Summary of field work carried out under Wildlife Research Permit WL501123 – "Boreal caribou and wolf monitoring program for the Tłı̨chǫ All-Season Road Project 2023-24"

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November 20, 2023

The Wildlife Research Permit WL501123 is active from February 4, 2023 - February 3, 2024. This update is to share information on the project up to November 1, 2023.

Boreal caribou collar deployments

Between February 28 and March 5, 2023, ECC deployed 7 GPS collars on female boreal caribou in the North Slave Region, Tłı̨chǫ All Season Road Study Area. 5 collars were deployed in the area of the Tłı̨chǫ Highway, and 2 collars were deployed north of Lac La Martre (northwest of Gamètì). Figure 1 shows the location of the 2023 and earlier collar deployments in this study area.

These collars are Telonics model TGW-4677-4 GPS Iridium collars, weigh ~1100 grams, and are programmed with a geofence 10 km from the Tłı̨chǫ Highway and Highway 3 (the geofenced area is indicated with purple shading in Figure 1). The collars are programmed to collect a location every 4 hours outside the geofence and every 1 hour inside the geofenced area, and are scheduled to release on September 15, 2028. The project objectives were to deploy up to 10 collars in 2023, however, due to weather delays, only 7 collars were able to be deployed.

For 2023, ECC had proposed to deploy a few more collars than necessary to meet the 30-collar sample size goal, to have more regular, smaller deployment years in the future. This will also help to reduce the potential long-term bias of survival estimates. Estimating survival of a population assumes a random sample of animals being tracked. If all animals are captured at the same time, the entire cohort ages older at the same time over the period tracked (e.g. 4 years) which can result in biased, lower survival rates in later years as all animals are older than they were at time of capture (with the assumption that survival decreases in old animals). To address this, it is better to add a portion of new collars that are randomly selected from the population each year, so that the age distribution of the sample of tracked animals more closely matches a random sample of the population. At the end of March 2023, there were 36 collared adult females in the North Slave Region, Tłı̨chǫ All Season Road Study Area, and as of November 1, 2023, there are 34 collared adult females in this area.

All boreal caribou were captured with a net-gun fired from a helicopter using methods approved by the NWT Wildlife Care Committee (approval NWTWCC 2022-011). Each animal was initially examined to assess the condition and to check for any capture-related injuries. Samples collected from each animal included approximately 15 mL of blood (from the cephalic vein in the foreleg), approximately 50 g of feces (either from the ground after defecation, or from the rectum), and a sample of hair (with roots; taken from the rump). Any winter tick related hair loss was documented and associated ticks collected. The following was also recorded for each capture event: age class based on tooth wear, struggle index, body condition score, capture location, chase and handling times, presence of calf, lactation status, chest girth, average snow depths and pertinent information pertaining to observations of the health

(signs of disease, previous injury, etc.) or welfare of other members of the herd from which the caribou is captured. No immobilization drugs were using during the capture program.

All collars were fit snugly around the neck, allowing for an open-palmed hand to move freely between the neck and the collar material. Chase times ranged between 6 seconds to 45 seconds, with an average of 18 seconds. Handling times ranged between 9 minutes to 24 minutes, with an average of 14.5 minutes. Temperatures ranged between -29°C and -22°C. Blood collected will be analyzed for genetic microsatellites and serum is used to investigate stress and general health. Fecal matter will be analyzed for parasites. Pregnancy rates were determined from blood serum from collared cows. The crew was able to obtain blood samples from 6 of the 7 females; all 6 of those females were pregnant. Three of the 7 caribou showed hair loss associated with winter tick: two caribou scored “mild” hair loss and 1 caribou scored “moderate-severe” hair loss. Ticks were collected from one caribou. No capture-related injuries or mortalities occurred during the collar deployments.

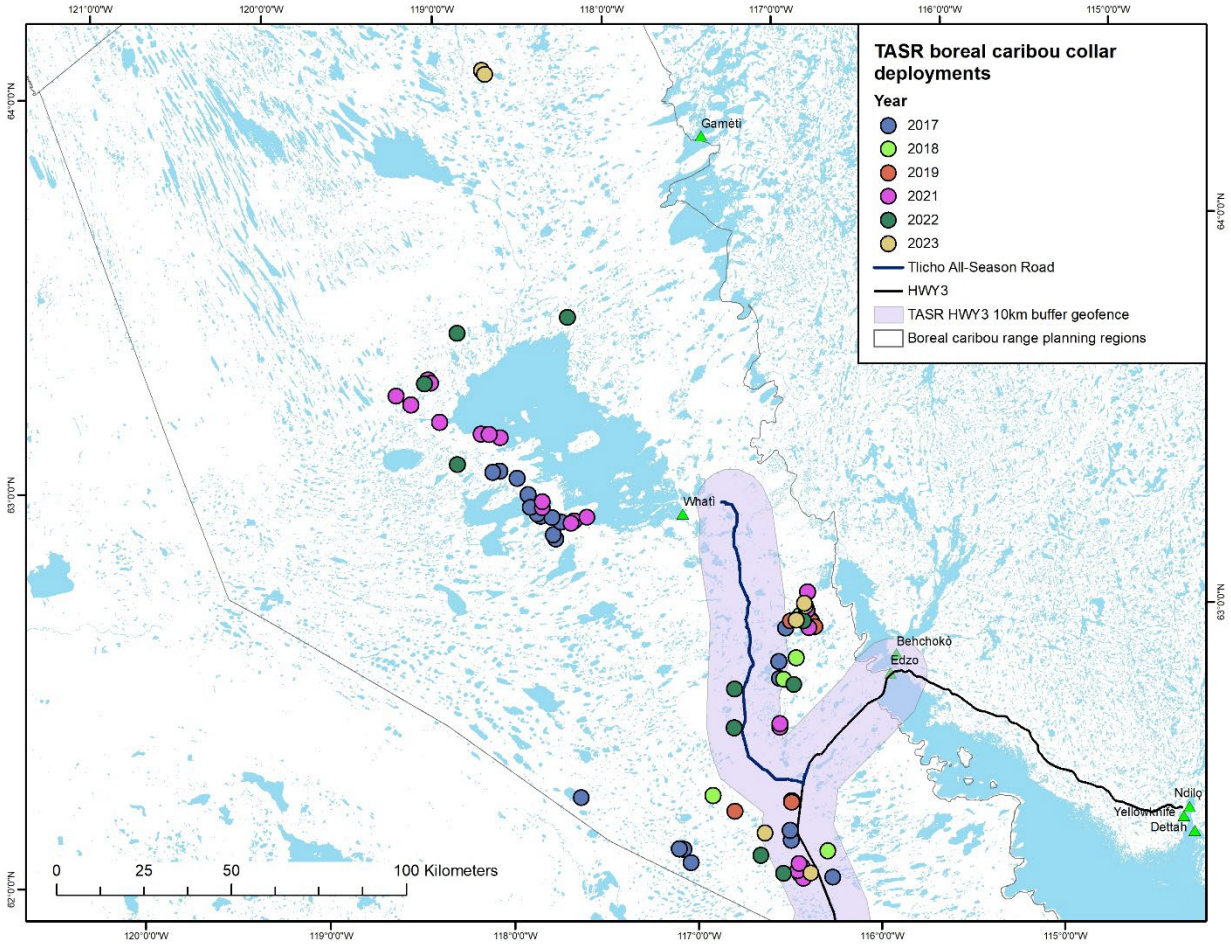

Figure 1. Locations where adult female boreal caribou were fitted with GPS collars in the North Slave Region, Tłı̨chǫ All Season Road Study Area.

Boreal caribou reconnaissance survey

The Wek'èezhìı boreal caribou range plan area includes extensive boreal caribou habitat north of the area currently monitored by the Tłı̨chǫ All-Season Road monitoring program. To better understand caribou movements and habitat use across the entire area, the deployment of up to 5 collars far north of Lac La Martre to cover more of the North Slave portion of the boreal caribou range was discussed at the Wek'èezhìı boreal caribou range plan working group meeting in April 2021. Although this area is part of the boreal caribou range in the NWT, there was no information from collared animals to help locate groups for deployment. A reconnaissance survey was planned for this area to locate boreal caribou for the capture crew and help capture work to be more efficient. The survey area focused on areas north of Lac La Marte identified as preferred mid-winter habitat for boreal caribou in resource selection function (RSF) model-derived maps produced by ECC. The survey was planned and flown using distance-sampling survey methods, so that if sufficient animal groups were detected, they could contribute to an abundance estimate for the area.

The survey was based out of Whatì and was completed on Feb 22-24, 2023. A Cessna 180 was used to fly transects spaced 4 km apart over the study area. The survey crew consisted of pilot (Sergei Mjatelski, Goose Flying Service, Fort Simpson), ECC staff (Stefan Goodman, Wildlife Technician, North Slave Region) and 1 to 2 Whatì community observers per flight (Walter Beaverho, Peter Nitsiza, and Louisa Nitsiza). When caribou were observed, the plane left the survey transect to take a waypoint over the group to measure the distance to transect line. Distance-to-transect waypoints were also collected for moose on day 2 and 3 of the survey.

Most caribou tracks observed during the survey were north of Lac La Marte, or east of Lac Grandin. Caribou were only observed in three locations. However, the capture crew used the cluster of caribou tracks observed east of Lac Grandin to target their capture work and successfully collared two cows in this area in early March 2023. Figure 2 shows the location of flight lines and observations for this survey.

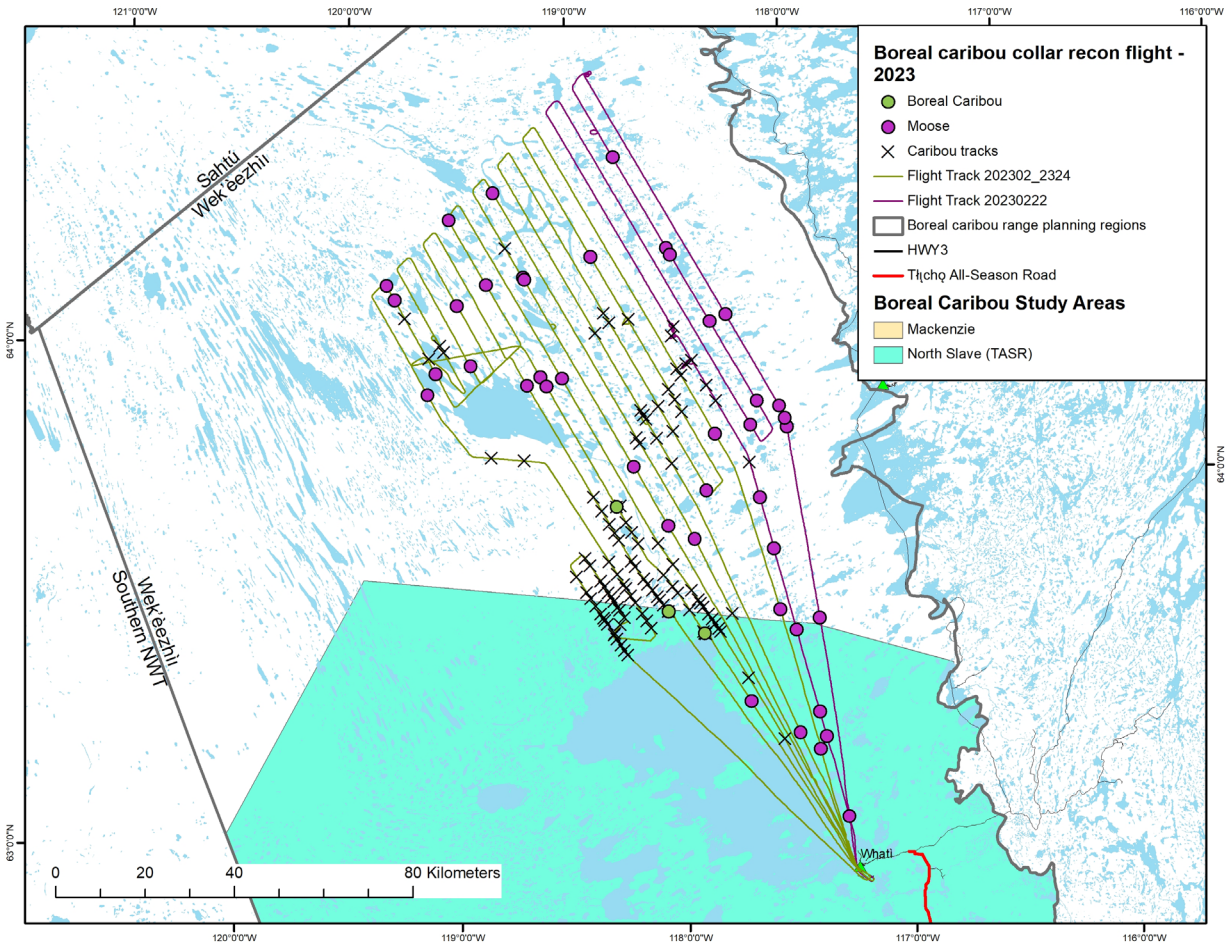

Figure 2. Flight lines and observations of caribou, moose, and caribou tracks during a boreal caribou reconnaissance survey Feb 22-24, 2023.

Boreal caribou composition survey

A boreal caribou classification survey was flown March 3-5, 2023 (Figure 3). The objective of this survey is to classify caribou into age and sex classes and count the number of calves per 100 cows observed. Because caribou mortality is highest during the first year of life, calves that survive until the time of survey (when calves are approximately 10 months old) are assumed to be "recruited" into the adult population with an associated higher survival rate. The ratio of female calves to total females is used together with the adult female survival to estimate the annual population trend.

For this survey, a helicopter is used to locate and classify observed caribou into cows, calves, bulls, and yearlings. The survey is planned by using the last known location of collared females present in the study area. Once the helicopter is within ~5 km of each location, radio telemetry is used to locate the group with the collared female. Additional groups of caribou that are encountered but do not contain a collared female are also classified. Boreal caribou were classified into calves (9-10 months old), yearlings (21-22 months old), females (≥ 32 months old) and males (≥ 32 months old), based upon antler size and shape, animal size, and presence of a black vulva patch.

Within the Tłı̨chǫ All-Season Road study area, a total of 52 bulls, 159 cows, 0 yearlings, 54 calves and 7 adults of unknown sex were observed on the 2023 survey, for a total of 272 boreal caribou classified (Table 1). Individuals of unknown sex and yearlings were split 50/50 amongst adult males/females to calculate calf:cow ratios. The calf:cow ratio was 0.332 (33 calves per 100 cows). The calf:cow ratio, along with adult female survival rates for the 2023-24 year, will be used to calculate the annual finite population growth rate (ʎ), which will be reported in the next annual Water Licence report for the TASR project.

Within the North Slave region portion of the Mackenzie study area, 62 boreal caribou were classified in 2023. A total of 27 cows, 13 bulls, 0 yearlings, 18 calves and 4 adults of unknown sex were counted. These classification results will be added to those of the South Slave region portion of the Mackenzie study area to calculate calf:cow ratios for that study area.

Incidental sightings during the classification survey included 17 bison in 6 groups, 5 moose in 3 groups, and a pack of 9 wolves.

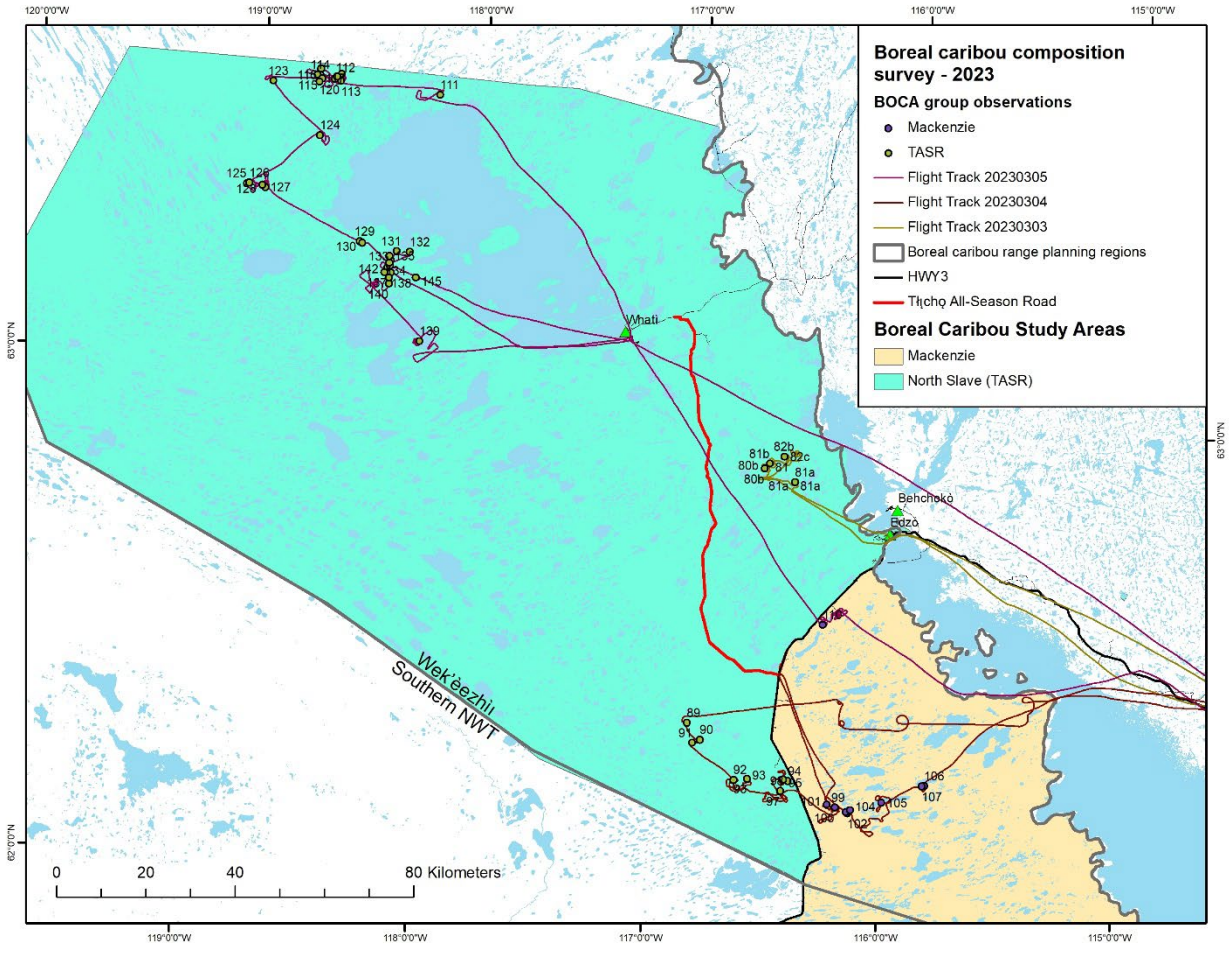

Figure 3. Flight lines and classification waypoints from the 2023 boreal caribou composition survey March 3-5, 2023.

Collar releases and retrievals

Six collars deployed on boreal caribou in 2019 were scheduled to release on March 1, 2023. All six collars released on schedule and were retrieved during the composition survey March 3-5, 2023.

Boreal caribou mortality (fate) investigations

Between February 4, 2023, and November 1, 2023, two of the collared caribou in the study area have died. No collars released prematurely or experienced GPS transmission failures during this period.

Caribou BWCA21613 was harvested west of Lac La Martre on April 16, 2023, and the collar was brought back to Whatì by the harvester. No samples were collected from this animal, but the collar was returned to ECC.

Caribou BWCA21615 died on April 12, 2023, from wolf predation. The mortality site was visited on April 19, 2023, where broken branches, wolf tracks and wolf scat were observed. Only hair and a mandible (jaw) bone remained, and these samples were collected.

Wolf collar deployments

Wolf collars were deployed at the same time as boreal caribou captures, using the same capture crew. Wolf capture and handling methods adhere to ENR's Standard Operating Procedures for wolf captures and to the conditions of the Wildlife Care Committee (approval NWTWCC 2021-011) for the capture and handling of wolves. Wolves are captured with a net-gun fired from a helicopter and restrained with a Y-pole. The net-gunner must engage the entangled animal with a Y-pole and securely push the wolf to the ground by positioning the Y-pole behind its head. The Y-poles are designed to "lock" in the neck area to prevent the wolf from rolling out. The crew then uses a muzzle (preferred) or tape to secure the mouth and snare in a closed position. The net is then untangled and a blindfold is placed over the eyes and the legs are hobbled. The capture crew minimizes noise (including talking) to reduce sound disturbance. Collared wolves are released in the immediate area after all data have been recorded. For release, restraints are removed in the reverse order as applied. The wolf is positioned with its head pointing in a safe direction (i.e. away from the crew or helicopter). The crew will then apply the Y-pole and secure the snare pole. The muzzle will be removed from the mouth, followed by the blind fold and hobbles. The snare pole is released while the wolf remains pinned using the Y-pole. When safe to do so the Y-pole is removed and the animal released.

Two boreal wolves were captured and collared on March 4 and 5, 2023, east of Highway 3 near the Highway 3/ Tłı̨chǫ Highway junction. The project objectives were to collar up to 5 wolves in the study area, but due to weather delays the crew was not able to spend time searching for additional wolf packs to deploy the remaining collars.

BOWF23601, collared March 4, 2023, is an old (age estimate 7) male wolf with a grey coat. BOWF23602, collared March 5, 2023, is a prime age female wolf with grey coat. Handling time was 21 minutes for each animal. Both wolves were from the same pack of 9 wolves. Both wolves are fitted with Telonics TGW-4577-4 GPS Iridium collars that are programmed to collect locations hourly, and are scheduled to release on June 1, 2024. Both wolves are still alive as of November 1, 2024. Figure 3 shows the location of the 2023 and earlier wolf collar deployments in this study area and the movement paths of those collared wolves up to October 2023.

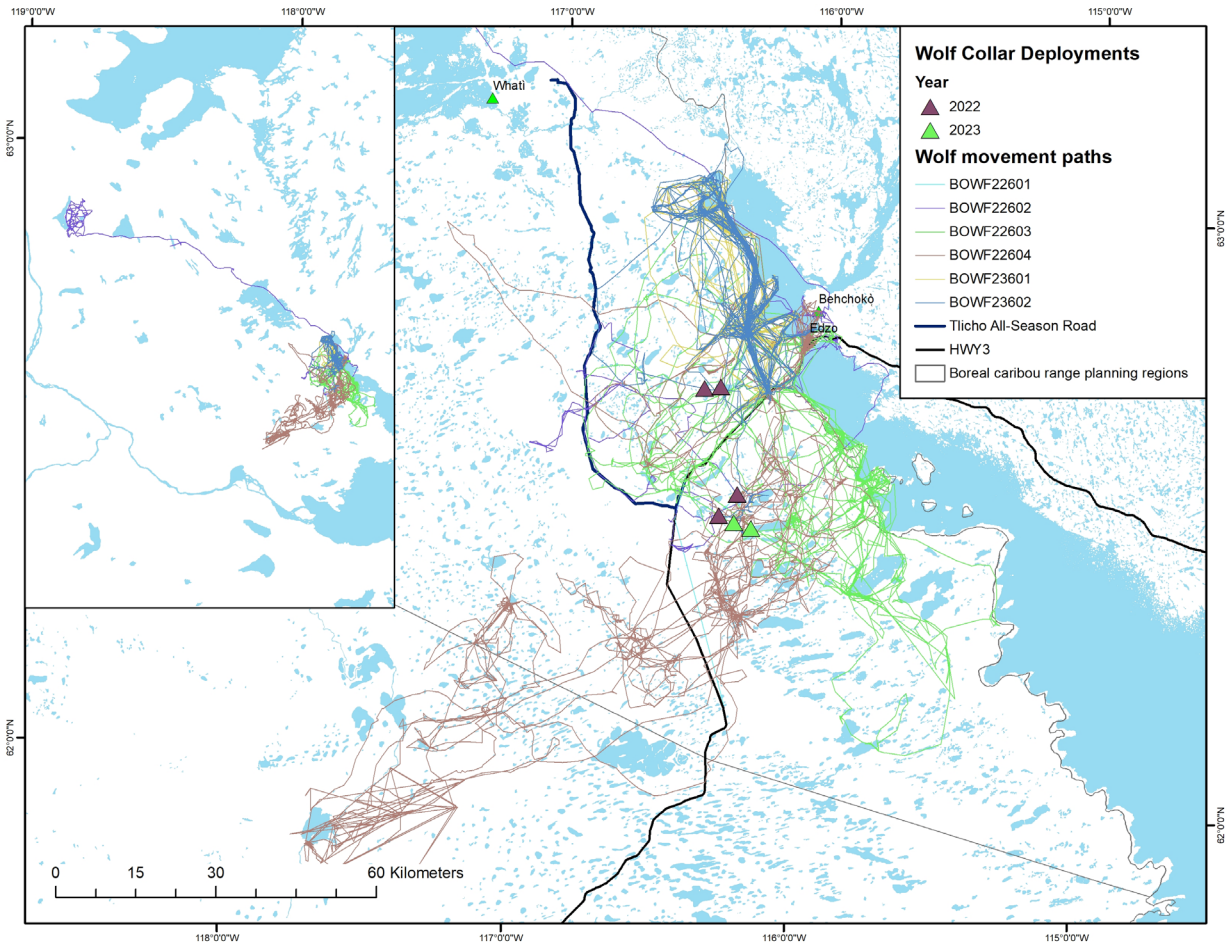

Figure 4: Locations of the 2023 and earlier wolf collar deployments in this study area and the movement paths of those collared wolves up to October 2023.

Collared wolf mortality (fate) investigations

Four collars were deployed on boreal wolves in March 2022, under Wildlife Research Permit WL501017, and two of those collared wolves (BOWF22603 and BOWF22604) were still wearing active collars at the beginning of the WL501123 monitoring period. (BOWF22601 died March 2022, vehicle impact suspected as cause of death, and BOWF22602 dispersed west to near Wrigley, where the wolf slipped out of its collar in July 2022.)

The collar on BOWF22603 released on schedule June 1, 2023, near the North Arm of Great Slave Lake, and was retrieved in October 2023.

In January 2023, BOWF22604 dispersed to the area around Mink Lake, north of Fort Providence. This collar released on schedule June 1, 2023, and has not yet been retrieved.

Table 1. Composition of boreal caribou groups classified in the Tłı̨chǫ All-Season Road study area during aerial composition surveys conducted March 3-5, 2023.

Study Area	Date	Group #	Cows	Calves	Bulls	Unk Adult	Group Size	Collared female in group	Calf with collar ?
TASR	03-Mar-23	1	4		3		7	BWCA21604	No
TASR	03-Mar-23	1						BWCA23603	No
TASR	03-Mar-23	1						BWCA23601	No
TASR	03-Mar-23	2	2	1	3		6	BWCA22603	CAH
TASR	03-Mar-23	3	5	1	1		7	BWCA21605	Yes
TASR	03-Mar-23	4	1	1	2	1	5	BWCA21606	No
TASR	03-Mar-23	5	2				2		
TASR	03-Mar-23	6	2	2			4	BWCA21607	Yes
TASR	03-Mar-23	7	5	3	1		9	BWCA23602	No
TASR	03-Mar-23	8	5	1			6		
TASR	04-Mar-23	9	2	2			4	BWCA22604	Yes
TASR	04-Mar-23	10	3	1			4		
TASR	04-Mar-23	11	4	6			10	BWCA22601	Yes
TASR	04-Mar-23	12	3	2			5	BWCA21603	Yes
TASR	04-Mar-23	13	8	2		1	11	BWCA21600	No
TASR		13						BWCA21602	Yes
TASR	04-Mar-23	14	4	3	2	1	10	BWCA22602	No
TASR	04-Mar-23	15	3	2	6	1	12	BWCA21610	No
TASR	04-Mar-23	16	4		3		7	BWCA22606	No
TASR	04-Mar-23	17	1	1			2	BWCA21615	Yes
TASR	05-Mar-23	18	1	1			2	BWCA21616	Yes
TASR	05-Mar-23	19	2		3		5		
TASR	05-Mar-23	20		2	1		3		
TASR	05-Mar-23	21	4				4		
TASR	05-Mar-23	22	1	1			2	BWCA21619	Yes
TASR	05-Mar-23	23	5		1		6		
TASR	05-Mar-23	24	3				3		
TASR	05-Mar-23	25	3			1	4	BWCA21620	No
TASR	05-Mar-23	26	6	3	1		10		
TASR	05-Mar-23	27			2		2		
TASR	05-Mar-23	28	6		1		7	BWCA21609	No
TASR	05-Mar-23	29	2		2		4	BWCA22608	No
TASR	05-Mar-23	30	4	1	1		6	BWCA22609	No
TASR	05-Mar-23	31	1				1		
TASR	05-Mar-23	32	7	2	2		11	BWCA21617	No
TASR	05-Mar-23	33	3	2	1	1	7		

Study Area	Date	Group #	Cows	Calves	Bulls	Unk Adult	Group Size	Collared female in group	Calf with collar ?
TASR	05-Mar-23	34	1	1			2	BWCA21621	Yes
TASR	05-Mar-23	35	4	1			5		
TASR	05-Mar-23	36	2	1	1		4		
TASR	05-Mar-23	37	5		2		7		
TASR	05-Mar-23	38	3				3	BWCA22610	No
TASR	05-Mar-23	39	2		2		4		
TASR	05-Mar-23	40	6	3	1	1	11	BWCA21622	Yes
TASR	05-Mar-23	41	1	1	1		3	BWCA21613	Yes
TASR	05-Mar-23	42	3	1			4		
TASR	05-Mar-23	43	2				2		
TASR	05-Mar-23	44	6	3			9	BWCA21608	Yes
TASR	05-Mar-23	45	2				2	BWCA21614	No
TASR	05-Mar-23	46	2	2	6		10		
TASR	05-Mar-23	47	3				3		
TASR	05-Mar-23	48	3		1		4		
TASR	05-Mar-23	49	3				3		
TASR	05-Mar-23	50	2	1			3	BWCA21612	No
TASR	05-Mar-23	51	3		2		5		
	Totals		**159**	**54**	**52**	**7**	**272**		