Appendix 28: 2021 Caribou Trail Camera Study

Meliadine Project

Caribou Trail Camera Study, 2021

January 2022

Project No.: 0605387-3

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January 2022

Meliadine Project

Caribou Trail Camera Study, 2021

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EXECUTIVE SUMMARY

The Meliadine Mine (the Project), owned and operated by Agnico Eagle Mines Limited (Agnico Eagle), is located on Inuit Owned Land (IOL) approximately 25 km north of Rankin Inlet, Nunavut. A 34 km all weather access road (AWAR) connects the Project to Rankin Inlet. During July each year, groups of Qamanirjuaq caribou occur in the Project area, regularly crossing through the Project site and the AWAR.

In 2020 and 2021, a study was conducted using motion-trigger cameras to study caribou interactions with the Project infrastructure during their annual migration, and particularly the AWAR. The study was designed to identify features of the AWAR (i.e., slope, substrate, height, and surrounding habitat) that may facilitate higher rates of caribou passage. Cameras were also placed at locations identified by community members and Inuit Elders from Inuit Qaujimajatuqangit (IQ) where caribou more frequently crossed the road. The survey protocol in 2021 followed that used in 2020, with minor improvements intended to increase the reliability of results.

This study was completed in accordance with the Meliadine Mine Nunavut Impact Review Board (NIRB) Project Certificate (#006) and commitments made by Agnico Eagle to document and assess whether or not caribou movement near the Project Area is affected by Project infrastructure.

Twenty-seven cameras were placed along the AWAR in mid June 2021, and were removed in mid July. Cameras were placed approximately 2 metres west of the AWAR, facing north; and took both timed and motion-triggered photos. Road survey data from 2020 was used and included; height above tundra, width, side-slope, surfacing material (esker vs. quarry rock, and size), and surrounding vegetation type. Four cameras were spaced in quarters along the AWAR and set up facing the road to specifically capture vehicle passage. These cameras were analysed for vehicle traffic.

Overall, the key findings from the camera study included:

- The cameras were successful at capturing many caribou crossing the AWAR, with peak caribou passage occurring one week earlier in 2021 vs 2020, consistent with patterns of inter-annual variability observed in the collar data.

- Caribou crossing timing and locations in 2021 were consistent with locations identified in 2020 and with locations identified by IQ from Inuit Elders and community members. The hotspots identified by the camera data in both 2020 and 2021 aligned more closely with the IQ identified hotspots than the collar data from 2012-2019.

- Road height and road-side slope at each camera location was not related to the number of caribou observed with each camera, suggesting that differences in the structure of the AWAR road was not influencing the locations where caribou cross the road. Alternatively, since the structure of the road is relatively uniform along its length, there may not be enough difference in the shape or profile of the road to influence which sections of the road caribou prefer to cross.

- More caribou were observed on cameras on the northern half of the road. Esker material is more common as a substrate on the northern half of the road which may suggest caribou prefer crossing on esker material. However, this may be an artifact of a sampling bias in the data.

- All recorded caribou crossings occurred between 5 minutes and 8.75 hours of a vehicle passing, with an average of 1.3 hours. The type of vehicle (heavy vehicle, light truck, or quad) had no apparent effect on the lag time to caribou crossing. Vehicle results should be treated with caution, as caribou may pass behind a camera or out of range of the camera motion detector, and therefore not all caribou crossings will be captured.

These results highlight the power of using motion-trigger cameras to draw connections between the many interacting variables that may explain caribou passage through the Project area. Overall the results

suggest that caribou are not affected by the structure of the road, but spatial differences in road crossing locations may be explained by sampling bias, traffic, timing, migratory route fidelity, or some combination of all of these. Additional data collection will help confirm any effects, particularly in the southern section of the road which was inaccessible in 2020 and 2021,

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ACRONYMS AND ABBREVIATIONS

Agnico Eagle	Agnico Eagle Mines Ltd.
ATV	All-terrain vehicle
AWAR	All weather access road
BQCMB	Beverly Qamanirjuaq Caribou Management Board
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
GN	Government of Nunavut
GNWT ENR	Government of Northwest Territories Department of Environment and Natural Resources
IOL	Inuit-owned land
IQ	Inuit Qaujimajatuqangit (Inuit Traditional Knowledge)
m	Metre
NIRB	Nunavut Impact Review Board
NWT	Northwest Territories
TEMMP	Meliadine Mine Terrestrial Environment Management and Monitoring Plan
The Project	The Meliadine Mine

1. PROJECT OVERVIEW

The Meliadine Mine (the Project), owned and operated by Agnico Eagle Mines Limited (Agnico Eagle), is located on Inuit Owned Land (IOL) approximately 25 km north of Rankin Inlet, Nunavut. A 34 km all weather access road (AWAR) connects the Project to Rankin Inlet. A bypass road was constructed to the west and south of Rankin Inlet to allow mine traffic to circumvent the hamlet when traveling from the AWAR to the Project marine laydown (Figure 1-1).

The Meliadine Mine was approved with a life of mine plan that includes production from five ore bodies by the Nunavut Impact Review Board (NIRB) in 2015 (Project Certificate #006). The mine plan includes open pits, underground mining and associated ore processing, waste management and ancillary infrastructure. Construction of the AWAR, camp, ore processing facilities and ancillary infrastructure began in 2017 and production from the Tiriganiaq deposit began in Q2 2019. The remainder of the orebodies are planned throughout the life of the Meliadine complex. In 2019, the Meliadine Mine NIRB Project Certificate (#006) was amended to include discharge of saline effluent to the marine environment via diffuser at Itivia Harbour and to convey via truck saline effluent along the AWAR to Itivia Harbour (i.e., Melvin Bay).

A caribou motion-trigger camera study was conducted in June and July 2020 and 2021 at the Meliadine Mine and AWAR in support of existing NIRB monitoring conditions as outlined in Project Certificate No.6.

1.1 Terrestrial Environment Management and Monitoring Plan

The Meliadine Mine 2015 Project Certificate and 2019 Project Certificate Amendment from the NIRB, Term and Condition 57 requires the Project to report in its annual NIRB report:

> "(T&C 57, c.) Demonstration and description of how the monitoring results, including the all-weather access road and associated access roads/trails contribute to cumulative effects of the project."

The Meliadine Mine Terrestrial Environment Management and Monitoring Plan (TEMMP; Agnico Eagle 2020) is designed to meet this condition, with a road surveillance monitoring program (Section 4.3) that has the following objective:

> "To record the presence of wildlife and/or wildlife signs (e.g., tracks, nesting) in relation to the Mine infrastructure. Of particular importance is the frequency of wildlife entering the Mine infrastructure areas and along the AWAR corridor. This information can then be used to determine any areas of attraction to wildlife, document human-wildlife conflicts, areas/timing of wildlife mortality or potential mortality; seasonal trends of wildlife occurrence in the Project area, and effectiveness of mitigation (e.g., waste management and landfill)."

The caribou camera program described in this report is designed to be complementary to the objective of the caribou collaring program (TEMMP Section 4.7), which is:

■ To contribute to the scientific knowledge of caribou activity near mining operations and caribou population dynamics in Nunavut; and

■ To assess whether caribou movement near the Project Area is hindered by Project infrastructure (i.e., mine site infrastructure and AWAR).
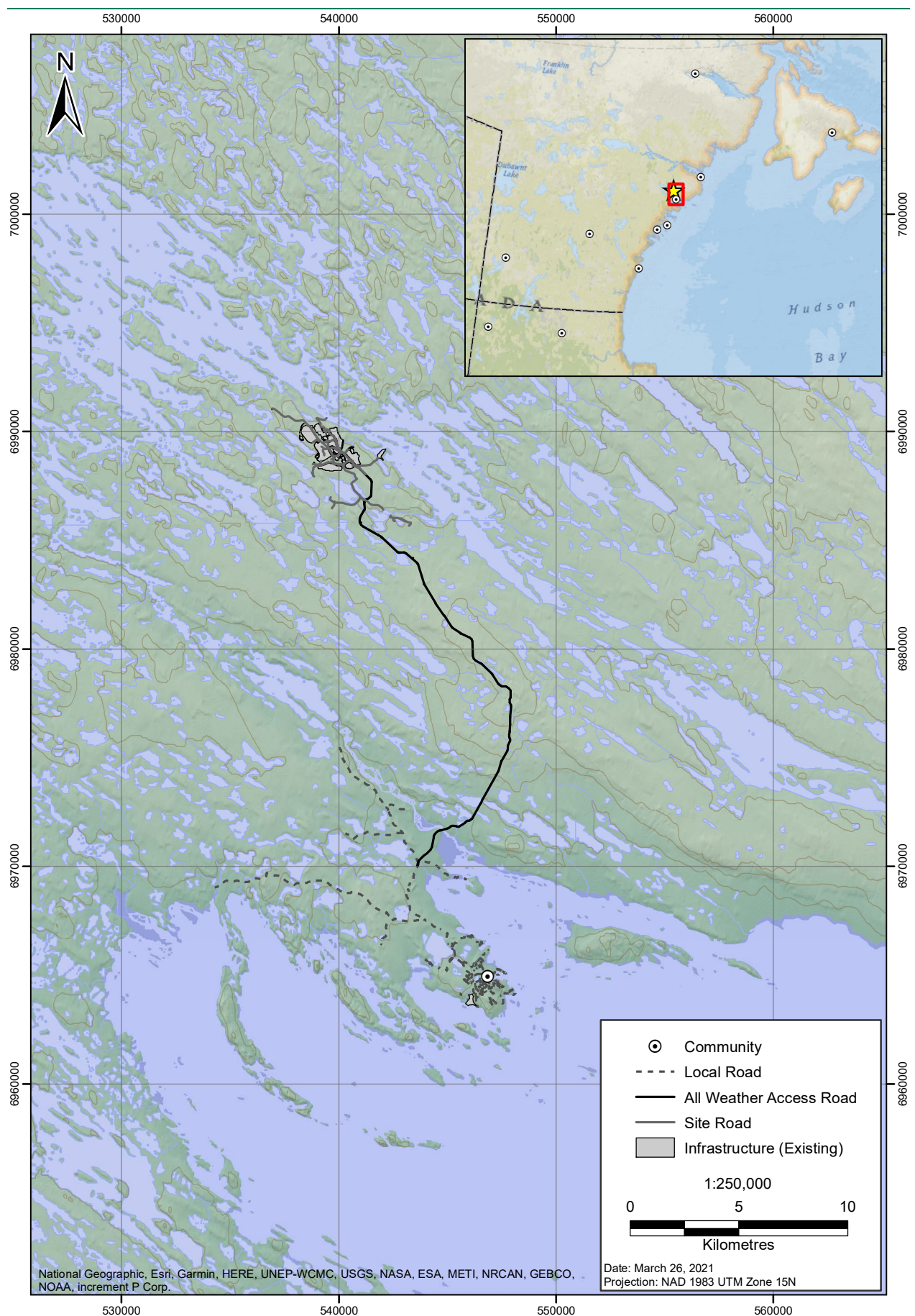
Figure 1-1:   Meliadine Gold Project Location

2. STUDY OBJECTIVES

The objectives of the 2021 study were:

- To conduct a study using motion-trigger cameras at the Project site to estimate how the AWAR and site infrastructure contribute to cumulative effects of the project on caribou.

- To evaluate if there were specific locations with high numbers of caribou observations along the AWAR in 2021, and compare these locations with 2020 camera data, and with those identified by Inuit Qaujimajatuqangit (IQ) and collar data.

- To use the information on road crossings to determine what road features are preferred by caribou for crossing, specifically:

  - Material of road construction (esker vs. quarry);

  - Side slope;

  - Road height; and

  - Surrounding vegetation type.

- To evaluate what relationship (if any) there is between vehicles recorded on the road and location/timing of caribou observations.

3. BACKGROUND

3.1 Qamanirjuaq Herd

The Qamanirjuaq caribou herd is a large caribou herd numbering approximately over 200,000 animals in 2017, down from over 300,000 animals reported in 2008 (COSEWIC 2016). The herd range is centered in south-eastern Nunavut. The herd range stretches approximately 1,000 km from Chesterfield Inlet in the north to northern Manitoba in the south, and from Hudson Bay on the east to eastern Northwest Territories and north-eastern Saskatchewan in the west (BQCMB 2020a).

The Beverly and Qamanirjuaq Caribou Management Board (BQCMB) has rated the Qamanirjuaq herd as having Medium vulnerability in 2014 due to continued population declines since 2008 (BQCMB 2014) and upgraded this rating to Medium-High in 2016 (BQCMB 2016).

The herd generally winters below the treeline in northern Manitoba, Saskatchewan and the adjoining areas of Northwest Territories (NWT) and Nunavut. Spring migration is north along the coast of Hudson Bay, past the communities of Arviat, Whale Cove and Rankin Inlet to a broad calving ground generally centered on Qamanirjuaq Lake (BQCMB 2020a).

Following calving, the caribou form into large groups and radiate out from the calving grounds, including east towards the coast. During July, large groups of animals from this herd interact with the hamlet of Rankin Inlet, the Meliadine Mine and the AWAR connecting the two.

During summer and fall, the caribou generally move south and inland, gradually returning south towards their wintering areas by early December. Maps of the caribou range and movement are available on the BQCMB website (https://arctic-caribou.com/resources).

4. STUDY AREA

The dominant terrain in the Project area comprises glacial landforms such as drumlins (glacial till), eskers (gravel and sand), and lakes. A series of low relief ridges are composed of glacial deposits, oriented in a northwest-southeast direction, which control the regional surface drainage patterns. The property is approximately 60 metres (m) above sea level in low-lying topography with numerous lakes (Final Environmental Impact Statement; Agnico Eagle 2015).

The study area for the camera study included the existing Project footprint of the Meliadine Mine site and the AWAR.

5. METHODS

5.1 Camera Field Study

During 2020, AEM acquired Bushnell Core HD Low Glow motion-trigger cameras, which were installed along the AWAR and around the mine site. In 2021 the study was repeated with a focus on the AWAR and modifications to the survey design to better capture vehicle traffic. The cameras were programmed and installed in mid-June by a wildlife biologist from ERM and a Meliadine Environment technician, two weeks prior to the predicted arrival of caribou in the area. The ERM wildlife biologist maintained the cameras for the duration of the study and disassembled the cameras and setup in late July when the study ended.

Camera locations were selected to maximize coverage and representation of habitat and road types, and to best detect caribou and vehicles (Figure 5.1-1). The same locations were used in 2020 and 2021:

- Twenty-seven single cameras were installed at a spacing of 500 m to 1,000 m, starting from the gatehouse at KM 8 of the AWAR, and ending at the mine site at KM 30 of the AWAR. Cameras were not installed further south than the gatehouse due to COVID-19 protocols in place in 2020 and 2021.

- Through previous consultation and community meetings community members and Inuit Elders identified locations on the road where caribou are known to cross more frequently, including at KM 9, 12, 16, 22, and 27 (Public Meeting; Rankin Inlet, March 17, 2020). Cameras were placed at or near these locations.

- The camera locations were stratified by road structure, with approximately half of cameras placed in areas where the road shoulder was esker material and half where the shoulder was quarry rock. Locations were also selected to have equal representation of steep and flat road shoulders.

- All cameras were installed on the west side of the road facing north with the road in the camera field of view on the right side of images. In 2020, cameras were located up to 15 m from the road, whereas in 2021 cameras were place no more than 5 m from the side of the road in order to better capture vehicle traffic.

During camera setup, the surrounding habitat type, road structure, and GPS location were recorded. If any ATV trails or caribou trails were detected near the camera site, these were noted. The coordinates for the road cameras were used to calculate the distance to the mine and to Rankin Inlet along the AWAR.

Cameras were installed at a height of 50 centimetres, which was determined to be the optimal height for detecting movement of a passing caribou (ERM, unpublished data). Cameras on the AWAR were positioned to capture part of the road in the field of view. In 2020, cameras were not explicitly set up to capture vehicle traffic, but in 2021 cameras were placed closer to the road (no more than 5 m) to capture traffic. Four cameras spaced in quarters along the AWAR were set up facing the road to specifically capture vehicle passage. These cameras were analysed for vehicle traffic.

The installation setup was a simple bucket-and-stick design, where the camera was strapped onto a 2" × 4" piece of lumber that was stabilized in a bucket full of quarry rock (Photo 5.1-1). This setup was designed to be temporary and to minimize impact on the ground where it was placed. When the cameras were removed at the end of the study, all setup materials were returned to the Mine Site.
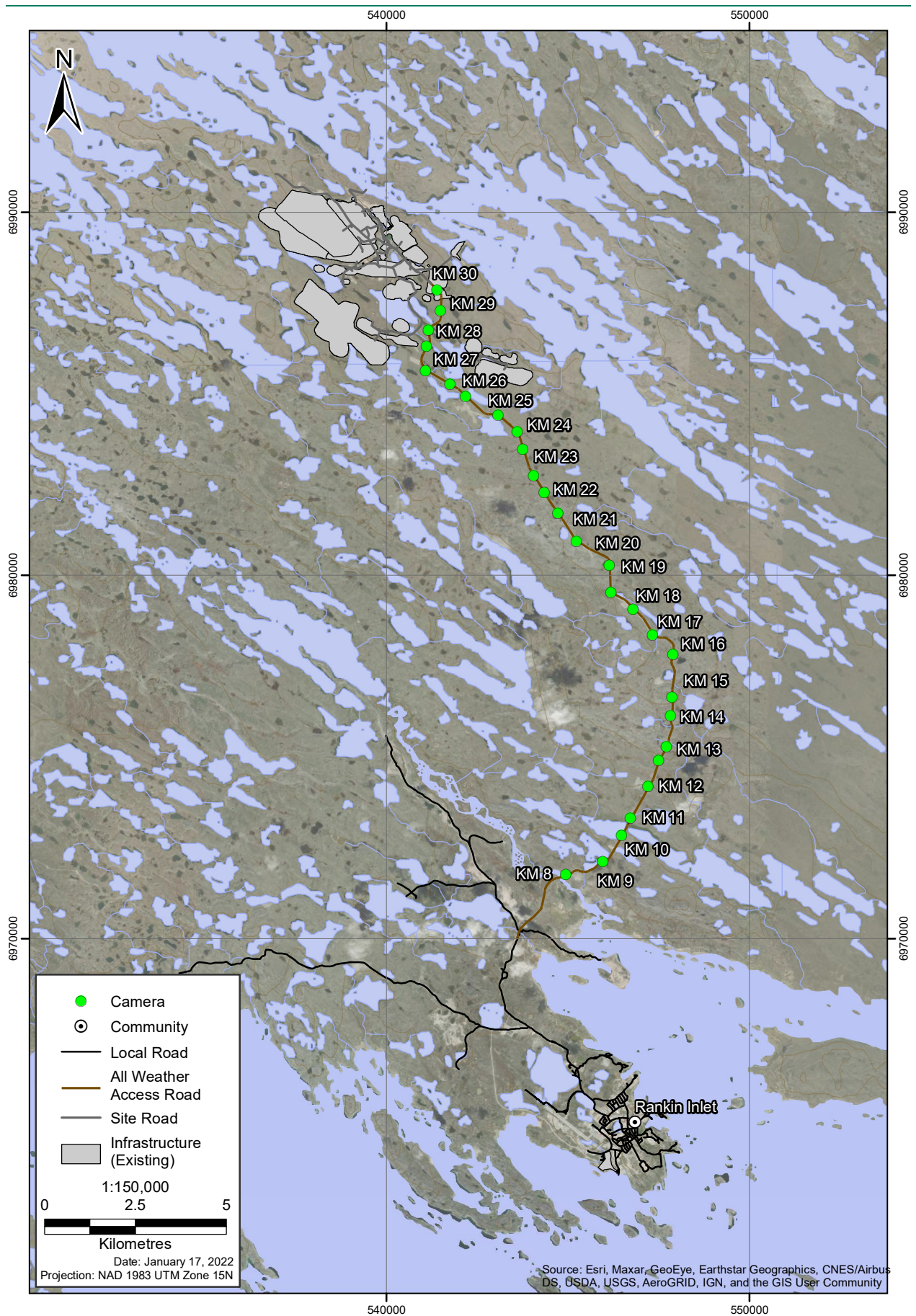
Figure 5.1-1: Locations of Motion-Trigger Cameras in July 2021

Photo 5.1-1: Typical camera setup from the Meliadine 2021 Study.

All cameras took pictures whenever motion was detected within 40 m of the motion detector, including wildlife, vehicles, and occasionally objects moving in the wind. In addition, all cameras were programmed to take one photo every thirty minutes, day or night. This was done for two reasons: 1) to help capture activity happening beyond the range of the motion detector, and 2) to provide assurance that the cameras were operational during the entire duration of the study (measure effort). The cameras were checked after one week to ensure battery life, SD card space, and positioning was still adequate. Throughout the duration of the study, field technicians and the ERM field biologist regularly checked the cameras to ensure they were still in place.

5.2   Road Structure Field Study

In 2020, additional surveys were conducted on the as-built AWAR to help address the objective of determining whether there are road characteristics that caribou prefer to cross on. The results of this survey were used in both the 2020 and the 2021 analysis.

An ERM wildlife biologist and Meliadine environment technician surveyed the road structure, taking the measurements every 100 m along the road, including:

■   GPS location;

■   Width of the road (m);

■   Height of the road above the tundra (m);

- Road-side slope angle – measured with an inclinometer (east and west side);

- Road-side material (esker or quarry stone);

- Substrate grain size, i.e., the area of the roadside shoulder covered by <0.75 inch, 0.75 to 6 inch, 6 to 12 inch, and >12 inch stones (measurement standards used by road engineers); and

- Surrounding habitat features.

5.3   Photo Processing

ERM personnel reviewed all photos from the cameras and recorded every detection from wildlife. A detection is an event where an individual or group triggers the camera. There can be one photo or many photos in quick succession, depending on how long the caribou were in front of the camera. Hence, one detection may have many individual caribou.

Data recorded for each wildlife detection event included:

- The time of the first photo;

- The species of wildlife;

- The number of individuals in the group; and

- For events where multiple photos were captured, the duration of the motion-trigger event.

Vehicle traffic was also recorded on four cameras. Data recorded on each vehicle detection included:

- The time of the photo;

- The type of vehicle; and

- Whether the vehicle was travelling in a convoy or not.

5.4   Data Analysis

The analysis in this report was designed to quantify trends in the study data and determine whether factors such as road structure, vehicle traffic on the road, or placement of the cameras could be used to explain caribou occurrence and identify "hotspots" where caribou were likely to cross.

An initial exploratory analysis was conducted to visualize the data and determine the appropriate method for analyzing the data. Where data were complete, generalized linear models (GLMs) were used to assess the differences in the number of caribou detection events as a function of various controlling variables, including road structure and the occurrence of vehicle traffic. This regression framework provides a means to control for habitat, environmental variables, repeated measurements, and spatial correlation. For some comparisons in which statistical models were not useful due to a small sample size, summary statistics and correlations were calculated. This included the comparison of collar data to camera data by kilometre of roadway. Analyses were carried out using program R version 3.6.3 (R Core Team 2017).

6. RESULTS AND DISCUSSION

6.1 Field Work

In total, 27 cameras were deployed on June 23 and 24, 2021, and were removed on July 13, 2021. This amounted to more than 540 trap-nights and ~100,000 photos. More than two-thirds of all photos were from timed photos, most of which did not contain wildlife or vehicles. The remainder were from motion-triggered events. Of the 27 cameras deployed, one was unsuccessful due to a programming malfunction.

The study concluded on July 12, 2020, when caribou had not been observed for several days at or near the Project and collar data indicated that they were not expected to return. Cameras were removed and the setup was disassembled. It should be noted that several large groups of caribou were observed crossing the southern portion of the road near Rankin Inlet after July 12, after the cameras had been removed. Collar data indicated that there were likely two to three days of data that were not captured by the cameras as a result of this, but that the majority of the migration had been captured.

6.2 Caribou Distribution Relative to the AWAR

One of the objectives of this study was to evaluate if there were specific locations with high numbers of caribou observations along the AWAR in 2021, and compare these locations with those identified in 2020 and with collar data and IQ.

Of the 358 independent wildlife detection events from the cameras in 2021, more than a third were from caribou (Table 6.2-1). The first observations of caribou occurred on June 27, 2021, which was consistent with the collar data and observations of caribou from site personnel who were conducting wildlife surveys. Caribou detections peaked from June 29 to July 2, with 38 detection events and 1,654 adult caribou recorded across all cameras on July 1 (Figure 6.2-1). This was approximately one week earlier than peak caribou detections in 2020, which occurred from July 4 to 9, 2020 (Figure 6.2-1). This finding is consistent with patterns of inter-annual variability observed in the collar data.

Table 6.2-1: Wildlife Detections across All Cameras

Wildlife Type	Number of Camera Detections in 2020	Number of Camera Detections in 2021
Arctic Fox	13	14
Arctic Ground Squirrel	3	8
Arctic Hare	4	4
Caribou	91	128
Gull	12	11
Raptor	1	2
Sandhill Crane	6	28
Songbird	23	17
Uncategorized Bird	35	110
Unknown	1	0
Waterfowl	51	30
Uncategorized Mammal	0	6
Total	**240**	**358**

Note: Detections may be from motion-triggered photos or from timed photos. For consistency, results from off-site cameras in 2020 were not included in these results.
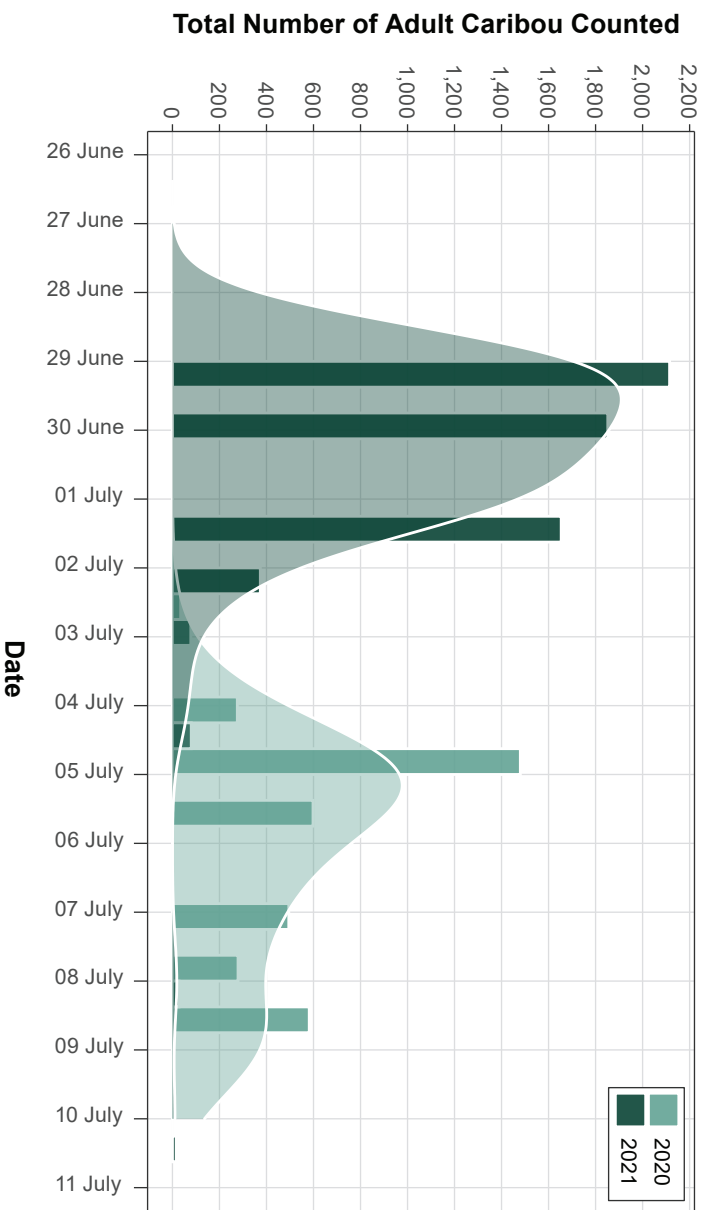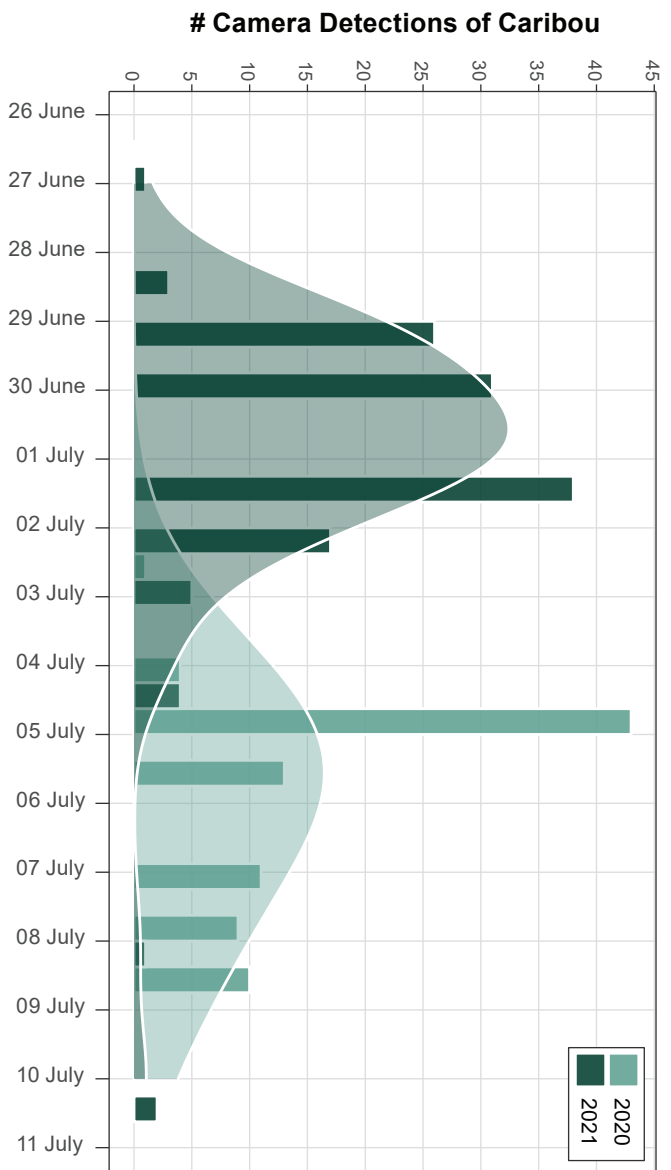
Figure 6.2-1: Caribou Detections across All Cameras by Date

After the peak, caribou were detected less frequently and smaller groups every day until July 12, when most of the cameras were demobilized. Caribou were detected in 25 of 27 cameras (93%) in 2021, compared to 73% of road cameras in 2020. More caribou were detected overall in 2021. Most caribou observations were concentrated in the northern half of the AWAR (Figure 6.2-2), but as noted in Section 6.1, caribou may have been near the southern half of the AWAR after July 12.

Time of day was not related to the number of caribou detections, although there was some evidence that caribou were detected more consistently during the day (09:00 to 21:00) than at night in 2021 (Figure 6.2-2). The same trend was not noted in 2020.

Overall, the results suggest that the span from KM 22-24 was a major crossing area in 2021, with 27% of all crossings recorded at KM 22 (Figure 6.2.3). The major caribou crossing locations identified by Elders and community members in March 2020 are at KM 16, 22, and 27. The results from the 2021 cameras are consistent with these crossing locations.

A comparison between the camera data from 2020 and 2021 and collar data from previous years (2012-2019) is shown in Figure 6.2-3, where values for each kilometre segment of the road are expressed as the proportion of total crossing events that occurred in that segment. This comparison was done to identify potential hotspots for caribou crossing and test whether there is any consistency across years and between data types. The extent of agreement between the hotspots identified in the two datasets can be measured by testing the correlation: an index of linear relationship between variables. A correlation value of 100% would indicate that the number of crossings per km in the camera data are identical to the number of crossings per km in the collar data. A correlation value of 0% indicates there is no similarity between the locations identified in the two datasets.

The camera data from 2021 shares a 40% similarity with the camera data from 2020, with both datasets showing relatively high numbers of crossings between KM 22 and 24 (an IQ identified section) and few crossings in the southern portion of the road. In 2021 fewer crossings occurred near KM 27 and KM 16, two locations identified by Elders that were more heavily frequented in 2020 (Figure 6.2-3).

The collar data collected by the GN over 2012-2019 is most similar to the camera data from 2020. Both the collar data and camera data suggest that caribou have preferred crossing locations that are generally consistent (within ~1 km). Removing the southernmost 7 km of the AWAR from the analysis increases the correlation between the camera data and the collar data from 12% to 63%, which aligns with the notion that the camera data from the southernmost section of the AWAR were incomplete in both 2020 and 2021 due to the cameras being removed before caribou completely left the area.

Overall, the hotspots identified by the camera data in both 2020 and 2021 aligned more closely with the IQ identified hotspots than the collar data from 2012-2019. This makes sense as only a small fraction of caribou are collared, and therefore crossing locations identified from collar data are far more subject to random chance. Some inter-annual variation is expected and may also help explain the differences noted between IQ, camera data, and collar data.

The results from two years of camera studies suggest that cameras are a far more effective way of capturing road crossings than collar data, as the average number of road crossing events in the collar data was only 20 individuals per year, with a maximum of 62 individuals crossing 2018. Assuming that the number of caribou interacting with the AWAR is relatively stable year to year, then the 91 and 128 caribou detection events captured on the AWAR cameras in 2020 and 2021 (respectively) represent a more than 540% increase from the average collar rate. This is important as it suggests that preferred crossing locations may be only partially detected by collar data. A systematic camera study has the critical advantage that it not only detects where caribou *are*, but also where they *are not.* This, in combination with the fact that camera placement can be controlled for road characteristics, makes it possible to test for the association between caribou detections and road characteristics. This is simply not possible with collar data. In addition, the hotspots identified by the camera data aligned more closely with the IQ identified hotspots than the collar data.
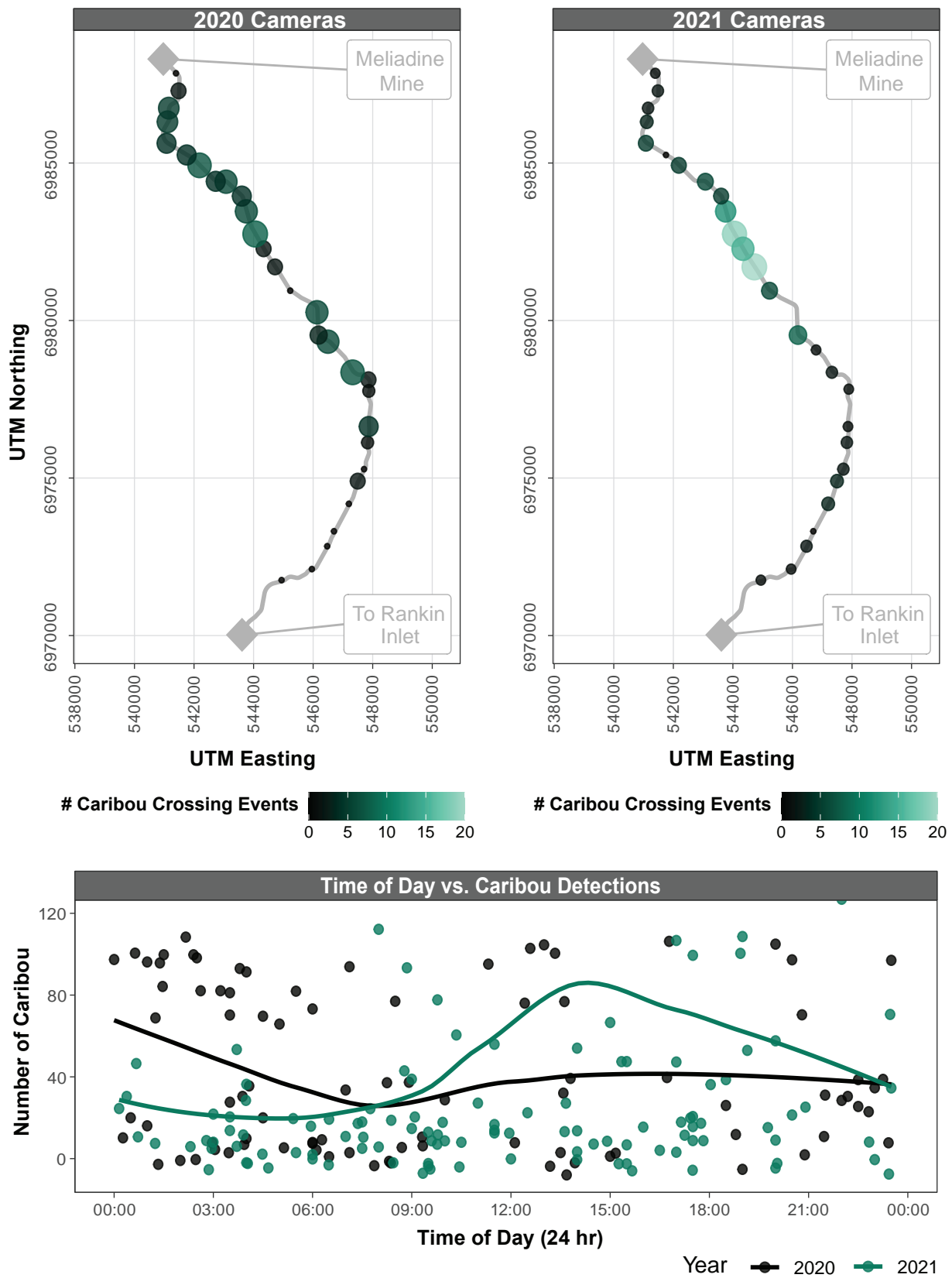
Figure 6.2-2: **Distribution of Caribou Detections on Cameras and Time of Day of Detections**

Figure 6.2-3: **Comparison of Road Crossing Locations from Cameras (2020 & 2021) and From Collar Data (2012-2019)**
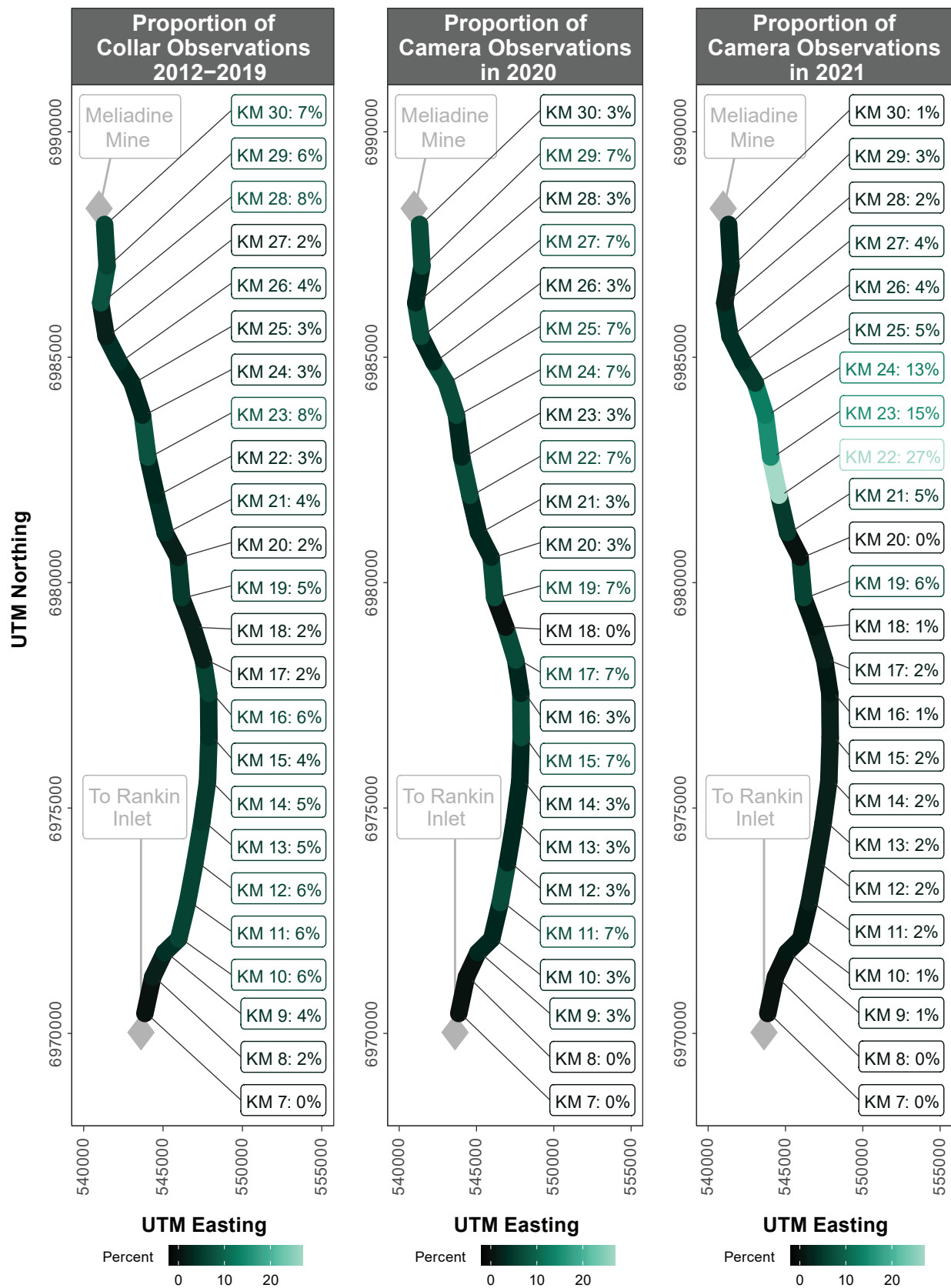
Note: "proportion" indicates the proportion of caribou detections in each 1 km segment out of the total count of detections on the AWAR for that dataset. Crossing locations identified by Inuit Qaujimajatuqangit (IQ) are at KM 9, 12, 16, 22, and 27.

6.3   Road Structure Survey Results and Caribou

The next objective for this study was to use the information on the number of road crossings at each camera to determine if caribou prefer particular road conditions for crossing, specifically: material of road construction (esker vs. quarry); side slope; road height; and surrounding vegetation type.

In 2020, road surveys for structure and substrate type were completed every 100 m along the length of the AWAR from KM 8 (at the gatehouse) to the mine entrance at KM 30, totalling 210 surveys. The results of these surveys are presented in Figure 6.3-1. Road structure was generally consistent, with 88% of the roadside slope measurements falling within the "moderate" category (3.7:1 to 1.7:1 or 15-30 degrees), and only 6% classified as steep (<1.7:1 or 30 degrees). Similarly, 92% of road height measurements were either low (<1 m from the tundra; 48%), or moderate (between 1-2 m from the tundra; 44%). The maximum road height measured was 4.9 m, but this value represented an outlier as it was measured on a bridge ramp.

The surveys indicated there was a higher proportion of road with esker as the substrate material in the northern two-thirds of the AWAR, and a higher proportion of quarry rock as the substrate material in the southern third of the AWAR (Figure 6.3-1). This was likely because there is a large esker at approximately KM 18 that was used to construct the majority of the northern part of the road. There was also a higher proportion of lowland habitat in the southern third of the AWAR.

The road structure at the site of each camera was compared with the number of caribou detected in 2021 (Figure 6.3-2). Neither slope nor road height was correlated with the number of caribou detected crossing the road, as evidenced by the flat GLM line fitted to the data. This may be due to the lack of variability in road height and slope along the length of the AWAR – the majority of the road had moderate side slope and low height. These results are consistent with the results of the 2020 camera study.

Caribou did appear to cross the road more readily where esker material was the substrate vs. quarry rock, but quarry rock was concentrated in the southern portion of the road where the cameras were removed first. This suggests that the apparent preference by caribou of esker over quarry rock may be an artifact of the data, and not a true effect. When only the northern two-thirds of the roadway was included in the analysis, no difference was found between esker and quarry rock and caribou detections. The presence of a higher proportion of lowland habitat in the southern portion of the AWAR, which includes marshes and lakes, may have also reduced the number of locations where caribou are likely to cross. The same trend was noted in 2020, when the camera survey also incomplete in the southern section of the road.

Figure 6.3-1: Road Structure Survey Results
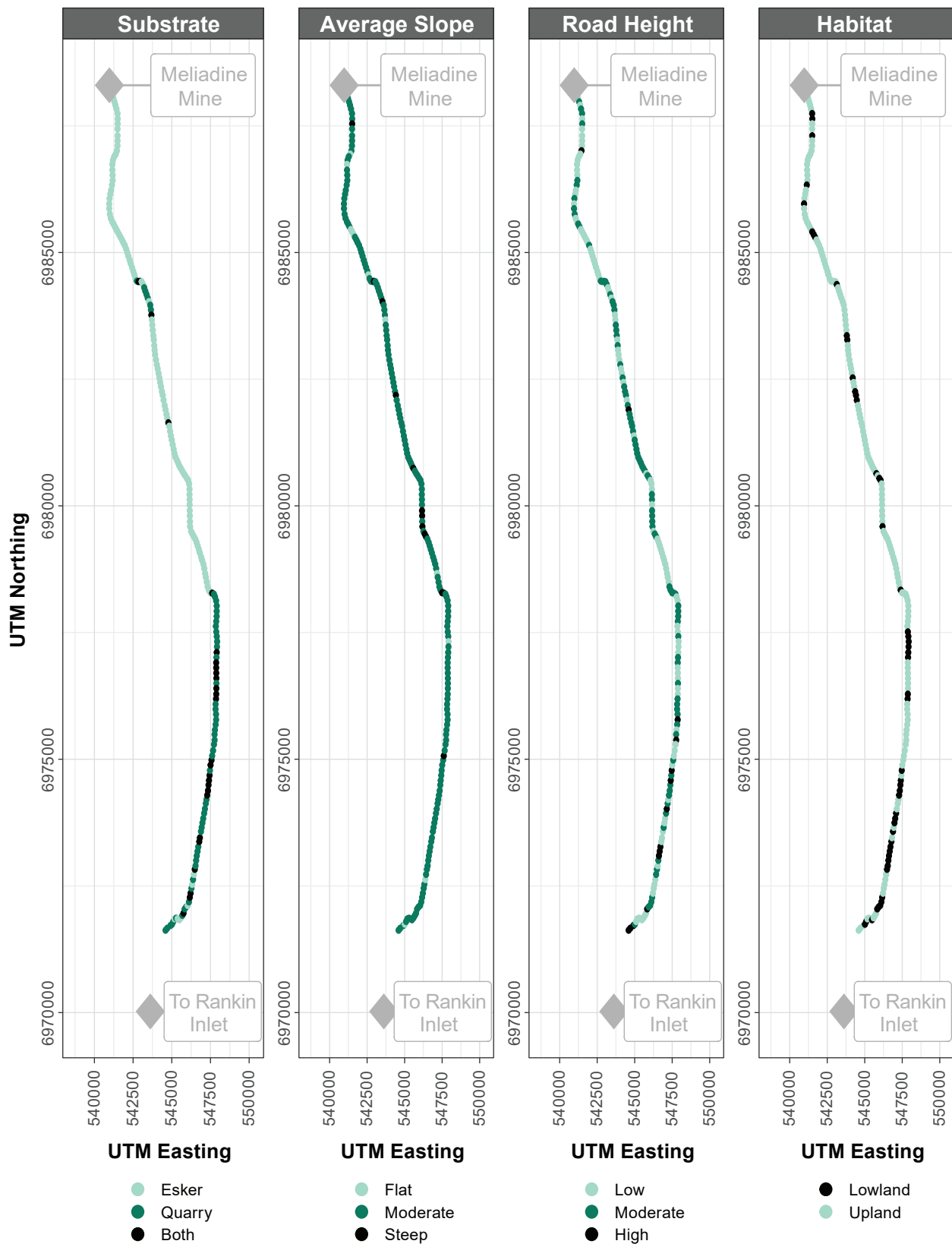
Note: Flat slope is < 15 degrees or 3.7:1; moderate slope is 15-30 degrees or 3.7:1 - 1.7:1; and steep slope is >30 degrees or 1.7:1
Low height is < 1 meter; moderate height is 1-2 meters; and high height is >2 meters
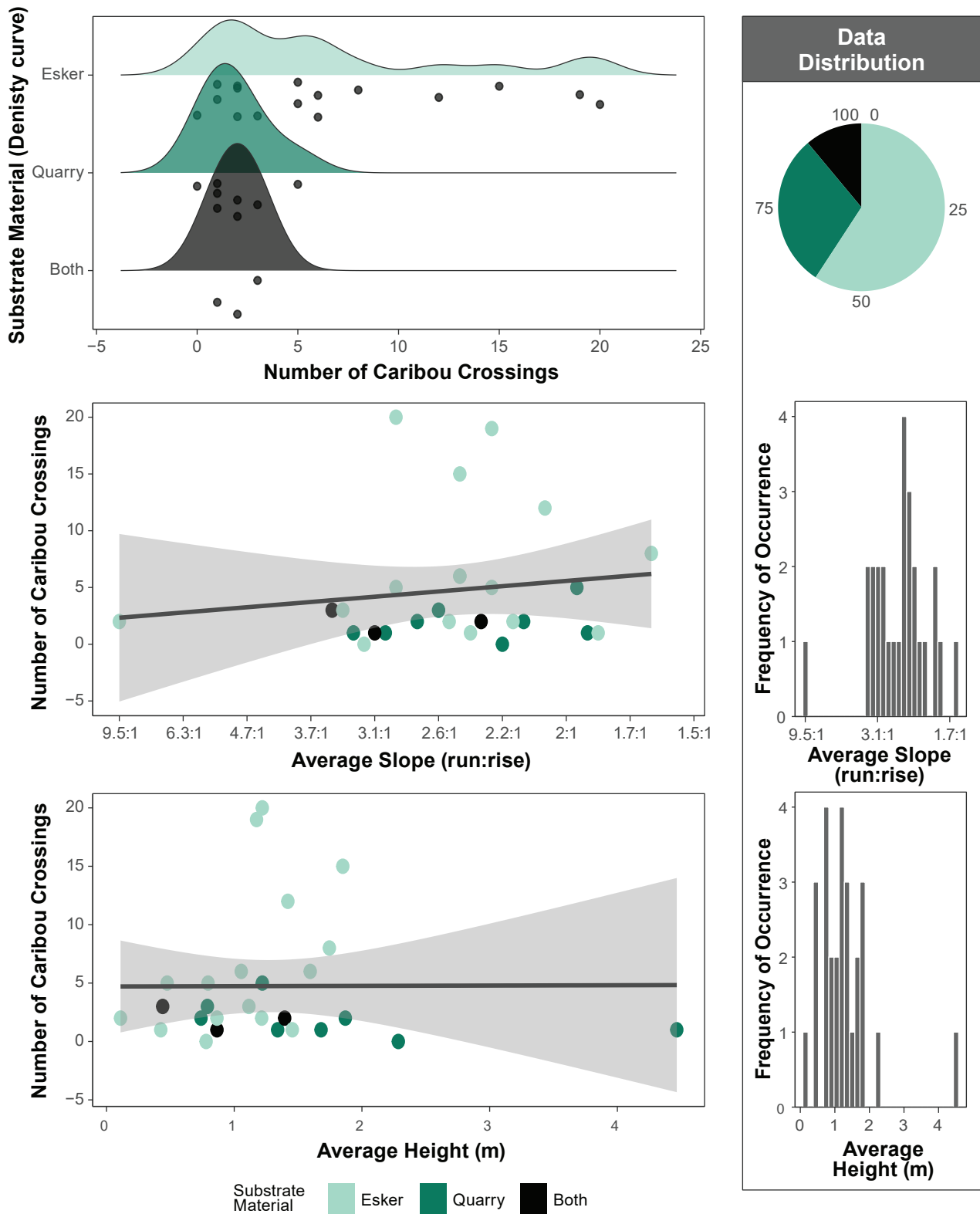
Figure 6.3-2: Comparisons of Road Structure and Caribou Detections

6.4   Vehicle Detections on the AWAR and Caribou

In 2021, the cameras were angled to better capture vehicle traffic on the road, based on lessons learned in 2020 when vehicle traffic was only captured incidentally. Because each camera had hundreds of vehicle triggers, it was decided that only four cameras would be processed for vehicle traffic, one for each quarter section of the AWAR. A summary of vehicles detected on those four cameras is presented in Table 6.4-1. The number of vehicles detected in each of these cameras was consistent (Figure 6.4-1), particularly for heavy vehicles, which are more likely to travel the entire length of the AWAR than light trucks and quads.

Table 6.4-1: Vehicle Detections across the Four Cameras Processed

Vehicle Type	Vehicle	Average Number of Detections Across Cameras	Proportion of Total Detections (%)
Heavy Vehicle	Ambulance	6	0.33
	Box Truck	63	3.24
	Cement Truck	2	0.08
	Flatbed Truck	62	3.23
	Forklift	2	0.1
	Front Loader	2	0.08
	Fuel Tanker	74	3.8
	Grader	21	1.1
	Haul Truck	7	0.38
	School Bus	177	9.15
	Tractor Trailer	268	13.86
	Water Truck	36	1.86
Light Truck	Pickup Truck	525	27.13
	Service Truck	5	0.28
Quad	Motorcycle	5	0.24
	Quad	680	35.13
Total		**4788**	**100**

The three primary groups of vehicles (quads, pickups and heavy vehicles) exhibited slightly different patterns of observations:

■   There were notably more quads in the southern section of the road compared to the northern section. This is consistent with a scenario of people traveling out from Rankin Inlet and either stopping along the road, or turning off to side trails and cabins along the road.

■   Pickup trucks are relatively consistent between the three northern cameras, but fewer were detected at the southern camera. This is consistent with a scenario where most pickup trucks are based at the mine site, with some stopping along the road to conduct surveys or road checks.

■   The number of heavy trucks was consistent across all four cameras, with only small differences which may be attributable to error in detection by cameras. This is consistent with heavy trucks primarily hauling fuel and equipment from Rankin Inlet to the mine site and not stopping along the road.
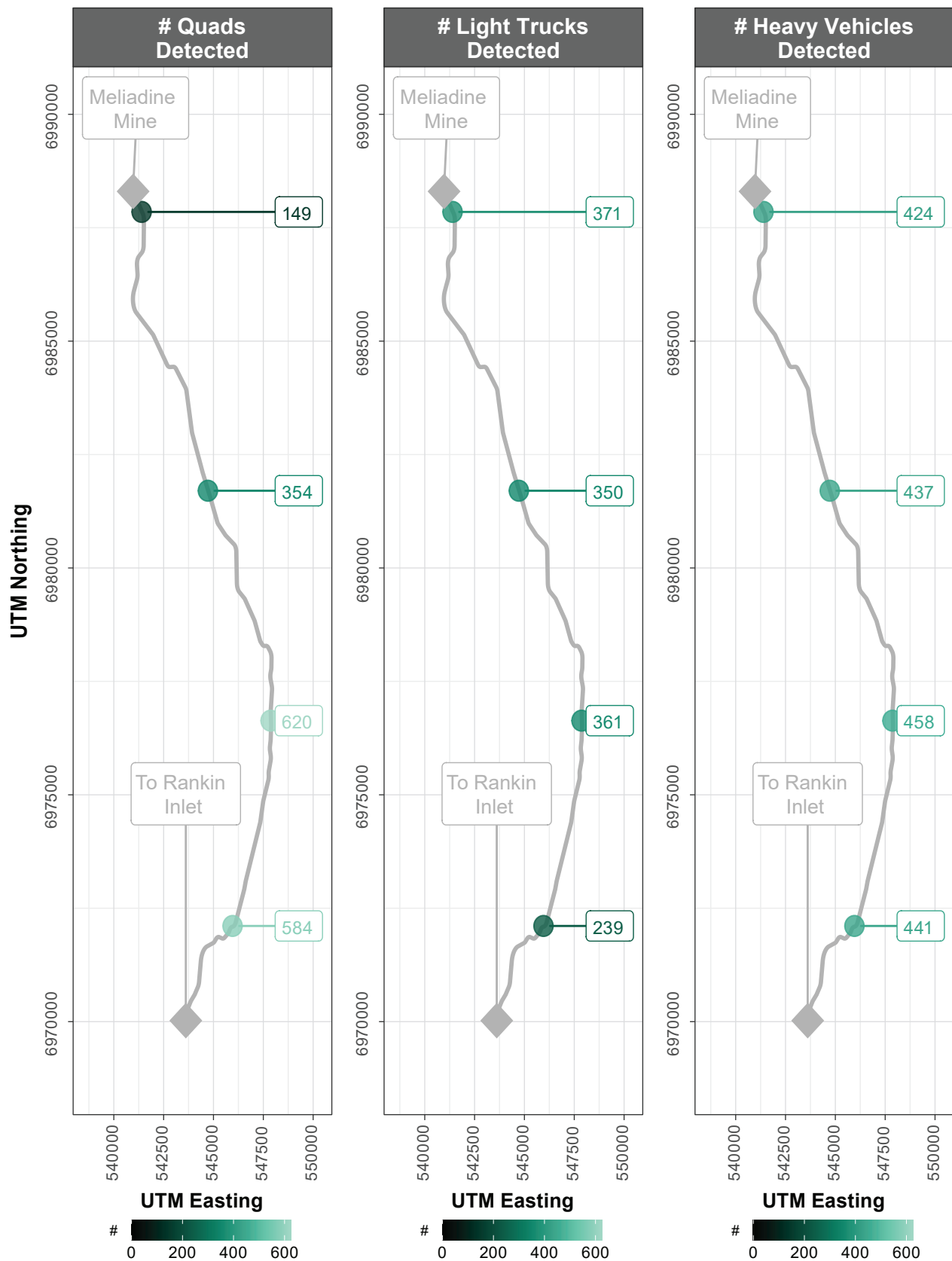
Figure 6.4-1: Number of vehicle detections on the AWAR by vehicle type

Note: Only cameras with >500 vehicle detections included.

For the four "vehicle cameras" processed, the time between a vehicle passing and caribou crossing – or lag time – was calculated. Caribou crossings from any camera within 1 km of the vehicle camera were included, under the assumption that vehicles detected on a vehicle camera would be detected on nearby cameras within plus or minus five minutes and therefore caribou would detect those vehicles at a similar time at nearby cameras. It was also assumed that if caribou were photographed within 5 m of the road, where the camera was placed, then they crossed the road.

There were 43 instances where caribou crossed the road after a vehicle was detected. The mean lag time to crossing was 1 hours 18 minutes, and the median lag time was 50 minutes (Figure 6.4-2). The maximum lag time was 8 hours 45 minutes, occurring after a passing pickup truck. A breakdown by vehicle type suggests that the type of vehicle (heavy vehicle, light truck, or quad) did not have an effect on the lag time to caribou crossing, with the highest mean lag time (1 hour 26 minutes for light trucks) being only 14 minutes different from the lowest mean lag time (1 hour 12 minutes for quads).

During the peak caribou movement period, much of the Project vehicle traffic on the AWAR occurred within convoys of three or more vehicles, usually with several heavy vehicles flanked on each side by a pick-up truck. Only one instance was captured of caribou crossing the road following a convoy. In that instance, the lag time to cross the road was 2 hours and 34 minutes. The relative lack of data points following convoys can most likely be attributed to the fact that during the peak caribou movement period, traffic was substantially reduced.

These vehicle results should be treated with caution, as caribou may pass behind a camera or out of range of the camera motion detector, and therefore not all caribou crossings will be captured. As we are reasonably certain that most or all passing vehicles were captured on camera, these estimates of lag time are likely over-estimates, but provide a conservative place to start assessing the behavioural impact of passing vehicles.

The important take-away from this analysis is that the time between a vehicle passing and caribou crossing the road is on the order of minutes to a few hours, not many hours or days. This suggests that caribou, during June and July, on this road and with the type of traffic observed, are willing to cross the road during relatively short pauses in traffic.
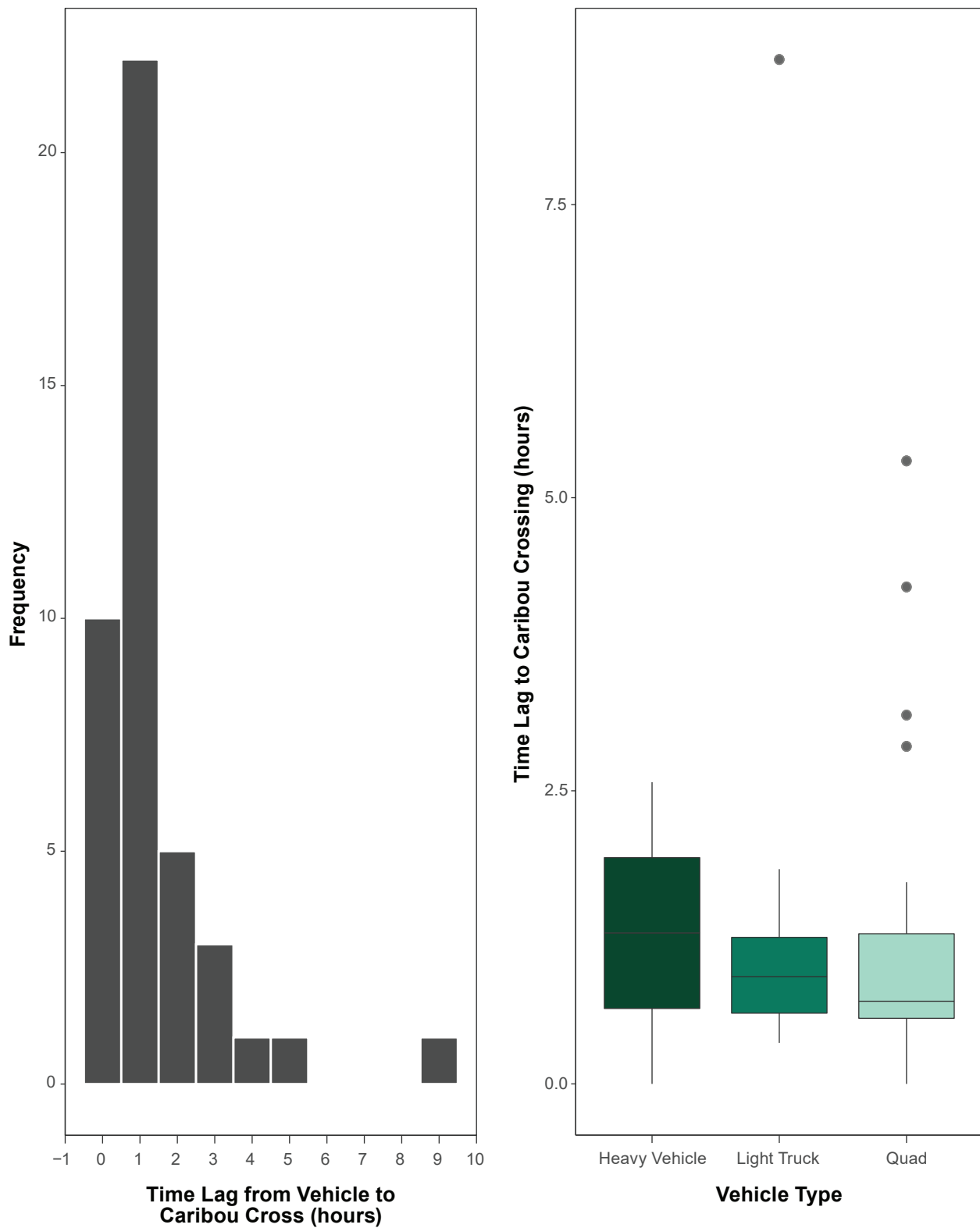
Note: The midpoint represented on the boxplot is the median value, not the mean.

Figure 6.4-2: Lag time from Vehicle Detection to Caribou Detection

7. SUMMARY

The results of this study suggest the potential for many interacting factors explaining where and when caribou cross the AWAR. The choice of where to cross the road may be mitigated by several factors to varying degrees, including habitat, road traffic, substrate type, and inter-annual route fidelity (i.e., same route chosen every year).

Overall, the camera study found that the cameras were successful at capturing many caribou crossing the AWAR.

One of the objectives of this study was to evaluate if there were specific locations with high numbers of caribou observations along the AWAR in 2021, and compare these locations with those identified in 2020 and by collar data and IQ.

- Peak caribou passage occurred one week earlier in 2021 vs 2020, consistent with patterns of inter-annual variability observed in the collar data.

- The study found that caribou crossing timing and locations on the AWAR in 2021 were consistent with locations identified in 2020 and with locations identified by IQ from Elders and community members. The hotspots identified by the camera data in both 2020 and 2021 aligned more closely with the IQ identified hotspots than the collar data from 2012-2019.

- Cameras have the potential to capture far more caribou crossings on the AWAR than collars alone. A systematic camera study also has the critical advantage over collar data that it not only detects where caribou *are*, but also where they *are not.* This, in combination with the fact that camera placement can be controlled for road characteristics, is what make it possible to test for the association between caribou detections and road characteristics.

The next objective for this study was to use the information on road crossings determine whether caribou prefer to cross the road at locations with a particular set of road features, specifically: material of road construction (esker vs. quarry); side slope; road height; and surrounding vegetation type.

- Road height and road-side slope did not have an impact on caribou crossing locations.

- Alternatively, since the structure of the road is relatively uniform along its length, there may not be enough difference in the shape, profile, or materials used to build the road to influence which sections of the road caribou prefer to cross, or crossing locations may be driven by surrounding features, such as habitat, trails, etc.

- Caribou appeared to cross the AWAR more readily in the northern portion of the road where esker rock is more common as a substrate, but this may be an artifact of a sampling bias in the data.

The last objective for this study was to evaluate what relationship (if any) there is between vehicles recorded on the road and the location and timing of caribou observations.

- All recorded caribou crossings occurred between 5 minutes and 8.75 hours of a vehicle passing, with the average lag time between vehicles passing and caribou crossing at 1 hour and 18 minutes.

- A breakdown by vehicle type suggests that the type of vehicle (heavy vehicle, light truck, or quad) did not have an effect on the lag time to caribou crossing.

Insights about improving data collection in the future include leaving cameras out longer, replacing cameras with programming errors, and setting cameras in the southern section of the road as restrictions allow. This study highlights the power of using motion-trigger cameras to draw connections between the many possible variables explaining caribou movement. The results suggest that multiple factors may contribute to when and where caribou cross the AWAR, including vehicle traffic, road substrate, and inter-annual variability.

8. REFERENCES

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APPENDIX A   DATA FROM MOTION-TRIGGER CAMERAS

Appendix A: Data from Motion-trigger Cameras

Camera No.	Date Observed	Time		Photo				Species Name	Number Adults	Number Young	Behaviour (laying, feeding, walking, running)	Direction (E-W)	Did they cross? (Y/N)
		Start	End	Type	Start	End	Trigger						
1	6/29/2021	06:00:00	06:00:00	T	6290569	6290569	1	Arctic Fox	1	0	Walking	SE	N
	6/29/2021	11:10:33	11:10:33	M	6290583	6290583	1	Songbird	1	0	Standing	W	N
	7/1/2021	20:00:00	20:00:00	T	7010825	7010825	1	Gull	1	0	Flying	W	N
	7/6/2021	17:00:00	17:00:00	T	7060508	7060508	1	Uncategorized Bird	NA	NA	Flying	E	N
2	6/23/2021	21:30:00	21:30:00	T	6230081	6230081	1	Uncategorized Bird	2	0	Flying	NA	N
	6/25/2021	16:00:00	16:00:00	T	6250198	6250198	1	Gull	1	0	Flying	W	Y
	6/28/2021	09:52:29	09:52:29	M	6280486	6280486	1	Sandhill Crane	1	0	Standing	W	N
	6/30/2021	07:30:00	07:30:00	T	6300695	6300695	1	Waterfowl	2	0	Feeding	E	N
	6/30/2021	10:30:00	10:30:00	T	6300707	6300707	1	Uncategorized Bird	1	0	Flying	W	N
	6/30/2021	11:16:42	11:16:42	M	6300709	6300709	1	Uncategorized Bird	1	0	Flying	W	N
	6/30/2021	12:44:51	12:44:51	M	6300718	6300718	1	Uncategorized Bird	2	0	Flying	E	N
	6/30/2021	14:05:26	14:05:26	M	6300723	6300723	1	Uncategorized Bird	1	0	Flying	E	N
	7/1/2021	14:32:32	14:32:43	M	7010805	7010806	2	Uncategorized Bird	1	0	Flying	W	N
	7/1/2021	19:00:00	19:02:47	T	7010830	7010831	2	Caribou	100	unknown	Grazing	E	N
	7/2/2021	15:52:59	15:52:59	M	7020929	7020929	1	Uncategorized Bird	1	0	Flying	NA	N
	7/3/2021	11:28:30	11:28:35	M	7030005	7030006	2	Uncategorized Bird	1	0	Flying	NA	N
	7/3/2021	12:11:10	12:11:10	M	7030010	7030010	1	Uncategorized Bird	7	0	Flying	W	N
	7/3/2021	12:27:10	12:27:10	M	7030012	7030012	1	Uncategorized Bird	1	0	Flying	NA	N
	7/3/2021	13:37:25	13:37:25	M	7030020	7030020	1	Uncategorized Bird	1	0	Flying	NA	N
	7/3/2021	17:15:14	17:36:45	M	7030059	7030061	3	Uncategorized Bird	3	0	Flying	E	N
	7/3/2021	17:47:06	17:49:24	M	7030063	7030064	2	Uncategorized Bird	2	unknown	Flying	NA	N
	7/3/2021	18:30:00	18:30:00	T	7030066	7030066	1	Uncategorized Bird	2	unknown	Flying	NA	N
	7/3/2021	19:30:00	19:30:00	T	7030070	7030070	1	Uncategorized Bird	4	0	Flying	NA	N
	7/4/2021	14:00:39	14:00:39	M	7040164	7040164	1	Uncategorized Bird	2	0	Flying	NA	N
	7/4/2021	15:17:09	15:17:09	M	7040179	7040179	1	Uncategorized Bird	1	0	Flying	NA	N
	7/5/2021	20:33:24	20:33:24	M	7050379	7050379	1	Uncategorized Bird	1	0	Flying	W	N
	7/6/2021	05:30:00	05:30:00	T	7060404	7060404	1	Uncategorized Bird	1	0	Flying	NA	N
	7/6/2021	07:30:00	07:30:00	T	7060409	7060409	1	Uncategorized Bird	11	0	Flying	W	N
	7/6/2021	15:26:20	15:26:26	M	7060482	7060483	2	Uncategorized Bird	1	0	Flying	E	N
	7/6/2021	15:26:31	15:26:36	M	7060484	7060485	2	Uncategorized Bird	1	0	Flying	E	N
	7/6/2021	16:16:03	16:16:03	M	7060494	7060494	1	Uncategorized Bird	1	0	Flying	E	N
	7/6/2021	22:30:00	22:30:00	T	7060533	7060533	1	Uncategorized Bird	1	0	Flying	E	N
	7/7/2021	07:58:14	07:58:14	M	7070556	7070556	1	Uncategorized Bird	1	0	Flying	W	N
	7/7/2021	07:58:37	07:58:37	M	7070558	7070558	1	Uncategorized Bird	1	0	Flying	W	N
	7/7/2021	10:00:00	10:00:00	T	7070577	7070577	1	Uncategorized Bird	1	0	Flying	N	N
	7/8/2021	09:22:41	09:22:41	M	7080711	7080711	1	Uncategorized Bird	1	0	Flying	W	N
	7/8/2021	15:41:31	15:41:38	M	7080772	7080773	2	Raptor	1	0	Flying	W-E	N

Appendix A: Data from Motion-trigger Cameras

Camera No.	Date Observed	Time		Photo				Species Name	Number Adults	Number Young	Behaviour (laying, feeding, walking, running)	Direction (E-W)	Did they cross? (Y/N)
		Start	End	Type	Start	End	Trigger						
2	7/8/2021	18:41:53	18:41:53	M	7080795	7080795	1	Uncategorized Bird	2	0	Flying	N	N
(cont'd)	7/9/2021	08:26:58	08:26:58	M	7090863	7090863	1	Uncategorized Bird	4	0	Flying	W	N
	7/9/2021	08:27:23	08:27:23	M	7090868	7090868	1	Uncategorized Bird	1	0	Flying	W	N
	7/9/2021	13:24:36	13:24:36	M	7090909	7090909	1	Uncategorized Bird	1	0	Flying	W	N
	7/9/2021	18:01:16	18:01:16	M	7090984	7090984	1	Uncategorized Bird	1	0	Flying	E	N
	7/10/2021	06:30:00	06:59:37	T	7100025	7100027	3	Uncategorized Bird	1	0	Flying	E	N
	7/10/2021	08:34:51	08:34:51	M	7100036	7100036	1	Uncategorized Bird	1	0	Flying	E	N
	7/10/2021	08:43:34	08:43:34	M	7100039	7100039	1	Uncategorized Bird	1	0	Flying	E	N
	7/10/2021	14:42:12	14:42:42	M	7100080	7100080	1	Uncategorized Bird	1	0	Flying	W	N
	7/10/2021	17:30:00	17:30:00	T	7100116	7100116	1	Uncategorized Bird	2	0	Flying	E	N
	7/10/2021	17:38:23	17:38:23	M	7100117	7100117	1	Uncategorized Bird	1	0	Flying	W	N
	7/10/2021	17:49:20	17:49:20	M	7100119	7100119	1	Uncategorized Bird	1	0	Flying	E	N
	7/10/2021	17:55:49	17:55:49	M	7100121	7100121	1	Uncategorized Bird	1	0	Flying	E	N
	7/10/2021	18:03:10	18:03:10	M	7100125	7100125	1	Uncategorized Bird	1	0	Flying	E	N
	7/11/2021	13:57:13	13:57:13	M	7110232	7110232	1	Uncategorized Bird	1	0	Standing	NA	N
	7/12/2021	07:00:00	07:00:00	T	7120312	7120312	1	Uncategorized Bird	1	0	Flying	E	N
	7/12/2021	10:04:34	10:04:34	M	7120330	7120330	1	Uncategorized Bird	3	0	Flying	E	N
	7/12/2021	12:12:10	12:12:10	M	7120337	7120337	1	Uncategorized Bird	1	0	Flying	E	N
	7/12/2021	22:32:47	22:32:47	M	7120380	7120380	1	Uncategorized Bird	1	0	Flying	E	N
3	6/24/2021	06:58:34	06:58:34	M	6240104	6240104	1	Waterfowl	2	0	Flying and Running	W	N
	6/24/2021	19:00:00	19:00:00	T	6240180	6240180	1	Uncategorized Bird	1	0	Flying	E	N
	6/25/2021	04:00:00	04:00:00	T	6250202	6250202	1	Uncategorized Bird	2	0	Feeding	E	N
	6/25/2021	05:46:32	05:46:32	M	6250206	6250206	1	Uncategorized Bird	1	0	Flying	E	N
	6/25/2021	07:59:23	07:59:30	M	6250213	6250214	2	Uncategorized Bird	1	0	Flying	W	N
	6/26/2021	09:15:17	09:15:17	M	6260302	6260302	1	Sandhill Crane	1	0	Flying	W	Y
	6/26/2021	13:40:16	13:40:16	M	6260335	6260335	1	Sandhill Crane	1	0	Flying	E	N
	6/27/2021	07:00:00	07:00:00	T	6270433	6270433	1	Arctic Ground Squirrel	1	0	Standing	NA	N
	6/27/2021	08:39:10	08:39:10	M	6270441	6270441	1	Uncategorized Bird	1	0	Flying	W	N
	6/27/2021	16:55:21	16:55:21	M	6270490	6270490	1	Arctic Ground Squirrel	1	0	Sitting	NA	N
	6/27/2021	21:30:00	21:30:00	T	6270517	6270517	1	Arctic Ground Squirrel	1	0	Sitting	NA	N
	6/28/2021	06:30:00	06:30:00	T	6280546	6280546	1	Uncategorized Bird	2	0	Flying	W	N
	6/28/2021	10:26:25	10:26:25	M	6280560	6280560	1	Caribou	1	0	Walking	W	Y
	6/28/2021	14:57:55	14:58:00	M	6280604	6280605	2	Uncategorized Bird	2	0	Flying	W	N
	6/29/2021	04:30:00	04:30:00	T	6290647	6290647	1	Uncategorized Bird	1	0	Flying	E	N
	6/29/2021	21:00:00	21:00:00	T	6290742	6290742	1	Sandhill Crane	1	0	Walking	E	Y
	6/30/2021	06:29:15	06:29:15	M	6300770	6300770	1	Caribou	1	0	Walking	NW	Y
	6/30/2021	12:23:31	12:23:31	M	6300793	6300793	1	Sandhill Crane	2	0	Flying	E	N

Appendix A: Data from Motion-trigger Cameras

Camera No.	Date Observed	Time Start	Time End	Photo Type	Photo Start	Photo End	Photo Trigger	Species Name	Number Adults	Number Young	Behaviour (laying, feeding, walking, running)	Direction (E-W)	Did they cross? (Y/N)
3 (cont'd)	6/30/2021	15:33:52	15:33:52	M	6300807	6300807	1	Sandhill Crane	3	0	2 Flying 1 about to fly	E	N
	7/1/2021	13:30:00	13:30:00	T	7010890	7010890	1	Sandhill Crane	1	0	Standing	NW	Y
	7/1/2021	14:13:27	14:13:32	M	7010892	7010893	2	Raptor	5	0	Flying	E	N
	7/2/2021	08:30:00	08:30:00	T	7020982	7020982	1	Sandhill Crane	1	0	walking	SW	N
	7/2/2021	10:40:24	10:40:24	M	7020991	7020991	1	Sandhill Crane	3	0	Flying	E	N
	7/2/2021	10:46:20	10:46:20	M	7020993	7020993	1	Sandhill Crane	2	0	Standing and flying	N	Y
	7/2/2021	15:53:08	15:53:17	M	7020034	7020035	2	Uncategorized Bird	2	0	Flying	E	N
	7/3/2021	10:23:21	10:23:21	M	7030129	7030129	1	Uncategorized Bird	1	0	Flying	SW	N
	7/3/2021	11:31:58	11:32:02	M	7030135	7030136	2	Waterfowl	1	0	Flying	E	N
	7/3/2021	12:48:20	12:48:20	M	7030144	7030144	1	Uncategorized Bird	1	0	Flying	E	N
	7/4/2021	17:58:17	17:58:17	M	7040354	7040354	1	Uncategorized Bird	2	0	Flying	E	N
	7/4/2021	21:28:03	21:28:03	M	7040384	7040384	1	Sandhill Crane	1	0	Flying	E	Y
	7/5/2021	09:55:46	09:55:46	M	7050426	7050426	1	Uncategorized Bird	4	0	Flying	W	Y
	7/5/2021	10:43:06	10:43:06	M	7050429	7050429	1	Uncategorized Bird	1	0	Flying	NA	N
	7/8/2021	19:30:00	19:30:00	T	7080987	7080987	1	Uncategorized Bird	1	0	Flying	E	N
	7/9/2021	14:52:52	14:52:52	M	7090106	7090106	1	Uncategorized Bird	1	0	Flying	E	N
	7/10/2021	08:43:46	08:43:46	M	7100214	7100214	1	Uncategorized Bird	2	0	Flying	NA	N
	7/10/2021	14:11:53	14:11:53	M	7100252	7100252	1	Sandhill Crane	4	0	Flying	E	Y
	7/10/2021	14:49:13	14:49:13	M	7100260	7100260	1	Uncategorized Bird	1	0	Flying	E	N
	7/10/2021	22:00:00	22:01:49	T	7100336	7100337	2	Arctic Ground Squirrel	1	0	Sitting	NA	N
	7/11/2021	11:00:00	11:00:00	T	7110408	7110408	1	Uncategorized Bird	2	0	Flying	E	N
	7/11/2021	12:09:56	12:09:56	M	7110419	7110419	1	Uncategorized Bird	1	0	Flying	E	N
	7/11/2021	14:21:37	14:21:37	M	7110442	7110442	1	Uncategorized Bird	1	0	Flying	E	N
	7/12/2021	09:24:39	09:24:39	M	7120559	7120559	1	Uncategorized Bird	2	0	Flying	E	N
4	6/26/2021	11:49:29	11:49:29	M	6260146	6260146	1	Sandhill Crane	1	0	Standing	E	N
	6/27/2021	14:00:00	14:00:00	M	6270207	6270207	1	Arctic Fox	1	0	Walking	NE	N
	6/27/2021	21:18:34	21:18:34	M	6270223	6270223	1	Arctic Fox	1	0	Walking	NW	N
	6/28/2021	16:00:00	16:00:00	T	6280263	6280263	1	Arctic Ground Squirrel	1	0	Standing	NA	Y
	6/29/2021	19:00:00	19:00:00	T	6290362	6290362	1	Songbird	1	0	Standing	S	Y
	7/10/2021	07:00:00	07:41:35	T	7100193	7100195	3	Uncategorized Bird	2	0	Flying	E	N
5	7/1/2021	14:50:26	22:00:00	M	7010813	7010853	41	Caribou	-250	Unkown	Walking and Feeding	W	N
	7/3/2021	09:20:13	09:20:13	M	7030003	7030003	1	Caribou	1	0	Walking	E	N
	7/3/2021	17:51:45	17:51:45	M	7030071	7030071	1	Uncategorized Bird	2	0	Flying	E	N
	7/5/2021	08:00:00	08:00:00	T	7050257	7050257	1	Uncategorized Bird	1	0	Flying	E	N
	7/8/2021	09:20:11	09:20:11	M	7080691	7080691	1	Uncategorized Bird	1	0	Flying	E	N
	7/9/2021	06:00:00	06:00:00	T	7090823	7090823	1	Uncategorized Bird	2	0	Flying	E	N
	7/9/2021	08:24:24	08:30:00	M	7090846	7090847	2	Uncategorized Bird	1	0	Flying	W	N
	7/10/2021	06:00:00	06:00:00	T	7100009	7100009	1	Caribou	1	0	Feeding	E	N

Appendix A: Data from Motion-trigger Cameras

Camera No.	Date Observed	Time Start	Time End	Type	Photo Start	Photo End	Trigger	Species Name	Number Adults	Number Young	Behaviour (laying, feeding, walking, running)	Direction (E-W)	Did they cross? (Y/N)
6	6/27/2021	08:00:00	08:00:00	T	6270444	6270444	1	Caribou	1	0	Standing	E	N
	7/1/2021	03:42:36	03:46:29	M	7010864	7010865	2	Caribou	2	0	Feeding	E	Y
	7/1/2021	17:30:00	18:58:44	T	7010926	7010935	10	Caribou	20	0	Feeding	E	N
	7/6/2021	14:46:50	14:46:57	M	7060644	7060645	2	Uncategorized Bird	1	0	Flying	W	N
	7/8/2021	08:53:12	08:53:17	M	7080918	7080919	2	Uncategorized Bird	1	0	Standing	NA	N
7	6/26/2021	06:00:00	06:00:00	T	6260190	6260190	1	Waterfowl	2	0	Feeding	NA	N
	6/29/2021	02:51:41	02:51:41	M	6290355	6290355	1	Caribou	1	0	Feeding	E	N
	7/1/2021	00:43:16	00:43:21	M	7010449	7010450	2	Caribou	1	0	Feeding	W	N
	7/1/2021	11:48:08	11:48:08	M	7010473	7010473	1	Sandhill Crane	2	0	Walking	W	N
	7/8/2021	13:30:00	13:30:00	T	7080824	7080824	1	Sandhill Crane	1	0	Walking	W	Y
	7/10/2021	11:30:00	11:30:00	T	7100916	7100916	1	Sandhill Crane	1	0	Walking	W	Y
8	6/23/2021	21:03:26	21:03:26	M	6230056	6230056	1	Arctic Fox	1	0	Walking	E	Y
	6/30/2021	09:30:00	09:30:00	T	6300907	6300907	1	Gull	1	0	Flying	E	N
	7/1/2021	14:00:00	14:38:18	T	7010989	7010994	6	Caribou	5	Unkown	Feeding	W	N
	7/1/2021	18:56:19	20:30:00	M	7010020	7010031	12	Caribou	-100	Unkown	Feeding	W	N
	7/3/2021	12:30:00	12:30:00	T	7030181	7030181	1	Songbird	2	0	Standing	NA	N
	7/4/2021	14:06:24	14:06:24	M	7040349	7040349	1	Uncategorized Bird	1	0	Flying	NA	N
9	7/2/2021	21:02:27	21:02:27	M	7020035	7020035	1	Uncategorized Bird	1	0	Flying	W	N
	7/2/2021	09:30:00	09:30:00	T	7020940	7020940	1	Caribou	1	0	Walking	W	Y
	7/3/2021	12:16:08	12:16:08	M	7030082	7030082	1	Uncategorized Bird	1	0	Flying	E	N
	7/4/2021	14:00:00	14:00:00	T	7040247	7040247	1	Uncategorized Bird	1	0	Flying	E	N
	7/6/2021	10:00:00	11:00:00	T	7060496	7060502	7	Uncategorized Bird	1	0	Standing	NA	N
	7/7/2021	18:11:44	18:11:52	M	7070747	7070749	3	Uncategorized Bird	1	0	Flying	W	N
	7/7/2021	22:30:00	22:30:00	T	7070771	7070771	1	Uncategorized Bird	2	0	Walking	E	N
	7/11/2021	16:14:28	16:14:28	M	7110450	7110450	1	Uncategorized Bird	1	0	Flying	W	N
	7/12/2021	08:43:06	08:48:12	M	7120538	7120539	2	Uncategorized Bird	1	0	Flying	W	N
10	6/27/2021	10:00:00	10:00:00	T	6270196	6270196	1	Uncategorized Bird	2	0	Flying	NA	N
	6/30/2021	04:00:00	04:00:00	T	6300331	6300331	1	Songbird	1	0	Sitting	NA	N
	6/30/2021	05:00:00	05:00:00	T	6300333	6300333	1	Uncategorized Bird	1	0	Flying	NA	N
	7/4/2021	03:00:00	03:30:00	T	7040530	7040535	6	Caribou	3	0	Grazing	W	Y
	7/9/2021	17:58:40	17:58:40	M	7090813	7090813	1	Arctic Ground Squirrel	1	0	Walking	E	N
	7/13/2021	03:30:00	03:30:00	T	7130983	7130983	1	Uncategorized Bird	1	0	Flying	E	N
11	6/25/2021	18:00:00	18:00:00	T	6250111	6250111	1	Arctic Ground Squirrel	1	0	Walking	NA	Y
	7/1/2021	07:22:10	08:30:00	M	7010399	7010416	18	Caribou	-20	5	Feeding	W	N
	7/2/2021	15:00:00	15:30:00	T	7020482	7020508	27	Caribou	50-75	25	Feeding	E	Y
	7/3/2021	10:00:00	10:00:00	T	7030548	7030548	1	Songbird	1	0	Siting	NA	N
	7/11/2021	05:30:00	05:30:00	T	7110928	7110928	1	Arctic Ground Squirrel	1	0	Siting	NA	N

Appendix A: Data from Motion-trigger Cameras

Camera No.	Date Observed	Time Start	Time End	Type	Photo Start	Photo End	Trigger	Species Name	Number Adults	Number Young	Behaviour (laying, feeding, walking, running)	Direction (E-W)	Did they cross? (Y/N)
12	6/27/2021	14:00:00	14:00:00	T	6270205	6270205	1	Gull	1	0	Flying	W	N
	6/30/2021	01:06:58	01:06:58	M	6300324	6300324	1	Uncategorized Mammal	1	0	Running	E	N
	7/1/2021	04:00:00	08:00:00	T	7010382	7010425	44	Caribou	-30	-5	Feeding	E	Y
	7/4/2021	07:03:15	07:03:15	M	7040600	7040600	1	Arctic Hare	1	0	Running	W	N
	7/10/2021	20:00:00	20:00:00	T	7100917	7100917	1	Uncategorized Bird	1	0	Flying	NA	N
13	6/24/2021	19:00:00	19:00:00	T	6240063	6240063	1	Waterfowl	4	0	Standing	NA	N
	6/26/2021	00:30:00	01:00:00	T	6260124	6260127	4	Arctic Hare	1	0	Grazing	NA	Y
	6/29/2021	01:00:00	01:00:00	T	6290273	6290273	1	Uncategorized Mammal	1	0	Laying	NA	N
	6/29/2021	21:00:00	21:00:00	T	6290313	6290313	1	Gull	1	0	Standing	NA	N
	7/1/2021	03:59:05	06:01:54	M	7010382	7010396	15	Caribou	30	8	Grazing	E	Y
	7/1/2021	07:00:00	08:30:00	T	7010398	7010403	6	Caribou	20	4	Grazing	E	Y
	7/1/2021	10:00:00	10:00:00	T	7010409	7010409	1	Caribou	3	0	Grazing	W	N
	7/1/2021	20:54:18	22:30:00	M	7010431	7010448	18	Caribou	25	10	Grazing	W	Y
	7/1/2021	23:30:00	00:55:39	T	7020450	7020455	6	Caribou	-30	5	Grazing	W	Y
	7/2/2021	02:18:28	02:40:13	M	7020462	7020469	8	Caribou	-11	4	Grazing	E	Y
	7/2/2021	10:30:00	10:30:00	T	7020485	7020485	1	Caribou	1	1	Standing	W	Y
	7/2/2021	11:30:00	11:30:00	T	7020487	7020487	1	Caribou	15	-12	Walking/Grazing	W	Y
	7/8/2021	21:00:00	21:00:00	T	7080809	7080809	1	Uncategorized Bird	3	0	Flying	W	NA
	7/9/2021	13:00:00	13:00:00	T	7090841	7090841	1	Uncategorized Bird	1	0	Flying	E	NA
	7/10/2021	06:30:00	06:30:00	T	7100879	7100879	1	Sandhill Crane	2	0	Walking/Grazing	W	NA
15	6/27/2021	04:00:00	04:00:00	T	6270347	6270347	1	Waterfowl	1	0	Standing	NA	N
	6/30/2021	14:18:40	14:18:40	M	6300689	6300689	1	Uncategorized Mammal	10	0	Walking	W	Y
	6/30/2021	17:30:00	18:00:00	M	6300697	6300706	10	Caribou	-20	5	Walking	W	Y
	6/30/2021	20:03:10	20:04:17	M	6300715	6300716	2	Caribou	5	2	Walking	E	Y
	7/1/2021	09:00:00	09:00:00	T	7010750	7010750	1	Caribou	-40	Unkown	Grazing	E	Y
	7/2/2021	12:30:00	12:30:00	T	7020890	7020890	1	Caribou	-20	Unkown	Laying	E	Y
	7/2/2021	15:30:00	16:14:37	T	7020898	7020923	26	Caribou	-50	Unkown	Walking	E	Y
	7/2/2021	17:29:35	17:29:35	M	7020928	7020928	1	Caribou	3	0	Running	W	Y
	7/3/2021	07:36:41	07:36:41	T	7030966	7030966	1	Arctic Fox	1	0	Walking	E	Y
	7/6/2021	10:30:00	10:30:00	T	7060353	7060353	1	Uncategorized Bird	1	0	Flying	NA	N
	7/6/2021	10:52:03	10:52:03	M	7060355	7060355	1	Uncategorized Bird	1	0	Flying	NA	N
	7/8/2021	06:32:46	06:32:46	M	7080655	7080655	1	Arctic Fox	1	0	Walking	W	Y
	7/10/2021	08:12:24	08:23:19	M	7100991	7100992	2	Uncategorized Bird	1	0	Flying	NA	N
	7/10/2021	15:10:35	15:10:35	M	7100050	7100050	1	Uncategorized Bird	1	0	Flying	NA	N
16	6/29/2021	01:14:26	01:30:00	M	6290680	6290681	2	Caribou	12	0	Walking	East	Y
	6/29/2021	03:00:00	04:17:28	T	6290684	6290693	10	Caribou	19	0	Walking	East	Y
	6/29/2021	04:39:49	05:00:00	M	6290695	6290708	14	Caribou	2	0	Walking, Grazing	North	Y
	6/29/2021	05:24:56	05:30:00	M	6290709	6290716	8	Caribou	23	9	Walking	West	Y

Appendix A: Data from Motion-trigger Cameras

Camera No.	Date Observed	Time Start	Time End	Type	Photo Start	Photo End	Trigger	Species Name	Number Adults	Number Young	Behaviour (laying, feeding, walking, running)	Direction (E-W)	Did they cross? (Y/N)
16 (cont'd)	6/29/2021	05:57:05	06:30:00	M	6290617	6290733	17	Caribou	6	0	Walking/Grazing	East	Y
	6/29/2021	07:30:00	08:47:57	T	6290735	6290762	28	Caribou	20	4	Walking/Grazing	East	Y
	6/29/2021	08:51:12	09:27:38	M	6290763	6290787	25	Caribou	86	36	Walking/Grazing	East	Y
	6/29/2021	09:33:33	09:34:50	M	6290789	6290972	4	Caribou	3	3	Walking	East	N
	6/29/2021	09:46:12	09:47:08	M	6290793	6290794	2	Caribou	1	1	Walking	East	Y
	6/29/2021	17:08:43	17:12:19	M	6290819	6290285	7	Caribou	12	4	Walking	East	Y
	6/29/2021	17:15:08	17:20:55	M	6290826	6290828	3	Caribou	11	4	Walking	East	Y
	6/29/2021	17:25:42	18:00:00	M	6290829	6290833	5	Caribou	18	5	Walking, Grazing	East/North	Y
	6/29/2021	18:02:18	18:02:22	M	6290834	6290385	2	Caribou	32	12	Running	West	N
	6/29/2021	23:00:00	23:00:00	T	6290851	6290851	1	Caribou	4	0	Walking	East/North	Y
	6/29/2021	23:27:56	00:00:00	M	6290852	6290871	14	Caribou	61	27	Walking	East	Y
	6/30/2021	09:05:36	09:08:54	M	6300894	6300902	9	Caribou	27	15	Walking	East	Y
	6/30/2021	11:00:00	11:34:13	T	6300914	6300942	26	Caribou	~150	~60	Walking/Running	East	Y
	6/30/2021	12:00:00	12:00:00	T	6300943	6300943	1	Caribou	5	1	Walking	East	Y
	6/30/2021	17:49:04	17:49:04	M	6300972	6300972	1	Caribou	7	3	Running	East	Y
	7/2/2021	04:00:00	04:00:00	T	7020115	7020115	1	Waterfowl	2	0	NA	NA	NA
	7/4/2021	03:00:00	03:00:00	T	7040367	7040367	1	Sandhill Crane	1	0	NA	NA	NA
17	6/23/2021	05:30:00	05:30:00	T	6240072	6240072	1	Waterfowl	2	0	NA	NA	NA
	6/28/2021	08:26:29	08:26:34	M	6280476	6280477	2	Caribou	1	0	Walking	West	N
	6/30/2021	08:00:00	10:18:47	T	6300677	6300723	47	Caribou	119	57	Walking, Grazing	East	Y
	6/30/2021	14:00:00	14:25:05	T	6300736	6300741	5	Caribou	12	0	Walking	East	Y
	6/30/2021	16:00:00	16:12:14	T	6300746	6300747	2	Caribou	17	7	Walking	North	Y
	6/30/2021	17:00:00	17:30:00	T	6300749	6300750	2	Caribou	~50	0	Walking	Northeast	N
	6/30/2021	17:44:49	17:51:16	M	6300751	6300755	5	Caribou	10	3	Walking	East	Y
	6/30/2021	19:08:48	19:16:06	M	6300763	6300775	13	Caribou	53	28	Walking	North/East	Y
	6/30/2021	22:00:00	23:03:50	T	6300785	300788	4	Caribou	~120	NA	Walking	Northeast	Y
	7/1/2021	06:00:00	06:51:12	T	7010805	7010807	3	Caribou	8	0	Walking	East	Y
	7/1/2021	08:46:35	09:17:37	M	7010813	7010848	36	Caribou	40	21	Walking, Grazing	East	Y
	7/1/2021	09:47:11	09:47:11	M	7010850	7010850	1	Caribou	18	10	Walking	East	N
	7/1/2021	18:00:00	18:49:29	T	7010885	7010890	7	Caribou	~175	NA	Walking	East	Y
	7/2/2021	09:46:36	09:55:59	M	7020938	7021000	63	Caribou	84	56	Walking, Grazing	Northeast	Y
	7/2/2021	09:56:04	09:57:01	M	7020001	7020008	8	Caribou	14	12	Walking	East	Y
	7/2/2021	14:00:00	15:25:03	T	7020042	7020086	45	Caribou	55	24	Walking	East	Y
	7/2/2021	15:39:48	15:39:48	M	7020088	7020088	1	Caribou	2	0	Walking	West	Y
	7/2/2021	17:30:00	17:31:11	T	7020119	7020120	2	Caribou	2	1	Walking	East	Y
	7/2/2021	20:30:00	20:30:00	T	7020130	7020130	1	Caribou	~20	NA	Walking	Northeast	Y
	7/3/2021	04:29:00	04:29:00	M	7030152	7030152	1	Caribou	1	1	Running	West	Y
	7/3/2021	19:46:03	19:46:03	M	7030235	7030235	1	Caribou	~15	NA	Walking	East	N
	7/6/2021	13:42:13	13:42:13	M	7060605	7060605	1	Gull	1	0	NA	NA	NA

Appendix A: Data from Motion-trigger Cameras

Camera No.	Date Observed	Time		Photo				Species Name	Number Adults	Number Young	Behaviour (laying, feeding, walking, running)	Direction (E-W)	Did they cross? (Y/N)
		Start	End	Type	Start	End	Trigger						
18	6/30/2021	04:00:00	04:30:00	T	6300323	6300324	2	Caribou	5	0	Walking	East	Y
	6/30/2021	05:30:00	10:18:44	T	6300326	6300392	66	Caribou	284	41	Walking	Southeast	Y
	6/30/2021	08:45:59	08:45:59	M	6300348	6300349	2	Waterfowl	2	0	NA	NA	NA
	6/30/2021	08:53:11	08:53:11	M	6300355	6300355	1	Uncategorized Bird	2	0	NA	NA	NA
	6/30/2021	15:30:00	15:30:00	T	6300403	6300403	1	Caribou	1	0	Walking	East	Y
	6/30/2021	17:00:00	18:00:00	T	6300406	6300408	3	Caribou	~100	NA	Walking	East	Y
	6/30/2021	21:56:04	03:00:00	M	6300417	7010467	51	Caribou	~200	~59	Walking	East	Y
	7/1/2021	08:22:47	08:25:44	M	7010478	7010501	24	Caribou	23	12	Walking, Grazing	East	Y
	7/1/2021	09:30:00	09:30:00	T	7010504	7010504	1	Caribou	7	6	Walking	South	Y
	7/1/2021	09:36:05	09:51:34	M	7010505	7010512	8	Caribou	10	6	Walking	East	Y
	7/1/2021	17:30:00	17:30:00	T	7010528	7010528	1	Caribou	~90	NA	Walking	East	Y
	7/1/2021	18:15:15	18:44:53	M	7010530	7010573	43	Caribou	328	157	Walking/Running	East	Y
	7/2/2021	14:00:00	14:00:00	T	7020613	7020613	1	Caribou	8	2	Standing, Grazing	NA	N
	7/2/2021	14:54:28	14:54:36	M	7020615	7020616	2	Caribou	1	0	Walking	East	N
	7/2/2021	22:49:48	22:50:10	M	7020633	7020637	5	Caribou	12	8	Running	West	Y
	7/3/2021	20:00:00	20:30:00	T	7020683	7020684	2	Caribou	~60	NA	Walking	East	Y
	7/4/2021	15:30:00	15:30:00	T	7020784	7020784	1	Caribou	1	0	Standing	NA	N
	7/8/2021	05:59:18	05:59:18	M	7080898	7080898	1	Arctic Fox	1	0	NA	NA	NA
	7/8/2021	22:25:26	22:25:26	M	7080931	7080931	1	Arctic Fox	1	0	NA	NA	NA
	7/8/2021	07:36:16	07:36:16	M	7090951	7090951	1	Arctic Fox	1	0	NA	NA	NA
19	6/30/2021	00:40:11	00:44:54	M	6300319	6300331	13	Caribou	49	7	Walking	East	Y
	6/30/2021	03:30:00	03:48:26	T	6300337	6300349	12	Caribou	12	4	Walking	East	Y
	6/30/2021	05:00:00	08:58:35	T	6300352	6300473	122	Caribou	170	61	Walking	East	Y
	6/30/2021	09:30:00	09:30:00	T	6300475	6300475	1	Caribou	9	4	Standing	NA	N
	6/30/2021	17:50:17	18:02:44	M	6300492	6300534	42	Caribou	185	108	Walking	East	Y
	6/30/2021	20:00:00	20:00:00	T	6300538	6300538	1	Caribou	1	0	Walking	East	Y
	7/1/2021	04:02:25	04:02:25	M	7010556	7010556	1	Caribou	2	1	Running	West	N
	7/1/2021	07:30:00	07:30:00	T	7010563	7010563	1	Caribou	13	6	Walking	East	Y
	7/1/2021	07:44:46	07:52:48	M	7010564	7010580	14	Caribou	30	14	Walking	East	Y
	7/1/2021	11:30:00	12:40:23	T	7010588	7010622	34	Caribou	59	26	Walking	East	Y
	7/1/2021	15:20:39	15:22:59	M	7010628	7010631	4	Caribou	42	25	Wakling/Running	West	Y
	7/3/2021	23:25:41	23:25:51	M	7030745	7030747	3	Caribou	1	1	Walking/Running	East	N
	7/9/2021	19:00:00	19:00:00	T	7090028	7090028	1	Sandhill Crane	2	0	NA	NA	NA
21	6/27/2021	05:07:26	05:07:26	M	6270146	6270146	1	Arctic Fox	1	0	NA	NA	NA
	6/30/2021	00:22:47	00:30:00	M	6300282	6300288	7	Caribou	31	7	Walking/Running	South	Y
	6/30/2021	05:30:00	06:03:49	T	6300298	6300300	3	Caribou	9	5	Walking	West	Y
	6/30/2021	07:32:06	08:15:08	M	6300304	6300340	36	Caribou	20	14	Walking	East	Y

Appendix A: Data from Motion-trigger Cameras

Camera No.	Date Observed	Time Start	Time End	Type	Photo Start	Photo End	Trigger	Species Name	Number Adults	Number Young	Behaviour (laying, feeding, walking, running)	Direction (E-W)	Did they cross? (Y/N)
21 (cont'd)	7/1/2021	02:47:20	02:49:54	M	7010380	7010384	5	Caribou	5	4	Walking	East	Y
	7/1/2021	11:30:00	11:34:41	T	7010402	7010404	3	Caribou	4	4	Walking	South	Y
	7/2/2021	11:00:00	11:00:00	T	7020452	7020452	1	Songbird	1	0	NA	NA	NA
	7/5/2021	11:30:00	11:30:00	T	7050602	7050602	1	Gull	1	0	NA	NA	NA
22	6/29/2021	17:00:00	17:00:00	T	6290264	6290264	1	Uncategorized Bird	10	0	NA	NA	NA
	6/30/2021	03:30:00	04:00:00	T	6300285	6300286	2	Caribou	~15	NA	Walking	West	N
	7/1/2021	09:00:00	10:00:04	T	7010345	7010359	14	Caribou	17	1	Walking	East	N
	7/1/2021	11:00:00	11:30:00	T	7010361	7010362	2	Caribou	~35	NA	Walking, Grazing	East	Y
	7/1/2021	11:56:57	12:09:40	M	7010363	7010403	40	Caribou	8	5	Walking	East	Y
	7/1/2021	13:37:21	13:45:09	M	7010407	7010414	8	Caribou	6	3	Walking, Grazing	East	N
	7/1/2021	14:30:00	14:30:00	T	7010416	7010416	1	Caribou	1	0	Grazing	NA	N
	7/3/2021	11:00:00	11:00:00	T	7030507	7030507	1	Uncategorized Bird	1	0	NA	NA	NA
	7/3/2021	20:02:40	20:02:40	M	7030526	7030526	1	Arctic Fox	1	0	NA	NA	NA
	7/7/2021	16:06:47	16:06:47	M	7070718	7070718	1	Arctic Fox	1	0	NA	NA	NA
25	6/27/2021	05:30:49	05:30:49	M	6270177	6270177	1	Waterfowl	1	0	NA	NA	NA
	6/27/2021	06:30:00	06:30:00	T	6270179	6270179	1	Uncategorized Bird	1	0	NA	NA	NA
	6/28/2021	00:00:00	01:00:00	T	6280219	6280222	4	Waterfowl	16	0	NA	NA	NA
	6/29/2021	13:00:00	14:30:00	T	6290316	6290328	12	Caribou	~250	NA	Walking	East	Y
	6/29/2021	15:15:35	15:17:30	M	6290330	6290333	4	Caribou	2	0	Walking	North	No
	6/29/2021	15:30:00	17:14:00	T	6290335	6290389	54	Caribou	151	57	Walking	Southeast	Y
	6/30/2021	02:00:00	02:00:00	T	6300407	6300407	1	Waterfowl	2	0	NA	NA	NA
	7/1/2021	08:00:00	08:00:00	T	7010472	7010472	1	Sandhill Crane	1	0	NA	NA	NA
	7/1/2021	10:20:54	11:10:21	M	7010479	7010601	122	Caribou	55	33	Walking, Grazing	East, then west	Y
	7/1/2021	15:00:00	15:00:00	T	7010609	7010609	1	Uncategorized Bird	1	0	NA	NA	NA
	7/10/2021	11:30:00	11:31:26	T	7100062	7100065	3	Caribou	15	0	Walking	West	Y
	7/12/2021	10:00:00	10:00:00	T	7120162	7120162	1	Sandhill Crane	1	0	NA	NA	NA
27	6/25/2021	13:00:00	13:00:00	T	6250083	6250083	1	Uncategorized Bird	2	0	NA	NA	NA
	6/27/2021	18:00:00	18:00:00	T	6270250	6270250	1	Sandhill Crane	2	0	NA	NA	NA
	6/27/2021	23:00:00	23:00:00	T	6270269	6270269	1	Sandhill Crane	2	0	NA	NA	NA
	6/28/2021	07:30:00	07:30:00	T	6280290	6280290	1	Sandhill Crane	2	0	NA	NA	NA
	6/28/2021	14:07:07	14:08:22	M	6280319	6280327	9	Songbird	1	0	NA	NA	NA
	6/28/2021	14:30:00	14:30:00	T	6280329	6280329	1	Sandhill Crane	1	0	NA	NA	NA
	6/29/2021	13:38:09	17:23:32	M	6290404	6290690	286	Caribou	~700	~350	Walking, Grazing	East	Y
	6/29/2021	18:30:00	18:30:00	T	6290693	6290693	1	Caribou	32	16	Walking	East	Y
	6/30/2021	21:30:00	21:20:00	T	6300774	6300774	1	Uncategorized Bird	1	0	NA	NA	NA
	7/4/2021	15:06:04	15:06:04	M	7040026	7040026	1	Uncategorized Bird	1	0	NA	NA	NA
	7/6/2021	22:30:00	22:30:00	T	7060280	7060280	1	Songbird	1	0	NA	NA	NA

Appendix A: Data from Motion-trigger Cameras

Camera No.	Date Observed	Time Start	Time End	Type	Photo Start	Photo End	Trigger	Species Name	Number Adults	Number Young	Behaviour (laying, feeding, walking, running)	Direction (E-W)	Did they cross? (Y/N)
28	6/29/2021	15:10:06	17:00:00	M	6290274	6290554	200	Caribou	241	138	Walking, Grazing	West, then East	Y
	7/2/2021	00:48:00	00:48:00	M	7020667	7020667	1	Uncategorized Mammal	1	0	NA	NA	NA
	7/4/2021	07:30:57	07:30:57	M	7040844	7040844	1	Sandhill Crane	2	1	NA	NA	NA
	7/7/2021	03:17:15	03:17:15	M	7070980	7070980	1	Arctic Hare	1	0	NA	NA	NA
	7/8/2021	06:30:00	06:30:00	T	7080036	7080036	1	Caribou	28	0	Walking	Northeast	N
	7/9/2021	15:21:21	15:21:21	M	7090103	7090103	1	Sandhill Crane	1	0	NA	NA	NA
	7/11/2021	16:30:00	16:30:00	M	7110205	7110205	1	Sandhill Crane	2	0	NA	NA	NA
29	6/26/2021	00:00:00	00:00:00	T	6260132	6260132	1	Uncategorized Mammal	2	0	NA	NA	NA
	6/28/2021	18:30:00	18:30:00	T	6280425	6280425	1	Uncategorized Mammal	1	0	NA	NA	NA
	6/28/2021	19:00:00	19:00:00	T	6280426	6280426	1	Waterfowl	2	0	NA	NA	NA
	6/28/2021	20:00:00	20:00:00	T	6280428	6280428	1	Waterfowl	4	0	NA	NA	NA
	6/29/2021	11:03:32	11:03:32	M	6290492	6290492	1	Uncategorized Bird	1	0	NA	NA	NA
	6/29/2021	11:03:40	11:03:40	M	6290494	6290494	1	Uncategorized Bird	1	0	NA	NA	NA
	6/29/2021	17:00:00	17:00:00	T	6290507	6290507	1	Caribou	3	0	Drinking	NA	N
	6/30/2021	15:30:00	15:30:00	T	6300578	6300578	1	Songbird	1	0	NA	NA	NA
	7/2/2021	05:00:00	05:00:00	T	7020680	7020680	1	Waterfowl	1	0	NA	NA	NA
	7/2/2021	15:30:00	16:00:00	T	7020724	7020726	3	Waterfowl	6	0	NA	NA	NA
	7/2/2021	21:00:00	21:00:00	T	7020755	7020755	1	Waterfowl	2	0	NA	NA	NA
	7/3/2021	03:30:00	03:30:00	T	7030770	7030770	1	Uncategorized Bird	1	0	NA	NA	NA
	7/3/2021	03:57:53	03:57:53	M	7030771	7030771	1	Uncategorized Bird	3	0	NA	NA	NA
	7/3/2021	09:39:23	09:39:29	M	7030785	7030786	2	Waterfowl	6	0	NA	NA	NA
	7/3/2021	23:30:00	23:30:20	T	7030838	7030840	3	Waterfowl	6	0	NA	NA	NA
	7/4/2021	13:30:00	13:30:00	T	7040908	7040908	1	Songbird	1	0	NA	NA	NA
	7/7/2021	04:00:00	04:00:00	T	7070261	7070261	1	Waterfowl	4	0	NA	NA	NA
	7/8/2021	16:52:34	16:52:34	M	7080501	7080501	1	Songbird	1	0	NA	NA	NA
	7/8/2021	17:01:33	17:01:33	M	7080503	7080503	1	Uncategorized Bird	1	0	NA	NA	NA
	7/9/2021	18:14:13	18:15:00	M	7090661	7090664	4	Songbird	1	0	NA	NA	NA
	7/10/2021	09:26:41	09:30:26	M	7100732	7100734	3	Songbird	3	0	NA	NA	NA
	7/10/2021	10:25:18	10:30:00	M	7100747	7100748	2	Songbird	1	0	NA	NA	NA
	7/10/2021	16:06:42	16:06:42	M	7100786	7100786	1	Arctic Hare	1	0	NA	NA	NA
	7/10/2021	16:30:00	16:30:00	T	7100974	7100974	1	Songbird	1	0	NA	NA	NA
	7/11/2021	14:49:53	14:49:53	M	7110930	7110930	1	Waterfowl	2	0	NA	NA	NA
	7/11/2021	18:00:00	18:00:00	T	7110959	7110959	1	Songbird	1	0	NA	NA	NA
	7/11/2021	20:00:00	20:00:00	T	7110969	7110969	1	Songbird	1	0	NA	NA	NA
39	6/26/2021	09:00:00	09:00:00	T	6260167	260167	1	Waterfowl	1	0	NA	NA	NA
	6/26/2021	17:30:00	17:30:00	T	6260186	6260186	1	Gull	1	0	NA	NA	NA
	6/27/2021	15:30:00	15:30:00	T	6270232	6270232	1	Gull	1	0	NA	NA	NA

Appendix A: Data from Motion-trigger Cameras

Camera No.	Date Observed	Time		Photo				Species Name	Number Adults	Number Young	Behaviour (laying, feeding, walking, running)	Direction (E-W)	Did they cross? (Y/N)
		Start	End	Type	Start	End	Trigger						
39	6/28/2021	06:30:00	06:30:00	T	6280262	6280262	1	Waterfowl	1	0	NA	NA	NA
(cont'd)	6/28/2021	15:30:00	15:30:00	T	6280280	6280280	1	Waterfowl	1	0	NA	NA	NA
	6/29/2021	13:39:43	13:55:28	M	6290325	6290367	42	Caribou	24	3	Walking, Grazing	West	Y
	6/29/2021	14:08:14	19:00:00	M	6290369	6290596	227	Caribou	~400	43	Walking, Grazing	East	Y
	6/29/2021	20:00:00	20:00:00	T	6290598	6290598	1	Caribou	1	0	Walking	North	N
	7/1/2021	13:30:00	13:30:00	T	7010683	7010683	1	Gull	1	0	NA	NA	NA
	7/2/2021	20:30:00	20:30:00	T	7020749	7020749	1	Waterfowl	1	0	NA	NA	NA
	7/3/2021	12:00:00	12:00:00	T	7030781	7030781	1	Waterfowl	1	0	NA	NA	NA
	7/4/2021	11:00:00	11:00:00	T	7040830	7040830	1	Waterfowl	1	0	NA	NA	NA
	7/5/2021	09:00:00	09:00:00	T	7050874	7050874	1	Gull	3	1	NA	NA	NA
	7/7/2021	08:00:00	08:00:00	T	7070970	7070970	1	Waterfowl	1	0	NA	NA	NA
	7/7/2021	20:00:00	20:00:00	T	7070994	7070994	1	Waterfowl	1	0	NA	NA	NA
	7/8/2021	06:13:01	06:13:01	M	7080015	7080015	1	Arctic Fox	1	0	NA	NA	NA
40	6/28/2021	19:00:00	19:30:00	T	6280401	6280402	2	Waterfowl	4	0	NA	NA	NA
	6/30/2021	03:54:21	04:23:04	M	6300515	6300525	11	Caribou	15	0	Walking, Grazing	East, then ran west	Y
	6/30/2021	11:30:00	12:52:05	T	7010603	7010606	4	Caribou	~150	~18	Walking	Southeast	Y
	7/1/2021	16:30:00	16:41:00	T	7010622	7010623	2	Caribou	2	0	Walking, Grazing	West	N
	7/4/2021	00:09:03	00:15:53	M	7040826	7040851	26	Caribou	32	6	Walking, Grazing	East	Y
	7/4/2021	03:42:27	03:52:36	M	7040860	7040894	35	Caribou	44	18	Walking, Grazing	East	Y
	7/12/2021	04:30:00	04:30:00	T	7120026	7120026	1	Arctic Fox	1	0	NA	NA	NA

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