

**Wolf Lake Caribou Herd
Interim Project Report
Population Estimate 2022**



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Government of Yukon
Fish and Wildlife Branch
SR-23-09

Authors

Jaylene Goorts, Kelsey L. Russell, Kenji Tatsumi, and Kristina Beckmann

Acknowledgements

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Copies available from:

Environment Yukon
Fish and Wildlife Branch, V-5
Box 2703, Whitehorse, Yukon Y1A 2C6
Phone (867) 667-5721
Email: environmentyukon@gov.yk.ca
Online: www.env.gov.yk.ca

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Executive Summary

- We conducted a mark-resight population survey on the Wolf Lake caribou herd, northeast of Teslin, Yukon from 28 September to 6 October 2022. This work is part of a five-year project to update the status and current population size of the Wolf Lake caribou herd to better inform decision-making about the herd.
- This project began in 2020 with a fall rut composition survey, but prior to that, the Wolf Lake herd had not been surveyed in over 20 years. The last population survey was conducted in 1998, which estimated 1,491 animals.
- We delineated 19 survey blocks in the herd range based on terrain features, and GPS radio-collared animals served as the "marked" animals. Three discrete resight surveys were conducted via helicopter with three separate crews. The animals were also classified as calves, cows, immature and mature bulls on the last resight session.
- Results of the composition survey indicated a low calf recruitment ratio of 17 calves per 100 cows, and a productive adult sex ratio of 47 bulls per 100 cows.
- The 2022 population estimate of the Wolf Lake herd is 1,184 (95% CI = 808–1,740) animals.
- The estimated population size of 1,184 animals lies within the confidence intervals of the previous two population estimates, suggesting the herd may be stable; however, recent trends in fall calf recruitment are concerning and may be indicative of a slowly decreasing trend in herd size. Additional information is needed to confidently determine the overall status of the herd (increasing, decreasing, or stable).

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Introduction

The Wolf Lake caribou herd (WLCH) is part of the Northern Mountain (NM) population of woodland caribou (*Rangifer tarandus caribou*), which are currently listed as Special Concern under the federal *Species at Risk Act*. The Wolf Lake herd was once the focus of extensive work, including population estimates, radio-collaring, and composition surveys in the 1980s and 1990s; however, the herd has not been surveyed since 1998, leaving a 22-year gap in information about this herd. During this time, the population was believed to be stable, harvest rates were thought to be within sustainable limits, and there was relatively low pressure from land-use activities and development on their range. The outdated nature and uncertainty in the population estimate was highlighted during outfitter quota discussions in 2018, during which the Teslin Tlingit Council (TTC) and Teslin Renewable Resources Council (TRRC) expressed concern about the sustainability of current harvest rates. In response, the Department of Environment initiated a 5-year monitoring and inventory assessment for the Wolf Lake herd starting in 2020. This assessment aims to update information on the spatial distribution, herd demographics, and population estimate and trajectory, through annual composition surveys, GPS collaring, and a population survey.

This interim project report summarizes the results of the mark-resight population survey conducted from 28 September to 6 October 2022. The purpose of this survey was to update the status and population estimate for the Wolf Lake herd, which will help inform harvest management and land-use decisions in the area.

Management and monitoring history

Prior to the 1970s, much of the information for Wolf Lake caribou was obtained anecdotally from varied sources, including local information, pilot observations, and other wildlife surveys. In 1971, caribou observations were recorded during early winter flights aimed at gaining information on the winter distribution of large herbivores and carnivores to support a proposed ecological reserve in the Wolf Lake Area (Geist et al. 1974). Geist et al. (1974) speculated it was unlikely that more than 500 caribou occupied the Wolf Lake area, though this conclusion was only based on two days of non-targeted flights over the area. The authors also reference reports from local residents who suggested caribou numbers fluctuated in the Wolf Lake area and that they may have been more abundant in the 1930s.

Early monitoring and inventory work on the Wolf Lake caribou herd began in the early 1980s with studies that focused on caribou movement and distribution patterns, demography, and range condition. Wolf Lake caribou were also used as a control herd to compare demographic values for the Finlayson caribou wolf control program during the same period (Farnell and McDonald 1987). Composition

surveys were conducted during three seasonal periods (rut, late winter, and post-calving) from 1984 to 1986, and in 1987 the first population survey was conducted using a stratified random quadrat method in late winter which estimated the herd at 664 caribou (90% CIs = 531–797). The 1987 population survey was deemed more reliable than the previous composition surveys; thus, the adult sex ratio and calf-to-cow ratio reported from the population survey were used to characterize the herd's demographics¹. Farnell and McDonald (1989) reported adequate levels of calf recruitment (28 calves per 100 cows), but a concerning low adult sex ratio during late winter (29 bulls per 100 cows) that the authors attributed to natural processes. Between 1984 and 1987, 13 VHF radio collars were deployed to monitor distribution during winter, calving, post-calving, and fall. Using information gathered from VHF collar relocations and subsequent survey observations, the herd range was delineated to be much the same as today, save for portions of the Pelly Mountains and Cyr Range north of Nisutlin Lake. Additionally, assessments of diet and snow conditions across the range were also conducted (Farnell and McDonald 1989). Following the course of monitoring and an evaluation of harvest levels in the 1980s, the Wolf Lake herd was thought to be slowly increasing and able to support a moderate level harvest of 2% of the population.

Monitoring resumed in 1993 when the Wolf Lake herd was used as a control herd for the Aishihik caribou recovery program, where lethal wolf control and sterilization was being used to test the hypothesis that wolf predation was limiting population growth in that herd (Florkiewicz 1998; Farnell 2009). Thirty VHF radio collars were deployed in February 1993, followed immediately by a stratified random quadrat population survey. The 1993 population survey estimated 1,249 caribou (95% CI = 1,055–1,443) — nearly double the previous estimate in 1987.

Annual late winter, post-calving and fall composition surveys resumed, using radio-collar relocations to locate groups of caribou. Fall composition surveys were completed annually between 1993 and 1999 (except 1998), with a range of 517–699 caribou observed each survey, an average fall calf-cow ratio of 26 calves per 100 cows, and an average adult sex ratio of 50 bulls per 100 cows. A late winter population survey was conducted in 1998, resulting in an estimated 1,491 caribou (95% CI = 939–2,042). Active VHF collars were used to correct for sightability during the 1998 population survey and post-hoc for the 1993 population survey. At this time, the herd was stable.

¹ Farnell and McDonald (1989) concluded that because Wolf Lake caribou exist at low densities and sufficient sample sizes could not be observed during post-calving and rut that population demographic information should be obtained from the stratified random quadrat survey and future repetitions of such. Further, it was suggested that a significant number of caribou were not located during the fall composition surveys and that the collar information may not have identified all the major rutting areas after the minimum count during the 1987 late winter population survey far exceeded the fall composition counts. The 1987 population survey was thought to be more reliable than the previous fall composition surveys and the sex ratio and recruitment rates reported from the population survey were used instead to characterize herd demographics.

In 1995 and 1996, an additional 31 collars were deployed on the herd, totalling 46 active collars in 1996 and by 1998, 30 active collars remained. Using information provided from the VHF collar relocations, the herd range was refined to include parts of the Pelly Mountains to the north and east of Nisutlin Lake to the Tintina Trench and formed the basis of what is considered the Wolf Lake caribou herd range today.

Harvest

From 1979 to 1987, harvest levels for the Wolf Lake caribou herd were estimated from annual questionnaires issued to licensed hunters and mandatory trophy export declarations. It was estimated that licensed harvest averaged 3.3 caribou (± 5.2) and 2.6 caribou (± 1.5) annually for licensed resident and non-residents hunters, respectively, which was thought to be within sustainable limits for the herd. Little information about First Nation harvest was known or recorded during this time.

In 1993, reporting for all caribou harvest was made mandatory for licensed hunters. Systematic and more accurate records of licensed harvest were kept from 1995 on (Figure 1). Records of First Nation harvest are not known; however, the Teslin Tlingit Council (TTC) may keep records of TTC citizens' harvest, which may be shared periodically to evaluate harvest levels.

Today, caribou harvest in Yukon is managed using the *Science-based Guidelines for Management of Northern Mountain Caribou in Yukon* (Environment Yukon 2016), which states that if a herd is stable, then a bull-only harvest rate of up to 2% of the total population size is likely sustainable. The guidelines state that if a herd is in decline, or if information on a herd is limited or outdated, then a bull-only harvest of up to 1% of the total population is likely sustainable.

Following the 1998 population survey, the Wolf Lake herd was considered stable at approximately 1,500 caribou, resulting in a sustainable harvest of up to 30 bulls. Since 1995, annual licensed harvest has generally remained below 20 caribou, with total harvest below 30 caribou when estimates of First Nation harvest are included (Figure 1). In 2018, licensed harvest alone accounted for 30 caribou, providing an exception to this trend (Figure 1). Concern that information on the Wolf Lake herd was too outdated to meaningfully evaluate the sustainability of the current harvest led to monitoring efforts being initiated in 2020.

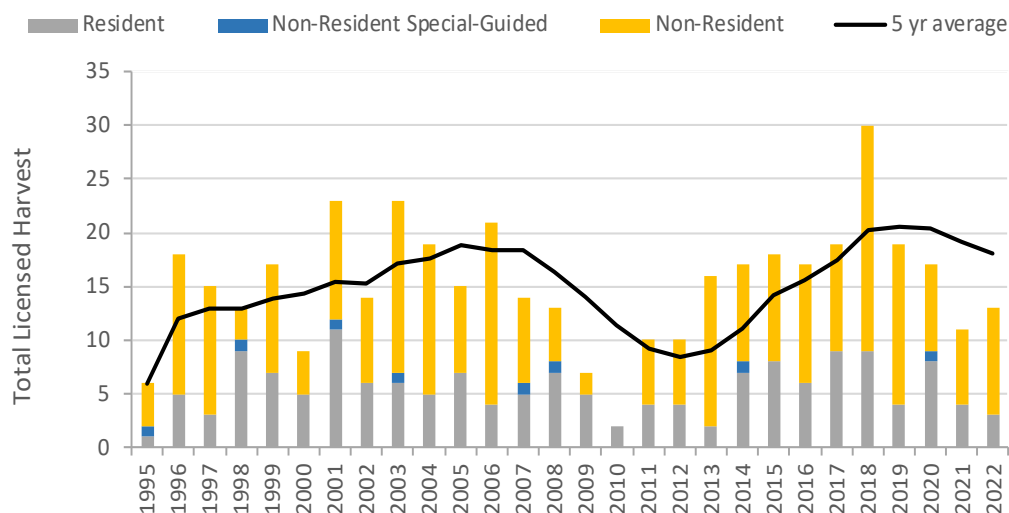


Figure 1. Total reported licensed harvest of caribou from the Wolf Lake herd from 1995–2022.

Study Area

The Wolf Lake caribou herd range is between Watson Lake and Teslin, north of the Alaska Highway, and centred on Wolf Lake, 75 km northeast of Teslin (Figure 2). It extends northwest to Quiet Lake and the Tintina Trench and includes the southern extent of the Pelly Mountains, including part of the St. Cyr range near Nisutlin Lake. In the northeast, the herd range extends into the Simpson Range north to the Liard River headwaters and encompasses the Cassiar Mountains to the Alaska Highway in the south. The Wolf Lake caribou herd range is in the Traditional Territories of the Teslin Tlingit Council and the Kaska First Nations.

The Wolf Lake herd range lies within the Pelly Mountains ecoregion which is a rolling plateau with numerous mountains and dissected in places by small rivers with much of it above treeline at elevations between 1,350 and 1,500 m. In the boreal forest, white spruce with a moss or lichen understory is dominant (Yukon Ecoregions Working Group 2004). The higher elevations result in cooler summers and less severe winters, with mean annual temperature in the region near -3°C , with moderate variations due to elevation and season. Mean January temperatures are near -20°C , with mean July temperatures around 10°C . Precipitation is moderate with the greatest amounts between September and January, primarily in the form of snow (Yukon Ecoregions Working Group 2004).

In addition to caribou, the Wolf Lake area supports other ungulate species, including moose, sheep, goats, and less commonly, deer. It also supports large predatory species, including wolves, grizzlies and black bears. In the 1970s, an ecological reserve was proposed for the Wolf Lake area, describing it as a biologically rich and complete ecosystem, and recognizing the importance of its rich wildlife populations, including caribou (Geist et.al. 1974). In 1998, the Wolf Lake area garnered attention as a potential site for the establishment of a new national park, owing to its well-preserved natural

landscape. Wolf Lake caribou were also appealing in this process as a herd with limited human interference or development on their range (CPAWS-Yukon 1999) — the same characteristics that led to their inclusion as a 'control' herd for the Finlayson and Aishihik wolf control programs in the 1980s and 1990s. Neither the ecological reserve nor national park materialized, but this interest highlights the importance of the Wolf Lake area and the caribou that occupy it.

The survey area for the 2022 population survey focused on known rutting areas within the Wolf Lake herd range. These areas were identified through historical monitoring and inventory work completed in the 1980s and 1990s and confirmed by more recent fall composition surveys (2020 and 2021), GPS collar locations (from March 2022 onwards), and local knowledge. Many of the known rutting areas were located on the broad, mid elevation alpine plateaus east and southeast of Wolf Lake around the Ice Lakes, Northwind Lakes, Irvine Creek, and the headwaters of the Meister River. They also include similar terrain in the Thirty Mile and Englishman Ranges to the west and in the Cassiar Mountains to the south. Recent fall composition surveys had limited effort in northern portions of the range into the Pelly Mountains, though local knowledge and historical survey and radio-collar information suggested that Wolf Lake caribou do occupy those areas during the rut, but in smaller, widely dispersed groups commonly in less typical rutting terrain. Further, five of the GPS-collared animals remained in the northern reaches of the range, resulting in the inclusion of these northern areas in the population survey coverage.

The total survey area was 8,379 km², and within that area, 19 survey blocks were delineated across the herd's range. Survey blocks ranged in size from 151 km² to 773 km² and followed the natural terrain features as much as possible (Figure 2). Survey blocks were also designed to cover the distribution of the GPS collared caribou (marks), to ensure they were available for detection during the survey.

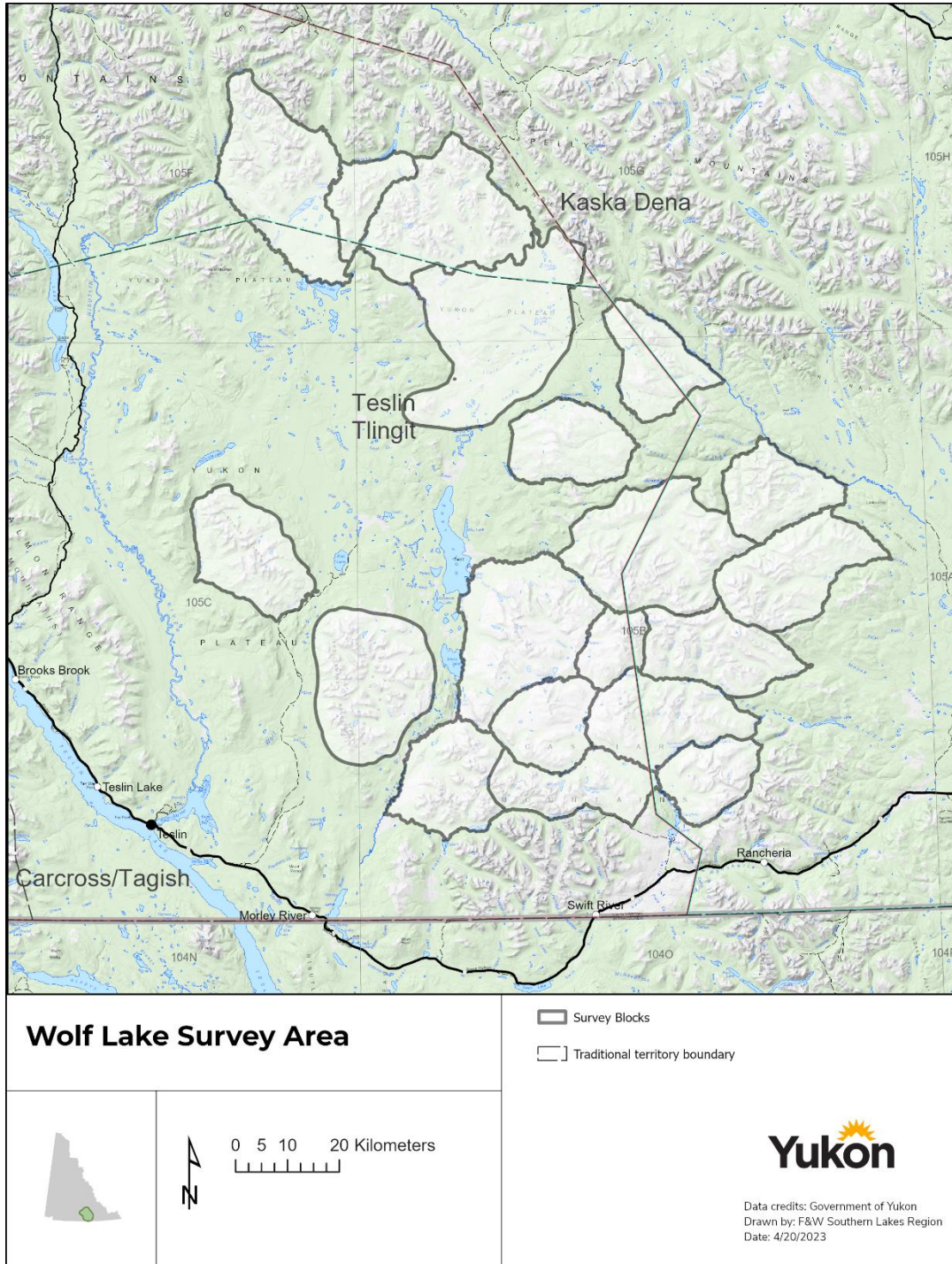


Figure 2 Wolf Lake caribou herd 2022 mark-resight population survey area and blocks.

Methods

A mark-resight survey technique was used to estimate the number of caribou in the Wolf Lake caribou herd. The mark-resight method uses collared caribou as 'marks', with the proportion of marked to unmarked caribou seen during the survey providing an estimate of the total population size. Three separate resighting sessions (lasting three days each) were conducted with a Bell 206 Longranger helicopter by unique crews from 28 September to 6 October 2022. The study area was delineated into 19 survey blocks based on fall rut locations from previous surveys, collar locations, and terrain features to guide survey efforts (Figure 2). To ensure each survey crew had the same effort, each block was allocated a proportion of the total survey time based on block size, as well as the number of groups observed in the blocks during previous years' fall rut surveys. Each survey block was to be flown by each crew.

At the start of the population survey, there were 23 active caribou collars in the Wolf Lake caribou herd. Within each survey block, crews focused survey efforts on subalpine and alpine habitats assumed to have a high probability of caribou occurrence. When a group of caribou was located, the numbers of marked and unmarked animals were recorded (Table 2) and a waypoint taken using a handheld GPS unit. Marked animals were identified by their unique vis-bands, where possible. In rare instances, where crews were unable to confirm a vis-band number (e.g., only one number was visible), telemetry may have been used to confirm the unique radio frequency of the collar. The use of telemetry was limited to this purpose, as using telemetry to locate collared individuals would violate the assumptions of the mark-resight methodology. During the third resighting session, animals were also classified as calves, cows, or immature and mature bulls to estimate herd composition.

Collaring activities

A total of 31 GPS collars were deployed on female caribou throughout the Wolf Lake herd range between March and July 2022. Thirty caribou were captured via helicopter (A-Star), net-gun, and a three person capture crew in late March 2022. By May 2022, eight mortalities of collared caribou occurred, six of which were confirmed to be a result of wolf predation. To increase the number of marked caribou in the herd, another capture session was conducted in July 2022 via helicopter (A-Star), chemical immobilization (darts), and a three person capture crew. Due to the difficulty of finding animals and challenging capture terrain, only one caribou was collared. All collars were fitted with unique colour-number combination vis-bands to enable field identification of individuals.

Captured caribou were affixed with Vectronic Aerospace Survey-2D collars programmed to take a GPS location every 5hrs 45min. These location data are transmitted via the Iridium satellite to the Vectronic

Inventa web service that provides locations daily to Fish and Wildlife Branch biologists. These collars were also fitted with timed drop-off mechanisms that are scheduled to be released on 1 June 2025.

Data analysis

To derive a population estimate for the Wolf Lake herd, the analysis was conducted in Program MARK (ver. 9.0; White 2019). A mixed logit-normal modeling approach was used, as the herd range was considered geographically closed and marks were individually identifiable. This model allows for individual heterogeneity in resighting probabilities by treating each animal as a random effect; however, if this parameter was not supported during model selection, the data was considered to have no individually identifiable marks and was fixed at zero (McClintock 2018).

A set of four candidate models were evaluated using the survey data (Table 1). We used Akaike's Information Criterion difference ($\Delta_i AIC_c$; Akaike 1973) adjusted for small sample sizes (AIC_c ; Burnham and Anderson 1998) and Akaike weights ($AIC_c w_i$) to select the model(s) with the fewest predictor variables that explained the greatest variation in the data (i.e., the most parsimonious model). All models with a $\Delta_i AIC_c$ of ≤ 2.00 were considered plausible (Richards 2005; Symonds and Moussalli 2011).

Table 1. Mark-resight candidate models fitted to the resighting survey data to estimate the abundance of the Wolf Lake caribou herd.

Model	Description
$N p. \sigma=0$	Constant p across all resighting sessions, σ fixed at zero
$N p_t \sigma=0$	Different p for each resighting session, σ fixed at zero
$N p. \sigma.$	Constant p across all resighting sessions, σ as a random effect
$N p_t \sigma.$	Different p for each resighting session, σ as a random effect

Results and Discussion

Throughout the survey, weather was sunny or partly cloudy with good visibility; however, despite postponing the survey for want of snow, there was no snow on the ground for all three resight sessions, which made spotting and tracking caribou difficult. All 23 active collars were available in the survey blocks for the duration of the survey. This availability was determined by examining GPS locations after surveys were complete. Crews did not know which marked animals were present in a block during their survey, and no telemetry equipment was used to locate animals, as that would bias the resighting rates high (Figure 2, Figure 3, and Figure 4).

Table 2 Mark-resight survey results for the Wolf Lake caribou herd, 28 September to 6 October 2022.

Resight session	Survey effort (km/min)	Total marked animals available	Total marked animals observed	Total animals observed	Resighting rate
1 (28–30 September)	2.38	23	10	536	0.43
2 (2–4 October)	2.40	23	8	406	0.35
3 (4–6 October)	1.99	23	9	461	0.39

Population estimate

Resighting rates (i.e., recapture probability), based on data in Table 2 for sessions 1, 2, and 3 were 0.43, 0.35, and 0.39, respectively. The top selected model for the Wolf Lake herd included a constant resighting probability across sessions, and the parameter for individual heterogeneity fixed as a random effect (Table 1, Table 3). The AIC_c weights were high, suggesting the top model was best fit to the data compared to the other candidate models. All other candidate models had a $\Delta_i AIC_c > 2.00$, thus they were not considered plausible. The final 2022 population estimate for Wolf Lake is 1,184 (95% CI: 808–1,740) animals (Table 4).

The confidence intervals around the population estimate are broader than expected for a mark-resight survey. The top model included a time-constant parameter for resighting probability, indicating there were not considerable differences among resight sessions. This is supported by the consistent survey conditions across sessions, limited time between sessions, and resight rates (Table 2). Individual heterogeneity was included in the model as a random effect, which indicates that there may have been differences among marked individuals that made them harder to detect. Further examination of the individual encounter histories (i.e., which marked animals were observed across resight sessions) revealed that a high proportion (39%) of the same available marked animals were missed by every session, counter to the expectation that all marks are equally detectable. As a result of the poor sightability conditions during the survey (i.e., no snow cover), we assumed the marked individuals who were consistently not detected were in smaller groups, were located below the treeline, or a

combination of both, resulting in them being more difficult to detect across resight sessions. Uncertainty in the estimate was introduced because of the poor sightability conditions during the survey and were exacerbated by high and unexpected mortalities of collared individuals, which reduced the sample size of marked individuals.

The previous estimate of the Wolf Lake herd from 1998 was 1,491 (95% CI = 939–2,042) animals, derived from a stratified random block survey that corrected for missed animals by using active VHF collars. Without accounting for missed animals, the total number of animals observed was 809. The confidence intervals for this estimate were quite large because of a high range of variation in the number of caribou located within low (or secondary) blocks and compounded by the variation in the sightability correction factor. The 95% confidence interval of the current Wolf Lake population estimate overlaps with the 1998 estimate; however, as both surveys had high variation and the time between the surveys was quite long, it would be erroneous to derive population trend based on these results alone.

Table 3 Candidate models for the 2022 Wolf Lake caribou population estimate with model selection values.

Model	Rank	K ^a	AICc	Δi AICc	AICc weight
$N p. \sigma.$	1	3	99.009	0.00	0.840
$N p_t \sigma.$	2	5	102.977	3.97	0.115
$N p. \sigma=0$	3	2	105.112	6.10	0.040
$N p_t \sigma=0$	4	4	109.178	10.17	0.005

a: Number of model parameters including the intercept.

Table 4 Estimates of model parameters of the Wolf Lake caribou herd from the most supported mark-resight model.

Top model	Parameter	Value	SE	95% Confidence Interval
$N p. \sigma.$	N	1,184	234	808–1,740
	p	0.333	0.123	0.145–0.596
	σ	1.962	0.770	0.934–4.120

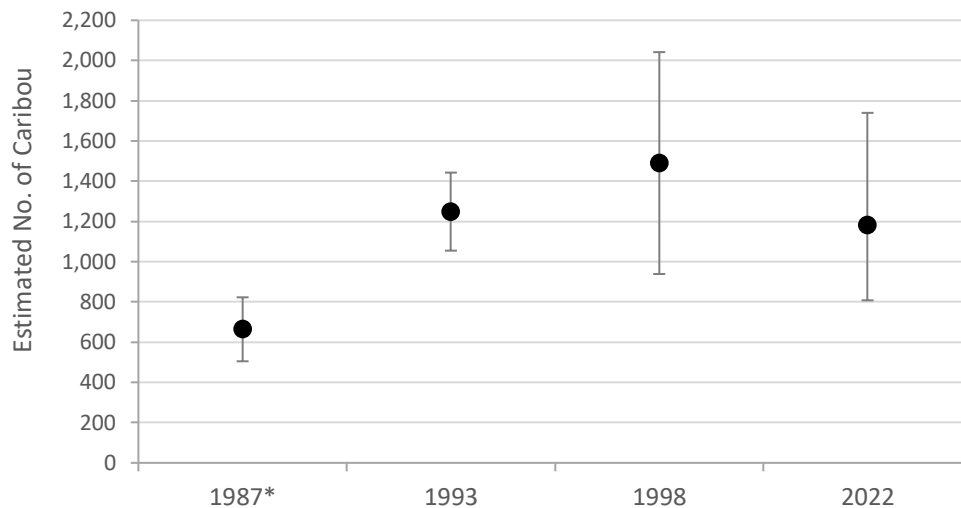


Figure 3 Population estimates (with 95% confidence intervals) of the Wolf Lake herd from 1987 to 2022. Population surveys from 1987 to 1998 were conducted during late winter using a stratified random block methodology. The population estimate in 2022 was conducted during fall rut using a mark-resight methodology. *Variation for the 1987 survey is represented by 90% confidence intervals.

Herd composition

During the third resight session, observed caribou were further classified by sex and age to determine the herd's composition. 461 caribou were observed during the third resighting session, 386 of which were classified (Table 5). Due to challenging terrain and aircraft limitations, a group of 74 caribou was not completely classified (ten calves and one mature bull confirmed), thus all animals in this group were not included in final composition results.

The fall calf recruitment ratio was estimated to be 17 calves per 100 cows. This is below the minimum fall recruitment ratio necessary for a stable population growth rate (20–25 calves per 100 cows) as outlined in the *Science-based guidelines for management of Northern Mountain caribou in Yukon* (Environment Yukon, 2016). Although the 2022 recruitment estimate was an improvement from the previous two years (12 and 11 calves per 100 cows in 2020 and 2021, respectively), the running average (13 calves per 100 cows, 2020–2022; Figure 4) is lower than what is considered necessary for a stable population. The adult sex ratio was estimated to be 47 bulls per 100 cows, which is above what is considered adequate to ensure reproduction and maximized genetic diversity (Environment Yukon, 2016). Overall, the addition of the 2022 survey's ratio results in a running average of 44 bulls per 100 cows (2020–2022; Figure 4). It is important to analyze long-term trends in calf recruitment and adult sex ratios to gain a more comprehensive understanding of the herd's overall trajectory, as annual estimates may vary from year-to-year. Additional composition surveys for this herd are planned in fall 2023 and 2024.

During previous work on the Wolf Lake herd (1993–1999), fall calf recruitment averaged 26 calves per 100 cows and adult sex ratios averaged 50 bulls per 100 cows, supporting the stable herd status that was determined from population surveys in 1993 and 1998 (Figure 3, Figure 4).

Table 5. Observed composition of the Wolf Lake caribou herd, October 2022.

Survey	Calves per 100 cows	Percent calves	Bulls per 100 cows	Number of caribou classified	Number of caribou unclassified
October 2022, resight #3	17.0	10.4	47.2	386	64

¹A total of 461 caribou were observed during the composition portion of the survey. 64 animals were unclassified, and one bull and 10 calves classified within a large group were not included in the composition summary as not all animals in that group were classified.

Table 6. Estimated composition of the Wolf Lake caribou herd based on estimated age and sex ratios and population estimates, October 2022.

Estimated herd size	Calves	Cows	Bulls
1,184	123	721	340

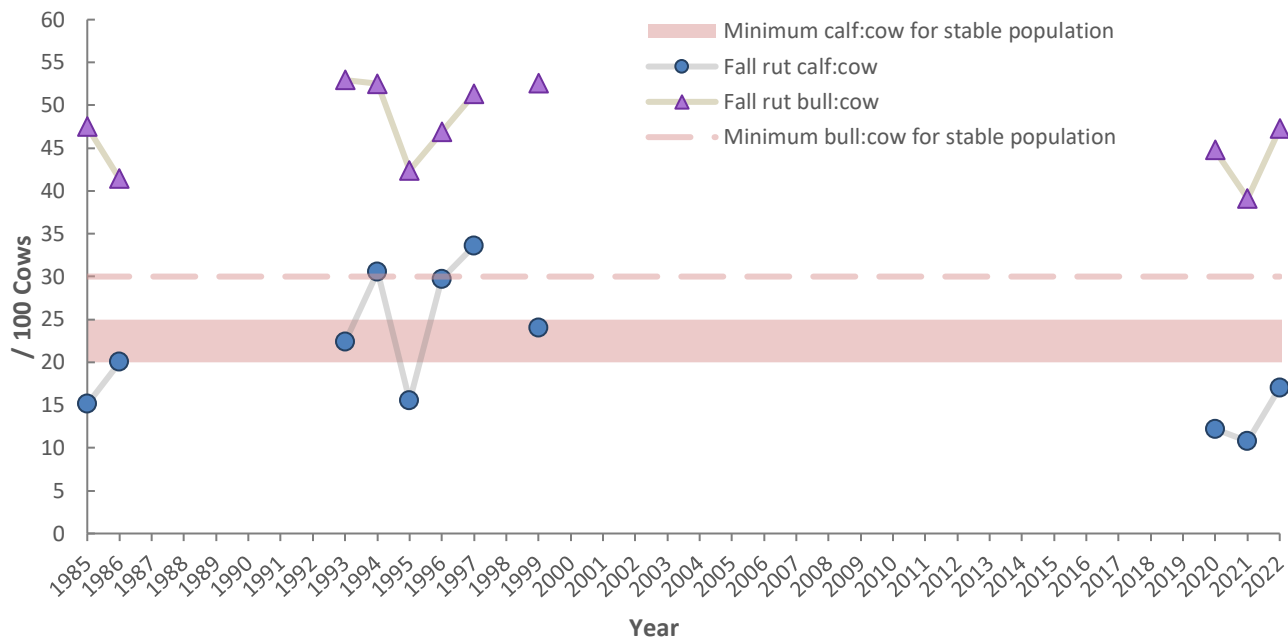


Figure 4. Measure of recruitment as number of calves per 100 adult cows, and adult sex ratio as number of bulls per 100 adult cows, calculated from composition surveys conducted during fall, 1985–2022.

Distribution

Caribou groups were primarily distributed on open alpine and subalpine rutting areas, east and southeast of Wolf Lake (Figure 5, Figure 6, Figure 7) in the northern Cassiar Mountains. This is consistent with caribou observations from our 2020 composition survey. These groups ranged in size from 1–74

individuals (average = 11 individuals). The two largest groups observed comprised of 74 animals each were found on the ridges north of Irvine Creek and north of Ram Creek.

Smaller groups of caribou were observed north of Wolf Lake in both low-elevation sparsely-forested lichen flats and high elevation alpine areas in the southern portion of the St Cyr Range, from the McNeil River to the Ings River. Groups observed north of Wolf Lake were typically smaller in size, ranging from 1–23 individuals (average = 6 individuals). Although one group of 23 individuals was observed, most groups were comprised of 1–3 animals.

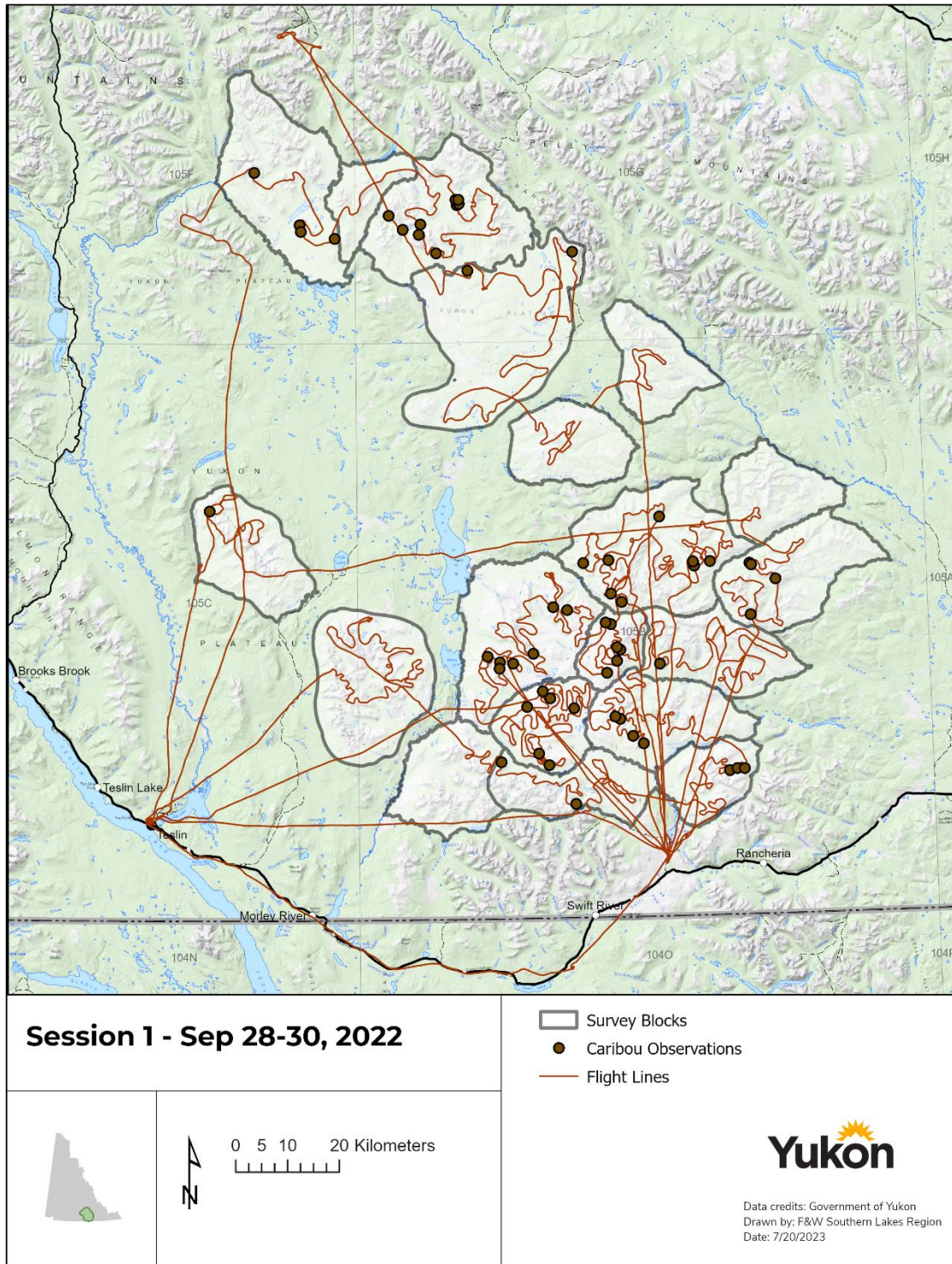


Figure 5. Flight lines and caribou observations from the first session of the 2022 mark-resight population survey of Wolf Lake caribou.

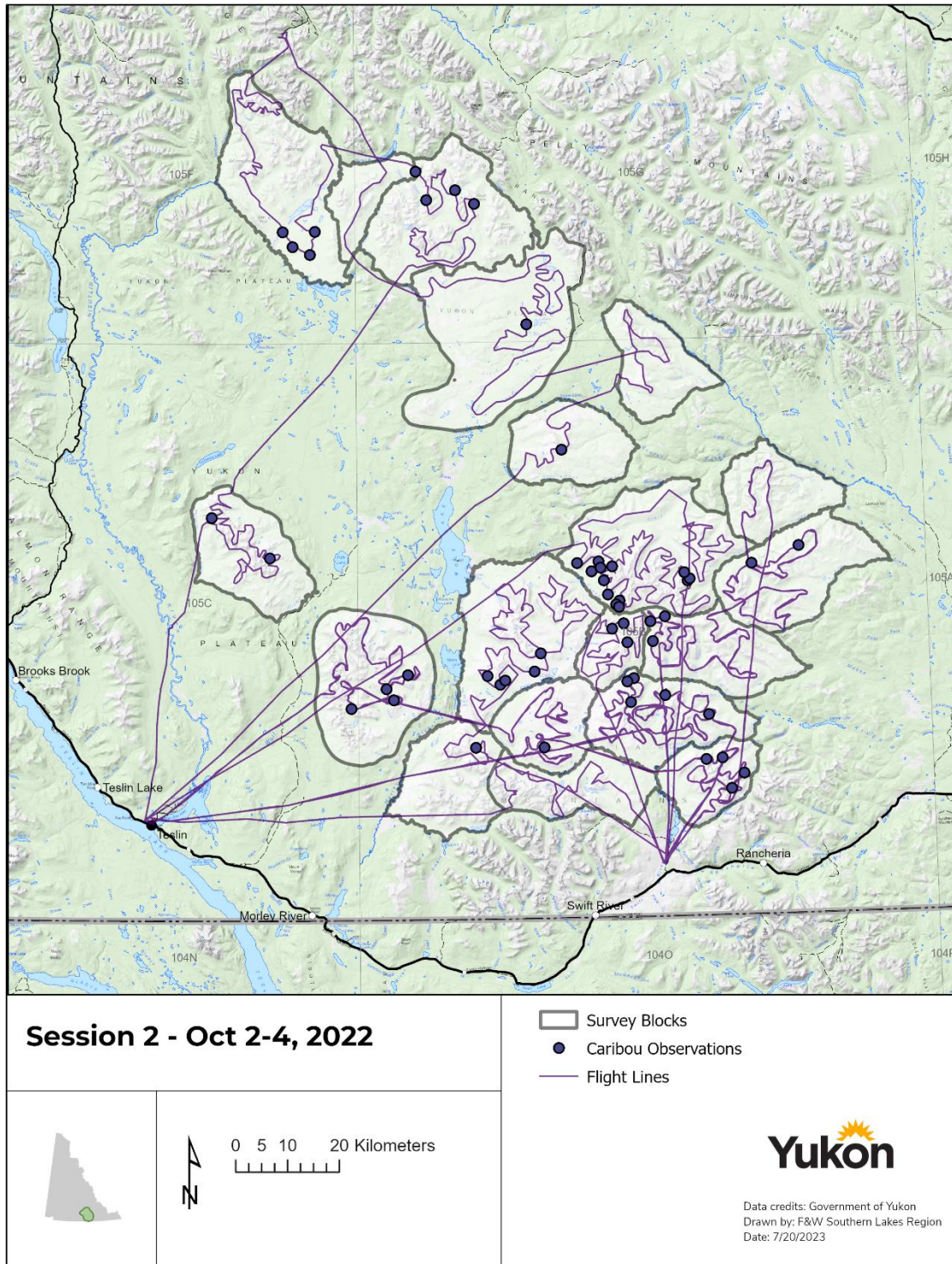


Figure 6. Flight lines and caribou observations from the second session of the 2022 mark-resight population survey of Wolf Lake caribou.

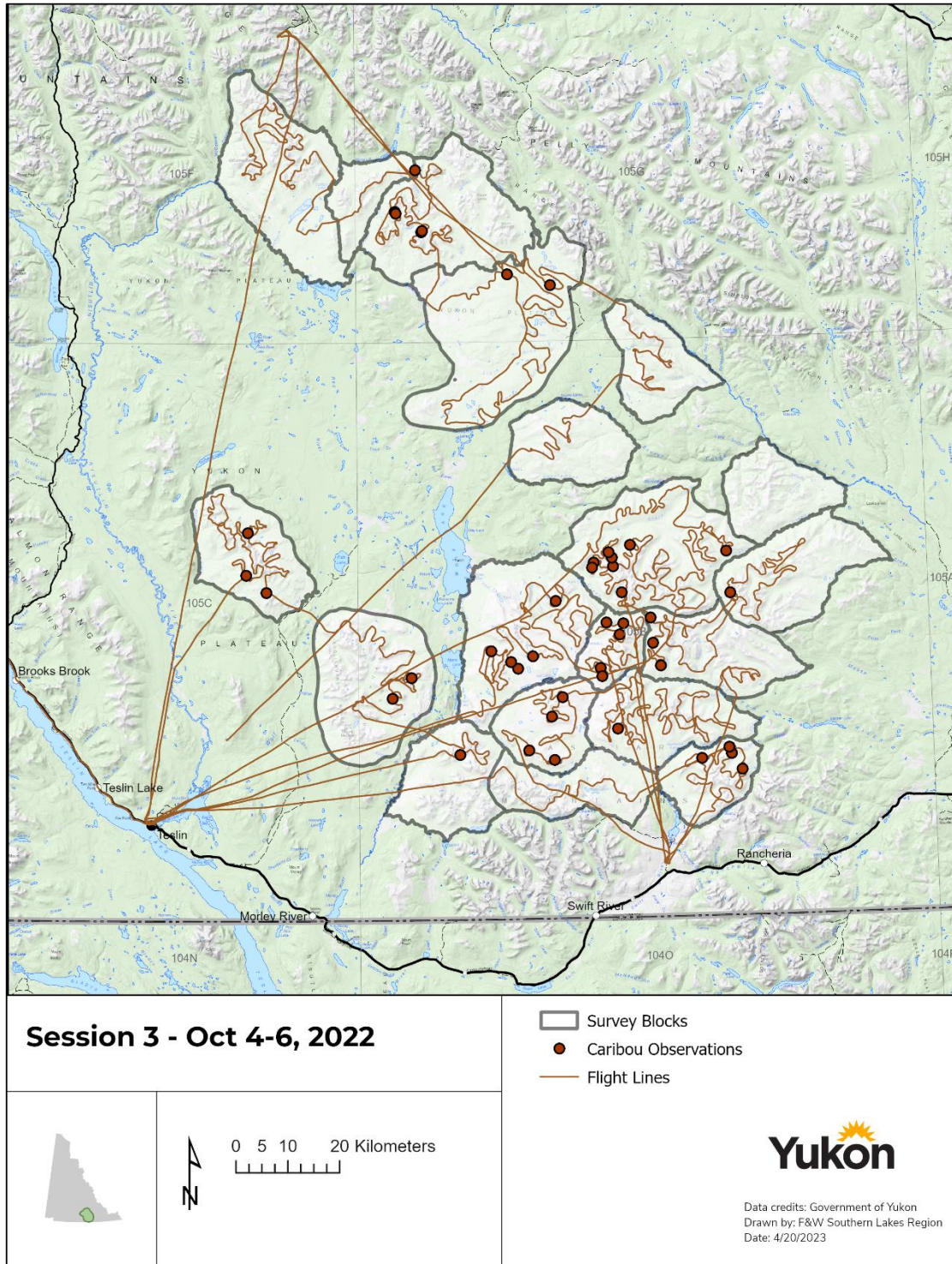


Figure 7. Flight lines and caribou observations from the third session of the 2022 mark-resight population survey of Wolf Lake caribou.

Management Implications

The mark-resight population survey conducted on the Wolf Lake caribou herd northeast of Teslin, Yukon has provided valuable insights into the status and population size of the herd. The estimated population size of 1,184 animals lies within the confidence intervals of the previous two population estimates, suggesting the herd may be stable; however, recent trends in fall calf recruitment are concerning and may be indicative of a stable or slowly decreasing trend in herd size. This project will continue to 2025, with further monitoring necessary to gain a more comprehensive understanding of the long-term trend and dynamics of the herd.

This survey was carried out as part of a five-year project aimed at updating knowledge about the Wolf Lake caribou herd to support informed decision-making about its management. During harvest conversations in 2023, concerns from the community were raised regarding the level of harvest. In response, a reduction in the sustainable harvest level from 2% to 1.5% was deemed appropriate given the concern for the herd, the recent monitoring results, and with the understanding that further monitoring will help to better understand the herd's status. As a result, outfitter quota numbers for the Wolf Lake herd were reduced to conform to the lowered sustainable harvest limits, while respecting harvest sharing amongst licensed and subsistence users. Sustainable harvest rates may be adjusted further following the completion of the 5-year program and a review of the available data.

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