FALL 2022 COMPOSITION SURVEYS OF BATHURST, BLUENOSE-EAST AND BEVERLY BARREN-GROUND CARIBOU HERDS

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ABSTRACT

This report describes the results of helicopter-based fall composition surveys of the Bathurst, Bluenose-East and Beverly barren-ground caribou herds conducted in October/November 2022 near the peak of the rut. The main purpose of these surveys was to estimate the sex ratio in the herd during the breeding season, and to estimate the proportion of females in the herd that were accompanied by a calf, as an index of calf survival in the first four and a half months of age.

The surveys were conducted primarily between October 17 and 25, with most of the Beverly survey completed between November 1 and 3. There were in total 47.7 hours flown from three bases: Wekweètì, the Tundra Ecological Research Station at Daring Lake, and the Hoarfrost River base. Survey planning was focused on flying to locations of collared female and male caribou from the Bathurst, Bluenose-East and Beverly herds. Caribou were classified as cows, calves, young bulls and prime bulls using motion-stabilized binoculars from the front seat of the helicopter. Observations were recorded on tablet computers.

For the Bluenose-East herd, 2,887 caribou were classified and the calf: cow ratio was estimated at 52.3 calves: 100 cows (95%CI 48.5-56.3). The calf: cow ratios in 2021 (49.6) and 2020 (51.7) were very similar and were the highest of ten surveys between 2009 and 2022. The bull: cow ratio estimated in October 2022 (64.8 bulls: 100 cows, 95%CI 57.3-72.7) was similar to the ratios for 2021 (68.7) and 2020 (63.3), and these three were the highest values estimated in this herd between 2009 and 2022. The 2022 results suggested that healthy demographic indicators documented in this herd 2018-2021 had continued through 2022.

For the Beverly herd, 6,369 caribou were classified, resulting in a calf: cow ratio of 46.5 calves: 100 cows (95%CI 43.8-49.2). The last previous fall composition survey for the Beverly herd in 2011 had a ratio of 53.9 calves: 100 cows. Recent March calf: cow ratios for the Beverly herd 2020-2022 have ranged between 45 and 52 calves: 100 cows, suggesting good calf recruitment over this period. The bull: cow ratio estimated for the Beverly herd was 62.8 bulls: 100 cows (55.0-71.4) in 2022; the last previous estimate from 2011 was a similar 69.0 bulls: 100 cows. These represent healthy bull: cow ratios.

For the Bathurst herd, 1,520 caribou were classified in areas having only Bathurst collars; there were also areas where Bathurst and Beverly collars were mixed. The calf: cow ratio in Bathurst collar-only areas was estimated at 38.4 calves: 100 cows (95%CI 31.3-46.9), similar to the last fall estimate for this herd in 2020 (39.1). The bull: cow ratio from the same sample of caribou was 105.6 bulls: 100 cows (92.4-122.0). This result is anomalous and is best set aside pending confirmation from further fall surveys of the herd. The fall 2020 survey of the Bathurst herd was in an area where only Bathurst collars were present, resulting in an

estimate of 64.1 bulls: 100 cows, similar to the 2020 estimate for the Bluenose-East herd (63.3). We consider possible explanations for the 2022 Bathurst survey results.

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INTRODUCTION

The Bathurst, Bluenose-East and Beverly[1] caribou herds all have calving grounds in Nunavut (Figure 1). The Bathurst calving ground is west of Bathurst Inlet, the Bluenose-East calving ground is west of Kugluktuk, and the Beverly calving ground is in the Queen Maud Gulf lowlands.
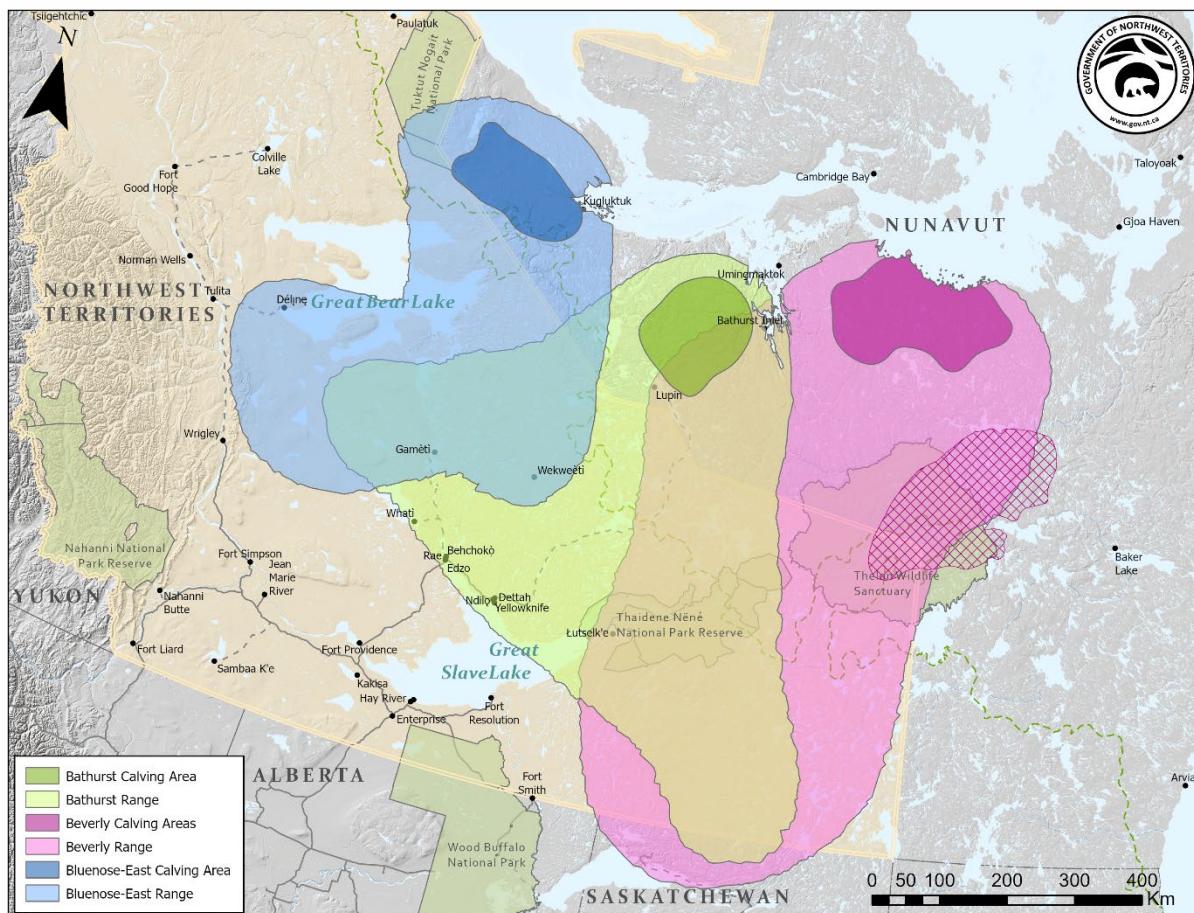
Figure 1. Annual ranges and calving grounds of the Bluenose-East, Bathurst, and Beverly herds, based on accumulated radio collar locations of cows (based on Nagy et al. 2011). Other herd ranges west and east of these herds were omitted for simplicity.

Portions of the summer ranges for all three herds are in Nunavut (NU) and the remainder of the ranges are in the Northwest Territories (NWT) (Figure 1). In previous years, ranges of the Bathurst and Beverly herds have occasionally extended as far south as northern Saskatchewan.

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[1] The Beverly herd described in this report is the herd defined by the Government of Nunavut as calving in the central and western Queen Maud Gulf. This herd may not correspond exactly to the Beverly herd defined prior to 2009 with an inland calving ground south of Garry Lakes (Adamczewski et al. 2015).

Fall composition surveys of barren-ground caribou herds have normally been carried out in late October near the peak of the fall breeding season. At the peak of the breeding season, all sex and age classes of caribou are mixed in rutting aggregations, thus sampling across the herd's distribution can provide an estimate of the sex ratio (bulls:100 cows). This is needed to generate an overall herd estimate from the estimated numbers of females on the calving grounds in June (e.g. Boulanger et al. 2022, Adamczewski et al. 2022a). In addition, a calf: cow ratio can be estimated which gives an index of calf survival in the first four and a half months after birth, although it is also affected by initial calf productivity in June.

Population estimates for the Bathurst herd in 2018 (Adamczewski et al. 2019) and the Bluenose-East herd in 2018 (Boulanger et al. 2019) showed large declines from the previous estimates in 2015. In joint management proposals from the Tłı̨chǫ Government and the Department of Environment and Natural Resources (ENR[2]) to the Wek'èezhìı Renewable Resources Board (WRRB) in early 2019, increased monitoring proposed for the two herds included annual composition surveys of both herds in June, late October, and March/April (ENR and TG 2019a, b). The WRRB approved this monitoring (WRRB 2019a, b). In keeping with these monitoring plans, composition surveys of the Bathurst and Bluenose-East herds were planned for late October 2022.

The most recent population estimate for the Beverly herd in 2018 of about 103,000 caribou indicated that the herd was still relatively large (Campbell et al. 2019). Monitoring of this herd has been less intensive than for the Bathurst and Bluenose-East herds but has included March composition surveys to monitor calf: cow ratios at about nine and a half months of age in most recent years. Composition surveys in the fall have been infrequent for the Beverly herd, in part because the herd has been widely dispersed based on collars, and often portions of the herd have been in remote areas. The last fall composition survey for the Beverly herd was carried out by ENR in 2011, with the results described in Campbell et al. (2019). Because a June 2023 calving ground survey for the Beverly herd was planned by the Government of Nunavut, which would require an up-to-date estimate of sex ratio in the herd for a new population estimate, ENR planned a fall composition survey for the Beverly herd in late October 2022, in addition to surveys of the Bathurst and Bluenose-East herds.

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[2] In 2023 the GNWT department Environment and Natural Resources (ENR) was re-named Environment and Climate Change (ECC). As the surveys described in this report were flown in 2022 and prior to the name change, ENR has been used here for that time and references prior to 2023.

METHODS

Collared Caribou

Locations of collared Bathurst (36 F, 18 M), Bluenose-East (49 F, 11 M), and Beverly (19 F, 15 M) caribou were monitored through the study period of October 17-November 3, 2022. Because the survey period extended over more than two weeks and there was continuing migratory movement of collared caribou over this period, it was important to work with the most recent collar locations. On some occasions, flying to the locations of collared caribou yielded few observations because the caribou had moved several kilometers from the last locations we were working with. In the case of the Beverly herd, movements of collared caribou were generally south and west, which worked in our favour as they came closer to the sites where we were based.

Classification Methods

Daily flying routes were planned around locations of collared caribou, with consideration of fuel and flying time remaining, as well as proximity to fuel caches. Caribou were classified from the front of the helicopter using motion-stabilized binoculars. Caribou were identified as calves (based on small body size), cows (based on presence of a vulva patch), prime bulls (based on large body size and large antlers and absence of vulva patch) and young bulls (based on absence of vulva patch, smaller size and smaller antlers). Identification of young bulls and prime bulls was somewhat subjective; the largest prime bulls and the smallest bulls were unmistakable but intermediate-sized bulls required a judgement call. Trimble Yuma 2 tablet computers were used to record observations with a GPS waypoint taken for each observation. Garmin GPS model 276Cx units were used to plan flights and record flight lines. In addition to caribou, we also recorded observations and locations of other large mammals.

RESULTS

Daily Flying and Survey Crew

A daily summary of flying hours and tasks for each day is shown in Table 1. There was an initial survey period of October 17-25, 2022, followed by a second period of November 1-3. Weather was poor (low cloud, fog and snowfall) between these periods and the survey crew remained in Yellowknife during that time.

Table 1. Days of the October/November 2022 fall composition surveys and daily flying carried out.

Date	Flying Hours and Tasks
Oct. 17	Yellowknife to Wekweètì; survey BNE caribou; 4.0 hours survey, 1.9 hours ferry.
Oct. 18	Survey BNE caribou; 1.4 hours survey, 2.4 hours ferry.
Oct. 19	No flying; poor weather, low cloud, drizzle, freezing rain.
Oct. 20	Wekweètì to Daring Lake; survey Bathurst caribou; 2.0 hours survey, 1.2 hours ferry.
Oct. 21	Survey Bathurst caribou 1.4 hours; survey BNE caribou; 2.7 hours survey, 1.6 hours ferry.
Oct. 22	Survey Bathurst caribou 2.2 hours; survey Bathurst/Beverly caribou; 2.1 hours survey, 2.3 hours ferry.
Oct. 23	Survey Bathurst caribou 2.8 hours, 0.2 hours ferry.
Oct. 24	Daring Lake to Hoarfrost River; survey Beverly caribou 2.3 hours, 2.3 hours ferry.
Oct. 25	Hoarfrost River to Yellowknife; 1.8 hours ferry.
Oct. 26-31	No flying; poor weather, low cloud, poor visibility.
Nov. 1	Yellowknife to Gahcho Kue mine, then Hoarfrost River; 1.4 hours survey Beverly caribou, 2.1 hours ferry.
Nov. 2	Survey Beverly caribou; 5.4 hours survey, 1.5 hours ferry.
Nov. 3	Survey Beverly caribou 0.7 hours; Hoarfrost River to Yellowknife, ferry 2.0 hours.
Totals	28.4 hours survey total; 19.3 hours ferry total; 47.7 hours flying overall.

Two Acasta Heliflight A-Star helicopters (C-GTVH and C-GCHH) were used during the fall 2022 surveys due to mechanical issues, resulting in two exchanges of aircraft. On November 3, a mechanical issue resulted in the survey ending at that time. There was very little further flying to carry out and the survey crew returned to Yellowknife. Two pilots flew on the fall 2022 surveys: Denali Hatler and Matt Adams. Judy Williams and Colin Modeste-Burgin were

part of the survey crew October 17-25, Dean Cluff was on the surveys November 1-3, and Jan Adamczewski was on the surveys throughout.

Three bases were used for the fall 2022 surveys because the satellite collars on the Bluenose-East, Bathurst and Beverly herds were distributed over a wide range from near Great Bear Lake to Artillery Lake northeast of the East Arm of Great Slave Lake. The initial flying October 17-18 was based at Wekweètì, then the survey crew flew to the Government of the NWT (GNWT) Tundra Ecological Research Station at Daring Lake on October 20 and was based there October 20-24. The survey crew then flew to a base at the mouth of the Hoarfrost River near the tip of the East Arm of Great Slave Lake October 24 (Hoarfrost River Huskies Ltd.) and was based there October 24-25. The final phase of the survey November 1-3 was again based at the Hoarfrost River. One of the survey aircraft and the survey crew are shown in Figures 2a and 2b.

Figure 2a. Fall 2022 caribou composition survey crew at Daring Lake (left to right): Jan Adamczewski, pilot Denali Hatler, Colin Modeste-Burgin, Judy Williams and pilot Matt Adams.

Figure 2b. Fall 2022 survey participants Matt Adams (left) and Dean Cluff (right) at a fuel cache at Reliance, near the tip of the East Arm of Great Slave Lake.

Survey Conditions

Temperatures during the surveys were initially mild, varying between -3°C and +3°C October 17-20, then became somewhat colder October 21-24 between -3°C and -10°C, and were colder November 1-3 between -17°C and -20°C. The larger lakes had nearly all open water, with only a few bays with ice; this led to abundant moisture in the air. Low cloud, fog and snowfall resulted in no flying October 19 and October 26-31 and on other days somewhat constrained the flying. Snow cover was generally thin and patchy (Figure 3), which sometimes made caribou difficult to see. Snow cover gradually increased over the survey period.

Caribou Group Composition and Rutting Behaviour

There were multiple observations of prime bulls fighting during the survey flying in late October 2022. We also saw many cases of prime bulls closely following cows. Groups of caribou showed a mix of cows, calves, prime bulls and young bulls and some groups were substantial in number (hundreds and occasionally thousands). These observations suggested that our surveys were timed close to the peak of the breeding season. We were concerned that the final days of flying November 1-3 might be after the peak of the rut, when the large rutting aggregations can begin to break up and the males segregate away from the females. However, the survey flying November 1-3 was over the Beverly herd, which tends to calve (and thus rut) a few days later than the Bathurst and Bluenose-East herds (e.g. Campbell et al. 2019). Caribou groups seen during this last phase of the surveys were often large, numbering hundreds or thousands, and rutting behaviour was still widespread (Figure 4).
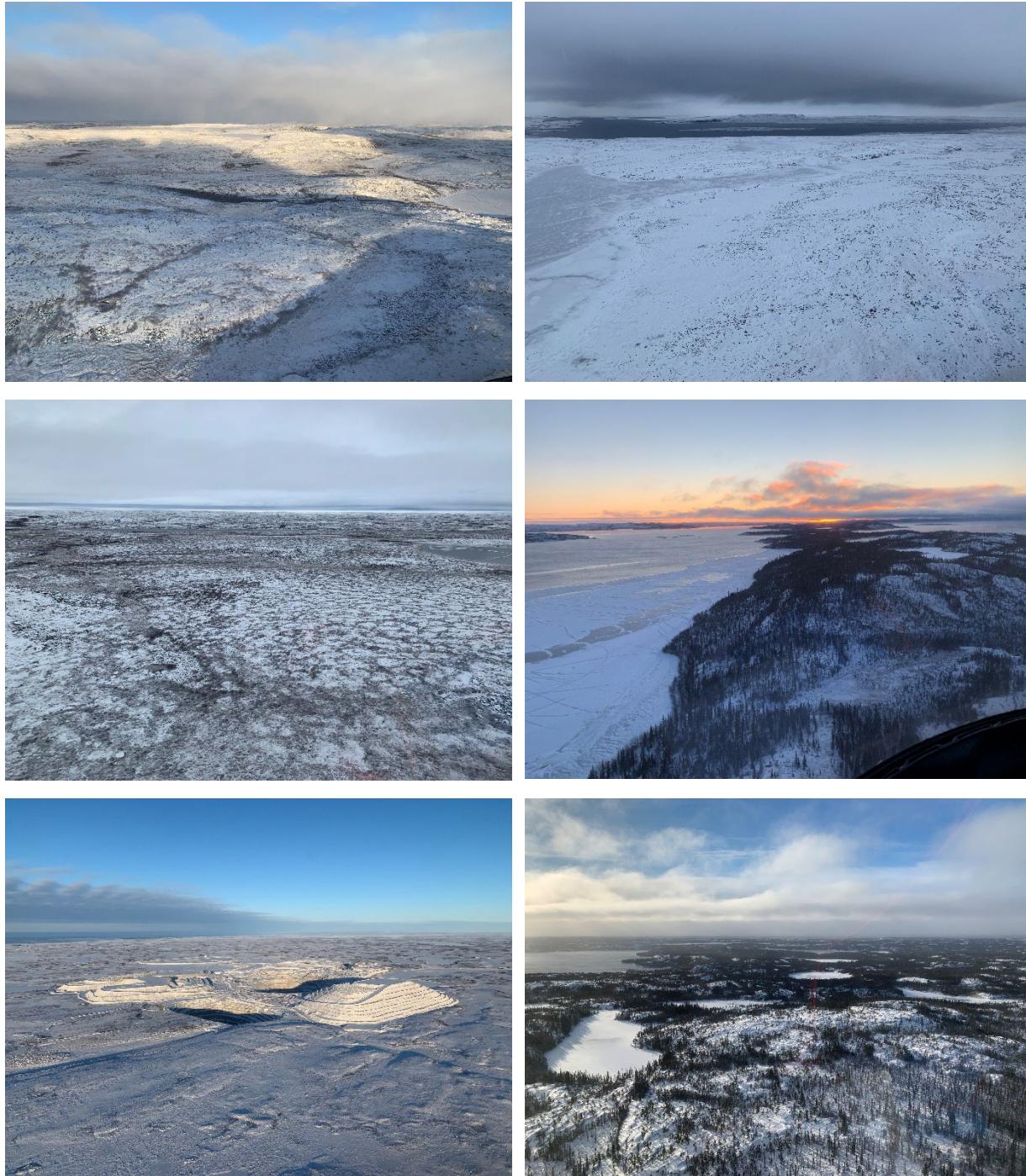
Figure 3. Snow conditions during fall composition surveys October 17-November 3, 2022. View of Gahcho Kue mine at bottom left. Snow cover was light and patchy initially and increased somewhat during the survey period. Most lakes had primarily open water with some bays and smaller ponds frozen over. Photos J. Adamczewski, GNWT.

Figure 4. A group of several thousand Beverly caribou observed during fall composition survey November 2, 2022, near Artillery Lake. Photo D. Cluff, GNWT.

Survey Results for Bluenose-East Herd

The Bluenose-East survey was flown on October 17, 18 and 21 with the helicopter based initially at Wekweètì, then at the Daring Lake research station in the NWT, south of Contwoyto Lake (Figure 5). The area flown on October 21 was labeled as the Point Lake area. The area flown October 17 and 18 was labeled as the Rawalpindi Lake area, south and east of the Point Lake area.

Thirty-eight of the 49 Bluenose-East female collars and ten of the 11 male collars were in areas surveyed (Table 2; 48/60 or 80% of total collars). A few additional Bluenose-East collars were within these two general areas, though not flown to (see Figure 5). There were just two collared Bathurst caribou females mixed with the Bluenose-East collars. These results suggested that the survey was a representative herd-wide sample of the Bluenose-East herd.
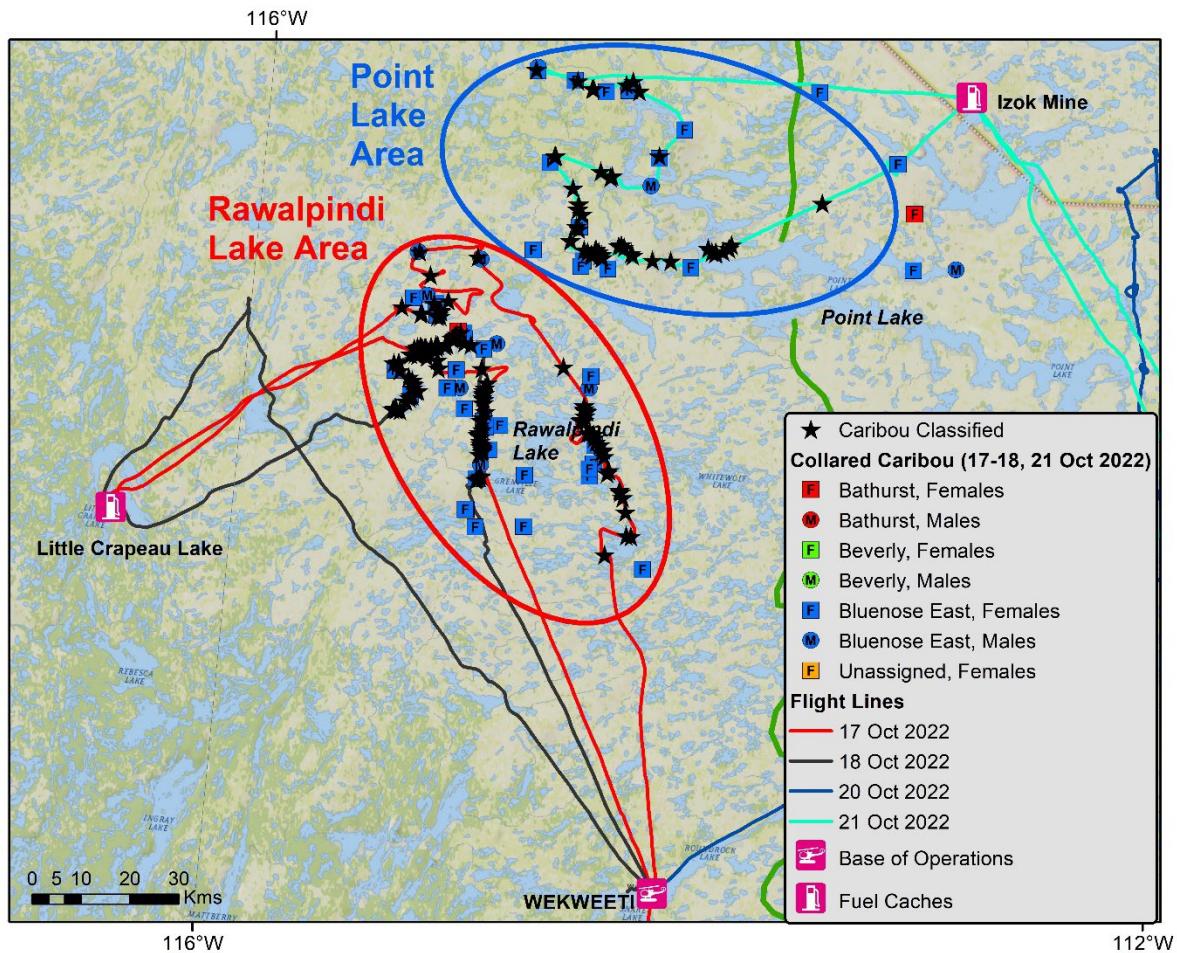
Figure 5. Helicopter flight lines, caribou locations, and locations of caribou groups surveyed on Oct. 17, 18 and 21, 2022 during the Bluenose-East survey. The main bases were the Daring Lake research station (not shown, further west) and Wekweètì, with fuel caches at Little Crapeau Lake and the Izok Mine site. Collar locations and flight lines are shown for the day they were flown, due to substantial daily movements south.

Table 2. Numbers of Bluenose-East collared females and males in the October 2022 fall survey areas and overall numbers of collared caribou in the herd.

	Female Bluenose-East	Male Bluenose-East	Total Bluenose-East	Other collars in area
Collars on Herd	49	11	60	
Collars in Rawalpindi Lake Area October 17, 18	24	7	31	1 Bat F
Collars in Point Lake Area October 21	14	3	17	1 Bat F
Total Collars in Areas Flown	38	10	48	2 Bat F

The survey of the Bluenose-East herd totaled 2,884 caribou (including calves) in 168 groups (Table 3). Groups identified during the survey were more units of convenience than actual group sizes.

The overall Bluenose-East calf: cow ratio was 52.3 calves:100 cows (95%CI 48.5-56.3). Results were calculated separately for two areas to assess regional variation in the calf: cow and bull: cow ratios. Numbers of caribou classified in the Rawalpindi Lake area were higher than in the Point Lake area, which reflected relative numbers of caribou seen. There were also more collared caribou (31) in the areas flown in the Rawalpindi Lake area than in the Point Lake area (17). The calf: cow ratio was lower in the Point Lake area (41.0 calves: 100 cows), than in the Rawalpindi Lake area (57.6:100 cows).

Table 3. Overall results and regional variation for October 2022 Bluenose-East fall composition survey. SE = Standard Error; CIU = 95% Confidence Interval Upper; CIL = 95% Confidence Interval Lower.

Measurement	Point Lake Area (October 21)	Rawalpindi Lake Area (October 17, 18)	All Areas
# Caribou	876	2,008	2,884
# Cows	424	904	1,328
# Calves	174	521	695
# Young Bulls	154	295	449
# Prime Bulls	124	288	412
# Groups	48	120	168
Mean Group Size	18.2	16.8	17.2
Calves:100 Cows	41.0	57.6	52.3
SE Calves:100 Cows	3.1	2.3	2.0
CIU & CIL Calf: Cow	35.3, 47.3	53.2, 62.3	48.5, 56.3
Bulls:100 Cows	65.6	64.5	64.8
SE Bulls:100 Cows	9.5	3.7	3.9
CIU & CIL Bull: Cow	49.6, 87.3	57.3, 72.0	57.3, 72.7

The overall bull: cow ratio for the Bluenose-East herd was 64.8 bulls:100 cows (95%CI 57.3-72.7). The bull: cow ratios were similar in the Point Lake (65.6) and Rawalpindi Lake areas (64.5).

Although our helicopter-based survey did not allow for prolonged observation of individual caribou, the caribou we saw on the Bluenose-East survey appeared to be in very good condition, there were many large bulls with impressive antlers, and some of the calves appeared large and had substantial spike antlers.

Survey Results for Bathurst Herd

The Bathurst survey was flown from the Daring Lake research station and included flights on October 20, 21, 22 and 23 (Figure 6).
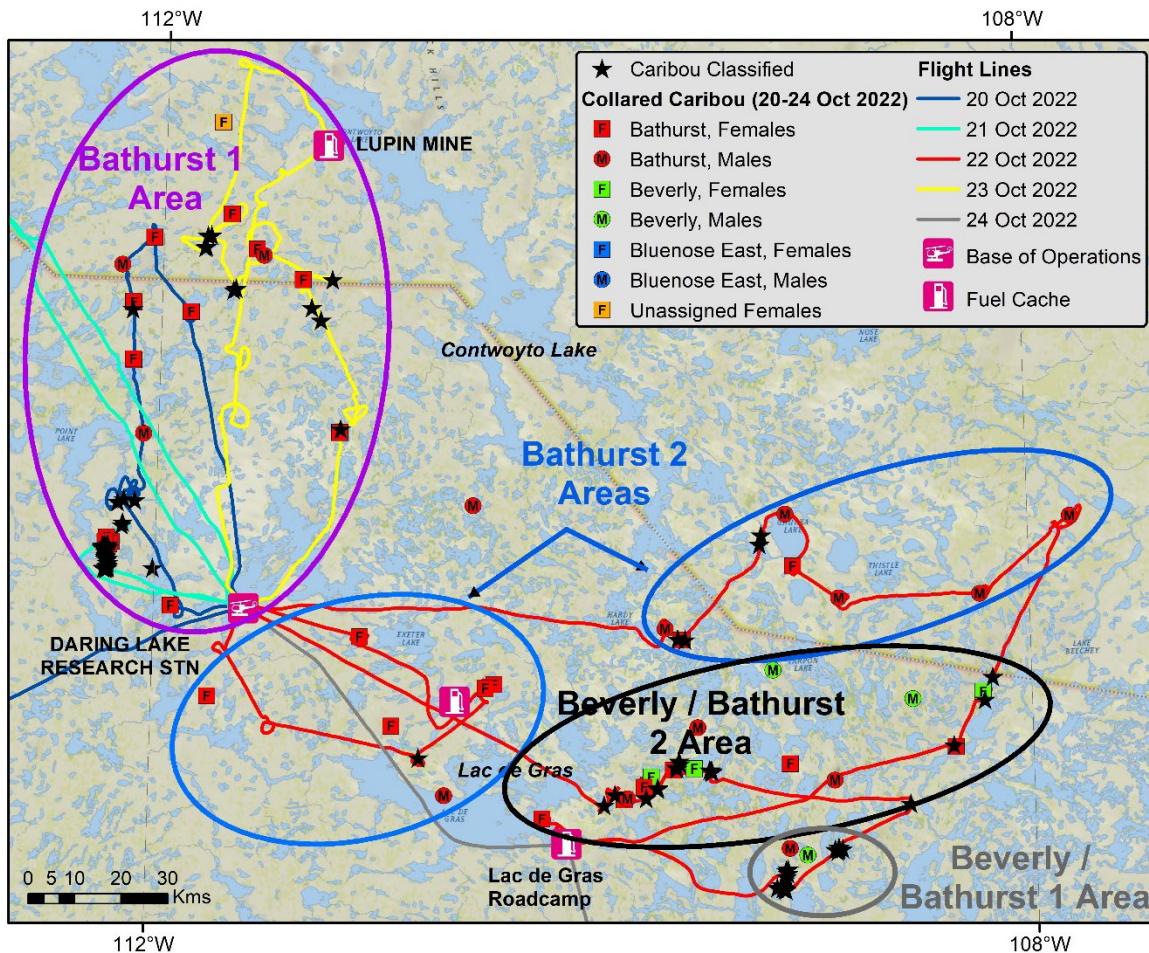
Figure 6. Helicopter flight lines, caribou locations, and locations of caribou groups surveyed on October 20-23, 2022 during the Bathurst survey. The base was the Daring Lake research station, with fuel caches at Lupin Mine and Lac de Gras. Collar locations and flight lines are shown for the day they were flown, due to substantial daily movements south.

The flights on October 20, 21 and 23 included only Bathurst collars and results are summarized as the Bathurst 1 area. The October 22 flight included a northern portion that had only Bathurst collars and was identified as Bathurst 2 (two polygons in Figure 6). There were two areas flown October 22 where there was a mix of Bathurst and Beverly collars. These were labeled as Beverly/Bathurst 1 and 2 and are also shown in Figure 6.

To assist in assessing the likelihood of an area having Bathurst caribou vs. a possible mix of Bathurst and Beverly, we recorded notes on relative group numbers of caribou present along with numbers of Bathurst and Beverly collars in the area (Table 4). Experience from a number of recent fall and late-winter composition surveys indicated that areas having only

Bathurst collars tended to have groups numbering 50-100 or sometimes a few hundred. Areas having Beverly collars often tended to number groups of several hundred or a few thousand. We had also found on occasion that groups of caribou numbering thousands were encountered with no collared caribou nearby. Given that the Beverly herd was estimated at about 103,000 in 2018 (Campbell et al. 2019) and the Bathurst herd at about 6,200 in 2022 (Adamczewski et al. 2022a) and with fewer collars on the larger herd, the likelihood of hundreds or thousands of Beverly caribou not having a collar present is much greater than large groups of Bathurst caribou having no collar associated.

Table 4. Survey flights October 20-23, 2022 from Daring Lake focused on Bathurst collars for fall composition survey, numbers of caribou classified, observations of group sizes, and presence of Bathurst and Beverly collared caribou. Bat = Bathurst, Bev = Beverly.

Date Flown	Area	Caribou Classified	Collars in Area	Group Size Observations
October 20	Bathurst 1	151	9 Bat	One group ca. 300, rest small groups
October 21	Bathurst 1	863	5 Bat	1000-2000 or more in one area; possibly a large portion of the herd
October 22	Bathurst 2	98	15 Bat	Small groups only (<100)
October 23	Bathurst 1	408	11 Bat	A few groups of 200-300 plus smaller groups
October 22	Bev/Bat 1	771	1 Bat, 1 Bev	2 Sites with 1000s of caribou each
October 22	Bev/Bat 2	625	11 Bat, 6 Bev	Groups of various sizes, up to 300

Flights October 20, 21 and 23 were in areas having only Bathurst collars and these areas were relatively close together. These resulted in a total of 1,422 caribou classified and were added together as the Bathurst 1 area. Of these flights, the groups classified October 21 were estimated to have 1,000-2,000 or more caribou, with five Bathurst collars in the area, and 863 caribou were classified on this flight. This may have represented a significant proportion of the Bathurst herd. Groups observed October 20 and October 23 numbered up to 200-300 and included smaller groups. A flight on October 22 included an area separate from the areas flown October 20, 21 and 23, with small groups only (<100) and 15 Bathurst collars and was labeled as Bathurst 2, with just 98 caribou classified. The 1,522 caribou classified on these four days were treated as the Bathurst fall 2022 sample. It appeared that some caribou groups were missed on the flights to Bathurst collar locations due to their movements (mostly southward) from the last locations used to plan flights.

Two additional areas with Bathurst collars were flown on October 22, and these areas also contained Beverly collars. The Beverly/Bathurst 1 area was relatively small, but we found

two sites that each had several thousand caribou, and there was one Bathurst male collar and one Beverly male collar in the area. We reasoned that these caribou were most likely predominantly Beverly caribou as there was only one Bathurst collar in the area and the size of the two groups found was more indicative of the much larger Beverly herd. Caribou classified in this area were included with the Beverly survey results. A second area was labeled Beverly/Bathurst 2 and this area had 17 Bathurst collars and five Beverly collars. Groups were variable in size and generally numbered a few hundred; no groups numbering thousands were seen. We report results from this area, but the numbers are not included in either the Bathurst or the Beverly survey estimates. These results are more likely representative of the Beverly herd based on collar numbers and herd sizes[3].

Overall, there were 54 Bathurst collared caribou in October 2022 and 34 of these caribou (63.0 %) were in the areas surveyed as Bathurst 1 and 2 (Table 5a). A further 18 Bathurst collars were in the two Beverly/Bathurst mixed areas (33.3 %; Table 5b). This suggested that a high proportion of the Bathurst herd (52/54 collars or 96.3%) was in all areas surveyed in October 2022.

Table 5a. Numbers of satellite collared Bathurst collared females and males in the herd and in survey areas during October 2022 composition survey. This table does not include Beverly/Bathurst mixed areas.

	Female Bathurst	Male Bathurst	Total Bathurst	Other Collars in area
Collars on Herd	35	18	54	
Collars in Area Flown October 20, 21, 23 (Bathurst 1)	18	6	24	1 Unassigned F
Collars in Area flown October 22 (Bathurst 2)	5	5	10	
Total Collars in Areas Flown	23	11	34	1 F

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[3] If numbers of caribou associated with a collar are assumed proportionate to collar numbers and herd size, then 5/34 Beverly collars x 103,000 Beverly caribou in the area is 15,147 Beverly caribou. Similarly 17/54 collars x 6,200 Bathurst caribou means 1,952 Bathurst caribou in the area. Beverly caribou would represent 15,147/17,099 or 88.5% of the caribou in the Beverly/Bathurst 2 area. These are approximations only; actual numbers of caribou associated with a collared caribou can vary widely.

Table 5b. Numbers of satellite-collared Bathurst and Beverly collared females and males in the herd and in mixed Beverly/Bathurst survey areas during October 2022 composition survey.

	Female Bathurst	Male Bathurst	Total Bathurst	Female Beverly	Male Beverly	Total Beverly
Collars on Herd	36	18	54	19	15	34
Collars in Beverly/Bathurst 1 Area		1	1		1	1
Beverly/Bathurst 2 Area	13	4	17	3	2	5
Total Collars in Mixed Areas	13	5	18	3	3	6

The overall calf: cow ratio for the Bathurst herd was estimated at 38.4 calves:100 cows (95%CI 31.3-46.9) based on 1,520 caribou classified in the Bathurst 1 and 2 areas combined (Table 6). This ratio basically reflected results from the 1,422 caribou classified in the Bathurst 1 area (39.0). The calf: cow ratio in the Bathurst 2 area was somewhat lower (30.2) but the total sample in that area was just 98 caribou.

Table 6. Overall results and regional variation for October 2022 Bathurst fall composition survey. Results from two areas that had a mix of Bathurst and Beverly collars are included. Areas are shown in Figure 6. SE = Standard Error; CIU = 95% Confidence Interval Upper; CIL = 95% Confidence Interval Lower.

Measurement	Bathurst 1 Area	Bathurst 2 Area	Bathurst 1&2 Areas Combined	Beverly/Bathurst Area 1	Beverly/Bathurst Area 2
# Caribou	1,422	98	1,520	771	625
# Cows	580	43	623	345	289
# Calves	226	13	239	149	112
# Young Bulls	313	16	329	153	140
# Prime Bulls	303	26	329	123	84
# Groups	45	6	51	16	17
Mean Group Size	31.6	16.3	29.8	48.2	36.8
Calves: 100 Cows	39.0	30.2	38.4	43.2	38.8
SE Calves:100 Cows	4.4	7.5	4.1	2.1	3.2
CIU & CIL Calf: Cow	31.6, 48.4	16.1, 45.5	31.3, 46.9	39.5, 47.7	33.8, 46.4
Bulls:100 Cows	106.2	97.7	105.6	80.0	77.5
SE Bulls:100 Cows	8.1	6.9	7.6	7.7	7.4
CIU & CIL Bull: Cow	92.1, 123.4	87.1, 111.7	92.4, 122.0	66.2, 96.2	65.3, 94.4

The calf: cow ratio was estimated at 43.2: 100 in the Beverly/Bathurst 1 area and 38.8: 100 in the Beverly/Bathurst 2 area. These results are relatively similar to the ratio estimated in the Bathurst-only areas; however, they most likely primarily reflect the composition of the

Beverly herd in that area given comparative herd sizes and numbers of collars present. The limited numbers of caribou classified in the Beverly/Bathurst 2 area (625) and group sizes encountered (hundreds but not thousands) suggest that the proportion of the Beverly herd in that area was relatively small.

The overall bull: cow ratio estimated for the combined Bathurst 1 and 2 areas was 105.6 bulls:100 cows (95%CI 92.4-122.0) and was similar in the Bathurst 1 (106.2) and Bathurst 2 (97.7) areas. Bull: cow ratios were somewhat lower in the Beverly/Bathurst 1 (80.0) and Beverly/Bathurst 2 (77.5) mixed areas. The estimate of 105.6 bulls: 100 cows reflects what was seen on the survey. However, this ratio is much higher than the fall 2020 estimate for the Bathurst herd (64.1:100; Adamczewski et al. 2022b), which appeared to be reliable. It is also much higher than the adult sex ratio estimated in various caribou populations and eco-types, with adult females commonly out-numbering adult males about 2:1, i.e., a bull: cow ratio around 50:100 (Bergerud 2000). Validity of this estimate is considered further in the Discussion.

Survey Results for Beverly Herd

The main Beverly survey was flown on October 24 and November 3 in an area south of Artillery Lake where 1,502 caribou were classified, and in an area around Gahcho Kue mine on November 1 and 2 where 4,096 caribou were classified (Figure 7).
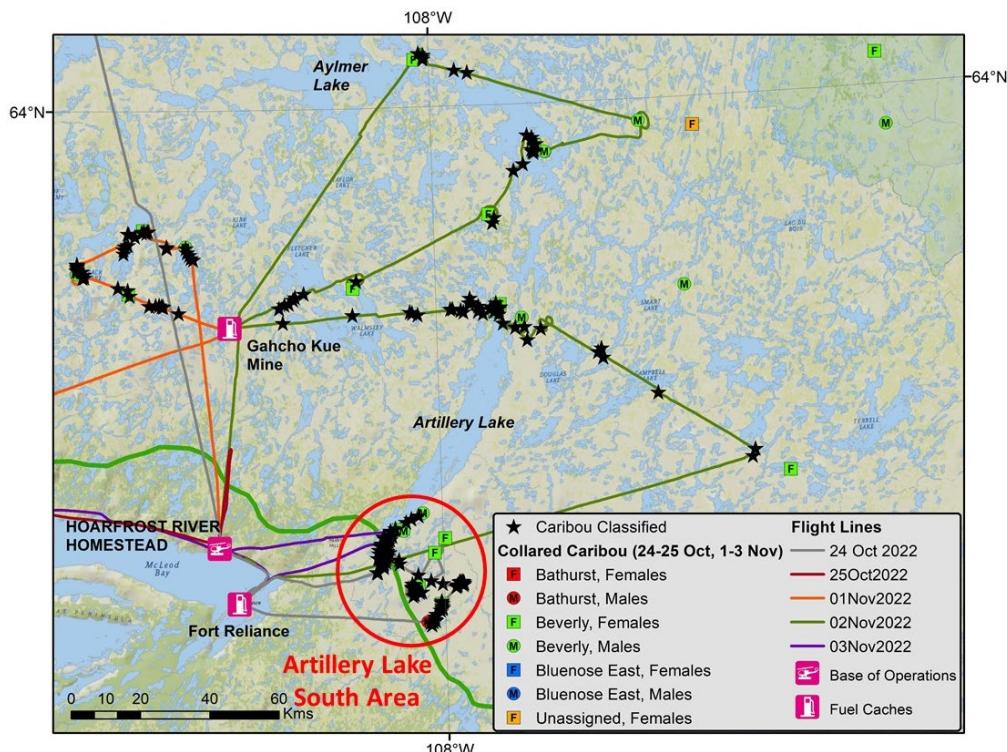
Figure 7. Helicopter flight lines, collared caribou locations, locations of caribou groups surveyed on October 24 and November 1-3, 2022 on the main Beverly survey. The base for

flying was the Hoarfrost River base. Collar locations and flight lines are shown for the day they were flown, due to substantial daily movements south and west. Artillery Lake South area is circled; remaining surveyed areas are the Gahcho Kue area.

Group sizes of caribou encountered in the Gahcho Kue area were consistently in the thousands, which is reflected in the largest sample in this area. In addition, as described earlier in the Bathurst results section, there were two areas that had a mix of Beverly and Bathurst collars. Results from the Beverly/Bathurst 1 mixed area (771 caribou classified) were assessed as likely predominantly Beverly caribou and those results are included here with the Beverly survey results.

There were 34 total Beverly collars at the time of the survey (19 F, 15 M), and eight of these (23.5%) were in areas surveyed in the Artillery Lake South area, 13 were in the Gahcho Kue area (38.2 %), and there was one Beverly male collar as well as one Bathurst male collar in the Beverly/Bathurst 1 mixed area (Table 7). As noted earlier, five Beverly collars were in the Beverly/Bathurst 2 mixed area. Overall, 27 of 34 Beverly collars (79.4 %) were accounted for in areas surveyed in October/November 2022 and 22 of 34 (64.7 %) were in the three areas that contributed to the Beverly ratios.

Table 7. Numbers of satellite collared Beverly collared females and males in the herd and in Beverly survey areas during October/November 2022 composition survey. The collars in the Beverly/Bathurst 1 area were previously noted in Table 5b.

	Female Beverly	Male Beverly	Total Beverly	Bat or BNE collars in area
Collars on Herd	19	15	34	
Collars in Artillery Lake South area	5	3	8	1 Bat M
Collars in Gahcho Kue area	8	5	13	
Collars in Beverly/Bathurst 1 area		1		1 Bat male
Total Collars in Areas Flown	13	9	22	2 Bat M

Numbers classified and ratios for the Artillery Lake South, Gahcho Kue and Beverly/Bathurst Mixed 1 areas are in Table 8. Total numbers and overall ratios are included for caribou classified in the Gahcho Kue and Artillery Lake South areas combined, and in the Gahcho Kue, Artillery Lake South and Beverly/Bathurst Mixed 1 areas combined. The Beverly survey totaled 6,389 caribou (including calves) in 195 groups if the caribou classified in the Beverly/Bathurst Mixed 1 area are included.

The Beverly survey resulted in an estimate of 46.5 calves:100 cows across all areas. The calf: cow ratio was higher in the Artillery Lake area (57.0) than in the Gahcho Kue area (43.1). The calf: cow ratio of 43.2 in the Beverly/Bathurst 1 area was similar to the ratio for the

Gahcho Kue area. The overall ratio was most influenced by the ratio from the Gahcho Kue area because about 2/3 of the sample was classified in that area. If the Beverly/Bathurst Mixed 1 area results are omitted and only the Artillery Lake and Gahcho Kue results are considered, the overall calf: cow ratio is nearly unchanged at 46.9 calves:100 cows.

The overall estimate of sex ratio in the Beverly herd was 62.8 bulls: 100 cows across all areas, including the Beverly/Bathurst Mixed 1 area. There was substantial regional variation with a higher ratio of 66.2 in the Gahcho Kue area and a lower ratio of 45.7 in the Artillery Lake area. The ratio in the Beverly/Bathurst 1 area was a relatively high 80.0, although this was the smallest sample of the three areas. If the Beverly/Bathurst Mixed 1 results are omitted and only the Artillery Lake and Gahcho Kue results are considered, the overall bull: cow ratio is slightly lower at 60.5 compared to 62.8. As with the calf: cow ratio, the result from the largest regional sample (Gahcho Kue) had the greatest influence on the overall bull: cow ratio.

Table 8. Overall results and regional variation for October 2022 Beverly fall composition survey. SE = Standard Error; CIU = 95% Confidence Interval Upper; CIL = 95% Confidence Interval Lower.

Measurement	Artillery Lake South Area	Gahcho Kue Area	Beverly/Bathurst 1 Area	Artillery and Gahcho Kue Areas	All Areas
# Caribou	1,502	4,096	771	5,598	6,369
# Cows	741	1,956	345	2,697	3,042
# Calves	422	844	149	1,266	1,415
# Young Bulls	166	499	153	665	818
# Prime Bulls	173	795	123	968	1,091
# Groups	77	102	16	179	195
Mean Group Size	19.5	40.2	48.2	31.3	32.7
Calves: 100 Cows	57.0	43.1	43.2	46.9	46.5
SE Calves:100 Cows	2.5	1.8	2.1	1.6	1.4
CIU & CIL Calf: Cow	52.6, 62.1	39.5, 46.7	39.5, 47.7	43.9, 50.1	43.8, 49.2
Bulls:100 Cows	45.7	66.2	80.0	60.5	62.8
SE Bulls:100 Cows	3.2	6.0	7.7	4.6	4.2
CIU & CIL Bull: Cow	40.4, 53.0	55.5, 78.5	66.2, 96.2	52.4, 70.2	55.0, 71.4

Tables of classification observations by individual groups for the three herds and for the Beverly/Bathurst mixed areas are included as Appendix 1.

Incidental Sightings of Other Large Mammals

Incidental sightings of wolves, grizzly bears, muskoxen and moose during Bluenose-East, Bathurst and Beverly fall composition surveys in 2022 are listed in Table 9.

Table 9. Incidental sightings of wolves, grizzly bears, muskoxen and moose on the Bluenose-East, Bathurst and Beverly October/November 2022 composition surveys.

Species	Bathurst Survey	Bluenose-East Survey	Beverly Survey	Notes Beverly	Beverly/Bathurst Mixed
Wolf	0	1	3	1,2	0
Grizzly Bear	0	0	1	On kill; another kill site near by	0
Muskox	58	0	251	18 groups (1-35)	0
Moose	2	0	0		2

One wolf was seen on the Bluenose-East survey, none on the Bathurst survey, and three on the Beverly survey. One grizzly bear was seen on the Beverly survey with two kill sites nearby. Eighteen groups of muskoxen were seen on the Beverly survey.

DISCUSSION

Bluenose-East Survey

To provide context for the 2022 Bluenose-East fall composition survey, fall calf: cow and bull: cow ratios for the herd from 2009-2022 are shown in Figure 8. The calf: cow ratios in October 2020 (51.7), 2021 (49.6) and 2022 (52.3) were very similar and were the highest of the ten surveys conducted over these years. Bull: cow ratios between 2009 and 2019 were variable with no clear trend. The bull: cow ratios recorded in October 2020 (63.3), 2021 (68.7) and 2022 (64.8) were similar and were the three highest values estimated in this herd 2009-2022. The last period of widespread growth in NWT mainland barren-ground caribou herds was in the early 1980s. The average bull: cow ratio recorded during six fall composition surveys during this period was 66 bulls: 100 cows (in Gunn et al. 1997, p. 35), similar to the Bluenose-East ratios for 2020, 2021, and 2022. Overall, the results of the fall 2022 Bluenose-East survey suggest that the healthy indicators in the herd from 2018 to 2021 have continued through 2022.
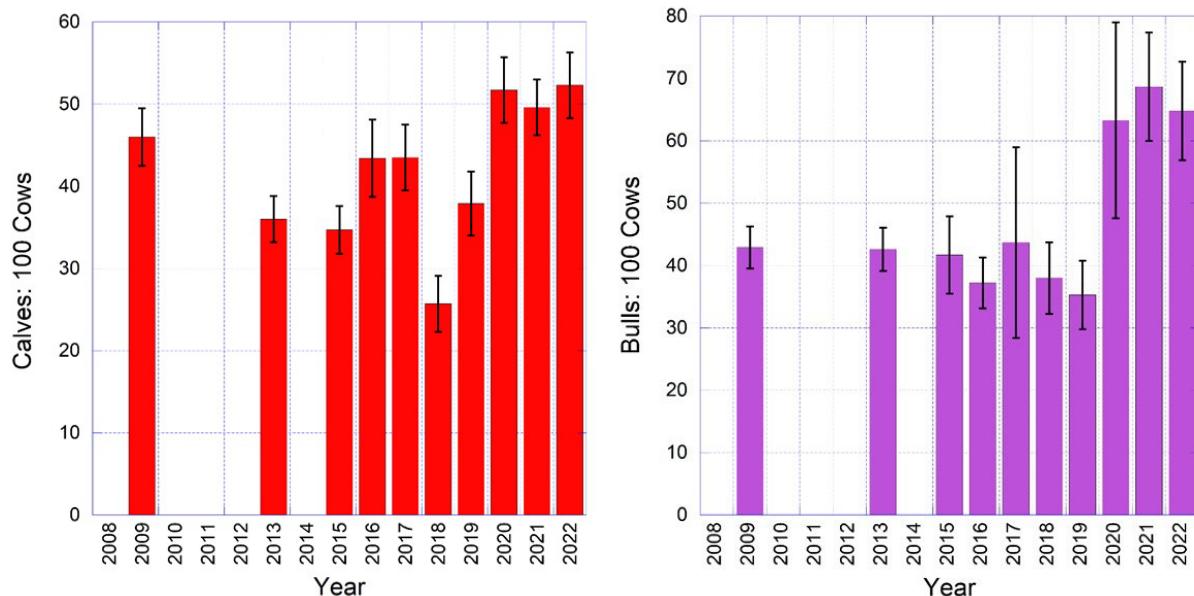
Figure 8. Fall calf: cow ratios (left) and bull: cow ratios (right) for the Bluenose-East herd 2009-2022. Means are shown with 95% Confidence Intervals.

Comparison with Ekwǫ̀ Nàxoèdee K'è Caribou Monitoring of Bluenose-East Caribou (Sahti Ekwǫ̀) in 2022

The Tłı̨chǫ Government carried out ground-based monitoring of Bluenose-East caribou in fall (September) of 2022 in the Point Lake (Deèzàatì) area. A summary of trends (courtesy of P. Jacobsen, Tłı̨chǫ Government) is included here to compare with our October 2022 survey

of the Bluenose-East herd. A summary of these results was also included in the report on June 2022 Bathurst and Bluenose-East calving ground surveys (Adamczewski et al. 2023).

Among the trends for Bluenose-East caribou observed by Tłįchǫ Government caribou monitors in fall 2022 were the following:

1. There was a high proportion of younger two-year-old caribou (both young bull and young cows) in many groups. In some herds, a high proportion of tsidaa (young cows) was observed.

2. All the caribou were in very good shape; most adult bulls and cow were healthy and considered fat. The bulls were really fat; the coat was new and looked clean. Most bulls had large antlers, white neck mane, and had rounded rumps and backs, due to thick fat layers on their backs. The cows were fat; visible by straight and rounded backs, and new clean coat. The field teams observed 76% of the bulls as fat, 24% as good and no skinny bulls; the cows were scored as 73% as fat, 27 in good condition and no skinny cows observed. For calves, the teams scored 87% of the calves in good condition, 13% as fat, and no skinny calves observed.

3. The calves were healthy and had grown larger bodies at this time of year, end of September. At times, it was challenging to differentiate between a calf and a yearling; the calf's antlers had grown longer than what is considered "normal" calf antlers.

4. Most adult caribou had large bellies. The animals ate peacefully all day without any harassment from insects, wolves or hunters.

5. We observed a total of 1,034 caribou in 64 herds. Overall, we counted 38 calves:100 cows; we consider that a low-to-average ratio.

In general, these Tłįchǫ observations of Bluenose-East caribou in fall 2022 are consistent with the results of our fall 2022 survey of this herd and the healthy demographic indicators recorded in this herd by ENR 2018-2021 (Boulanger et al. 2022). As noted earlier in this report, we also saw many calves with relatively large antlers in October 2022, and the caribou generally appeared to be in very good condition. In a herd that appears to be stabilizing and potentially in the early stages of recovery, large proportions of young males and females should be expected.

The calf: cow ratio observed by Tłįchǫ observers in September 2022 (38 calves:100 cows) near Point Lake was similar to the ratio of 41 calves:100 cows in the Bluenose-East herd in an area that included Point Lake in October 2022 (this report). However, on October 17 and 18, we recorded a ratio of 57.6 calves:100 cows in 2,011 Bluenose-East caribou in an area further west and south of Point Lake, with an overall survey estimate of 52.3 calves:100 cows between the two areas. These results underscore the importance of herd-wide coverage on composition and population surveys of migratory caribou that use very large ranges.

We also note observations of A. Niptanatiak and A. Dumond in Kugluktuk (pers. comm.) for recent summers on the Bluenose-East summer range – relatively cool, wet and windy conditions with relatively mild summer insect seasons. Trends toward lower summer temperatures and a reduced oesterid (warble fly) index based on the MERRA climate database for the summer range of the Bluenose-East herd were noted by Boulanger et al. (2022), demonstrating a parallel trend between local ground-based observations of environmental trends and metrics based on satellite-based results.

Beverly Survey

The Beverly fall 2022 survey should be representative of the herd, with 27 of 34 (79.4 %) of collared caribou in the herd in all areas flown and larger numbers of caribou classified in areas having greater numbers of caribou. Of the 34 Beverly collars, 22 (64.7%) were in the areas included for the Beverly estimates. Mixing of Beverly and Bathurst caribou, based on collars, creates some uncertainty as to calf: cow and bull: cow ratios estimated in mixed areas, although the much greater size of the Beverly herd means that ratios in mixed areas are likely to be more representative of the larger herd.

Fall composition surveys of the Beverly herd have been relatively infrequent, in part due to the herd's widespread and sometimes remote distribution at this time of year, and in part because this herd has been relatively abundant when compared to the Bathurst and Bluenose-East herds.

Results of the last fall GNWT composition survey of this herd in 2011, as reported in Campbell et al. (2019) indicate that:

- the herd was surveyed October 22-28, 2011;
- there were eight active satellite collars on the herd;
- a fixed-wing reconnaissance survey was flown to assist in survey planning;
- 12,421 caribou were classified in 252 groups;
- the calf: cow ratio was 53.9 calves: 100 cows; and
- the bull: cow ratio was 69.0 bulls: 100 cows.

Because 11 years passed between the 2011 and 2022 fall surveys of this herd, inferences about trend are difficult to draw. However, the bull: cow ratios in 2011 (69.0) and 2022 (62.8) were fairly similar and suggest healthy bull: cow ratios in these two years.

A map of the fall 2011 composition survey area from Campbell et al. (2019; Figure 9) indicates that the herd's distribution at that time was further east than in 2022. Most of the caribou were classified south and east of Artillery Lake and flying extended as far east as an area north of Dubawnt Lake.
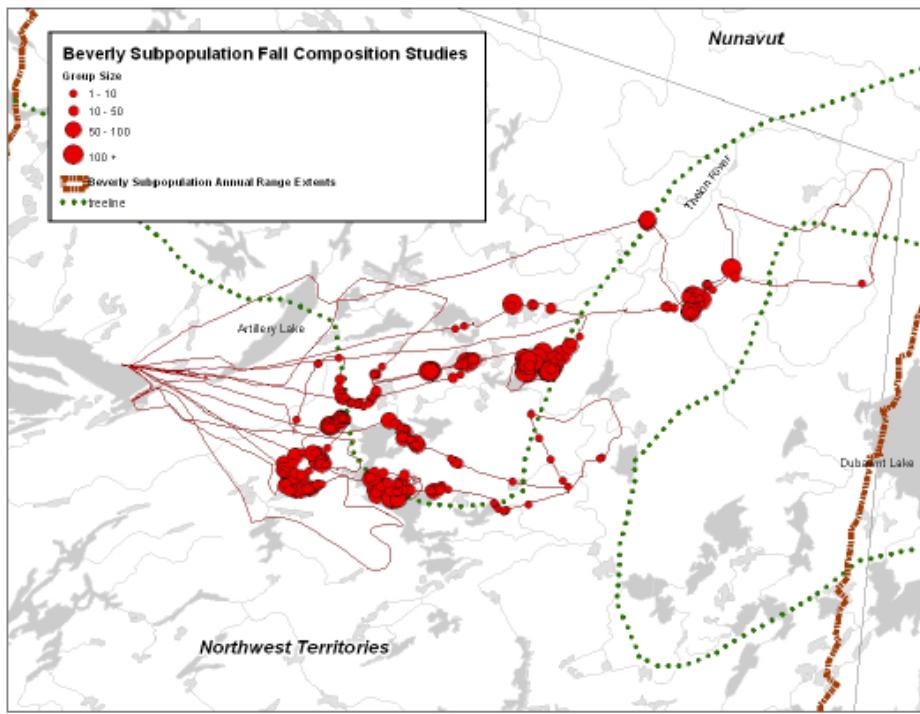
Figure 9. Flight lines and locations of caribou groups classified October 25-29, 2011 on Beverly fall composition survey. Originally Figure 33, p. 106 in Campbell et al. (2019).

Late winter (March) composition surveys have been carried out more frequently for the Beverly herd (Figure 10) and ratios of 45-52 calves:100 cows 2020-2022 suggest healthy recruitment in the herd in recent years and generally increasing calf: cow ratios since 2014.
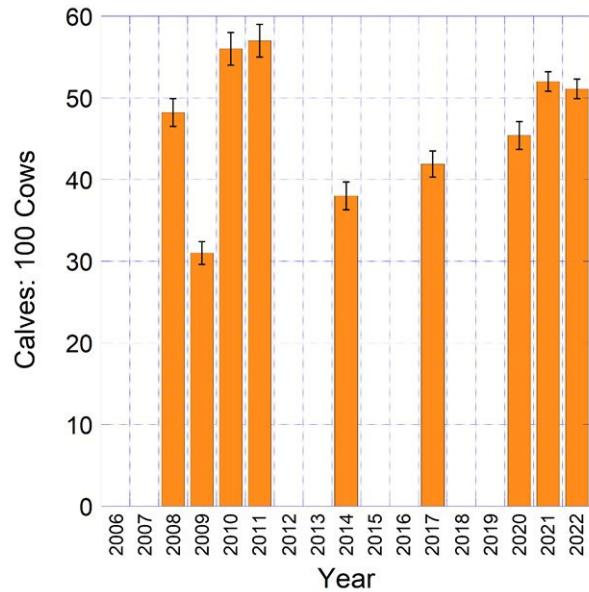
Figure 10. Late winter calf: cow ratios estimated in the Beverly herd 2008-2022 from GNWT surveys.

Bathurst Survey

Results of the Bathurst fall 2022 survey are less clear-cut than results for the Bluenose-East and Beverly herds, in large part because the Bathurst herd was at least partially mixed with the much larger Beverly herd based on satellite collars. Fall surveys in 2020 and 2021 also were complicated by some degree of Bathurst collars mixing with Beverly collars. The large disparity in herd sizes (Beverly estimated at 103,000 in 2018, Bathurst estimated at 6,200 in 2021) indicates that there were about 17 Beverly caribou for each Bathurst caribou. In effect a few thousand Beverly caribou can "swamp" a much smaller number of Bathurst caribou. The much larger herd size of the Beverly herd also means that, with 30-50 satellite collars on the herd (34 at time of fall 2022 surveys), a few hundred or a few thousand Beverly caribou can easily have no collar associated with them. We have on a number of fall and late winter surveys encountered groups of caribou numbering thousands with no collared caribou in the area. The likeliest explanation is that these are entirely or predominantly Beverly caribou. Given these circumstances, classifying Bathurst caribou seems most likely to be representative of the herd if there are several Bathurst collars in an area and no collars from other herds. Smaller groups of caribou (50-100 or a few hundred) are also more likely representative of the Bathurst herd. Any areas with a mix of Bathurst and Beverly collars are most likely to be representative primarily of the larger herd.

In October 2020, about three-quarters of the Bathurst collars were concentrated in a limited area and there were no collars from either the Beverly or Bluenose-East herds nearby (Adamczewski et al. 2022a). The remaining Bathurst collars were mixed with more numerous Beverly collars in a remote area. Most of the Bathurst caribou encountered and classified were in a single large rutting aggregation that numbered thousands (ibid.). The fall 2020 Bathurst survey provided an estimate of 64.1 bulls:100 cows, very similar to an estimate that fall for the Bluenose-East herd of 63.3 bulls:100 cows (Adamczewski et al. 2022b), and consistent with a trend in both herds toward improved demographics 2018-2021 (Adamczewski et al. 2022a, Boulanger et al. 2022). This estimate for the Bathurst herd appeared reliable.

In October 2021, a Bathurst fall survey was attempted but a reliable result was not obtained because of extensive Bathurst-Beverly collar mixing and insufficient sampling of areas that could reliably be considered Bathurst-only (Adamczewski et al. 2022c).

The fall 2022 Bathurst survey estimates included just classification results from areas having only Bathurst collars. The calf: cow ratio of 38.4 was within a fairly normal range and similar to the ratios recorded in Beverly/Bathurst mixed areas (43.2 and 38.8). The survey estimates included a substantial proportion (34 of 54, 63.0 %) of available Bathurst collars, thus this appears to be a valid estimate for the Bathurst herd. Overall, 52 of 54 Bathurst collars were in all survey areas (96.3 %). Some caution should be used with this calf: cow estimate,

however, as the potential exists for the presence of some Beverly caribou with no collars associated being mixed with Bathurst caribou.

The Bathurst bull: cow estimate of 105.6 bulls: 100 cows in fall 2022 is questionable for a number of reasons. The Bathurst estimate of 64.1 bulls:100 cows in October 2020 appeared to be a reliable number and was very similar to the ratio in the Bluenose-East herd that year of 63.3:100; it seems unlikely that the Bathurst bull: cow ratio would increase to this extent in just two years in a herd either still declining or at best stabilizing. In addition, adult bull: cow ratios in caribou and reindeer populations are always skewed toward females and commonly adult females outnumber adult males by about 2:1 (50 bulls: 100 cows; Bergerud 2000). Fall bull: cow ratios in the Western Arctic herd varied over a range of about 38-65 bulls: 100 cows (Dau 2015). Fall ratios for the George River herd were generally between 53 and 59 bulls: cows (Bergerud et al. 2008). Thus, a bull: cow ratio of 105.6 bulls: 100 cows in the Bathurst herd in 2022 seems biologically unrealistic.

There are at least two potential explanations for this anomalous result in Oct. 2022:

1. There was more mixing of Bathurst and Beverly caribou than indicated by the collars, a portion of the Beverly herd was classified as Bathurst caribou and that portion of the Beverly herd had a high bull: cow ratio. In 2011 bull: cow ratios varied regionally between 40 and 99 bulls:100 cows in the Beverly herd with an overall herd ratio of 69.0 bulls:100 cows (Campbell et al. 2019). In the fall 2020 Bluenose-East survey, bull: cow ratios in three areas were 52.3, 84.5 and 122.6:100 with an overall ratio of 63.3 bulls:100 cows (Adamczewski et al. 2022b). Thus, regional variation in bull: cow ratios can be substantial and localized bull: cow ratios can exceed 100 bulls:100 cows, even where the overall herd-wide ratio is substantially lower. In this case, the high Bathurst bull: cow ratio in fall 2022 could be an outcome of sampling that does not adequately represent the Bathurst herd's composition.

2. The extensive mixing of Bathurst and Beverly caribou in recent years and emigration of Bathurst-to-Beverly female caribou has resulted in a different dynamic between the two herds in cows and bulls. For female caribou, emigration can be estimated based on known collared cows, e.g. 6 of 34 (17.6%) known Bathurst cows moved to the Beverly calving distribution in June/July 2021 (Adamczewski et al. 2022a). However, it is unclear whether movement rates of males from the Bathurst herd to the Beverly occurred at the same rate in 2021 or in other years. If females and males are moving between the two herds in different ways and at different rates, anomalous estimates of sex ratio could result. In this case, the fall 2022 Bathurst sex ratio could be representative of the herd's true composition.

Regardless of the explanation, we suggest that this estimate of the Bathurst sex ratio is best set aside at least until it can be confirmed with future surveys. A closer examination of Bathurst collared bull fidelity and movements may be useful. The extensive mixing of

Bathurst and Beverly caribou in recent years means that results of fall and late-winter composition surveys need to be considered with some caution for the Bathurst herd.[4]

For context on previous fall composition surveys of the Bathurst herd, graphs showing estimates of calf: cow and bull: cow ratios for the herd are shown in Figure 11. Calf: cow ratios in 2020 (39.1 calves:100 cows) and 2022 (38.4:100) were quite similar. Herd mixing has prevented reliable estimates of herd demographics in a number of years. Bull: cow ratios have varied between 2006 and 2020, with the highest estimate over this period of 64.1 bulls:100 cows in 2020.
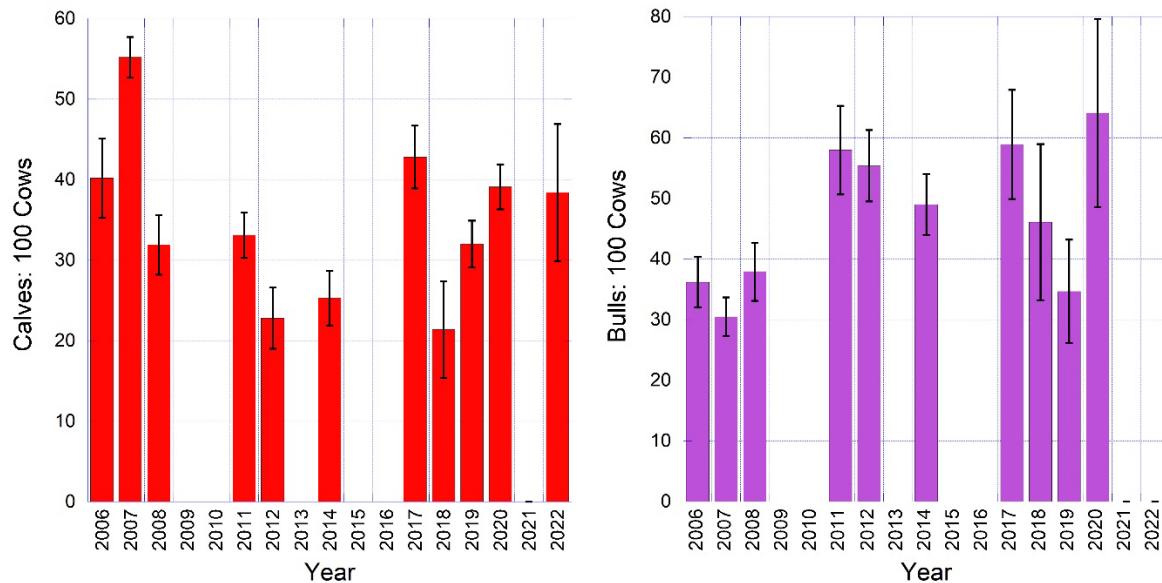
Figure 11. Fall calf: cow ratios (left) and bull: cow ratios (right) for the Bathurst herd 2009-2022. Means are shown with 95% Confidence Intervals. The fall 2022 bull: cow estimate is not included.

Comparison with Ekwǫ̀ Nàxoèdee K'è Caribou Monitoring of Bathurst Caribou (Kokètì Ekwǫ̀) in 2022

The Tłı̨chǫ Government carried out ground-based monitoring of Bathurst caribou (Kokètì Ekwǫ̀) in summer and fall 2016-2022 in the Kokètì (Contwoyto Lake) area, and in the Ek'atì (Lac de Gras) area in 2022. A summary of trends is included here (courtesy of P. Jacobsen,

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[4] As this report was not finalized until 2024, we include some additional relevant information. A fall 2023 composition survey of the Bathurst herd appeared reliable with very limited Bathurst-Bluenose-East collar mixing and no Bathurst-Beverly collar mixing in the surveyed areas. That survey resulted in a Bathurst estimate of 110.1 bulls: 100 cows, similar to the ratio in fall 2022 (Boulanger et al. 2024). In addition, an initial assessment of bull collar fidelity to summer ranges in July in the Bathurst, Bluenose-East and Beverly herds (Boulanger et al. 2024) suggested that there was high fidelity of bulls and the switching of Bathurst to Beverly collared cows was not matched by Bathurst to Beverly switching of collared bulls. These results suggest that the estimated Bathurst bull: cow ratios in fall 2022 and 2023 were representative of the herd and reflected emigration of Bathurst cows not matched by emigration of Bathurst bulls.

Tłįchǫ Government) to compare with survey-based information recorded by GNWT ENR biologists and summarized in this report. A similar extract of trends was included in a report on June 2022 calving ground surveys (Adamczewski et al. 2023).

Among the trends in Bathurst caribou observed by Tłįchǫ observers 2016-2022:

1. 2016/17 – warm and dry; high insect harassment;
2. 2018-21; start of colder, wet & windy conditions:

   - Caribou food and habitat in "good" and "optimal" conditions due to much rain and wind
   - Caribou described as "fat" and "healthy"
   - Windy; less insect activity; herds feeding peacefully
   - Many fat bulls and cows in August and September

3. During last four years (2018-2021) caribou habitat and food has generally been in excellent condition due to much rain and wind. Overall habitat conditions at Kokètì in summer 2022 were good forage conditions but dry, short growing season, low water levels and little to no water in muskeg and ponds. Cows and bulls were healthy and described as in "good" condition through the summer/fall; many fat bulls in September

4. The calf to cow ratio during summer at Kokètì for 2019-2022 have been the following:

   - 2019 – we observed 89 herds and counted 31 calves per 100 cows.
   - 2020 – we observed 37 groups and counted 29 calves to 100 cows.
   - 2021 – we observed 69 herds and counted 39 calves to 100 cows.
   - 2022 – we observed 44 groups and counted 48 calves to 100 cows.
   - 2022 – we observed 44 groups and counted 48 calves to 100 cows.

We consider this amount of calves in the herd during summer and fall as 'good' and 'normal', compared to low calf numbers around Kokètì in recent years.

At Ek'atì (Lac de Gras) in August 2022, the observed calf to cow ratio was 34.3 calves per 100 cows. Combining the cow-calf observations at Kokètì and Ekati resulted in an estimate of 39.2 calves per 100 cows for summer 2022. Around Ek'atì, the Tłįchǫ monitors also observed a high proportion of *tsidaa* and *yagoa* (young cows and young bulls) in many herds.

The caribou monitors assessed Bathurst caribou body condition around Ekati, and scored bulls as 65% fat, 35% in good condition and none as skinny. For cows, 51% were scored as fat, 49% in good condition and none as skinny. For calves, 28% were scored as fat, 72% in good condition and no skinny calves were observed. During August, caribou were observed as healthy and feeding peacefully without disturbance from insects, wolves and hunters.

Overall, these observations correspond well to improved demographic indicators in the Bathurst herd since about 2018. Caribou in good condition should lead to a healthy pregnancy rate in the fall. The Tłı̨chǫ Government combined summer calf: cow ratio of 39.2 calves: 100 cows was similar to the late October Bathurst survey ratio (38.4) we recorded. In June 2022 about a week after the peak of calving, we recorded Bathurst estimates of 79.8% breeding cows and 87.3 calves:100 cows in breeding cows (Adamczewski et al. 2023), which suggested a good pregnancy rate in winter 2021-2022 and a good initial calf: cow ratio with limited early calf mortality. We note that indicators such as the % breeding females in June and calf: cow ratios in October and March have consistently been somewhat higher in the Bluenose-East herd than in the Bathurst herd in recent years.

ACKNOWLEDGEMENTS

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APPENDIX 1A. OCTOBER 2022 BLUENOSE-EAST CARIBOU COMPOSITION SURVEY GROUP OBSERVATIONS

Date & Time	Latitude	Longitude	Cows	Calves	Yrlgs	Small Bulls	Prime Bulls	Bulls Total	All Caribou	Area
17/10/2022 1:13:30 PM	64.807719	-114.375115	1	1	0	1	0	1	3	Rawalpindi
17/10/2022 1:18:48 PM	64.845677	-114.286918	0	1	0	0	0	0	1	Rawalpindi
17/10/2022 1:20:32 PM	64.844441	-114.266722	0	0	0	2	0	2	2	Rawalpindi
17/10/2022 1:25:16 PM	64.888771	-114.297349	28	19	1	8	6	14	62	Rawalpindi
17/10/2022 1:26:34 PM	64.914838	-114.314074	0	0	0	1	0	1	1	Rawalpindi
17/10/2022 1:27:54 PM	64.924102	-114.325710	13	5	0	4	4	8	26	Rawalpindi
17/10/2022 1:28:41 PM	64.928036	-114.329338	3	2	0	0	2	2	7	Rawalpindi
17/10/2022 1:31:41 PM	64.957760	-114.388639	7	4	0	2	3	5	16	Rawalpindi
17/10/2022 1:32:33 PM	64.962852	-114.381520	0	0	0	1	1	2	2	Rawalpindi
17/10/2022 1:35:36 PM	64.988026	-114.407306	19	11	0	4	3	7	37	Rawalpindi
17/10/2022 1:36:47 PM	64.996354	-114.418322	1	1	0	0	3	3	5	Rawalpindi
17/10/2022 1:37:13 PM	65.000616	-114.411128	0	0	0	0	1	1	1	Rawalpindi
17/10/2022 1:38:35 PM	65.008433	-114.429560	5	3	0	3	2	5	13	Rawalpindi
17/10/2022 1:40:42 PM	65.013424	-114.446507	15	12	0	6	4	10	37	Rawalpindi
17/10/2022 1:41:35 PM	65.020432	-114.456375	16	9	0	4	6	10	35	Rawalpindi
17/10/2022 1:45:57 PM	65.027390	-114.458718	56	30	0	18	20	38	124	Rawalpindi
17/10/2022 1:47:38 PM	65.030136	-114.475604	19	8	0	5	4	9	36	Rawalpindi
17/10/2022 1:48:26 PM	65.028284	-114.487309	16	10	0	1	4	5	31	Rawalpindi
17/10/2022 1:54:32 PM	65.052633	-114.512951	7	5	0	5	3	8	20	Rawalpindi
17/10/2022 1:56:08 PM	65.051345	-114.504708	9	6	0	4	3	7	22	Rawalpindi
17/10/2022 1:58:54 PM	65.051090	-114.519415	32	24	0	11	12	23	79	Rawalpindi
17/10/2022 2:01:43 PM	65.059718	-114.502425	28	14	0	12	10	22	64	Rawalpindi
17/10/2022 2:03:13 PM	65.068672	-114.494880	15	8	0	4	5	9	32	Rawalpindi
17/10/2022 2:03:44 PM	65.069259	-114.502290	6	4	0	2	1	3	13	Rawalpindi
17/10/2022 2:04:40 PM	65.072723	-114.508627	2	0	0	1	2	3	5	Rawalpindi
17/10/2022 2:06:03 PM	65.078530	-114.508859	2	2	0	1	2	3	7	Rawalpindi
17/10/2022 2:09:38 PM	65.147600	-114.611067	2	1	0	0	1	1	4	Rawalpindi
17/10/2022 2:40:08 PM	65.337693	-115.022895	54	22	0	22	30	52	128	Rawalpindi
17/10/2022 2:49:48 PM	65.338237	-115.280721	39	12	1	4	23	27	79	Rawalpindi
17/10/2022 2:55:45 PM	65.297192	-115.225447	0	0	0	3	1	4	4	Rawalpindi
17/10/2022 3:14:50 PM	65.253024	-115.137465	14	2	0	10	11	21	37	Rawalpindi
17/10/2022 3:17:29 PM	65.245999	-115.198439	8	3	0	3	5	8	19	Rawalpindi
17/10/2022 3:21:07 PM	65.233999	-115.168238	15	4	0	5	9	14	33	Rawalpindi
17/10/2022 3:22:19 PM	65.232091	-115.166944	9	3	0	2	4	6	18	Rawalpindi
17/10/2022 3:23:32 PM	65.225741	-115.176148	7	2	0	2	0	2	11	Rawalpindi
17/10/2022 3:24:12 PM	65.222745	-115.167620	0	0	0	2	0	2	2	Rawalpindi

Date & Time	Latitude	Longitude	Cows	Calves	Yrlgs	Small Bulls	Prime Bulls	Bulls Total	All Caribou	Area
17/10/2022 3:25:17 PM	65.222297	-115.180277	5	5	0	0	2	2	12	Rawalpindi
17/10/2022 3:27:33 PM	65.224433	-115.253920	1	1	0	1	1	2	4	Rawalpindi
17/10/2022 3:28:08 PM	65.226357	-115.248602	0	0	0	0	1	1	1	Rawalpindi
17/10/2022 3:32:27 PM	65.234953	-115.338696	0	0	0	1	0	1	1	Rawalpindi
17/10/2022 4:54:02 PM	64.817099	-116.523202	1	0	0	1	2	3	4	Rawalpindi
17/10/2022 4:54:29 PM	65.150531	-115.263785	4	3	0	1	0	1	8	Rawalpindi
17/10/2022 4:55:02 PM	65.148184	-115.252460	1	1	0	0	0	0	2	Rawalpindi
17/10/2022 4:56:45 PM	65.146231	-115.211143	2	1	0	1	0	1	4	Rawalpindi
17/10/2022 4:59:13 PM	65.142147	-115.164472	15	8	0	1	5	6	29	Rawalpindi
17/10/2022 5:00:49 PM	65.127157	-115.156512	1	1	0	1	0	1	3	Rawalpindi
17/10/2022 5:10:26 PM	65.107449	-114.938325	3	3	0	2	0	2	8	Rawalpindi
17/10/2022 5:13:11 PM	65.097445	-114.947608	8	4	0	1	3	4	16	Rawalpindi
17/10/2022 5:14:13 PM	65.092933	-114.955298	2	1	0	0	0	0	3	Rawalpindi
17/10/2022 5:15:39 PM	65.080102	-114.954632	2	1	0	0	1	1	4	Rawalpindi
17/10/2022 5:16:24 PM	65.076566	-114.947401	3	2	0	0	0	0	5	Rawalpindi
17/10/2022 5:19:27 PM	65.070476	-114.947045	24	14	0	9	4	13	51	Rawalpindi
17/10/2022 5:20:33 PM	65.054296	-114.938083	5	3	0	1	1	2	10	Rawalpindi
17/10/2022 5:24:50 PM	65.042807	-114.946362	28	16	0	12	6	18	62	Rawalpindi
17/10/2022 5:27:05 PM	65.037885	-114.954495	12	9	0	3	3	6	27	Rawalpindi
17/10/2022 5:30:48 PM	65.020863	-114.944444	27	20	0	7	8	15	62	Rawalpindi
17/10/2022 5:32:59 PM	65.015062	-114.957019	35	23	0	6	5	11	69	Rawalpindi
17/10/2022 5:33:32 PM	65.011041	-114.959440	9	5	0	1	0	1	15	Rawalpindi
17/10/2022 5:35:02 PM	65.009348	-114.957811	16	9	0	4	4	8	33	Rawalpindi
17/10/2022 5:36:53 PM	65.006974	-114.950296	20	10	0	4	3	7	37	Rawalpindi
17/10/2022 5:38:18 PM	64.999185	-114.949342	12	6	0	5	3	8	26	Rawalpindi
17/10/2022 5:39:35 PM	64.994233	-114.946995	17	10	0	4	1	5	32	Rawalpindi
17/10/2022 5:39:51 PM	64.989770	-114.947423	2	2	0	1	0	1	5	Rawalpindi
17/10/2022 5:41:56 PM	64.991780	-114.938643	16	9	0	5	3	8	33	Rawalpindi
17/10/2022 5:42:22 PM	64.984660	-114.936530	10	7	0	0	0	0	17	Rawalpindi
17/10/2022 5:42:52 PM	64.982350	-114.936004	4	4	0	3	1	4	12	Rawalpindi
17/10/2022 5:44:11 PM	64.980051	-114.938739	17	13	0	8	5	13	43	Rawalpindi
17/10/2022 5:44:27 PM	64.975411	-114.950288	1	1	0	0	0	0	2	Rawalpindi
18/10/2022 2:46:24 PM	65.047629	-115.327847	2	2	0	0	0	0	4	Rawalpindi
18/10/2022 2:47:04 PM	65.047249	-115.332374	2	2	0	1	0	1	5	Rawalpindi
18/10/2022 2:47:37 PM	65.044862	-115.340381	2	0	0	2	0	2	4	Rawalpindi
18/10/2022 2:48:26 PM	65.045140	-115.327743	4	2	0	1	0	1	7	Rawalpindi
18/10/2022 2:49:20 PM	65.045474	-115.324942	2	0	0	2	0	2	4	Rawalpindi
18/10/2022 2:50:05 PM	65.044028	-115.309974	3	2	0	2	0	2	7	Rawalpindi
18/10/2022 2:51:38 PM	65.061949	-115.286366	1	1	0	1	0	1	3	Rawalpindi
18/10/2022 2:53:38 PM	65.068431	-115.271813	1	2	0	1	0	1	4	Rawalpindi
18/10/2022 2:54:59 PM	65.072276	-115.267820	7	2	0	3	2	5	14	Rawalpindi

Date & Time	Latitude	Longitude	Cows	Calves	Yrlgs	Small Bulls	Prime Bulls	Bulls Total	All Caribou	Area
18/10/2022 2:55:25 PM	65.073225	-115.261168	4	3	0	0	2	2	9	Rawalpindi
18/10/2022 2:56:52 PM	65.082477	-115.245218	0	0	0	1	1	2	2	Rawalpindi
18/10/2022 2:57:41 PM	65.082730	-115.238075	0	0	0	3	1	4	4	Rawalpindi
18/10/2022 2:59:10 PM	65.087672	-115.259886	2	2	0	0	0	0	4	Rawalpindi
18/10/2022 3:00:42 PM	65.093264	-115.259644	13	8	0	4	3	7	28	Rawalpindi
18/10/2022 3:01:40 PM	65.095122	-115.262866	5	4	0	1	6	7	16	Rawalpindi
18/10/2022 3:03:11 PM	65.100884	-115.266646	3	2	0	0	0	0	5	Rawalpindi
18/10/2022 3:04:05 PM	65.106125	-115.282752	1	1	0	0	0	0	2	Rawalpindi
18/10/2022 3:06:16 PM	65.117428	-115.324194	1	1	0	1	1	2	4	Rawalpindi
18/10/2022 3:08:48 PM	65.130010	-115.352285	2	2	0	2	0	2	6	Rawalpindi
18/10/2022 3:10:12 PM	65.132255	-115.331617	2	1	0	2	0	2	5	Rawalpindi
18/10/2022 3:12:38 PM	65.148534	-115.282655	0	0	0	2	0	2	2	Rawalpindi
18/10/2022 3:14:10 PM	65.159873	-115.269025	2	1	0	0	0	0	3	Rawalpindi
18/10/2022 3:15:13 PM	65.162760	-115.255993	1	1	0	2	0	2	4	Rawalpindi
18/10/2022 3:16:24 PM	65.165234	-115.243168	0	0	0	2	1	3	3	Rawalpindi
18/10/2022 3:17:07 PM	65.162058	-115.234775	2	1	0	0	0	0	3	Rawalpindi
18/10/2022 3:17:48 PM	65.162555	-115.224008	1	2	0	0	0	0	3	Rawalpindi
18/10/2022 3:18:14 PM	65.163539	-115.219295	1	1	0	0	0	0	2	Rawalpindi
18/10/2022 3:20:01 PM	65.166121	-115.196432	2	2	0	0	1	1	5	Rawalpindi
18/10/2022 3:21:21 PM	65.169509	-115.175762	2	1	0	1	1	2	5	Rawalpindi
18/10/2022 3:22:24 PM	65.168752	-115.167972	4	2	0	0	0	0	6	Rawalpindi
18/10/2022 3:22:59 PM	65.166139	-115.172986	5	3	0	0	1	1	9	Rawalpindi
18/10/2022 3:23:53 PM	65.165453	-115.172795	8	4	0	1	1	2	14	Rawalpindi
18/10/2022 3:26:21 PM	65.169124	-115.135316	2	2	0	1	0	1	5	Rawalpindi
18/10/2022 3:27:11 PM	65.172108	-115.127911	2	1	0	1	0	1	4	Rawalpindi
18/10/2022 3:29:41 PM	65.183844	-115.107016	2	0	0	0	1	1	3	Rawalpindi
18/10/2022 3:30:41 PM	65.186118	-115.100713	6	3	0	2	1	3	12	Rawalpindi
18/10/2022 3:31:27 PM	65.188001	-115.097017	1	0	0	1	0	1	2	Rawalpindi
18/10/2022 3:31:51 PM	65.188511	-115.099510	4	2	0	2	1	3	9	Rawalpindi
18/10/2022 3:32:54 PM	65.190337	-115.092033	4	3	0	1	2	3	10	Rawalpindi
18/10/2022 3:33:46 PM	65.192298	-115.087796	5	3	0	1	2	3	11	Rawalpindi
18/10/2022 3:37:35 PM	65.196819	-115.072539	2	1	0	0	0	0	3	Rawalpindi
18/10/2022 3:40:53 PM	65.178430	-115.052243	0	0	0	1	0	1	1	Rawalpindi
18/10/2022 3:42:51 PM	65.175069	-115.023573	0	1	1	0	1	1	3	Rawalpindi
18/10/2022 3:52:41 PM	65.133068	-114.968418	2	2	0	0	0	0	4	Rawalpindi
18/10/2022 3:58:53 PM	65.087230	-114.949249	10	6	0	5	6	11	27	Rawalpindi
18/10/2022 3:59:48 PM	65.085275	-114.952632	1	0	0	0	1	1	2	Rawalpindi
18/10/2022 4:02:08 PM	65.069572	-114.949848	5	4	0	2	1	3	12	Rawalpindi
18/10/2022 4:16:30 PM	64.935602	-114.934390	4	4	0	3	1	4	12	Rawalpindi
18/10/2022 4:17:08 PM	64.933021	-114.940443	1	1	0	0	0	0	2	Rawalpindi
18/10/2022 4:17:42 PM	64.932674	-114.939290	1	1	0	0	0	0	2	Rawalpindi

Date & Time	Latitude	Longitude	Cows	Calves	Yrlgs	Small Bulls	Prime Bulls	Bulls Total	All Caribou	Area
18/10/2022 4:18:56 PM	64.930425	-114.949935	8	5	0	1	1	2	15	Rawalpindi
18/10/2022 4:20:09 PM	64.927769	-114.954341	8	7	0	3	2	5	20	Rawalpindi
21/10/2022 2:06:35 PM	65.479058	-113.519515	0	0	0	2	0	2	2	Point Lake
21/10/2022 2:13:59 PM	65.392516	-113.909708	0	0	0	0	1	1	1	Point Lake
21/10/2022 2:15:52 PM	65.385604	-113.919825	0	0	0	1	0	1	1	Point Lake
21/10/2022 2:17:40 PM	65.379433	-113.945067	6	5	0	2	1	3	14	Point Lake
21/10/2022 2:19:07 PM	65.376042	-113.975422	5	4	0	0	2	2	11	Point Lake
21/10/2022 2:19:50 PM	65.375461	-113.979200	4	3	0	2	1	3	10	Point Lake
21/10/2022 2:21:50 PM	65.377307	-113.993906	22	12	0	8	4	12	46	Point Lake
21/10/2022 2:22:24 PM	65.383552	-114.011156	0	0	0	0	1	1	1	Point Lake
21/10/2022 2:28:06 PM	65.355774	-114.173528	2	3	0	5	2	7	12	Point Lake
21/10/2022 2:30:28 PM	65.355050	-114.254324	2	0	0	0	0	0	2	Point Lake
21/10/2022 2:34:02 PM	65.361259	-114.342762	13	7	0	1	2	3	23	Point Lake
21/10/2022 2:34:11 PM	65.365241	-114.348856	1	1	0	0	0	0	2	Point Lake
21/10/2022 2:37:42 PM	65.376866	-114.407320	9	5	0	7	3	10	24	Point Lake
21/10/2022 2:37:57 PM	65.379186	-114.395604	1	1	0	0	1	1	3	Point Lake
21/10/2022 2:38:56 PM	65.375396	-114.382054	2	1	0	0	0	0	3	Point Lake
21/10/2022 2:43:47 PM	65.353411	-114.478484	36	21	0	6	5	11	68	Point Lake
21/10/2022 2:46:21 PM	65.353117	-114.475397	51	18	0	2	6	8	77	Point Lake
21/10/2022 2:48:34 PM	65.358801	-114.479356	23	8	0	5	6	11	42	Point Lake
21/10/2022 2:50:11 PM	65.358023	-114.486392	18	5	0	9	4	13	36	Point Lake
21/10/2022 2:51:15 PM	65.363742	-114.493034	13	3	0	7	8	15	31	Point Lake
21/10/2022 2:51:47 PM	65.368439	-114.506211	2	2	0	1	0	1	5	Point Lake
21/10/2022 2:52:25 PM	65.365464	-114.509103	1	1	0	0	0	0	2	Point Lake
21/10/2022 2:54:22 PM	65.357796	-114.526320	18	10	0	4	8	12	40	Point Lake
21/10/2022 2:55:50 PM	65.356126	-114.522311	27	6	0	7	3	10	43	Point Lake
21/10/2022 2:57:01 PM	65.361944	-114.541987	2	2	0	3	0	3	7	Point Lake
21/10/2022 2:57:39 PM	65.365314	-114.558267	0	0	0	0	1	1	1	Point Lake
21/10/2022 3:00:36 PM	65.380382	-114.621983	11	3	0	1	2	3	17	Point Lake
21/10/2022 3:04:01 PM	65.407258	-114.599271	17	6	0	5	7	12	35	Point Lake
21/10/2022 3:05:58 PM	65.402904	-114.588325	16	5	0	2	6	8	29	Point Lake
21/10/2022 3:08:58 PM	65.430425	-114.578499	2	1	0	1	1	2	5	Point Lake
21/10/2022 3:10:07 PM	65.438906	-114.598610	5	3	0	0	0	0	8	Point Lake
21/10/2022 3:10:10 PM	65.439319	-114.598773	1	1	0	0	0	0	2	Point Lake
21/10/2022 3:11:37 PM	65.448610	-114.596881	11	2	0	4	2	6	19	Point Lake
21/10/2022 3:14:13 PM	65.477202	-114.627270	4	1	0	4	1	5	10	Point Lake
21/10/2022 3:19:29 PM	65.533160	-114.718223	10	6	0	7	8	15	31	Point Lake
21/10/2022 3:19:42 PM	65.534340	-114.715118	2	0	0	0	2	2	4	Point Lake
21/10/2022 3:20:19 PM	65.534693	-114.714491	7	2	0	3	3	6	15	Point Lake
21/10/2022 3:24:39 PM	65.511679	-114.509306	4	1	0	2	0	2	7	Point Lake
21/10/2022 3:27:06 PM	65.502092	-114.463827	6	2	0	3	3	6	14	Point Lake

Date & Time	Latitude	Longitude	Cows	Calves	Yrlgs	Small Bulls	Prime Bulls	Bulls Total	All Caribou	Area
21/10/2022 3:27:45 PM	65.504335	-114.457677	3	1	0	1	0	1	5	Point Lake
21/10/2022 3:37:17 PM	65.547457	-114.254166	26	11	0	12	7	19	56	Point Lake
21/10/2022 3:48:56 PM	65.664137	-114.363189	0	0	0	0	1	1	1	Point Lake
21/10/2022 3:51:55 PM	65.674352	-114.421649	7	2	0	18	5	23	32	Point Lake
21/10/2022 3:54:06 PM	65.681409	-114.392960	6	3	0	0	2	2	11	Point Lake
21/10/2022 3:59:23 PM	65.662571	-114.572997	10	4	0	6	4	10	24	Point Lake
21/10/2022 4:00:16 PM	65.662881	-114.567574	7	0	0	6	5	11	18	Point Lake
21/10/2022 4:03:12 PM	65.674855	-114.639524	11	2	0	7	5	12	25	Point Lake
21/10/2022 4:07:30 PM	65.690291	-114.828454	0	0	0	0	1	1	1	Point Lake

APPENDIX 1B. OCTOBER/NOVEMBER 2022 BEVERLY CARIBOU COMPOSITION SURVEY GROUP OBSERVATIONS.

Note Beverly/Bathurst 1 mixed results were included as part of Beverly survey and are in Appendix 1D.

Date & Time	Latitude	Longitude	Cows	Calves	Yrlgs	Small Bulls	Prime Bulls	Bulls Total	All Caribou	Area
10/24/2022 2:34:43 PM	62.666075	-108.055521	1	1	0	0	0	0	2	Artillery
10/24/2022 2:36:02 PM	62.663305	-108.068253	11	6	0	1	3	4	21	Artillery
10/24/2022 2:37:17 PM	62.655893	-108.077383	2	2	0	0	2	2	6	Artillery
10/24/2022 2:37:34 PM	62.655526	-108.075798	2	2	0	2	0	2	6	Artillery
10/24/2022 2:40:02 PM	62.661267	-108.085582	28	19	0	2	15	17	64	Artillery
10/24/2022 2:41:23 PM	62.669532	-108.061574	0	0	0	0	1	1	1	Artillery
10/24/2022 2:41:52 PM	62.668692	-108.057906	3	1	0	0	2	2	6	Artillery
10/24/2022 2:43:43 PM	62.676006	-108.059567	21	16	0	0	9	9	46	Artillery
10/24/2022 2:46:24 PM	62.682674	-108.052083	28	19	0	5	4	9	56	Artillery
10/24/2022 2:48:09 PM	62.693206	-108.026688	19	12	0	4	11	15	46	Artillery
10/24/2022 2:48:23 PM	62.697662	-108.01694	2	2	0	0	0	0	4	Artillery
10/24/2022 2:49:32 PM	62.698254	-108.013126	23	9	0	3	5	8	40	Artillery
10/24/2022 2:51:10 PM	62.7035	-108.01531	16	9	0	2	5	7	32	Artillery
10/24/2022 2:52:18 PM	62.710075	-108.014914	16	11	0	5	4	9	36	Artillery
10/24/2022 2:53:22 PM	62.712721	-108.020245	12	6	0	3	5	8	26	Artillery
10/24/2022 2:54:57 PM	62.716326	-108.018259	28	17	0	6	3	9	54	Artillery
10/24/2022 2:59:59 PM	62.752593	-107.932785	20	12	0	1	4	5	37	Artillery
10/24/2022 3:00:46 PM	62.755076	-107.928551	11	4	0	3	0	3	18	Artillery
10/24/2022 3:02:24 PM	62.757459	-107.925763	14	9	0	4	6	10	33	Artillery
10/24/2022 3:03:16 PM	62.764368	-107.91529	23	9	0	3	3	6	38	Artillery
10/24/2022 3:03:39 PM	62.765619	-107.90919	5	1	0	2	1	3	9	Artillery
10/24/2022 3:04:23 PM	62.766419	-107.899688	7	4	0	1	0	1	12	Artillery
10/24/2022 3:04:54 PM	62.765071	-107.891224	4	2	0	0	1	1	7	Artillery
10/24/2022 3:05:30 PM	62.761394	-107.887877	3	3	0	1	2	3	9	Artillery
10/24/2022 3:07:32 PM	62.757259	-107.891383	19	13	0	3	4	7	39	Artillery
10/24/2022 3:10:45 PM	62.761977	-108.008756	4	4	0	1	0	1	9	Artillery
10/24/2022 3:12:51 PM	62.769717	-108.074633	1	1	0	0	0	0	2	Artillery
10/24/2022 3:27:27 PM	62.759938	-108.168968	1	1	0	0	0	0	2	Artillery
10/24/2022 3:28:30 PM	62.752743	-108.168994	6	3	0	2	2	4	13	Artillery
10/24/2022 3:29:37 PM	62.752236	-108.183708	3	2	0	3	1	4	9	Artillery
10/24/2022 3:30:11 PM	62.755112	-108.182445	2	1	0	1	0	1	4	Artillery
10/24/2022 3:31:05 PM	62.762331	-108.182328	3	3	0	2	0	2	8	Artillery

Date & Time	Latitude	Longitude	Cows	Calves	Yrlgs	Small Bulls	Prime Bulls	Bulls Total	All Caribou	Area
10/24/2022 3:35:24 PM	62.73171	-108.178138	2	1	0	3	1	4	7	Artillery
10/24/2022 3:35:50 PM	62.734672	-108.169418	0	0	0	3	2	5	5	Artillery
10/24/2022 3:37:07 PM	62.740796	-108.140986	5	2	0	0	0	0	7	Artillery
10/24/2022 3:37:41 PM	62.741411	-108.128642	2	1	0	1	0	1	4	Artillery
10/24/2022 3:41:38 PM	62.785664	-108.147004	2	1	0	2	0	2	5	Artillery
10/24/2022 3:45:10 PM	62.81659	-108.250533	4	2	0	5	1	6	12	Artillery
10/24/2022 3:46:29 PM	62.825984	-108.253993	15	7	0	7	1	8	30	Artillery
10/24/2022 3:48:23 PM	62.846562	-108.309966	1	1	0	0	1	1	3	Artillery
10/24/2022 3:49:00 PM	62.849362	-108.320228	3	3	0	0	0	0	6	Artillery
10/24/2022 3:50:05 PM	62.858547	-108.325306	4	3	0	2	0	2	9	Artillery
10/24/2022 3:51:34 PM	62.865951	-108.316065	2	1	0	4	0	4	7	Artillery
10/24/2022 3:52:07 PM	62.870802	-108.317061	1	1	0	0	1	1	3	Artillery
10/24/2022 3:52:52 PM	62.874884	-108.310534	1	1	0	0	0	0	2	Artillery
10/24/2022 3:53:35 PM	62.878895	-108.301526	5	4	0	0	0	0	9	Artillery
10/24/2022 3:54:53 PM	62.887955	-108.288611	1	1	0	1	1	2	4	Artillery
10/24/2022 3:55:14 PM	62.890731	-108.294406	2	2	0	1	0	1	5	Artillery
10/24/2022 3:56:46 PM	62.888598	-108.307569	7	5	0	2	4	6	18	Artillery
10/24/2022 3:58:02 PM	62.886724	-108.339092	3	3	0	2	2	4	10	Artillery
10/24/2022 3:58:30 PM	62.88429	-108.333681	3	1	0	2	0	2	6	Artillery
10/24/2022 3:59:17 PM	62.881361	-108.333075	8	3	0	1	0	1	12	Artillery
10/24/2022 4:00:52 PM	62.869088	-108.351796	1	1	0	2	0	2	4	Artillery
10/24/2022 4:01:24 PM	62.865193	-108.354636	2	2	0	0	2	2	6	Artillery
10/24/2022 4:02:27 PM	62.863432	-108.35965	5	4	0	1	2	3	12	Artillery
10/24/2022 4:04:11 PM	62.852942	-108.366608	10	4	0	1	4	5	19	Artillery
10/24/2022 4:05:16 PM	62.843783	-108.366313	1	1	0	0	1	1	3	Artillery
10/24/2022 4:06:35 PM	62.831343	-108.373404	2	1	0	1	0	1	4	Artillery
10/24/2022 4:07:44 PM	62.829387	-108.364369	10	8	0	3	2	5	23	Artillery
10/24/2022 4:08:32 PM	62.831367	-108.355398	5	4	0	2	1	3	12	Artillery
10/24/2022 4:09:32 PM	62.830951	-108.342244	4	3	0	2	1	3	10	Artillery
10/24/2022 4:10:08 PM	62.834073	-108.340718	3	2	0	0	0	0	5	Artillery
10/24/2022 4:11:06 PM	62.83441	-108.326696	4	3	0	2	1	3	10	Artillery
10/24/2022 4:11:46 PM	62.837708	-108.316271	2	1	0	2	0	2	5	Artillery
10/24/2022 4:12:36 PM	62.844991	-108.310533	1	1	0	0	1	1	3	Artillery
10/24/2022 4:14:46 PM	62.82172	-108.326473	4	3	0	1	1	2	9	Artillery
10/24/2022 4:15:40 PM	62.81854	-108.339107	1	0	0	0	1	1	2	Artillery
10/24/2022 4:16:47 PM	62.817416	-108.347697	9	5	0	1	1	2	16	Artillery
10/24/2022 4:17:27 PM	62.81306	-108.34096	10	7	0	2	1	3	20	Artillery
10/24/2022 4:19:17 PM	62.807768	-108.342054	18	11	0	4	3	7	36	Artillery
10/24/2022 4:20:45 PM	62.794739	-108.374931	1	0	0	0	1	1	2	Artillery
10/24/2022 4:21:14 PM	62.795116	-108.381285	3	1	0	0	1	1	5	Artillery
11/1/2022 4:09:10 PM	63.47607	-109.49588	0	0	0	0	5	5	5	Gahcho Kue

Date & Time	Latitude	Longitude	Cows	Calves	Yrlgs	Small Bulls	Prime Bulls	Bulls Total	All Caribou	Area
11/1/2022 4:11:21 PM	63.493054	-109.585975	0	0	0	0	7	7	7	Gahcho Kue
11/1/2022 4:11:34 PM	63.494695	-109.593185	0	0	0	0	2	2	2	Gahcho Kue
11/1/2022 4:11:56 PM	63.493674	-109.595111	3	2	0	0	1	1	6	Gahcho Kue
11/1/2022 4:14:05 PM	63.49686	-109.609282	17	10	0	0	6	6	33	Gahcho Kue
11/1/2022 4:18:29 PM	63.496351	-109.629279	50	29	0	25	16	41	120	Gahcho Kue
11/1/2022 4:19:29 PM	63.495666	-109.667473	5	3	0	4	1	5	13	Gahcho Kue
11/1/2022 4:23:03 PM	63.522178	-109.781154	8	5	0	3	1	4	17	Gahcho Kue
11/1/2022 4:26:31 PM	63.536597	-109.792044	0	0	0	0	1	1	1	Gahcho Kue
11/1/2022 4:28:08 PM	63.542328	-109.84888	7	3	0	1	1	2	12	Gahcho Kue
11/1/2022 4:33:24 PM	63.569635	-110.044862	7	6	0	2	0	2	15	Gahcho Kue
11/1/2022 4:38:43 PM	63.56892	-110.054568	6	2	0	3	0	3	11	Gahcho Kue
11/1/2022 4:39:36 PM	63.577078	-110.046827	8	3	0	0	1	1	12	Gahcho Kue
11/1/2022 4:40:24 PM	63.58562	-110.059106	3	2	0	0	0	0	5	Gahcho Kue
11/1/2022 4:41:38 PM	63.591089	-110.085909	7	3	0	0	0	0	10	Gahcho Kue
11/1/2022 4:42:04 PM	63.588041	-110.090911	0	0	0	1	0	1	1	Gahcho Kue
11/1/2022 4:43:52 PM	63.596402	-110.087911	11	5	0	4	0	4	20	Gahcho Kue
11/1/2022 4:44:22 PM	63.600265	-110.086151	2	1	0	0	0	0	3	Gahcho Kue
11/1/2022 4:45:14 PM	63.602408	-110.087696	11	1	0	2	3	5	17	Gahcho Kue
11/1/2022 4:45:59 PM	63.604011	-110.087541	17	4	0	1	0	1	22	Gahcho Kue
11/1/2022 4:52:41 PM	63.631957	-109.81545	4	2	0	1	0	1	7	Gahcho Kue
11/1/2022 4:54:06 PM	63.642599	-109.815616	5	4	0	0	0	0	9	Gahcho Kue
11/1/2022 4:54:46 PM	63.650396	-109.807302	1	1	0	0	0	0	2	Gahcho Kue
11/1/2022 4:55:19 PM	63.653963	-109.790325	0	0	0	1	0	1	1	Gahcho Kue
11/1/2022 4:59:36 PM	63.675701	-109.748611	22	12	0	5	14	19	53	Gahcho Kue
11/1/2022 5:00:26 PM	63.68191	-109.783959	9	7	0	4	2	6	22	Gahcho Kue
11/1/2022 5:00:56 PM	63.683647	-109.790855	0	0	0	2	3	5	5	Gahcho Kue
11/1/2022 5:03:56 PM	63.686838	-109.708261	15	7	0	0	3	3	25	Gahcho Kue
11/1/2022 5:05:20 PM	63.68588	-109.680871	5	3	0	2	4	6	14	Gahcho Kue
11/1/2022 5:05:56 PM	63.689212	-109.671036	1	2	0	1	0	1	4	Gahcho Kue
11/1/2022 5:07:50 PM	63.689118	-109.695465	13	7	0	1	3	4	24	Gahcho Kue
11/1/2022 5:11:41 PM	63.648066	-109.564906	2	1	0	2	0	2	5	Gahcho Kue
11/1/2022 5:12:05 PM	63.645409	-109.56209	3	0	0	1	0	1	4	Gahcho Kue
11/1/2022 5:14:57 PM	63.644996	-109.451561	3	2	0	4	6	10	15	Gahcho Kue
11/1/2022 5:16:47 PM	63.633867	-109.444596	7	3	0	4	4	8	18	Gahcho Kue
11/1/2022 5:17:12 PM	63.627382	-109.430726	0	0	0	1	0	1	1	Gahcho Kue
11/1/2022 5:19:12 PM	63.619112	-109.42312	10	4	0	5	5	10	24	Gahcho Kue
11/1/2022 5:22:22 PM	63.614991	-109.409116	29	11	0	22	20	42	82	Gahcho Kue
11/2/2022 11:01:43 AM	64.140103	-108.059598	123	35	1	60	85	145	304	Gahcho Kue
11/2/2022 11:05:11 AM	64.135507	-108.030933	20	10	0	10	23	33	63	Gahcho Kue
11/2/2022 11:06:32 AM	64.130166	-108.034699	13	5	0	9	9	18	36	Gahcho Kue
11/2/2022 11:09:07 AM	64.124917	-108.033875	31	11	0	10	19	29	71	Gahcho Kue

Date & Time	Latitude	Longitude	Cows	Calves	Yrlgs	Small Bulls	Prime Bulls	Bulls Total	All Caribou	Area
11/2/2022 11:13:07 AM	64.094626	-107.848913	0	0	0	0	2	2	2	Gahcho Kue
11/2/2022 11:14:58 AM	64.086969	-107.772214	0	1	0	0	0	0	1	Gahcho Kue
11/2/2022 11:56:27 AM	63.872657	-107.395689	4	2	0	2	2	4	10	Gahcho Kue
11/2/2022 11:58:01 AM	63.874881	-107.402	21	9	0	6	10	16	46	Gahcho Kue
11/2/2022 11:58:39 AM	63.880419	-107.407173	2	1	0	2	3	5	8	Gahcho Kue
11/2/2022 12:03:57 PM	63.878279	-107.391017	62	27	0	28	47	75	164	Gahcho Kue
11/2/2022 12:07:55 PM	63.895281	-107.38064	40	14	0	22	33	55	109	Gahcho Kue
11/2/2022 12:11:51 PM	63.904268	-107.404699	31	18	0	9	21	30	79	Gahcho Kue
11/2/2022 12:13:34 PM	63.912041	-107.403338	17	11	0	2	22	24	52	Gahcho Kue
11/2/2022 12:15:54 PM	63.918713	-107.432368	24	9	0	7	8	15	48	Gahcho Kue
11/2/2022 12:21:49 PM	63.843968	-107.460671	31	14	0	9	14	23	68	Gahcho Kue
11/2/2022 12:24:27 PM	63.828091	-107.518214	32	18	0	13	9	22	72	Gahcho Kue
11/2/2022 12:33:02 PM	63.694301	-107.654371	7	0	0	7	5	12	19	Gahcho Kue
11/2/2022 12:34:11 PM	63.707842	-107.642794	0	0	0	0	1	1	1	Gahcho Kue
11/2/2022 12:55:15 PM	63.552147	-108.46023	31	19	0	9	15	24	74	Gahcho Kue
11/2/2022 1:07:44 PM	63.522297	-108.767653	7	2	0	0	0	0	9	Gahcho Kue
11/2/2022 1:10:18 PM	63.513513	-108.818035	23	8	0	4	9	13	44	Gahcho Kue
11/2/2022 1:12:04 PM	63.507605	-108.829676	18	7	0	10	5	15	40	Gahcho Kue
11/2/2022 1:13:36 PM	63.496656	-108.854244	14	3	0	1	3	4	21	Gahcho Kue
11/2/2022 1:14:45 PM	63.494737	-108.879961	7	3	0	0	5	5	15	Gahcho Kue
11/2/2022 1:15:48 PM	63.485291	-108.912254	2	1	0	3	0	3	6	Gahcho Kue
11/2/2022 1:58:05 PM	63.44724	-108.89072	3	2	0	2	12	14	19	Gahcho Kue
11/2/2022 2:06:42 PM	63.463977	-108.486042	4	1	0	0	0	0	5	Gahcho Kue
11/2/2022 2:14:24 PM	63.46838	-108.152941	7	5	0	1	0	1	13	Gahcho Kue
11/2/2022 2:14:57 PM	63.465923	-108.139152	1	1	0	0	0	0	2	Gahcho Kue
11/2/2022 2:16:55 PM	63.461239	-108.107213	15	7	0	1	2	3	25	Gahcho Kue
11/2/2022 2:21:54 PM	63.473208	-107.916972	7	3	0	2	1	3	13	Gahcho Kue
11/2/2022 2:22:48 PM	63.473896	-107.903765	4	1	0	0	10	10	15	Gahcho Kue
11/2/2022 2:25:10 PM	63.469311	-107.855964	10	2	0	1	20	21	33	Gahcho Kue
11/2/2022 2:29:23 PM	63.465057	-107.840431	91	27	0	11	22	33	151	Gahcho Kue
11/2/2022 2:31:46 PM	63.488327	-107.806389	32	15	0	3	12	15	62	Gahcho Kue
11/2/2022 2:32:59 PM	63.500126	-107.80196	21	5	0	2	1	3	29	Gahcho Kue
11/2/2022 2:36:21 PM	63.489183	-107.788425	58	25	0	10	20	30	113	Gahcho Kue
11/2/2022 2:37:45 PM	63.479043	-107.753939	16	5	0	2	11	13	34	Gahcho Kue
11/2/2022 2:39:28 PM	63.470893	-107.741365	28	12	0	6	7	13	53	Gahcho Kue
11/2/2022 2:40:19 PM	63.465893	-107.754634	10	5	0	3	5	8	23	Gahcho Kue
11/2/2022 2:43:59 PM	63.459468	-107.727482	53	22	0	5	21	26	101	Gahcho Kue
11/2/2022 2:45:36 PM	63.470231	-107.685896	24	5	1	6	8	14	44	Gahcho Kue
11/2/2022 2:47:02 PM	63.476135	-107.680518	18	7	0	2	3	5	30	Gahcho Kue
11/2/2022 2:49:18 PM	63.485919	-107.649996	30	5	0	5	5	10	45	Gahcho Kue
11/2/2022 2:52:04 PM	63.475147	-107.625895	24	4	0	9	6	15	43	Gahcho Kue

Date & Time	Latitude	Longitude	Cows	Calves	Yrlgs	Small Bulls	Prime Bulls	Bulls Total	All Caribou	Area
11/2/2022 2:54:27 PM	63.469846	-107.633588	39	13	0	5	20	25	77	Gahcho Kue
11/2/2022 2:55:50 PM	63.463359	-107.663426	9	3	0	1	5	6	18	Gahcho Kue
11/2/2022 3:00:01 PM	63.456469	-107.636154	64	34	0	11	35	46	144	Gahcho Kue
11/2/2022 3:01:30 PM	63.43252	-107.613436	3	0	0	0	9	9	12	Gahcho Kue
11/2/2022 3:04:48 PM	63.420744	-107.543008	4	0	0	1	0	1	5	Gahcho Kue
11/2/2022 3:09:27 PM	63.421463	-107.489662	33	15	0	6	13	19	67	Gahcho Kue
11/2/2022 3:14:55 PM	63.386813	-107.47589	0	0	0	0	7	7	7	Gahcho Kue
11/2/2022 3:17:41 PM	63.415181	-107.394817	2	1	0	0	1	1	4	Gahcho Kue
11/2/2022 3:34:14 PM	63.348188	-107.069265	61	24	0	10	11	21	106	Gahcho Kue
11/2/2022 3:35:34 PM	63.357238	-107.04811	29	18	0	4	4	8	55	Gahcho Kue
11/2/2022 3:37:34 PM	63.33343	-107.040541	17	5	0	2	1	3	25	Gahcho Kue
11/2/2022 3:45:48 PM	63.235497	-106.732473	3	2	0	0	1	1	6	Gahcho Kue
11/2/2022 4:02:45 PM	63.075379	-106.192739	85	46	0	11	13	24	155	Gahcho Kue
11/2/2022 4:05:53 PM	63.057426	-106.209861	64	38	0	6	8	14	116	Gahcho Kue
11/3/2022 10:00:18 AM	62.901883	-108.298727	43	25	0	8	8	16	84	Artillery
11/3/2022 10:00:18 AM	62.901883	-108.298727	43	25	0	8	8	16	84	Artillery
11/3/2022 10:05:15 AM	62.907694	-108.269629	101	46	0	13	18	31	178	Artillery
11/3/2022 10:05:15 AM	62.907694	-108.269629	101	46	0	13	18	31	178	Artillery
11/3/2022 10:07:27 AM	62.923605	-108.207811	26	14	0	6	7	13	53	Artillery
11/3/2022 10:07:27 AM	62.923605	-108.207811	26	14	0	6	7	13	53	Artillery
11/3/2022 10:09:36 AM	62.931399	-108.177495	29	9	0	8	4	12	50	Artillery
11/3/2022 10:09:36 AM	62.931399	-108.177495	29	9	0	8	4	12	50	Artillery
11/3/2022 10:38:36 AM	62.939258	-108.135165	37	19	0	11	5	16	72	Artillery
11/3/2022 10:38:36 AM	62.939258	-108.135165	37	19	0	11	5	16	72	Artillery

APPENDIX 1C. OCTOBER 2022 BATHURST CARIBOU COMPOSITION SURVEY GROUP OBSERVATIONS

Results are from area with Bathurst-only collars; results from Beverly/Bathurst mixed areas are in appendix 1D.

Date & Time	Latitude	Longitude	Cows	Calves	Yrlgs	Small Bulls	Prime Bulls	Bulls Total	All Caribou	Area
20/10/2022 4:04:41 PM	64.940557	-112.008079	1	1	0	0	2	2	4	Bathurst 1
20/10/2022 4:06:44 PM	65.066403	-112.177152	0	0	0	1	0	1	1	Bathurst 1
20/10/2022 4:13:20 PM	65.072482	-112.150041	0	0	0	0	1	1	1	Bathurst 1
20/10/2022 4:24:02 PM	65.070648	-112.099831	9	4	0	1	4	5	18	Bathurst 1
20/10/2022 4:59:29 PM	65.440973	-112.136366	54	9	0	26	38	64	127	Bathurst 1
21/10/2022 11:12:55 AM	64.981906	-112.21641	7	2	0	2	1	3	12	Bathurst 1
21/10/2022 11:13:21 AM	64.983503	-112.217665	1	1	0	1	0	1	3	Bathurst 1
21/10/2022 11:18:02 AM	65.021943	-112.155921	9	4	0	10	8	18	31	Bathurst 1
21/10/2022 11:19:00 AM	65.026868	-112.152288	2	2	0	2	1	3	7	Bathurst 1
21/10/2022 11:26:42 AM	64.977756	-112.212962	9	4	0	5	6	11	24	Bathurst 1
21/10/2022 11:28:40 AM	64.981152	-112.229929	5	2	0	0	0	0	7	Bathurst 1
21/10/2022 11:29:20 AM	64.981792	-112.232214	2	0	0	2	1	3	5	Bathurst 1
21/10/2022 11:30:39 AM	64.979749	-112.232229	3	1	0	3	4	7	11	Bathurst 1
21/10/2022 11:31:13 AM	64.980853	-112.240166	2	1	0	0	1	1	4	Bathurst 1
21/10/2022 11:31:42 AM	64.98146	-112.241726	2	0	0	3	4	7	9	Bathurst 1
21/10/2022 11:32:08 AM	64.97846	-112.241805	1	1	0	7	0	7	9	Bathurst 1
21/10/2022 11:32:30 AM	64.976862	-112.240357	3	1	0	3	0	3	7	Bathurst 1
21/10/2022 11:33:29 AM	64.975725	-112.239054	11	4	0	5	8	13	28	Bathurst 1
21/10/2022 11:35:05 AM	64.971996	-112.224423	1	2	0	1	1	2	5	Bathurst 1
21/10/2022 11:35:54 AM	64.969604	-112.226831	8	5	0	2	1	3	16	Bathurst 1
21/10/2022 11:37:14 AM	64.961811	-112.222648	10	6	0	6	2	8	24	Bathurst 1
21/10/2022 11:38:17 AM	64.959731	-112.224019	10	4	0	4	5	9	23	Bathurst 1
21/10/2022 11:40:51 AM	64.958767	-112.224185	20	7	0	6	13	19	46	Bathurst 1
21/10/2022 11:43:46 AM	64.955606	-112.215752	20	6	0	12	16	28	54	Bathurst 1
21/10/2022 11:45:01 AM	64.953125	-112.217334	15	11	0	7	7	14	40	Bathurst 1
21/10/2022 11:50:55 AM	64.946984	-112.214414	66	44	0	43	33	76	186	Bathurst 1
21/10/2022 11:53:56 AM	64.936654	-112.232945	27	7	0	27	15	42	76	Bathurst 1
21/10/2022 11:56:55 AM	64.942729	-112.215455	20	6	0	15	6	21	47	Bathurst 1
21/10/2022 11:57:45 AM	64.942729	-112.215455	6	0	0	13	6	19	25	Bathurst 1
21/10/2022 11:58:26 AM	64.9378	-112.228456	8	4	0	7	5	12	24	Bathurst 1
21/10/2022 12:00:01 PM	64.936992	-112.225123	15	5	0	4	4	8	28	Bathurst 1
21/10/2022 12:01:50 PM	64.936417	-112.221786	20	11	0	14	10	24	55	Bathurst 1

Date & Time	Latitude	Longitude	Cows	Calves	Yrlgs	Small Bulls	Prime Bulls	Bulls Total	All Caribou	Area
21/10/2022 12:02:14 PM	64.939991	-112.216401	1	1	0	1	0	1	3	Bathurst 1
21/10/2022 12:02:59 PM	64.940083	-112.215503	10	5	0	4	1	5	20	Bathurst 1
21/10/2022 12:04:03 PM	64.937873	-112.214174	14	5	0	11	4	15	34	Bathurst 1
22/10/2022 10:23:17 AM	64.814807	-109.606803	18	4	0	7	9	16	38	Bathurst 2
22/10/2022 10:27:09 AM	64.813429	-109.573233	3	0	0	1	2	3	6	Bathurst 2
22/10/2022 10:38:38 AM	64.997297	-109.229383	1	0	0	0	1	1	2	Bathurst 2
22/10/2022 10:41:49 AM	65.015034	-109.221175	13	6	0	5	10	15	34	Bathurst 2
22/10/2022 11:30:31 AM	65.016639	-108.543212	5	1	0	3	1	4	10	Bathurst 2
22/10/2022 4:22:34 PM	64.583303	-110.782029	3	2	0	0	3	3	8	Bathurst 2
23/10/2022 10:04:10 AM	65.218541	-111.158965	3	3	0	0	4	4	10	Bathurst 1
23/10/2022 10:22:21 AM	65.428256	-111.258923	1	0	0	0	3	3	4	Bathurst 1
23/10/2022 10:26:31 AM	65.452677	-111.302985	2	0	0	5	5	10	12	Bathurst 1
23/10/2022 10:32:50 AM	65.507776	-111.208555	28	10	0	9	11	20	58	Bathurst 1
23/10/2022 10:45:48 AM	65.486069	-111.657141	3	2	0	0	5	5	10	Bathurst 1
23/10/2022 10:55:23 AM	65.483635	-111.669825	83	23	0	23	34	57	163	Bathurst 1
23/10/2022 11:06:59 AM	65.564807	-111.807313	23	7	0	5	13	18	48	Bathurst 1
23/10/2022 11:07:08 AM	65.56618	-111.801264	0	0	0	0	7	7	7	Bathurst 1
23/10/2022 11:09:50 AM	65.588326	-111.779268	24	10	0	11	6	17	51	Bathurst 1
23/10/2022 11:19:25 AM	65.587347	-111.795543	21	5	0	12	7	19	45	Bathurst 1

APPENDIX 1D. OCTOBER 2022 BEVERLY/BATHURST MIXED CARIBOU COMPOSITION SURVEY GROUP OBSERVATIONS

Date & Time	Latitude	Longitude	Cows	Calves	Yrlgs	Small Bulls	Prime Bulls	Bulls Total	All Caribou	Area
22/10/2022 1:32:09 PM	64.364045	-109.126434	29	9	0	19	20	39	77	Bev/Bat 1
22/10/2022 1:34:19 PM	64.366475	-109.118382	29	12	0	13	15	28	69	Bev/Bat 1
22/10/2022 1:35:48 PM	64.358453	-109.11828	5	5	0	3	1	4	14	Bev/Bat 1
22/10/2022 1:37:46 PM	64.351372	-109.126697	26	11	0	13	9	22	59	Bev/Bat 1
22/10/2022 1:41:31 PM	64.331682	-109.141361	27	10	0	11	8	19	56	Bev/Bat 1
22/10/2022 1:42:54 PM	64.328103	-109.133402	21	7	0	13	13	26	54	Bev/Bat 1
22/10/2022 1:45:12 PM	64.329682	-109.142541	32	16	0	14	1	15	63	Bev/Bat 1
22/10/2022 1:47:40 PM	64.331161	-109.166821	42	18	0	9	13	22	82	Bev/Bat 1
22/10/2022 1:49:48 PM	64.336239	-109.147345	31	13	1	7	12	19	64	Bev/Bat 1
22/10/2022 1:50:45 PM	64.330044	-109.130583	7	3	0	5	0	5	15	Bev/Bat 1
22/10/2022 1:59:14 PM	64.326814	-109.127036	36	13	0	19	9	28	77	Bev/Bat 1
22/10/2022 2:00:26 PM	64.403436	-108.904353	13	8	0	4	3	7	28	Bev/Bat 1
22/10/2022 2:01:27 PM	64.40025	-108.89368	8	4	0	4	1	5	17	Bev/Bat 1
22/10/2022 2:02:25 PM	64.402755	-108.888521	15	7	0	2	7	9	31	Bev/Bat 1
22/10/2022 2:03:53 PM	64.407485	-108.888255	16	8	0	11	6	17	41	Bev/Bat 1
22/10/2022 2:12:47 PM	64.404871	-108.870666	8	5	0	6	5	11	24	Bev/Bat 1
22/10/2022 11:45:32 AM	64.688054	-108.214091	4	1	0	6	0	6	11	Bev/Bat 2
22/10/2022 11:55:02 AM	64.601533	-108.359862	8	3	0	5	3	8	19	Bev/Bat 2
22/10/2022 1:39:49 PM	4.406569	-75.168032	29	16	0	13	18	31	76	Bev/Bat 2
22/10/2022 2:14:36 PM	64.489926	-108.560754	4	4	0	5	3	8	16	Bev/Bat 2
22/10/2022 2:32:36 PM	64.556844	-109.454464	40	11	0	16	6	22	73	Bev/Bat 2
22/10/2022 2:33:02 PM	64.560624	-109.465534	4	1	0	1	0	1	6	Bev/Bat 2
22/10/2022 2:34:13 PM	64.558536	-109.456258	10	5	0	5	0	5	20	Bev/Bat 2
22/10/2022 2:38:47 PM	64.559076	-109.458863	6	3	0	2	1	3	12	Bev/Bat 2
22/10/2022 2:39:24 PM	64.563937	-109.612613	0	0	0	0	1	1	1	Bev/Bat 2
22/10/2022 2:40:34 PM	64.566438	-109.614491	15	5	0	6	4	10	30	Bev/Bat 2
22/10/2022 2:41:59 PM	64.572965	-109.59901	17	6	0	7	6	13	36	Bev/Bat 2
22/10/2022 2:45:55 PM	64.578095	-109.602976	4	1	0	3	2	5	10	Bev/Bat 2
22/10/2022 2:46:39 PM	64.526831	-109.699778	11	5	0	5	4	9	25	Bev/Bat 2
22/10/2022 2:49:01 PM	64.524629	-109.70088	2	2	0	2	1	3	7	Bev/Bat 2
22/10/2022 2:53:38 PM	64.506766	-109.752219	20	8	0	16	5	21	49	Bev/Bat 2
22/10/2022 2:56:48 PM	64.51354	-109.892925	49	20	0	17	9	26	95	Bev/Bat 2
22/10/2022 3:03:54 PM	64.49331	-109.942042	66	21	0	31	21	52	139	Bev/Bat 2