

ITCHA-ILGACHUZ JUNE POPULATION SURVEY



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2023 – Itcha-Ilgachuz Population Survey

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Summary

The Itcha-Ilgachuz caribou herd experienced a rapid population decline of 80% between 2003 and 2019 (Shores 2019). In response to this population decline, a wolf reduction program was initiated in 2020 to recover the Itcha-Ilgachuz caribou population. After initial population increases in 2020 and 2021, the population estimate of 551 in 2023 was the same as the last population estimate of 550 in 2021 ($\lambda=1.004$). Neonate percentage and calf recruitment have increased following wolf removal. Neonate percentage was at a low of 10% in 2018 and has increased back up to its expected range (20-30%). Calf recruitment in the 2023 late-winter recruitment survey was very high at 24.2%. Coupled with a high adult survival rate of 85%, population metrics have been improving overall following the wolf removal program. The population estimate plateau between 2021 and 2023 highlights the importance of continued monitoring. It also underlines that habitat protection and restoration measures are the long-term and ultimate solution to Itcha-Ilgachuz caribou herd recovery.

Introduction

The Itcha-Ilgachuz caribou subpopulation on the Chilcotin plateau are shallow snow, terrestrial lichen eating caribou. Using Committee on the Status of Endangered Wildlife in Canada (COSEWIC) classification, they fall under Designatable Unit 7 (DU7) and are a species of Special Concern (COSEWIC 2014). The Itcha-Ilgachuz caribou herd declined by 80% between 2003-2019 (Shores 2019). Given the rate of decline, in 2019 it was estimated that functional extirpation (<20 animals) was possible within the next eight years. A wolf reduction program was initiated in 2020 as an emergency measure to curtail rapid population decline of the herd and to plan for long-term habitat protection and restoration measures. The BC Caribou Recovery Program recommends annual population surveys for herds where predator reduction is occurring. The objectives of the Itcha-Ilgachuz population survey were to obtain a minimum total count, estimate population size, and estimate percentage of neonates.

Methods

The 2023 Itcha-Ilgachuz population survey was flown from June 22nd-24th. June is the optimal month to conduct a population survey for this herd because the majority of caribou are concentrated in alpine areas and are easier to locate and classify than in the winter months when they are spread out in smaller groups throughout low elevation pine forests. Most of Itcha-Ilgachuz caribou high summer elevation range and portions of low elevation summer range were flown using a Bell 407 helicopter. Flight tracks and caribou locations are shown in Figure 1.

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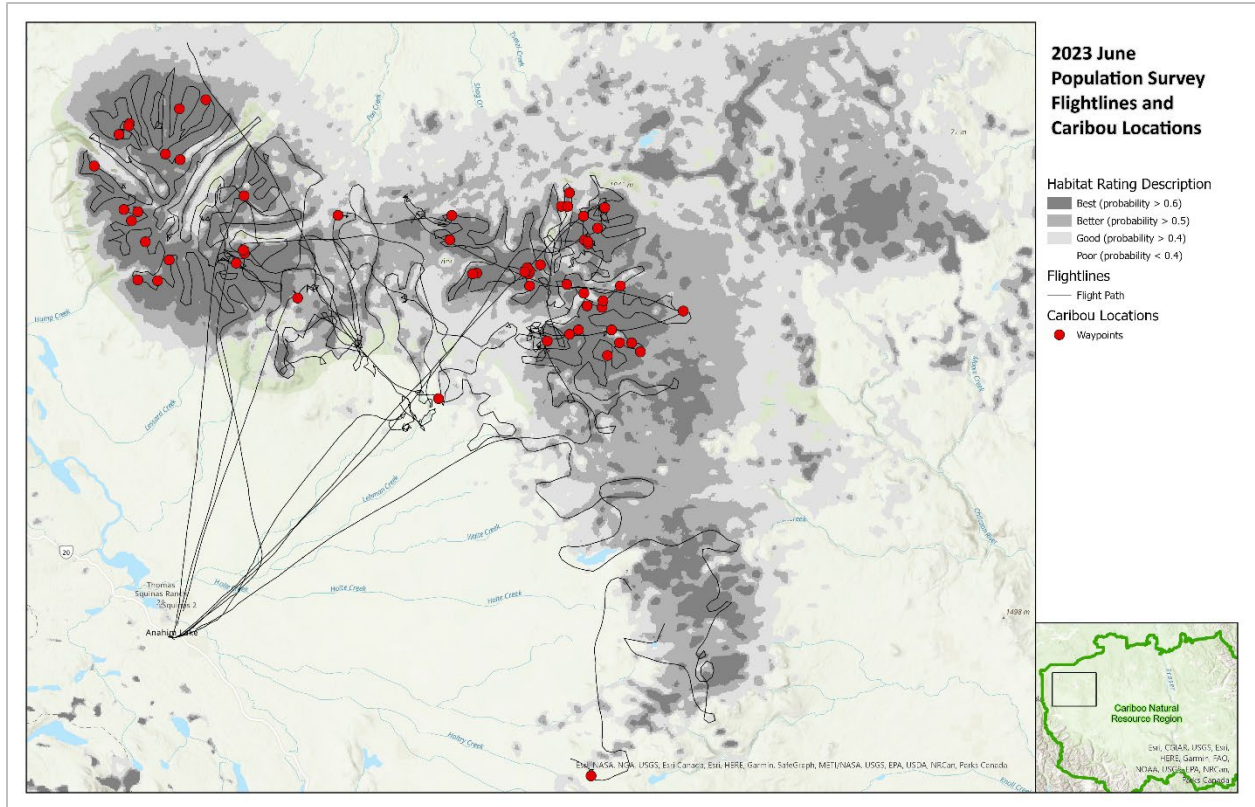


Figure 1. June 2023 survey helicopter flight tracks and caribou locations in the Itcha-Ilgachuz herd range overlaid with a caribou summer habitat suitability model.

Radio collars deployed on caribou provided a sample for a mark-resight population estimate. There were 33 caribou with active radio collars within the survey area, 28 cows and five bulls. When caribou were spotted, total count, classification, and presence of collar(s) were recorded. Caribou were classified into the following categories: cow, bull, yearling, and calf. Identifying which collared individuals were seen was done using coloured ear-tag combinations and telemetry equipment to identify the collar frequencies. When a collared cow was seen, presence of a calf was recorded. Any collared animals not seen during the survey were located after during a follow-up flight and this information was used to obtain a minimum total count.

Survey estimates were calculated in R studio using mark-resight calculations for a closed population and a single resight event. The estimate is derived using a simplified joint hypergeometric estimator (JHE) called the Petersen method (Krebs 2014).

$$N = \frac{(M + 1)(C + 1)}{(R + 1)} - 1$$

Where: N = population estimate, C = total caribou observed during survey, R = the number of collared caribou seen

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Cows and bulls are observed at different rates as cows are often in the alpine calving, whereas bulls can be occupying areas in the timber or sub-alpine habitats (Cichowski 1993). Because of this, a population estimate for each caribou classification (cow, bull, yearling, and calf) was run separately and summed afterwards. The cow population estimate was calculated using the cow sightability correction factor (SCF) from the 2023 survey. For the bull population estimate, we had low confidence in the bull SCF from the survey due to only five collared bulls being within the survey area. Instead, we used an average bull SCF of 0.487 which was calculated using Itcha-Ilgachuz survey data from 2012 to 2020 where there were greater than five collared bulls available within the survey area. Calf estimates were calculated using the cow SCF as a surrogate because calves are not seen without cows. The yearling estimate was calculated using the SCF factor for all 33 collared adults available during the survey.

The percentage of neonates in the population was calculated as the number of calves divided by the total population and should be interrupted as a measure of early neonate survival. Calf recruitment is a separate metric that is measured in March and is interpreted as calf overwinter survival and recruitment into adulthood.

$$\text{Percent neonates} = \left(\frac{\text{total neonates}}{\text{total classified caribou}} \right) * 100$$

The finite population growth rate (lambda, or λ) was calculated and gives the proportional change in population size from one time period to the next. $\lambda < 1.0$ indicates a decreasing population, and $\lambda > 1.0$ indicates an increasing population.

$$\lambda = \frac{N_{t+1}}{N_t},$$

Where: N_t = population estimate at time t , N_{t+1}
= population estimate after one time period

Survival of adult caribou is another metric that affects population growth and decline, and adult survival was calculated for the 2022-2023 biological year (May 1, 2022 - April 30, 2023).

$$\begin{aligned} &\text{Estimated finite survival rate per biological year} \\ &= \text{finite daily survival rate}^{(\# \text{ of days in biological year})}, \\ &\text{where finite daily survival rate} \\ &= \frac{\# \text{ radio collar days over period} - \# \text{ of deaths over period}}{\# \text{ of radio collar days over period}} \end{aligned}$$

Results

Weather conditions were considered good for surveying, with high visibility and calm weather. Survey conditions were a mix of sun with some overcast, and temperatures ranged from 11 to 16 degrees Celsius.

Itcha-Ilgachuz Herd

The population estimate of Itcha-Ilgachuz caribou from the survey was 551, and the number of caribou observed on the survey was 409 (Table 1, Figure 2). An additional 42 caribou were sighted during the follow up survey for collared caribou that were not seen during the survey. This resulted in a minimum count of 451 caribou (297 cows, 18 bulls, 19 yearlings, and 117 calves). The lambda (λ) for the Itcha-Ilgachuz herd between 2021 and 2023 was 1.004, which is indicative of a stable population. The neonate percentage was a healthy 25.9% (Figure 3). The collared adult survival for the 2022-2023 biological year was 85%.

Data from the 1970’s was not used in Figure 1 because the caribou survey done in 1977 (the first survey before 1985) was less intensive, conducted in April rather than in June, and was only a minimum count survey (Smith and Hebert 1986).

Table 1. Itcha-Ilgachuz June 2023 survey summary table.

	Adult Cows	Adult Bulls	Yearlings	Calves	Total
Caribou observed - survey	277	15	18	99	409
Caribou observed - follow-up	20	3	1	18	42
Minimum Count	297	18	19	117	451
Marked Seen	21	4	-	-	25
Marked Available	28	5	-	-	33
Population Estimate	365	31*	24	131	551

*SCF of 0.487 was used which was an average bull SCF from Itcha-Ilgachuz June surveys between 2012-2020 as 2023 collared bull sample size was too low.

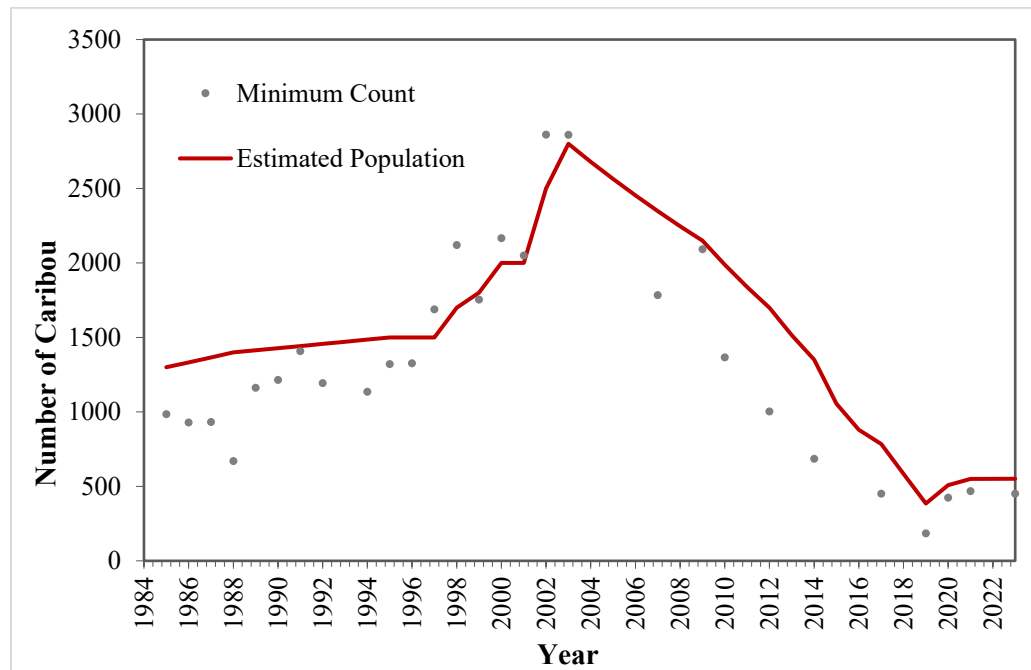


Figure 2. Itcha-Ilgachuz herd population estimates and minimum counts from 1985-2023 June post-calving surveys.

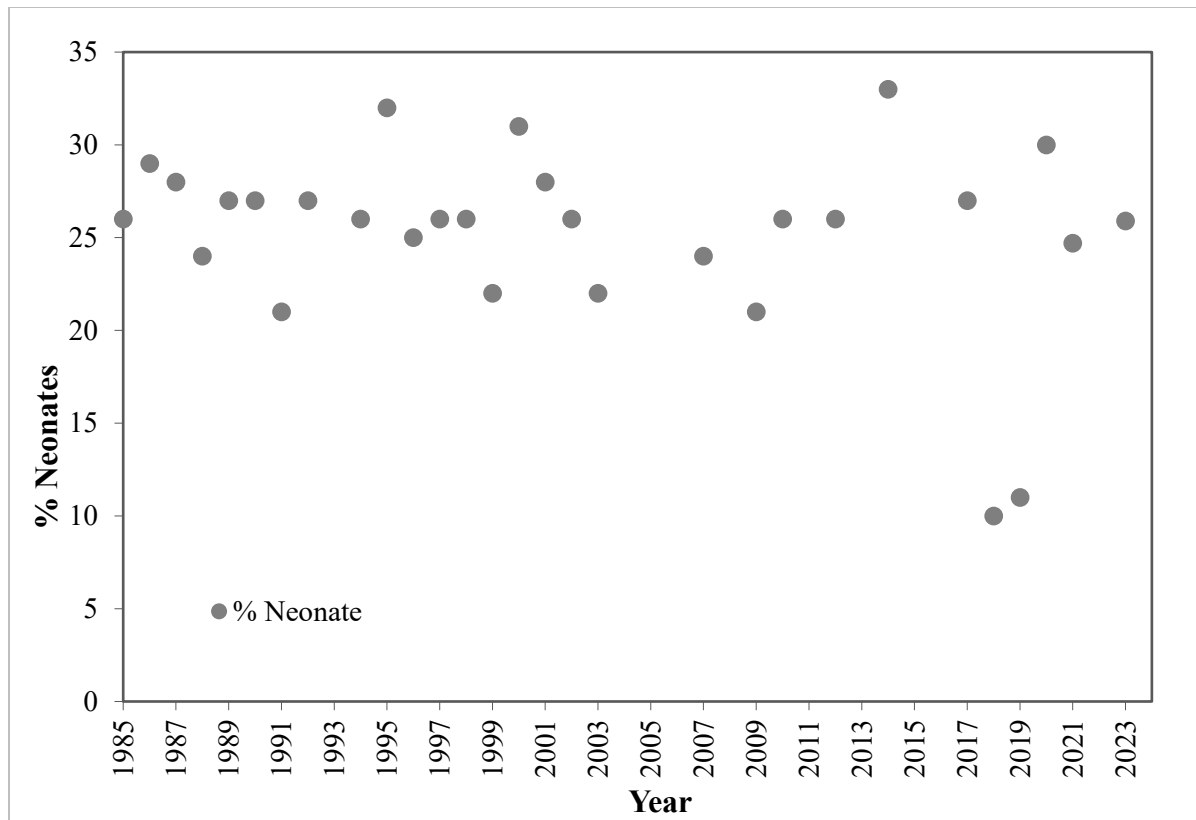


Figure 3. Itcha-Ilgachuz herd percentage of neonates from 1985 – 2021 June post-calving surveys.

Discussion

After a steep decline in the Itcha-Ilgachuz herd population from 2003-2019 (Figure 2), the population increased in 2020 and 2021 following the implementation of wolf removal in winter 2019-2020 (BC Caribou Recovery Program 2020). The population estimate in 2023 was the same as in 2021 ($\lambda = 1.004$), which is indicative of a stable population. A population survey should be conducted in 2024 to see if the population continues to increase with continued wolf removal, or if the wolf removal program has potentially served as a population stabilizer at around 550 caribou. One of the largest changes appears to be in neonate percentage and calf recruitment. Neonate percentage was low in 2018 and 2019 at 10 and 11% respectively, and has recovered in 2020, 2021, and 2023 surveys (Figure 3). Further, the 2023 late-winter calf percentage was the highest that's been recorded for the Itcha-Ilgachuz herd since 1986 at 24.2% and recruitment has generally recovered following the wolf reduction program (Gannon 2023). A recruitment rate of 15% is considered a threshold for a stable caribou population when coupled with an 85% adult survival rate and normal sex ratios (Bergerud 1980). The estimated survival during the 2022-2023 biological year met the assumption level at 85%.

Itcha-Ilgachuz caribou population response following wolf removal supports other findings that wolf removal can quickly change caribou population parameters (Serrouya *et al.* 2019). Population surveys in future years will help determine if the population will increase or remain

stable with the continued wolf removal program. These results highlight that wolf reduction is an emergency measure to prevent the loss of caribou in the Chilcotin and that the long-term solution for caribou recovery requires a reduction in habitat disturbance as well as extensive habitat restoration.

Management Recommendations

- Itcha-Ilgachuz population and recruitment results are positive, and wolf reduction measures should continue to allow for further recovery of the herd.
- Habitat protection and restoration measures must be implemented in Itcha-Ilgachuz caribou herd habitat to allow for long-term population stabilization and recovery.
- Habitat protection measures include the following:
 - Amend the Government Actions Regulation (GAR) order under the *Forest and Range Practices Act* to further protect caribou habitat in Wildlife Habitat Areas within Itcha-Ilgachuz herd range.
 - Consider implementing a *Wildlife Act* Wildlife Management Area (WMA) that focuses on Itcha-Ilgachuz caribou habitat conservation.
 - The GAR order amendment or WMA implementation should focus on:
 - Retaining and recruiting large tracks of mature forest, while considering current caribou habitat use (using GPS collar locations). Focus should be on reducing the amount of disturbance and the disturbance frequency, as caribou require large, connected areas of mature forest to forage, reproduce, and avoid predators (Seip 1991; Wilson *et al.* 2019).
 - In many systems, predation is a key factor in caribou population growth and decline. Any further development in caribou habitat should minimize the number of linear features created, as caribou avoid areas with high density of linear features (Apps 2020) and linear features are known to facilitate predator movement and efficiency (Apps *et al.* 2013; Dickie *et al.* 2017; Apps 2020).
- Habitat restoration measures include the following:
 - Allocate funding from multiple sources (federal, provincial, and conservation partners) towards caribou habitat restoration programs in the Chilcotin. Initial funding should support staffing resources as restoration programs require significant planning, engagement, and project management.
 - Caribou habitat restoration should focus on:
 - Reducing the number of linear features in and around critical caribou habitat through road restoration programs.
 - Recruiting future caribou habitat by rehabilitating/planting fire-burned or beetle killed areas on strategic sites.

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Survey Costs

Funding for this survey was provided by the BC Caribou Recovery Program. Due to an active wildfire season, we were unable to use a Bell 206 helicopter. This resulted in increased survey costs from using a Bell 407 and the restriction of the survey area to the Itcha-Ilgachuz herd to stay within the provided budget. It is our hope to resume surveying the Charlotte Alplands and Rainbow subpopulations in 2024 using a Bell 206. The survey subtotal was \$47,800 plus \$2,390 GST at a dry rate (not including fuel) of \$2,485/hour. The total flight time was 16.6 hours.

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