Appendix 16A

Terrestrial Wildlife Baseline Report

Grays Bay Road and Port Project
Terrestrial Wildlife Baseline Report

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Appendix A Habitat Modelling — Resource Selection Functions

Abbreviations

ACCWM ..... Advisory Committee for the Cooperation on Wildlife Management

AICc ..... Akaike's Information Criterion

asl ..... above sea level

ASTER ..... Advanced Spaceborne Thermal Emission and Reflection Radiometer

BBMM ..... brownian bridge movement model

BCMPWG ..... Bluenose Caribou Management Plan Working Group

BCRP ..... *Bathurst Caribou Range Plan*

BNL ..... Basic needs level

CI ..... confidence interval

CLDF ..... Cumulative Land Disturbance Framework

COSEWIC ..... Committee on the Status of Endangered Wildlife in Canada

DNA ..... Deoxyribonucleic acid

EDI ..... Environmental Dynamics Inc.

EOSD ..... Earth Observation for Sustainable Development of Forests

GIS ..... Geographic information system; a program used for spatial analysis and mapping

GN ..... Government of Nunavut

GN-DOE ..... Government of Nunavut Department of Environment

GNWT ..... Government of Northwest Territories

GNWT-ECC ..... Government of Northwest Territories, Environment and Climate Change

GNWT-ENR ..... Government of Northwest Territories, Environment and Natural Resources

GPS ..... Global positioning system

HS ..... High subarctic

HSI ..... Habitat Suitability Index

HTO ..... Hunters and Trappers Organization

IAG ..... Inuit Advisory Group

ILUOP ..... Inuit Land Use and Occupancy Project

IS ..... Impact Statement

KDE ..... kernel density estimation

LS ..... Low subarctic

MCP ..... Minimum convex polygon (used for depicting or measuring home range)

NDVI ..... Normalized Difference Vegetation Index

NLC ..... Northern Land Cover

NT ..... Northwest Territories

NTKP ..... Naonaiyaotit Traditional Knowledge Project

NU ..... Nunavut

NWMB ..... Nunavut Wildlife Management Board

PDA ..... Project Development Area

Project, the ..... Grays Bay Road and Port Project

RSA ..... Regional Study Area

RSF ..... Resource Selection Function

SARA ..... *Species at Risk Act*

SARC ..... Species at Risk Committee (NT)

SD ..... standard deviation

SE ..... standard error

TAH ..... Total Allowable Harvest

TRI ..... terrain ruggedness index

UD ..... utilization distribution

UV ..... ultraviolet

VC ..... Valued Component

VHF ..... Very high frequency (radio collars that must be located using radio signals)

WGI ..... Wildlife Genetics International

WKR ..... West Kitikmeot Resources Corp.

WKRLUP ..... West Kitikmeot Regional Land Use Plan

WKSS ..... West Kitikmeot/Slave Study

WRRB ..... Wek'èezhìi Renewable Resources Board

Symbols and Units of Measure

cm ..... centimetre

km ..... kilometre

km/h ..... kilometre per hour

km^2 ..... square kilometre

m ..... metre

Glossary

Term	Definition
Project-specific terms:	
The Project	Grays Bay Road and Port Project
Project area	A general term referring to the broader undefined area.
Regional Study Area (RSA)	The area within which terrestrial wildlife field surveys were completed, generally a 30 km buffer around the High Lake to Grays Bay area, and a 20 km buffer around the remainder of the proposed road section.
Izok area	A general term describing the area between Izok and Lupin and the surrounding areas.
High Lake area	A general term describing the area between the High Lake mineral property and Grays Bay and surrounding areas.
Caribou-specific terms:	
Annual calving range	The area occupied by parturient caribou from birth through the initiation of foraging by calves — at about three weeks after birth.
Cohort	A group of individuals (caribou) born in the same year.
Concentrated calving area	The area of relatively high use within an annual calving range.
Extent of calving	The outer perimeter of all known annual calving range.
Fecundity	A measure of the ability to produce young.
Parturient cows	Either pregnant or recently calved cows.
Parturition	The act of calving.
Peak of calving	The date (median) when approximately 50% of the cows in a herd (as represented by those that are collared) have calved. Determination during surveys is based on observations of calves with cows; from satellite-collar data it is determined from changes in movement rates by collared cows.
Peak calving area	The area used in a particular year by parturient cows during calving.

Term	Definition
Cumulative peak calving area	The cumulative outer perimeter of all known peak calving areas.
Post-calving	Generally considered the first 3–4 weeks after calving.
Total Allowable Harvest (TAH)	The number of individuals from a population of wildlife that may be lawfully harvested as established by the NWMB pursuant to Sections 5.6.16 to 5.6.18 of the Nunavut Land Claim Agreement.
Transect	A line followed during a survey. For aerial wildlife surveys, they are generally spaced at 5 or 10 km from an adjacent transect. A 500 m transect strip width is generally used for each side of the aircraft.
Statistical terms:	
Confidence interval (CI)	The probability that a range of values will fall between the upper and lower bound of a probability distribution. The most common confidence interval probabilities are 90% and 95%.
Correlation	The numeric relationship between two variables; for example, caribou age and weight are positively correlated.
r^2	Describes how much of the data variance is explained by a model.
Sample size (*n*)	The number of samples (counts, individuals, transects, etc.) used.
Standard deviation (SD)	A measure of the spread or dispersion of a set of data. It is calculated by taking the square root of the variance. The SD of an estimate is expressed in the same units as the estimate itself.
Standard error (SE)	A measure of the sampling variability or precision of an estimate. The SE of an estimate is expressed in the same units as the estimate itself. It is calculated as the standard deviation divided by the square root of the number of observations.

Term	Definition
Other terms:	
Abundance	The total number of individuals, or the total amount of a resource (e.g., food, water, habitat) present in an area, population, or community. When abundance is described as a number within a defined area, the quantity is a density.
Anthropogenic	Human-related, often referring to an activity, development, or disturbance on the landscape.
Basic needs level (BNL)	Determined by the Nunavut Wildlife Management Board based on the average harvest by a community or region in past years.
Bryoids	Plants such as mosses, liverworts, hornworts, and non-crustose lichens.
Carnivore	Terrestrial mammals that survive by catching living prey or opportunistically scavenging on the prey of other animals (e.g., grizzly bear, wolf, wolverine).
Cover class	A combination of vegetation and site physiography used in habitat cover mapping.
Cubs of the year	Bear cubs less than 10 months old.
Cumulative impact	Changes to the environment that are caused by an action in combination with other past, present, and future actions.
DNA	Deoxyribonucleic acid; a molecule that encodes the genetic instructions for living organisms. DNA from hair follicles enables identification of individuals.
Ecology	The study of the interactions between organisms and their environment.
Ecosystem	A community of interacting organisms considered together with the chemical and physical factors that make up their environment.
Esker	Linear structures of loose sand and gravel, formed by glacial rivers, which often provide critical habitat for carnivores and ungulates in the Arctic.
Glacio-fluvial deposit	Consist of material — often sand and small rocks but ranging in size from clay particles to boulders — that has been transported, sorted, and deposited by meltwater from a glacier or inland ice sheets. Generally seen as eskers or terraces.

Term	Definition
Graminoid	All grasses and grass-like plants, including sedges and rushes.
Home range	The area in which an animal usually confines its daily, seasonal or annual activities.
Treeline	The edge of the habitat where trees are capable of growing. In the Arctic, treeline is a transitional zone from open taiga to treeless tundra (Timoney et al. 1992).
Ungulate	Hoofed mammals (e.g., caribou, muskoxen, or moose).
Valued Component (VC)	Environmental attributes or components that are perceived as important for ecological, social, cultural, and/or economic reasons.

1 Introduction

West Kitikmeot Resources Corporation (WKR) is an Inuit-owned, Inuit-led company focused on the advancement of the Grays Bay Road and Port Project (the Project) in the Kitikmeot Region of Nunavut (NU). WKR's largest shareholder is a wholly owned subsidiary of the Kitikmeot Inuit Association.
The Project is proposed as a multi-user, multi-use transportation infrastructure to be located on a combination of Inuit-owned Land and Crown land in the Kitikmeot Region of western NU. Subject to approval, the Project would result in the establishment of the first deep water port in the Canadian Central Arctic at Grays Bay (*Kogloktoakyok*), as well as a 230 kilometre (km) all-season access road between Grays Bay and Jericho station near Contwoyto Lake (*Tahikyoak*). The Project will connect to the already approved Tibbitt to Contwoyto Winter Road. The multi-user, multi-use Project would allow for the establishment of shared infrastructure with many potential users including the federal and territorial governments, communities, community members, resource companies, and defense agencies.

This Baseline Report was prepared by EDI Environmental Dynamics Inc. (EDI) and summarizes current knowledge and baseline information for terrestrial mammals in the Project area. This Baseline Report was prepared in support of an Impact Statement (IS).

1.1 Inuit Knowledge, Traditional Knowledge, and Community Knowledge

Inuit Knowledge has been documented for the Project, which has substantially informed WKR's understanding of baseline environmental and socio-economic conditions in the Project Development Area (PDA). For the purposes of the IS, focus is placed on Inuit of the Kitikmeot Region, or Kitikmiut. The Project is located wholly within the Kitikmeot Region; as such, the region and its people are where key Project interactions and effects are most likely to occur.

Verified Inuit Knowledge and perspectives considered and integrated in the IS were shared through two primary Project-specific sources.

1. **Naonaiyaotit Traditional Knowledge Project (NTKP):** The Kitikmeot Inuit Association maintains a repository of Inuit Knowledge for the Kitikmeot Region within a Geographic Information System (GIS)-based database called the NTKP. The NTKP contains the collective body of documented and verified Inuit Knowledge of the Kitikmeot Region, including but not limited to knowledge of birds, fish, terrestrial and marine mammals, water quality, travel routes, gathering places, and heritage. The Kitikmeot Inuit Association compiled a Project-specific report called *Kitikmiut Knowledge of the Proposed Kogloktoakyok (Grays Bay) Port and Road Project* (Banci and Spicker 2024), which provides the majority of Inuit Knowledge shared and integrated in the IS.

2. **Inuit Advisory Group (IAG)**: Initiated in 2018 by the previous Project proponent, WKR re-initiated the IAG in 2025. Through a series of IAG workshops, WKR and Inuit land users, Elders, and Knowledge Holders have met to discuss and document feedback and advice about the Project, including but not limited to dialogue about wildlife, fisheries, land use, archaeology, water, air quality, and access management. Through the IAG, multiple perspectives have been shared, allowing for the integration of knowledge systems (both Inuit Knowledge and western science), resulting in a more informed and sustainable Project. At the time of filing, four IAG workshops had occurred (GBEEC 2018a; GBEEC 2018b; IAG 2025a; IAG 2025b), with additional workshops planned for the future.

Pertinent baseline information from these sources of Inuit Knowledge has been integrated into this baseline report and is provided in the above-noted reports themselves, the 'Baseline Conditions' sections of each assessment section and integrated in the Assessment of Potential Effects on Terrestrial Wildlife sections where appropriate. The same process was applied when integrating baseline information associated with applicable Traditional Knowledge and Community Knowledge shared in publicly available literature and through the Project-specific engagement program.

1.2 Study Purpose and Objectives

This report, henceforth referred to as a baseline study, characterizes the status of the wildlife populations that potentially interact with the Project. Specific objectives of this baseline study include:

- Determine species occurrence, distribution, and abundance.
- Document the presence of any species at risk.
- Determine the seasonal occurrence and habitat requirements of migrating and breeding species.

1.3 Overview of Ecological Conditions in the Project Region

The Project is located within the Kitikmeot Region of mainland NU, Canada. It is situated in the Low Arctic tundra (Gould et al. 2003) and within the Takijua Lake Upland Ecoregion of the Southern Arctic Ecozone (Ecosystem Classification Group 2012). The Project extends from just above treeline to the Arctic coast. Numerous lakes, rivers, and streams dominate the lowlands, surrounded by broad, sloping uplands and plateaus, interspersed with bedrock outcrops and rugged ridges. The terrain gets increasingly rugged in the north towards the Coronation Gulf (*Oalik Tagiuga*) and the Arctic Ocean. Vegetation cover throughout the area is characterized by shrub tundra that consists of dwarf birch, willow, northern Labrador tea, lichens, *Dryas* spp., and *Vaccinium* spp. (Government of Canada 2013).

Elevations in the region range from sea level at the Arctic coast to over 700 metres (m) above sea level (asl) at Contwoyto Lake. The granitic bedrock underlying the region is part of the northern edge of the Bear Slave Upland on the Canadian Shield. Glaciation by the Wisconsinan Laurentide Ice Sheet was the major influence in forming the characteristic rugged terrain that is typical of well-glaciated shield topography. Prominent outcrops of diabase dykes and sills form ridges, mesas, and canyons in much of the region closer to the coast. The region is pitted with numerous small lakes connected by wide, irregular, boulder-strewn channels. Substrates on top of the bedrock include sorted and unsorted glacial deposits of various depths. In much of the area, sediments form a thin veneer, and exposures of the underlying granite bedrock are common.

The Project is located within the zone of continuous permafrost, meaning the ground is permanently frozen throughout the year. Talik zones (pockets of unfrozen ground) are usually found below large bodies of water near the coast and under major rivers and lakes. Permafrost is estimated to extend to a depth of 500 m below the surface. During the warmer summer months, the uppermost layer of sediment thaws. By late summer this active layer varies in depth from less than 1.5 m in clay sediments to over 2.0 m in sand and gravel deposits.

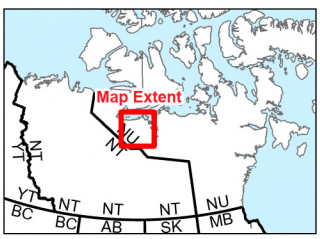
Vegetation in the area is adapted to survive long, cold, dry winters and a relatively short growing season of about four months. Cold, nutrient-poor soils and the thin active layer restrict plant growth. Willows, dwarf birch, heaths, sedges, cotton-grasses, mosses, and lichens are prominent and well adapted to this environment. Dominant vegetation types on drier sites include bedrock exposures with high lichen cover and heath tundra of low evergreen shrubs. Lichens proliferate on glacio-fluvial outwash surfaces. On lower areas, where water collects and flows on top of the permafrost boundary, tussock sedge tundra and low shrublands occur. Where water levels are at the surface, wet sedge meadows and tall riparian shrublands grow.

1.4 Study Areas

1.4.1 Regional Study Area

The Regional Study Area (RSA) is the area within which terrestrial wildlife baseline studies were completed (see Figure 1.1). The RSA was altered several times since studies began in 2004 to accommodate changes in Project focus, remaining relatively unchanged from 2008–2013, other than some alterations due to road realignments for mine sites. The RSA covers a 19,408 square kilometre (km²) area and reflects the new Project focus—the proposed road—and has eliminated the area in the southwest that represented the Izok and Hood mineral properties. The RSA maintained a 30-km buffer surrounding major proposed Project components (the High Lake exploration camp to port site corridor), and a 20 km buffer around the proposed all-season road from Jericho Station, past Ulu, to just south of the High Lake area.

The RSA was designed particularly to address information needs for caribou (*tuktu*; *Rangifer tarandus groenlandicus*) and was considered spatially expansive enough to encompass Project effects of other wildlife species. Effects for some other species or species groups were not expected to extend to the full extent of the RSA and thus surveys for these species were generally restricted to smaller areas within the RSA (e.g., carnivore den surveys). Study areas for the wolverine (*kalvik*; *Gulo gulo*) and grizzly bear (*akhak*; *Ursus arctos*) deoxyribonucleic acid (DNA) programs were developed independent of the main RSA and were centred on the High Lake area in the northern RSA (wolverine) with supplemental information from surveys completed for the proposed Izok mine site area (wolverine and grizzly bear).



Notes
1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Government of Canada, Stantec, Natural Resources Canada, Government of Canada (https://www.nrcan.gc.ca/earth-sciences/geography/download-geographical-names-data/9245)
Publication Date: Unknown
Downloaded: September 7, 2021
Last Checked: September 7, 2021

- Grays Bay Port
- Grays Bay Road
- Grays Bay Winter Road
- Tibbitt to Contwoyto Winter Road
- Territorial Boundary
- Treeline
- Watercourse
- Wildlife Regional Study Area (RSA)

0 20 40 Kilometres
(At original document size of 8.5x11) 1:1,600,000

N

WEST KITIKMEOT RESOURCES CORP

EDI ENVIRONMENTAL DYNAMICS INC.

Project Location
West Kitikmeot Region
Nunavut

Prepared by OliviaLeblanc on 2026-02-23

Client/Project 24Y0376
West Kitikmeot Resources Corp (WKR)
Grays Bay Road and Port

Figure No.
1.1

Title
Grays Bay Road and Port Project
Wildlife Regional Study Area

Path: L:\PROJECTS\2024\WH\24Y0029_GBRP\WildlifeBaselineUpdates_2025_V3.aprx\24Y0376_WildBaseline_Fig1-1_WildlifeRSA_20260220; Revised: 2026-02-23 By: OliviaLeblanc

2 Data Sources and Methods

Development of this Baseline Report involved collecting and collating information from several data sources, including Inuit Knowledge studies, species accounts, regional surveys and other regional literature, discussions with regional biologists, field surveys, and habitat classification and modelling for select species.

Previous Field Studies

Since the early 2000s, the proposed Project has been examined by former proponents under two separate project descriptions: the High Lake Project and the Izok (Corridor) Project. The High Lake area was the focus from 2004 to 2008, while studies that included the Izok Project area were initiated in 2007. The global recession of late 2008 and subsequent economic uncertainty resulted in little field work in 2009 and 2011. Terrestrial wildlife baseline studies have been completed intermittently since 2004, but over several years, providing additional wildlife information as a baseline assessment of the Project area. The current Project focuses on the development of the Project and airstrip. Data collected in the Izok area, although located outside of the current RSA, provide valuable regional-level information and are included throughout this document where applicable. For example, the grizzly bear and wolverine DNA studies based out of the Izok area in 2012 provide detailed population-level information relevant to the current Project RSA.

2.1 Inuit Knowledge and Consultation

A review of published and publicly available Inuit Knowledge was completed as part of the Baseline Report research. Information relating to terrestrial wildlife was summarized and integrated into the current volume. Main sources reviewed included:

- Inuit Land Use and Occupancy Project (Freeman 1976)
- Nunavut Atlas (Riewe 1992)
- Thunder on the Tundra (Thorpe et al. 2001b)
- The Nunavut Wildlife Harvest Study (Priest and Usher 2004)
- GN workshop (Dumond 2007a)
- Community vulnerability to climate change in the context of other exposure-sensitivities in Kugluktuk, NU (Prno et al. 2011)
- Traditional knowledge gathered specifically for the Izok Corridor project in 2012 and 2013 (Thorpe Consulting Services Ltd. 2014a)
- Naonaiyaotit Traditional Knowledge Project (NTKP 2018).

- Environmental change in the Kitikmeot Region of western NU and Ulukhaktok region of eastern Northwest Territories (NT) (McLennan et al. 2022)
- Kitikmiut Knowledge of the Proposed Kogloktoakyok (Grays Bay) Port and Road Project – final Report (Banci and Spicker 2024)

In addition to the previously available published Inuit Knowledge, several independent collections of Inuit Knowledge were examined. Wildlife Local Knowledge was collected during the following meetings, workshops, and interviews:

- Workshops, interviews, meetings
- Communities visited
- Specific to Traditional Knowledge and terrestrial wildlife, information was collected during the following meetings, workshops and interviews:
- Preliminary meetings on the Project with several board and staff members of the Kitikmeot Inuit Association and with a lands representative of the Tłı̨chǫ government — November 2007
- Meetings with the Kugluktuk Hunters and Trapper's Organization (HTO) and the Government of Nunavut Department of Environment (GN-DOE) regarding field programs for both Izok and High Lake — January 2008
- Meetings with several agencies in Kugluktuk: the mayor, the Economic Development Officer, the junior staff at the HTO and Kitikmeot Inuit Association, the Elder Centre, and the school principal — August 2011
- Regular update meetings with the mayor of Kugluktuk and Cambridge Bay (*Ekaluktutiak*) and with the HTOs in the Kitikmeot Region
- A site visit by the Kugluktuk HTO — August 2012
- Meeting and IQ workshop with the Kugluktuk HTO board and elders in Kugluktuk — September 2012 (Thorpe Consulting Services Ltd. 2014b)
- Meeting with the Cambridge Bay HTO board and elders in Cambridge Bay — September 2012
- Meetings with staff of the institutes of public government, the Government of Nunavut (GN), the Government of Northwest Territories (GNWT), and other stakeholder groups in NT — September and October 2012
- Community visits, open houses and interactions with high school students in five communities in the Kitikmeot Region (Kugluktuk, Cambridge Bay, Taloyoak, Gjoa Haven [*Ursuqtuq*], and Kugaaruk) — September and October 2012
- Meeting and Inuit Knowledge workshop with elders and community members in Gjoa Haven and from surrounding eastern Kitikmeot communities
- Project engagement with NT outfitters, Government of Northwest Territories-Environment and Natural Resources (GNWT-ENR), Yellowknives Dene First Nation, and Tłı̨chǫ Kwe Beh Working Group in Yellowknife — January 2013

- Meeting and Inuit Knowledge workshop with elders and community members from Inuvialuit Settlement Region communities (Aklavik, Inuvik, Sachs Harbour, Paulatuk, Ulukhaktok), Kugluktuk HTO and Cambridge Bay HTO in Cambridge Bay — March 2013 (Thorpe Consulting Services Ltd. 2014a)
- Grays Bay Road and Port Project Early Engagement (2016-2017);
- Grays Bay Engineering & Environmental Consultants (GBEEC). Grays Bay Road and Port Project Inuit Knowledge Workshop #1: March 2018
- Nunavut Impact Review Board, Back River Energy Centre Project Proposal. Hearing Volume 1 and 2. Cambridge Bay, Nunavut: February 27 & 28, 2024 (Nunavut Impact Review Board 2024a, 2024b)
- Grays Bay Road and Port Project What We Heard Report - Inuit Advisory Group Workshop #1 Summary (Inuit Advisory Group 2025)

2.2 Regional Information

Regional-level science studies were completed on some wildlife species in the west Kitikmeot Region. Many of the studies were completed by government agencies including the GN-DOE and the Government of Northwest Territories Environment and Climate Change (GNWT-ECC; formerly GNWT-ENR), and by co-management or research bodies including the Wek'èezhìi Renewable Resources Board (WRRB) and the West Kitikmeot/Slave Study (WKSS) Society. Other regional studies were led by academic institutions. Land use and management plans for the region also informed baseline research, including the Draft West Kitikmeot Regional Land Use Plan (Nunavut Planning Commission 2004), the Bathurst Caribou Range Plan (Government of Northwest Territories 2019), and the Bathurst Caribou Management Plan (Bathurst Caribou Advisory Committee 2021).

Species-specific reports from organizations like the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or the NT Species at Risk Committee (SARC) provide information on a species' status and distribution, habitat needs, and potential concerns or trends.

Satellite and global positioning system (GPS) collar data for Bathurst, Bluenose-East, and Beverly/Ahiak caribou were provided by GNWT-ECC for the years 1996–2024, and satellite and GPS collar data (1987–2006 and 2015–2023) for Dolphin and Union caribou were analyzed and mapped by GN-DOE. These data informed many of the analyses presented and supported baseline aerial surveys completed in the RSA. Where relevant, subsets of the data that were used for specific analyses are identified (e.g., GPS collars for movement and habitat modelling). Collared caribou that switched calving range from the Bathurst to adjacent herds were removed from mapping. Species-specific databases (e.g., regional grizzly mortalities, wolf [*amagok*; *Canis lupus*] den locations) were provided by the GN-DOE, GNWT-ECC, and Phil McLoughlin, a researcher from the University of Saskatchewan who has completed studies in the region.

2.3 Field Studies

The objective of the terrestrial wildlife field studies was to document species occurrence and distribution within the vicinity of the proposed Project and to fill knowledge gaps, particularly as they relate to potential effects from the Project. Field studies completed between 2012–2013 focused on the following:

- ungulate distribution surveys;
- ungulate track and trail surveys;
- DNA inventories for wolverine and grizzly bear; and,
- carnivore denning surveys.
- Additional field studies were completed in 2024–2025 to address data gaps. These studies include:
- remote camera study to supplement caribou collar data to help better understand the following:
  - Island caribou (Dolphin and Union herd): season use of shoreline and potential interaction with the proposed port footprint.
  - Mainland caribou (primarily Bathurst herd): migration movement paths and potential interaction with the proposed road.
- Documenting wildlife trails located near the proposed Project.

2.3.1 Wildlife Habitat Modelling

Two habitat modelling approaches were used for wildlife: Resource Selection Functions (RSFs) for the caribou herds (i.e., Bathurst, and Dolphin and Union; see Appendix A), and Habitat Suitability ratings model for muskox (*omingmak*; *Ovibos moschatus*), grizzly bear, and wolverine. While each habitat model aims to quantify habitat quality, they differ in their underlying assumptions, data requirements, methods, and interpretations.

Terrain and land cover variables for the models were generated from available land cover and digital elevation model data. Two sources were used to create the land cover layer: Earth Observation for Sustainable Development of Forests (EOSD; Wood et al. 2002) and Northern Land Cover (NLC; Olthof et al. 2009). EOSD was resampled to change pixel resolution from 25 m to 30 m for consistency with the terrain and NLC layers. Terrain data were created from Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) data (Yamaguchi et al. 1998; Abrams et al. 2015). ASTER files were obtained online from NASA's Earth Observing System Data and Information System (http://earthdata.nasa.gov/).

2.3.1.1 Resource Selection Functions Model

Resource selection functions (RSF) quantify the probability of an animal using a resource unit proportional to its availability in the environment (Manly et al. 2002). RSFs are typically statistical models (often logistic regression) that use animal locations (via satellite collar data or telemetry points) to spatially explicit environmental covariates (e.g., land cover, elevation, distance to water). Each of the environmental covariates is given a coefficient (i.e., a numerical value) that quantifies the strength of the

relationship between each covariate and the animal locations. The output is a relative probability of use, indicating areas that are more likely to be used given their availability, but not necessarily a measure of habitat quality or fitness.

RSFs were developed to compare used (known) versus available (random) locations for the Bathurst caribou and Dolphin and Union caribou herds. These RSFs were developed using GPS collar data acquired from the GNWT and the GN. Further details on the RSF models for the caribou herds can be found in Section 4.1.2.3 and in Appendix A.

2.3.1.2 Habitat Suitability Ratings

Habitat suitability ratings are used to map areas on a landscape that provide the life requisites for a particular wildlife species (Government of British Columbia 2021). The habitat suitability ratings can be based on a variety of sources including Inuit Knowledge, field data, local experts, or other sources. Further details on the habitat rankings for muskox can be found in Section 4.6.4, while details on the grizzly bear and wolverine habitat ratings can be found in Section 5.1.2.

3 Regional Overview

Terrestrial wildlife species within the RSA are largely representative of the entire species assemblage found in the central Low Arctic. Species guilds include large and medium-sized carnivores, ungulates, and small mammals (*avingak*). Populations in the Arctic are affected by climate, food supply, predation, disease, and interactions with humans. Many wildlife species are migratory, resulting in seasonally variable abundance. The assemblage of species present supports many dynamic predator-prey relationships. Ungulate prey (predominantly caribou and muskoxen, but also moose [*tuktukvak*; *Alces alces*]) provide a food source to support large carnivores (e.g., grizzly bear and wolf). Medium-sized carnivores such as foxes (red fox [*kayuktok*; *Vulpes vulpes*] and Arctic fox [*tigiganiak*; *Vulpes lagopus*]) and wolverine often scavenge ungulate and seal (*nattik*) carcass remains, or prey on small mammals, waterfowl, and upland bird eggs and young.

Wildlife habitat within the RSA consists of a variety of tundra plant communities, varying from large expanses of heath tundra to less common riparian-shrub and wetland systems. Abiotic features such as bare rock landscapes, cliffs, and eskers also provide unique wildlife habitats and contribute to biodiversity in the area.

3.1 Species at Risk

Wildlife species within the region have been assessed by the GN-DOE and the GNWT-ECC (Canadian Endangered Species Conservation Council 2022; Government of Northwest Territories 2024a) as well as by the COSEWIC, and have been assigned a status based on their abundance, population trends, and threats. Under the federal *Species at Risk Act* (SARA), a species may be listed as Schedule 1 (species that are classified as Extirpated, Endangered, Threatened, Special Concern), Schedule 2 (species that had been designated as Endangered or Threatened, and have yet to be re-assessed by COSEWIC using revised criteria), or Schedule 3 (species that had been designated as Special Concern, and have yet to be re-assessed by COSEWIC using revised criteria). Territorial species statuses represent those species present in either the NT or NU that are currently listed or under consideration for listing by either federal or territorial species at risk legislation (Government of Northwest Territories 2024a). NT rankings complement federal SARA listings, while NU rankings reflect those designated by the Canadian Endangered Species Conservation Council (CESCC; Canadian Endangered Species Conservation Council 2022). CESCC ranks species in general categories from presumed Extirpated, Possibly Extirpated, Critically Imperiled, Imperiled, Vulnerable, Apparently Secure, Secure, Unrankable, Unranked, Not Applicable, and Not Present. The status of individual species known or potentially present within the RSA is listed in Table 3.1.

Table 3.1 Status of Terrestrial Mammal Species Potentially Present in the Regional Study Area

English Name	Innuinnaqtun Name	Scientific Name	Species Status			
			SARA	COSEWIC	Nunavut	NT
Caribou (Dolphin and Union population)	*tuktu*	*Rangifer tarandus*	Schedule 1 (Special Concern)	Endangered	Vulnerable	Endangered
Grizzly bear	*akhaat* / *akhak*	*Ursus arctos*	Schedule 1 (Special Concern)	Special Concern	Vulnerable	No status
Wolverine	*kalvik* / *kalviak*	*Gulo gulo*	Schedule 1 (Special Concern)	Special Concern	Vulnerable	No status
Caribou (Bathurst population)	*tuktu*	*Rangifer tarandus groenlandicus*	Not scheduled	Threatened	Secure	Threatened
Wolf	*amagok* *akluk* (singular) *aakluit* (plural)	*Canis lupus*	Not scheduled	Not at Risk	Secure	Secure
Arctic ground squirrel	*hikhik*	*Spermophilus parryii*	Not scheduled	Not assessed	Secure	Not assessed
Arctic hare	*okalik*	*Lepus arcticus*	Not scheduled	Not assessed	Secure	Not assessed
Peary Land collared lemming	*kilakmuitan*	*Dicrostonyx groenlandicus*	Not scheduled	Not assessed	Secure	Not assessed
Richardson's collared lemming	*kilakmuitan*	*Dicrostonyx richardsoni*	Not scheduled	Not assessed	Secure	Not assessed
Brown lemming	*ulamikak*	*Lemmus trimucronatus*	Not scheduled	Not assessed	Secure	Not assessed
Ermine	*tigiak*	*Mustela erminea*	Not scheduled	Not assessed	Secure	Not assessed
Meadow vole	-	*Microtus pennsylvanicus*	Not scheduled	Not assessed	Secure	Not assessed
Northern red-backed vole	-	*Clethrionomys rutilus*	Not scheduled	Not assessed	Secure	Not assessed
Barren ground shrew	*ugyoknak*	*Sorex ugyunak*	Not scheduled	Not assessed	Secure	Not assessed
Cinerus shrew	*ugyoknak*	*Sorex cinereus*	Not scheduled	Not assessed	Secure	Not assessed

English Name	Innuinnaqtun Name	Scientific Name	Species Status			
			SARA	COSEWIC	Nunavut	NT
Tundra vole	*avingak*	*Alexandromys oeconomus*	Not scheduled	Not assessed	Secure	Not assessed
Arctic fox	*tigiganiak*	*Vulpex lagopus*	Not scheduled	Not assessed	Apparently Secure	-
Red fox	*kayuktok/ kiangatuk/ kiahigotilik/ maggak*	*Vulpes vulpes*	Not scheduled	Not assessed	Secure	-
Muskox	*omingmak/ pungnik*	*Ovibos moschatus*	Not scheduled	Not assessed	Apparently Secure	Not assessed
Moose	*tuktukvak/ noggak/ nogatokkak*	*Alces alces*	Not scheduled	Not assessed	Unrankable	Not assessed
Victoria collared lemming	-	*Dicrostonyx kilangmiutak*	Not scheduled	Not assessed	Not Present	Not assessed
Arctic shrew	*ugyoknak*	*Sorex arcticus*	Not scheduled	Not assessed	Not present	Not assessed

3.1.1 Focal Species

Focal species for the wildlife baseline field studies include species of conservation concern and/or species with social, cultural, or economic value. They reflect the recommendations of Inuit and other stakeholders, the GN-DOE, and GNWT-ECC, and are generally reflective of the species highlighted in Inuit Knowledge. Field studies were designed to augment existing data for each focal species. Focal species, or species groups, include:

- Caribou
- Muskox
- Moose
- Grizzly bear
- Wolf
- Wolverine
- Foxes
- Small mammals

Inuit Knowledge holders stress that all things are connected and that studying all wildlife within a proposed development area is important.

> *C51 "A little story I would like to tell is about how everything around an area pollinates itself. That's how our water, the quality of the water, everything pollinates itself, bees, caribou, wolf, what have you. It's all a natural ecosystem, all the wildlife. (You need to look at) how each one is going to be impacted by mining. Like all the other mines in the past and nowadays you can see a lot of differences in how the land pollinates itself. Everything interacts in nature and makes this land that we have. It's the same all over, all over the world the animals and everything in that area. How it pollinates itself. It's a story I like to tell because everything is connected to a natural ecosystem. How water is kept clean, through all the animals, land animals, interact together around that area. That's what I look at for our ecosystem." C51 uses the term "pollinate" to explain how everything is connected* (NTKP 2018).

Due to their importance as a wildlife habitat feature, eskers were also included in this Baseline Report. Inuit Knowledge shows that eskers are important as landmarks, for Inuit travel and camping locations, for caribou travel, grazing and relief from biting insects; and for a variety of wildlife habitat requirements (carnivore dens, travel, hunting habitat).

4 Ungulates

This section discusses three of the focal ungulate species: caribou, muskox, and moose.

Caribou are a key terrestrial wildlife species in the region and play a central role in the sustenance, culture, and identity of Inuit peoples and other northern residents. Caribou have been consistently identified as a valued component (VC) in northern environmental assessments and are considered a Valued Cultural Keystone Species. Two caribou herds occur within the Project RSA on a seasonal basis: the Dolphin and Union herd, which occupies mainland NU from the Arctic coast to the Hood River (*Hivogahik*) during winter; and the Bathurst herd, which occupies NU south of the Hood River during spring, summer, and fall (see Figure 4.1). Evidence from collar data (Poole et al. 2010; Government of Northwest Territories 2024b) and observations in the RSA indicate that Bathurst caribou do not generally venture far north of the Hood River during spring and summer (but parts of their calving range extends north to the James River [*Hannigayok*]), and Dolphin and Union caribou are generally found as far south as the Hood River area during winter (but some individuals can occur approximately 30–50 km south of the Hood River). Individual caribou from the Bluenose-East herd occur west of the southern portion of the RSA and very rarely enter the RSA, and individuals from the Beverly/Ahiak caribou herd infrequently approach from the east and rarely enter the southern RSA.

Kitikmiut do not distinguish caribou herds as do western scientists, although they recognize three main types of caribou: mainland caribou (also called barren-ground caribou), which includes Bathurst, Bluenose-East, and Beverly/Ahiak herds; island caribou, which includes the Dolphin and Union herd; and Peary (high Arctic) caribou. Differentiation between herds is less relevant to community members, but there are recognized differences between the herds (Banci and Spicker 2024). For this Baseline Report, reference is made to individual herds.

> *C51 “Ahiak and Bathurst caribou don’t look much different. Almost identical, but they travel in two different directions, one goes south and one goes west” (Banci and Spicker 2024).*
>
> *C13 “Bluenose herd, being from the west, these caribou have longer legs, just like a horse. The Bluenose caribou are taller animals. But the Island caribou are all small, they have a mostly white coat, the Island caribou, and they are smaller animals. That's how you know that they are Island caribou” (Banci and Spicker 2024).*
>
> *C208 “I notice that the caribou from Garry Lakes (Bathurst and/or Beverley herd caribou) are much darker colour than the Queen Maud Gulf caribou and the Victoria Island caribou. I have seen both kinds, the Island caribou and the barren-land caribou, lots. I notice barren-land caribou are much bigger and darker than the Island caribou” (Banci and Spicker 2024).*
>
> *C17 “...The caribou taste different. I think. Island caribou taste better than Bathurst caribou because they have a lot more fat. Our caribou (Bathurst) are kind of big. People mostly eat Bathurst caribou...” (Banci and Spicker 2024).*

> *C211 "The caribou in the Bathurst Inlet (Kingaok) area and further inland are much larger. The caribou from the centre (Beverly herd) are bigger. I've seen different kinds of caribou in the east and south. I used to travel around and see other animals, they're not the same" (Banci and Spicker 2024).*

A theory based on Inuit Knowledge is that caribou from different herds are constantly interacting, mixing, and overlapping, eventually resulting in the development of new herds (Banci and Spicker 2024). Elders have discussed the overlap between the herds. The overlap between Beverly/Ahiak and Bathurst caribou was described as extensive, with caribou over-wintering and migrating together; and island and mainland caribou frequently mixing in the fall, winter, and spring (Banci and Spicker 2024).

> *C211 "The caribou from the Bay Chimo (Omingmaktok) and Bathurst Inlet (Kingaok) area usually get together with those from the east and south, they would gather in one area, that's how the herd would grow. The caribou would gather in the Bathurst Inlet (Kingaok) area, they would get together with other herds from other areas. They would get together in that area during the spring. That's what they do" (Banci and Spicker 2024).*

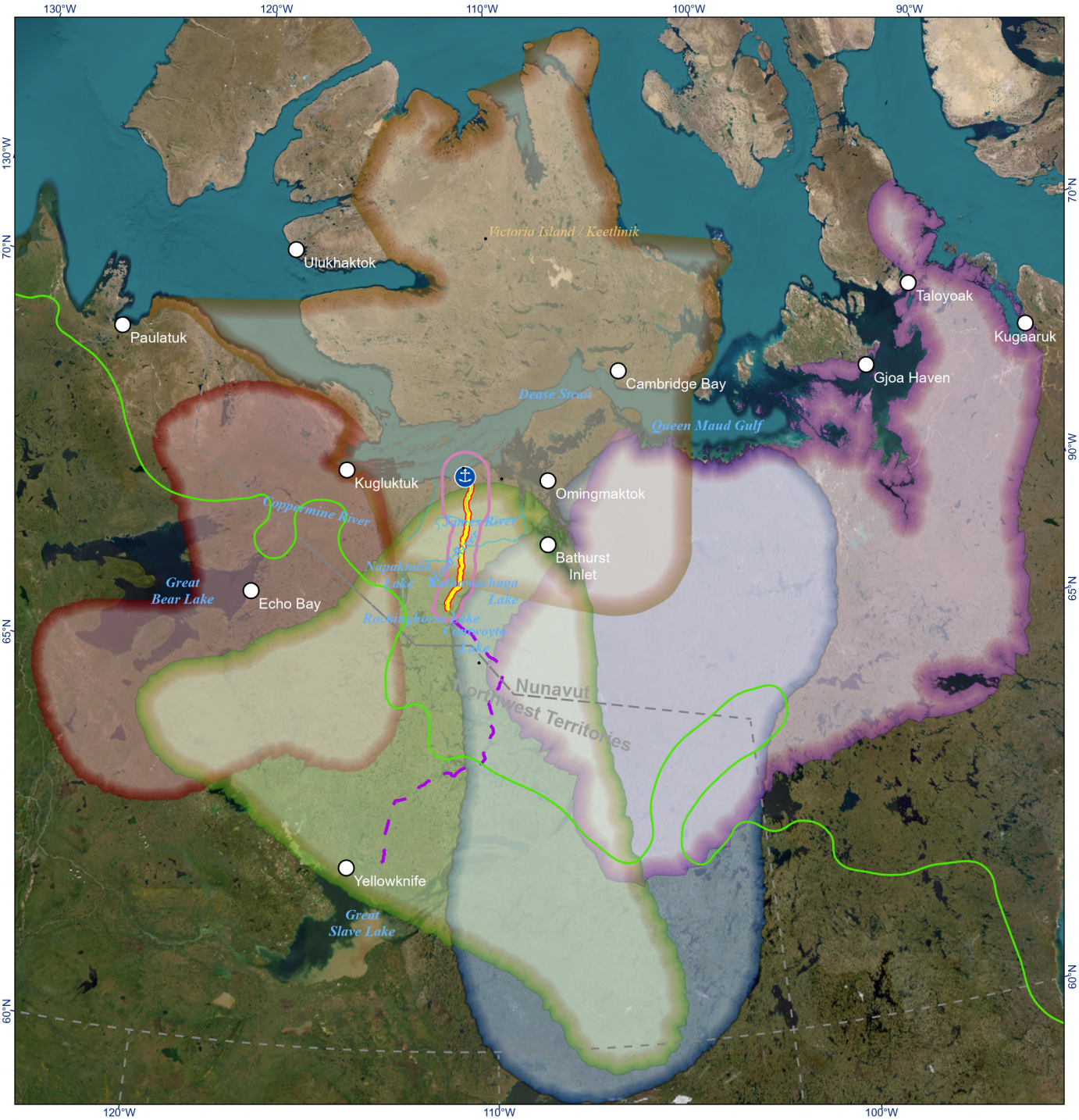
> *C51 "It's the Bathurst and Beverley herds that the Ahiak herd are mixing with. They've always been doing this, for as long as caribou have been there. People are just finally noticing it, these last few years, recently (interview held in 2012). They just started to come forward, these other herds that come around this and other areas too" (Banci and Spicker 2024).*

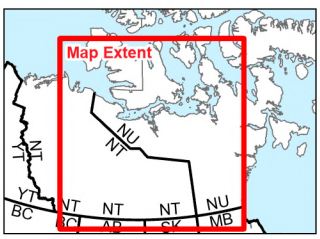
Caribou are an important harvest species in the region. Previous estimates of annual Indigenous harvest approximated 25,000 caribou in NU (Priest and Usher 2004) and a minimum of 11,000 caribou in the NT (Government of Northwest Territories 2006). However, these harvest rates have changed with the recent establishment of harvest management restrictions in response to caribou population declines (e.g., Government of Nunavut 2017, 2020). In addition to the importance of the meat, the hides continue to be used as sleeping mats, traditional clothing, and for other uses (Banci and Spicker 2024).

> *C569 PT-10 "We lived in Kugluktoalok (Tree River) and travelled to Grays Bay to hunt and trap. The Grays Bay area was a yearly traditional hunting trip in early winter, as soon as the ice froze the caribou crossed. I stopped travelling when the Dew Line was started. The area had game, moose, caribou, muskox. Compared to Kugluktoalok, it was a hunting oasis"* (*Banci and Spicker 2024).*

> *C4Kug JA-01 "I went to Grays Bay because there are wolverine, foxes, coloured foxes and tuktu. That's where Oniak's cabin is, on the river Kogloktoakyok. There are moose too. The caribou always stayed there, all around" (NTKP 2018)*.

> *C562 CB-03 "Grays Bay is good hunting all over the area and sometimes caribou in the winter. It's a good hunting and trapping area. Fish and wolverine up towards High Lake area; charr and lake trout along Otkohikhalik (Wentzel River), good fishing. Caribou are hunted around Grays Bay. Grays Bay is also good for seals" (NTKP 2018)*.





Notes
1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Government of Canada, Stantec, Natural Resources Canada, Government of Canada (https://www.nrcan.gc.ca/earth-sciences/geography/download-geographical-names-data/9245)
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- Bathurst Caribou Herd
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- Beverly Caribou Herd

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WEST KITIKMEOT RESOURCES CORP

EDI ENVIRONMENTAL DYNAMICS INC.

Project Location
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Prepared by OliviaLeblanc on 2026-02-23

Client/Project 24Y0376
West Kitikmeot Resources Corp (WKR)
Grays Bay Road and Port

Figure No.
4.1

Title
Caribou Herds within the Vicinity of the Grays Bay Road and Port Project Regional Study Area

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Similarly, muskox are an important element of identity and a source of local food and meat for commercial export. Inuit hunt muskox during all seasons except summer, when the animals are skinny and the pelt quality is poor (Banci and Spicker 2024). Elders interviewed as part of the Naonaiyaotit Traditional Knowledge Project describe how muskox were scarce in the early 1900s, but that populations are recovering and muskox have recolonized areas that were vacant for many years (Banci and Spicker 2024).

> *C51 "There are more muskox now inland now compared to the 1970s and 1950s and those years. They were gone from those areas for long time again until just recently. There are so many muskox on the mainland now that we have a little bit less caribou. They, for some reason, caribou has a great dislike for muskox" (Banci and Spicker 2024).*
>
> *C13 "Sometimes we used to see only one at a time on the land. It was very rare to see lots. In 1978 there was a time when we started seeing lots" (Banci and Spicker 2024).*
>
> *C28 "We saw lots of muskox along the coast by Kugluktoalok (Tree River, area known as Kitagonak) after a certain time" (NTKP 2018).*
>
> *C427 "Muskox are all over in the Grays Bay area. There didn't used to be muskox. There was an albino muskox seen in Kikkaktot (Walker Bay) north of Omingmaktok (a rare occurrence)" (NTKP 2018).*
>
> *C43 "There are lots of muskox just about anywhere in the whole Arctic, all along the coast and islands, mostly around the coast (from Kugakyoak on the west coast to Otkohikhalik (Wentzel River) on the east coast). Some might have eighty or ninety in a herd. I just saw about eighty in a herd over at Kugakyoak. There were lots of muskox" (Banci and Spicker 2024).*

Muskox are increasingly used for guided sport hunts and as a resource for tourism and wildlife viewing. The RSA contains part of the MX/11-CM (central mainland) muskox population (Leclerc 2015) and lies mostly on the western half of the management zone.

Within NU, moose only exist within the Kitikmeot and Kivalliq Regions. Baseline data and Inuit Knowledge indicate that moose are present within the region at very low densities and are predominantly found in river valleys near Coronation Gulf (Banci and Spicker 2024). Not all Elders involved in the NTKP had experience with moose. Moose were primarily known and used by Inuit living near the treeline, but could be found extensive distances from the boreal forest when they had followed river corridors north (Banci and Spicker 2024). Recent Inuit Knowledge (Banci and Spicker 2024) suggests that the distribution of moose may be expanding. Moose have been seen in winter, as well as in other seasons.

> *C51, C110 "Everywhere you see in the creeks for several miles, where you may have shrubs and small willow trees, around these rivers, that's where you find moose. This Western River is no different. You have moose along there too. They like to live where there are tall bushes near the rivers. They like to stay inside the river valleys, in swampy areas mostly" (Banci and Spicker 2024).*

C427 "Moose are found along the rivers and at the coast. Moose follow rivers north during hot weather. When weather gets cold, they go back south (but some stay) to where there are more willows." He mapped two locations with moose, near the mouth of Otkohikhalik (Wentzel River), and near the mouth of Kogloktoakyok" (Banci and Spicker 2024).

C51 "Moose is another animal that's really coming up more. It's always been here but there are more and more showing up nowadays, with climate change" (Banci and Spicker 2024).

4.1 Methods

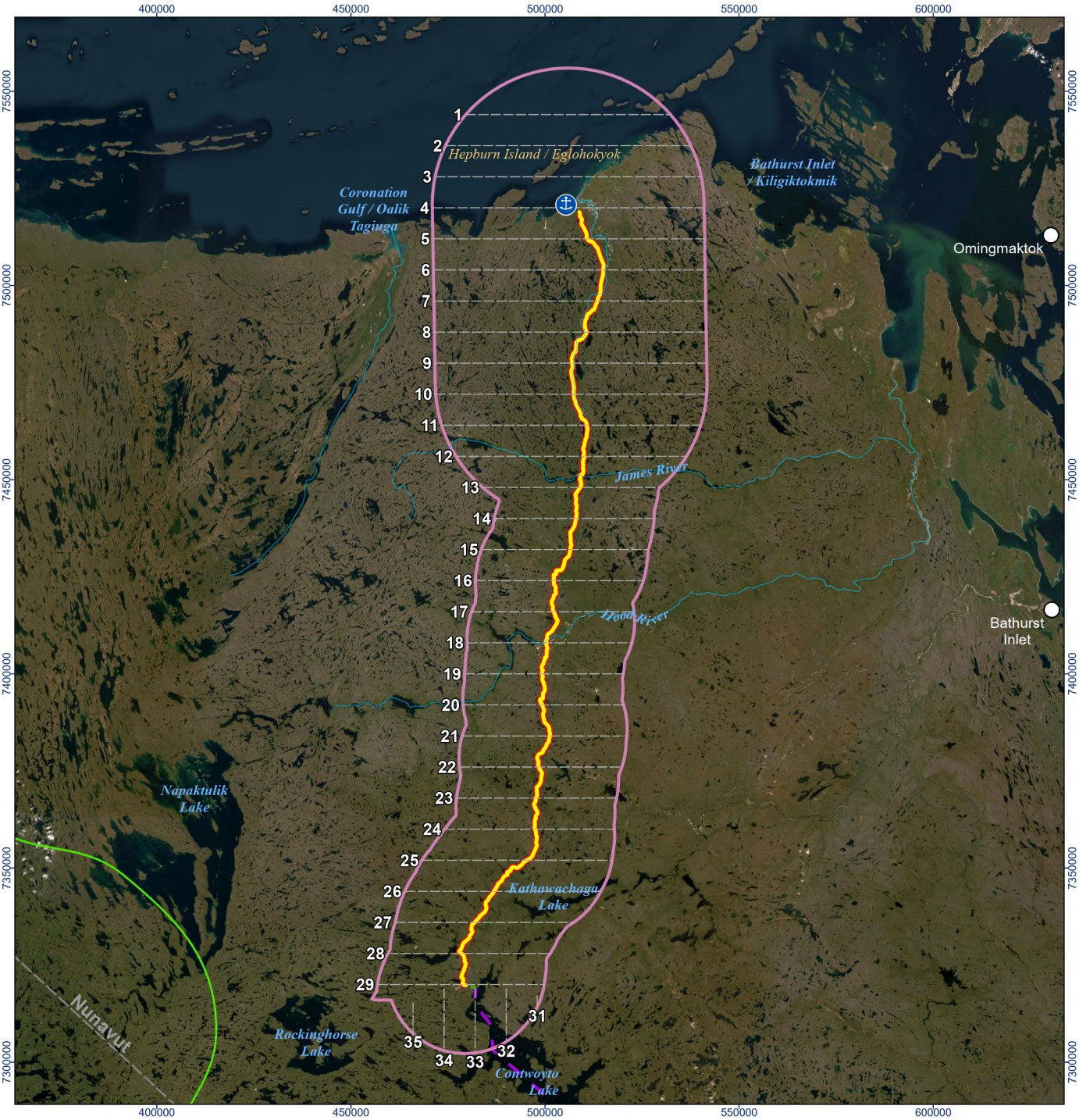
4.1.1 Field Studies

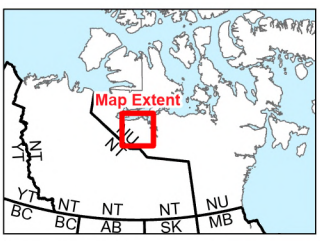
4.1.1.1 Aerial Ungulate Surveys (2004 to 2013)

Standardized aerial fixed wing transect surveys were completed between 2004 and 2013 to collect information on ungulates and other large mammals in the RSA and were flown to correspond with ecologically meaningful seasons for caribou. The timing of these surveys was based, in part, on Inuit Knowledge of migratory behaviour, known migration patterns, and satellite-collar information. Surveys were completed in February and March (winter), April (late winter), May (pre-calving season), early June (calving), late June/early July (post-calving), late July/August (summer), and September and October (fall). These surveys generated data primarily on the relative distribution and abundance, and composition of caribou, muskox, moose, and information on incidental sightings of other species.

Surveys from 2004 to 2006 focused on the High Lake to Grays Bay area, on the southern RSA in 2007 and 2010, and in 2008, 2012, and 2013 covered the entire Project RSA. Transects surveyed in 2005 and 2006 were based on a previous Project description and are slightly different than transects used from 2007 to 2013. The exact survey area within each year varied slightly depending upon seasonal differences within the study area (e.g., open ocean conditions on the northernmost transects during summer), weather (e.g., ice fog), and Project-related alterations.

The aerial ungulate surveys involved flying in a fixed-wing aircraft (Cessna 185, Turbo Beaver, Found Bush Hawk) at approximately 125 to 150 m above ground level at approximately 140 to 160 kilometres per hour (km/h) over the RSA on pre-determined systematic transects (1 km wide transects [500 m each side of the aircraft] spaced 8 km apart; see Figure 4.2). Transect width was confirmed by a flight over a known distance prior to survey. Locations of ungulate observations along transects were marked using a GPS and were corrected for direction and distance to the observation from the airplane. Distance to group was estimated into five distance "bins" (0–100 m, 100–200 m, 200–300 m, 300–400 m, 400–500 m) to facilitate abundance estimates using distance sampling (Buckland et al. 2001). Three observers were used for most surveys.





Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Government of Canada, Stantec, Natural Resources Canada, Government of Canada (https://www.nrcan.gc.ca/earth-sciences/geography/download-geographical-names-data/9245)
   Publication Date: Unknown
   Downloaded: September 7, 2021
   Last Checked: September 7, 2021

- Grays Bay Port
- Survey Transect Flightline
- Grays Bay Road
- Grays Bay Winter Road
- Tibbitt to Contwoyto Winter Road
- Territorial Boundary
- Treeline
- Watercourse
- Wildlife Regional Study Area (RSA)

0 15 30 Kilometres

(At original document size of 8.5x11) 1:1,520,172

N

WEST KITIKMEOT RESOURCES CORP

EDI ENVIRONMENTAL DYNAMICS INC.

Project Location
West Kitikmeot Region
Nunavut

Prepared by OliviaLeblanc on 2026-02-23

Client/Project 24Y0376
West Kitikmeot Resources Corp (WKR)
Grays Bay Road and Port

Figure No.
4.2

Title
Ungulate Aerial Survey Transects within the Grays Bay Road and Port Project Regional Study Area

Path: L:\PROJECTS\2024\WH\24Y0029_GBRP\WildlifeBaselineUpdates_2025_V3.aprx\24Y0376_WildBaseline_Fig4-2_UngulateAerialSurveyTransects_20260220; Revised: 2026-02-23 By: OliviaLeblanc

Caribou observations were classified as cows, calves, and bulls, based on body size and the presence and appearance of antlers at various times of the year based on Gunn and D'Hont (2002). However, many caribou observed were unclassified because individuals were too far off the transect midline to reliably confirm sex and age class and could only be classified generally as nursery or non-nursery groups based on the presence of smaller calves that could be observed at a distance. Muskox were classified simply as adults and calves, and moose were also classified to bulls, cows, or calves where possible. Other species observed were noted and locations recorded.

Density estimates were calculated from on-transect observations. Due to the variation in survey areas throughout the years and to correlate with herd-specific range use, density estimates were split into separate transect sections according to herd and year. For example, the Dolphin and Union caribou herd does not typically venture further south than transect 17 at the Hood River, thus Dolphin and Union caribou density estimates for all survey years were limited to transects 1 to 17 (see Figure 4.2). Also, some surveys were only completed in portions of the RSA (e.g., the High Lake to Grays Bay area), limiting the coverage of the survey area. Some survey years were also limited to certain seasons, such as during 2007 and 2010 when surveys were only completed in August and September. For those reasons, density estimates for the Bathurst herd were calculated only in the southern RSA (corresponding to transects 14–35).

4.1.1.2 Snow-Tracking Surveys (2012)

Winter snow-tracking surveys provide an indication of wildlife distribution in the area. Snow-tracking surveys can provide indices of relative population density within and among surveys. The objective of the winter snow-tracking survey was to document seasonal distribution of ungulates (caribou, muskox, and moose) along the proposed road alignment. Dolphin and Union (island) caribou are known to use parts of the High Lake area as their winter range, and it was expected that high concentrations of caribou tracks would be present in this area. Muskox occur throughout the RSA, and although they likely make seasonal migrations within the region, these movements are not well documented. Moose in the region are known to occur throughout the Arctic mainland, with individuals spotted along the treeless coastline and river valleys. Moose likely occur in relatively low densities throughout the area. Little is known about moose in this region; snow-tracking surveys provided an opportunity to document their distribution in relation to the road alignment, especially with low densities that make it difficult to locate the animals during aerial surveys.

Winter snow-tracking surveys were completed by helicopter along the road alignment. Surveys took place on March 27 and April 7, 8 and 17, 2012 and involved flying at low altitudes (20 to 40 m) at 90 to 125 km/h along the road alignment. Some helicopter surveys were prioritized to cover areas that corresponded with known seasonal distributions of ungulates. Tracks of all medium-sized to large mammals, including caribou, muskox, moose, wolves, wolverine, and fox were recorded. Tracks of caribou were grouped as few (1–5 track sets), some (6–10 track sets), or many (>10), or an indistinguishable amount of track sets. Tracks were identified based on a combination of foot plunge marks, stride length, drag patterns, foraging activity (cratering), and travel pattern (e.g., meandering forager versus straight travel path of lone wolverine). If the identity of a track was in doubt, the helicopter was manoeuvred to provide a closer view of the track and other signs, such as pellets or craters. Three observers participated in each helicopter survey and visible tracks on or near the road alignment were

recorded by GPS. Survey conditions, including snow cover, days since last snowfall, and visibility were recorded along with the GPS location, type, number, and direction of tracks.

4.1.1.3 Camera Deployments (2024)

Remote cameras were deployed between August 22 and September 3, 2024, to document caribou interaction with the Project area. Forty cameras were deployed: 20 cameras in the expected Bathurst caribou range; and 20 cameras in the expected Dolphin and Union caribou range. Camera placements were informed by two desktop assessments that used caribou collar data (see Section 4.1.2.1). First, collared caribou movement paths were analyzed to identify expected crossings with the Project. Spring migration movements by Bathurst caribou were used to identify interactions with the road alignment. Spring/ fall migration (across the Coronation Gulf) and winter (mainland NU) movements by Dolphin and Union caribou were used to identify interactions with the port site and road alignment. Second, RSFs that described calving/ post-calving habitat selection by Bathurst caribou and winter habitat selection by Dolphin and Union caribou were used to map relative habitat quality across the landscape (see Section 4.1.2.3). Camera placement prioritized areas with higher relative quality. These desktop assessments guided site selection along the Arctic shoreline (near the port) and road alignment at a coarse scale (i.e., a 2–10 km radius). Fine-scale camera placement was determined by the availability of boulders or bedrock for mounting, location of wildlife trails, and anticipated movement paths based on topography. The location and description of camera placements are provided in Table 4.1.

Cameras were mounted on custom-made painted rebar tripods anchored in rock (see Photo 4.1). Tripods were mounted by drilling holes in the rock and using concrete wedge anchors to secure the link at the bottom of each tripod into the rock. Wire was used to tighten connection points, if necessary, to limit movement. Cameras were fastened to the tripod using ball-and-socket RAM® mounts and tightened securely. Cameras were aimed at features of interest such as potential movement corridors, mineral licks, or wildlife trails, and positioned to limit the amount of sky captured while still including the horizon. Site characteristics (e.g., coordinates, elevation, lens compass bearing, habitat type, and rationale for placement) were recorded at each deployment location, and pictures of the installation and the surrounding habitat were taken. Of the placement sites in the Dolphin and Union herd range, six had paired cameras (i.e., 12 cameras total) to capture shoreline movement and maximize deployment effort. To estimate snow depth, a marked stake was also placed in the field of view of select cameras.

Due to the open nature of the topography in the study area, the limitations of the motion sensor, and review of trial data (2017 cameras), it was determined that motion-triggered images did not capture much animal use within the field of view. To address this concern, remote cameras installed in 2024 were set to take pictures every 10 minutes in a 24-hour period (daily), in addition to any motion triggers, based on recommendations from Leorna and Brinkman (Leorna and Brinkman 2024).

Photo 4.1 **Components of a rebar camera tripod mount including RAM© mount (left), wired connection points (top right), and concrete wedge anchors (bottom right).**

A subset of cameras (12 sites, see Table 4.1) were viewed from the total 40 camera sites. Images were first screened using imbedded metadata on images to extract motion only triggered files and exclude scheduled time lapse photos. Once filtered by trigger type if the quantity of images exceeded 500 images, folders were run through AddaxAI, an AI model that identifies animals, people, and vehicles in camera images. This model is trained on several million images from a variety of ecosystems, is highly accurate, and is especially useful in the data analysis workflow for eliminating blank images from datasets (i.e., images without animals, people, or vehicles) thus increasing the efficiency of image processing and data extraction (Fennell et al. 2022).

Once timelapse images were eliminated from the datasets, photo analysis was streamlined with the use of third-party analytical software, Timelapse2 (Saul 2022). This program, and its sister software Timelapse Template Editor, facilitate the development of a custom template that extracts specified metadata from images and defines the Project-specific data collection. In collaboration with MegaDetector, images could then be filtered to review only wildlife, people, or vehicle, or set date ranges. All retained images were then manually reviewed, and data metrics were recorded for each image. For the purpose of this subset data review, data metrics recorded for animal motion detection included site ID, date and time, temperature, species, minimum group size (i.e., the minimum number of individuals of one species detected within an event) and general comments.

When a string of images was recorded, the set of images was classified as the same occurrence when images were taken less than 10 minutes apart. This allowed reviewers to determine minimum total counts that may include multiple sets of triggers and animals as they moved past a camera or an individual that was active in front of a camera for a long period of time.

Table 4.1 Remote Cameras Deployed in Bathurst Caribou and Dolphin and Union Caribou Herd Ranges Near the Project

Herd	Site ID	Location ID	Date Deployed	Latitude	Longitude	Elevation (masl)[1]	Vegetation Type	Road Distance (m)[2]	Comments
Bathurst	BA24-01	Jericho	2024-08-30	66.038161	-111.434524	466	Barren/exposed rock	988	Abundance of wildlife trails and tracks along water features and between ridge lines.
Bathurst	BA24-02	Skull Flats	2024-08-30	66.081274	-111.426927	434	Graminoid and heath	2,199	Abundance of wildlife trails, caribou skull, with wolf tracks.
Bathurst	BA24-03	Lunch Lookout	2024-08-30	66.061443	-111.459283	445	Heath and rock	93	Lots of caribou trails in all directions.
Bathurst	BA24-04	Big Sky	2024-08-30	66.069055	-111.385673	454	Shrub and rock	3,346	Wildlife trails in area, camera located at trail convergence.
Bathurst	BA24-05	Foggy Stretch	2024-08-31	66.715154	-111.015527	465	Heath	6	Camera located at area with intersecting and concentrated wildlife trails.
Bathurst	BA24-06	Goose Feather	2024-08-31	66.697317	-110.666226	427	Heath and shrub	14,875	Abundance of caribou trails and some browse. Some indication of movement paths along river.
Bathurst	BA24-07	Mushroom Hill	2024-08-31	66.786418	-110.115598	446	Heath and shrub	36,051	Indication of caribou trails and pellets in area, good forage in deployment area.
Bathurst	BA24-08	Tom's Area	2024-08-31	66.713330	-110.083034	456	Graminoid and rock	40,719	Wildlife trails leading towards water body. Caribou antler shed and pellets found at site.
Bathurst	BA24-09	Take Your Lumps	2024-08-31	66.584809	-110.118678	474	Barren, some heath and graminoid	37,778	Some caribou pellets and forage at site.
Bathurst	BA24-10	Road Ridge	2024-08-31	66.614591	-111.013658	485	Graminoid along lakes	264	Wildlife trails by camera descending ridge, abundance of trails along edge of water body.
Bathurst	BA24-11	River Crossing	2024-09-01	66.131271	-111.332446	406	Graminoid and shrub	3,243	Wildlife trails along edge of river with evidence as a staging area for crossing using collar data.

Herd	Site ID	Location ID	Date Deployed	Latitude	Longitude	Elevation (masl)[1]	Vegetation Type	Road Distance (m)[2]	Comments
Bathurst	BA24-12	Ptarmigan Alley	2024-09-01	66.141428	-111.389653	439	Shrub and graminoid	565	Trails and tracks converge at deployment site with forage.
Bathurst	BA24-13	Quartz Point	2024-09-01	66.201497	-111.325641	479	Rock and heath	250	Wildlife trails and caribou pellets at site.
Bathurst	BA24-14	Big Shed	2024-09-02	66.237569	-111.152076	408	Shrub	3,425	Wildlife trails at site funnel towards nearby river.
Bathurst	BA24-15	Little Shed	2024-09-02	66.261324	-111.207405	440	Shrub and graminoid	84	Abundance of wildlife trails with an antler shed and caribou pellets.
Bathurst	BA24-16	Matt's Place	2024-09-02	66.283017	-111.300626	448	Shrub	4,564	Wildlife trails and evidence of muskox and caribou use at site.
Bathurst	BA24-17	Spawn Point	2024-09-03	66.507799	-110.821905	518	Graminoid, shrub, and exposed rock	8,940	Abundance of wildlife trails and caribou tracks. Collar data supports use of this site during post-calving season.
Bathurst	BA24-18	Caribou Crossing	2024-09-03	66.387431	-110.812693	493	Graminoid and shrub	10,351	Narrow and heavy wildlife trails intersect at camera location with high density of trails in field of view.
Bathurst	BA24-19	Lemming Hill	2024-09-03	66.437899	-111.052816	528	Graminoid and shrub	293	Abundance of intersecting trails at site.
Bathurst	BA24-20	Drop Dead End	2024-09-03	66.560378	-110.974857	530	Heath and shrub	212	Convergence of wildlife trails along gully in field of view.
Dolphin and Union	DU24-01	Port Fuel Cache	2024-08-26	67.798881	-110.853582	9	Shrub	367	Location near fuel cache and port site, some grizzly bear sign at site.
Dolphin and Union	DU24-04	2017 Camera 4	2024-08-23	67.782130	-110.798802	24	Open shrubland valley	309	Adjacent to old Site 04 from 2017.

Herd	Site ID	Location ID	Date Deployed	Latitude	Longitude	Elevation (masl)[1]	Vegetation Type	Road Distance (m)[2]	Comments
Dolphin and Union	DU24-05	2017 Camera 5	2024-08-27	67.776068	-110.929918	21	Heath	3,732	Some caribou tracks at site, camera is up on ledge pointing towards valley, adjacent to old Site 05 from 2017.
Dolphin and Union	DU24-06	2017 Camera 6	2024-08-23	67.769917	-110.833275	48	Shrub	1,867	Adjacent to old Site 06 from 2017.
Dolphin and Union	DU24-09	Jamison Islands	2024-08-24	67.968811	-110.212806	3	Heath	31,778	Paired camera. Potential caribou shore crossing location, some wildlife trails at site.
Dolphin and Union	DU24-10	Jamison Islands	2024-08-24	67.968811	-110.212806	3	Heath	31,778	Paired camera. Potential caribou shore crossing location, some wildlife trails at site.
Dolphin and Union	DU24-11	Wentzel River	2024-08-24	67.879331	-110.656776	8	Heath	11,942	Paired camera. Potential caribou shore crossing location, some caribou pellets at site.
Dolphin and Union	DU24-12	Wentzel River	2024-08-24	67.879331	-110.656776	8	Heath	11,942	Paired camera. Potential caribou shore crossing location, some caribou pellets at site.
Dolphin and Union	DU24-13	Kennarctic River	2024-08-25	67.819462	-110.778614	4	Shrub	3,735	Paired camera, site is in area of interest for winter caribou movement.
Dolphin and Union	DU24-14	Kennarctic River	2024-08-25	67.819462	-110.778614	4	Shrub	3,735	Paired camera, site is in area of interest for winter caribou movement.
Dolphin and Union	DU24-15	Airstrip	2024-08-25	67.785325	-110.760331	34	Heath	1,179	Deployed in location of potential airstrip to monitor caribou use.
Dolphin and Union	DU24-16	White Wolf Bay	2024-08-26	67.762394	-111.018302	12	Graminoid	7,687	Paired camera, in area of interest for winter crossing and shoreline movements.

Herd	Site ID	Location ID	Date Deployed	Latitude	Longitude	Elevation (masl)[1]	Vegetation Type	Road Distance (m)[2]	Comments
Dolphin and Union	DU24-17	White Wolf Bay	2024-08-26	67.762394	-111.018302	12	Graminoid	7,687	Paired camera, in area of interest for winter crossing and shoreline movements.
Dolphin and Union	DU24-18	Ledge Lakes	2024-08-26	67.748983	-111.224884	0	Graminoid	16,282	Paired camera, site is area of interest for shoreline movements and winter ice crossing.
Dolphin and Union	DU24-19	Ledge Lakes	2024-08-26	67.748983	-111.224884	0	Graminoid	16,282	Paired camera, site is area of interest for shoreline movements and winter ice crossing.
Dolphin and Union	DU24-20	Hepburn Island	2024-08-26	67.862860	-111.063515	0	Heath	11,290	Paired camera. Site is area of high interest based on collar data. Adult and calf caribou tracks found in potential mineral lick.
Dolphin and Union	DU24-21	Hepburn Island	2024-08-26	67.862860	-111.063515	0	Heath	11,290	Paired camera. Site is area of high interest based on collar data. Adult and calf caribou tracks found in potential mineral lick.
Dolphin and Union	DU24-22	Lichen Ridge	2024-08-27	67.454490	-110.784115	240	Barren and exposed rock	1,614	Site selected based on use from collar data, good lichen forage and caribou pellets on site.
Dolphin and Union	DU24-23	Ulu Trails	2024-08-28	67.043214	-110.854404	406	Hummocky graminoid	194	Site has potential for winter and spring caribou use from collar data, high concentration of trails in area.
Dolphin and Union	DU24-24	Lichen Ridge	2024-09-01	67.457369	-110.784183	282	Heath and exposed rock	1,465	Site selected based on use from collar data, good lichen forage and caribou pellets on site.

Notes:

[1] Metres above sea level.

[2] Distance to the Project road alignment.

4.1.1.4 Summer Trail Surveys (2012 and 2024)

Aerial trail surveys were completed via helicopter along the proposed road alignment on July 5–6, 2012 and August 30, 2024. The objective of the surveys was to document the relative density and distribution of wildlife trails near or crossing the proposed road alignment in the RSA. Surveys in 2024 primarily focused on the proposed road aligned from its southern terminus up to the Hood River, thereby covering the extent of trails likely used by Bathurst caribou during the growing season. Three observers counted trails that neared or crossed the road alignment on either side of the helicopter. Trails were documented for their density (few: 1–5 trails; some: 6–10 trails; or many: >10 or an indistinguishable number of trails), continuity, and predominant direction (east-west or north-south). The locations of all trails were recorded using a GPS device.

4.1.2 Desktop Studies

4.1.2.1 Caribou Collar Data and Seasonal Ranges

Bathurst Caribou (1996 to 2024)

Bathurst caribou collar data (1996 to 2024) were provided by GNWT-ECC (Government of Northwest Territories 2024b).

Seasonal Ranges

Seasonal ranges for the Bathurst herd were provided by GNWT-ECC (Nick Wilson [GNWT] 2024, pers. comm.). Those seasonal ranges were created using caribou satellite and GPS collar data (1996 to 2023) during the herd's spring migration (April 20 to June 1), calving/ post-calving (June 2 to June 28), summer (June 29 to September 6), fall (September 7 to November 30), and winter (December 1 to April 19); dates follow those identified in the *Bathurst Caribou Range Plan* (Government of Northwest Territories 2019).

Caribou location data from 1996 to 2007 are associated with satellite collars, which provided a location fix (on average) every 1 to 5 days; location error from these satellite collars was generally <150 m but could range up to 1 km (Gunn et al. 2008b). In the fall of 2008, GPS collars were deployed on Bathurst caribou, which provided increased accuracy (<20 m) and fix frequency, while some satellite collars remained on individuals. Most of the data from 2008-onward is acquired from GPS collars.

Collars that contained >50 percent (%) of the data for a given season were included when developing seasonal ranges; e.g., a collar required a minimum of 21 days of data during spring migration to be included in the range development for that season (42 days total) (Nick Wilson [GNWT] 2024, pers. comm.). To delineate seasonal range boundaries, kernel density estimation (KDE) was implemented using a 1-km (cell size) standardized grid with a seasonally variable reference bandwidth (Nick Wilson [GNWT] 2024, pers. comm.). Seasonal ranges were defined by a 95% utilization distribution (UD) boundary representing the probability of use based on density values (Worton 1989). In other words, the 95% UD seasonal ranges captured 95% of caribou collar locations for a given season.

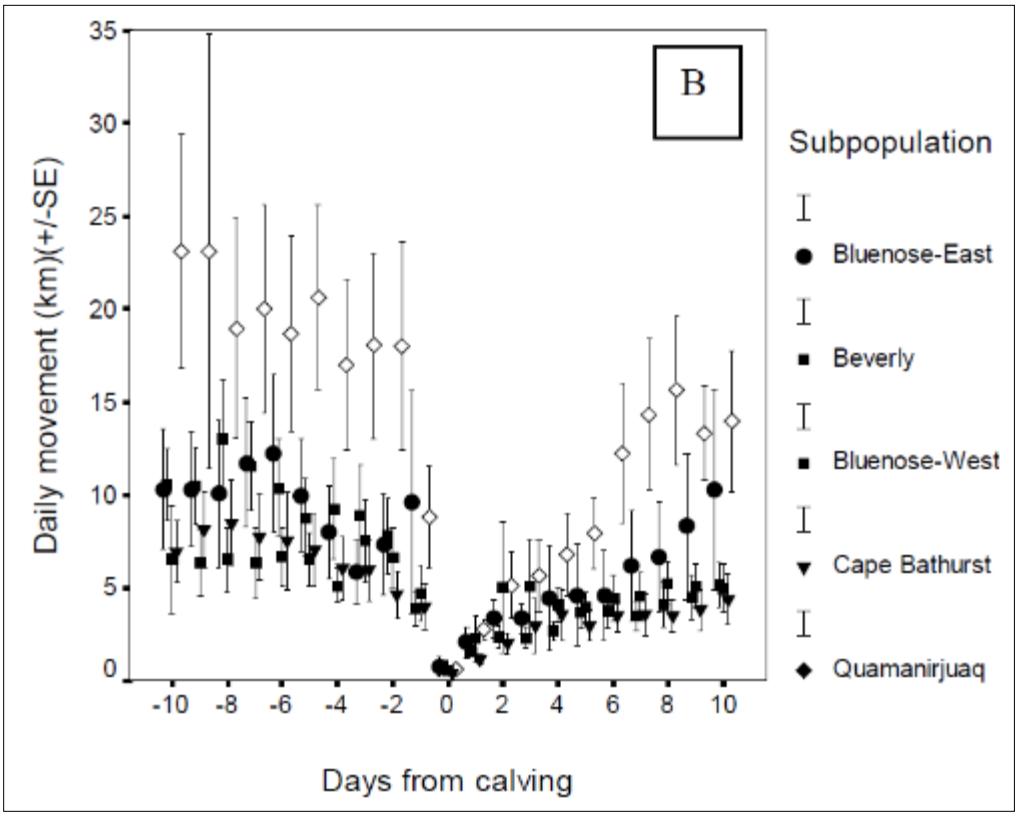
Peak Calving Area

Spatial and temporal attributes of the Bathurst caribou herd peak calving area (defined using the location of estimated calving events) were analyzed using methods similar to Gunn et al. (2008c). Gunn et al. (2008c) found reasonable agreement between caribou locations during peak calving (as determined from satellite collars) and areas of moderate to high-density caribou as observed during aerial surveys.

The movement rates of collared female caribou (cows) were examined to determine whether they calved in known calving areas for the Bathurst herd. Ultimately, the movement of each cow was assessed using a dual approach: first, by assessing mean daily movement rates using a box-and-whisker plot, and second, by observing the animal's movement trajectories in a GIS. Pregnant cows typically decrease movement immediately prior to giving birth, with a continued reduction in movement in the immediate days after calving (Gunn and Russell 2008). Bathurst caribou calving dates were determined by examining the movement rates of collared female caribou during the general calving season, from mid-May to late June. Calving was estimated by identifying a period of decreased movement rate paired with spatial analysis of movement patterns, e.g., identification of circular movement in a small radius as opposed to a directional trend. If numerous low movements were observed within a likely calving period, generally the earliest date of decreased movement was chosen (sensu Nagy 2011; see Figure 4.3). If individuals were found to be distant from known calving areas, the entire data set for that individual was examined to determine whether it calved in another calving area, if it was likely barren, or if it calved outside the known calving areas. Caribou removed from the databases had either obviously calved in neighbouring calving areas, had limited collar data available during the calving period, were suspected to be barren, or were located a considerable distance from the known Bathurst calving area and were considered an outlier.

> *C5 "They move from here to here (from Bathurst Inlet to Kent Peninsula) depending on the lateness of the spring. When the snow gets too soft they quit traveling…. I know these two areas (west and east Bathurst. Inlet) because. I've seen caribou giving birth to lots of calves" (NTKP 2018).*
>
> *C23 "Caribou have their calves where there are flat wetlands and where the young calves won't have to stumble when they are born because the caribou are always moving. Some of the caribou give birth as they are walking north. Soon after it's born the young calf starts walking right away…. They give birth away from cliffs or rocky areas because as soon as the young is born they start to walk right away, even if it stumbles. Maybe after two days the calves start to graze, eating the grass while they are still feeding from their mothers" (Banci and Spicker 2024).*
>
> *C25 "The caribou give birth quickly. The female caribou would be grazing and the newborn calf would be safe from other wildlife; such as wolves and bears … They calve where the plants are plentiful to eat. The female caribou run away from the wolves leaving the newborn calves when they have trouble. If it's not approached by other wildlife, its mother grazes near the newborn calf" (NTKP 2018).*

Figure 4.3 Mean Daily Movements of Mainland Caribou during the General Calving Period are Used to Estimate Calving Dates (taken from Nagy 2011)



Once the calving date was estimated for each animal, the date of peak of calving was calculated for each year (when 50% of cows calved that year, calculated as the median date among individuals). The 7-day period of reduced movement likely associated with calving (Gunn et al. 2008a) was used to determine the peak calving areas (polygons) and centroids. Fix locations suggesting calving, plus six days, were selected and formed the basis of the peak calving polygon delineation.

Following the methods outlined by Caslys Consulting Ltd. (2016), the KDE method was used to develop UD polygons that represented the probability of use based on density values (Worton 1989) for each year of collar data. The most influential variable affecting polygon shape and size is the input search radius, also known as the bandwidth or smoothing parameter. As the search radius decreases, the prediction accuracy for the range boundary increases. As the search radius increases, the resulting range boundary becomes smoothed, representing a broader density of use. There are several ways to derive the search radius, and for the analysis conducted on behalf of the GN, the GIS approach used two different methods (the reference search radius and least squares cross-validation), resulting in a range of search radii from 3–20 km. Based on justifications ground in ecology (e.g., Boulanger et al. 2012) and logistics (the minimum distance that produced continuous range boundaries), Caslys Consulting Ltd. (2016) used an 11 km search radius. The same 11 km search radius was used here to develop annual 95% UD peak calving range boundaries. Annual peak calving areas were derived using the Kernel Density

ArcGIS Pro tool (ESRI 2025). To connect these areas, which were often patchy, each individual polygon was buffered by 11 km, then all the buffered polygons were merged and dissolved (i.e., shared edges removed), and finally, a negative 11 km buffer was applied to restore it to the original 95% density class. Finally, annual peak calving areas were merged to create a cumulative peak calving area and identify areas of greatest overlap from 1996 to 2024.

To determine whether annual peak calving areas showed a consistent directional shift over time, linear regressions were run to examine the relationship between year and UTM X coordinate (UTM_x ~ year; longitudinal shift) as well as year and UTM Y coordinate (UTM_y ~ year; latitudinal shift). Regressions were also fit with a quadratic term for year, and the performance of the two models for each direction were compared using Akaike's Information Criterion corrected for small sample size (AICc; Burnham and Anderson 2002). Multiple models were considered in the case that ΔAICc < 2. Autocorrelation was assessed using the Durbin-Watson test; if necessary, the Cochrane-Orcutt procedure was applied to reduce autocorrelation in model residuals to ensure robust inference. Regression coefficients were interpreted to determine the shift in peak calving areas over time. A regression model was also fit to determine whether the size of peak calving areas changed over time.

Dolphin and Union Caribou (1987 to 2024)

Dolphin and Union caribou collar data (1987 to 2024) were obtained from the GN-DOE (Government of Nunavut 2025).

Winter Range (Mainland Nunavut)

The Dolphin and Union herd winter range was delineated using a combination of the herd's core winter range (GNWT 2015) and collar data locations (1987 to 2024) on mainland NU during winter. The winter range expands the 2015 core winter range to include recent collar data. The winter range is bounded by the shoreline along the east (Bathurst Inlet [*Kiligiktokmik*]) and north (Coronation Gulf) and the 2015 core winter range boundary along the west. The south boundary was expanded to encompass most contemporary collar locations. This delineation provided a broad extent of where Dolphin and Union caribou may occur on mainland NU.

4.1.2.2 Caribou Migration Movement Modelling

Brownian bridge movement models (BBMMs) were used to quantify space use during the spring and fall migrations of Bathurst caribou (GPS collar data from 2009 to 2024) and Dolphin and Union caribou (GPS collar data from 2015 to 2024). BBMMs characterize the movement pathway as a spatial probability distribution (or UD) of the animal using a given location at a point in time. BBMMs consider the time interval and sequence of GPS collar locations when modelling the UD of an animal travelling along a given path (Horne et al. 2007).

Migration Classification

The timing of caribou migrations can show significant variability among years and individuals (Nicholson et al. 2016; Gurarie et al. 2019). To ensure that the analysis only considered locations collected during the migration, this period was classified for each caribou in every year using the Migration Mapper application (Merkle et al. 2022). First, the traditional date ranges for herd migrations were considered (Bathurst Caribou Advisory Committee 2021; Mennell 2021; Species at Risk Committee 2023a). Then, caribou movement routes from GPS collar data were visualized using Migration Mapper. The start date of the migration was identified as the point when movement velocity increased, paired with consistent directionality in movement. End date was characterized as the point when velocity decreased, and movements became less directional and more circular in nature. Spring and fall migrations by Dolphin and Union caribou, and spring migration by Bathurst caribou, were classified in this way. However, the fall migration of Bathurst caribou occurs in a slow, meandering nature and is not characterized by strong directional movement or increased velocity, as described by Inuit Knowledge (Banci and Spicker 2024) and western science (Mennell 2021). Thus the start and end dates were defined using the dates that Mennell (2021) used when examining Bathurst caribou seasonality.

Brownian Bridge Movement Models

BBMMs were used to model migration-related UD using animal locations obtained from GPS collars. BBMMs require data to be collected at a relatively short time interval, thus data were only used from years when most collars had ≥1 GPS fix per day. BBMMs were fit for collared individuals in each year to develop a UD for each animal. Then, following Sawyer et al. (2009), the mean of all UDs was calculated for each herd in every year, as well as across all years. The 25th, 50th, 75th, and 95th percentiles of annual and total UD probability distributions were calculated to determine areas used most during migration. All BBMMs were fit using the ‘bbmm’ package (Nielson et al. 2019) in R software for statistical computing (R Core Team 2025). An output gride cell size of 500 m was used to balance computation time and ecological relevance (Nicholson et al. 2016). The analysis was completed on collared females because they generally are found to best represent the movement patterns of herds, as determined by Inuit Knowledge and western science (Nicholson et al. 2016; Mennell 2021; Banci and Spicker 2024). Since all collared animals from the Dolphin and Union herd were females, the entire dataset was used to quantify migration routes.

4.1.2.3 Habitat Modelling

Resource Selection Function Modelling for Caribou

RSF is a statistical tool that helps describe the environmental variables selected and avoided by animals (Manly et al. 2002). These functions compare ‘use’ data (e.g., GPS fixes of a known location) against ‘availability data’ (i.e., randomly sampled locations). If a population uses a resource more than it is available, that resource is *selected*. In contrast, if a resource is used less than it is available, that resource is *avoided*. The RSF predicts the *relative* probability of selecting a given resource type (Lele et al. 2013). Furthermore, the RSF can be used to make spatial predictions of resource selection in a heterogeneous landscape composed of multiple resource types.

RSFs were developed using GPS collar data for the following caribou herds and seasons:

Bathurst Caribou (2009 to 2024)

1. Calving/Post-calving (June 2 to June 28)
2. Summer (June 29 to September 6)
3. Fall (September 7 to November 30)

Dolphin and Union Caribou (2015 to 2023)

1. Pre-Spring Migration Staging and Post-Fall Migration (April 15 to May 28, November 9 to 30)

   Notes: The objective in assessing these combined seasons was to describe habitat selection when space use is concentrated along the mainland ocean shoreline. Spring migration typically occurs from April 15 to May 28, but most caribou began staging near the mainland shoreline around April 25 according to GPS collars with 50% seasonal coverage (see Appendix A). Fall migration onto mainland NU typically occurs from November 9 to 30, but most do not reach mainland NU until approximately November 23 according to GPS-collared Dolphin and Union caribou with 50% seasonal coverage (see Appendix A).
2. Winter (December 1 to April 14)

The seasonal date ranges used for RSFs were retrieved from the *Bathurst Caribou Range Plan* (Government of Northwest Territories 2019) and the *Species Status Report for Dolphin and Union Caribou* (Species at Risk Committee 2023b). For Dolphin and Union caribou, only collar locations on mainland NU were considered when developing RSFs; according to collar locations on the mainland, pre-spring migration staging typically began on April 25 or later, and post-fall migration arrival on mainland NU occurred on November 23 or later.

Seasonal RSFs were developed within each herd's 95% UD seasonal ranges (see Caribou Collar Data and Seasonal Ranges in Section 4.1.2). However, these seasonal ranges were modified to include only the largest contiguous polygon for each season; in other words, smaller polygons disconnected from the central mass of seasonal ranges were excluded when defining habitat availability.

The modelling methods and results are presented in Appendix A and incorporated into relevant sections of the text.

Habitat Ratings for Muskox

Habitat ratings for muskox were completed for an area larger than the RSA based on information regarding muskox movements. A study west of Kugluktuk found that the average home range size of muskoxen, measured as the mean maximum straight-line distance between summer and winter ranges, was 75–85 km, with a maximum straight-line distance of 138.5 km between seasonal ranges (Gunn and Fournier 2000a). Based on this information, habitat ratings for muskox were completed using a 100 km buffer around the PDA.

Habitat ratings were assigned to land cover classes for summer (growing season) and late winter based on a review of the literature (Ferguson 1991; Klein et al. 1993; Nault et al. 1993; Gunn and Fournier 2000a; Danks and Klein 2002) and by comparing the proportion of muskox observations by cover class obtained during Project surveys with the availability of cover classes within the RSA (note that while muskox observations were only available within the RSA, the habitat selection observed was assumed to be representative of selection throughout the 100 km buffer around the PDA). The following habitat suitability classes were used to categorize the habitat ratings:

- **High (H)** — Cover types most preferred
- **Moderate (M)** — Cover types neither greatly preferred nor avoided
- **Low (L)** — Cover types generally selected against
- **Nil** — Cover types not used, not appropriate to consider, or with no data available with which to model suitability

The habitat suitability ratings for muskox are provided in Table 4.2.

4.1.3 Regional Bathurst Caribou Surveys

The Government of NT has completed regional surveys of the Bathurst caribou herd's calving range multiple times between 1965 and 2022, including full calving range photographic surveys for population estimates (e.g., Adamczewski et al. 2019, 2022, 2023), and reconnaissance surveys (e.g., Boulanger et al. 2016b). Calving range surveys estimate the number of breeding females on the calving range, which is typically extrapolated to derive a total population estimate using the proportion of females on the calving range that were pregnant (to estimate the female component of the population) and fall composition surveys to estimate sex ratios and the male component. Pregnancy rates during surveys are most reliably determined by observing the presence of calves at heel, distended udders and/or hard antlers during calving range surveys or from harvested cows (Adamczewski et al. 2009). From 1965 to 1995 surveys began with an unsystematic search of known calving range to find concentrations of caribou, but by 1996, satellite collars were deployed on females in the herd, allowing surveyors to locate groups prior to the survey (Sutherland and Gunn 1996). Survey methodology has evolved throughout the years, ranging from random block surveys (1971, 1974), stratified transect surveys (1977, 1978, 1980, 1982, 1984, 1986), to photographic surveys (from 1980 onwards, in combination with stratified transect surveys; Sutherland and Gunn 1996). In more recent years, strata have been divided into low, medium, and high density, with aerial systematic surveys for visual estimation used in the low density stratum, and aerial photography used in high and medium density strata (Nishi et al. 2007), and with double observer methods used to correct for caribou sightability during visual observations (Boulanger et al. 2016b).

Table 4.2 Muskox Habitat Suitability Ratings

Cover Type ID	Description	Layer Source	Muskox Late Winter	Muskox Summer
0	No Data	EOSD/ NLC	No Data	No Data
1	Tussock graminoid tundra (<25% dwarf shrub): Moist tussock tundra with <25% dwarf shrubs <40 cm tall and moss. May also include lichen.	NLC	H	H
2	Wet sedge: Graminoids and bryoids - Wet sedge including cottongrass that is saturated for a significant part of the growing season, also includes moss and may include <10% dwarf shrubs <40 cm tall.	NLC	M	H
3	Moist to dry non-tussock graminoid / dwarf shrub tundra with 50–70% vegetated cover. Includes a mixture of graminoids, dwarf erect <40 cm and prostrate dwarf shrubs. May also include trace amounts of lichen and moss.	NLC	H	H
4	Dry graminoid prostrate dwarf shrub tundra with 70–100% cover. Upland or well-drained non-tussock graminoid tundra with low to prostrate dwarf shrub heath.	NLC	H	H
5	Low shrub (<40 cm; >25% cover): Moist erect low shrub <40 cm forming more than 25% of the vegetated cover, consisting mainly of dwarf birch and/or willow. The remaining cover consists of graminoids, lichen, and may contain prostrate dwarf shrubs and bare soil.	NLC	M	M
6	Tall shrub (>40 cm; >25% cover): Moist to wet erect tall shrub >40 cm forming more than 25% of the vegetated cover, consisting mainly of dwarf birch (Betula), willow (Salix) and/or alder (Alnus). The remaining cover consists of graminoids, lichen and <10% prostrate dwarf shrubs.	NLC	L	H
7	Prostrate dwarf shrub: Dryas/heath, usually on bedrock or till - Generally dry >50% vegetated cover consisting of prostrate dwarf shrubs, graminoids and may contain <10% lichen and moss.	NLC	M	M
8	Sparsely vegetated bedrock: Barren surfaces with 2–10% vegetation cover on acidic, igneous, mostly consolidated bedrock. Vegetation cover generally consists of graminoids and prostrate dwarf shrubs.	NLC	M	M
9	Sparsely vegetated till-colluvium (2–10% cover): Barren surfaces with 2–10% vegetation cover on nonacidic and calcareous bedrock and colluvium. Vegetation cover generally consists of graminoids and prostrate dwarf shrubs.	NLC	L	L
10	Bare soil with cryptogam crust - frost boils: Unconsolidated barren surfaces having experienced significant cryoturbation with 2–10% vegetation cover consisting of graminoids and cryptogam plants.	NLC	L	L
12	Topographic shadow.	NLC	No Data	No Data
13	Barren: <2% vegetation cover on nonacidic and calcareous parent material.	NLC	L	L

Cover Type ID	Description	Layer Source	Muskox Late Winter	Muskox Summer
14	Wetlands: vegetated areas where the water table intersects the land surface all or part of the year. Vegetation cover may include graminoids, mosses, and/or dwarf shrub.	NLC	M	M
20	Water: Lakes, reservoirs, rivers, streams, or salt water.	EOSD/ NLC	L	L
31	Ice/snow: Areas permanently covered by snow and ice (glaciers).	EOSD/ NLC	Nil	Nil
32	Rock/Rubble: Bedrock, rubble, talus, blockfield, rubbley mine spoils, or lava beds.	EOSD	L	L
33	Exposed Land: River sediments, exposed soils, pond or lake sediments, reservoir margins, beaches, landings, burned areas, road surfaces, mudflat sediments, cutbanks, moraines, gravel pits, tailings, railway surfaces, buildings and parking, or other non-vegetated surfaces.	EOSD	L	L
40	Bryoids: Minimum of 20% ground cover or one-third of total vegetation is bryophytes (mosses, liverworts, and hornworts) or lichens (foliose or fruticose; not crustose).	EOSD	L	L
51/52	Shrub Types: Minimum 20% ground cover or one-third of total vegetation is shrub.	EOSD	L	L
81/82	Wetland-Treed/Wetland-Shrub: Water table near/at/above soil surface for enough time to promote wetland or aquatic processes; the majority of vegetation is trees or shrub.	EOSD	L	L
83	Wetland-Herb: Water table near/at/above soil surface for enough time to promote wetland or aquatic processes; the majority of vegetation is herb.	EOSD	L	L
100	Herb: Minimum 20% ground cover or one-third of total vegetation is herb (grasses, crops, forbs, graminoids).	EOSD	L	L
211/212/ 213	Coniferous Types: Coniferous trees are 75% or more of the total basal area.	EOSD	L	L
221/222/ 223	Broadleaf Types: Broadleaf trees are 75% or more of the total basal area.	EOSD	L	L
231/232	Mixedwood Types: Neither coniferous nor broadleaf tree account for 75% or more of the total basal area.	EOSD	L	L

Notes:

EOSD = Earth Observation for Sustainable Development of Forests

NLC = Northern Land Cover

4.2 Bathurst Caribou (Mainland Caribou)

The Bathurst caribou herd, named by government biologists after their traditional calving area around Bathurst Inlet, ranges throughout portions of western mainland NU (west of Bathurst Inlet) and the NT (generally between Great Bear and Great Slave lakes; see Figure 4.1). Bathurst caribou are mainland caribou (Banci and Spicker 2024). In the late 1980s to late 1990s the Bathurst caribou herd ranged as far south as northern Saskatchewan, but collared caribou from that herd have not been observed there since 2001 (Gunn et al. 2013; COSEWIC 2016). With declining numbers, the herd's range has constricted. People throughout the range of the Bathurst herd have moved with and relied upon the herd for millennia, and today continue to maintain their cultural and spiritual relationship with caribou (Thorpe et al. 2001b; Gordon 2005).

Caribou are of substantial value to northerners when considering the in-kind replacement cost of store-bought meat. For instance, the total net annual value of the Beverly and Qamanirjuaq caribou harvest was estimated at $19.9 million annually in the mid-2000s, and the average estimated value of a harvested caribou for domestic purposes was $1,174/caribou in NU and $1,052/caribou in the NT (Intergroup Consultants Ltd. 2008). Prior to the elimination of big game outfitting for mainland caribou within the NT at the end of 2009, the harvest of Bathurst caribou also contributed a substantial amount to the NT economy, with the big game outfitting industry alone contributing an estimated $4.01 million in 2005 (Gunn et al. 2008a).

Caribou are not only valued for their cultural significance and importance as a resource, but also for the cascading effects they have throughout the ecosystem they inhabit (Gunn et al. 2011). Within the Arctic, caribou play an integral role in the functioning of an ecosystem that is relatively nutrient-limited. Due to their large numbers, caribou remove substantial amounts of forage from the landscape, add nutrients to the ecosystem by way of fecal pellets, and thereby re-distribute nutrients across the extent of their range (Gunn et al. 2011). Caribou also help to sustain multiple species, from large predators (Mowat and Heard 2006, Klaczek et al. 2016) and scavengers to parasites (e.g., flies, mosquitoes, etc.; Gunn et al. 2011).

4.2.1 Management

The management of all caribou within the West Kitikmeot falls under the authority of the Nunavut Wildlife Management Board (NWMB) to ensure co-management by Indigenous and government representatives. The GN-DOE, Environment and Climate Change Canada, Regional Inuit Organizations (e.g., Kitikmeot Inuit Association), and Nunavut Tunngavik Incorporated are all represented on the NWMB, in addition to Inuit members. The Kitikmeot Regional Wildlife Board, representing Local Hunters and Trappers organizations, are also responsible for regional caribou management. Since the Bathurst caribou herd range extends into multiple jurisdictions and is a source for subsistence and commercial harvest, several stakeholder groups are involved in the management of the herd.

The WRRB is another co-management group with management authority over the Bathurst caribou herd (Wek'èezhìı Renewable Resources Board 2016a); however, within NU other groups involved in management and decision-making include the GN, the Tłı̨chǫ First Nation Government, and other First Nations groups (Boulanger et al. 2011; Wek'èezhìı Renewable Resources Board 2016a). The Tłı̨chǫ Settlement Area contains major parts of the summer, fall, and winter ranges of the Bathurst caribou herd,

and wildlife-related decisions pertaining to this area are made by the WRRB. In 2000, federal, territorial, and Indigenous governments, First Nations, Inuit organizations, Institutions of Public Government, and communities within or adjacent to the herd's range, formed the Bathurst Caribou Management Planning Committee with the aim to prepare a management plan for the herd (Bathurst Caribou Management Planning Committee 2004). The *Bathurst Caribou Management Plan* was completed in 2004 and outlines both a management framework and an action plan (Bathurst Caribou Management Planning Committee 2004). Subsequently, the Bathurst Caribou Advisory Committee was formed in 2017 to guide the development of the 2021 *Bathurst Caribou Management Plan* (Bathurst Caribou Advisory Committee 2021). The main objectives of the plan are to:

1. Promote sustainable and culturally respectful harvest.
2. Conserve the herd's range by managing land use and disturbance.
3. Manage predator-prey relationships.
4. Research and monitor the herd's population dynamics, range, and ecology.
5. Increase public knowledge of the herd and support its conservation.

To address ongoing concern with the health of the Bathurst herd, the Government of NT and Tłı̨chǫ Government developed a joint proposal for management actions (Wek'èezhìı Renewable Resources Board 2016a). Subsequently, the *Bathurst Caribou Range Plan* (BCRP) was developed in 2019 and describes how the Bathurst caribou range will be managed over time and help prepare for any future changes to habitat.

The BCRP outlines a comprehensive, non-binding strategy for managing the Bathurst caribou herd's range across NU, the NT, and northern Saskatchewan. The BCRP was developed in response to a dramatic decline (about 96%) in the Bathurst caribou population since the 1980s, driven by cumulative effects such as human activities increasing across their range, climate change and associated effects like increased wildfires, and changes in the relationship between people and caribou. The BCRP is informed by Inuit Knowledge, Traditional knowledge, and scientific research and was developed collaboratively with input from multiple governments, communities, and organizations.

The main goal of the BCRP is to maintain the Bathurst herd's range in a resilient condition, which applies to a ~390,000 km² area across NU, NT, and northern Saskatchewan. The four supporting objectives are:

1. Maintain the integrity of key caribou habitats.
2. Preserve connectivity between seasonal ranges.
3. Limit human-caused land disturbance below defined thresholds.
4. Manage road development with caribou considerations.

The main components of the BCRP include a Cumulative Land Disturbance Framework (CLDF), management tools, and implementation. The CLDF categorizes areas into three disturbance levels (Desirable, Cautionary, High Risk) and recommends graduated management responses. The seven management tools are categorized as follows:

- Community Guardianship

- Habitat Conservation
- Mobile Caribou Conservation Measures
- Road Planning and Management
- Offsetting/Compensatory Mechanisms
- Wildfire and Fuels Management
- Online Map Staking

The BCRP offers guidance for decision-making in land use, regulatory, and wildlife management contexts; recommendations will feed into broader efforts by the Bathurst Caribou Advisory Committee to create a full caribou management plan; and adaptive management including regular monitoring and a five-year review cycle to reassess the plan based on herd status and other changing factors.

4.2.2 Population

Inuit consultants talk of times of great abundance of mainland caribou in their lifetimes, and also of caribou declines. The elder consultants lived through times of at least three population lows, around the 1920s, the 1950s, and the 2000s. Predation by wolves and mining and exploration since the 1990s were believed to be the cause for these declines. There may have also been a localized drop in numbers in the 1970s at Bathurst Inlet which was attributable to a harsh winter with freezing rain (Banci and Spicker 2024).

> *C19 "A long time ago, it seemed like the caribou had vanished (He was born in 1916). There was no caribou at all. They were in abundance before they completely disappeared, for how many years, I'm not sure. They started catching the odd caribou, now they are plentiful again. I remember when caribou started coming around again. Today (1998), they even come close to town (Kingaok)" (Banci and Spicker 2024).*

> *C202 "I remember a long time ago (she was born in the 1920s) when there was less caribou and muskox. When the caribou numbers were going up in the past, was about the same time the white men started coming around, this was quite some time ago. In the 1930s the caribou numbers were going up" (Banci and Spicker 2024).*

> *C211 "After one winter, the snow was covered in ice and that's how the numbers dropped. The number of muskox went down too, the land was covered in sleet and there was no place for them to eat. This was by Wellington Bay (Ekaloktok). I can't remember what year, I remember it well, but I can't remember what year, it was after I met my wife. The snow was covered in ice. It had rained after a big snowfall, that's when some of the caribou had starved to death. But in another area of the land, where it isn't so rough, they were fine. There are some rough areas up that way. Some areas were fine where it didn't rain" (Banci and Spicker 2024).*

There were no caribou at all in this area (Bathurst Inlet); people would go out that way to hunt caribou during the winter. People went to the mainland to hunt caribou during the winter because there was none here, there was no muskox too. This was maybe in the 1970s. The land was covered in sleet and ice and some caribou and muskox froze to death. When the land is covered in ice, where it isn't so rough, some caribou would freeze to death" (A. Komak; see Thorpe 2000).

C110 "Back in the early 1950s, when I was 3, 4, 5, 6 years old, we used to go trading in summer, springtime go visit Bathurst Inlet trading post. During that time period, springtime, when the birds start coming through from the treeline, we'd be there for a couple of weeks or so. The caribou would be going through constantly for two weeks, going east towards Ellice River, the calving grounds. Day and night, nonstop.

And then you go sleep for a while, sleeping period, you wake up, and the caribou were still coming! 24 hours a day nonstop. And then Lupin came in, it's right on the Bathurst herd major migration route, and the winter road, the whole system, all along that migration route. After they came in, for myself, we started noticing that less and less caribou were coming through over the years. Less and less. And now there are hardly any more coming through, right to Bathurst because of all these mines along the way" (Banci and Spicker 2024).

C51 "There are less caribou now. Herds are smaller now. There was a big die off in the 1950s or the 1940s. Something happened, the numbers were very, very low too in those years.

Another one was wolves. Each and every animal has a cycle, in its natural state. The wolf cycle, there tend to be more wolves in some years, that's what we see. What we're seeing now is more wolves here today, compared to what we saw in the past, just before we start staying in Kugluktuk. There are more wolf packs than normal. But a whole lot less caribou now" (Banci and Spicker 2024).

"And each and every mine that they (caribou) run into, because they have a scent gland right at the bottom of their feet, they collect all these chemicals and everything on the bottom of their feet. They walk on it and it stays with them for a number of miles before it can rub off. In that time I believe what they have stepped on will actually sieve through that scent gland and into the body. That's why you see lame caribou or something. It's what I looked at when I was living at Pellatt Lake" (Bobby Algona; see Trailmark Systems Inc., 2015).

"I have seen many changes because of this mining activity, exploration activity, be it a fully grown mine or just one little box. Drilling in the middle of nowhere can actually deter caribou from going to that area and maybe going to another area. That's what is disrupting the migration route of the caribou" (Bobby Algona; see Trailmark Systems Inc., 2015).

C203 "I remember my brother Jimmy when he was a young man maybe about twenty. He remembers being at Arctic Sound. Right on the east side of Arctic Sound along that east shore, and he said that he literally saw thousands of caribou just migrating. That was in the early 1960s or mid-1960s.

> *He said there was lots of caribou; he came back with a sled load of caribou in the springtime. He said it was like thousands everywhere. It is nice and green in here in the summer around the Hood River (Hivogahik) area. Hood River, James River right up to about Daniel Moore Bay (Kangihoakyok), that whole place is really lush. Nice and green around the Banks Peninsula (Hinikyoak). It is really nice in there in the summer time. Always see caribou all along in here, lots of caribou. I know there is always lots of caribou here (all of Banks Peninsula and large area to the north)" (Banci and Spicker 2024).*

Observations from community members are supported by the scientific evidence that caribou populations, in general, follow cycles with 40 to 70 year periods; however, the length of cycles between high and low caribou numbers is not always predictable and the highs and lows are variable (Zalatan et al. 2006; Government of Northwest Territories 2014). According to Traditional Knowledge from Elders of the Tłı̨chǫ First Nation, a large Bathurst caribou population existed during the 1940s, decreased in the 1950s, and subsequently increased in the 1970s and 1980s (Legat et al. 2001). An analysis of hoof scar frequency on the roots of black spruce trees along the migration path of the Bathurst herd corresponds to Tłı̨chǫ observations, with high numbers detected in the 1940s and very low numbers during the 1920s and the 1950s to 1970s (Zalatan et al. 2006). Similar trends are demonstrated at archaeological sites (Gordon 2005).

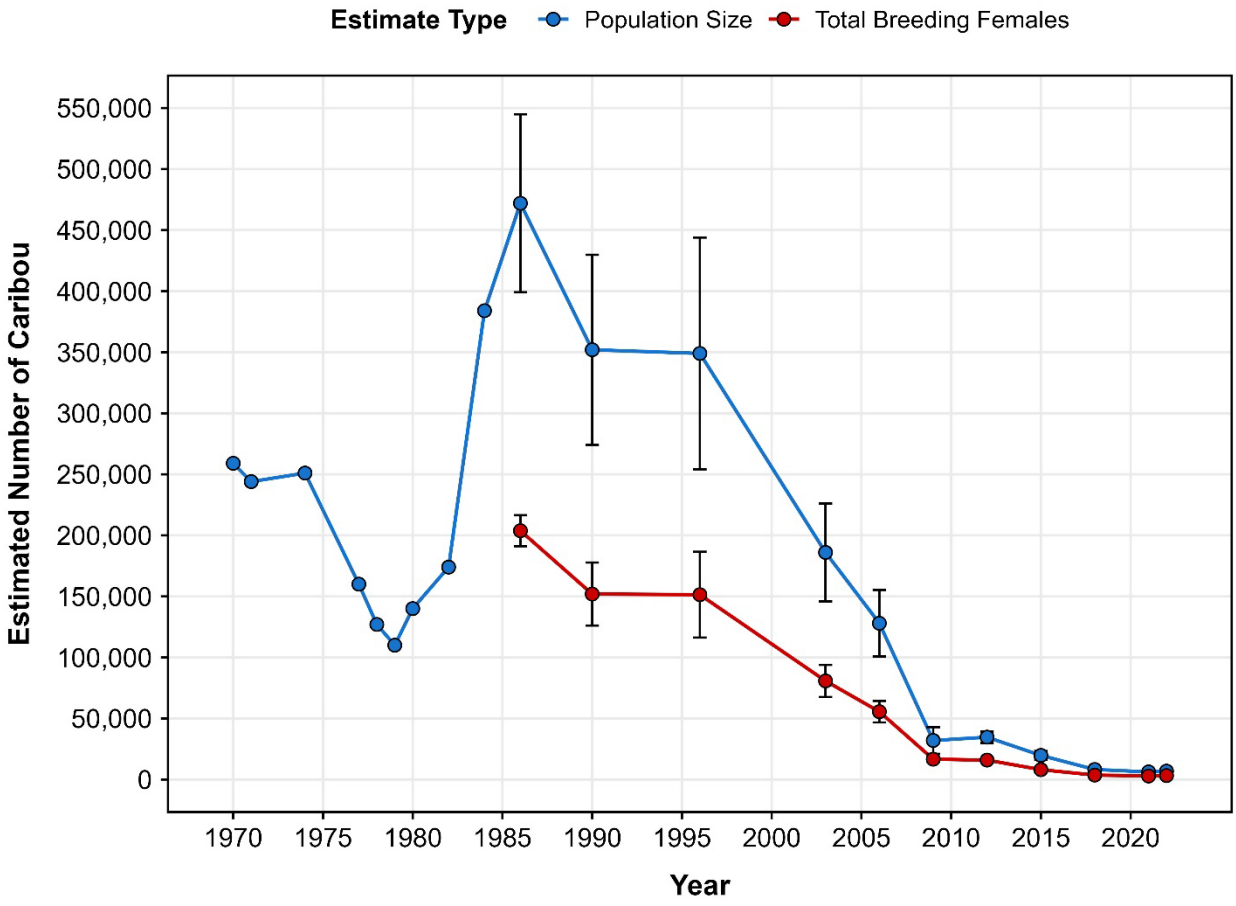
The Bathurst caribou herd has been studied by biologists since the mid-20th century, primarily by conducting programs aimed at improving knowledge about the herd's movements and annual range (Mitchell 1980). Methods for estimating population size have varied over the years. Contemporary estimates of population size have been derived from a combination of photographic and visual calving range surveys (to determine the number of breeding females), and composition surveys during calving and fall (sex and age classes) (Adamczewski et al. 2009). The first surveys to determine the herd's population size were completed using visual aerial survey methods through the 1970s, and showed a notable decrease by 1979, with 110,000 animals estimated (see Figure 4.4; estimates and standard errors were compiled from various technical reports [Adamczewski et al. 2019, 2022, 2023; Boulanger et al. 2014b, 2017; Gunn et al. 2008; Nishi et al. 2010]). Starting in 1980, population estimates were derived using aerial photography. By 1986, the herd peaked at an estimated of 472,000 (± 72,900 standard error [SE]) animals. From 1986 to 2006, the herd decreased at a rate of 5% per year (Gunn et al. 2011), and from 2006 to 2009 by over 20% annually, such that the herd had declined by more than 90% from its peak to an estimated 31,980 (± 5,306 SE) animals (Nishi et al. 2010). Although some stability in numbers was observed in from 2009 to 2012 (Adamczewski et al. 2019), the 2018 herd size estimate dropped to 8,207 (± 1,079 SE) animals (Adamczewski et al. 2019), including far fewer breeding cows, lower pregnancy rate, and low calf and cow survival. Subsequent surveys estimated 6,243 (± 1,370 SE) animals in 2021 (Adamczewski et al. 2022) and 6,851 (± 1,787 SE) animals in 2022 (Adamczewski et al. 2023). Overall, this represents a 98.5% decline in herd size between 1986 and 2022.

Breeding females are the most biologically significant portion of the population (Adamczewski et al. 2009, Boulanger et al. 2011), and provide an index of total herd size. Since 1986 the number of breeding females in the Bathurst herd generally declined between 1986 and 2009, stabilized from 2009 to 2012, and continued to decline through 2015 (8,075 ± 1,650 SE animals), 2018 (3,636 ± 505 SE animals), 2021 (3,474 ± 848 SE animals), and 2022 (3,237 ± 903 SE animals) (see Figure 4.4). The most recent (2025), preliminary herd size estimate is 3,609 caribou (Government of Northwest Territories 2025a);

however, the GNWT has yet to publish a report with additional analyses and context to interpret this survey result.

Summary reports from the Inuit Land Use and Occupancy Project (ILUOP) provide a detailed description of land use throughout the Kugluktuk region during three time periods: Period I before the traders (pre-1916), Period II from 1916 to the DEW Line (1955), and Period III from 1955 to 1974 (Banci and Spicker 2024). Prior to the arrival of the traders (Period I), caribou were hunted by all regional Inuit groups and there was no mention of caribou population declines. Caribou population declines during Period II are also not mentioned. During Period III, few details are provided regarding caribou population numbers; however, they say that caribou increased in all the regions from the previous period.

Figure 4.4 Bathurst Caribou Herd Estimates (± SE) of Population Size (1970 to 2022) and Total Breeding Females (1986 to 2022)



Caribou population growth may be limited by a number of interacting factors including forage quality and availability, predation, hunting pressure, disease, insects and parasites, extreme climatic conditions, competition with other grazing ungulates (e.g., muskox), and anthropogenic activities (Klein 1991). Many potential causes for the sharp decline in the Bathurst caribou herd have been explored; however, it appears to be related to a combination of contributing factors. Ultimate causes of trends in caribou abundance include climatic factors that operate at large geographic scales (Vors and Boyce 2009). One key effect of climate on migratory caribou is on productivity of vegetation on the summer range (Gunn 2003).

At a demographics level, modelling suggests that reduced adult female and calf survival and reduced fecundity were the primary drivers of the decline (Boulanger et al. 2011, 2017; Government of Northwest Territories 2014; Adamczewski et al. 2019). Spring calf:cow ratios for the Bathurst herd between 1985 and 1995 were consistently above 30:100 and frequently exceeded 40:100 (Government of Northwest Territories 2014). Between 2000 and 2006, calf to cow ratios declined from 29:100 to as low as 9:100, leading to weak cohorts, especially in 2005 and 2006. Mean calf survival (as indexed by late winter calf:cow ratios) was higher from 2007 to 2011 (37–49:100) but was low again during 2012 to 2015 (24–32:100) and in 2018 (21:100; Boulanger et al. 2011; Government of Northwest Territories 2014, COSEWIC 2016). Calf survival increased from 2018 to 2020 and cow:calf ratios were moderate to good (Adamczewski et al. 2022). Calf:cow ratios were 32:100 in 2019, 39.1:100 in 2020, and 36.8:100 in 2023 (Bathurst Caribou Advisory Committee 2024). Generally, a calf:cow ratio of 30 calves:100 cows indicates herd stability, with ratios of 35–40 calves:100 cows or higher usually indicative of a stable or possible increasing herd (Government of Northwest Territories 2014). High calf survival is typically correlated with high adult survival rates (Demarais and Krausman 2000).

Sex ratio is estimated from fall composition surveys. Bull:cow ratios between 2004 and 2008 ranged between 31–38 bulls:100 cows, and were higher in 2011 and 2012 at 56–58 bulls:100 cows (Government of Northwest Territories 2014). Ratios below 50:100 are consistent with herds experiencing poor conditions (Government of Northwest Territories 2014).

The years of poor calf survival resulted in changes to the age structure of the herd, primarily increasing the number of older cows and reducing the number of middle-aged cows. This shift in age structure likely resulted in lower productivity (older females are more likely to have breeding pauses) and higher rates of mortality (older females generally are in poorer condition; Adamczewski et al. 2009). By 2009, adult female survival was estimated at around 68% (mortality of ~32%; Adamczewski et al. 2009) and as low as 50% in 2011 (COSEWIC 2016). Data-driven modelling suggest that adult female survival was 0.78 (confidence interval [CI]=0.76–0.80) from 2009 to 2015 (Boulanger et al. 2017), and 0.81 (CI=0.75-0.87) from 2014 to 2017 (Adamczewski et al. 2019), which is still below the 80 to 85% percent normally required for a herd to maintain stability (Government of Northwest Territories 2014). Population modelling for the Bathurst herd has suggested that cow survival rates of 0.84 to 0.90 are needed for a stable herd (Adamczewski et al. 2019). Collections of harvested cows, and (more recently) blood samples from cows captured for collar deployment, have helped determine pregnancy rates for the herd, which have ranged from 60% (1991) to 100% (1990 and 2008; Adamczewski et al. 2009). Pregnancy rates from 2009 to 2014 varied between 71% and 92% (Government of Northwest Territories 2014). Pregnancy rates from 2018 through 2023 varied from 70% to 83% and are considered to be moderate-to-good pregnancy rates (Bathurst Caribou Advisory Committee 2024).

Anthropogenic factors, primarily a constant harvest, have likely disproportionately affected adult survival in the early to middle stages of the decline, exacerbating the effects of reduced productivity (Boulanger et al. 2011). Another hypothesis is that many Bathurst caribou have switched to neighbouring herds, either the Bluenose-East herd to the west or the Beverly/Ahiak herd to east. While there is no evidence of large-scale emigration, recent analysis of collar data (2018 to 2023) revealed an average 13.6% switching rate from cows in the Bathurst herd to the Beverly/Ahiak herd during calving (Adamczewski et al. 2023, Bathurst Caribou Advisory Committee 2024), an increase from around 3.3% per year from the Bathurst and Bluenose-East herds to adjacent herds between 2010 and 2014 (Government of Northwest Territories 2014).

4.2.3 Harvest and Mortality

4.2.3.1 Harvest

Inuit Knowledge identified that intense harvest pressure on caribou occurred throughout the West Kitikmeot Region from 1916-onwards (starting in Period II; ILUOP) (Banci and Spicker 2024).

> *"Caribou were usually plentiful throughout most of this area [Coppermine], both before and after the interruption of the caribou migrations. Many hunted caribou during spring and winter inland, northwest from Basil and Klengenberg bays … Many hunted throughout the year between the Dismal Lakes and Coppermine, though less commonly during winter, and many hunted the area southwest of the Dismal Lakes … some had winter camps south of the Coppermine River well into the wooded area, where caribou were abundant in spring and fall. The people living inland in the Asiak River area … hunted caribou far inland to south and toward Napaktulik during the spring and fall. In summer, they hunted along the coast between Coppermine and Kugaryuak River with boats"* (Banci and Spicker 2024).

> *"The Contwoyto Lake area increased considerably in importance after the arrival of traders, for it had very good fox trapping grounds and excellent hunting … Caribou were usually killed where they crossed river during their migration in spring and, especially in fall. There were many such crossings. During winter, many people lived on caribou meat stored in caches. When the supplies were exhausted, they were forced to travel long distances, especially while trapping, in search of caribou. They went southwest past Itchen Lake, and as far south as Aylmer Lake. People from the Nose Lake area hunted close to Beechey Lake and up Mara River. The whole Contwoyto Lake area was hunted very intensively, and the people also hunted on their way to trade at either Coppermine or Bathurst Inlet" (NTKP 2018).*

> *"The people of the Contwoyto Lake area usually preferred to camp in one of three or four general areas: Concession Lake, the central east side of Contwoyto Lake, Pellat Lake, and Nose Lake. Each of these areas included one or more good hunting places at caribou crossings … Between caribou migrations, the people had to travel father afield to hunt caribou. The area north-northeast of Contwoyto Lake, on the upper reaches of the James and Hood rivers, was seldom used, although caribou hunting was said to be good there"* (NTKP 2018).

> *"During Period II, the people started to live year round at their winter camps on the coast near Burnside River, Gordon Bay, Kilusiktomiut, Hiuktak and Portage Bay. However, they often returned inland to the Beechey Lake area or near Kimuktun and Tahikafalok lakes to hunt caribou in the fall or to fish. Most of their hunting took place near Bathurst Inlet because of its abundant resources. Spring caribou hunting, in which they ambushed the herds during their spring migration across southern Bathurst Inlet on their way to the calving grounds, remained an important activity … Other groups who hunted Bathurst Inlet in the spring did the same thing. During summer, they hunted caribou on the numerous islands and peninsulas of Bathurst Inlet, inland up the river valleys, and in the hills on both sides of the inlet. The fall hunt, which was important for winter clothing and meat, occurred in the Western River and Beechey Lake area. During winter, they took few caribou, and those they got were chance encounters on the inland trap lines"* (NTKP 2018).
>
> *"They also hunted caribou in spring around Bathurst Inlet and as far east as Kent Peninsula, and they dried the meat for summer and fall use. They also hunted up Hood and James rivers, inland from Arctic Sound and Daniel Moore Bay, and along the coast as far west as Tree River"* (NTKP 2018).

The Bathurst herd is harvested by numerous communities at different times of the year. Caribou have been a resource for food, clothing, tools, and many other purposes for people throughout the range of the Bathurst herd for millennia and still comprise a large part of the diet. There are traditions and customs that apply to the harvest of caribou:

> *C66 "Once you start wasting caribou meat, you are going to have hard times in the future. So I try not to do those things, never do them anyway. I try to share my meat"* (NTKP 2018).
>
> *C22 "In the past Inuit respected their hunting grounds. They cared and kept the area clean. They never harvested caribou where the caribou routes were. They walked away from the routes, never where the caribou would walk by…. If you harvest caribou where they walk, then there will no longer be caribou there. The caribou will take a different route"* (NTKP 2018).
>
> *C13 "I listened to the elders and. I followed their way of life by sharing the meat with others so that the meat didn't spoil. I can't finish a whole caribou by myself so everyone shared their food and the others might want some meat too. The meat wasn't kept for ourselves but shared with others Whoever wanted food was given food so that everyone could be happy (That was) our elder's way of life"* (NTKP 2018).
>
> *C203 "The only thing I have heard is that when you are out hunting if you ignore the first caribou you see and you do not shoot it then you're not going to have good luck after that. You shouldn't be choosy when you are out caribou hunting"* (NTKP 2018).
>
> *C51 "Some people say you have to turn the head of the caribou when you take the head off, you have to turn it away from the body, so the head doesn't see what's happening to the body. There are some stories like that, all kinds of stories like that, but nothing from my family. But for me, I've not heard anything from the old folks, my folks, about any superstitions like that, so I never really paid any attention to them"* (NTKP 2018).

Northwest Territories

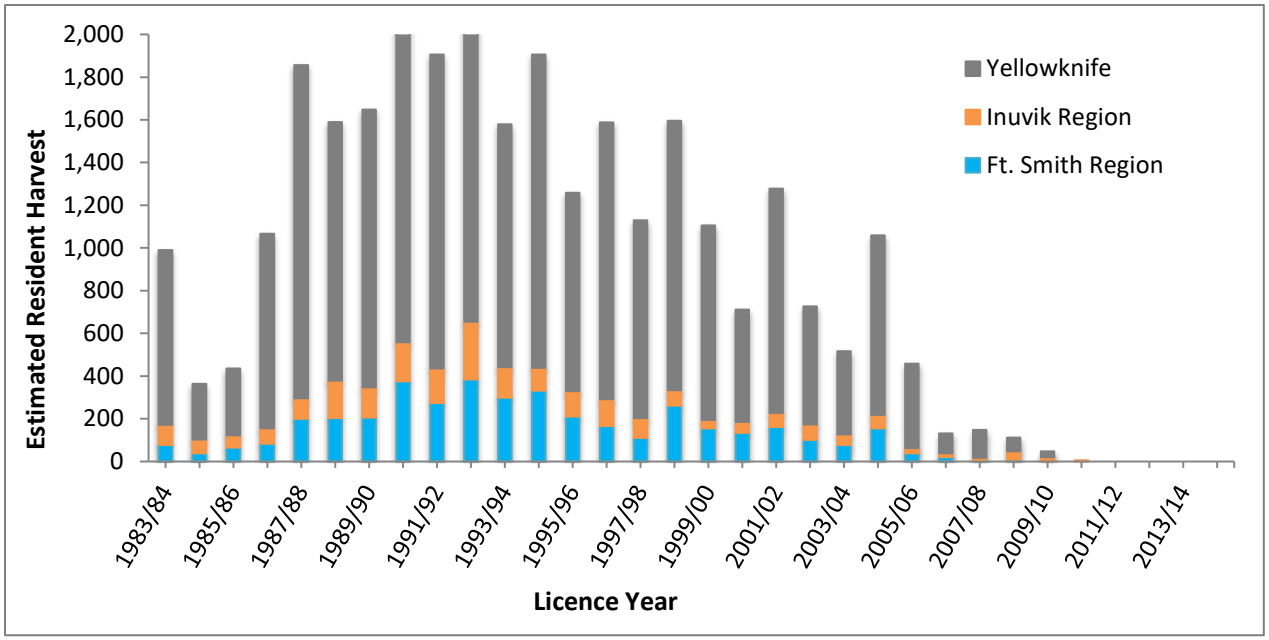
Indigenous harvest of Bathurst caribou comprises most of the harvest for the herd; however, harvest level statistics are variable in consistency and availability throughout the years. During winter, the herd's proximity to communities increases and accessing caribou becomes easier. The communities of Behchokö, Wekweètì, Gamètì, and Whatì in the NT consist largely of the Tłı̨chǫ, an Indigenous group that historically occupied the largest portion of the North Slave Geological Area, and harvests primarily from the Bathurst herd (Legat et al. 2001). Harvesters from Yellowknife, N'Dilo, Łutselk'e, and Detah, NT also hunt Bathurst caribou (Adamczewski et al. 2009). Harvest of the Bathurst herd is primarily by the Tłı̨chǫ people; accounting for up to 71% of the herd harvest in the late 1990s (Legat et al. 2001).

Studies of Indigenous harvest in the Tłı̨chǫ region were completed from 1988 to 1993 and 2007 to 2009. The first study (1988–1993) resulted in an estimated average annual harvest of 15,864 Bathurst caribou (53% cows; Adamczewski et al. 2009), while the second study (2007 to 2009) estimated total annual harvests of 1,690 (2007/2008 season) and 2,712 (2008/2009 season), with more than 50% of the harvest consisting of cows (Croft and Rabesca 2009). These numbers likely underestimated the actual harvest level due to limitations with harvest reporting (e.g., underreporting, wounding losses, etc.; Adamczewski et al. 2009). In 2007/2008 and 2008/2009, the annual harvest of the Bathurst caribou herd from all sources was estimated to be between 4,000 and 6,000 animals (15 to 20% of the herd population), the majority cows (Government of Northwest Territories 2014). In 2007/2008 and 2008/2009, an estimated 4,000 to 5,000 Bathurst caribou were taken by Indigenous hunters (Government of Northwest Territories 2014). Due to the ease of access to caribou, a result of the increasing number of winter roads into previously inaccessible areas, the harvest of Bathurst caribou did not decrease with the declining population, and instead remained constant through the decline (Adamczewski et al. 2009).

The annual harvest of mainland caribou (not herd-specific) by non-Indigenous resident hunters in the NT increased in the early 1990s and decreased by the 2008/2009 season when many hunting zones began to close to resident harvest in response to the observed population declines (see Figure 4.5; Carrière 2012). Resident hunting patterns also changed within this time—hunting success dropped from around 50% in the 1990s to 10 to 20% by 2007, and the ratio of female to male caribou harvested also declined in the mid to late 2000s (Carrière 2012). There has been no hunting of caribou by non-Indigenous NT residents since 2010/2011.

The non-resident (guided) harvest of Bathurst caribou averaged about 830 bulls annually between 1997 and 2009 (Adamczewski et al. 2009). This harvest typically took place in August and September, with most hunts completed by the first week of October (Gunn et al. 2008a). In response to declining herd size, non-resident hunting of Bathurst caribou in the NT was prohibited in 2010.

Figure 4.5 Estimated Resident Harvest of Mainland Caribou in Northwest Territories



In 2010, restrictions on harvest of the Bathurst caribou herd were imposed by Tłı̨chǫ and NT governments in response to the observed population declines and a need to better understand the causes of the decline (Wek'èezhìı Renewable Resources Board 2016a). Indigenous harvest was given priority over outfitter and resident harvest. Indigenous harvest was limited to 300 animals annually, with a target bull to cow harvest ratio of 85:15 and a no-hunting conservation zone in the herd's winter range (Wek'èezhìı Renewable Resources Board 2016a). During 2009/2010 to 2012/2013, the Bathurst harvest in the NT averaged 191 caribou, with 62% cows (Government of Northwest Territories 2014). In December 2014, a suspension of harvest across the herd's range was initiated, except for a 15-animal harvest set aside for First Nations' ceremonial use. In 2015, the WRRB has recommended that a total allowable harvest (TAH) of zero should be implemented for all users of the Bathurst caribou herd within the Wek'èezhìı area (ERM Consultants Canada Ltd. 2025; Wek'èezhìı Renewable Resources Board 2016b). Consequently, harvest of Bathurst caribou has been prohibited since 2015 (Government of Northwest Territories 2019).

Nunavut

Within NU, Bathurst caribou are harvested primarily by residents of Kugluktuk, Bathurst Inlet (*Kingaok*), and Bay Chimo (*Omingmaktok*) in the Kitikmeot Region. The harvest is relatively light (Thorpe Consulting Services Ltd. 2014b), primarily because of difficult access during summer when Bathurst caribou are generally present within NU. Beneficiaries of the Nunavut Land Claim Agreement generally have unrestricted harvest rights to caribou, unless a conservation concern arises that requires the establishment of a TAH limit, and caribou harvest reporting (unless a TAH is applied) is not mandatory.

The development of a caribou TAH in NU began with the GN Wildlife Research Section assessing the maximum Basic Needs Level (BNL) for caribou populations (Wildlife Research Section 2007). The BNL of Bathurst caribou for communities in the Kitikmeot Region are as follows: Kugluktuk = 35 caribou, Bathurst Inlet = 47 caribou, and Bay Chimo = 12 caribou. The BNL of Bathurst caribou were partly derived from data collected during the *Nunavut Wildlife Harvest Study* (Priest and Usher 2004), which is largely outdated; however, these harvest estimates do not distinguish between herds and represent harvest from the Bathurst, Bluenose-East, Dolphin and Union, and Beverly/Ahiak herds (see Table 4.3).

A TAH has been in effect to limit the annual harvest of Bathurst caribou in NU since 2017 (Government of Nunavut 2017). In 2020, the TAH was set to 30 bulls/year, but that number was reduced to 10 bulls/year in 2023.

Table 4.3 Reported/Estimated Caribou Harvest by Three Communities in the Kitikmeot Region of Nunavut (1996 to 2001)

Reported/Estimated Caribou[1] Harvest[2]			
Years	**Kugluktuk**	**Bathurst Inlet**	**Bay Chimo**
1996–1997	1,561 ± 156	117 ± 21	314 ± 28
1997–1998	1,462 ± 137	83 ± 31	247 ± 17
1998–1999	1,913 ± 155	98 ± 19	155 ± 15
1999–2000	1,584 ± 134	75 ± 17	111 ± 11
2000–2001	1,355 ± 125	94 ± 41	52 ± 13

Notes:

[1] Does not distinguish between herds

[2] Data from the *Nunavut Wildlife Harvest Study* (Priest and Usher 2004)

4.2.3.2 Predation

Predation of mainland caribou is primarily by wolves, and to a lesser extent, grizzly bears, wolverine, lynx, and eagles (Gunn et al. 2011). Predation is most likely to affect migratory mainland caribou population trends at lower numbers and may even prolong the period of low numbers (Bergerud et al. 2008). People in Kitikmeot similarly observe that several animals prey upon caribou:

> *C51 "Wolf is usually the one to kill caribou, but I witnessed a bear tackle caribou. I witnessed wolf tackle caribou, I witnessed wolverine tackle caribou, even a fox try to tackle a caribou. Everything likes caribou meat. It is pretty much similar, the way they hunt caribou. Stalk and kill"* (Banci and Spicker 2024).
>
> *C51 "I've seen wolverine take down caribou before. You know how a caribou sits motionless for hours on end? That is how I've seen a wolverine take down a caribou. Once a caribou is motionless at one spot you can almost go right up to them and touch them"* (NTKP 2018).
>
> *C310 "Caribou are found in rocky areas in winter to avoid wolves (south of Grays Bay but not mapped)"* (NTKP 2018).

Wolves in the region tend to den at higher densities near the treeline, and infrequently den near calving range on the tundra (Heard and Williams 1992). Predation by wolves is most substantial on the Bathurst herd's forested winter range, with predation rates potentially high enough to limit the herd's population growth (Heard and Williams 1991). In the 1990s, wolves were estimated to be responsible for killing approximately 55,500 caribou annually, representing 16% of the 1990 herd population, and translating to an estimated 2,250 wolves on the Bathurst range (Case et al. 1996). One NTKP Elder noted that, "*few Inuit trim the caribou herds like the wolves presently do*" (NTKP 2018).

Between 1996 and 2009, an annual average of 20.5 wolf dens (± 0.9 SE, range 14 to 28, *n* = 14 years) were known to be active on the Bathurst herd's summer range in early summer (May to June; Adamczewski et al. 2009). Low rates of pup recruitment from 2010 to 2012, and high den abandonment from 2007 to 2012, were correlated with declining numbers of Bathurst caribou and contraction of the herd's late-summer distribution towards the calving range, which likely resulted in a numeric response in wolf densities from declining caribou numbers (Klaczek et al. 2016). In 2014, wolf density was estimated at <4 wolves/1,000 km^2 in the Bathurst caribou summer range (Klaczek et al. 2016). High rates of den abandonment and low pup recruitment were also observed during the 2013 and 2014 denning periods (Government of Northwest Territories 2014). However, the trend for wolves associated with caribou on late winter ranges has not declined concomitant with reductions in caribou abundance. An increasing trend in wolf sightings (number of wolves/100 hours of flying) is evident on late winter Bathurst range (COSEWIC 2016).

In 2020, the GNWT and the Tłı̨chǫ Government submitted a joint proposal to implement wolf management programs to reduce predation and support herd recovery, aiming to remove 60% to 80% of wolves from the winter range over a five-year period (Government of Northwest Territories 2020). Since then, 336 wolves have been harvested (removed) from the Bathurst caribou and Bluenose-East caribou winter ranges (Wilson et al. 2025). Necropsies of harvested wolves in 2024 identified that caribou was a major portion (~70%) of wolf diet.

Bathurst caribou also comprise a large proportion of grizzly bear diet, ranging from 10% to 93% of a bear's diet, depending on the season, and resulting in a largely carnivorous diet for grizzlies in the area (Gau et al. 2002). Grizzly bears in the Arctic have been found to have the highest fraction of terrestrial meat in their diet of all grizzly bear populations across North America (Mowat and Heard 2006). The Bathurst herd is estimated to support around 450 grizzly bears throughout their range (Gunn et al. 2011), and sightings of grizzly bears in 2015 per 10 hours of flying calving range surveys was the highest recorded since 2006 (COSEWIC 2016).

> *C215 "I have seen a grizzly chasing a calf once. I caught sight of it as they were disappearing behind a hill. The grizzly probably ate it"* (NTKP 2018).
>
> *C51 "In the summer I see grizzly bears almost anywhere there is an abundance of meat, such as on the caribou migration routes"* (Banci and Spicker 2024).

> *C21 "The newborn caribou calves are born in June after the rivers are flowing. The grizzly bears hunt them when the newborn calves are learning how to run. The calves are still slow so they catch them, just like eating hikhik. Sometimes the female caribou get killed when trying to protect their calves. The caribou don't have teeth but they have antlers, which they try to use to protect their young. Once the grizzly bears bite the caribou by the neck the caribou are dead" (Banci and Spicker 2024).*
>
> *C36 "Bears have the caribou calves for food, even the young muskox calves. They also have other young wildlife but mainly they eat the newborn caribou and muskox calves" (Banci and Spicker 2024).*

Wolverines are wide-ranging carnivores with large home ranges. They depend primarily on carrion, particularly caribou, as their major food source (Mulders 2000). According to Inuit Knowledge, caribou carrion is mostly from wolf and Inuit kills (NTKP 2018). Wolverine numbers on one portion of the Bathurst summer range declined approximately 11% annually between 2004 and 2011 (Boulanger and Mulders 2013), possibly related to fewer wolf-killed caribou available for scavenging.

> *C27 "Wolves kill and eat the caribou calves because they can't run really fast. When the caribou herds reach where there are lots of wolves, the wolves mainly take the calves. When the wolves don't finish the caribou, the foxes and wolverine finish off the carcasses"* (Banci and Spicker 2024).
>
> *C29 "The wolverine hunting and den sites are found where there are caribou because they eat caribou that were killed by other animals…They rest in their dens, in snow dens and rock crevices. They have snow dens just about anywhere. Some wolverine are very smart when they run away towards rocks or rocky area"* (Banci and Spicker 2024).

4.2.3.3 Parasites and Disease

The magnitude of the effect of parasitism and disease on the Bathurst caribou population is unknown. Mainland caribou are subject to many internal and external parasites such as mosquitoes, black flies, warble and nasal bot flies (oestrid flies), and intestinal parasites. Caribou in Arctic North America are exposed to 35 confirmed parasite species, including seven intestinal nematode, seven tissue nematode, four cestode (tapeworm), two trematode (flatworm), three protozoan (gastrointestinal single-celled organisms), and seven arthropod ectoparasite species (Kutz et al. 2012). During summer, insect harassment can hinder optimal food intake, leading to the development of strategies to minimize this effect, such as selecting for areas with fewer insects, higher quality forage, and exposure to wind, and responding behaviourally by forming compact groups after calving (Russell et al. 1993; Witter et al. 2012). The oestrid (warble) index on the summer range of the Bathurst and Bluenose-East subpopulations varies annually but has increased as summers have become warmer, particularly after the late 2000s (COSEWIC 2016).

External parasites, especially oestrid and black flies, may elicit behavioural responses such as running, shaking, and stamping that create trade-offs with other activities such as laying down, feeding, and walking, which may ultimately affect survival and reproduction (Witter et al. 2012). This behaviour is also noted in Inuit Knowledge:

> *C34 "When there are too many mosquitoes, caribou would gather and go in circles to get rid of the mosquitoes. Sometimes when they shook the flies off, it would make the sound of thunder. There would be so many mosquitoes that they would look like snowflakes. You can see even from a distance. Even from a distance you can hear the noise they make when they shake the mosquitoes off"* (Banci and Spicker 2024).

> *C23 "Where there are lots of willows and grass there are lots of mosquitoes and they can drive you crazy during the summer. When you hunt caribou during the summer there are lots of mosquitoes landing on them wanting to suck blood. When the large caribou herds start to arrive some of the caribou run trying to avoid the mosquitoes and find a windy area. That is why the caribou get skinny, because they are not grazing but just standing or running from mosquitoes or from the heat"* (Banci and Spicker 2024).

Recently, community members gathered as part of the Environmental Management Advisory Board for the Diavik Diamond Mine. The Traditional Knowledge Panel reported a strategy used by caribou when bothered by insects: caribou are said to put their nose in the air, trot quickly, and then run around madly before flopping to the ground (SENES Consultants Ltd. 2012).

> *C16a "Sometimes people would stop hunting, usually in July when the weather gets too hot… People would stop hunting during the month of July, because of the worms"* (Banci and Spicker 2024).

> *C48 "We would hunt less when there are flies, as the worms would spoil the meat"* (NTKP 2018).

> *C216 ""But on days like this (rainy days) you need to make your dry meat really thin because otherwise they get flies that make worms on them. That way you don't have worms on your meat when you make it into dry meat. That way you have meat all summer. Maybe if you got enough caribou in the spring you could have dry meat until the fall. You got to be careful how you prepare your meat if you don't want it to go rotten"* (NTKP 2018).

Disease resulting from internal parasites has been found to negatively affect reproductive success by reducing nutrient intake (via reduced appetite and disrupted digestion), and ultimately deteriorating body condition (Gunn and Irvine 2003).

> *C216 "Some of the caribou had puss in them, like on the lungs or in the liver and the puss was yellow. Sometimes their lungs, one side were stuck right to the ribcage where it shouldn't be. Some of them were good and some of them weren't. One in a hundred. We just leave the ones that were sick because if we eat it then we get sick too"* (Banci and Spicker 2024).

> *C48 "We see diseased caribou once in a while. Sometimes though a caribou would have lots of white spots on the meat. When their lungs have white spots on them we throw them away. The liver always seems fine, sometimes though they'd have white spots"* (Banci and Spicker 2024).

4.2.4 Movements and Distribution

4.2.4.1 Overview

Knowledge of Bathurst caribou within the RSA is largely based upon Inuit Knowledge, data from government-led collaring initiatives, and surveys completed as part of the current baseline studies. Within the RSA, aerial surveys focused on areas overlapping the Bathurst range were completed in 2007, 2008, 2010, 2012, and 2013 (see Table 4.4). Surveys completed in 2005 and 2006 focused on the High Lake to Grays Bay area but also covered areas as far south as the Bathurst calving range northern boundary. Caribou observations during these years were consistent with the general pattern of known caribou movements within the RSA.

Table 4.4 Bathurst Caribou Observations During Aerial Surveys from 2004 to 2013

Survey Year	Survey Date	Season	Transects Surveyed	#Caribou On Transect	#Caribou Off Transect
2004	10–11 June	Calving	-	0	4
2005	22–23 May	Pre-calving	1–20[1]	28	0
	10–11 June	Calving	1–20[1]	48	28
	29 June	Post-calving	11–20[1]	0	0
2006	24–25 May	Pre-calving	1–20[1]	9	0
	10–11 June	Calving	1–20[1]	16	6
	26–27 June	Post-calving	1–20[1]	1	0
2007	7–8 August	Summer	30–35	1	0
	23–24 September	Fall	30–35	0	0
2008	20–21 May	Pre-calving	1–35	366	89
	12–14 June	Calving	1–35	12	33
	3–5 July	Post-calving	1–35	24	113
	29–31 July	Summer	14–35	5	1
	14 September	Fall	30–35	24	0
2010	10–12 August	Summer	30–35	0	0
	18–19 September	Fall	30–35	56	1
2012	20–23 May	Pre-calving	1–35	55	7
	9–12 June	Calving	2–35	33	9
	8–11 July	Post-calving	2–35	3	2
	16–19 August	Summer	1–35	60	21
	13–15 September	Fall	2–35	6	0
2013	17–23 May	Pre-calving	1–35	132	113
	6–9 June	Calving	14–35	9	0
	1–3 August	Summer	14–35	10	5
	12–15 September	Fall	14–35	9	0

Note:

[1] Transects surveyed in 2005 and 2006 were based on a previous Project description and are therefore different than subsequent surveys (further extension eastwards into potential Bathurst caribou herd calving areas).

Caribou do not always occupy defined spaces on the land:

> *C51 "…They are all over the land around here and here. The land is full of caribou. They would walk in all directions" (NTKP 2018).*

Nonetheless, there is some pattern to their seasonal movements:

> *C211 "The caribou would travel in one direction, going south towards the centre of the mainland. They would head south in the fall. When the weather gets warmer in the spring, they would head up from the south. They would come towards the ocean. That is the way the caribou travel… Their ways are not all the same" (Banci and Spicker 2024).*

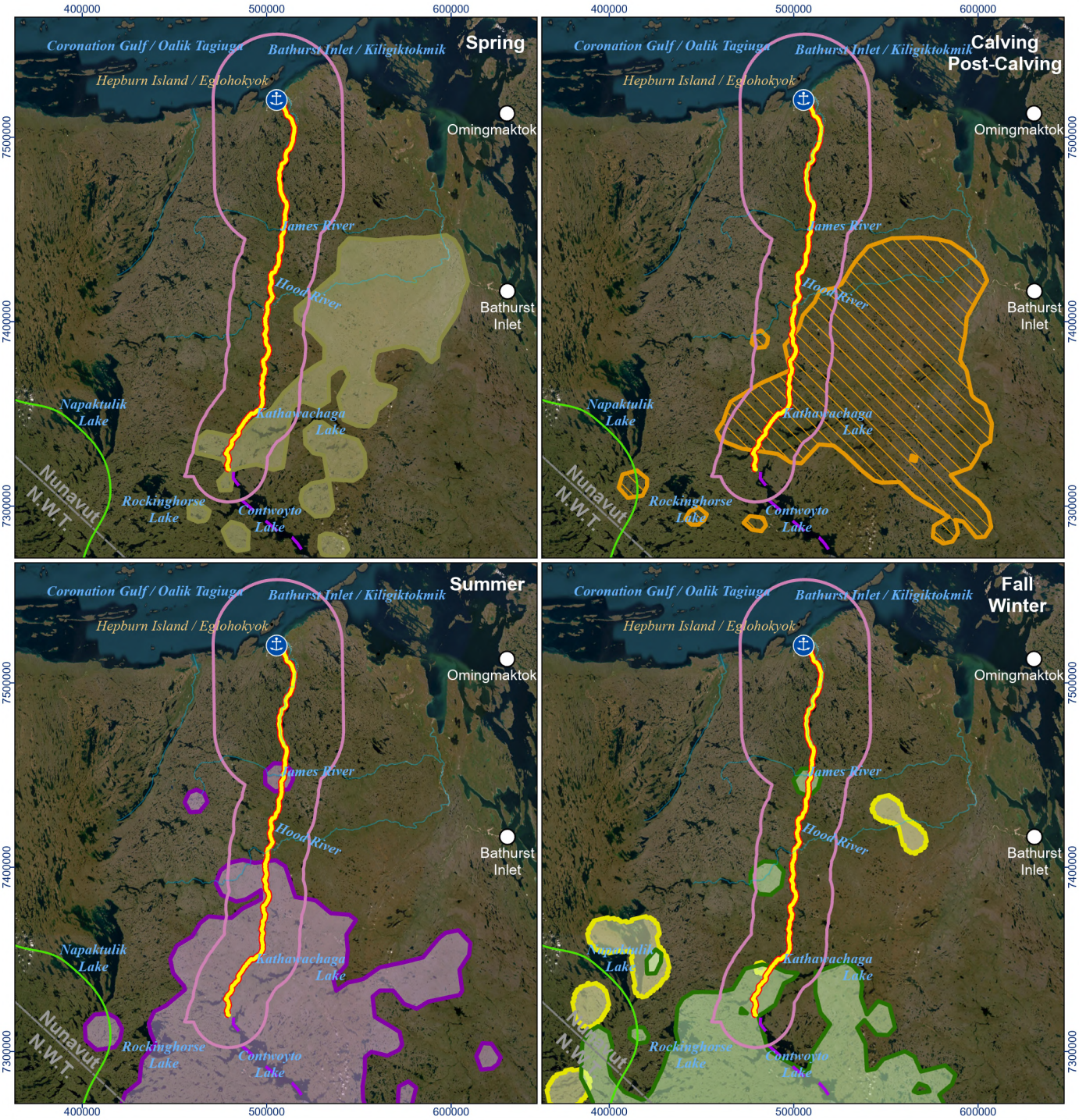
> *C1 "Caribou start to migrate to the ocean in the spring when the weather is much warmer…somewhere around the month of May. Sometimes the Tahikyoak (Contwoyto Lake) shoreline would have lots of caribou when I used to stay there. Around mid-April they start to arrive from the south. They head towards the ocean from the land south of Tahikyoak" (Banci and Spicker 2024).*

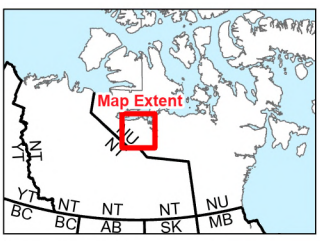
> *C35 "Caribou trails are used every year, down to shore or all over. You can see trails in low places along the Rae River. Every year in different seasons they use these routes. They go back and forth every year. In spring and fall they use trails back and forth. They have a cycle, spring, summer, and fall. When traveling through Grays Bay before there were lots of caribou" (NTKP 2018).*

NTKP participants identified spring and fall migration routes for mainland caribou. Migrations were generally northeast and southwest (Banci and Spicker 2024).

Caribou also leave sign of their migration routes on the land by leaving trails that are cut into the tundra from multiple years of use (NTKP 2018). Movements rates are highest during three seasonal periods throughout the year: the pre-calving migration, early summer (movement due to insect harassment), and rut or fall migration (Nagy 2011). Calving corresponds with the least movement of individuals throughout the year (Gunn and Poole 2010).

Delineation and timing of Bathurst herd seasons varies slightly among researchers, based on the numbers of seasons identified and differences in interpretation of movement rates and habitat use (Nagy 2011, Gunn et al. 2013). To be consistent with the BCRP (Government of Northwest Territories 2019), date ranges from the Plan are used to define seasonal ranges and periods for Bathurst caribou (see Table 4.5 and Figure 4.6).





Notes
1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Government of Canada, Stantec, Natural Resources Canada, Government of Canada (https://www.nrcan.gc.ca/earth-sciences/geography/download-geographical-names-data/9245)
Publication Date: Unknown
Downloaded: September 7, 2021
Last Checked: September 7, 2021

- Grays Bay Port
- Grays Bay Road
- Tibbitt to Contwoyto Winter Road
- Territorial Boundary
- Treeline
- Watercourse
- Wildlife Regional Study Area (RSA)

- Spring: April 20 to June 1
- Calving / Post-Calving: June 2 to June 28
- Summer: June 29 to September 6
- Fall Migration/Rut: September 7 to November 30
- Winter: December 1 to April 19

0 25 50 75 Kilometres
(At original document size of 8.5x11) 1:3,200,000

N

WEST KITIKMEOT RESOURCES CORP

EDI ENVIRONMENTAL DYNAMICS INC.

Project Location
West Kitikmeot Region
Nunavut

Prepared by OliviaLeblanc on 2026-02-23

Client/Project 24Y0376
West Kitikmeot Resources Corp (WKR)
Grays Bay Road and Port

Figure No.
4.6

Title
Bathurst Caribou Herd Seasonal Ranges Derived from Collar Data (1996 to 2024)

Path: L:\PROJECTS\2024\WH\24Y0029_GBRP\WildlifeBaselineUpdates_2025_V3.aprx\24Y0376_WildBaseline_Fig4-6_BAH_SeasonalRanges_20260220; Revised: 2026-02-23 By: OliviaLeblanc

Table 4.5 Approximate Timing of Seasonal Habitat Use and Movement of the Bathurst Caribou Herd[1]

Season	Approximate Dates
Spring Migration	April 20 to June 1
Calving/ Post-calving	June 2 to June 28
Summer	June 29 to September 6
Fall	September 7 to November 30
Winter	December 1 to April 19

Note:

[1] Seasons and dates taken from Figure 11 in the *Bathurst Caribou Range Plan* (Government of Northwest Territories 2019).

The Bathurst caribou herd's annual migration cycle begins with the northward spring movement, from treed wintering areas primarily in the NT to the calving range around Bathurst Inlet (see Figure 4.6):

> *C28 "Every spring, what they call atilliktun, they would come down to the ocean. They probably came from the wooded areas from far" (Banci and Spicker 2024).*
>
> *C19 "We didn't have calendars back then. They used the moon, only the moon. The moon was used to tell the seasons long ago.*
>
> *In the month of May, the seagulls would start coming, during the middle of May after the full moon, that's when the seagulls would start coming.*
>
> *The seals come out in April, they have their pups in April. The seals are usually winter animals, they live in the cold water during the winter and they'd have their pups in April.*
>
> *When the moon would come during the spring thaw, when there's water, the caribou are calving, and the birds are nesting, that's how it was used, during the month of June.*
>
> *The moon would go away again during the month of June, and when it returned you knew the birds were moulting at that time of the year, which is during the month of July. The moon was the only way the Inuit knew the time of the year. That's the time of year the birds would moult, when the moon returned after the last time*
>
> *After it disappeared it would return then it would be August. That's when the caribou fur would get nice. People would mention that the caribou were good for clothing. The birds would be flying again, the young birds would have grown then, that's how they knew the seasons, that's during the month of August" (Banci and Spicker 2024).*

Currently, calving occurs west of Bathurst Inlet (around and south of the Hood River to the Burnside River [*Ayapakpaktokvik*]), although prior to the late 1980s calving took place primarily east of Bathurst Inlet (Gunn et al. 2008c). The herd then generally moves south during post-calving to summer in the broader Contwoyto Lake area and begins moving towards treeline during the rut, and continues south and

westward into forested areas in the NT (generally between Great Slave and Great Bear lakes) for the winter season. Migrations from wintering areas to calving areas average 409 km, depending on how far south the herd winters (Gunn and Poole 2010), but have been as short as 100 km in years when they winter just south of Bathurst Inlet, and as far as 800 km when the herd wintered south of Great Bear Lake (*Imaryuaq*) (Fleck and Gunn 1982). There has been a declining trend in distance from the centroid of the winter range to the centroid of the calving range, supporting a contraction of the southern extent of fall and winter distribution of the Bathurst subpopulation concurrent with declines in abundance (COSEWIC 2016). Collar data suggest the Bathurst caribou are staying further north in recent years during summer and early fall, as the herd delays their traditional movements south towards winter range (ERM Consultants Canada Ltd 2016).

Evidence from both collar data (Government of Northwest Territories 2024b) and survey observations indicate that Bathurst caribou infrequently occur north of the Hood River (within the northern RSA extent). These occurrences are mostly associated with spring migration (pre-calving) around the north end of Contwoyto Lake and up to the calving range west of Bathurst Inlet. Collared Bathurst caribou occur south of Ulu (southern RSA extent) during late June, concentrating further south within the RSA in July and August, and thinning significantly in distribution within the RSA by September. Aerial surveys detected a few scattered Bathurst caribou within the very southern portions of the RSA as late as mid-September (the last surveys each year), but collar data (1996 to 2024; (Government of Northwest Territories 2024b) demonstrate several caribou using portions of the RSA near Lupin and between Takijuq Lake and Contwoyto Lake from October through December (2012 to 2023).

4.2.4.2 Pre-calving/Spring Migration

The Bathurst caribou herd's annual migration cycle begins with the northward spring movement from wintering areas primarily in the NT to the calving range near Bathurst Inlet:

> *C19 "During migration you can see them traveling, day after day. People used to make dry meat when the caribou were heading north because the caribou used that route (north of Tahikafalok and Kalgilik) when they were traveling north….*
>
> *When the caribou keep coming, one right after the other over the hills, day after day, they are called 'aatiktonik'. Sometimes they are not in large numbers but in a steady flow. There are other areas where caribou are doing the same thing, migrating north in the spring" (Banci and Spicker 2024).*

The location of wintering areas vary among years (Gunn et al. 2013), thus affecting the direction of spring migration. Increased movements begin around mid-April, are greatest by mid to late May (Gunn and Poole 2010), and appear to be at a faster pace than the fall migration:

> *C216 "They seem to be moving faster in the spring than in the fall" (Banci and Spicker 2024).*

Pre-calving/ spring migrations (April 20 to June 1) across Bathurst Inlet to calving range east of Bathurst Inlet have been documented since the early 1930s (Fleck and Gunn 1982); however, calving areas are currently concentrated on the west side of the inlet, thus springtime movements to the east have decreased. People of the Bathurst Inlet area used to ambush the herd as it moved eastwards across the

inlet in the spring to get to the calving range (Freeman 1976). Several factors, including late winter snow conditions, distance from winter range, and body condition affect rate and timing of the migration to calving range (Gunn and Poole 2010), and the migration routes taken depend on the location of wintering areas for each particular year (Gunn et al. 2001). Generally, cows and yearlings lead the northward movement, with bulls and non-breeding cows following behind, and often not travelling as far towards the calving range as the breeding cows (Banci and Spicker 2024). Inuit Knowledge identifies areas to the west and east of Contwoyto Lake, at the southern terminus of the Project, as having key migration corridors for Bathurst caribou (see Figure 4.7) (Banci and Spicker 2024). Given the placement of migration corridors, Bathurst caribou are expected to interact with the Project during spring migration. The timing of spring migration crossings of the Project varies annually but generally falls between end-April and early-May based on collar data (see Table 4.6).

A large concentration of Bathurst caribou was observed during Project pre-calving surveys southeast of Ulu in late May 2006; however, those surveys were based on transects that extended further east (into the calving range) than the current RSA. In May 2008, Bathurst caribou were observed during aerial surveys in the Jericho area (see Figure 4.8 and Table 4.4). In May 2012 and 2013, Bathurst caribou were observed primarily between Jericho and Ulu in relatively small, scattered groups. Pre-calving survey observations have varied throughout the years, with low densities observed in 2012 and 2013 (7.3 and 17.6 caribou/100 km², respectively) and relatively high densities observed in 2008 (48.7 caribou/100 km²; see Figure 4.9).

Table 4.6 Timing of Bathurst Caribou Spring Migration Crossings of the Project

Year	Number of Individuals (Crossers)	First Crossing Date	Last Crossing Date
2009	15	May 16	June 2
2010	16	May 5	June 2
2011	2	May 14	May 15
2013	6	May 24	May 29
2014	1	May 18	May 18
2015	2	May 18	May 19
2016	10	April 24	May 3
2017	6	May 21	June 1
2019	1	May 26	May 26
2020	3	May 20	May 22
2021	6	April 25	May 23
2022	22	May 13	June 2
2023	10	May 10	May 29
2024	22	May 15	June 1
Median Crossing Dates		**May 15**	**May 28**

Figure 4.7 Kitikmiut Knowledge of Regional Mainland Tuktuit (Caribou) Spring and Fall Migration

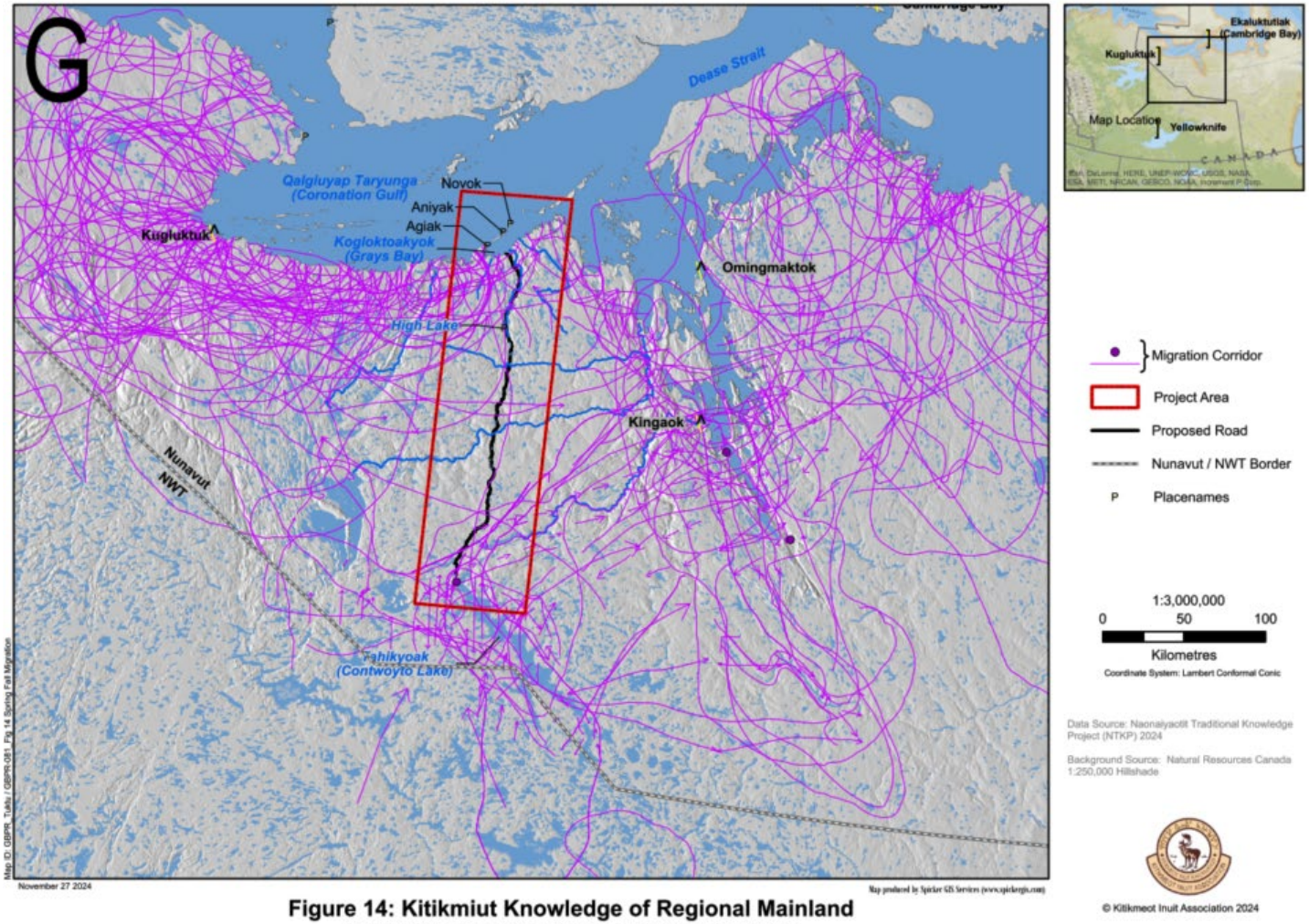
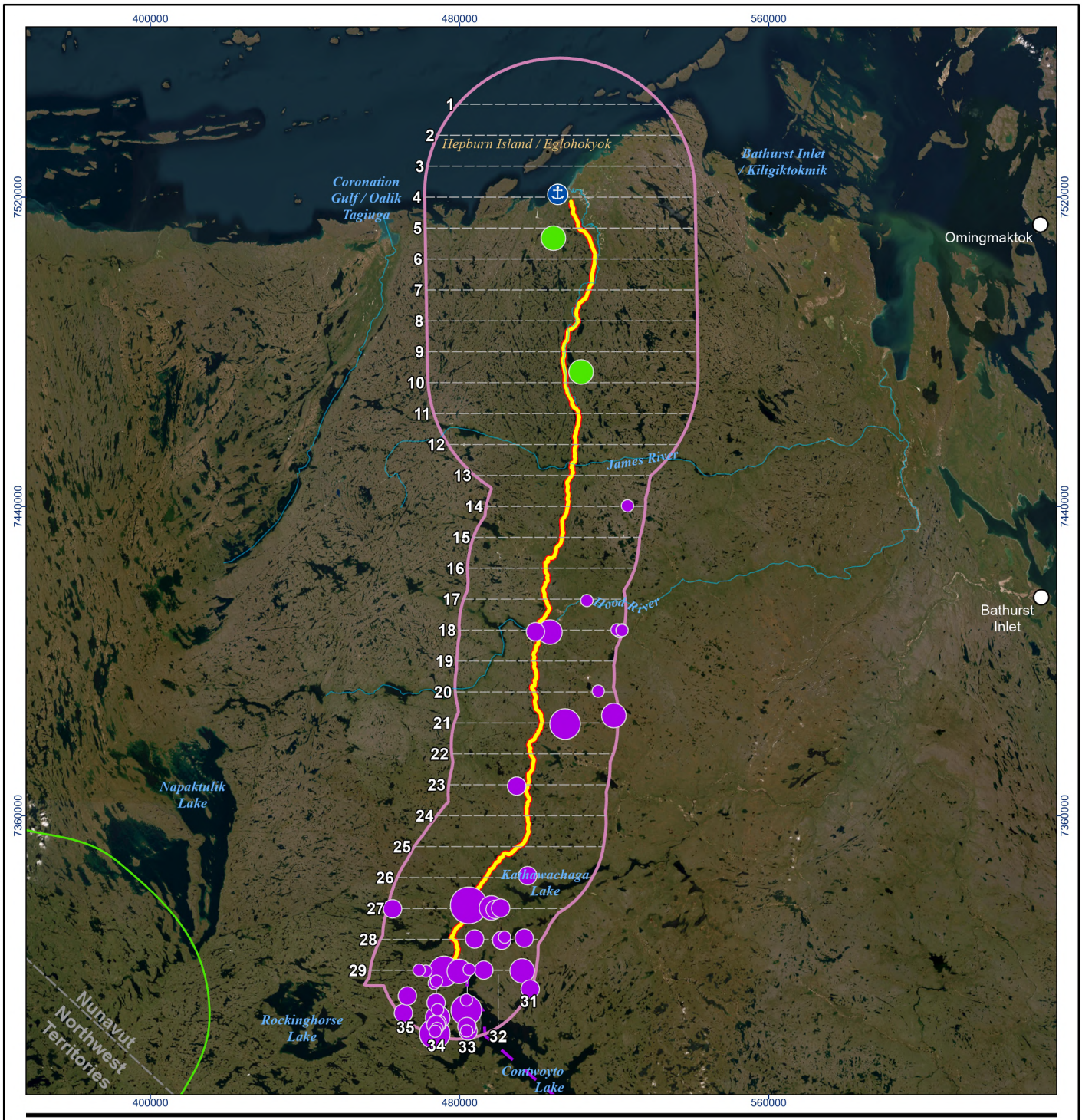
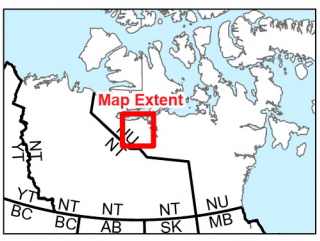


Figure 14: Kitikmiut Knowledge of Regional Mainland Tuktuit (Caribou) Spring and Fall Migration





Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Government of Canada, Stantec, Natural Resources Canada, Government of Canada (https://www.nrcan.gc.ca/earth-sciences/geography/download-geographical-names-data/9245)
Publication Date: Unknown
Downloaded: September 7, 2021
Last Checked: September 7, 2021

- Grays Bay Port
- Grays Bay Road
- Tibbitt to Contwoyto Winter Road
- Territorial Boundary
- Treeline
- Watercourse
- Wildlife Regional Study Area (RSA)

Ungulate Aerial Survey Transects
- Survey Transect Flightline

Bathurst Caribou Herd Observations (Pre-calving)
Total Individuals
- 1 - 5 Caribou
- 6 - 10 Caribou
- 11 - 20 Caribou
- 21 - 30 Caribou
- >30 Caribou

- 11-20 Caribou Likely Dolphin Union Observations

0 25 50 Kilometres
(At original document size of 8.5x11) 1:1,500,000
N

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Project Location
West Kitikmeot Region
Nunavut

Prepared by OliviaLeblanc on 2026-02-23

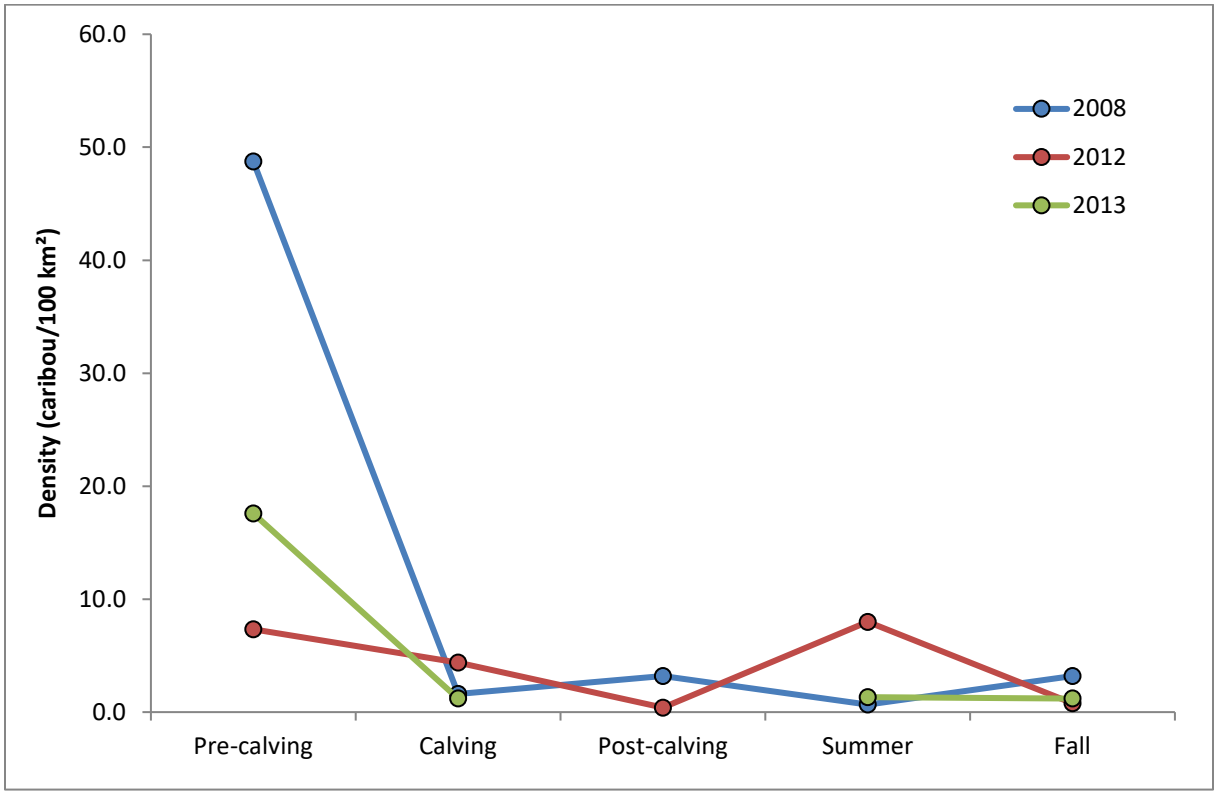
Client/Project 24Y0376
West Kitikmeot Resources Corp (WKR)
Grays Bay Road and Port

Figure No.
4.8

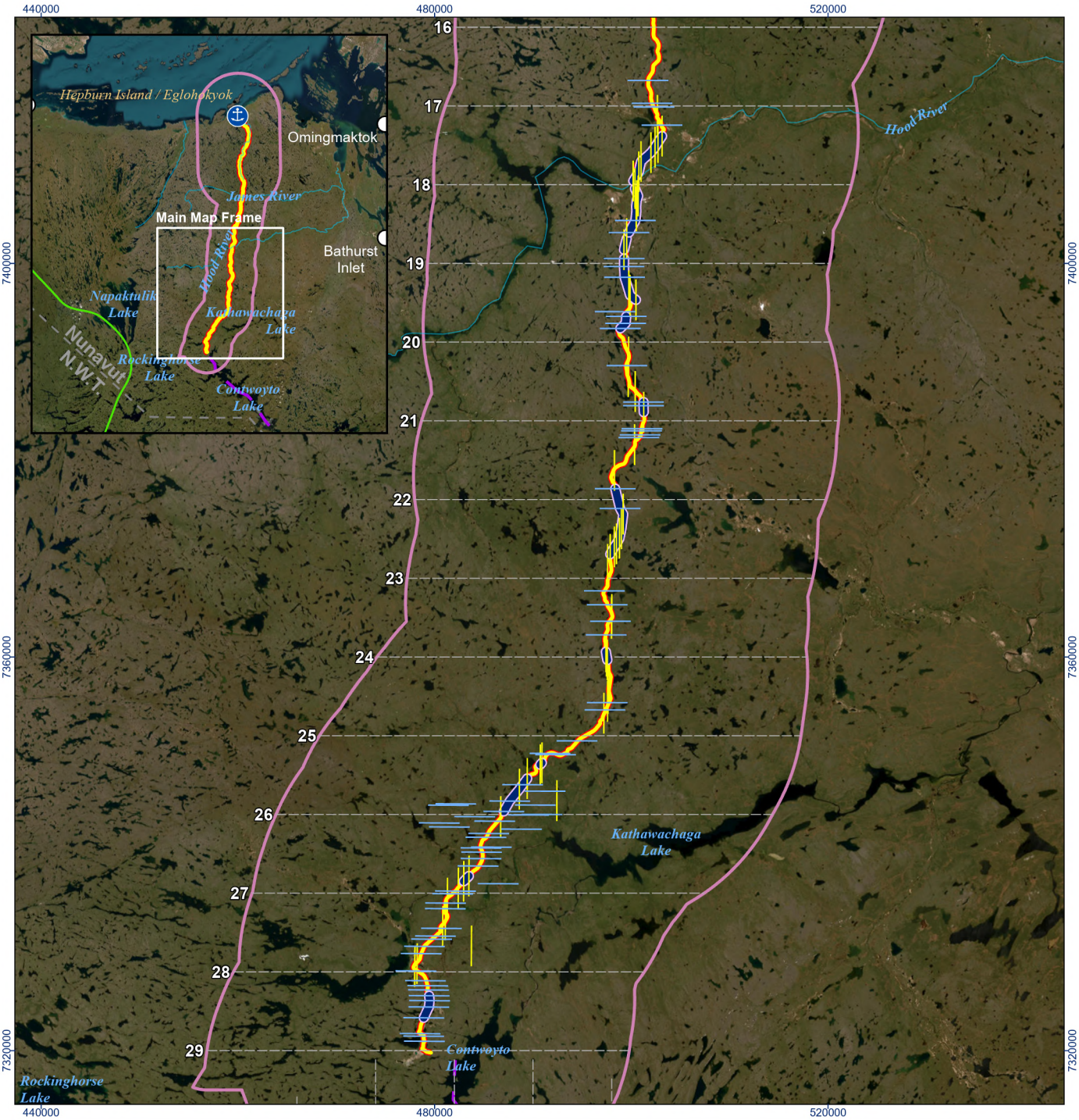
Title
Pre-calving Survey Observations of Caribou within the Grays Bay Road and Port Project Regional Study Area, late May, 2005, 2006, 2008, 2012, and 2013

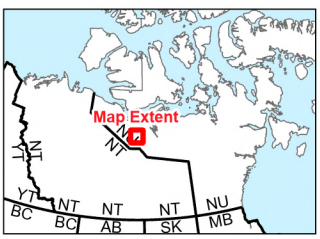
Path: L:\PROJECTS\2024\WH\24Y0029_GBRP\WildlifeBaselineUpdates_2025_V3.aprx\24Y0376_WildBaseline_Fig4-8_BAH_PreCalvingObs_20260220; Revised: 2026-02-23 By: OliviaLeblanc

Figure 4.9 Density of Bathurst Caribou Observed on Transects 14 to 35 within the Regional Study Area



During the aerial trail survey completed in early July 2012, trails were consistently observed from south of Jericho to approximately 20 km south of High Lake, where the terrain was primarily bedrock and boulder, and the farthest extent of the Bathurst caribou herd's summer range ends. Higher concentrations of trails occurred between 20 km south of Jericho and approximately 30 to 40 km north of the mine. Trails near Jericho had a predominantly north-south orientation. During the aerial trail survey completed in end-August 2024, trails were consistently observed from south of Jericho to the Hood River. As in 2012, most trails were concentrated approximately 30 km north of the Jericho mine (see Figure 4.10); but most of these trails were oriented east-west. Trails identified in 2012 and 2024 corresponded with movement paths by Bathurst caribou during spring migration.





Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Government of Canada, Stantec, Natural Resources, Government of Canada (http://ftp.maps.canada.ca/pub/nrcan_rncan/vector/canvec/fgdb/Transport)
canvec_1M_CA_Transport.gdb
Publication Date: 2019-11-8
Downloaded: December 12, 2019

- Grays Bay Port
- Grays Bay Road
- Tibbitt to Contwoyto Winter Road
- Territorial Boundary
- Treeline
- Watercourse
- Wildlife Regional Study Area (RSA)

Ungulate Aerial Survey Transects
- Survey Transect Flightline

Trails Intersecting
- East-West Trail
- North-South Trail
- Continuous Trail

0 5 10 15 Kilometres

(At original document size of 8.5x11) 1:600,000

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Project Location
West Kitikmeot Region
Nunavut

Prepared by OliviaLeblanc on 2026-02-23

Client/Project 24Y0376
West Kitikmeot Resources Corp (WKR)
Grays Bay Road and Port

Figure No.
4.10

Title
Trails Intersecting and in Proximity to the Grays Bay Road and Port Project, August 2024

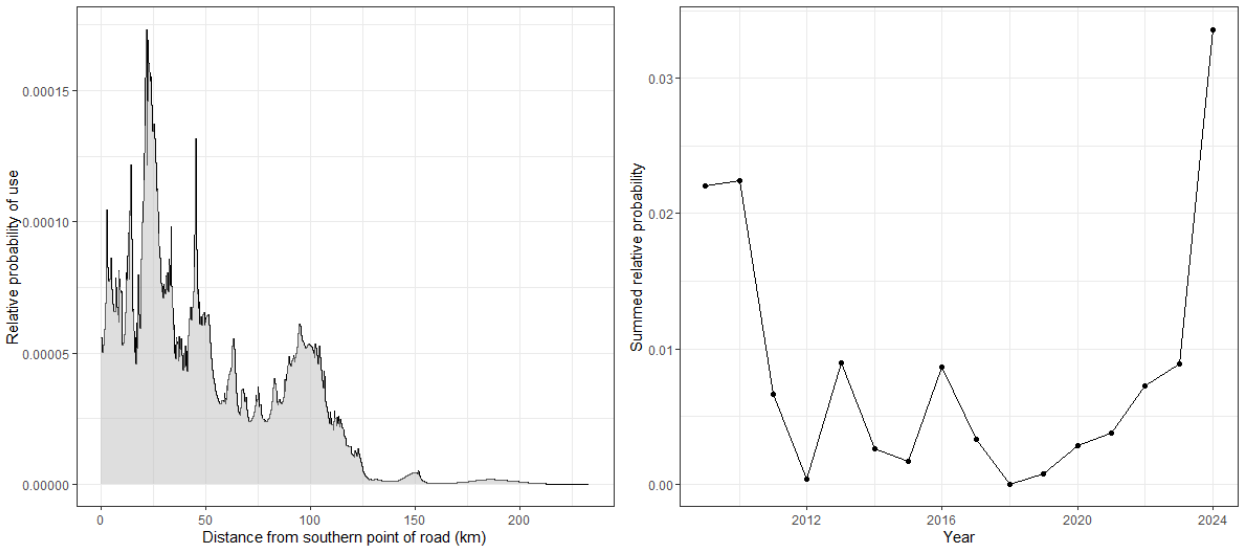
Path: L:\PROJECTS\2024\WH\24Y0029_GBRP\WildlifeBaselineUpdates_2025.aprx\24Y0376_WildBaseline_Fig4-10_TrailsIntersecting_20260223; Revised: 2026-02-23 By: OliviaLeblanc

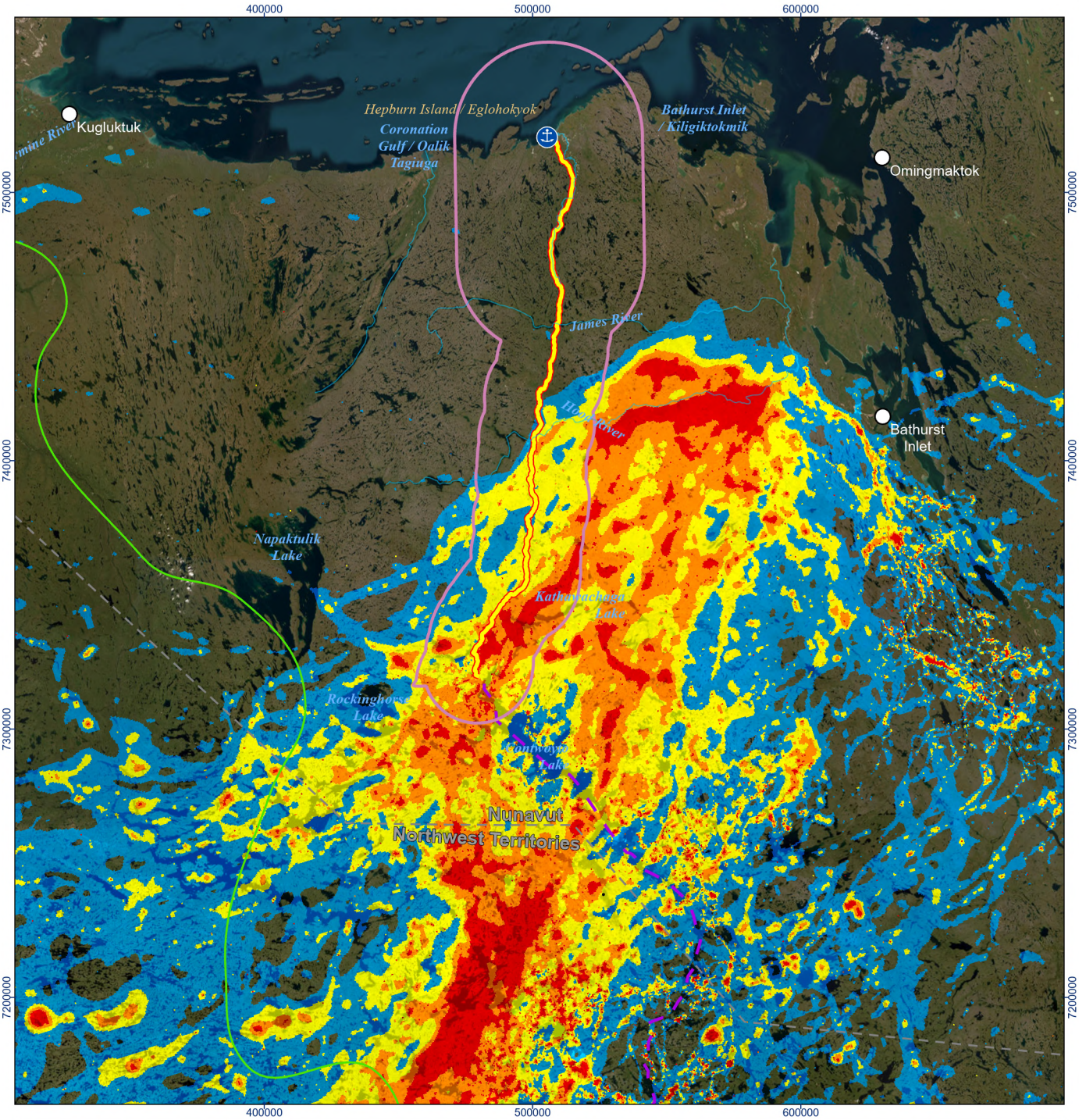
The BBMM of Bathurst caribou spring migration (derived from GPS collar data) demonstrates the herd moving in a northeastern trajectory from its winter range to its calving range. Though migration movements may vary and span a broad extent over many years, which consequently varies caribou interaction with the Project's southern road terminus (right panel; see Figure 4.11), a central migration corridor is evident (orange shading, see Figure 4.12). Caribou movement followed this central migration corridor in most years. Fine scale variation around the central migration corridor is also present across years. From 2009 to 2011, movement paths primarily originated on the west side of the Project, following or intersecting the Project at its southern terminus. During other years (e.g., 2012, 2018, 2019), the primary migration corridor occurred east of the road (and Contwoyto Lake) by 50 km to 100 km. Across all years of analysis, the most heavily utilized routes intersect the Project's southern 50 km extent (left panel; see Figure 4.11).

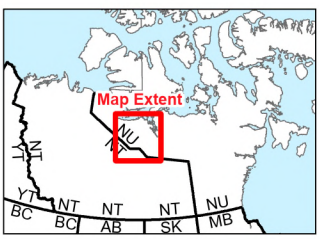
Bathurst caribou cross several water bodies (lakes and rivers) during seasonal migrations. Some water crossings (*Nadlok*) are especially important to caribou movement on the landscape, as they provide shorter swimming distances across large bodies of water and have become traditional crossing points for the herd. Some of these crossings are well-known for the herd, based on collar data and Inuit Knowledge, and have been designated as important crossings. Within the RSA, seven crossings are designated on Contwoyto Lake and one on Burnside River where it joins Contwoyto Lake (see Figure 4.13).

> *"C22 Those lake narrows are used by caribou. The wildlife knows about the lake narrows (nadlok), the grizzlies and muskox know the narrows as they swim across. There are lots of campsites in that area. When the caribou are going through there, Inuit hunted them using bows" (Banci and Spicker 2024).*

Figure 4.11 Relative Probability of Use of the Grays Bay Road by Bathurst Caribou During Spring Migration: (a) Distance from the Road's Southern Point and (b) Across Years







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1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Government of Canada, Stantec, Natural Resources Canada, Government of Canada (https://www.nrcan.gc.ca/earth-sciences/geography/download-geographical-names-data/9245)
Publication Date: Unknown
Downloaded: September 7, 2021
Last Checked: September 7, 2021

- Grays Bay Port
- Grays Bay Road
- Tibbitt to Contwoyto Winter Road
- Territorial Boundary
- Treeline
- Watercourse
- Wildlife Regional Study Area (RSA)

Probability of Use
- High Intensity Use (25%)
- Moderate-High Intensity Use (50%)
- Moderate Intensity Use (75%)
- Low Intensity Use (95%)

0 25 50 Kilometres
(At original document size of 8.5x11) 1:2,200,000

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Project Location
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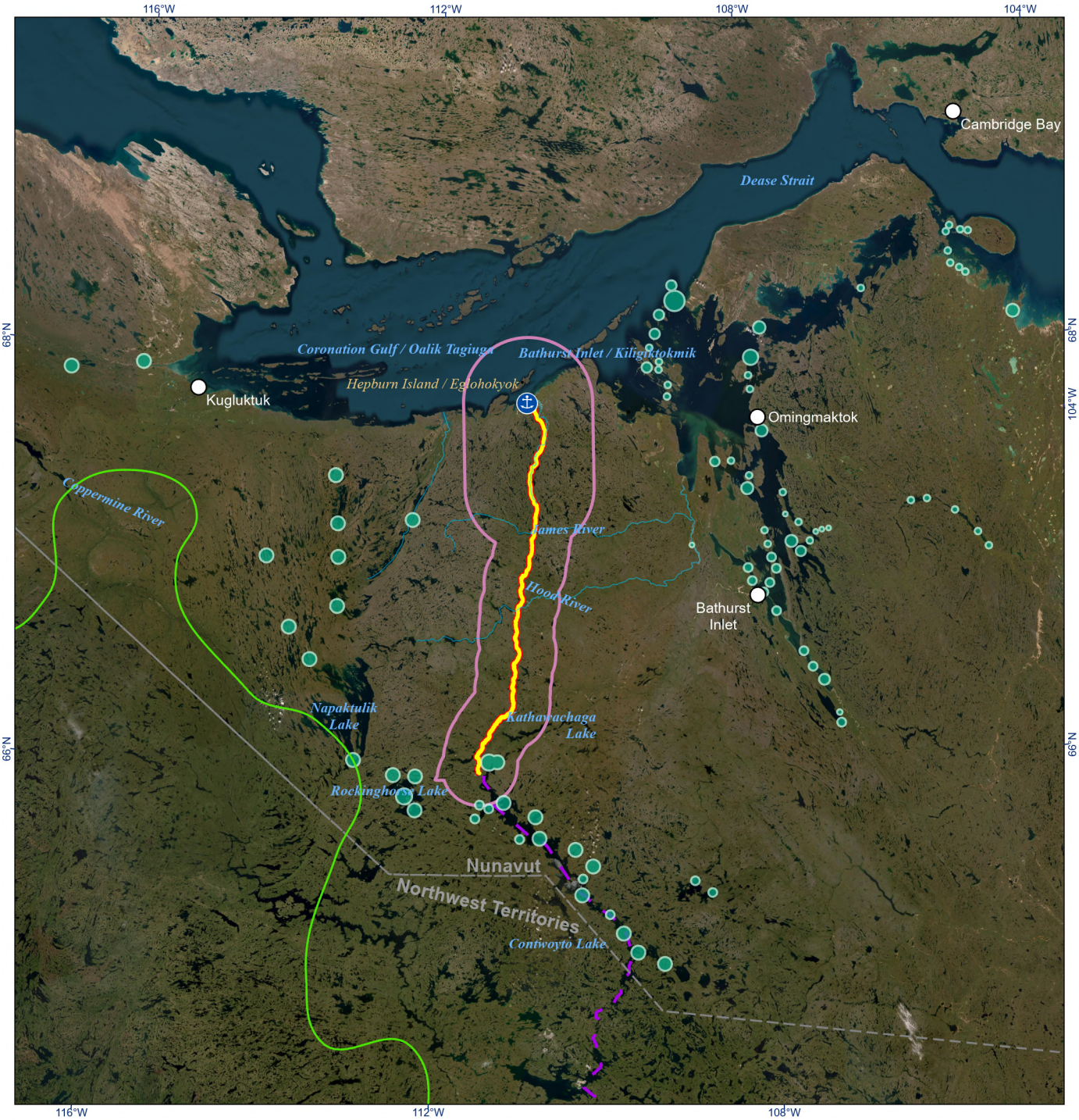
Prepared by OliviaLeblanc on 2026-02-23

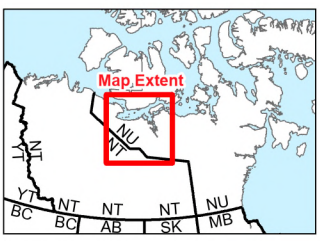
Client/Project 24Y0376
West Kitikmeot Resources Corp (WKR)
Grays Bay Road and Port

Figure No.
4.12

Title
Bathurst Caribou Herd Relative Use of Spring Migration Routes (2009 to 2024) Based on Brownian Bridge Movement Analysis

Path: L:\PROJECTS\2024\WH\24Y0029_GBRP\WildlifeBaselineUpdates_2025_V3.aprx\24Y0376_WildBaseline_Fig4-12_SeasonalMigration_Spring_20260220; Revised: 2026-02-23 By: OliviaLeblanc





Notes

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2. Data Sources: Government of Canada, Stantec, Natural Resources Canada, Government of Canada (https://www.nrcan.gc.ca/earth-sciences/geography/download-geographical-names-data/9245)
   Publication Date: Unknown
   Downloaded: September 7, 2021
   Last Checked: September 7, 2021

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- Territorial Boundary
- Treeline
- Watercourse
- Wildlife Regional Study Area (RSA)
- Caribou Water Crossing Location

0 50 100 Kilometres

(At original document size of 8.5x11) 1:3,200,000

N

WEST KITIKMEOT RESOURCES CORP

EDI ENVIRONMENTAL DYNAMICS INC.

Project Location
West Kitikmeot Region
Nunavut

Prepared by OliviaLeblanc on 2026-02-23

Client/Project 24Y0376

West Kitikmeot Resources Corp (WKR)
Grays Bay Road and Port

Figure No.
4.13

Title
Caribou Water Crossings

Path: L:\PROJECTS\2024\WH\24Y0029_GBRP\WildlifeBaselineUpdates_2025_V3.aprx\24Y0376_WildBaseline_Fig4-13_BAH_CaribouWaterCrossings_20260220; Revised: 2026-02-23 By: OliviaLeblanc

4.2.4.3 Calving

Bathurst Inlet is an important calving area for mainland caribou (calving: June 2 to 16). Inuit Knowledge descriptions of calving in Bathurst Inlet are divided into east and west coasts (Banci and Spicker 2024). Along the west coast, the most important calving area was located at Arctic Sound (*Katimanak Kangihok*) with smaller calving areas located on Banks Peninsula (*Hinikyoak*) and near the community of Bathurst Inlet and Bathurst Lake (*Tahikafalok*) at the south end of the inlet (NTKP 2018). Along the east coast, the most important calving areas included Tinney Hills and all of the Hiukkittak drainage, with calving also occurring near Bay Chimo (NTKP 2018).

> *C110 "The statement that I can make, which is true, this whole area is a calving ground, the whole of Bathurst Inlet corridor. It doesn't matter what years they are, they are going to be calving somewhere in here. It doesn't matter which part of this area. The whole area is the calving ground. They probably go further south but I'm not too sure how far south they go, but the whole Inlet area is a calving ground" (Banci and Spicker 2024).*

Despite the importance of Bathurst Inlet for calving, Inuit Knowledge has always reported the existence of other traditional well-used calving areas including Kent Peninsula (*Kilingoyak*), the Queen Maud Gulf (*Ahiak*) coast, and the Beechey Lake (*Hanningayuk*) and Contwoyto Lake regions (Banci and Spicker 2024). Caribou calved on Kent Peninsula and throughout the area south of the isthmus(Banci and Spicker 2024). Important calving areas along the Queen Maud Gulf coast included the Tingmeak River (*Kolgayok*), Kuugaarjuk River (*Kugakyoak*), Ellice River (*Kunayok*), Whitebear Point (*Aoulativikyoak*), Haloakhiokvik, Ahiak, and Perry River (*Kugyoak*) (NTKP 2018). From Bathurst Lake, caribou calving continued south along the Western River (*Kilokgiktok*) to Beechey Lake; this lake and the surrounding region was a major calving area (Banci and Spicker 2024). Further inland towards the Contwoyto Lake region, caribou calving areas were smaller and less used; calving areas were located north and south of Contwoyto Lake and along the shorelines of Contwoyto Lake, Pellatt Lake (*Nonatoklik*), Nose Lake (*Kingalhoak*), Kathawachaga Lake (*Aimaokatalok*), Rockinghorse Lake (*Kaomaogaktok*), and Napaktulik Lake (*Napaktolik*) (NTKP 2018).

> *C34 "The caribou calved around Kilingoyak (south of Kent Peninsula on Elu Inlet mainland) and Ahiak (east of Kunayok (Ellice River, and over here (east of Omingmaktok) … They calve just anywhere on the land around those places" (NTKP 2018).*

> *C19 "The caribou calve when it starts to melt and the ground is getting wet. Some calve close to around here (Kugyoak and Kunayok) and towards Kolgayok (Tingmeak River), on both sides of the river. The caribou don't all calve all at once. One after another they are born" (NTKP 2018).*

> *C20a "These are calving grounds, used to be calving grounds (Hanningayuk (Beechey Lake)). There's always a big herd there. People used to camp there. There have always been calves since I can remember, in the mid 1940s to mid 1950s. Caribou would come into this area, thousands of caribou with calves. It's always been that way every spring. Ever since we were little children the caribou have always gone there. Nowadays there's not many caribou going there" (NTKP 2018).*

> *C1 "… I've seen some caribou giving birth around here (Tahikyoak) (Contwoyto Lake). Long ago there used to be lots of newborn caribou claves around this area (both shores of the north half of Tahikyoak (Contwoyto) all the way that way (north and south)) …" (NTKP 2018).*
>
> *C18 "… I have seen caribou born here at Kaomaogaktok (Rockinghorse Lake). The calves must be born in the spring, when the snow is just starting to go away, when the weather gets warmer" (NTKP 2018).*
>
> *C40 "Caribou calved around Tahikyoak (Contwoyto) and near Napaktolik" (NTKP 2018).*

Calving areas have changed over time. In the past, mainland caribou calved on the east side of Bathurst Inlet, but by the 1990s caribou starting calving west of the Inlet (Banci and Spicker 2024). Inuit Knowledge identifies calving ranges post-1996 to occur close to Bathurst Inlet, more frequently on the west side of the inlet (see Figure 4.14) (Banci and Spicker 2024). As a result, people in Bathurst Inlet no longer saw caribou come through their community in the spring, causing great hardship to Inuit living there (Banci and Spicker 2024).

> *C13 "Sometimes caribou tend to, for number of years, calve on the east side of Bathurst for a number of years for some reason. Then they start to come back to this area again where they have been seldom seen for a long time" (NTKP 2018).*
>
> *C17 "When we first came to Kingaok twenty-four years ago (1970), there were lots of caribou calving here back then. (She mapped two older calving areas south of Kingaok). We hardly see anything like that anymore (1990s). For ten years, maybe more or maybe less, caribou haven't been coming around. Long ago we used to have thousands and thousands right around the houses. From late April to May we used to see lots of caribou but now (1990s) we hardly see any …" (NTKP 2018).*
>
> *C207 "I haven't seen too many calves within the last ten years (1988-1998). They are mostly to the west. There were lots of calves when I was growing up around the Inlet (Kingaok). Not too many caribou come through now. Maybe half the cows had calves, but then I probably missed them because I'm not always there. These days there seems to be less calves, caribou aren't coming right through. They have been staying mostly to the west. All the years I'd been growing up they've been calving around here (Kingaok), as I remember. The last ten to nineteen years (1980-1998) there have been hardly any caribou coming through" (Banci and Spicker 2024).*

Calving ranges are a commonly recognized aspect of mainland caribou ecology; however, terminology referring to these areas varies and can cause confusion. During the 2001 *Barren-ground Caribou Calving Ground Workshop*, a robust definition of a calving ground was reached by consensus: "*the area occupied by the parturient barren-ground caribou from calf birth through the initiation of foraging by calves*" (Russell et al. 2002).

Figure 4.14 Kitikmiut Knowledge of Regional Mainland Tuktuit (Caribou) Calving Areas

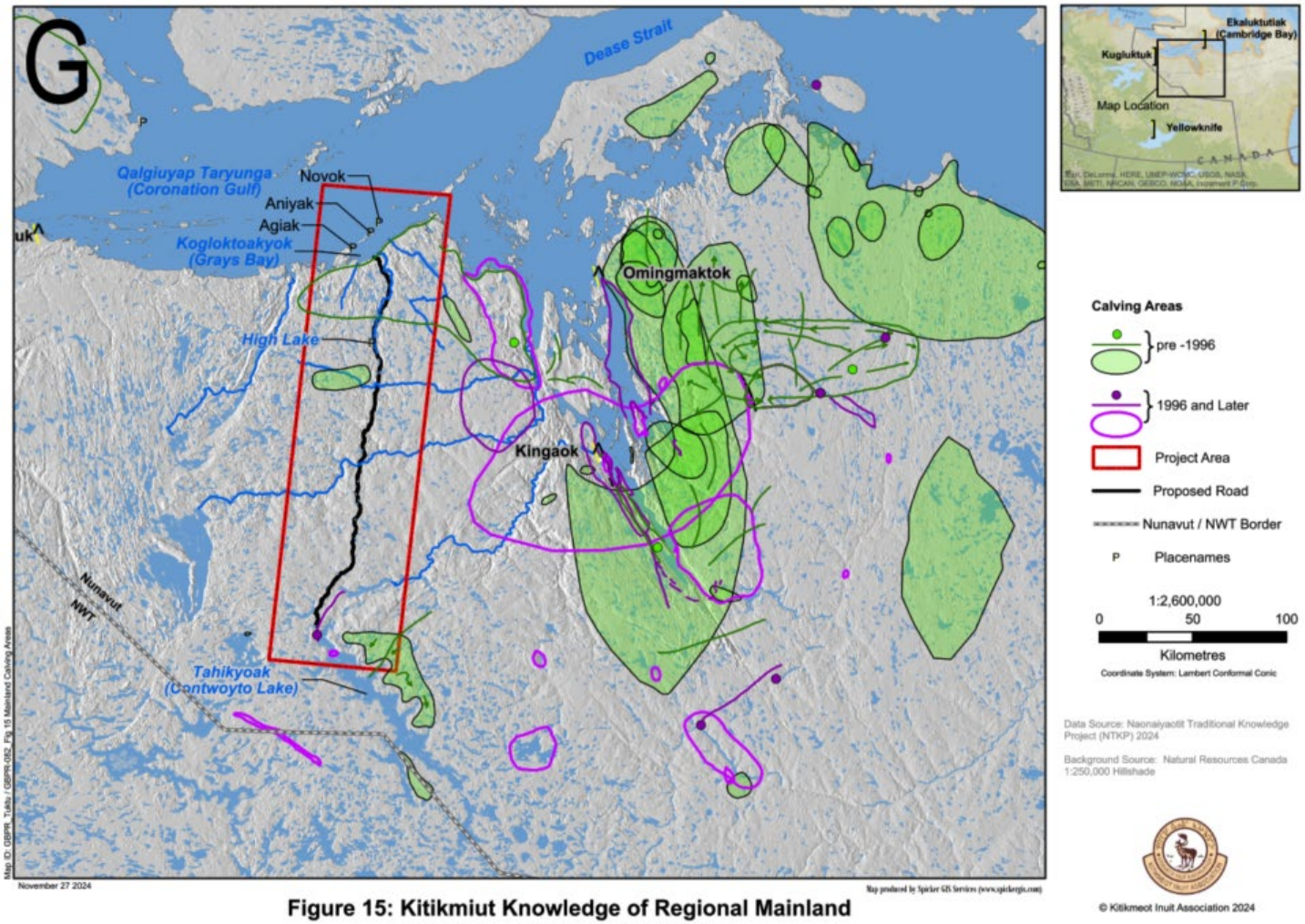


Figure 15: Kitikmiut Knowledge of Regional Mainland Tuktuit (Caribou) Calving Areas

This definition highlights the importance of the areas used by cows and calves up to three weeks after birth when the calves are particularly vulnerable (Russell et al. 2002). The concept that the actual location where a cow gives birth to her calf is not highly selected for is confirmed by Inuit Knowledge holders:

> *C19 "The caribou calve just about anywhere because they walk all over the land …" (NTKP 2018).*
>
> *C27 "They have their calves while they are walking, even if they don't reach their calving grounds. When the unborn calf wants to come out, it comes out …" (NTKP 2018).*
>
> *C49 "The caribou are constantly walking, calving, and they never stop" (Banci and Spicker 2024).*
>
> *C50 "The caribou calving grounds are anywhere on the land, even on the islands. They have their calves just about anywhere when they are walking" (NTKP 2018).*
>
> *C51 "As they are walking and the calf is about to be born, that is where they are born. They can calve anywhere because they do not stop as they are walking. The calves usually start running as soon as they are born" (Banci and Spicker 2024).*
>
> *C44 "The location of the calving grounds doesn't seem to change but sometimes during the spring the caribou are late in giving birth to their calves. By the time they reach northeast of Omingmaktok they already have their calves" (Banci and Spicker 2024).*
>
> *C208 "When the caribou cannot go anymore or maybe when they are in pain they calve" (Banci and Spicker 2024).*

How cows choose calving areas is not fully understood; however, some Inuit Knowledge suggests it is based on environmental factors such as the presence of rich vegetation, early snowmelt, and flat, open terrain to vigilantly detect and avoid wolves, or cows may simply return to where they were born (Banci and Spicker 2024).Other Inuit Knowledge suggests caribou do not always return to the same calving range, but alter where they go from year to year (Banci and Spicker 2024). This is consistent with current scientific information that suggests calving range selection is based on a combination of factors including landscape, timing of vegetation green-up, energetic requirements, and reduced risk of predation (Russell et al. 2002).

> *C11 "There is more than one calving ground, sometimes they would be late and other times early, it's never the same. They would calve in different areas than the years before. That's how it is. That's how they area. It is the same as the environment, always changing" (NTKP 2018).*
>
> *C51 "It's hard to tell how the caribou choose their calving areas. I guess the wolves tend to move them more often and sometimes they make them move a little further from their main calving grounds. There is no way of telling of where they will calve … We've seen them calving right on the snow and some on the ground. Caribou calve anywhere, even on some high hills where they are close to boulder fields" (NTKP 2018).*
>
> *C111 "From what I hear about the calving grounds, they use that area for a few years and then there will be no food so they change until the food grows there again, There are so many of them*

> *and there's no food. If they go back next year and there is no food for them, they change until the place grows again. They don't just calve in one spot for life. They switch to where there's food for them" (NTKP 2018).*

The fidelity of individual cow caribou to geographic calving areas has been well documented (Fleck and Gunn 1982, Cameron et al. 1986, Gunn and Miller 1986, Russell et al. 2002), and was observed during two distinct periods for the Bathurst herd (Gunn et al. 2008b, Gunn et al. 2011). According to Inuit Knowledge, Bathurst calving range are located east, west, or south of Bathurst Inlet, but when they are late in their arrival from the south they calve on the west side of Bathurst Inlet (Banci and Spicker 2024). Kelsall (1953, 1955 in Fleck and Gunn 1982) provided the first scientific description of Bathurst calving range in 1950, suggesting the herd moved east across Bathurst Inlet in early June of that year and returned with calves to the lowlands around Bathurst Inlet by mid-July. Kelsall speculated that the herd generally calved to the east of Bathurst Inlet; however, some calving within 10–15 km of either side of the inlet did occur (Fleck and Gunn 1982).

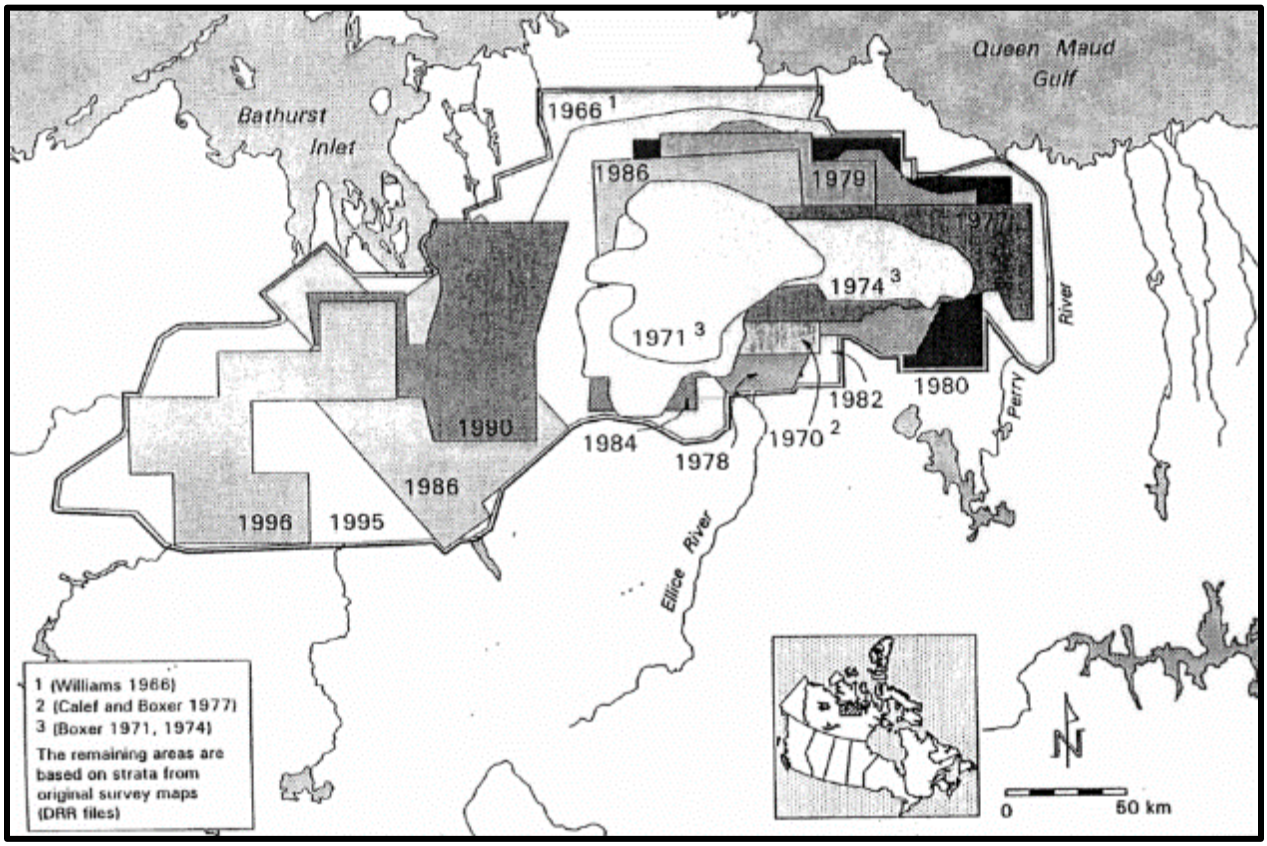
People generally avoid the herd during calving as it is respected as an especially sensitive time for caribou (Thorpe Consulting Services Ltd. 2014b). Most community members have never observed a calving range, except for during those years when the cows birth close to communities (e.g. Bathurst Inlet 1986 and 1990; Sutherland and Gunn 1996).

The GNWT began surveys of the Bathurst caribou herd's calving range in 1965, largely in response to the increase of exploration and development activity in the vicinity of calving range (Sutherland and Gunn 1996). In 1951, 1977, and 1979 caribou were observed calving west of Bathurst Inlet (Fleck and Gunn 1982); however, the majority of the herd calved east of Bathurst Inlet up to the mid-1980s, and between 1986 and 1996 calving ground use had shifted to west of the inlet, roughly around the Hood and Burnside rivers (Sutherland and Gunn 1996; see Figure 4.15). This shift in calving areas was also observed by Inuit Knowledge holders (Banci and Spicker 2024). With the population peak in 1986, this shift was attributed to increased density of breeding cows on the calving range (east of Bathurst Inlet), possibly leading to increased forage competition and risk of parasitism, and ultimately causing a shift to calving areas in the west that were not as highly or recently used (Gunn et al. 2012).

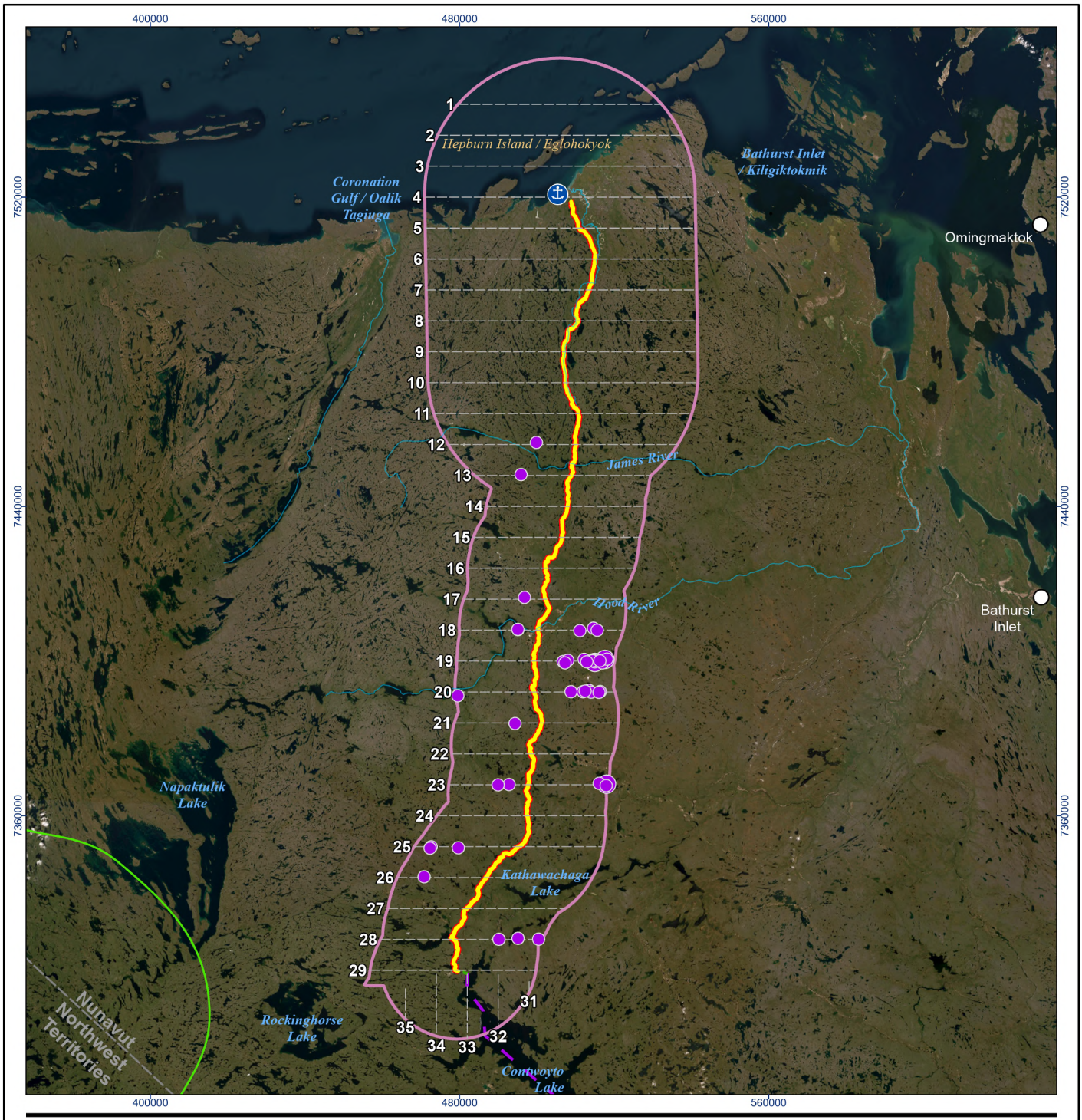
From 1966 to 1996, the Bathurst herd's peak of calving, defined as the date at which 50% of cows have calved (Gunn et al. 2008c), was estimated to occur throughout a five day period between 3 and 15 June (Sutherland and Gunn 1996), with estimates of peak calving as late as 18 June (Gunn et al. 2008c).

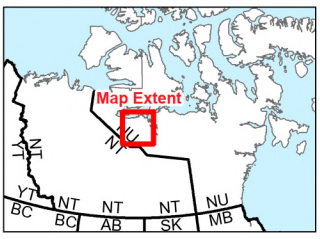
Since 1996, the Bathurst peak calving area (the area used in a particular year by parturient cows during calving) has remained west of Bathurst Inlet in the same general area (Gunn et al. 2008c), with some year-to-year latitudinal variation between the Burnside and James (*Hanigayok*) rivers (see Figure 4.15). From 1993 to 2009, peak calving was estimated to occur between June 4 and 12 (Nagy 2011), with cows arriving in the vicinity of the calving range between May 20 and June 5 from 1996 to 2009 (Gunn and Poole 2010). The size of the core calving range where breeding cows were detected declined from 4,000–7,000 km² during the period 2006 to 2010 to 1,000–1,500 km² during the period 2012–2015 (Boulanger et al. 2017). During the 2016 reconnaissance survey, caribou were observed at high density within an approximately 650 km² core calving area located on both sides of the Hood River (Boulanger et al. 2016).

Figure 4.15 Annual Calving Range of the Bathurst Caribou Herd Delineated during Reconnaissance Surveys, 1966 to 1996 (Sutherland and Gunn 1996)



The eastern outer edge of the RSA (transects 14 to 29; see Figure 4.2) overlaps with the western edge of the current Bathurst calving range in some years. Newborn calves were observed off-transect southeast of Ulu during the June 12 to 14, 2008, survey (see Figure 4.16). Nursery groups were generally observed southeast of Ulu, while bull caribou groups were observed in the Jericho/Lupin area. During calving surveys in 2012, Bathurst caribou were observed primarily south of Ulu in relatively small groups (<10 individuals). Most animals observed were barren cows and yearlings with some bulls; no calves were observed. A higher density of caribou was observed during the 2012 calving survey (4.4 caribou/100 km²) than in 2008 and 2013 (1.6 and 1.2 caribou/100 km², respectively; see Figure 4.9). Observations of bulls and non-breeding cow caribou in the southern extents of the RSA occur as they follow behind the cows (NTKP 2018) and do not venture as far towards the calving range as cows and yearlings.





Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Government of Canada, Stantec, Natural Resources Canada, Government of Canada (https://www.nrcan.gc.ca/earth-sciences/geography/download-geographical-names-data/9245)
Publication Date: Unknown
Downloaded: September 7, 2021
Last Checked: September 7, 2021

- Grays Bay Port
- Grays Bay Road
- Grays Bay Winter Road
- Tibbitt to Contwoyto Winter Road
- Territorial Boundary
- Treeline
- Watercourse
- Wildlife Regional Study Area (RSA)

Ungulate Aerial Survey Transects
- Survey Transect Flightline

Bathurst Caribou Herd Observations (Calving)
Total Individuals
- 1 - 5 Caribou
- 6 - 10 Caribou
- 11 - 20 Caribou
- 21 - 30 Caribou
- > 30 Caribou

0 20 40 Kilometres
(At original document size of 8.5x11) 1:1,500,000

N

WEST KITIKMEOT RESOURCES CORP

EDI ENVIRONMENTAL DYNAMICS INC.

Project Location
West Kitikmeot Region
Nunavut

Prepared by OliviaLeblanc on 2026-02-23

Client/Project 24Y0376
West Kitikmeot Resources Corp (WKR)
Grays Bay Road and Port

Figure No.
4.16

Title
Calving Survey Observations of Caribou within the Grays Bay Road and Port Project Regional Study Area, early June, 2005, 2006, 2008, 2012, and 2013

Path: L:\PROJECTS\2024\WH\24Y0029_GBRP\WildlifeBaselineUpdates_2025_V3.aprx\24Y0376_WildBaseline_Fig4-16_BAH_CalvingObs_20260220; Revised: 2026-02-23 By: OliviaLeblanc

Collared female caribou (cows) movement patterns were analyzed from 1996 to 2024 to estimate annual peak calving dates and locations. Median peak calving dates ranged from June 1 to 14 (see Table 4.7). The GNWT estimated comparable peak calving dates based on the combination of calving range surveys and collar data in 2009 (June 8), 2012 (June 5), 2015 (June 4), 2018 (June 8), 2021 (June 3 to 6), and 2022 (June 3 to 6) (Nishi et al. 2010; Boulanger et al. 2014a, 2017; Adamczewski et al. 2019, 2022, 2023).

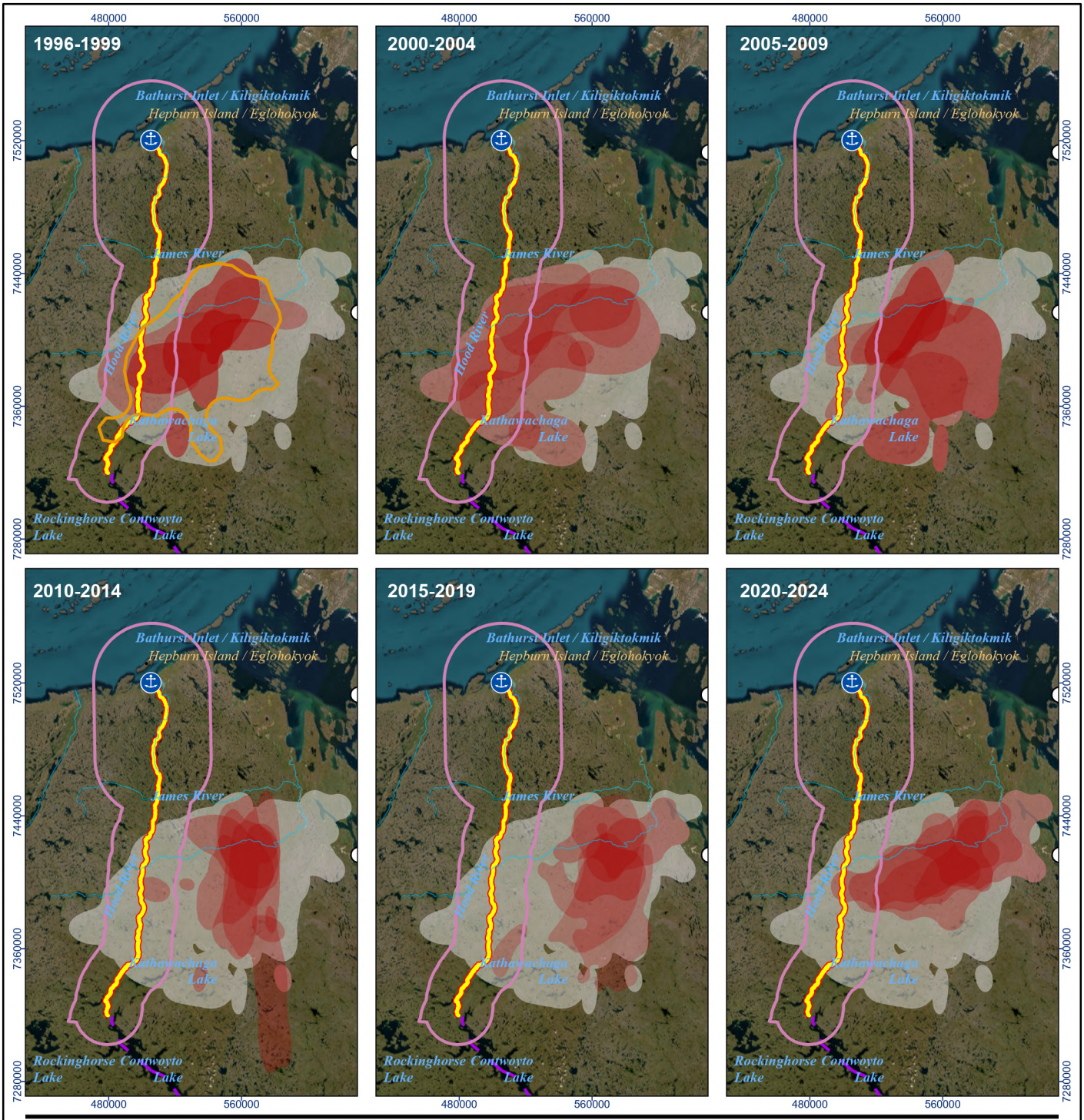
Since 1996, the herd's peak calving area has occurred west of Bathurst Inlet but varied in its proximity to the Project (see Figure 4.17). From 1996 to 2004, annual peak calving areas overlapped large areas of the southern extent of the Project. Since 2005, annual peak calving areas have shifted eastward (but still west of Bathurst Inlet) with minimal overlap of the Project. Cumulatively from 1996 to 2024, the interaction between the herd's peak calving area and the Project is limited (purple shading; see Figure 4.18).

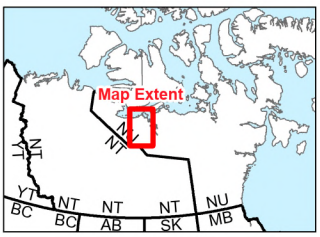
Table 4.7 Peak Calving Dates for the Bathurst Caribou Herd Based on Satellite and GPS Collar Data (1996 to 2024)

Year	Number of Individuals (Collar Type)	Number of Fixes	Estimated (Median) Peak Calving Date
1996–2000[1]	12 (SAT)	–	June 4–14
2001–2005[1]	12 (SAT)	–	June 8–14
2006[1]	14 (SAT)	–	June 8–14
2007[1]	19 (SAT)	–	June 8–14
2008	12 (SAT)	42	June 10
2009	9 (GPS), 1 (SAT)	65	June 8
2010	13 (GPS), 2(SAT)	202	June 5
2011	17 (GPS)	355	June 4
2012	18 (GPS)	377	June 4
2013	12 (GPS)	238	June 6
2014	17 (GPS)	344	June 4
2015	31 (GPS)	707	June 3
2016	19 (GPS)	493	June 1
2017	25 (GPS)	524	June 1
2018	12 (GPS)	252	June 7
2019	18 (GPS)	377	June 5
2020	26 (GPS)	546	June 5
2021	32 (GPS)	793	June 2
2022	35 (GPS)	783	June 6
2023	30 (GPS)	630	June 4
2024	19 (GPS)	399	June 4

Note:

[1] Collar data and estimated date ranges are taken from (Gunn et al. 2008c). Maximum number of collared individuals are identified for years that are grouped. Number of locations from 1996 to 2007 are not provided.





Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
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   Publication Date: Unknown
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   Last Checked: September 7, 2021

- Grays Bay Port
- Grays Bay Road
- Tibbitt to Contwoyto Winter Road
- Watercourse
- Wildlife Regional Study Area (RSA)
- Caribou Calving Area (NPC Designation)
- Bathurst Caribou Herd Peak Calving Range (1996 – 2024)

Peak Calving Areas (1996 – 2024)

- No Overlap (Single Year)
- Overlap

0 25 50 75 100 Kilometres

(At original document size of 8.5x11) 1:3,500,000

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WEST KITIKMEOT RESOURCES CORP

EDI ENVIRONMENTAL DYNAMICS INC.

Project Location
West Kitikmeot Region
Nunavut

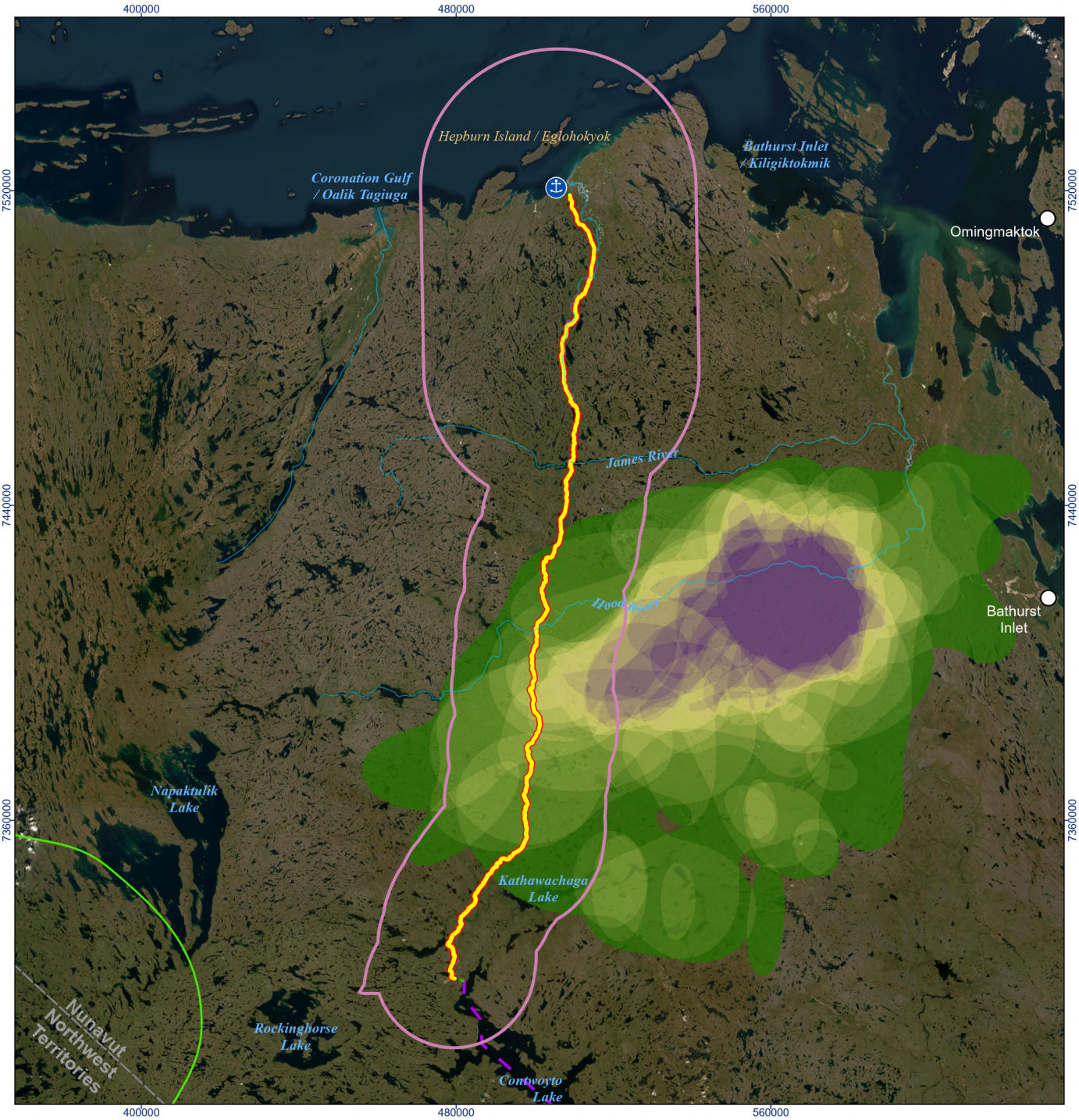
Prepared by OliviaLeblanc on 2026-02-23

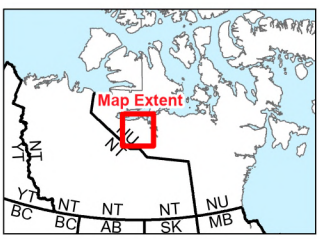
Client/Project 24Y0376
West Kitikmeot Resources Corp (WKR)
Grays Bay Road and Port

Figure No.
4.17

Title
Bathurst Caribou Herd Annual Peak Calving Areas (1996 to 2024)

Path: L:\PROJECTS\2024\WH\24Y0029_GBRP\WildlifeBaselineUpdates_2025_V3.aprx\24Y0376_WildBaseline_Fig4-17_BAH_PeakCalvingGrounds_20260220; Revised: 2026-02-23 By: OliviaLeblanc





Notes
1. Coordinate System: WGS 1984 UTM Zone 12N
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Publication Date: Unknown
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- Grays Bay Port
- Grays Bay Road
- Grays Bay Winter Road
- Tibbitt to Contwoyto Winter Road
- Territorial Boundary
- Treeline
- Watercourse
- Wildlife Regional Study Area (RSA)

Overlap of Peak Calving Grounds (1996 - 2024)
- High
- Low

0 20 40 Kilometres
(At original document size of 8.5x11) 1:1,500,000

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Prepared by OliviaLeblanc on 2026-02-23

Client/Project 24Y0376
West Kitikmeot Resources Corp (WKR)
Grays Bay Road and Port

Figure No.
4.18

Title
Bathurst Caribou Herd Cumulative Peak Calving Areas (1996 to 2024)

Path: L:\PROJECTS\2024\WH\24Y0029_GBRP\WildlifeBaselineUpdates_2025_V3.aprx\24Y0376_WildBaseline_Fig4-18_BAH_ExtentCumulativePeakCalving_20260220; Revised: 2026-02-23 By: OliviaLeblanc

Results from latitudinal and longitudinal regressions suggested that annual peak calving areas have progressively shifted to the east (R^2 = 0.48, p < 0.0001) and north (R^2 = 0.23, p = 0.005) from 1996 to 2024 (see Figure 4.19). Regression coefficients indicated that peak calving areas shifted 1,749 m east per year (95% confidence interval = 1,091–2,406 m) and 838 m north per year (95% confidence interval = 307–1,368 m). The eastward movement of the peak calving areas was persistent yet seemed to occur in pulses: farther east in 1996, 2004–2006, and 2018–2021, and farther west in 2000–2001, 2009, and 2023 (left panel; see Figure 4.19). Of course, latitudinal and longitudinal shifts cannot persist indefinitely. But the results indicate a low probability that the Project will disturb the Bathurst herd's peak calving areas. Furthermore, the size of peak calving areas did not show any indication of persistent change over time (p = 0.70) (red line = local weighted regression; see Figure 4.20).

Figure 4.19 Longitudinal (left panel) and Latitudinal (right panel) Shifts in the Bathurst Caribou Herd Peak Calving Area Over Time (1996 to 2024)

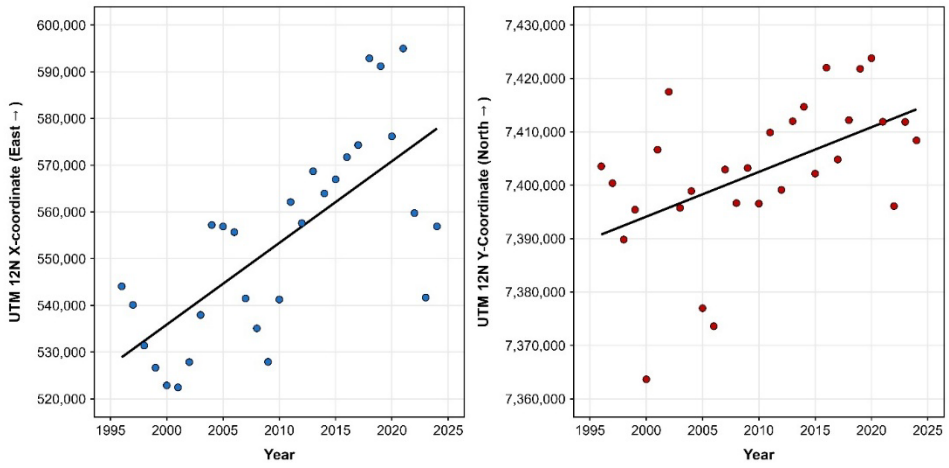
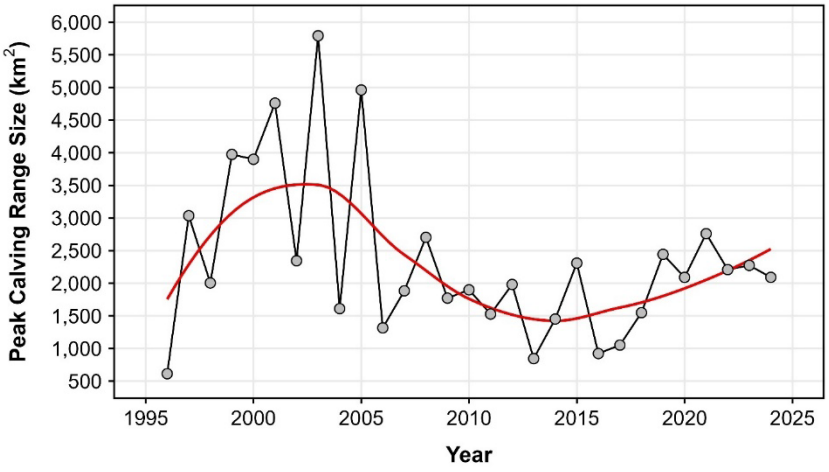


Figure 4.20 Size of Bathurst Caribou Herd Peak Calving Area Over Time (1996 to 2024)



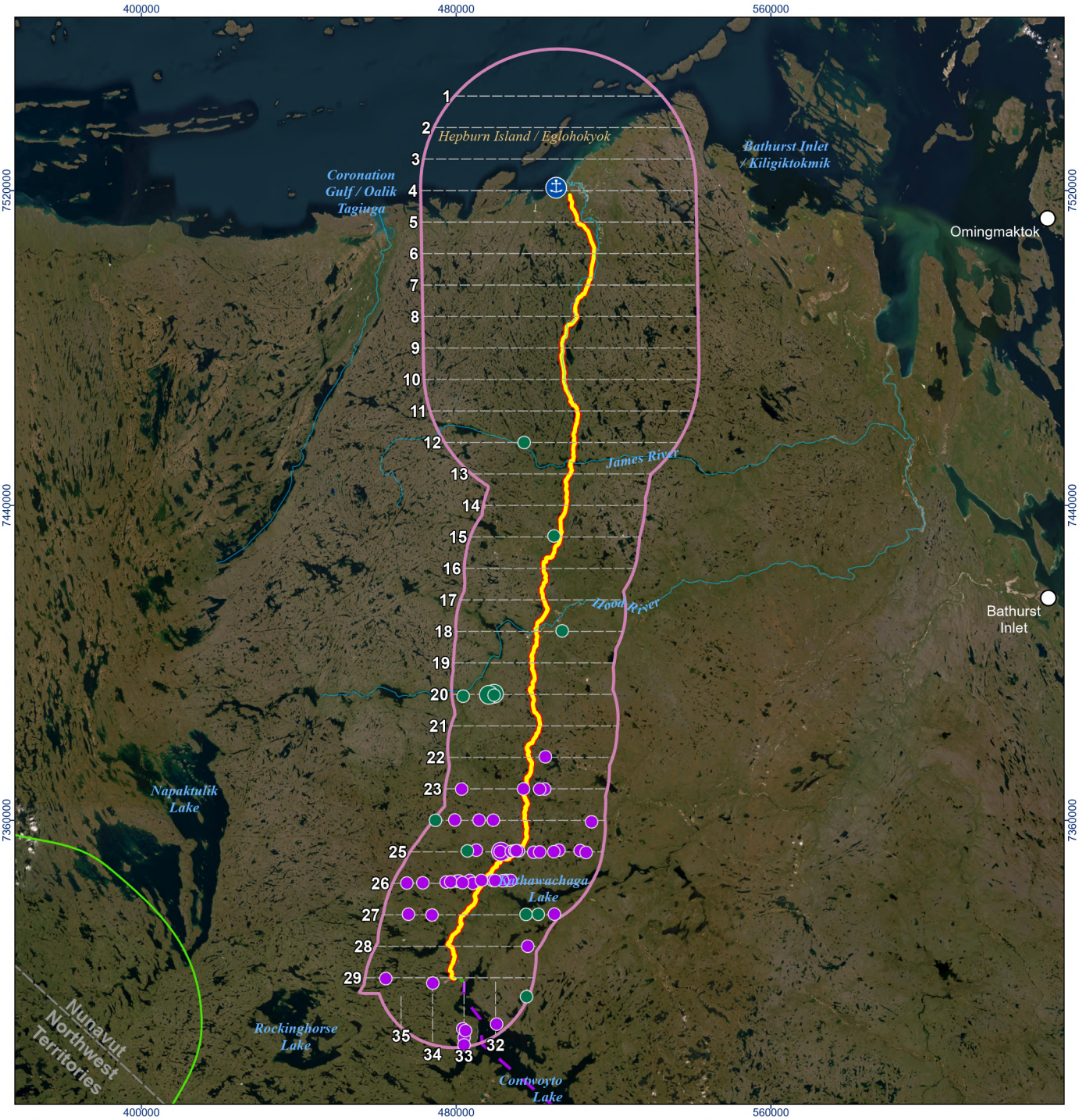
4.2.4.4 Post-calving and Summer

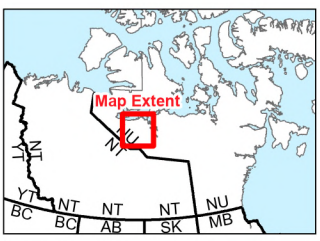
Post-calving is the period immediately after parturition (approximately June 17 to 28) (Gunn et al. 2013). According to the Russel et al. (2002) definition of the calving period (parturition date plus three weeks until foraging is initiated), the calving period encompasses this entire date range: June 3 to approximately July 5 (varies somewhat depending on date of peak calving). Post-calving is a period that is within, and further describes, the calving season. The post-calving is characterized by Bathurst caribou generally moving southwards and away from the peak calving area. This post--calving movement is believed to be largely related to the avoidance of parasitic insects (e.g., warble flies), with farther post-calving movements resulting in lower relative densities of parasitic infection (Folstad et al. 1991).
This corresponds with regional Inuit Knowledge:

> *C11 "After they have calved, there are too many mosquitoes" (Banci and Spicker 2024).*

By summer (June 29 to Sept 6), the Bathurst herd typically moves southwards towards the shores of Contwoyto Lake, although in some years they move west before heading south (Gunn et al. 2001). Once Contwoyto Lake is reached, movements are predominantly westward towards Point Lake (*Tahikafalok*). By late summer and early fall, post-calving aggregations have disbanded and the herd is dispersed across the landscape (Gunn et al. 2001). By early July 2008 most nursery groups observed during Project aerial surveys had moved south of the calving range to the east of Contwoyto Lake (see Figure 4.21). Very few caribou were observed north of Gumbo Lake during July surveys (see Figure 4.21). A large number of groups of caribou (with very few calves) were observed 20–40 km north of Jericho within the RSA during the mid-August 2012 survey (see Figure 4.21 and Table 4.4).

> *C51 "In July the caribou are very scattered when they start to come through the Nonatoklik area (southeast of Contwoyto Lake). The cows again are the first to come. They come in ones or maybe twos and then a couple of days later you might see three. Then all of a sudden after that you see the major herd come through. You can hear them before they come into camp.*
>
> *You could hear the thunder of their hooves, just like in the movies when there is a cattle stampede or something like that. Once they come through this whole landscape gets totally covered with caribou. It's like the whole earth is moving south. Our lake is quite large all right and when they start to walk on both sides it is just like the while lake is moving" (Banci and Spicker 2024).*





Notes

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Government of Canada, Stantec, Natural Resources Canada, Government of Canada (https://www.nrcan.gc.ca/earth-sciences/geography/download-geographical-names-data/9245)
   Publication Date: Unknown
   Downloaded: September 7, 2021
   Last Checked: September 7, 2021

- Grays Bay Port
- Grays Bay Road
- Grays Bay Winter Road
- Tibbitt to Contwoyto Winter Road
- Territorial Boundary
- Treeline
- Watercourse
- Wildlife Regional Study Area (RSA)

Ungulate Aerial Survey Transects

- Survey Transect Flightline

Bathurst Caribou Herd Observations (Post-Calving and Summer)

Total Individuals

- 1 - 5 Caribou
- 6 - 10 Caribou
- 11 - 20 Caribou
- 21 - 30 Caribou
- >30 Caribou

Post-Calving Summer

0 20 40 Kilometres

(At original document size of 8.5x11) 1:1,500,000

N

WEST KITIKMEOT RESOURCES CORP

EDI ENVIRONMENTAL DYNAMICS INC.

Project Location
West Kitikmeot Region
Nunavut

Prepared by OliviaLeblanc on 2026-02-23

Client/Project 24Y0376

West Kitikmeot Resources Corp (WKR)
Grays Bay Road and Port

Figure No.
4.21

Title
Post-calving (late June–early July, 2006, 2008, 2012, and 2013) and Summer (late July–mid-August, 2007, 2008, 2010, 2012 and 2013) Survey Observations of Caribou within the Grays Bay Road and Port Project Regional Study Area

Path: L:\PROJECTS\2024\WH\24Y0029_GBRP\WildlifeBaselineUpdates_2025_V3.aprx\24Y0376_WildBaseline_Fig4-21_BAH_PostCalvingSummerObs_20260220; Revised: 2026-02-23 By: OliviaLeblanc

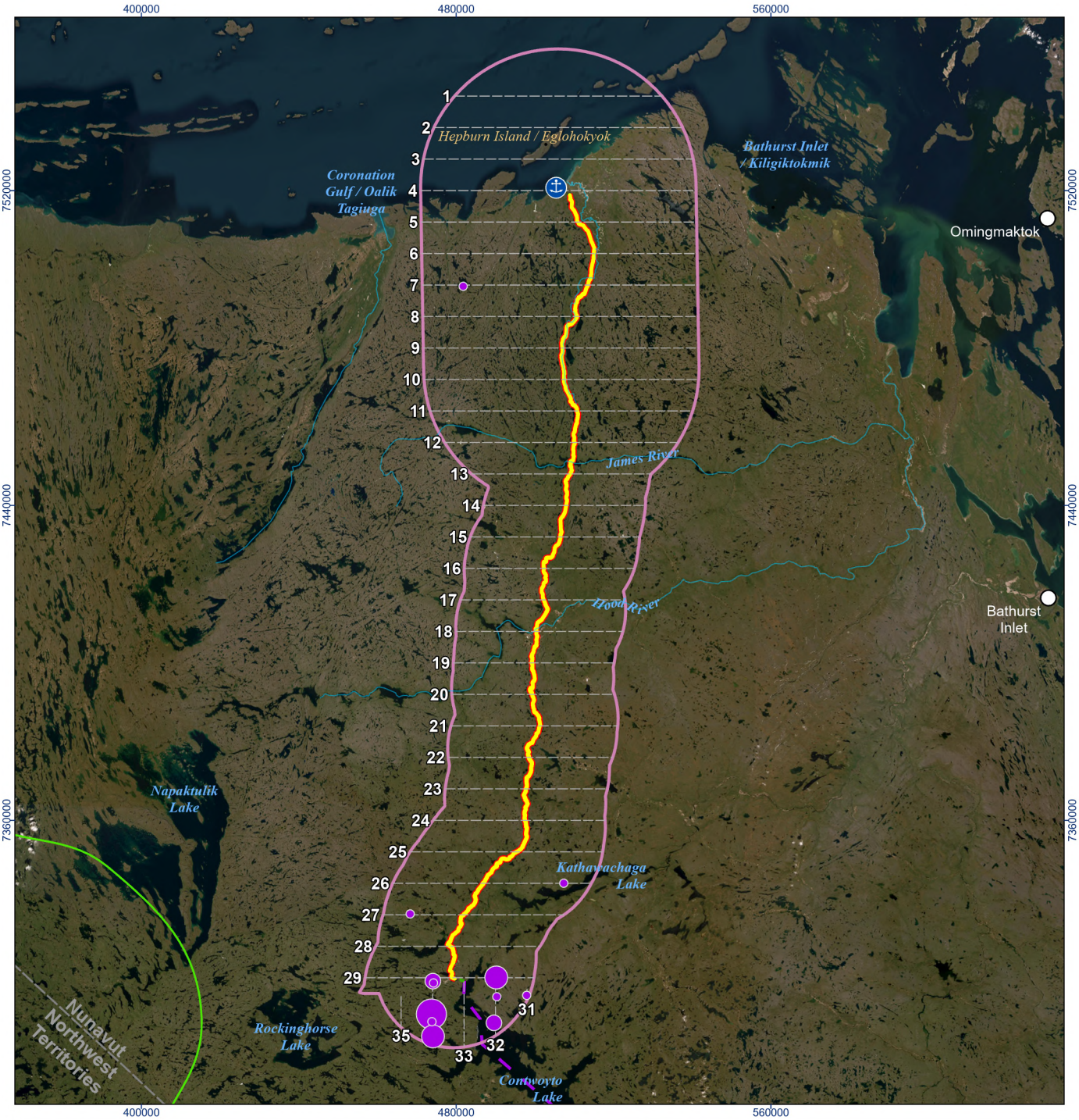
4.2.4.5 Fall and Rut

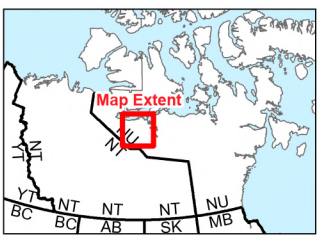
During the fall migration and rut (September 7 to November 30), bull and cow caribou reconvene and begin to move southwest towards treeline:

> *C211 "When the antlers have grown on the bulls, they would gather in one place… Near the end of October, around mid-October, they would get together. The bulls and cows would head south together. They would go right to the lakes, the bulls and cows, heading south" (Banci and Spicker 2024).*

The area used throughout September overlaps somewhat with summer range, but by October the herd is rutting along or within the treeline (Gunn et al. 2001). The area used during rut varies greatly in size from year to year, with caribou forming concentrated groups in most years (Gunn et al. 2001). A few scattered caribou were observed in the Jericho area in mid-September 2008 and 2010 and only four caribou were observed within the RSA north of Jericho in mid-September 2012 (see Figure 4.22). This pattern matches the collar dataset (GNWT-ECC, unpublished data), which shows few scattered collar locations north and especially south of Jericho.

The BBMM of Bathurst caribou fall migration (derived from GPS collar data) demonstrates greater annual variability than spring migration. In all years, the central migration corridor began south of the Project (orange shading; see Figure 4.23), with some broader, initial movements (blue shading; see Figure 4.23) occurring near the Project's southern terminus in a couple of years (e.g., 2013 and 2015). The central corridor appears to start approximately 50 km south of the Project before the herd moves into its winter range in NT. The annual variability in the Bathurst caribou fall migration corridor is related to the annual variability in summer and fall range use.





Notes

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Publication Date: Unknown
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- Grays Bay Port
- Grays Bay Road
- Grays Bay Winter Road
- Tibbitt to Contwoyto Winter Road
- Territorial Boundary
- Treeline
- Watercourse
- Wildlife Regional Study Area (RSA)

Ungulate Aerial Survey Transects
- Survey Transect Flightline

Bathurst Caribou Herd Observations (Fall)
Total Individuals
- 1 - 5 Caribou
- 6 - 10 Caribou
- 11 - 20 Caribou
- 21 - 30 Caribou
- > 30 Caribou

0 20 40 Kilometres
(At original document size of 8.5x11) 1:1,500,000

N

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EDI ENVIRONMENTAL DYNAMICS INC.

Project Location
West Kitikmeot Region
Nunavut

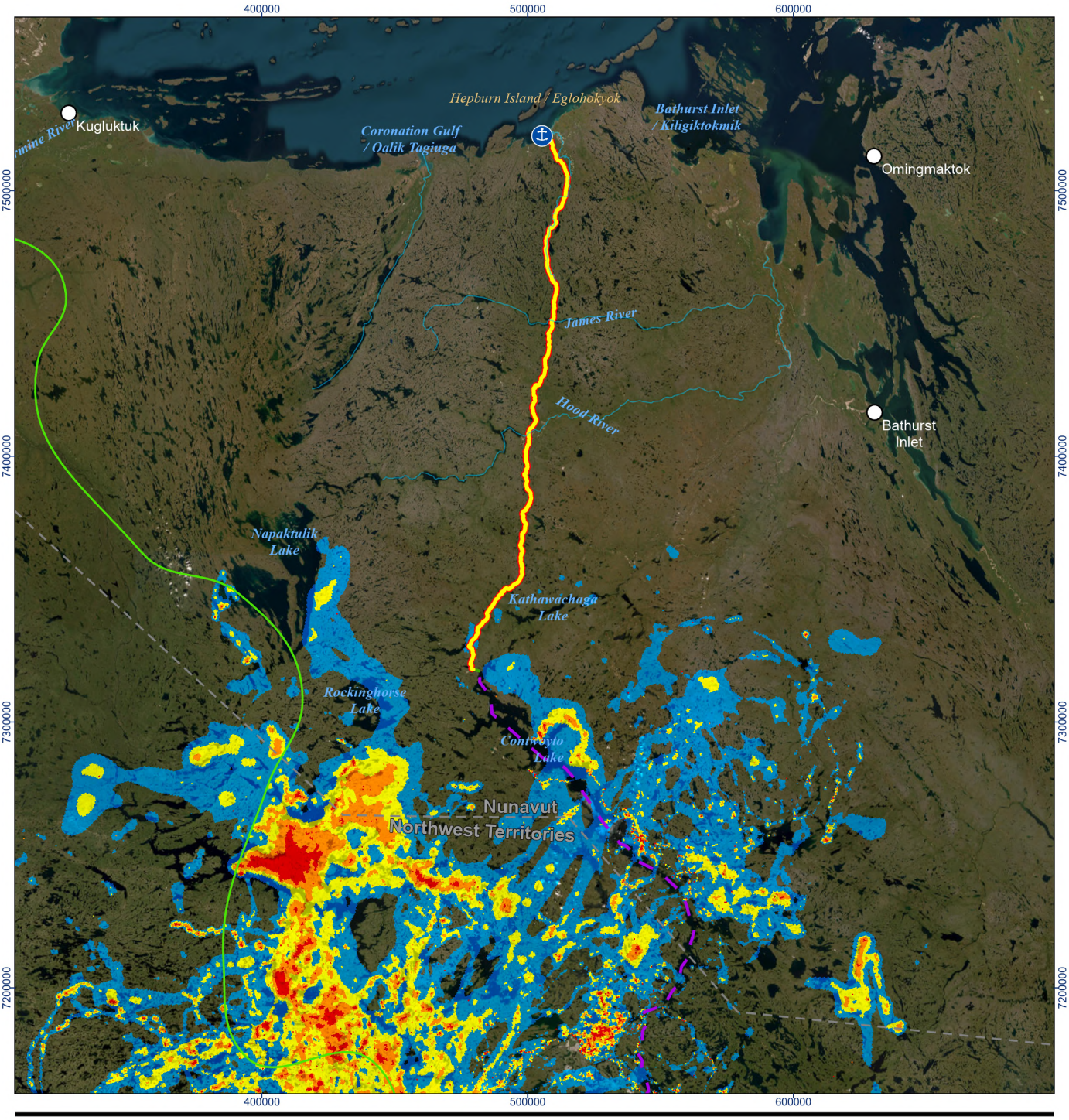
Prepared by OliviaLeblanc on 2026-02-23

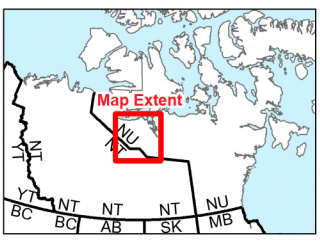
Client/Project 24Y0376
West Kitikmeot Resources Corp (WKR)
Grays Bay Road and Port

Figure No.
4.22

Title
Fall Survey Observations of Caribou within the Grays Bay Road and Port Project Regional Study Area, September, 2007, 2008, 2010, 2012, and 2013

Path: L:\PROJECTS\2024\WH\24Y0029_GBRP\WildlifeBaselineUpdates_2025_V3.aprx\24Y0376_WildBaseline_Fig4-22_BAH_FallObs_20260220; Revised: 2026-02-23 By: OliviaLeblanc





Notes
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Publication Date: Unknown
Downloaded: September 7, 2021
Last Checked: September 7, 2021

- Grays Bay Port
- Grays Bay Road
- Grays Bay Winter Road
- Tibbitt to Contwoyto Winter Road
- Territorial Boundary
- Treeline
- Watercourse

Probability of Use
- High Intensity Use (25%)
- Moderate-High Intensity Use (50%)
- Moderate Intensity Use (75%)
- Low Intensity Use (95%)

0 25 50 Kilometres
(At original document size of 8.5x11) 1:2,200,000

N

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EDI ENVIRONMENTAL DYNAMICS INC.

Project Location
West Kitikmeot Region
Nunavut

Prepared by OliviaLeblanc on 2026-02-23

Client/Project 24Y0376
West Kitikmeot Resources Corp (WKR)
Grays Bay Road and Port

Figure No.
4.23

Title
Bathurst Caribou Herd Relative Use of Fall Migration Routes (2009 to 2024) Based on Brownian Bridge Movement Analysis

Path: L:\PROJECTS\2024\WH\24Y0029_GBRP\WildlifeBaselineUpdates_2025_V3.aprx\24Y0376_WildBaseline_Fig4-23_SeasonalMigration_Fall_20260220; Revised: 2026-02-23 By: OliviaLeblanc

4.2.4.6 Winter

Areas used during winter (December 1 to April 19) change over time, with annual overlap ranging from 0–75% (Gunn et al. 2001), and are typically located between northwest of the east end of Great Slave Lake and south of Great Bear Lake (Case et al. 1996). The variation in winter range depends on multiple factors, but it is believed snow depth has a considerable influence on wintering areas (McNeil et al. 2004). In years with a shallow snow cover, Bathurst caribou were located southeast of Great Bear Lake, and in deep snow years they were near Great Slave Lake and as far south as the Saskatchewan border (McNeil et al. 2004). Between 1996 and 2000, winter ranges used by collared Bathurst cows varied from 43,000–87,000 km², comprising approximately 14% of their annual range (Gunn et al. 2001). The winter range of Bathurst caribou often nears the communities of Whatì, Wekweètì, Gamètì, and Behchokö. In some years before the early 2000s, the winter range extended as far south as Detah, Yellowknife, Łutselk'e and northern Saskatchewan. More recently, Bathurst herd winter ranges have moved northward (COSEWIC 2016). The herd's collar dataset (GNWT-ECC, unpublished data) identifies several caribou within the southern RSA and in the broader Jericho area from 2008 to 2024. Occurrence and duration in these areas varies dramatically by year. Inuit Knowledge identifies Bathurst caribou wintering areas south and east of Contwoyto Lake (see Figure 4.24) (Banci and Spicker 2024).

> *C13 "It is not the same every year. Sometimes the caribou winter between the Coppermine River and Tahikyoak. Now the caribou are not wintering around those areas. There may be scattered caribou around but not many" (Banci and Spicker 2024).*
>
> *C210 "This whole place had caribou all winter (western Tikigakyok (on Banks Peninsula)). Here (peninsula in north-central Tagionoak (Goulburn Lake), point on northwest Hanikgahiagohik on Goulburn Peninsula) ..." (Banci and Spicker 2024).*
>
> *C215 "Here (large area on northwest shore of Kiligiktokmik) is where we saw caribou in the winter" (Banci and Spicker 2024).*

4.2.4.7 Remote Camera Program

From the subset of 12 camera sites a total of 385,000 images were collected between April and August 2025. After excluding timelapse and empty images and focusing on images of caribou a total of 40 caribou occurrences were recorded on all subset sites except BA24-10, DU24-01, DU24-05, DU24-09, DU24-12, and DU24-15 (see Table 4.8). Caribou had the highest number of individuals at BA24-13 with 59 individuals over 2 occurrences, the larger of the two happening in July (see Figure 4.25).

Figure 4.24 Kitikmiut Knowledge of Regional Mainland Tuktuit (Caribou) Winter Distribution

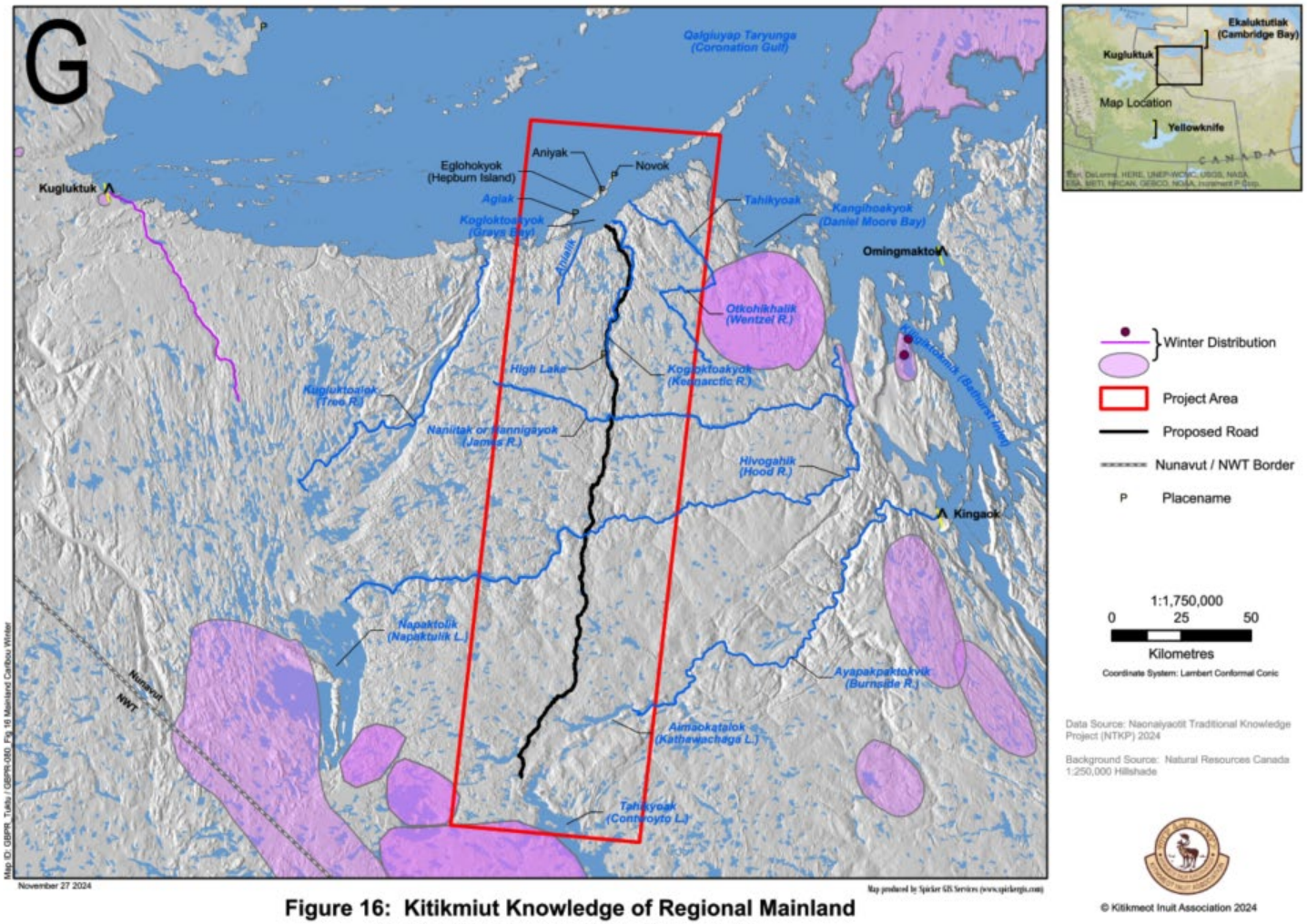
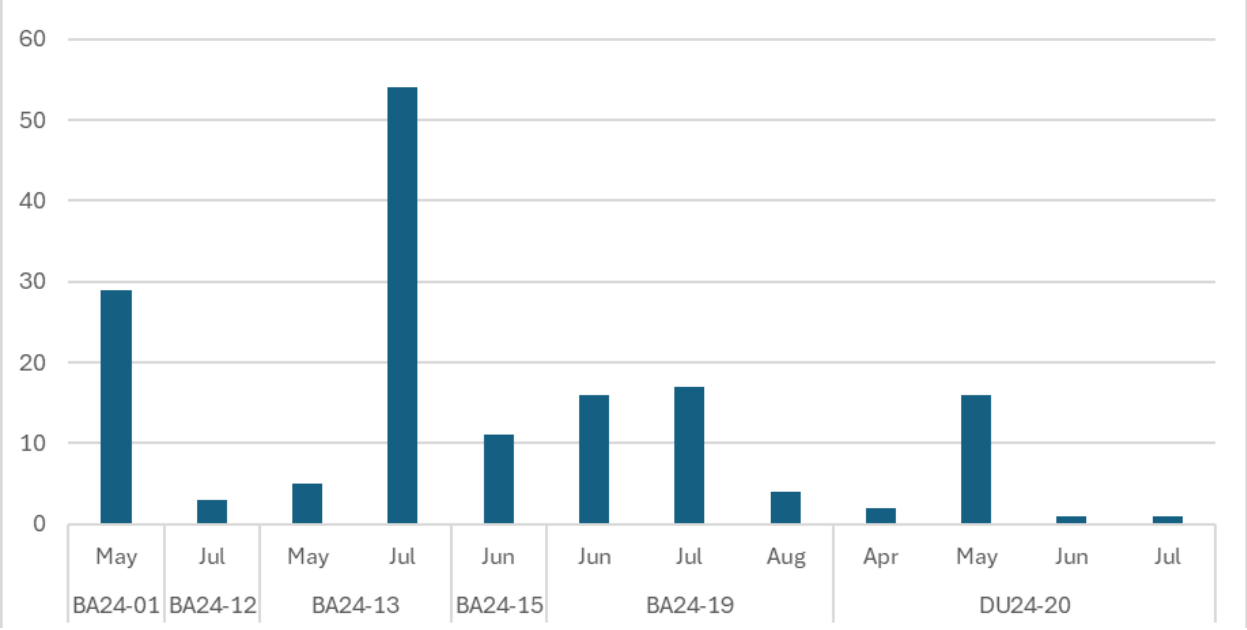


Figure 16: Kitikmiut Knowledge of Regional Mainland Tuktuit (Caribou) Winter Distribution

Table 4.8 Number of wildlife occurrences, caribou occurrences, and minimum total caribou for each subset camera between April and August 2025

Site	# Files	# Wildlife Occurrences	# Caribou Occurrences	Minimum Total Caribou
BA24-01	92,466	4	2	29
BA24-10	25,259	1	0	0
BA24-12	24,180	4	3	3
BA24-13	24,207	3	2	59
BA24-15	25,407	4	2	11
BA24-19	24,675	28	26	37
DU24-01	24,940	8	0	0
DU24-05	24,848	0	0	0
DU24-09	24,841	1	0	0
DU24-12	31,882	8	0	0
DU24-15	24,843	0	0	0
DU24-20	38,001	8	5	20

Figure 4.25 Minimum caribou totals per site based on month between April and August 2025



4.2.5 Habitat Use and Diet

Approximately half of the Bathurst herd's range exists within Low Arctic tundra habitat (lichen and shrub barrens), while the other half is below treeline in areas of open black spruce and pine (Gunn et al. 2001). The diet of the Bathurst herd varies by season (nutritional needs) and year (timing of green-up; Griffith et al. 2001). In general, mainland caribou eat a variety of vegetation types including lichens, graminoids, horsetails, mosses, deciduous and evergreen shrubs, forbs, and mushrooms (Russell et al. 1993).

> *C20b "In the spring, when the willows are moist and sprouting, they would loosen them with their snout. Then they would start gaining weight… Caribou mostly eat lichen in the spring. Their stomachs are always full of lichen… They eat a mixture of plants during the summer. Whatever sprouts, they will eat. In the fall, they will eat lichen. In the winter and fall, they eat lichen and grass. When the plants are dead, they look around for what they like to eat" (Banci and Spicker 2024).*

> *C562 "They like the nice green grass but they won't ever stick around where the gravel is. The ground that is mixed with the soil and sand, they don't really go for it. We haven't seen caribou eating black lichen on rocks. Our grandparents use to tell us that mushrooms are caribou food. They eat orange lichen and berries. They dig the ground and eat berries" (NTKP 2018).*

> *C427 "Island caribou go back and forth from island to island. Even the mainland caribou go to the ocean for two or three days. They need salt and then they go back to the mainland. They go back and forth. They have to have that salt. In winter, the salt is on top of the ice" (NTKP 2018).*

Inuit Knowledge holders have also observed that Bathurst caribou eat mushrooms when they are fresh during late summer and will also dig up frozen mushrooms from under the snow (Banci and Spicker 2024.

> *C48 "The caribou like the wetlands because of the plants that they eat there. That is why the caribou start to get fat right away after the plants get ripe. The caribou even eat the mushrooms. I even saw a caribou eat another's antler tip when they were resting long ago" (Banci and Spicker 2024).*

> *C565 "Caribou food is green grass, they don't stay in gravel area. When soil is mixed with sand, they don't stay around. They don't eat black lichen on rocks (kaluiohinak). Caribou eat orange lichen.*

> *Our grandparents told use that puffball mushrooms are caribou food. They eat blackberries, berries. Even in winter they dig and eat frozen berries" (NTKP 2018).*

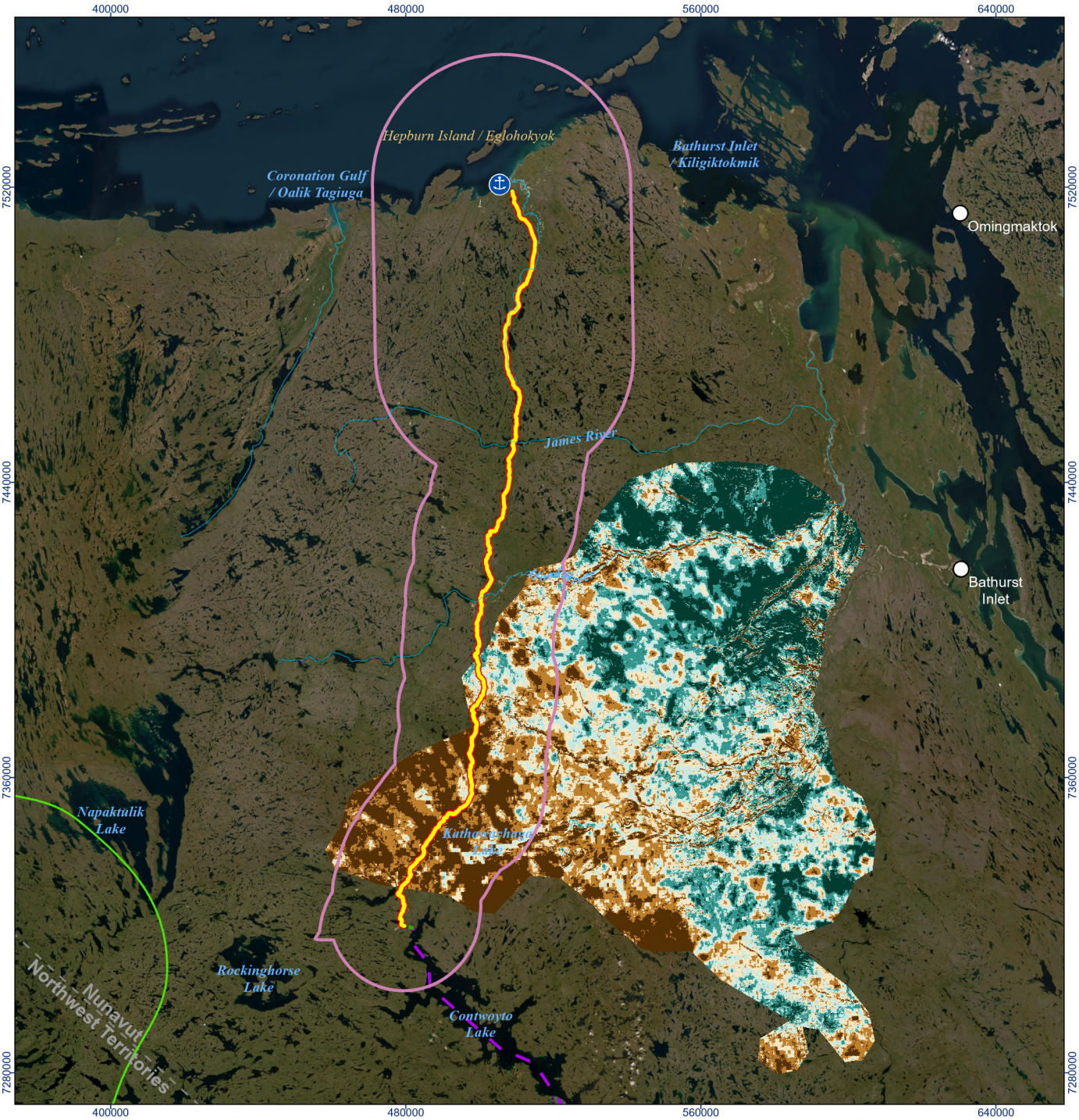
Although not a major food source, mushrooms appear to be an important item in the caribou diet, used as a source of water while caribou were on the move.

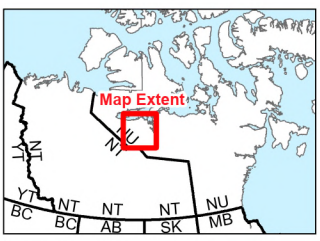
> *C4O "Caribou would keep them in their mouths as they walked. When they need water, they would keep these mushrooms in their mouths because they're moist inside. Wet, really wet. They're really wet inside, the insides are moist, and they keep them in their mouth. When caribou are walking, they can smell them right away, and they go after it. They have a good sense of smell, and when they smell mushrooms they go after it. Just like a snuff. Just like a snuff, caribou snuff. Caribou candy!" (Banci and Spicker 2024).*

4.2.5.1 Calving/ Post-calving

The calving/ post-calving range of the Bathurst herd is in the Takijuq Lake Upland Ecoregion of the Southern Arctic Ecozone (Ecosystem Classification Group 2012), inland from Bathurst Inlet. Prior to calving, Bathurst cows feed primarily on lichen which typically corresponds to relatively good body condition upon arrival to the calving range (Russell et al. 2002). From 1990 to 2000, lichen classes on the Bathurst calving range significantly decreased from 44% to 22% of the total calving range area, potentially a result of encroaching shrub classes (Gunn and Poole 2010).

From 2009 to 2024 during calving/ post-calving (June 2 to 28), Bathurst caribou selected low-to-mid elevations areas and avoided rugged terrain (see Appendix A). Relatively high coverage of grass-lichen-moss landcover, and moderate coverage of barren-lichen-moss landcover, were selected, suggesting the continued consumption of lichens but increasing preference for sedges. Moderate-to-high vegetation density (i.e., Normalized Difference Vegetation Index [NDVI]) was the most important indicator of calving/ post-calving resource selection. During calving, caribou are typically generalist foragers (Kelleyhouse 2001); however, Bathurst caribou may select for sedges in late May and early June, as they begin producing new growth before other plant species (Heard et al. 1996). Throughout June, the diet of cows primarily consists of lichens and, to a lesser extent, shrubs and mosses as green-up advances (Griffith et al. 2001). Approximately 46% of the Bathurst calving/ post-calving range is considered 'selected' habitat (moderate-to-high relative quality) by caribou (see Figure 4.26).





Notes

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Publication Date: Unknown
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- Grays Bay Port
- Grays Bay Road
- Grays Bay Winter Road
- Tibbitt to Contwoyto Winter Road
- Territorial Boundary
- Treeline
- Watercourse
- Wildlife Regional Study Area (RSA)

Caribou Habitat Rating

- Nil
- Very Low
- Low
- Moderate
- Mod-High
- High

0 20 40 Kilometres

(At original document size of 8.5x11) 1:1,600,000

N

WEST KITIKMEOT RESOURCES CORP

EDI ENVIRONMENTAL DYNAMICS INC.

Project Location
West Kitikmeot Region
Nunavut

Prepared by OliviaLeblanc on 2026-02-23

Client/Project 24Y0376

West Kitikmeot Resources Corp (WKR)
Grays Bay Road and Port

Figure No.
4.26

Title
Bathurst Caribou Herd Calving/ Post-calving Resource Selection

Path: L:\PROJECTS\2024\WH\24Y0029_GBRP\WildlifeBaselineUpdates_2025_V3.aprx\24Y0376_WildBaseline_Fig4-26_BAH_PostCalvingObs_20260220; Revised: 2026-02-23 By: OliviaLeblanc

The calving/ post-calving range of the Bathurst herd have relatively poor quality and low biomass forage (Griffith et al. 2001); however, areas adjacent to calving range generally provide sufficient forage during the period when the nutritional needs of cows is the greatest (Russell et al. 2002). Another factor that affects habitat selection during calving is the presence of patchy ground resulting from melting snow, which camouflages the dark-coloured newborn calves (Bergerud et al. 2008). Similarly, most wolves are known to den near treeline, reducing the likelihood of predation on the calving range during this time (Heard and Williams 1992).

> *C19 "These caribou give birth where it's clean and dry. They don't give birth where it's dirty, only in clean dry areas" (Banci and Spicker 2024).*
>
> *C25 "The cows calve where there is no water on the ground, where it's clean and not very windy. They give birth anywhere where they find it's alright to give birth" (NTKP 2018).*
>
> *C10 "Caribou give birth to their calves where there is less or no snow on the ground and where there is good grazing" (NTKP 2018).*
>
> *C13 "The caribou give birth in the flats (wetlands), where it is cooler, anywhere on the land" (NTKP 2018).*
>
> *C23 "Caribou have their calves where there are flat wetlands and where the young calves won't have to stumble when they are born because the caribou are always moving. Some of the caribou give birth as they are walking north. Soon after it's born the young calf starts walking right away … They give birth away from cliffs or rocky areas because as soon as the young is born they start to walk right away, even if it stumbles. Maybe after two days the calves start to graze, eating the grass while they are still feeding from their mothers" (Banci and Spicker 2024).*
>
> *C4Kug "The caribou know the land and that there are fewer wolves around the calving grounds. That may be why the caribou choose these areas as calving grounds" (Banci and Spicker 2024).*
>
> *C214 "It's never too high, when they're calving they're never on high ground. They're always on the flats, out in the open. They're always on flat land, in case there's wolves then they can escape into the water.*
>
> *Caribou can see from afar. It's hard not to be seen by those with calves. Makes it harder to hunt caribou, because they can see even a tiny person from far. Cows have really good eyesight. They usually calve on the flats, making it easier to escape from wolves. They're never in shaded areas. When the calves are fast and strong enough the caribou start walking on hills" (NTKP 2018).*

4.2.5.2 Summer

During summer (June 29 to September 6), caribou must increase their energy reserves by foraging heavily during the short growing season (Russell et al. 1993). Summer is also the period of greatest insect harassment, which ultimately influences habitat use and foraging activity during this time.

> *C20a "The wind direction changes caribou movement on hot days. Too many mosquitoes! They would face the wind direction to keep cold and keep the mosquitoes away" (Banci and Spicker 2024).*

> *C3 "…The caribou stay around the hill snow banks during the summer to keep cool when it gets really hot and when there are lots of mosquitoes…When the caribou get into a swarm of mosquitoes they run to get away from them, trying to catch a breeze. They also stay around the tops of hills facing into the wind. They go to snow banks on the sides of hills that have persisted when it gets too hot out" (Banci and Spicker 2024).*

> *C556 "… They will hang out on runways, depending on season, if it is mosquito season or warble fly season. Runways are mainly rock, gravel. They sit there away from insects that are tormenting them. They will use eskers too" (Banci and Spicker 2024).*

From 2009 to 2024 during summer, Bathurst caribou selected high elevations and avoided rugged terrain (see Appendix A). Relatively high coverage of grass-lichen-moss landcover and shrub-lichen-moss landcover, were selected, suggesting a broader use of forage and shrubs as green-up advanced. High vegetation density (i.e., NDVI) was the most important indicator of summer resource selection. To avoid insects, caribou typically move to higher, windier areas or select areas that have a lower risk of insect harassment based on vegetation cover and soil moisture (Russell et al. 1993). As Inuit Knowledge suggests, these areas may include grassy spots and cool springs. Increased selection of shrub habitats by Bathurst caribou aligned with expectations of increased vascular plant consumption (Webber et al. 2022). Approximately 42% of the Bathurst summer range is considered 'selected' habitat (moderate-to-high relative quality) by caribou (see Figure 4.27).

> *C19 "Sometimes the caribou are found around the coast to be away from the mosquitoes. They occasionally go onto the ice when the weather is hot and while there is still ice, after they have finished grazing. After they have been on the ice; they go back to the land and graze"* (*Banci and Spicker 2024)*

> *C26 "The areas around the base of the cliffs don't have too many mosquitoes because it's cooler at those places during the summer, but it depends on the time of the day. If the sun isn't shining at the base of the cliffs and there are shadows… and it's dark there, there are no mosquitoes"* (*Banci and Spicker 2024).*

> *C21 "The caribou get bothered by mosquitoes so they hide behind rocks, cliffs or snow banks. They stop on top of cliffs where it's windy to get away from the mosquitoes and when it's really hot out. Sometimes they seem to be drugged; they don't even seem to see the people because of the mosquitoes and the heat. They stop on the snow banks trying to cool off" (Banci and Spicker 2024).*

C27 "In those areas by the ice (near the coast) there will always be caribou in summer. When people camped on the coast, they would be away from mosquitoes and they would also keep cool. The caribou also went to these areas when the sun was really hot. They call these sites where the ice does not melt during the summer 'nuulak'" (Banci and Spicker 2024).

C22 "There are a lot of wetlands around Tahikyoak (Contwoyto). Caribou use the wetlands to cool off during the summer when it gets too hot. They use the wetlands when they're going north. When it gets hot the caribou run in these areas trying to cool off with the water in the wetlands" (Banci and Spicker 2024).

C562 "Caribou like to go in those areas where there is lots of ice build up and cold water springs up (neeluk). There are no mosquitoes because it is cold.

The places with the ice that builds up, that ice doesn't go away all summer is meela (ice wedge polygons). They are around Bathurst and some around town. There is also fresh water in them.

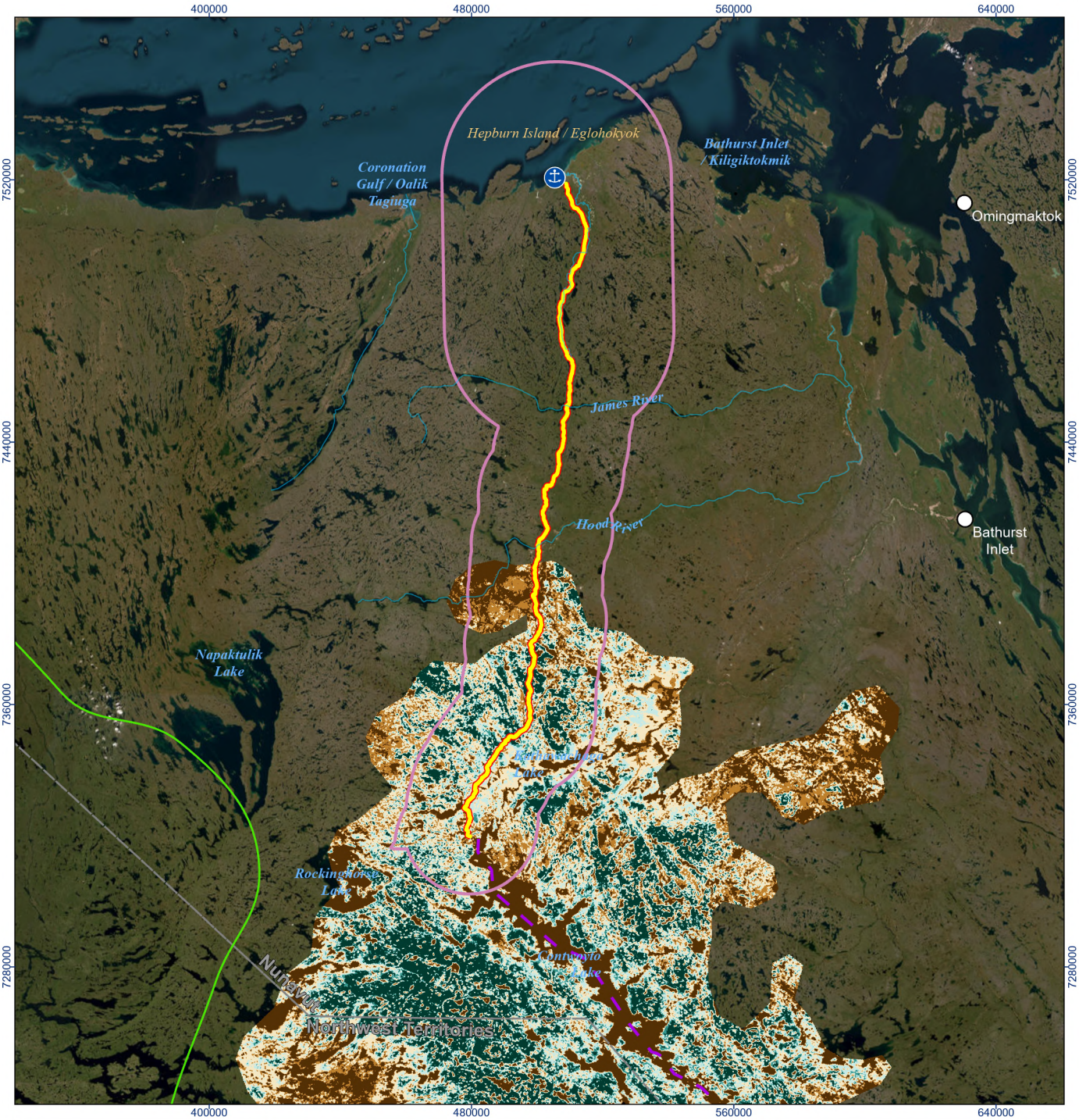
When it is really hot, caribou take shelter. When there are so many mosquitoes inland, mosquitoes could wreck their eyes. They take so much blood from their eyes and their rear end. Because they have no protection there. Sometimes that how the caribou get sick and from the flies too. Caribou go to the shore in the summer because it is cooler than inland" (NTKP 2018).

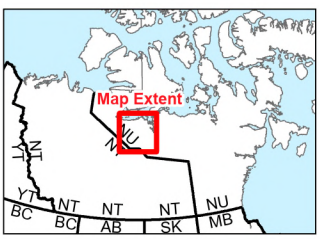
C565 "Neeluk are places where the ice builds up there and stays all summer. Neeluk are cold water springs that keep mosquitoes away.

Resting places are near the ocean and anywhere. Where there is snow is a good place to rest. When it is hot out they find a cool place sheltered from sun.

Mosquitoes suck blood out of their eyes, the rear end, and where skin is thin. Caribou get sick when there are so many mosquitoes. Caribou go to shore in summer where it's cooler" (NTKP 2018).

C569 "He mapped a location of a neeluk (year-round ice) between Anialik and Kogloktoakyok" (NTKP 2018).





Notes
1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Government of Canada, Stantec, Natural Resources Canada, Government of Canada (https://www.nrcan.gc.ca/earth-sciences/geography/download-geographical-names-data/9245)
Publication Date: Unknown
Downloaded: September 7, 2021
Last Checked: September 7, 2021

- Grays Bay Port
- Grays Bay Road
- Tibbitt to Contwoyto Winter Road
- Territorial Boundary
- Treeline
- Watercourse
- Wildlife Regional Study Area (RSA)

Caribou Habitat Rating
- Nil
- Very Low
- Low
- Moderate
- Mod-High
- High

0 25 50 Kilometres
(At original document size of 8.5x11) 1:1,800,000

N

WEST KITIKMEOT RESOURCES CORP

EDI ENVIRONMENTAL DYNAMICS INC.

Project Location
West Kitikmeot Region
Nunavut

Prepared by OliviaLeblanc on 2026-02-23

Client/Project 24Y0376
West Kitikmeot Resources Corp (WKR)
Grays Bay Road and Port

Figure No.
4.27

Title
Bathurst Caribou Herd Summer Resource Selection

Path: L:\PROJECTS\2024\WH\24Y0029_GBRP\WildlifeBaselineUpdates_2025_V3.aprx\24Y0376_WildBaseline_Fig4-27_BAH_RSFSummer_20260220; Revised: 2026-02-23 By: OliviaLeblanc

4.2.5.3 Fall

Fall (September 7 to November 30) corresponds with the period of reduced insect activity and declining forage quality. From 2009 to 2024 during fall, Bathurst caribou selected high elevations with high coverage of shrub-lichen-moss landcover (see Appendix A). Grass-lichen-moss landcover was typically avoided. High vegetation density (i.e., NDVI) was the most important indicator of fall resource selection. These results align with the herd's southward shift to their winter range, and the importance of consuming protein-rich forage (vascular plants) in preparation for winter (Denryter et al. 2017; Heard and Zimmerman 2021). Approximately 46% of the Bathurst fall range is considered 'selected' habitat (moderate-to-high relative quality) by caribou (see Figure 4.28)**.**

4.2.5.4 Winter

The winter range of the Bathurst herd lies largely within the high boreal and high and low subarctic (HS and LS) ecoregions of the Taiga Shield Ecozone (Ecosystem Classification Group 2008). To a lesser extent, the range enters the HS and LS ecoregions of the Taiga Plains ecozone. The centre of the Low Subarctic ecoregion is the main area used by wintering Bathurst caribou, while the Calder Upland LS ecoregion contains large tracts of spruce-lichen forests that are the northerly extent of the herd's winter range, and the Selwyn Upland LS ecoregion is the southerly extent of the herd's winter range (Ecosystem Classification Group 2008). The winter range is characterized by forest tundra and northern boreal forest, dominated by black spruce (*Picea mariana)*, white spruce (*Picea glauca*), and jack pine (*Pinus banksiana)* trees (Mattson et al. 2009).

During winter (December 1 to April 19), especially late winter, Bathurst caribou tend to select open, mature spruce stands with dense lichen cover and close to water bodies, as opposed to recently burned areas (Barrier 2011). Between 1959 and 2006, seasonal forest fires caused a decrease in the amount of lichen ranges within the herd's winter range (Gunn and Poole 2010). Snow depth and ice content (resulting in an icy snow crust) on the winter range of the herd affects the accessibility of forage (Gunn and Poole 2010). In the last half of the 20th century, warmer fall and late winter temperatures resulted in lower annual maximum snow depths, but increased thaw freeze events, resulting in higher ice content in snow (Gunn and Poole 2010).