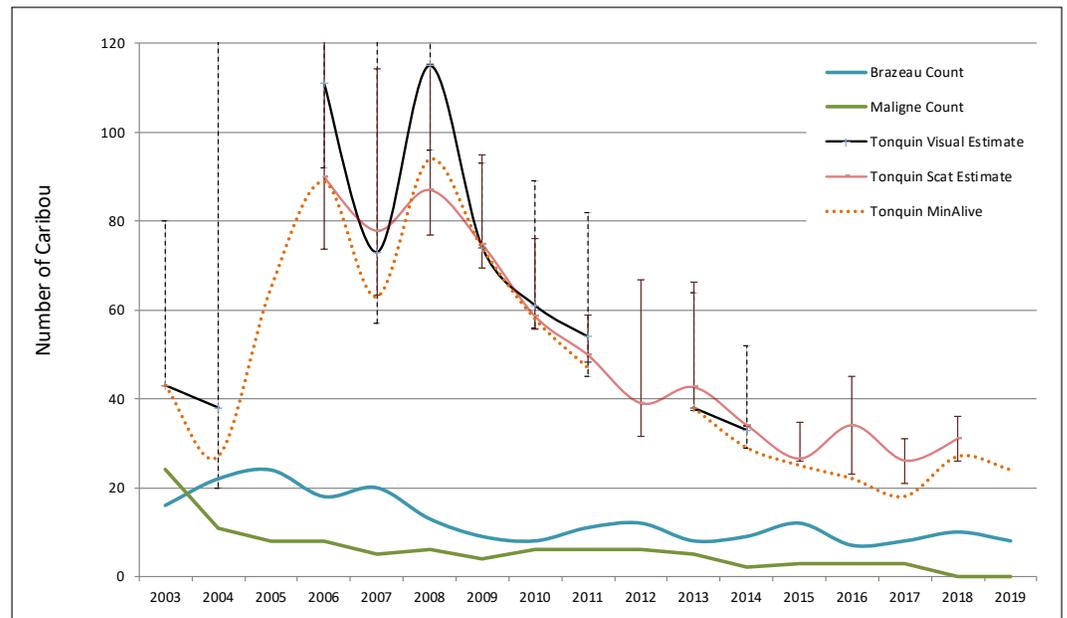
Figure 1. Caribou ranges for South Jasper (Brazeau, Maligne, and Tonquin) and North Jasper (A La Pêche).

7 caribou in the Brazeau and from 24 caribou in the Tonquin in 2017. Population estimates for the Tonquin analysis are forthcoming.

Parks Canada staff are also involved in assisting the Government of Alberta in monitoring the A la Pêche (ALP) herd, a trans-boundary herd that spends significant time in Blue Creek and the Snake Indian valley within Jasper. The A la Pêche herd is considered partially migratory. Some animals migrate to the foothills for the winter season, others stay in Jasper or mountainous regions year-round, and still others remain in the foothills year-round. The herd is approximately 140-150 animals, but work is ongoing to

refine the population estimate with scat DNA spatial mark-recapture modelling. Wolf control has been ongoing outside of national park lands in the ALP winter range since 2006 and in the winter and summer range since 2014. Due primarily to this ongoing reduction in wolf density, the ALP herd has experienced increased survival and recruitment rates and a positive population growth rate (Eacker et al. 2019). Survival values of 0.92 and 0.96 and female recruitment of 0.20 and 0.14 for 2016 and 2017, respectively, indicate that the herd is doing well and expected to continue to grow if conditions are consistent into the future. Lambda values were 1.16 and 1.12 in 2016 and 2017, indicating a 16% and 12% growth of the population, respectively (Eacker et al. 2019).

Figure 2. Population abundance and trends expressed as counts and population estimates (scat and visual collar mark-resight) for caribou in south Jasper National Park 2003 – 2018 (error bars are 95% confidence intervals).





Wolf Monitoring Program

Background

Wolves are a key predator in the Jasper ecosystem and, as identified in the Recovery Strategy for Southern Mountain Woodland Caribou, when at densities >3 wolves/1000km² are particularly influential to caribou herds. Although caribou are not an important prey item for wolves, even moderate levels of wolf predation in caribou herds can be sufficient to cause caribou decline. We monitor wolf distribution and pack size (density) in Jasper to better understand risks to caribou survival and assess ecological conditions for future caribou recovery efforts. This project is part of the larger Caribou Conservation Program.

Objectives

- Detect changes in wolf pack sizes and density to better understand the condition of critical caribou habitat.
- Document wolf response to management changes (e.g., delayed access to the backcountry) and to changes in deer and elk populations.

Methods

We aim to maintain radio-collar contact with several key wolf packs that overlap with caribou habitat. Monitoring wolves and wolf density is challenging as wolves are dynamic, frequently shift ranges, and have high mortality. VHF collars (very high frequency – collars that emit only a radio signal, not precise locations) are used mostly to maintain contact with packs. GPS or satellite collars provide precise locations that we use for delineating pack ranges, habitat use, and response to delayed backcountry access.

Wolf density and pack size data is gathered from reported sightings, track counts, radio-collar data, and remote camera images. Remote cameras allow for observation of wolves across the park and can provide multiple counts of wolf packs over time at a consistent location. Sightings help to supplement camera information, and radio-collars can help solidify knowledge about particular packs and areas.

We aim to estimate an approximate territory and pack size during the winter months when wolves travel as a pack. We calculate wolf density within caribou areas in southern Jasper National Park, using modified methods detailed in Hebblewhite (2007). When a pack and its range are identified by remote camera, we use knowledge of wolf biology and average territory size to adjust the pack's number by the proportion of time the pack is estimated to spend in south JNP. We use this adjusted wolf number to calculate wolf density across southern JNP.

Results

Wolf packs that overlap with caribou ranges include the Sunwapta pack, the Brazeau pack, the Pobokton pack, and to a lesser degree the Punchbowl and Rocky South packs (Figure 3).

Over the past two years, we have collected some habitat use and movement data on the Sunwapta Pack but were unable to locate other packs for collaring in spring 2017, or additional wolves with the Sunwapta pack in 2018. Collars are currently present on wolves in the Sunwapta pack and on a new pack on the north boundary of Jasper National Park. Finding wolves to collar has been increasingly difficult over the past five years.

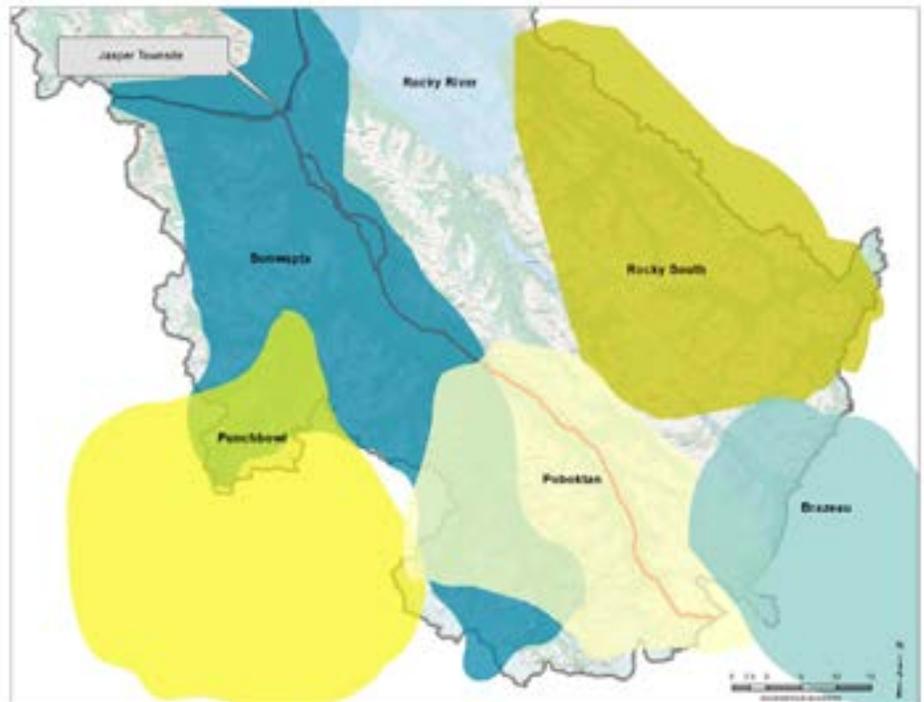


Figure 3. Approximate wolf pack ranges in south Jasper National Park in 2017 and 2018 – areas outside of JNP are not accurate nor informed by remote camera or GPS data.

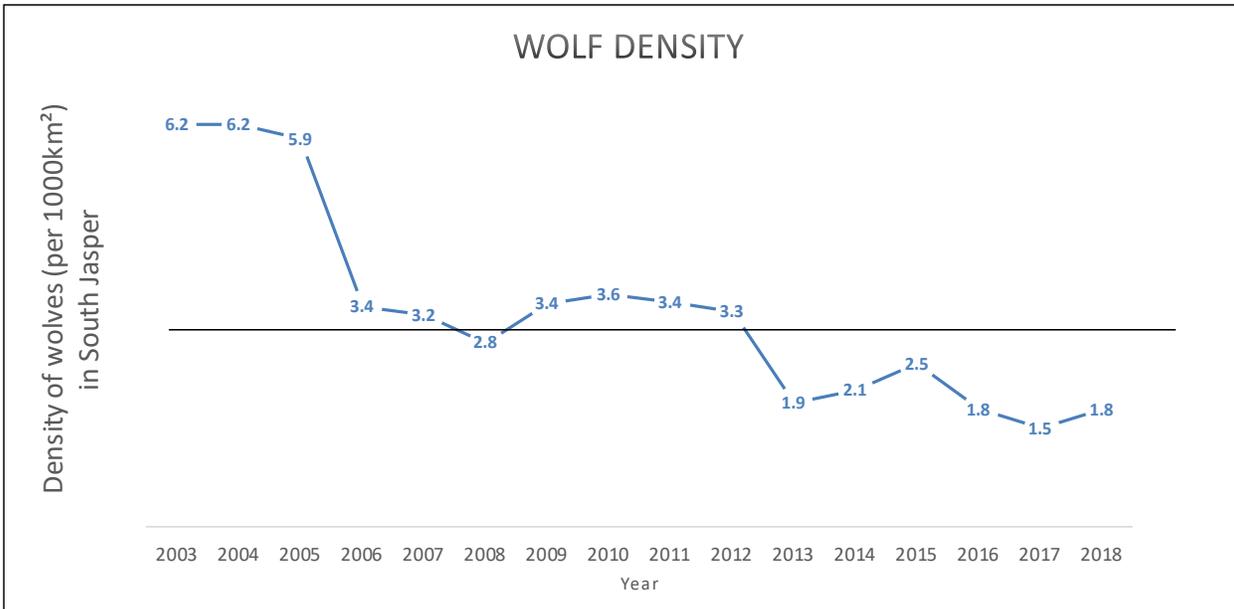


Figure 4. Wolf density (wolves per 1000km²) in south Jasper National park 2003/04 to 2017/18.

Wolf density as calculated by remote camera sightings has been declining in Jasper. In winter 2017/18, wolf density in south Jasper was estimated at 1.5 wolves/1000km². In winter 2016/17 density was estimated at 1.8 wolves/1000km², and there were an estimated 14 wolves in South Jasper as identified on remote cameras (average pack size of 3 wolves). In 2015/16 density was higher, but mainly because of the arrival of an unknown, temporary pack of 8 wolves near the townsite. Because these wolves did not establish a permanent presence, we adjusted our count to account for the proportion of time they were known to be in the area. Total number of wolves in South Jasper was estimated at 18 and density was calculated at 2.5 wolves/1000km². Wolf abundance and density has fluctuated historically, from a low of 0.3 wolves/1000km² in 1959 at the end of wolf control practices to its height of ~5-6 wolves/1000km² in the early 1980s as wolves recovered. Wolf density declined after the 1980s and then returned to high densities (around 5) in the early 2000s. After carcass dumping was stopped in 2006, wolf density began to drop again and has been around 3 wolves/1000km² since 2006, and near or below 2 wolves/1000km² since 2013 (Figure 4).

Wolf density in caribou habitat (including Matrix habitat – the habitat surrounding caribou ranges where predator/prey dynamics are known to influence caribou mortality rates), is a key indicator of caribou survival. It is thought that when density is below 3 wolves/1000km², caribou herds are likely to persist (as indicated in the *Recovery Strategy for the Woodland Caribou, Southern Mountain Population*). However, we observed sharp declines in the Tonquin herd from 2011-2013 when wolf densities hovered near 3, suggesting that 3 wolves/1000km² is not necessarily coincident with increasing caribou herds when herds are already small. We infer that not only is overall wolf density important, but proximity of wolf packs to caribou range (which influences wolf use of caribou habitat) is key in explaining declines. During 2011-2013, the Robson wolf pack was active in the Decoigne region, frequently using caribou habitat in the Tonquin. There has not been a resident pack in this area since 2015/16.





Caribou Conservation Actions

Background

The development of the community and stakeholder-based *Caribou Action Plan for Caribou Recovery* in 2005 guided caribou conservation actions prior to an official recovery strategy from Environment Canada. In anticipation of listing on Schedule 1 of the *Species at Risk Act*, these actions and current threats affecting caribou populations were reviewed and then incorporated in a second plan, the 2011 *Conservation Strategy for Woodland Caribou (Rangifer tarandus caribou), Southern Mountain Population, on Parks Canada Lands*. Actions for woodland caribou recovery continue, now under the auspices of the *Recovery Strategy for the Woodland Caribou, Southern Mountain population (Rangifer tarandus caribou) in Canada* (Environment Canada, 2014) and the recently published Multi-species Action Plan for Jasper National Park (Parks Canada, 2017).

Objectives

- Reduce or eliminate the five threats identified as impacting caribou in the mountain national parks: altered predator-prey dynamics, facilitated predator access, direct disturbance, habitat loss, and small population size.
- Achieve stable to increasing numbers to a minimum of 100 animals (as defined in the Southern Mountain Caribou Recovery Strategy) as a step towards achieving self-sustaining local herds in which natural processes (dispersal, migration) can occur.

Methods

Parks Canada is continuing the implementation and refinement of previously identified recovery actions. A combination of scientific literature, expert knowledge, monitoring and comments from the community is being used to support these actions.

Results

Threats to caribou herds in Jasper National Park are well understood and we have accumulated data and implemented science-supported actions to help address threats.

Parks Canada has prepared the Multi-species Action Plan for Jasper National Park that provides the detailed recovery

planning to support the strategic direction set out in the Recovery Strategy for the species. The plan outlines what needs to be done to achieve the population and distribution objectives identified in the Recovery Strategy, including the measures to be taken to address the threats and monitor the recovery of the species, as well as the proposed measures to protect critical habitat that has been identified for the species.

A comprehensive and detailed review of the current situation for the Tonquin herd has been completed (Bisaillon and Neufeld, 2017) with the objective to better understand human use in the Tonquin Valley, explore the cause of its continued decline, the impact of the implemented actions to date and ultimately, to review a suite of additional conservation measures. New measures are assessed based on the likelihood of providing a population level effect and mitigating existing threats such as facilitated predator access. This work will inform whether new conservation actions are warranted for the Tonquin Valley herd.

Altered Predator-Prey Dynamics

The largest threat to Jasper National Park caribou is apparent competition (high numbers of main prey in an ecosystem result in high predator numbers, which increases predation rate on a rare species), similar to the main identified threat for most other caribou populations across the country. However, in the case of Jasper caribou decline, we believe that the cause of apparent competition is not landscape disturbance (as occurs in most herds within industrial landscapes), but previous management practices of wolf control and elk reintroduction. That is, management-induced apparent competition (and not disturbance-mediated apparent competition) has affected predator-prey dynamics over the past several decades, resulting in poor conditions for caribou persistence.

Actions have been implemented in the Jasper/Banff Local Population Unit (Maligne, Tonquin, and Brazeau herds) to address four of the five identified threats, with altered predator-prey dynamic being the most influential threat. The Recovery Strategy indicates that caribou populations are more likely to survive when wolf density is at or below 3 wolves per 1000 km². Empirical evidence shows that in South Jasper, conservation actions aimed at restoring predator-prey dynamics in the park such as decreasing prey abundance and not dumping road killed animals in gravel pits have decreased wolf density below this threshold.

Facilitated Predator Access: Delayed Human Access

Wolves move more quickly and easily on packed trails in the winter, an effect that becomes more pronounced at higher elevations, resulting in an increased predation risk to caribou. To help mitigate this advantage for wolves, winter human use within caribou critical habitat is delayed until mid-winter. This action was first implemented in 2009.

Significant communication efforts were deployed to ensure that visitors were well informed on the recreational opportunities available in this area while minimizing incursions into the closed area. To that effect, signs and on-site communication were improved. Compliance rate is continually improving since the implementation of delayed access in 2014 with only a few minor incursions reported over the past two years.

Habitat Loss: Critical Habitat Implementation

Since the Caribou Recovery Strategy was approved in June 2014, we have worked with Environment Canada to produce and refine maps of critical caribou habitat within Jasper National Park. In addition, expert

opinion and support were provided by JNP's caribou management team to the Federal Infrastructure Investment Program, and other projects, to ensure that approved projects aligned with the caribou critical habitat designation and the goals of the Recovery Strategy. All new projects are currently reviewed to determine their impact on caribou and critical habitat and whether the project will jeopardize the survival or the recovery of the species. More details on projects permitted under the Species at Risk Act can be found on the SAR Registry at: www.sararegistry.gc.ca. Best practices to guide work in caribou habitat are also being developed to cover regular activities such as filming, random camping and trail work. The best practices should ensure that we are meeting our obligations under SARA while streamlining the assessment process.





Habitat Loss: Fire and Caribou

Parks Canada fire management, caribou conservation and species-at-risk specialists are working together to evaluate fire management actions with respect to caribou critical habitat protection. This year, in Jasper National Park, one significant fire event has given us the opportunity to work together on implementing this process.

In fall 2016, the fire management team started working on the Bench Lakes Complex with the objective to complete multiple prescribed fires over the next few years. In 2017-2018, it was decided to also pursue mechanical harvesting of additional locations on the Bench complex adding 700 hectares to the previously planned activities for an anticipated total of 950ha. The revised fire plan was assessed for impacts to caribou critical habitat, in light of the *Recovery Strategy for the Woodland Caribou, Southern Mountain population in Canada*. The team determined that the additional proposed activity is required for the safety of the Jasper Townsite and therefore falls under a public safety exception, despite possible impacts to caribou recovery. However, mitigation and monitoring measures will be explored and possibly implemented to ensure that the impact on caribou recovery is minimal.

Direct Disturbance

On Highway 93, on a stretch that runs through the Brazeau herd range, sightings of caribou have been recorded regularly since 1955. A total of 13 caribou road mortalities have been recorded between 1985 and 2003 and to help protect these caribou, a seasonal caribou speed zone reinforced with electronic highway signs has been in place since 2005. In spring 2016, data on the caribou herd was examined in relation to the current wildlife speed zone. The length and season of the implemented speed zone was shortened, and the zone was shifted north to focus on the area where caribou use is most frequent. Other factors which contributed to this decision included public feedback and road sightlines. The objective for these changes was to achieve greater compliance in the speed zone and improve the winter driving experience. No highway associated mortality has been reported since 2003.

Small Population Size

The Brazeau, Maligne, and Tonquin herds are at or below the quasi-extinction threshold and will not recover naturally. Based on a comprehensive review of existing literature and input from experts across North America, we conclude that none of these three herds will recover without direct intervention. After reviewing a number of recovery options including direct translocation, maternity penning, and wolf control we determined that a conservation breeding and augmentation program is the only viable option to reverse caribou declines, prevent the extirpation of caribou in Jasper National Park, and meet the goals and objectives of the Recovery Strategy for the Woodland Caribou, Southern Mountain population. Parks Canada, in close cooperation with experts across North America, has been investigating and developing a preliminary conceptual breeding program for Jasper. The work completed recently includes the development of conceptual design for the facility as well as a captive herd management and monitoring strategy, a health monitoring strategy, and a disease risk analysis. Population modelling to determine the impact of various augmentation scenarios has also been completed. We are currently looking at genetics implications of this project, assessing potential sites in Jasper for the facility, and exploring the origin of the source animals as most herds are declining which could limit the number of options available. Our next steps are to initiate the Environmental Impact Assessment and initiate the conversation with the Indigenous groups, the public and the stakeholders. The objective is to have a better understanding of various aspects of the conservation breeding and augmentation program to support the decision making process as no decision has been made yet whether to proceed with the project.



Photo by Mark Bradley

References

Eacker, D. R., M. Hebblewhite, R. Steenweg, M. Russell, A. Flasko, and D. Hervieux. 2019. Web-based application for threatened woodland caribou population modeling. *Wildlife Society Bulletin* 43:167-177.

Parks Canada Agency. 2011. *Conservation Strategy for Southern Mountain Caribou in Canada's National Parks*. Parks Canada Agency, Canada, pp. 30.

Bisaillon, Jean-François and Layla Neufeld. 2017. Review of existing human use and additional conservation measures for the Tonquin Valley caribou. Jasper National Park of Canada, Parks Canada Agency. Jasper, Alberta.

Environment Canada. 2014. *Recovery Strategy for the Woodland Caribou, Southern Mountain population (Rangifer tarandus caribou) in Canada*. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. Viii + 103 pp.

Parks Canada Agency. 2017. Multi-species Action Plan for Jasper National Park of Canada. Species at Risk Act Action Plan Series. Parks Canada Agency, Ottawa. iv + 21 pp.



Jasper Parc national
National Park Jasper

Caribou Conservation Program
2017 – 2018