

### 3. CARIBOU MONITORING AND MITIGATION

The NIRB Project Certificate (No. 007 Amendment 1) requires mitigation and monitoring be carried out for caribou at the Mine. This section describes the mitigation programs at the site, as well as the results of monitoring and any management that was triggered in 2024. Caribou from the Beverly/Ahiak herd interact with the Back River Mine during spring migration and the summer months, and to a lesser degree during the fall and winter periods. Two other herds, the Bathurst and Dolphin and Union herds, are approximately 100 km from the Back River Mine site, and do not regularly interact with the Project. Despite this, mitigation, management, and monitoring apply to all caribou, regardless of herd.

The following sections describe the results of monitoring and any management measures that were triggered, including:

- The Caribou Management System;
- Caribou monitoring on the Winter Ice Road;
- Monitoring of seasonal caribou ranges;
- Measurement of group size in caribou;
- Caribou behaviour monitoring;
- Onsite camera monitoring for caribou;
- Regional caribou monitoring for caribou avoidance of the Mine;
- Regional camera monitoring; and
- Incidental observations.

#### 3.1 FEIS PREDICTIONS

The predicted residual effects of the Project on caribou as identified in the FEIS included:

- Habitat loss (not significant, low magnitude);
- Disturbance (not significant, low magnitude); and
- Reduction in reproductive productivity (not significant, low magnitude).

Mitigation and management measures to reduce the potential for these effects to result in residual effects on caribou are discussed in Section 7 of the WMMP Plan (B2Gold 2024a).

#### 3.2 CARIBOU MANAGEMENT SYSTEM

As part of the WMMP Plan, B2Gold Nunavut is committed to a Caribou Management System that includes monitoring caribou presence near the Mine site and managing site activities through four levels of response to caribou presence, including:

- Level 1—Normal operations;
- Level 2—Site notification;
- Level 3—Site alert; and
- Level 4—Staged reduction in Project activities.

The Caribou Management System is outlined further in Section 7.2.2.2 of the WMMP Plan (B2Gold 2024a).

### 3.2.1 METHODS

Monitoring for caribou was conducted in accordance with, and using datasheets provided in the Caribou Management System Recording SOP (B2Gold 2024h). This includes:

- Monitoring of daily satellite collar locations for the Bathurst and Beverly/Ahiak caribou herds during the calving, post-calving, and summer seasons (June 5 to July 31, as summarized in Section 7.2.2.1 of the WMMP Plan; B2Gold 2024a);
- Reporting of incidental caribou observations by all staff; and
- Active monitoring by the Environment Department.

Collectively, these data are used to trigger staged reduction in site activities (Level 1 through Level 4), as described in Section 7.2.2.2 of the WMMP Plan (B2Gold 2024a).

### 3.2.2 RESULTS AND DISCUSSION

In 2024, implementation of the Caribou Management System (i.e., an increase in the protection level) was required on five occasions at the Mine (Table 3.2-1). To mitigate for effects on caribou, the Environment Department monitored GNWT collar data daily during the calving, post-calving, and summer seasons. While not required in the WMMP, weekly caribou collar maps were monitored during the rest of the year to anticipate caribou approaching the site.

**TABLE 3.2-1 OBSERVATIONS AND MITIGATION TRIGGERED THROUGH THE CARIBOU MANAGEMENT SYSTEM AT THE BACK RIVER MINE IN 2024**

Date	Previous Level	New Level	Caribou Observations
April 9	Level 1	Level 3	Fifty caribou spotted 1.5 to 2 km southwest of the main camp.
July 19	Level 3	Level 4	Two hundred and fifty plus caribou 1.5 km southeast of WRSA, near Echo Pit. Blasting suspended and reminder to site personnel on caribou mitigative measures.
July 19	Level 4	Level 3	Group increased to 600+ individuals, but now located 4 km traveling southwest away from the Mine. As a result, protection level was decreased, with blasting still suspended for the remainder of the day, and reminder to site personnel of caribou mitigative measures.
July 20	Level 3	Level 4	Two groups estimated to be 1,600 and 4,700 individuals located approximately 3 km south of the quarry and moving northwest towards camp. Blasting still suspended, and reminder to site personnel of caribou mitigative measures.
July 20	Level 4	Level 2	Groups 3.8 km south of Goose moving west away from site and as a result, protection level could be decreased.
October 2	Level 2	Level 3	Several groups in the area that could make site move to Level 4 at short notice.

Date	Previous Level	New Level	Caribou Observations
October 5	Level 3	Level 4	Two groups of caribou totaling 32 individuals 1.5 km southeast of site. Blasting suspended and reminder to site personnel on caribou mitigative measures.
October 6	Level 4	Level 3	Caribou no longer within trigger distance, with only one group of 50 caribou 7 km southeast of site.

Mitigation and monitoring measures in place by B2Gold Nunavut associated with the Caribou Management System were effective at monitoring and managing caribou presence near the Mine site. In 2024, the Mine shifted between Level 2 and Level 4 eight times between April 9 and October 6 (five of which were increases in protection level). Additionally, site-wide warning emails were sent on July 24, 26, and 29, August 28, and October 4, signaling caribou presence that could trigger a level change. The Mine moved to a Level 4 response on three occasions, with a site-wide email detailing caribou protection measures and suspending blasting distributed.

### 3.3 CARIBOU MONITORING ON THE WINTER ICE ROAD

B2Gold Nunavut is committed to ensuring safe wildlife passage across the WIR and limiting disturbance to caribou near the WIR. Mitigation and management for disruption of movement of caribou and other wildlife focuses on management of the WIR, as per Section 7.2.3 of the WMMP Plan (B2Gold 2024a). The objectives of caribou monitoring on the WIR are to trigger mitigation measures when required and to determine if the WIR is acting as a barrier to movement by documenting caribou moving towards or attempting to cross the road, as described in Section 7.3.1.10 of the WMMP Plan (B2Gold 2024a).

Construction of the WIR was based out of the MLA and Goose camps and two mobile camps: MLA Forward Camp near Bathurst Lake and Goose Forward Camp near KM30. In 2024, the WIR operated between March 7 and April 30, 2024. One thousand, five hundred and fifty-eight loads (return trips) were hauled on the WIR during the operating period, with additional daily ancillary maintenance equipment and caribou monitoring vehicles also using the WIR.

In a typical year, the WIR is designed to be closed by April 15 to minimize disturbance to Beverly/Ahiak caribou during spring migration. Due to construction and weather-based delays, operation of the WIR was extended to April 30, 2024.

#### 3.3.1 METHODS

##### 3.3.1.1 CARIBOU SURVEYS ON THE WIR

The WMMP Plan includes monitoring for caribou on the WIR should the WIR operate after April 15. Through discussions with the CTAG, it was decided to start this monitoring program earlier, based on when caribou are first observed along the WIR.

In 2024, a team of a biologist and an Inuit land user surveyed the WIR each day from March 27 to May 1, weather permitting, and informed drivers via radio of locations where caribou may be close enough to require slowing or stopping, as per mitigations described in Section 7.2.3 of the WMMP Plan (B2Gold 2024a).

### 3.3.1.2 WIR REMOTE CAMERAS

In 2024, 14 remote cameras were deployed along the WIR in areas where caribou were observed in 2023 and in areas where caribou were predicted to cross the WIR based on satellite collar data and caribou sign. The final locations of WIR cameras were determined by an onsite wildlife biologist and an Inuit land user (Figure 3.3-1). The cameras operated continuously for the entire duration that they were deployed, with the longest deployment from March 29 to April 30, 2024 (Table 3.3-1). Three cameras located on frozen lakes were removed on April 10 due to warming weather, and the remaining 11 cameras were serviced on April 30, before the official road closure date of May 1, and continued to operate throughout the year to integrate with the ongoing Regional Camera Monitoring Program (see Section 3.8). All cameras were deployed to have the WIR in the field of view and positioned within 10 m of the edge of the WIR.

Cameras were deployed in accordance with the Remote Camera Monitoring SOP (B2Gold 2024i).

**TABLE 3.3-1 WINTER ICE ROAD REMOTE CAMERA OPERATING DATES, 2024**

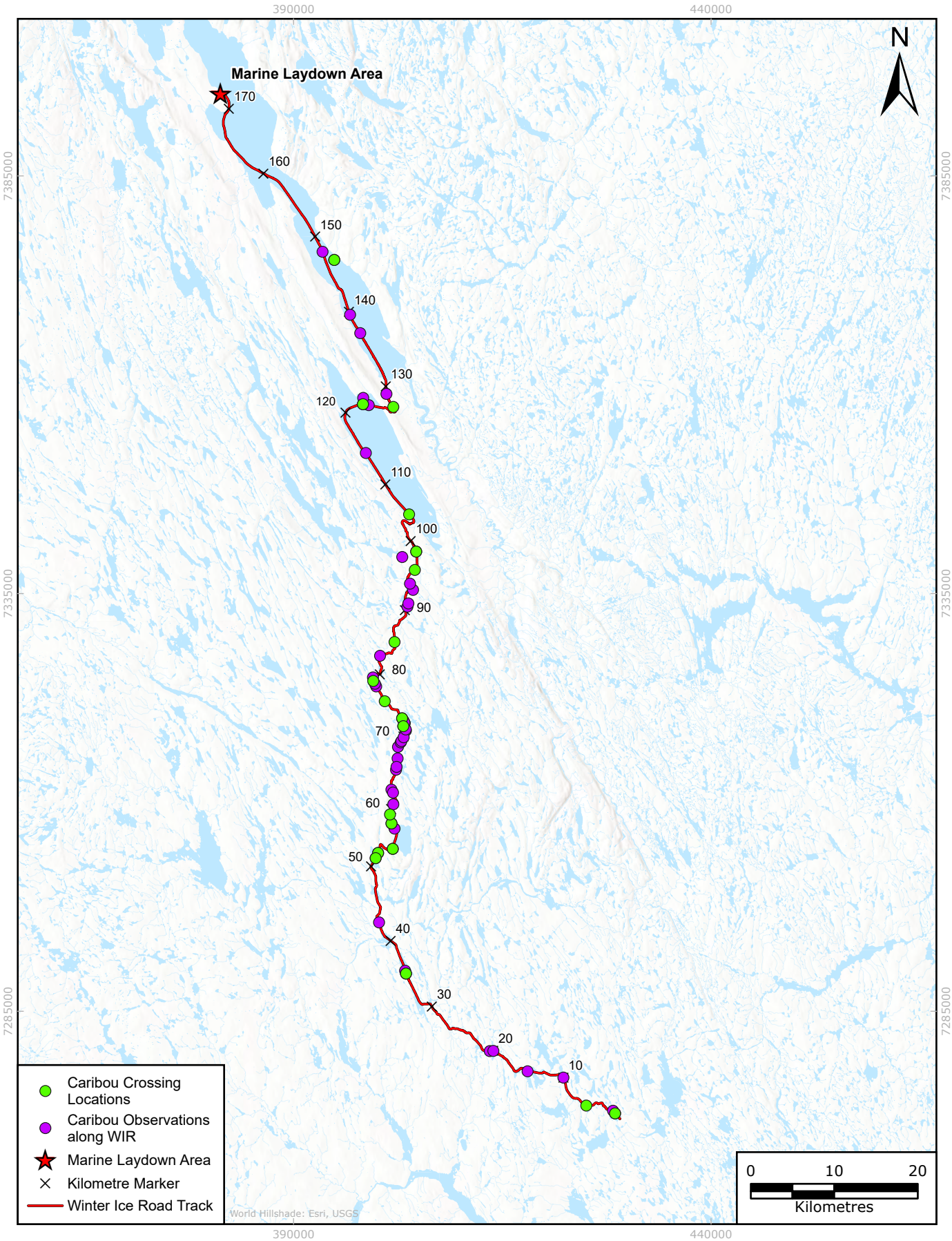
Camera ID	KM	Start Date	End Date	Operational Days
BR01 <sup>1</sup>	KM80.5	March 29	April 30	32
BR02 <sup>1</sup>	KM86	March 29	April 30	32
BR03 <sup>1</sup>	KM77.5	March 29	April 30	32
BR04 <sup>1</sup>	KM66	March 30	April 30	31
BR05 <sup>1</sup>	KM72.5	March 30	April 30	31
BR06 <sup>1</sup>	KM59	March 30	April 30	31
BR07	KM21.5	March 31	April 10	10
BR08 <sup>1</sup>	KM32	March 31	April 30	31
BR09	KM1	March 31	April 10	10
BR10 <sup>1</sup>	KM91.5	April 2	April 30	28
BR11 <sup>1</sup>	KM95	April 2	April 30	28
BR12 <sup>1</sup>	KM40	April 3	April 30	27
BR13 <sup>1</sup>	KM3	April 3	April 30	27
BR14	KM11	April 3	April 10	7

Note:

<sup>1</sup> Cameras continued to operate past April 30 after the WIR was closed as part of the Regional Camera Monitoring Program (see Section 3.8).



FIGURE 3.3-1 CARIBOU CROSSING LOCATIONS OBSERVED ALONG THE WIR, 2024



### 3.3.1.3 WIR TRAFFIC

See Section 2.3.3.1 for WIR traffic details in 2024.

## 3.3.2 RESULTS AND DISCUSSION

### 3.3.2.1 CARIBOU SURVEYS ON THE WIR

Caribou observations made by the WIR wildlife monitors (one biologist and one Inuit land user) are summarized in this section. Incidental observations of caribou recorded by onsite personnel are summarized in Section 3.9.

While monitoring the WIR each day, groups of caribou were observed on 51 occasions (Appendix E). Group sizes observed ranged from one to over 10,000 individuals, with five groups estimated as consisting of 1,000 or more caribou (Photo 3.3-1). The same groups were likely observed on multiple days while the animals passed through the area. Caribou groups were typically observed heading east, as expected during spring migration of the Beverly/Ahiak herd. Direct observations of caribou as well as caribou tracks were recorded crossing at multiple sections of the WIR, suggesting effective mitigation to allow caribou to cross the WIR (Photos 3.3-1 and 3.3-2; Figure 3.3-1). Caribou behaviour surveys were also conducted along the WIR and are summarized in Section 3.6.



Photo 3.3-1 Caribou observed near KM120 of the WIR.

B2Gold Nunavut Managers onsite consulted with biologists each day to ensure mitigations outlined in the WMMP Plan were being adequately followed by all staff and contractors. Biologists interacted with drivers onsite each day, discussing observations on the WIR, the reasoning behind mitigations, and clarifying questions around caribou mitigations before and after April 15. Signage summarizing caribou mitigations was posted around site, and brochures with mitigation information and datasheets for incidental observations were provided to all drivers.

Caribou monitoring, as well as mitigation measures along the WIR to facilitate caribou crossing, was effective. Therefore, no additional mitigation was required in 2024.





Photo 3.3-2 Caribou crossing the WIR near KM92.

### 3.3.2.2 WIR REMOTE CAMERAS

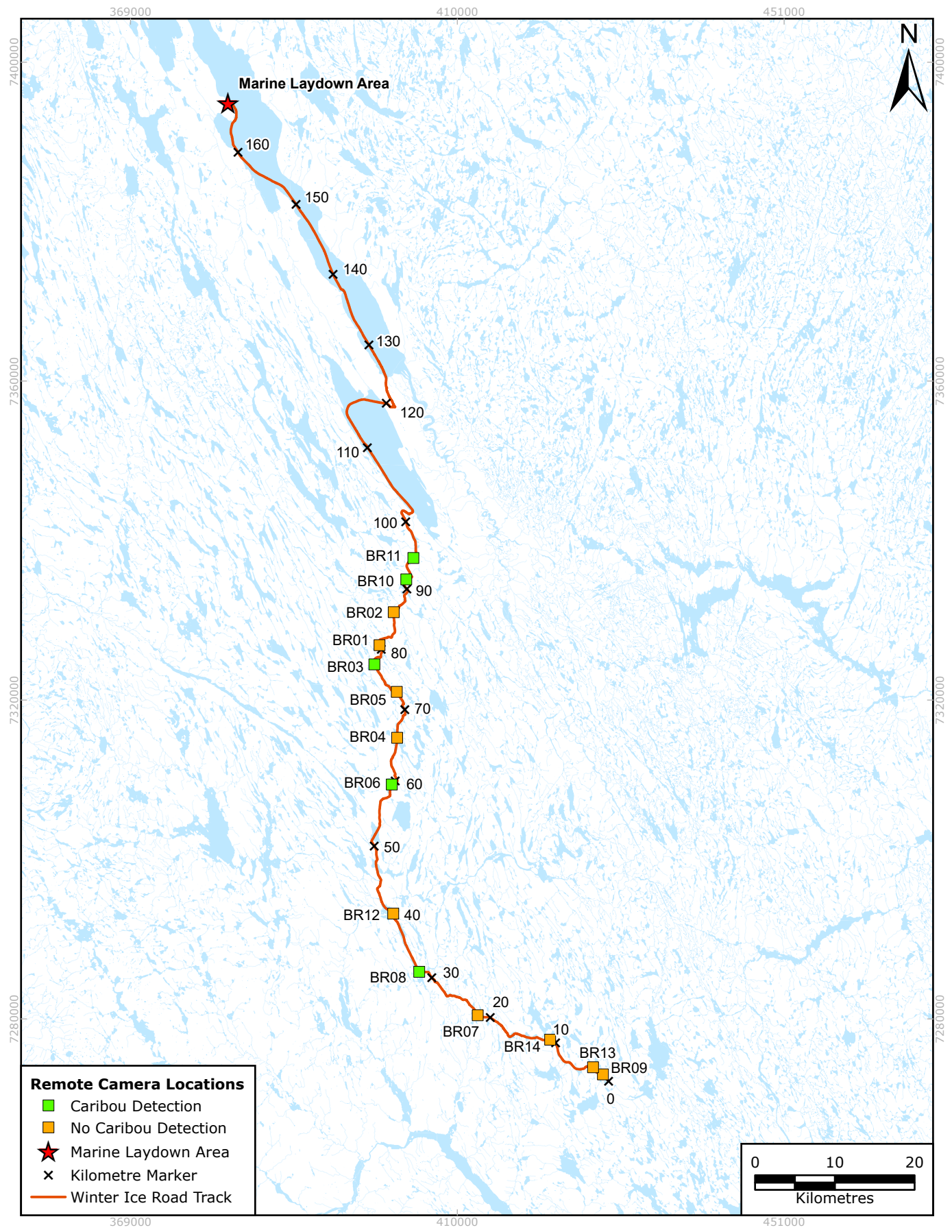
The WIR cameras were operational between March 29 and April 30 for a total of 357 active trap days, with batteries and SD card capacity checked regularly by WIR caribou monitors.

Caribou were recorded on five of the 14 cameras deployed on the WIR in 2024 (Figure 3.3-2; Photo 3.3-3). The caribou group sizes ranged from one to 200 individuals. In total, there were 14 detection events, recording 339 total caribou. Of the 14 caribou detection events, two events involved caribou crossing the WIR within view of the camera: one caribou at BR10 on April 7 and five caribou at BR03 on April 21. It should be noted that caribou observed by cameras may have also crossed the WIR out of the camera viewshed. Observed caribou behaviour mainly consisted of walking or feeding, with only one event of a single caribou running in view of the camera.



Photo 3.3-3 Caribou crossing the WIR at camera BR03 near KM77.5, April 21, 2024.

FIGURE 3.3-2 BACK RIVER WIR REMOTE CAMERA LOCATIONS, 2024



The earliest detection of caribou was on April 7 and the last on April 29. Camera detections peaked on April 29, with three detection events: two detections of 75 and 200 caribou at WIR KM59 and one event of four caribou at KM95. The earliest caribou detection reported by WIR caribou monitors was on March 31 and the last was on May 1, with peak detections occurring between April 27 to May 1. Although the caribou monitors recorded caribou sightings prior to the cameras, the peak in detections coincided between cameras and monitors.

In addition to caribou, grey wolf were detected at three cameras on five occasions, Arctic fox once at one camera, red fox once at one camera, raven at four cameras on five occasions, and other unidentified birds at two cameras on two occasions. Results from WIR cameras are summarized in Table 3.3-2.

**TABLE 3.3-2 WILDLIFE DETECTIONS AT REMOTE CAMERAS ALONG THE BACK RIVER WIR, 2024**

Date	Species	Scientific Name	Count	WIR KM
April 1	Bird (potential hawk)	-	1	KM21.5
April 7	Raven	<i>Corvus corax</i>	1	KM21.5
April 7	Raven	<i>Corvus corax</i>	1	KM21.5
April 7	Caribou	<i>Rangifer tarandus</i>	1	KM91.5
April 8	Grey wolf	<i>Canis lupus</i>	1	KM40
April 8	Grey wolf	<i>Canis lupus</i>	1	KM40
April 9	Caribou	<i>Rangifer tarandus</i>	1	KM77.5
April 9	Caribou	<i>Rangifer tarandus</i>	17	KM77.5
April 10	Caribou	<i>Rangifer tarandus</i>	2	KM77.5
April 11	Grey wolf	<i>Canis lupus</i>	1	KM40
April 11	Red fox	<i>Vulpes vulpes</i>	1	KM3
April 14	Caribou	<i>Rangifer tarandus</i>	4	KM77.5
April 14	Caribou	<i>Rangifer tarandus</i>	1	KM32
April 15	Caribou	<i>Rangifer tarandus</i>	4	KM77.5
April 17	Caribou	<i>Rangifer tarandus</i>	7	KM59
April 18	Raven	<i>Corvus corax</i>	1	KM32
April 20	Caribou	<i>Rangifer tarandus</i>	14	KM95
April 21	Caribou	<i>Rangifer tarandus</i>	5	KM77.5
April 21	Arctic fox	<i>Vulpes lagopus</i>	1	KM66
April 23	Grey wolf	<i>Canis lupus</i>	4	KM66
April 27	Raven	<i>Corvus corax</i>	2	KM95
April 27	Bird (Gyr Falcon)	<i>Falco rusticolus</i>	1	KM95



Date	Species	Scientific Name	Count	WIR KM
April 28	Raven	<i>Corvus corax</i>	1	KM86
April 28	Caribou	<i>Rangifer tarandus</i>	4	KM95
April 29	Caribou	<i>Rangifer tarandus</i>	75	KM59
April 29	Grey wolf	<i>Canis lupus</i>	1	KM59
April 29	Caribou	<i>Rangifer tarandus</i>	200	KM59

Results from remote camera monitoring in 2024 were compared to results from 2023 (Figure 3.3-3). In 2023, the cameras operated continuously from March 30 to April 24 and were removed at closure of the WIR on April 28 for a total of 350 active trap days. There were more caribou detection events and individuals recorded in 2024 (14 detection events with 339 individuals from 357 active trap days) than in 2023 (seven events with 77 individuals from 350 active trap days). There were larger group sizes recorded in 2024 (ranging from one to 200 individuals) compared to 2023 (ranging from one to 32 individuals). In 2023, the earliest detection was on April 4 and the last on April 22 with the peak on April 12. These dates are slightly earlier than those seen in 2024.

Deployment of wildlife cameras along the WIR was effective at monitoring caribou presence near the WIR, including observing multiple instances of caribou crossing the WIR.

### 3.3.2.3 WIR TRAFFIC

Dedicated caribou monitors travelled the WIR every day from March 27 to May 1, weather permitting. While driving along the WIR, monitors located groups of caribou near, or approaching the road, and informed other drivers via radio of the locations of these groups prior to traffic reaching them. In cases where caribou were within the distances or group sizes requiring mitigation as described in Section 7.2.3 of the WMMP Plan (B2Gold 2024a), caribou monitors reminded drivers of this requirement and monitored compliance. Examples of mitigation followed during the WIR season included the following, from the WMMP Plan:

- Driving speed on the road is set to ensure drivers can see and stop for caribou when required;
- Trucks are grouped into convoys so there is more time for caribou to cross the road between trips;
- Drivers report all observations of caribou to the Environment Department;
- If caribou are within 500 m of the road, trucks slow to 20 km/h to reduce disturbance; and
- Trucks stop and wait if caribou are moving towards the road or on the road.

Monitors observed excellent compliance with the mitigation measures, and multiple groups of caribou successfully crossing the WIR during pauses in traffic (Photo 3.3-4). Therefore, no additional mitigation was required in 2024.

FIGURE 3.3-3 BACK RIVER WIR REMOTE CAMERAS WITH CARIBOU DETECTIONS, 2023 AND 2024

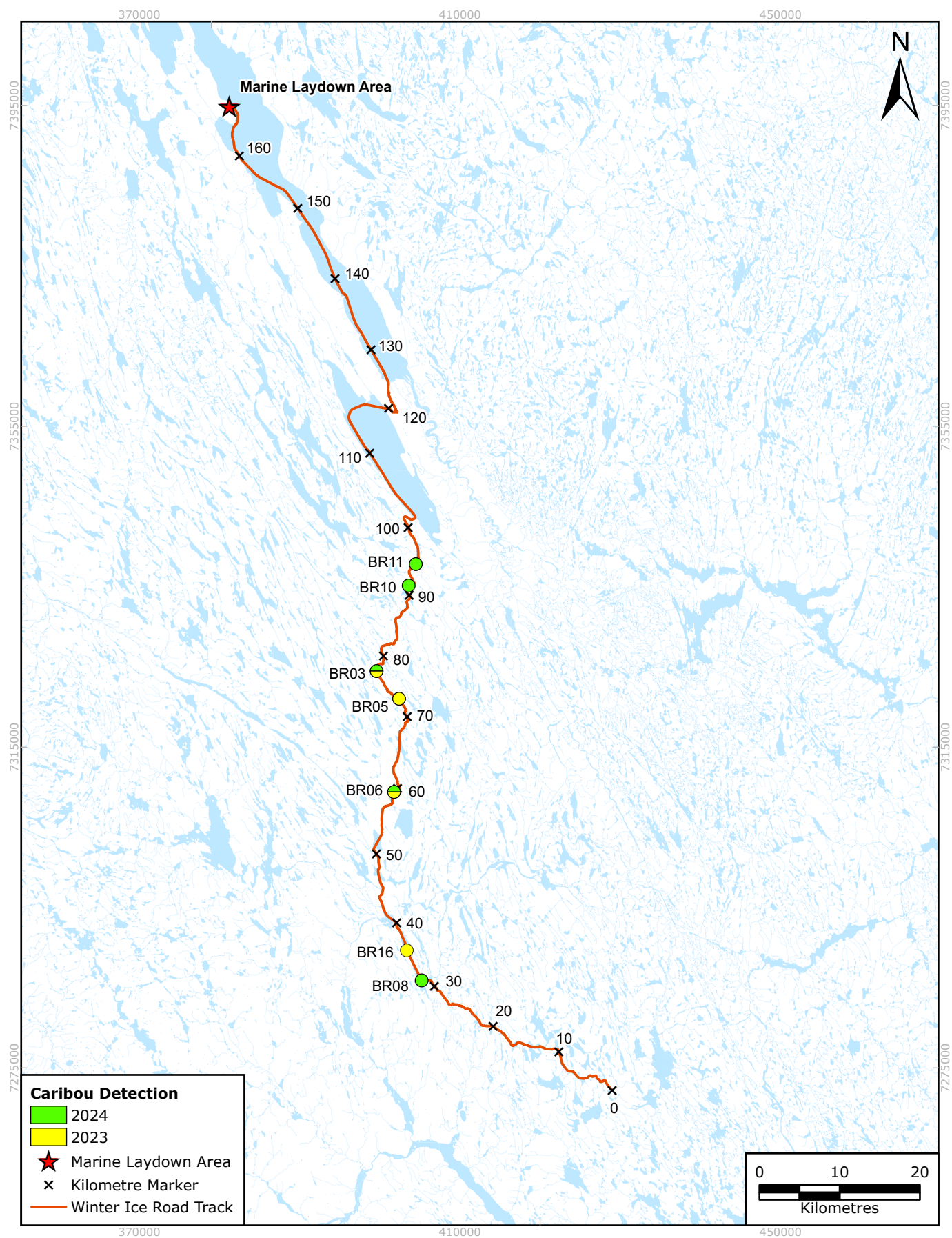




Photo 3.3-4 Vehicles stopped while waiting for caribou to cross the WIR, April 22, 2024.

### 3.4 SEASONAL CARIBOU RANGES

The range that caribou occupy is monitored through analysis of collar data during specific seasonal periods for the Beverly/Ahiak and Bathurst caribou herd, as described in Section 7.3.1.1 of the WMMP Plan (B2Gold 2024a). This analysis is completed to monitor for shifts in the calving range for the herds, which may trigger additional mitigation measures for caribou should the calving grounds shift towards or overlap with the Mine site. These collar data are analysed using kernel density analyses. This program has two objectives:

1. Identify if caribou interact with the Mine site so that monitoring and mitigation activities can be planned for caribou (e.g., wildlife monitors can be onsite to conduct active caribou monitoring and mitigation); and
2. Identify if the calving ground of the Bathurst or Beverly/Ahiak caribou herd has moved to overlap the Mine site.

#### 3.4.1 METHODS

Information from satellite collared female caribou collected by the GNWT ENR (Data Sharing Agreement DRA #572) was used to generate fixed kernel 50% Utilization Distributions (UDs) representing core ranges, and 95% kernel UD representing broader seasonal range extent for the Bathurst and Beverly/Ahiak caribou herds. UD were generated for each season as defined by dates from Nagy 2011 (Table 3.4-1) and overlap of the PDA with each seasonal polygon was assessed. Overlap was assessed as the area of the PDA within the bounds of the 50 or 95% seasonal UD for each herd as compared to the total area of each respective UD, represented as a percentage. Distances from the centroid of the calving season 95% UD polygon to the nearest edge of the Goose PDA and MLA PDA were calculated for both caribou herds to allow tracking of potential shifts year to year.



**TABLE 3.4-1 CARIBOU SEASON DATES USED FOR SATELLITE COLLAR ANALYSES AT THE BACK RIVER MINE**

Seasonal Period <sup>1</sup>	Bathurst Herd Dates	Beverly/Ahiak Herd Dates
Winter	December 1–April 19	December 16–April 9
Spring Migration	April 20–June 1	April 10–June 5
Calving	June 2–June 16	June 6–June 19
Post-Calving	June 17–June 28	June 20–July 8
Summer	June 29–August 17	July 9–August 12
Late Summer	August 18–September 6	August 13–September 11
Fall Migration (Pre-Breeding)	September 7–October 16	September 12–October 20
Rut	October 17–October 31	October 21–November 3
Fall Migration (Post-Breeding)	November 1–November 30	November 4–December 15

Note:

<sup>1</sup> Defined by Nagy 2011.

### 3.4.2 RESULTS AND DISCUSSION

The Bathurst caribou herd 50% and 95% UD overlapped the Back River Mine's PDA only during the spring migration season in 2024 (Figure 3.4-1). The PDA overlapped 0.020% of the total 95% UD polygon and 0.011% of the 50% UD polygon during spring migration (Table 3.4-2). This appears to be due to several Bathurst caribou following females from the Beverly/Ahiak herd to the northeast of the Mine, then turning and proceeding northwest across Bathurst Inlet to join the other Bathurst females at their calving site.

**TABLE 3.4-2 OVERLAP OF THE BACK RIVER PDA (GOOSE AND MLA COMBINED) WITH BATHURST AND BEVERLY/AHIAK SEASONAL RANGE UTILIZATION DISTRIBUTIONS, 2024**

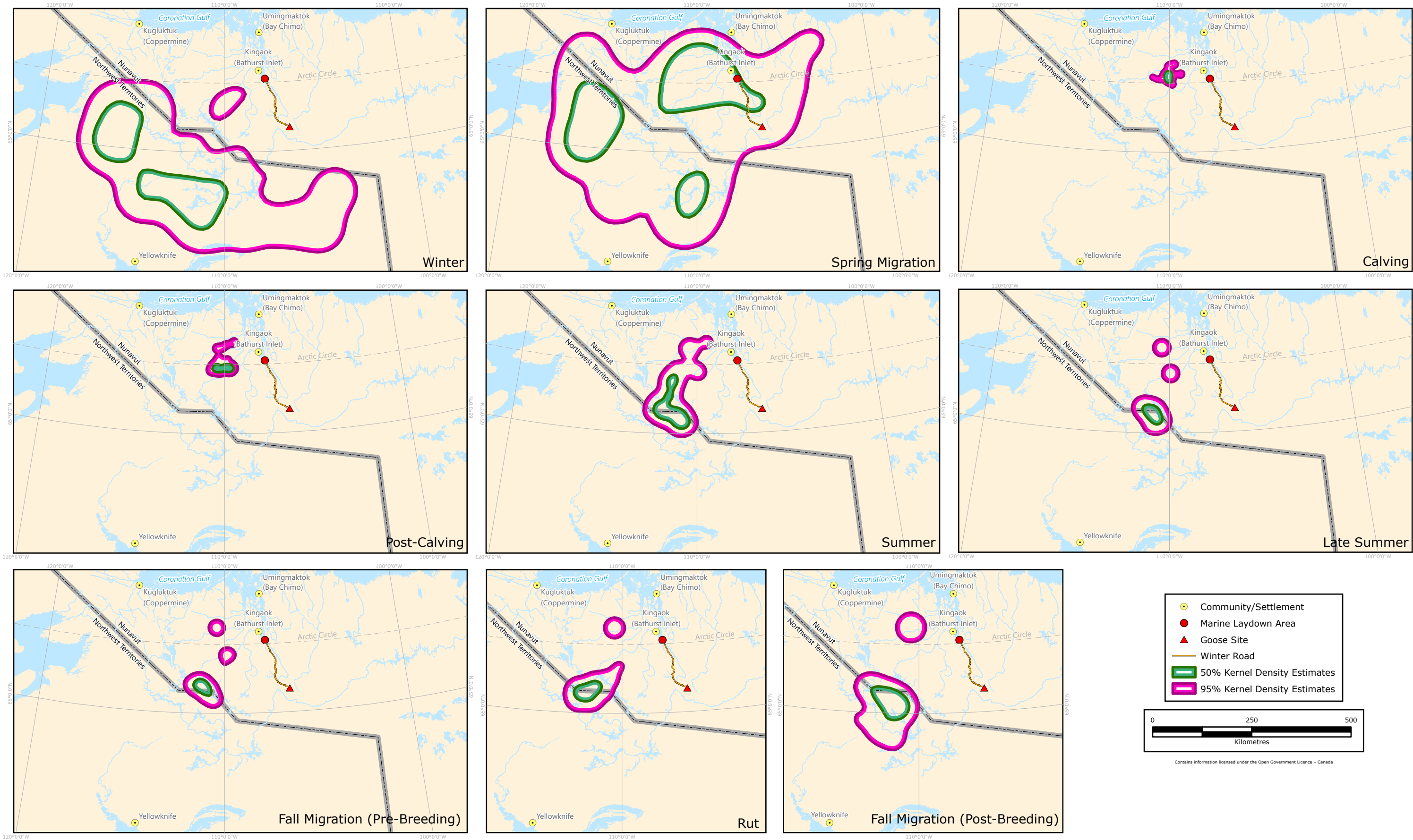
Season <sup>1</sup>	Bathurst		Beverly/Ahiak	
	50% UD	95% UD	50% UD	95% UD
Winter	0.000%	0.000%	0.000%	0.000%
Spring Migration	0.011%	0.020%	0.000%	0.020%
Calving	0.000%	0.000%	0.000%	0.000%
Post-Calving	0.000%	0.000%	0.000%	0.000%
Summer	0.000%	0.000%	0.070%	0.020%
Late Summer	0.000%	0.000%	0.070%	0.020%
Fall Migration (Pre-Breeding)	0.000%	0.000%	0.080%	0.020%
Rut	0.000%	0.000%	0.17%	0.040%
Fall Migration (Post-Breeding)	0.000%	0.000%	0.000%	0.000%

Note:

<sup>1</sup> See Table 3.4-1 for definitions of season for each herd.



FIGURE 3.4-1 BATHURST CARIBOU SEASONAL RANGES, 2024



The Beverly/Ahiak caribou herd 95% UD overlapped the Back River Mine's PDA during the spring migration, summer, late summer, rut, and fall migration (pre-breeding) seasons, and the 50% UD overlapped the PDA only during the summer, late summer, rut, and fall migration (pre-breeding) seasons (Figure 3.4-2). The PDA overlapped 0.020% of the total 95% UD polygon during spring migration, 0.020% of the 95% UD polygon and 0.070% of the 50% UD polygon during summer, 0.020% of the 95% UD polygon and 0.070% of the 50% UD polygon during late summer, 0.040% of the 95% UD polygon and 0.17% of the 50% UD polygon during rut, and 0.020% of the 95% UD polygon and 0.080% of the 50% UD polygon during fall migration (pre-breeding) in 2024 (Table 3.4-2).

Results of the range analyses for the 2024 calving season show that the calving range centroid for the Bathurst herd was 204.05 km from the nearest edge of the Goose PDA and 102.44 km from the nearest edge of the MLA PDA. The calving range centroid for the Beverly/Ahiak herd was 354.60 km from the nearest edge of the Goose PDA and 349.63 km from the nearest edge of the MLA PDA. In comparison to the 2015 FEIS, these values have stayed consistent with no major shifts in calving centroid towards the Back River Mine site. As there has not been a shift in the calving grounds towards the Back River Mine and there continues to be no overlap with the calving grounds, no additional mitigation was required in 2024.

### 3.5 CARIBOU MONITORING—GROUP SIZE THRESHOLD AERIAL SURVEY

An aerial group size threshold survey, as outlined in Section 7.3.1.11 of the WMMP Plan (B2Gold 2024a), was scheduled to be completed within the first 3 years of construction to determine the average group size of caribou with potential to interact with the Mine site during the summer season. This information may be used to confirm or inform triggers for mitigation actions described under the Caribou Management System (Section 3.2). This survey was completed in 2024, during year 2 of construction.

The objectives of the aerial survey were to:

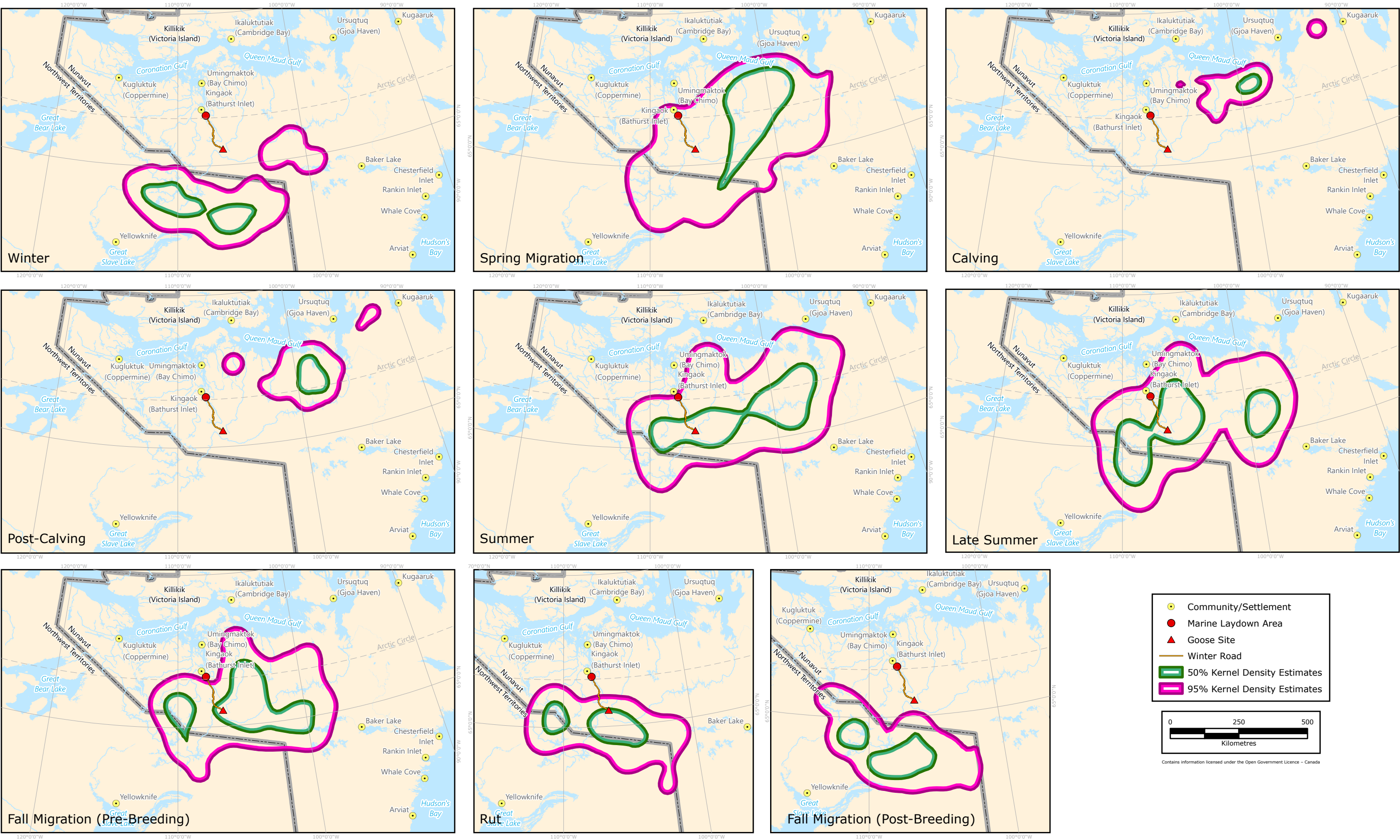
1. Determine the caribou group sizes that occur near the Mine during the summer.
2. Update the group size threshold for triggering the Staged Reduction in Project Activities (a Level 4 response), if necessary, to ensure mitigation (a Level 4 response) applies to at least 75% of individual caribou that may interact with the Mine. The current group size is 25 animals.

#### 3.5.1 METHODS

Aerial surveys followed methodology from Cluff et al. (2016) for composition surveys and classification of caribou groups. A 70 km by 70 km survey grid centred on the Mine was established and transects were spaced 4 km apart within the grid. Surveys were completed via helicopter and included an experienced caribou biologist, an Inuit land user, and an additional B2Gold Nunavut staff member as observers. The average altitude of the aircraft during surveys was 120 m above ground level and a maximum speed of 150 km/hr. In addition to the transect method, meandering surveys were also conducted to ensure small groups were not missed, prioritizing high quality habitat and increased coverage within 10 km of the Mine.



FIGURE 3.4-2 BEVERLY/AHIAK CARIBOU SEASONAL RANGES, 2024



Survey data included date, time, weather conditions, temperature, cloud cover, observer information, total flight time, and a GPS recorded track. Observation data included UTM coordinates, estimated distance from observers to each group, group size, group composition (where possible), and dominant habitat type. Caribou were classified into “groups” if they could see and react to each other on the tundra, as described in the WMMP, although in practice, groups were made up of tightly packed caribou avoiding insect harassment.

Multiple statistical methods were used to estimate and verify a group size threshold that will ensure mitigation (a Level 4 response) applies to at least 75% of individual caribou that may interact with the Mine. First, the survey-based (empirical) data was summarized to determine how groups of different sizes contribute to the total number of individuals observed via a frequency distribution. The cumulative sum of total individuals recorded was calculated and this number was used to determine the group size at which at least 75% of individual caribou are accounted for. To ensure the empirical estimate was robust, bootstrapping was used to resample the empirical data 100,000 times, then the 75% threshold group size was calculated in each resampled dataset. This resampling allowed for generating a distribution of thresholds with a mean and associated 95% confidence intervals, accounting for potential error.

To validate the results, sensitivity analyses were conducted to explore how the group size threshold estimates were influenced by study design. Data was simulated and thresholds recalculated across a range of sample sizes to evaluate if the existing data were sufficient to provide a robust group size threshold estimate. Given an expected survey bias toward large groups (i.e., they are easier to see than individuals or small groups), how this might affect group size threshold was evaluated by simulating different scenarios that varied detection probability based on group size. These scenarios included equal detection probability across groups and different degrees of reduced detection probability for smaller groups. In each scenario, the data were bootstrapped, then an estimated “true population size” was generated by multiplying all group sizes by the inverse of the detection probability for each group. Wherever detection probability was lower than one, the “true population” size is larger than the observed population, reflecting the fact that surveyors did not see all caribou, as anticipated. Like the prior bootstrapping approach, this allowed comparison of a distribution of group size thresholds with a mean and associated 95% confidence intervals.

Finally, to validate the estimated group size threshold, another bootstrapping simulation was conducted to determine the percentage of individuals anticipated to be subject to mitigation at different potential thresholds. This was conducted by calculating the number of simulations where a given group size would result in mitigation applied to 75% or more of individuals across 100,000 iterations and calculating the percentage of total individuals likely to experience mitigation under each group size threshold.

### 3.5.2 RESULTS AND DISCUSSION

Aerial surveys were completed from July 20 to July 31, 2024. Total survey effort was over 30 hours across 8 days and 12 flights, covering an area more than 5,450 km<sup>2</sup> that centered on the Mine (Figure 3.5-1). A total of 110 groups of caribou were observed and group sizes ranged from one to approximately 6,200 individuals. The total number of animals counted was 34,834; however, this does not represent an accurate number of total number of caribou encountered because some individuals may have been counted on multiple days. The mean group size observed was 317 caribou and across all caribou observations, 45% of observations were of a single animal and 69% contained 10 or fewer individuals.

#### 3.5.2.1 GROUP SIZE THRESHOLD

Based on the raw survey data, a group size of 900 accounted for 75% of the total individuals observed (cumulative sum of all caribou observed; n=34,834). Using the same number of total individuals, 100,000 bootstrapped resamples were conducted to determine a mean group size threshold for 75% of the total individuals and a measure of uncertainty around this estimate. Across 100,000 resamples, the mean group size threshold accounting for 75% of individuals was 1,064, and the median was 900 (Table 3.5-1). The lower bound of the 95% confidence interval for the group size threshold was 600 caribou, representing a conservative option to ensure mitigation applies to 75% or more of caribou individuals encountering the Mine.

**TABLE 3.5-1 SUMMARY OF GROUP SIZE THRESHOLD VALUES FROM 100,000 BOOTSTRAPPED DATASETS**

Mean Group Size Threshold	Median Group Size Threshold	Minimum Group Size Threshold	Maximum Group Size Threshold	Group Size Threshold Standard Deviation	Lower Quantile (2.5%)	Upper Quantile (97.5%)
1064	900	240	6200	402	600	2100

#### 3.5.2.2 SENSITIVITY ANALYSIS

##### Sample Size

While the group size threshold estimate is based on 110 observations, how the threshold changed while varying sample size from 20 to 200 group observation was assessed to evaluate the dependency of the group size threshold estimates on sample size. The group size threshold was higher in smaller samples and decreased as sample size increased, as expected, with the mean and confidence limits of the group size threshold estimate becoming relatively consistent after a sample size of 90 groups was reached. The mean group size threshold was approximately 1,000 and the lower confidence limit was approximately 600 for sample sizes of 90 or higher. The sensitivity analysis suggests the sample size of 110 groups provides a robust threshold estimate.