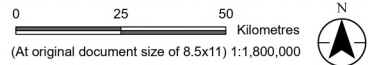
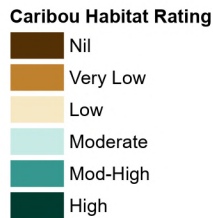


- Grays Bay Port
- Grays Bay Road
- Tibbitt to Contwoyto Winter Road
- Wildlife Regional Study Area (RSA)
- Territorial Boundary
- Treeline
- Watercourse



Project Location: West Kitikmeot Region, Nunavut  
 Prepared by: Olivia Leblanc on 2026-02-23  
 Client/Project: West Kitikmeot Resources Corp (WKR), Grays Bay Road and Port  
 24Y0376

Figure No. **4.28**  
 Title **Bathurst Caribou Herd Fall Resource Selection**

**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

Path: L:\PROJECTS\2024\W14\Y0376\_GBRPWildlifeBaselineUpdates\_2025\_V3\_aprx24Y0376\_WildBaseline\_Fig4-28\_BAH\_RSFFall\_20260220\_Revise02\_2026-02-23\_By: OliviaLeblanc

Disclaimer: EDI Environmental Dynamics Inc. has made every effort to verify this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

### 4.3 Dolphin and Union Caribou (Island Caribou)

Dolphin and Union caribou are a unique type of caribou found only on Victoria Island (*Keetlinik*) and the adjacent mainland NU. They are distinctive in appearance, genetics, and behaviour compared to Peary caribou (*R. t. pearyi*) and mainland (*R. t. groenlandicus*) caribou. The Dolphin and Union caribou were formerly considered part of the Low Arctic population of Peary caribou, but are now recognized as genetically distinct from both Peary caribou and barren-ground caribou (McFarlane et al. 2009; COSEWIC 2017). They are also unique in behaviour for staging during the rut and the scale of their regular, gregarious seasonal migrations across sea ice (Poole et al. 2010), and for having dispersed calving compared with mainland caribou populations (Nagy et al. 2011). Dolphin and Union caribou differ morphologically from mainland caribou in skull shape, antler velvet colour, hoof size, and breeding pelage pattern, being generally smaller than their mainland counterparts (see Photo 4.2).

**Photo 4.2** Dolphin and Union Caribou Near High Lake, April 2008. Photo by K. Poole, Used with Permission



Dolphin and Union caribou seasonal migrations follow a general pattern of moving south in the fall across the sea ice at Coronation Gulf and Dease Strait to winter on tundra of the northern mainland, and returning north to calve and summer on Victoria Island (NTKP 2018, Poole et al. 2010).

*“The Coppermine area – here defined as Dolphin and Union Strait, Coronation Gulf, and the surrounding land – has always been well populated. One important reason for this is that caribou in this area crossed the strait north to Victoria Island in the spring and returned by the same route in the fall” (NTKP 2018).*

*“They hunted caribou on the west side of Wellington Bay and inland from the coast in the fall, for the caribou would congregate here while waiting for the strait to freeze so they could migrate south to the mainland” (NTKP 2018).*

### **4.3.1 Management**

Caribou populations within the West Kitikmeot are managed under the authority of the NWMB. The intent of the NWMB is to make certain co-management by Indigenous and government representatives. The GN-DOE, Environment and Climate Change Canada, Regional Inuit Organizations, and NU Tunngavik Incorporated are all represented on the NWMB, in addition to Inuit members. Local Hunters and Trappers organizations also support the NWMB.

The Dolphin and Union herd is designated as an Endangered subpopulation by the COSEWIC (COSEWIC 2017), and was added to Schedule 1 of the federal SARA in 2011. Under the NT *Species at Risk Act* (Government of Northwest Territories 2024a), the herd was listed as Special Concern in 2013 (Species at Risk Committee 2013). The reason for the Special Concern designation was that although numbers had recovered from near extinction to perhaps a quarter of the population’s estimated historic size, the population remains relatively small, the herd is subject to a high rate of harvest whose sustainability is questionable, and possible threats including increasing deaths during sea-ice crossings due to climate change.

The herd was reassessed as Endangered in 2023 (Species at Risk Committee 2023b). The recent Endangered designation for Dolphin and Union caribou is based on direct observations that they have experienced an 89% decline in the total population over the 23 year period from 1997 to 2020 and concerns from local communities, including concerns about increased shipping traffic and the effects on ice conditions and migration across sea ice (Species at Risk Committee 2023b). Dolphin and Union caribou migrate between the mainland and Victoria Island and climate warming or increased shipping that extends the ice-free season may delay migratory movement (Dumond et al. 2013), make the ice crossing more dangerous (Poole et al. 2010; COSEWIC 2017; NTKP 2018) or shorten the length of time spent on the mainland.

### 4.3.2 Population

In the early 1900s, reports cite estimates of up to 100,000 Dolphin and Union caribou summering on Victoria Island (Manning 1960). From the 1900s to the 1920s, the population declined sharply, likely due in part to the introduction of firearms and overhunting (Manning 1960, Freeman 1976, NTKP 2018). Inuit elders also mention that, historically in the 1920s, severe icing storms caused a significant decline of the caribou on the island (M. Dumond, Government of Nunavut, unpublished data, *in* Poole et al. 2010). The herd eventually ceased migrations to the mainland during the 1920s (Freeman 1976). From the 1920s to the 1970s, Dolphin and Union caribou were rarely seen on Victoria Island, and migrations across the sea ice were not observed. An early estimate by Banfield (1950) suggested 1,000 caribou on Victoria Island, although the basis for it is unclear. The herd began to increase in size through the 1970s and 1980s, and by the mid-1970s, a few Dolphin and Union caribou resumed their historical migrations to mainland NU (Gunn et al. 1997). These population trends agree with Inuit Knowledge from that period:

*C19 “A long time ago, it seemed like the Island Caribou had vanished. There was no caribou at all. They were in abundance before they completely disappeared. For how many years, I am not sure. They started catching the odd caribou. Now they are plentiful again. I remember when caribou started coming around again. Today, they even come close to town (Cambridge Bay)” (Banci and Spicker 2024).*

*C48 “A long time ago, people would travel to the island and there was no caribou. The caribou would not come across... I’m getting old now and the caribou are showing again. My father in-law used to tell me, there used to be a lot of caribou on the island and they would hunt with bow and arrow. They didn’t have rifles then, when I was born, when I was a child” (Banci and Spicker 2024).*

*C13 “The caribou from Victoria Island are not from around this area (mainland coast). 1978 was when I first saw them and I did not know they were from north of us. When I first saw them I thought the skins were so nice and different. When I got a caribou, I brought it to my uncle. My uncle told me that they were from the north. I never knew they were from the north. It seems like, compared to when I first got caribou from north of us, they are coming more and more each year. The caribou from the north never used to come this close. They are small” (Banci and Spicker 2024).*

*“During the late 1940’s and early 1950’s, caribou were scarce. The people had to travel very far inland to obtain meat and skins, and they began to travel to such places as Itibiak, Foggy Bay, and Kent Peninsula on the mainland to hunt caribou during spring and early fall” (NTKP 2018).*

*“During the 1940’s and 1950’s, caribou hunting in the whole southwest of Victoria Island was not very productive; however, by the late 1960’s, this situation had changed. The caribou had increased in number ...” (NTKP 2018).*

*“During Period III [1955-1974], more hunting activity in the Richardson Islands area has been concentrated on Nagyuktok River, Byron Bay and Lady Franklin Point.. Actual land use has changed little, but there have been more caribou in the area recently, so hunters do not have to travel so far to find them as they did 10 years ago” (NTKP 2018).*

Complete surveys dedicated to documenting herd abundance began in 1997 along the south coast of Victoria Island in mid to late October, a period when Dolphin and Union caribou are most concentrated, making a population estimate logistically feasible and biologically meaningful (Nishi and Gunn 2004). Depending on whether and how corrections were applied to account for caribou outside the survey sample zones, the herd estimates ranged from 27,948 ± 3,367 caribou (within the study area) to 34,558 ± 4,283 caribou (within the population) in 1997, and 21,753 ± 2,343 caribou (within the study area) to 27,787 ± 3,613 caribou (within the population) in 2007 (Nishi and Gunn 2004, Dumond and Lee 2013). In 2015 the population was estimated at 18,413 ± 6,795 caribou, representing an average 4% annual decline rate from 2007 to 2015 (Leclerc and Boulanger 2019). In 2018, the population was estimated at 4,105 ± 694.8 caribou, representing a 62% total decline from the 2015 estimates (Leclerc and Boulanger 2019). Inuit Knowledge and local knowledge corroborated this decline (Thorpe Consulting Services Ltd. 2014b, Leclerc et al. 2016). In 2021, the population was estimated at 3,815 ± 514 caribou (Campbell 2021). Surveys in 2023 indicated a population of 5,229 caribou (95% CI = 3,985 to 6,473 caribou), which was not significantly different from the previous survey (Leclerc et al. 2025). These estimates, coupled with an unknown but likely high harvest rate and sea ice change, and changes to population and health indicators from local knowledge, confirm the likelihood of a declining trend in abundance since the late 1990s (Species at Risk Committee 2023b).

### **4.3.3 Harvest and Mortality**

#### **4.3.3.1 Harvest**

The Dolphin and Union herd is recognized for its importance to the communities within the region because of easier access to caribou during winter and spring via snowmobile than during summer. People from Kugluktuk, Bay Chimo, and Bathurst Inlet not only hunt Dolphin and Union caribou upon their return to the mainland in early winter, but also the wolves and wolverines that follow the caribou. The return of the migration of the Dolphin and Union herd to the mainland after an absence for most of the 20th century meant that Inuit from the mainland communities were able to re-establish hunting patterns that had largely been absent for generations (Gunn et al. 1997). Hunters from Holman Island (*Ulukhaktok*) and Cambridge Bay also pursue caribou during their migrations nearer to these communities. For a time, in addition to the subsistence harvest, Dolphin and Union caribou supported sports harvest in Cambridge Bay, with roughly 20 to 30 caribou harvested annually. However, the Ekaluktutiak Hunters and Trappers Organization has stopped issuing sport hunting tags for Dolphin and Union caribou since 2018 (Conference of Management Authorities 2023). No commercial harvest is currently in place (Government of Nunavut and Government of Northwest Territories 2018).

*“Soon after the introduction of the rifle, the caribou herds ceased to cross Dolphin and Union Strait to summer on Victoria Island ... Because caribou were not plentiful here, the people often had to trade for caribou skins to make winter clothing. Most of them visited the mainland, near Coppermine, at least once a year to hunt caribou” (NTKP 2018).*

*“During spring the caribou migrate across Tree River from west to east on their way to calving grounds. Before the caribou migrations to Victoria Island ceased around 1930, larger numbers of people hunted in this region, but after that time, they hunted caribou only inland near Inulik Lake and James River. The people began to hunt caribou along the coast by boat from Daniel Moore Bay to Kugaryuak River, and they travelled inland up Tree River to Napaktulik” (NTKP 2018).*

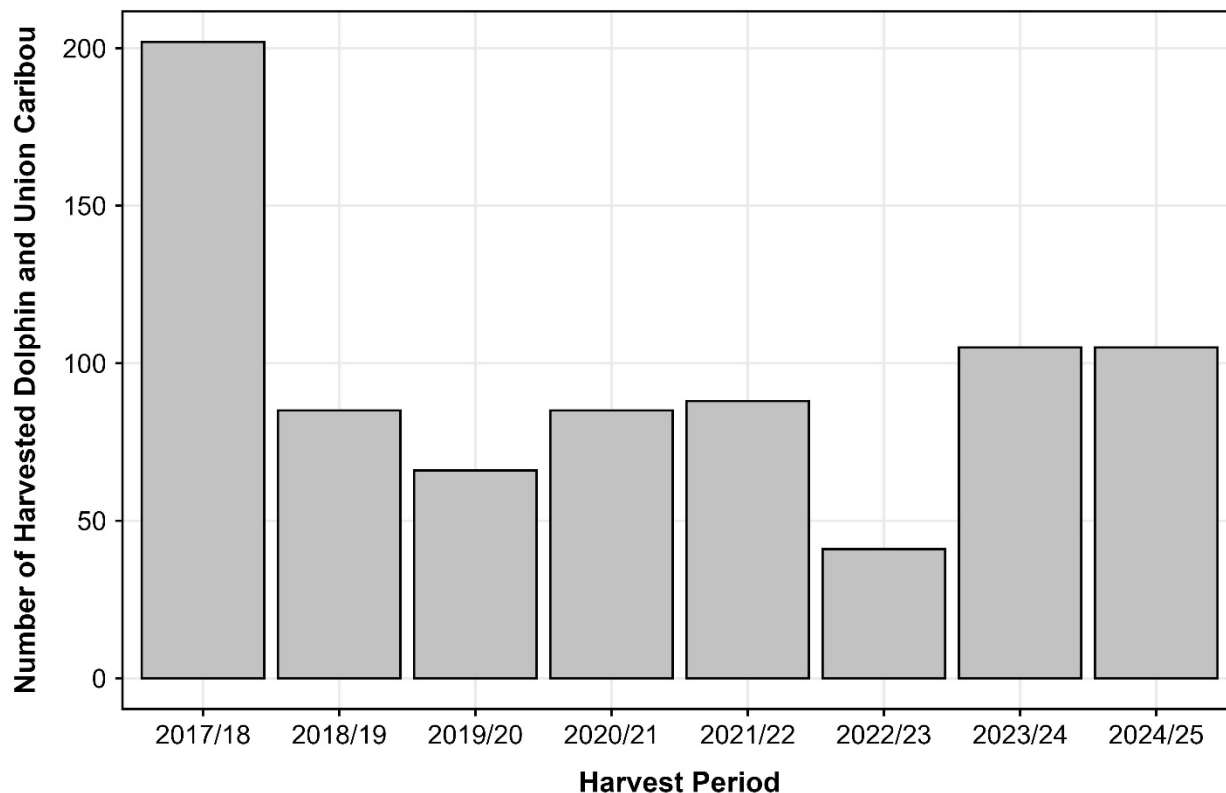
*“Caribou hunting in this region was seasonal. Before about 1930, the caribou arrived in spring from the south, crossing Dease Strait near Byron Bay and just west of Cambridge Bay. Hunters lay in ambush, the animals often guided toward them by lines of stone cairns. In fall, when the caribou were returning south, this activity was repeated. During these migrations, meat was abundant” (NTKP 2018).*

Average annual harvest for caribou from June 1996 to May 2001 varied by community: Kugluktuk = 1,575 caribou, Bay Chimo = 176 caribou, Bathurst Inlet = 93 caribou, and Cambridge Bay = 811 caribou (Priest and Usher 2004); however, these harvests likely came from a combination of herds in addition to the Dolphin and Union herd. For example, a portion of the Bathurst Inlet and Bay Chimo harvest occurred during summer when Dolphin and Union caribou were not near these communities. The bulk of the Kugluktuk harvest occurred in areas typically inhabited by Bluenose-East caribou (Priest and Usher 2004).

Actual harvests from Dolphin and Union caribou are difficult to quantify. In the past, a harvest of 2,000 to 3,000 Dolphin and Union caribou per year may have been likely (Gunn and Nishi 1998). According to spatial data from Priest and Usher (2004), Kugluktuk hunters harvested nine caribou along the coast within or near the RSA out of a five-year community total of over 7,500 animals. No caribou harvest was documented by *Kingaunmiut* hunters within the RSA, or by any hunters inland from the coast. Similarly, *Kingaunmiut* do not appear to have a tradition of hunting within the RSA between Grays Bay and the Hood River (Thorpe et al. 2001a). These hunting patterns may have changed because of more difficult access to mainland herds in recent years. Dumond (2007a) reported that numbers of caribou (all subspecies) harvested by Kugluktuk hunters was similar between the periods 1997 to 2001 and 2004 to 2007; roughly 1,000 to 2,000 animals. However, the proportion of the harvest that was Dolphin and Union caribou increased from about 20–30% during the period 1997 to 2001 to about 75% during the period 2006 to 2007.

Beginning in September 2020, an interim TAH of 42 caribou was set in response to the herd’s continued decline and conservation status (Government of Nunavut 2020). The interim TAH was replaced by a formal order in February 2021, which set the TAH to 105 caribou for each harvest period (July 1 to the following June 30, annually) (Government of Nunavut 2021a). This TAH continues to be in place for the herd. Recent harvest records provided by the GN-DOE indicate that 600 individuals from the Dolphin and Union caribou herd were harvested between 2017 and 2023 in the Kitikmeot region (Government of Nunavut 2024a). The largest harvest occurred during the 2017/18 harvest period, before the any TAH was established (see Figure 4.29). Annual harvest rates have dropped below 100 caribou until the 2023/24 and 2024/25 harvest periods; the TAH of 105 caribou was met in April 2024 and April 2025, respectively.

**Figure 4.29** Total numbers of Dolphin and Union Caribou individuals harvested in the Kitikmeot region by harvest period (July 1 to the following June 30, annually)



#### 4.3.3.2 Predation and Interspecific Competition

Wolves are the primary predators of Dolphin and Union caribou, although grizzly bears likely also depredate caribou, especially on calving range (Banci and Spicker 2024; NTKP 2018; Species at Risk Committee 2023b). There is no direct information on predation rates or the impact of wolf predation on Dolphin and Union caribou numbers. Wolf and grizzly bear numbers on Victoria Island, and grizzly bear abundance within the range of Dolphin and Union caribou, appear to have increased over the past two decades (Dumond 2007a, Slavik 2010, NTKP 2018, Species at Risk Committee 2023b).

Wolverines are also scavengers of caribou carcasses, but may sometimes also depredate caribou directly (Species at Risk Committee 2023b).

*“When I was young, there was no bears, no muskox, no caribou those years [on Victoria Island]. A lot of changes happened over the past 18 years. Now there are bears” (M.B. in Dumond 2007a).*

*“[Victoria Island] Packs of wolves are increasing. Last year at Rymer point [Victoria Island], there was a pack of 30 wolves. Isaac Klengenberg ran away from them” (C.A. in Dumond 2007a).*

C26 *“Wolves go along with the caribou herds looking for food. From Cambridge Bay across to the mainland, you can see wolves anywhere. I’ve seen wolves all over the place” (Banci and Spicker 2024).*

*“Another time at pin 3 there was a big pack of wolves. Wolves are increasing. Victoria Island fur is different, reddish color. On Victoria Island, wolves are smaller but taller” (C.A. in Dumond 2007a).*

C48 *“Those Island caribou migrate south. In the spring they go back down there north to Victoria Island and the wolves and wolverine follow them. Long ago there used to be hardly any wolves at Victoria Island where I used to live (Kikiktanayok area). Only at certain times would you see wolves down there but there were no caribou and no wolverine. Now they are getting caribou, wolverine and wolves down there” (Banci and Spicker 2024).*

C562 *“In early fall there are lots of caribou in Grays Bay. Caribou can move into the rough area (south towards High Lake) in winter. Caribou will travel through even if it’s rough. Wolves, foxes, wolverines, follow caribou” (NTKP 2018).*

C23 *“Wolverine can kill caribou because they are strong. They kill the caribou by biting its neck” (NTKP 2018).*

*Wolverines tend to be scavengers of caribou but can kill live animals as well. Calves are typically taken as well as the odd adult (NTKP 2018).*

Whether populations of muskox have a negative influence on Dolphin and Union caribou is unclear. Both species were relatively numerous on Victoria Island during the 1990s and 2000s. Hughes (2006) found overlap in diet and habitat use between muskox and caribou on southern Victoria Island in the mid-2000s and suggested that inter-specific competition was taking place. Muskox (as alternative prey) could possibly sustain wolf predation on Dolphin and Union caribou, or could influence caribou parasite relationships (Hughes et al. 2009, Species at Risk Committee 2013). Inuit Knowledge documents an inverse relationship between caribou and muskox distribution (Banci and Spicker 2024).

C38 *“I’ve heard and seen that there are more changes in muskox. There are a lot more muskox now and you can see muskox anywhere on the land now. Areas where the caribou used to stay now have a lot of muskox. The caribou must not like the smell of muskox. When the muskox moves in, the caribou move away. I’ve seen where the caribou used to migrate through and when the muskox moved in the caribou went around the muskox through another area. The caribou must not like the smell of muskox so they avoid them” (Banci and Spicker 2024).*

#### **4.3.3.3 Health and Mortality**

Dolphin and Union caribou body condition varies annually, likely dependent on access to forage (mainly mediated through weather and snow and icing events), oestrid fly (warbles and bots) harassment, and parasite loads. Samples from 82 Dolphin Union caribou from 2001 to 2003 detected a negative relationship between parasites and body condition (Hughes et al. 2009). Specifically, body weight decreased with nematode parasite abundance (especially for non-pregnant females), back fat depth decreased with increasing warble abundance, and the likelihood of pregnancy decreased with warble

larvae burdens (Hughes et al. 2009). The prevalence of diseases in caribou was a more recent phenomenon for the Kitikmiut:

*C564 “We have no known diseases on the mainland yet (2013 interview). In the past, western Coppermine River had brucellosis, lung worm” (see Banci & Spicker 2024).*

*C51 “Because caribou hair is hollow, it collects all kinds of dust also from the air... Because what’s under that skin, what goes into that skin is from that hollow hair into the skin and into the meat itself. That’s what our hunters are finding, Jell-O, slimy yellow stuff that’s just under the skin” (Banci and Spicker 2024).*

Pregnancy rates in Dolphin and Union caribou also vary annually. Pregnancy rates decreased from 76% in 1987 to 1991 ( $n = 91$ ) to 57% in 2001 to 2003 ( $n = 71$ ), then increased to 87% for the period 2015 to 2021 ( $n = 281$ ) (Aguilar et al. 2023). The relatively high pregnancy rates from 2015 to 2021 also differed between caribou that were hunted versus captured (e.g., 68% versus 94% in 2018, respectively) (Aguilar et al. 2023). Overall, Dolphin and Union caribou had relatively good body condition and pregnancy rates, and decreased stress, during their apparent decline in population size (Aguilar et al. 2023). The key indicator during the population decline was reduced survival rates.

From 25 cows fitted with satellite collars in 1999 and 2001, the overall survival rate was relatively low (annual survival for the adult cows was 76% during 1999–2006) and was lowest during fall migration and mid- to late winter (Poole et al. 2010) (adult female survival for caribou is usually considered to be at least 85% for a stable herd trend). In 2015 the annual survival rate was 70%, and continued to decline in 2016 to 2018 with survival rates ranging from 58% to 61% (Species at Risk Committee 2023).

While limited information is available on the causes of mortality, potential sources include drowning while crossing sea ice, predation, hunting, and adverse weather conditions leading to starvation (Species at Risk Committee 2023b). Harvest from local communities has been identified as a cause of mortality; however, lack of consistently collected harvest data makes it difficult to assess the relative role of harvest mortality, and recent community-based initiatives will help to better manage harvest and understand population dynamics (Species at Risk Committee 2023b). Verified mortality events include instances from crossing newly formed sea ice and from wolf predation. Freezing rain events likely cause death due to malnutrition in some years (Species at Risk Committee 2013). During the late October 2007 systematic aerial survey on the south coast of Victoria Island, surveyors observed three drowned caribou, 15 kill sites and two caribou dead from unknown causes (Dumond and Lee 2013). No dead caribou were documented during the October 1997 survey of the same area (Nishi and Gunn 2004). Calf survival rates are mostly unknown or based on small and infrequent samples.

Collar data, local observations, and surveys suggest fall sea-ice crossings increase mortality risk for Dolphin and Union caribou. Analyses of collar movements and observations suggest caribou are staging on the south coast of Victoria Island while waiting to cross the sea ice, and that they appear to move along the lead-edges of the sea ice waiting for the ice to form (Poole et al. 2010; Dumond et al. 2013). The eastern straits freeze earlier than the western straits, and caribou cross slightly earlier in the east. The western crossing (across Coronation Gulf) may be more hazardous, possibly because of the longer distances and currents between islands that would affect ice formation.

## 4.3.4 Movements and Distribution

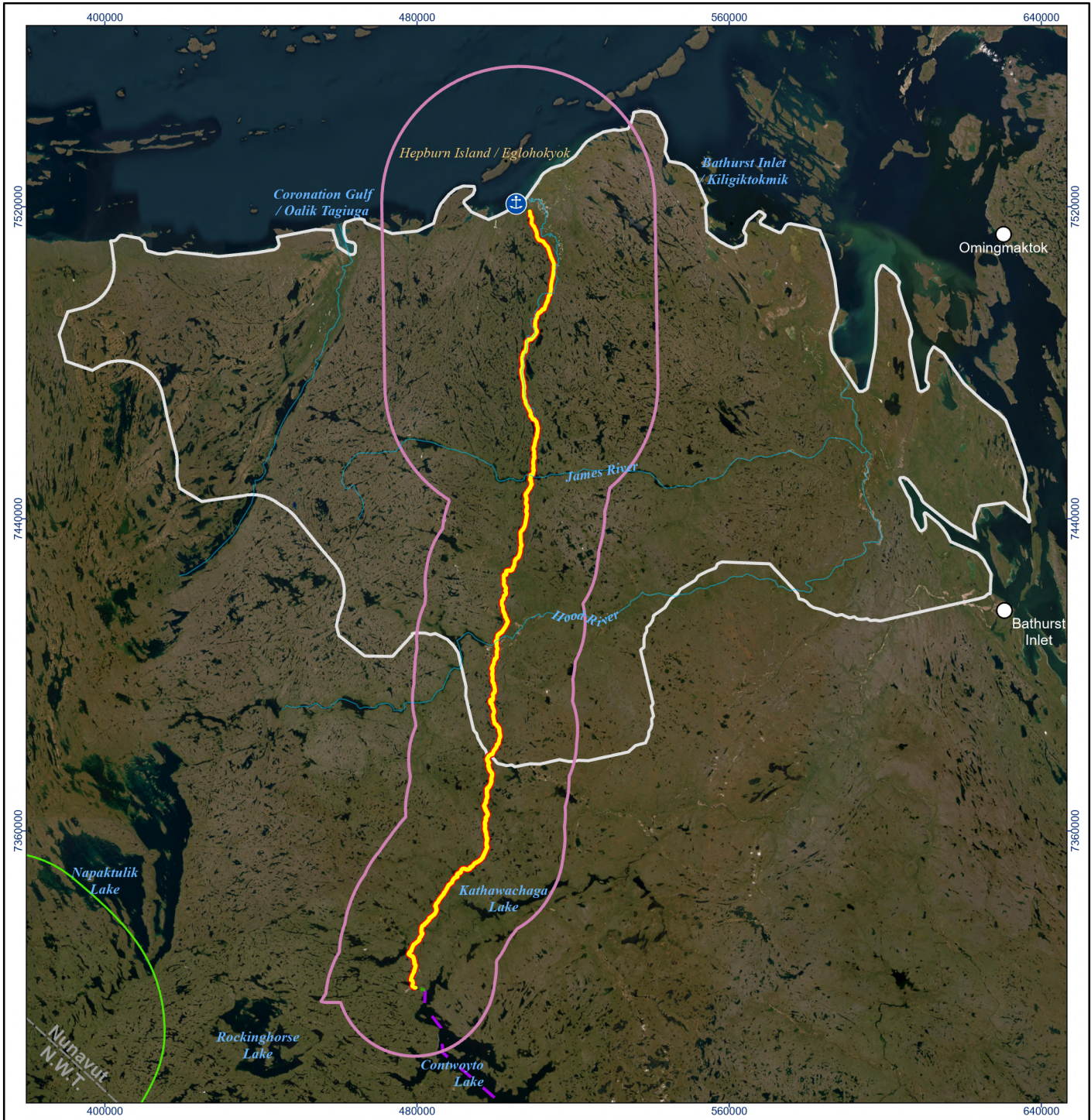
### 4.3.4.1 Overview

The Dolphin and Union caribou herd's seasonal migratory pattern can be summarized as follows (Banci and Spicker 2024, NTKP 2018, Poole et al. 2010, Dumond et al. 2013, Species at Risk Committee 2013): calving takes place dispersed across Victoria Island where the herd remains during the summer and rutting seasons, and migration to the mainland occurs when Dolphin and Union Strait (*Noahonirmiut*), Coronation Gulf, and Dease Strait freeze in late fall to early winter. Crossing distances vary from 21 to 70 km, with the greatest distances across Coronation Gulf. The herd remains on the mainland throughout the winter, using areas up to 200 km on both sides of Bathurst Inlet, and as far south as south of the Hood River on the west side of the inlet (see Figure 4.30). Ice remains across the straits until late June, and pregnant cows return to Victoria Island between late April and early June in time for calving (Species at Risk Committee 2023b). Bulls and non-breeding cows may cross at the same time or follow later. Therefore, Dolphin and Union caribou can be found in the northern RSA from late October through early June. If present during May and June, Dolphin and Union caribou are typically more numerous at the very northern extent of the RSA. No calving by Dolphin and Union caribou has been documented on the mainland (COSEWIC 2017; Species at Risk Committee 2023b).

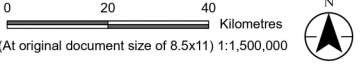
According to recorded Inuit Knowledge, there were two main calving areas on Victoria Island: one near Hadley Bay and one near the interior of the island east of Prince Albert Sound (*Kanikyoak*) (NTKP 2018). Summary reports from the ILUOP study (NTKP 2018) indicated that island caribou calved along the eastern edge of Victoria Island from Hadley Bay to Albert Edward Bay.

*C208 "Calving grounds are up north, up in Victoria Island (Killinik) it is not too far from Hadley Bay area, and Inukhoakavik (unverified place name) and Washburn Lake area. I guess cows like it there. It might be much safer for them to have their young ones there and more food there for them" (NTKP 2018).*

Collaring programs have also added greatly to the knowledge of the herd. Very high frequency (VHF) radio collar data from 1987 to 1989 and 1994 to 1997 determined that Dolphin and Union caribou calving locations are distributed across a wide area of southern Victoria Island (Gunn and Fournier 2000b, Nishi 2000). Most collared caribou congregate along the southern coast of Victoria Island for the rut. Subsequent satellite collars deployed on the mainland winter range (27 caribou; 1999 to 2006) and the Victoria Island summer range (10 caribou; 2003 to 2006) added additional information on seasonal movements and habitat use (Poole et al. 2010). Additional GPS collars were deployed in 2015 (25 caribou) and 2016 (19 caribou) on both sides of Bathurst Inlet; however, only 34 out of the 44 caribou were actually from the Dolphin and Union herd (Leclerc and Boulanger 2018). In 2021, an additional 36 collars were deployed on Dolphin and Union caribou during their spring migration (Government of Nunavut 2021b). The accumulated collar data from 1987 to 2024 (Government of Nunavut 2025) helped inform additional analyses for baseline studies.



-  Grays Bay Port
-  Grays Bay Road
-  Grays Bay Winter Road
-  Tibbitt to Contwoyto Winter Road
-  Territorial Boundary
-  Treeline
-  Watercourse
-  Wildlife Regional Study Area (RSA)
-  Dolphin and Union Caribou Herd Regional Assessment Area (DUH-RAA)



Project Location: West Kitikmeot Region, Nunavut  
 Prepared by Olivia Leblanc on 2026-02-23

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

Figure No. **4.30**

**Dolphin and Union Caribou Herd Mainland Nunavut Range Derived from Collar Data (1987 to 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

**Seasonal Date Ranges**  
 Winter (December 1 to April 24)  
 Pre-Spring Migration Staging (April 25 to May 28)  
 Post-Fall Migration (November 23 to 30)

Path: L:\PROJECTS\2024\W14\Y0376\_GBRPWildlifeBaselineUpdates\_2025\_V3\_aprx24Y0376\_WildBaseline\_Fig4-30\_DUH\_CollarData\_20260221\_Revise02-23-23\_By: OliviaLeblanc

Disclaimer: EDI Environmental Dynamics Inc. has made every effort to verify this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

Dolphin and Union caribou have seasonally distinct ranges. The overall annual range size (Victoria Island and mainland NU) may vary from approximately 224,000 km<sup>2</sup> (Nishi and Gunn 2004) to 300,000 km<sup>2</sup> (Poole et al. 2010). Summer range on Victoria Island covers approximately 180,000 km<sup>2</sup> (100% minimum convex polygon [MCP]; Nishi 2000) and the mainland winter range covers approximately 110,000 km<sup>2</sup> (100% MCP around all mainland winter locations). During calving the herd is found dispersed over a large area on south-central Victoria Island (Gunn and Fournier 2000b) and surrounding areas to the east and north (Nishi 2000). The herd generally occupies all of Victoria Island except for the northwest portion surrounding Minto Inlet, where Peary caribou occur. Overlap of ranges between these two types of caribou are most likely during the post-calving season, when some Dolphin and Union caribou move northward (Gunn and Fournier 2000b). Dolphin and Union caribou are not expected to occur within the RSA from approximately late June to late October, when animals from the herd are found on Victoria Island (Poole et al. 2010).

#### **4.3.4.2 Winter (Mainland)**

Dolphin and Union caribou interact with the Project during winter (December 1 to April 14) when they are found throughout mainland NU, generally between east of Bathurst Inlet (south of Kent Peninsula) and almost to the Tree River (*Kugluktoalok*) east of Kugluktuk; the southern range boundary is typically in the Ulu and Hood River area (see Figure 4.31), but may extend 30–50 km south of Hood River (see Figure 4.30). During Project-specific aerial surveys from 2004 to 2013 (see Table 4.9 and Figure 4.32 through Figure 4.34), Dolphin and Union caribou were observed from as far south as the Ulu and Hood River areas, with concentrations east and southeast of High Lake in March, changing towards the northern portions of the RSA later in winter. Between March and May, the distribution of caribou shifted and densities reduced throughout the northern RSA (see Figure 4.32) and greater concentrations towards the coast before spring migration (see Section 4.3.4.3).

**Grays Bay Road and Port Project  
Terrestrial Wildlife Baseline Report**

Section 4: Ungulates  
March 2026

**Table 4.9 Dolphin and Union Caribou Observations During Aerial Surveys from 2004 to 2013**

Survey Year	Survey Date	Season	Transects Surveyed	#Caribou On Transect	#Caribou Off Transect
2004	22–23 May	Pre-calving	N/A	369	142
	10–11 June	Calving	N/A	3	2
	19–21 August	Summer	N/A	–	–
	15–18 October	Rut	N/A	1	0
2005	10–12 March	Winter	1–19	1068	162
	10–11 April	Late Winter	1–19	365	68
	22–23 May	Pre-calving	1–20	16	6
	10–11 June	Calving	1–20	3	3
2006	21–23 March	Winter	1–20	1639	1505
	19–22 April	Late Winter	1–20	1678	115
	24–25 May	Pre-calving	1–20	7	0
	10–11 June	Calving	1–20	1	0
2008	26–30 March	Late Winter	4–29	1437	200
	20–22 April	Late Winter	1–13	459	61
	20–21 May	Pre-calving	1–35	109	57
	12–14 June	Calving	1–35	2	3
2012	24–26 March	Late Winter	2–35	466	176
	25–27 April	Late Winter	1–35	893	183
	20–23 May	Pre-calving	1–35	22	26
	9–12 June	Post-calving	2–35	0	0
2013	7–8 February	Winter	1–20	236	36
	14–15 April	Late Winter	1–20	338	135
	17–23 May	Pre-calving	1–35	126	0
	6–9 June	Calving	14–35	0	0

Figure 4.31 Kitikmiut Knowledge of Regional Island Tuktuik (Caribou) Migration and Winter Distribution

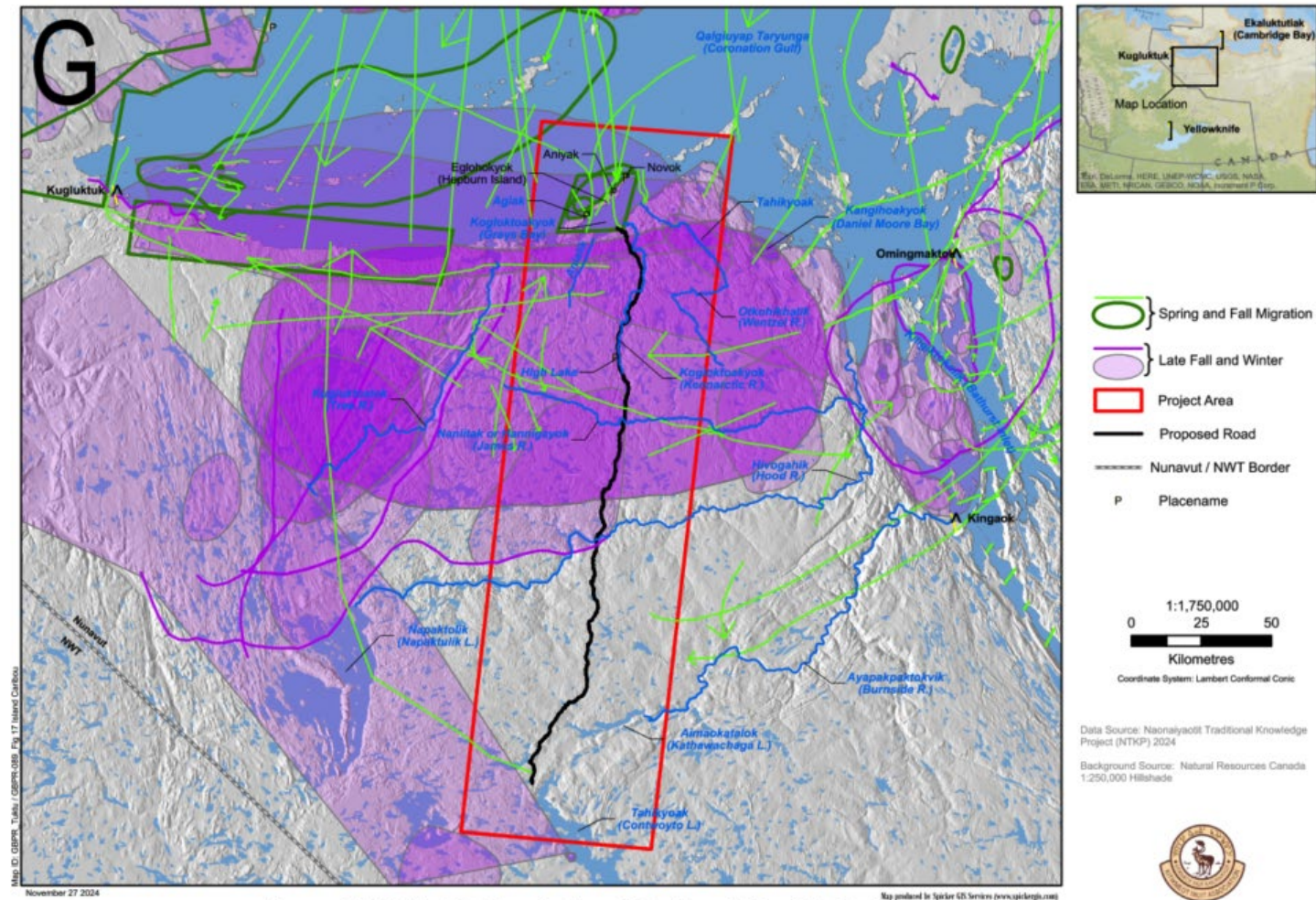
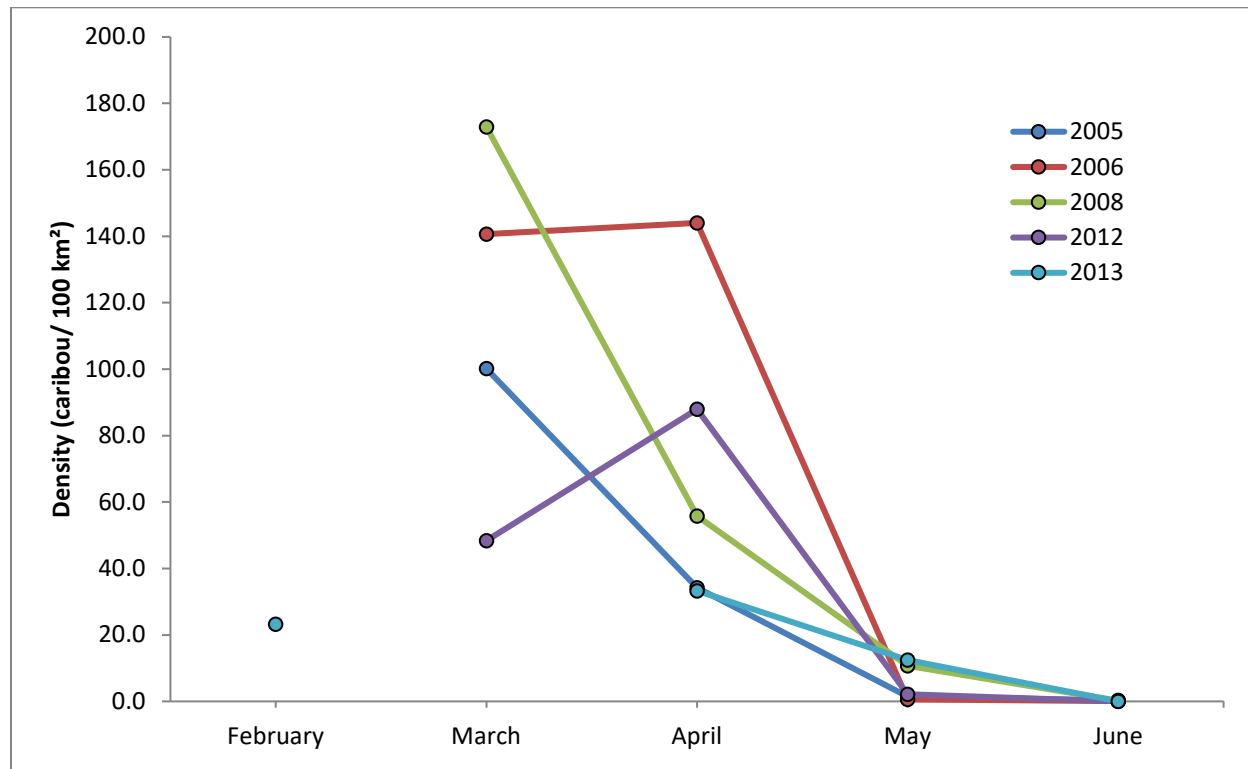


Figure 17: Kitikmiut Knowledge of Regional Island Tuktuik (Caribou): Migration and Winter Distribution

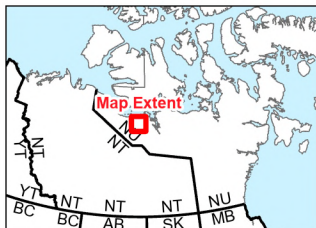
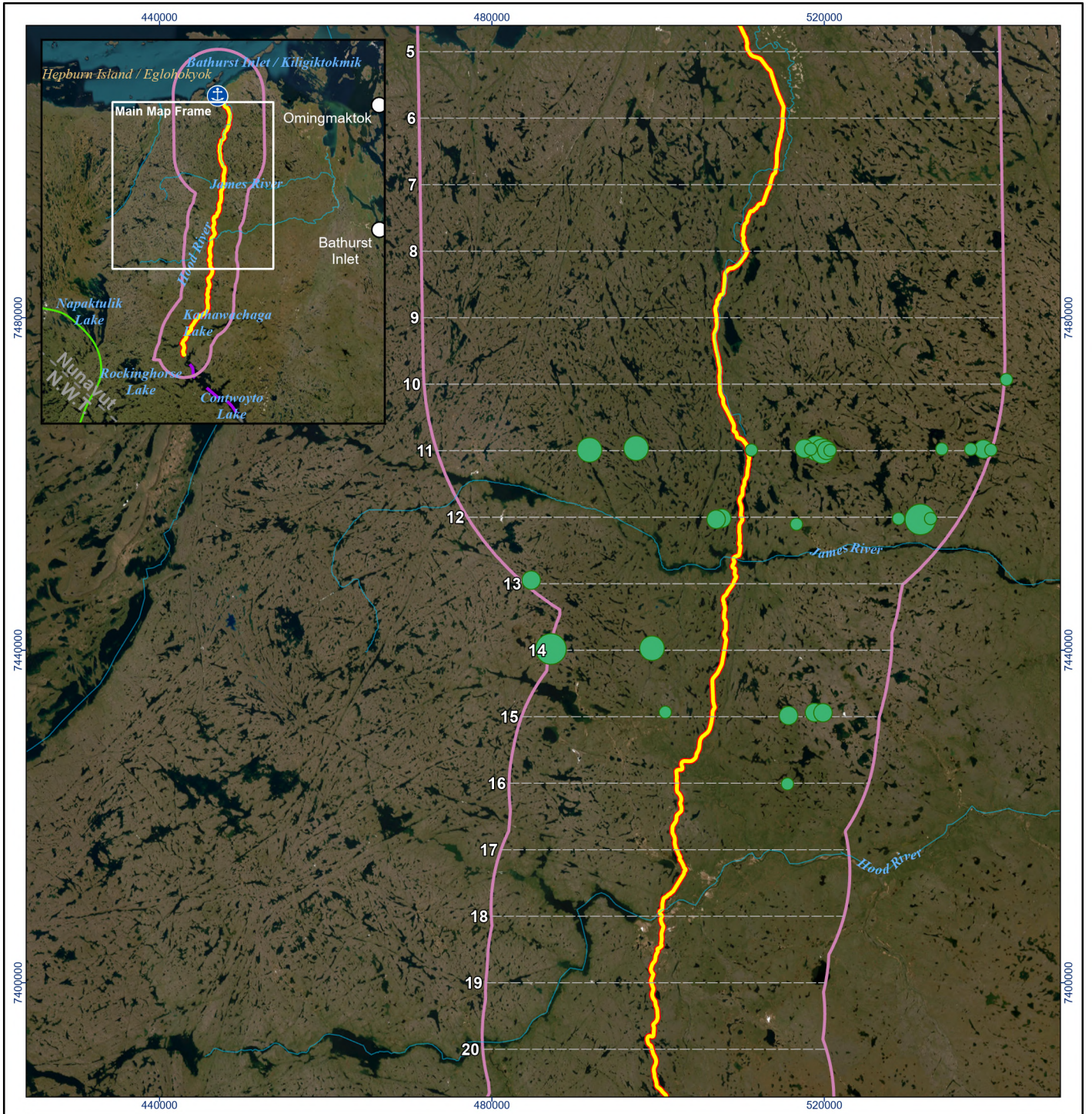
**Figure 4.32 Dolphin and Union Caribou Densities Observed on Transects 1 to 17 During Project Ungulate Surveys (2005 to 2013)**



Although survey counts vary among years for a given month, a substantial portion of the herd was present within the northern RSA in late winter in some years. Simple extrapolations from the number of caribou observed on transects during the March 2005 and April 2006 surveys (see Figure 4.33 and Figure 4.34) suggest an estimated 6,820 caribou (90% CI =  $\pm 2,556$ ) and 13,987 caribou (90% CI =  $\pm 9,266$ ), respectively, present within the RSA. Peak densities were similar in late winter 2008 and lower in 2012 (see Figure 4.32). The reduced numbers of Dolphin and Union caribou observed during the February 2013 survey may have been a result of very late freezing of portions of the Coronation Gulf during late fall 2012 (K. Klengenber, pers. comm., March 14, 2013), and subsequent re-direction of caribou away from normal wintering areas west of Bathurst Inlet (L.-M. Leclerc, pers. comm., March 7, 2013). Mean group size observed on transect during March and April surveys were 10.1 caribou ( $\pm 0.68$  SE;  $n = 457$ ) and 17.0 caribou ( $\pm 1.39$ ;  $n = 224$ ), respectively.

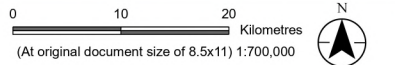
During December to mid-April (i.e., the mid-winter period between migrations), collared caribou were found throughout the northern RSA, but with limited use within 15 km of the coast (see Figure 4.33 and Figure 4.34). No caribou were observed within 55 km of the coast during the early February 2013 survey. Track counts completed along the proposed road alignment during March and April 2012 indicate the highest number of crossings south of High Lake, and midway between High Lake and Grays Bay (see Figure 4.34). Movement rates are the lowest and turning angles during winter than among other seasons, suggesting winter movements are generally localized (Poole et al. 2010).

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

- Dolpin and Union Caribou Observations (February 2013)**
- Total Individuals**
- 1 - 5 Caribou
  - 6 - 10 Caribou
  - 11 - 20 Caribou
  - 21 - 30 Caribou
  - > 30 Caribou



**Project Location** West Kitikmeot Region  
Nunavut

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

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24Y0376

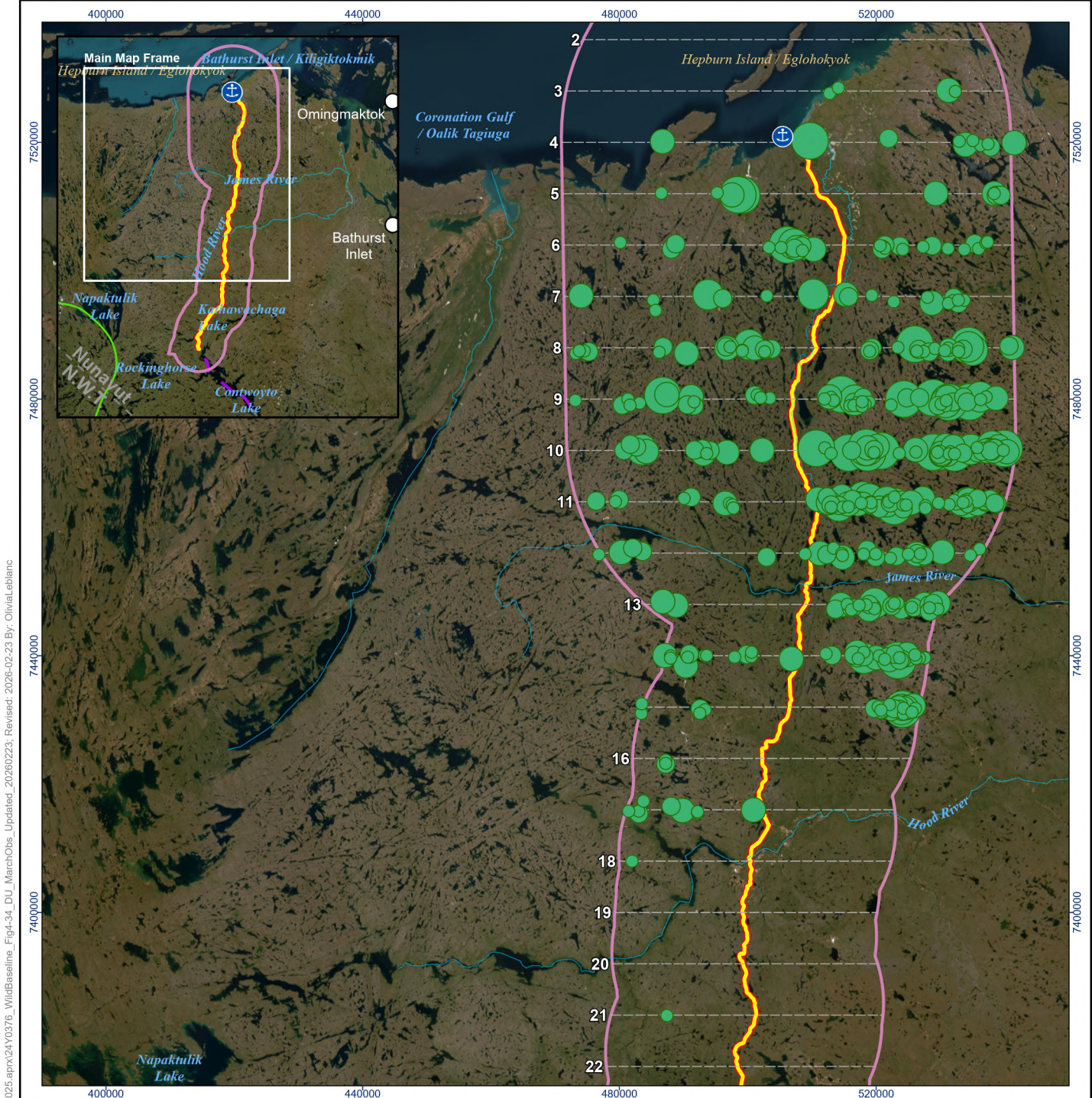
**Figure No.**  
**4.33**

**Title**  
**Dolpin and Union Caribou Observations from Project Ungulate Surveys During February 2013**

**Notes**

1. Coordinate System: WGS 1984 UTM Zone 12N
2. Data Sources: Government of Canada, Stantec, Downloaded by David Spry (Stantec GIS) in mid-December 2016 from [ftp://ftp.maps.canada.ca/pub/nrcan\\_nrcan/vector/canvec/gdb/Hydro/](ftp://ftp.maps.canada.ca/pub/nrcan_nrcan/vector/canvec/gdb/Hydro/) Last Modified 08-Nov-2016, Earthstar Geographics, Natural Resources Canada, Government of Canada (<https://www.nrcan.gc.ca/earth-sciences/geography/download-geographical-names>)

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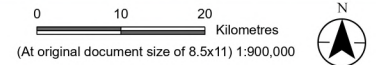
Path: L:\PROJECTS\2024\W14\Y0029\_GBRPW\Wildlife\Baseline\Updates\_2025.aprx\24Y0376\_WildBaseline\_Fig4-34\_DU\_MarchObs\_Updated\_2026-02-23 By: OliviaLeblanc



**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
- Watercourse
- Wildlife Regional Study Area (RSA)
- Ungulate Aerial Survey Transects
- Survey Transect Flightline

- Dolphin and Union Caribou Observations (March)**  
**Total Individuals**
- 1 - 5 Caribou
  - 6 - 10 Caribou
  - 11 - 20 Caribou
  - 21 - 30 Caribou
  - > 30 Caribou



**Project Location** West Kitikmeot Region  
 Nunavut  
**Client/Project** West Kitikmeot Resources Corp (WKR)  
 Grays Bay Road and Port  
 Prepared by OliviaLeblanc on 2026-02-23  
 24Y0376

**Figure No.**  
**4.34**  
**Title**  
**Dolphin and Union Caribou Observations from Project Ungulate Surveys During March 2005, 2006, 2008, 2012, and 2013**

Inuit Knowledge indicates that over the past several decades Dolphin and Union caribou winter range use has extended far south, while mainland caribou have been moving further northwards in winter (Banci and Spicker 2024; NTKP 2018). Although Dolphin and Union and mainland caribou are normally temporally separated in their use of habitat along these range boundaries, there are suggestions that both types of caribou may be overlapping more recently during winter on the mainland (Species at Risk Committee 2023b, Government of Northwest Territories 2024b, Government of Nunavut 2025).

*C110 “Over the years I’ve noticed that some of these Bathurst caribou are ending up at Victoria Island, following the Island caribou herd. Not that many but I’ve seen them going down that way with the Island caribou. Within the last 30 years, I guess, I’ve seen them, 30, 40 years ago (1970s-1980s).*

*Another thing, talking about Island caribou, we notice that in summertime sometimes they are on the mainland. Not all of them go back to the Island, some of them stay behind. And I believe they mix together. They mate, produce different caribou, different animals” (Banci and Spicker 2024).*

*C117 “Nowadays (2012 interview) Inuit see the Island caribou mixing, which they’ve never done before. They mix during spring, during the breeding season. Island caribou, what they are doing, is migrating to the mainland in springtime, mating season, as well as the Mainland caribou which are migrating from east to west.*

*They interbreed because we are getting some Island caribou that have darker fur. Most of the Island caribou are white in colour in the fall time when they are migrating through” (Banci and Spicker 2024).*

*C427 “There are a lot of different names we can call them. Lots of names we could use depending on when and where they are. Sometimes the caribou get mixed together. Sometimes when the Island caribou come over and get mixed with the Mainland caribou and they have a baby they would be a bit taller. If it was an Island caribou it would go back and if it was a Mainland caribou it would stay here” (NTKP 2018).*

Overwintering on the mainland may offer some protection from the catastrophic die-off events associated with severe winter icing events. Such icing events make forage inaccessible, and have resulted in drastic population declines of Peary caribou, which remain on Arctic islands throughout the winter (COSEWIC 2015). However, Dolphin and Union caribou are still at risk from icing events that may occur on the mainland.

*C211 “After one winter, the snow was covered in ice and that is how the numbers of caribou dropped. The number of muskox went down too, yhe land was covered in sleet and there was no place for them to eat. This was by Ekaloktok (Wellington Bay). I remember it well, but I cannot remember what year (1960s or 1970s) The snow was covered in ice. It had rained after a big snowfall. That is when some of the caribou had starved to death, but in another area of the land where it wasn’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).*

*C211 “In the spring when the snow is soft and deep, some of the caribou would get skinny. They would get skinny when there is too much soft snow during the spring. When that is how it is. Some of the caribou would be okay” (NTKP 2018).*

Topography that is more varied on the mainland may also result in greater abundance and accessibility of forage (Gunn et al. 1997).

*C11 “The caribou from Victoria Island are heading to the mainland where food is more abundant. Victoria Island has no willows and there is hardly any wood... There is no moss and lichen here on Victoria Island... That is where the caribou would go to spend the winter, where there is more for them to eat” (Banci and Spicker 2024).*

*C427 “The Island Caribou come across in the winter time because there is better food here, lichens, etc. They are basically this far down, they don’t go into the hilly area. The caribou don’t go into that really rocky area. They only stay where there is lots of food. They don’t go way up here.*

*In the winter there are lots of caribou here. There are lots of caribou in the area where the road might be. They come across from Killinik (Victoria Island) and stay here in early winter then they turn southwest and south. It is very rough here by High Lake but they travel there” (NTKP 2018).*

*C565 “Caribou move to mainland for better food (willows and other), and go back in spring. They don’t go in rocky areas, more by the coast. They stick around near shore. In summer there aren’t any on the coast” (NTKP 2018).*

Hughes (2006) found using NDVI satellite imagery that the summer productivity of vegetation on mainland coastal winter ranges was higher and less variable than on southern Victoria Island. At low population levels (i.e., pre 1980), the lack of mainland migration could indicate that higher densities of caribou influence available forage on Victoria Island, making migration worth the required effort (Gunn et al. 1997).

#### **4.3.4.3 Spring and Fall Migration**

During spring migration (April 15 to May 28), caribou are primarily found in the northern portion of the RSA, in preparation for the return to Victoria Island (see Figure 4.35 and Figure 4.36).

*C211 “During the spring, caribou would cross from Arctic Sound and Rideout Island towards Elu Inlet then across to Cambridge Bay, heading up to Victoria Island. The migration routes, they have not changed. Before spring they would head up here passing through Elu Inlet” (Banci and Spicker 2024).*

*“The cows can be seen in April or May, coming across from the mainland... During the month of May, the Kiilliniq caribou usually head to the calving grounds” (Banci and Spicker 2024).*

*C427 “Andrew (Nivingalok) and me used to travel past Grays Bay. We counted caribou tracks, and we counted caribou. Lots! This was spring time” (NTKP 2018).*

**Grays Bay Road and Port Project  
Terrestrial Wildlife Baseline Report**

Section 4: Ungulates  
March 2026

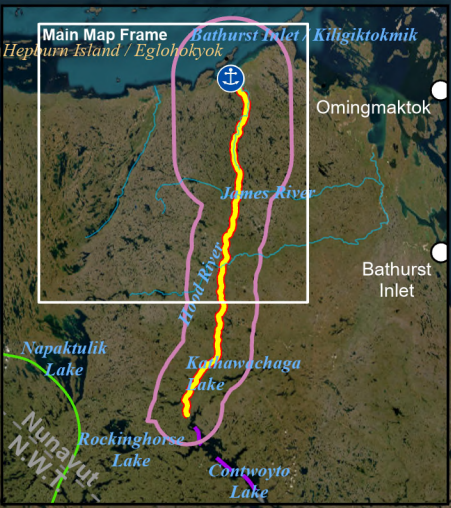
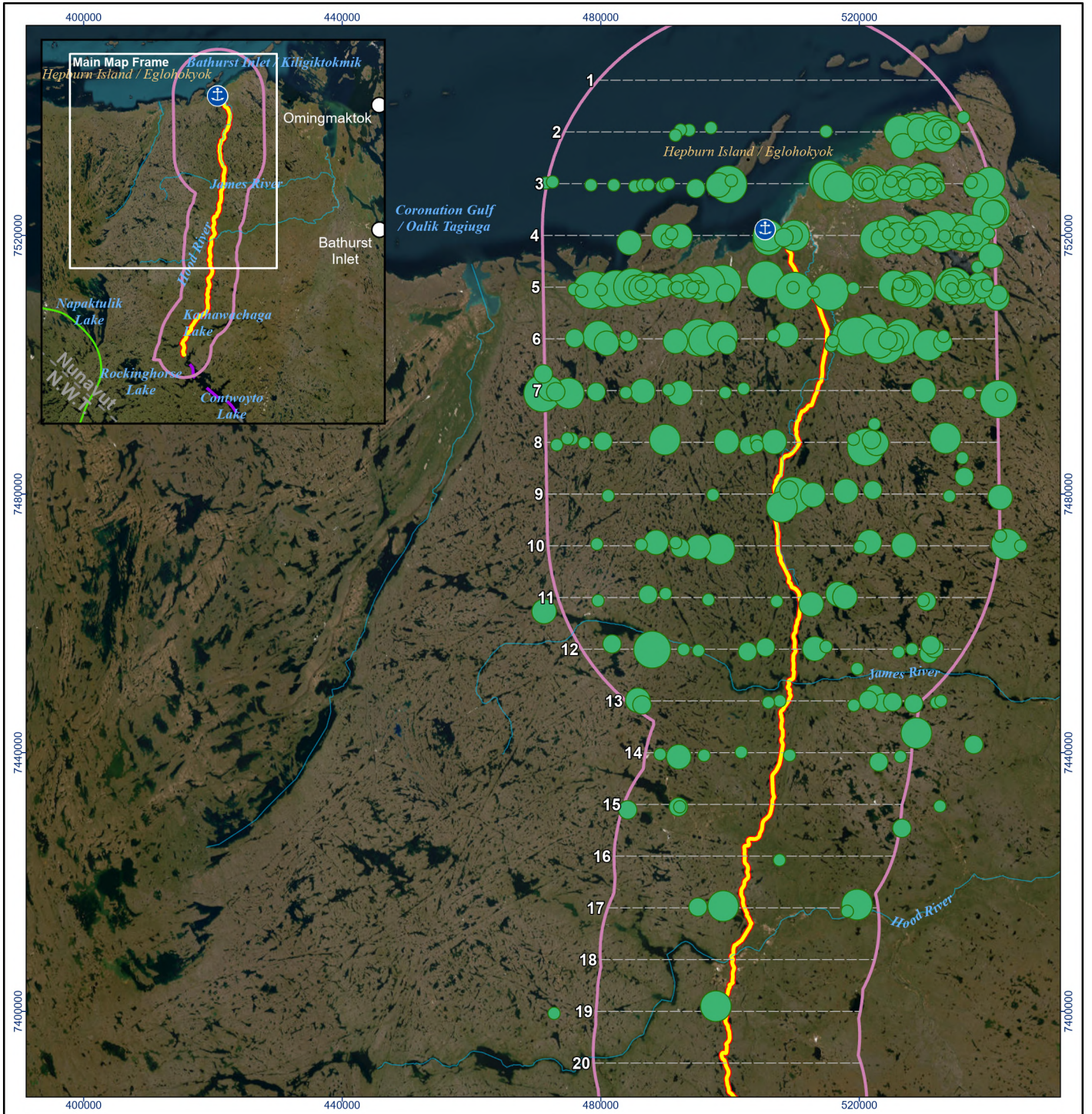
Most caribou depart the RSA by late May (Poole et al. 2010). Those caribou remaining in the RSA in late May and June were typically observed near or on Grays Bay, likely just prior to or during migration north to Victoria Island (see Figure 4.36). Mean group size observed on transects during May surveys were 12.3 caribou ( $\pm 1.19$ ;  $n = 239$ ).

Gunn et al. (1997) suggested that caribou concentrate along the mainland shoreline and islands and use these areas as staging grounds to feed and rest prior to crossing the sea ice. Crossings occur over the Coronation Gulf and Dease Strait, with limited crossings at and immediately adjacent to the mouth of Bathurst Inlet (Poole et al. 2010). Concentrations of crossings occur in some areas, such as between the Richardson Islands (*Nagyoktok*) on Victoria Island and the Jameson Islands and Grays Bay area on the mainland, and off the north and east sides of Kent Peninsula. Northbound spring migration crossings occur between mid-April and late June, with most occurring in May; caribou west of Bathurst Inlet crossed earlier than animals east of the inlet (Poole et al. 2010). GPS collar data from 2000 to 2024 indicate that annual spring migration (median) crossing dates off mainland NU, west of Bathurst Inlet and within 100 km of the Project, ranges from May 1 to 17 (see Table 4.10).

**Table 4.10 Timing of Dolphin and Union Caribou Spring Migration Crossings off Mainland Nunavut West of Bathurst Inlet and Within 100 km of the Project**

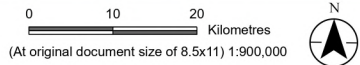
Year	Number of Individuals (Crossers)	First Crossing Date	Last Crossing Date
2000	2	May 5	May 16
2001	5	May 7	June 11
2002	4	May 1	May 12
2003	5	April 30	May 17
2004	1	May 24	May 24
2005	1	May 17	May 17
2015	22	April 29	May 19
2016	2	April 30	April 30
2017	3	May 11	May 17
2018	48	April 26	May 27
2019	34	May 8	June 4
2021	12	April 28	May 29
2022	50	April 25	May 14
2023	60	April 26	May 7
2024	52	April 26	May 15
<b>Median Crossing Dates</b>		<b>May 1</b>	<b>May 17</b>

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

- Dolphin and Union Caribou Observations (April)
- Total Individuals
- 1 - 5 Caribou
  - 6 - 10 Caribou
  - 11 - 20 Caribou
  - 21 - 30 Caribou
  - > 30 Caribou

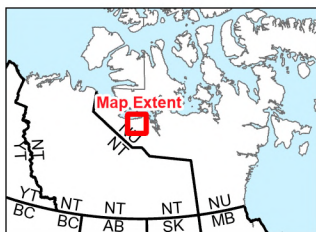
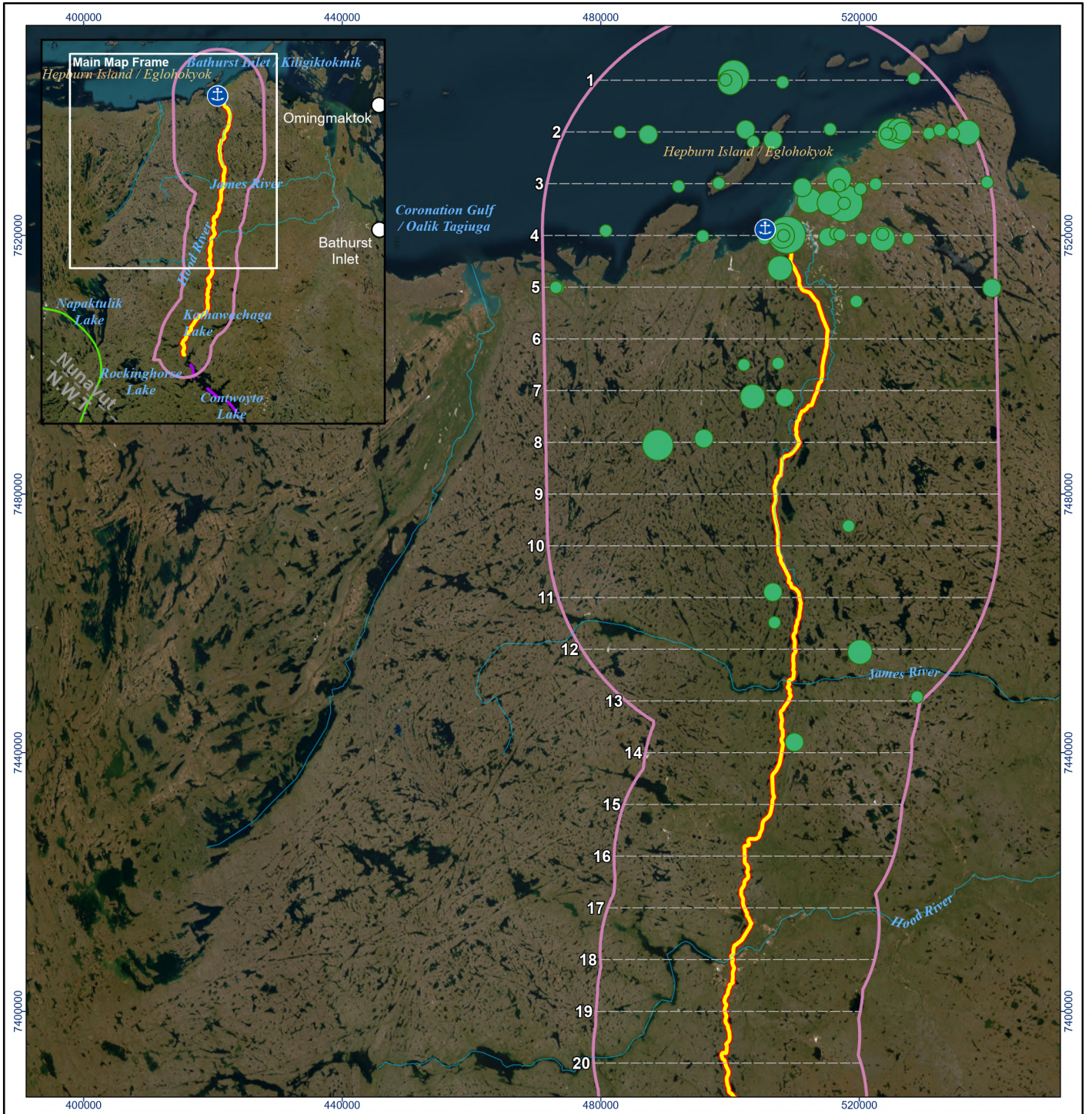


Project Location: West Kitikmeot Region, Nunavut  
 Prepared by Olivia Leblanc on 2026-02-23  
 Client/Project: West Kitikmeot Resources Corp (WKR), Grays Bay Road and Port, 24Y0376

Figure No. **4.35**  
**Dolphin and Union Caribou Observations from Project Ungulate Surveys During April 2005, 2006, 2008, 2012, and 2013**

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Path: L:\PROJECTS\2024\W1410029\_GBRP\Wildlife\BaselineUpdates\_2025.aprx\24Y0376\_WildBaseline\_Fig4-36\_DU\_MayObs\_Updated\_20260223\_Revise: 2026-02-23 By: OliviaLeblanc



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

- Dolphin and Union Caribou Observations (May)
- Total Individuals
- 1 - 5 Caribou
  - 6 - 10 Caribou
  - 11 - 20 Caribou
  - 21 - 30 Caribou
  - > 30 Caribou

0 10 20 Kilometres  
(At original document size of 8.5x11) 1:900,000



Project Location: West Kitikmeot Region, Nunavut  
 Client/Project: West Kitikmeot Resources Corp (WKR) Grays Bay Road and Port  
 Prepared by OliviaLeblanc on 2026-02-23  
 24Y0376

Figure No. **4.36**  
**Dolphin and Union Caribou Observations from Project Ungulate Surveys During May 2005, 2006, 2008, 2012, and 2013**

**Grays Bay Road and Port Project  
Terrestrial Wildlife Baseline Report**

Section 4: Ungulates  
March 2026

Immediately prior to the post-breeding fall migration south across Coronation Gulf, caribou aggregate on the southern shores of Victoria Island. Then, beginning in early November (and sometimes late October), caribou migrate across Coronation Gulf and may be found primarily at the northern extent of the RSA. Incidental observations at the end of November included numerous caribou (>100), indicating caribou had moved at least as far south as High Lake. GPS collar data confirms that caribou are distributed throughout the RSA and can occur as far south as the James River before winter (Government of Nunavut 2025). Most movements appear to follow a north-south orientation during this period, likely because animals continued to move south upon reaching the mainland.

Timing of caribou crossing south to the mainland is dependent on ice formation but tends to occur relatively quickly (i.e., almost twice as fast as northbound crossings during spring migration) from early to late November. GPS collar data from 2000 to 2024 indicate that annual fall migration (median) crossing dates onto mainland NU, west of Bathurst Inlet and within 100 km of the Project, ranges from November 9 to 19 (see Table 4.11). Later crossing dates post-2015 may be related to later ice formation in the Coronation Gulf.

**Table 4.11 Timing of Dolphin and Union Caribou Fall Migration Crossings onto Mainland Nunavut West of Bathurst Inlet and Within 100 km of the Project<sup>1</sup>**

Year	Number of Individuals (Crossers)	First Crossing Date	Last Crossing Date
2000	6	November 3	November 10
2001	6	November 8	November 15
2002	4	November 9	November 14
2003	–	–	–
2004	2	November 2	November 3
2005	2	November 6	November 12
2015	4	November 5	November 19
2016	2	November 23	November 25
2017	–	–	–
2018	58	November 11	November 29
2019	18	November 12	November 28
2021	49	November 24	November 29
2022	68	November 10	November 30
2023	–	–	–
2024	–	–	–
<b>Median Crossing Dates</b>		<b>November 9</b>	<b>November 19</b>

Note:

<sup>1</sup> In addition to changes in the number of active collars and the herd's broader migration distribution, years with no crossing dates are also associated with movements onto the mainland during December, outside of the designated fall migration period.

Gunn et al. (1997) reported that caribou use different crossing strategies depending on ice conditions. Rough ice conditions resulted in caribou travelling in spread out formation, with most travel patterns being single file along snowdrifts and in parallel to ice-cracks. The importance of islands as staging areas has been demonstrated by aerial surveys (see Figure 4.36), analysis of GPS collars (see Figure 4.38), and track distributions recorded by Gunn et al. (1997). Inuit Knowledge also suggested that Hepburn Island (*Eglohokyok*), in particular, was used during migration crossings (see Figure 4.37), and that caribou would cross east of Cambridge Bay when ice formation was delayed (Wolfden Resources Inc. 2006). Most crossing movement may take place at night (Gunn et al. 1997).

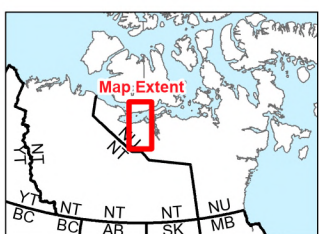
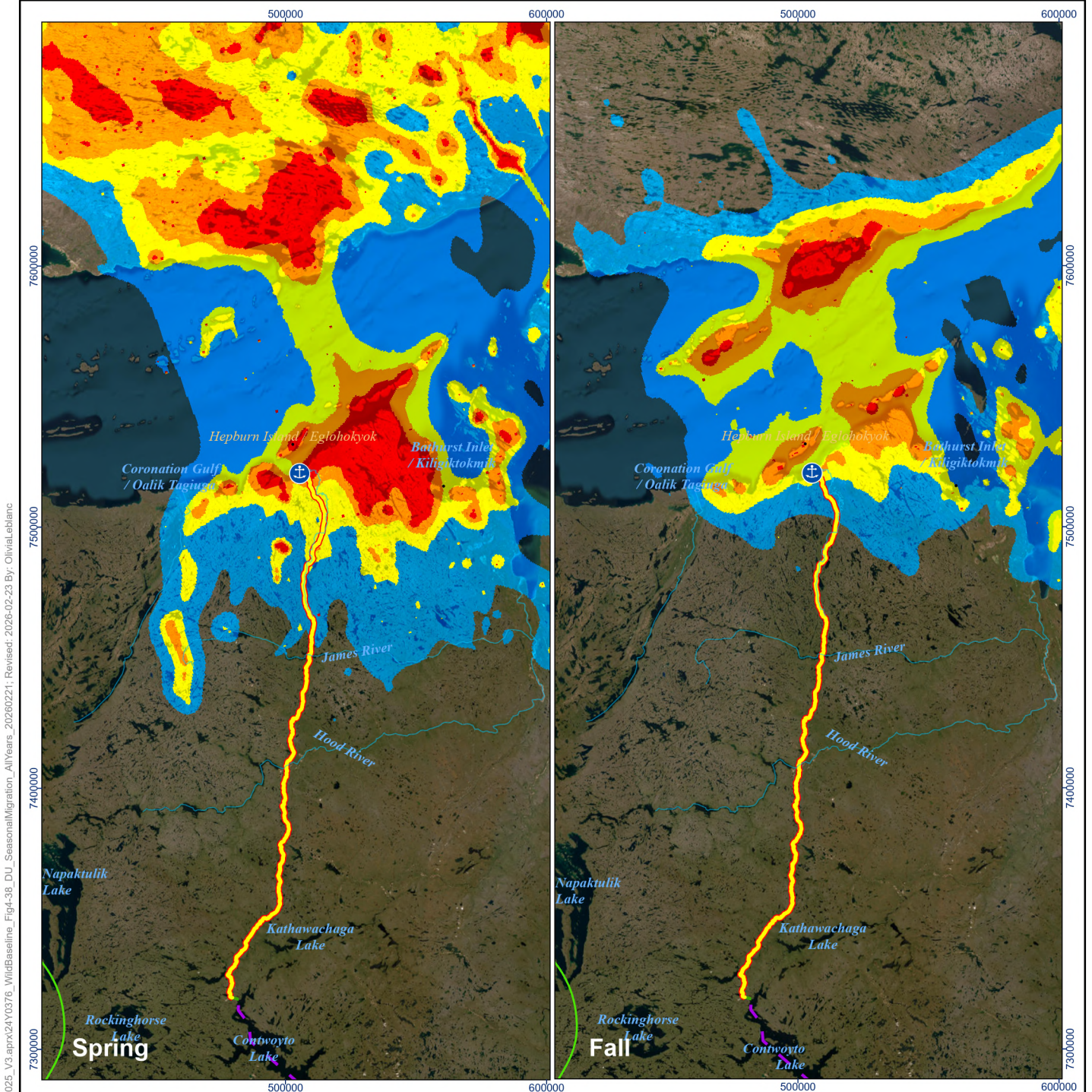
*C43 “March until December caribou are there. In spring Eglohokyok (Hepburn Island) is full of caribou. The caribou wait until there’s no water in the ocean before they go north to Victoria Island” (NTKP 2018).*

*C565 “This year (2005) it isn’t as bad. The ice wasn’t freezing, so they went east past Cambridge Bay until they found ice. Usually they cross on this side of Cambridge Bay to Hepburn Island area” (NTKP 2018).*

*C565 “It is poor for caribou right now (2005). They are closer to Kugluktoalok (Tree River) and partly at the mouth of Kilogiktok (Bathurst Inlet). Some years its better. (He drew a migration corridor between the mainland and Eglohokyok (Hepburn Island))” (NTKP 2018).*

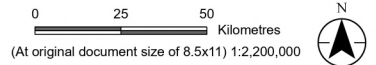
The BBMMs of Dolphin and Union caribou spring and fall migrations (derived from GPS collar data) identify the central migration routes used by the herd when crossing to/from mainland NU (see Figure 4.38). Spring migration begins at the mainland coastline, mostly to the east of the Project (port site). The Project is heavily utilized in certain years (e.g., 2016, 2020, and 2024), contributing to a relatively high intensity of use across the years of available data (left panel, see Figure 4.38). The heavily utilized areas (red shading; left panel, see Figure 4.38) span approximately 50 km to 70 km along the shoreline with the Project located on the western edge. Patterns of use from fall migration are similar to spring but less concentrated (i.e., smaller red shaded areas; right panel, see Figure 4.38). The Project does not overlap areas that are moderately high (orange shading) or heavily utilized (red shading; right panel, see Figure 4.38) during fall migration.





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

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



Project Location: West Kitikmeot Region, Nunavut  
 Prepared by: Olivia Leblanc on 2026-02-23

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

Figure No. **4.38**

Title: **Dolphin and Union Caribou Herd Relative Use of Seasonal Migration Routes (2015 to 2024) Based on Brownian Bridge Movement Analysis**

Path: L:\PROJECTS\2024\W14\Y0376\_GBRPW\W14\Y0376\_WildBaseline\_Fig4-38\_DU\_SeasonalMigration\_AllYears\_20260223\_Rev15\_2026-02-23 By: OliviaLeblanc

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Analysis of ice archive data indicated that sea-ice freezing occurred, on average, 8 to 10 days later in 2008 than in 1982, paralleling warming trends in fall temperatures (Poole et al. 2010). The timing of freeze-up (i.e., sea ice phenology) can vary by location (e.g., crossing routes) and across years; the more reliable the ice conditions over time, the more likely caribou are to use certain migration routes (Paquette et al. 2023). There has been a general trend of sea ice freezing later (in fall) and breaking sooner (in spring), which is shifting the timing of migrations (Paquette et al. 2023). Dolphin and Union caribou typically begin their migrations to cross the Coronation Gulf when sea ice concentrations reach 98.8% at a 25-km scale (Bowler et al. 2025). During their southern crossing caribou do not appear to linger longer than necessary after adequate ice formation before crossing the sea ice, and may be prone to pushing initiation of ice crossing if delayed:

*C48 “They would come just after freeze up, but some would fall through the ice and drown. Caribou are not like people and do not wait until it is solid and would fall through ice...”*  
(Banci and Spicker 2024).

Despite complexity and uncertainties, the warming trends are predicted to lead to further reductions in perennial ice (Serreze et al. 2007). The trend towards later freeze-up of the sea ice poses risks for Dolphin and Union caribou (Banci and Spicker 2024).. The near-future risk is increased deaths during crossings as the caribou try to cross to their wintering areas while the sea ice is still forming and too weak to bear their weight.

*C427 “In the fall time lots of caribou try to cross the ocean from Victoria Island in the north to the Arctic Ocean across. They have their babies in the north. One year it was really bad here, many caribou died frozen in the ice. Lots of caribou died that year the ice wasn’t thick enough. They were crossing here onto here in this area. This happens about every two or three years.*

*Sometimes from Victoria Island they all come at once or in a big herd. It is never the same. Some go across first and get way ahead and some get left behind. If they spread out and the ice is thin and there is snow on the ice and they can’t see, they just go through. It’s awful to look at them when its like that, when they try and cross and there is no ice.*

*It has been getting worse. It has taken really long to freeze this year (2005) in the Cambridge area. Most of the caribou passed this section and went all the way to the other (east) side of the Cambridge area. They went across the other side along where they have all those little islands. The ice was so late in freezing they keep going by the shore past Cambridge and finally made it across, maybe from Cambridge to Bay Chimo. But they got caught through here. They usually cross on this side (west) of Cambridge. This year there are lots crossing on these islands (Eglohokyok (Hepburn island)) right through here. They go through this pass (Aniyak)”* (Banci and Spicker 2024).

*C565 “In fall (October to end of November), caribou try to cross ocean from Victoria Island. They have babies on Victoria Island. One year there were lots of dead caribou because the ice wasn’t thick enough. This was north of the big islands in Grays Bay.*

*Sometimes caribou all come at once, sometimes not. Some can get way ahead, its different every time. When there is a lot of snow on ice they can go through the ice. On Victoria Island at our outpost camp we saw caribou go through the ice and couldn't get out" (NTKP 2018).*

*C446 "There were lots of island caribou. They came down from Victoria island and they crossed right there (Aniyak, across the break in Eglohokyok (Hepburn Island). They also go back in the fall because we had reports of dead caribou floating in. They got on the ice too soon and fell in. They spread along the coast" (NTKP 2018).*

*C43 "It takes a while for the ice to freeze north of Eglohokyok (Hepburn Island) (#25). There's a big crack there and there are always lots of dead caribou in the crack. Sometimes baby caribou are curled up and frozen because their moms have (fallen through the ice) and frozen in the crack" (NTKP 2018).*

*C4Kug "There are many deaths. The worst part is here (between southwest end of Hepburn Island and the mainland" (NTKP 2018).*

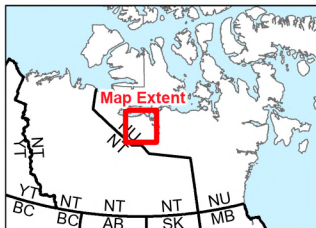
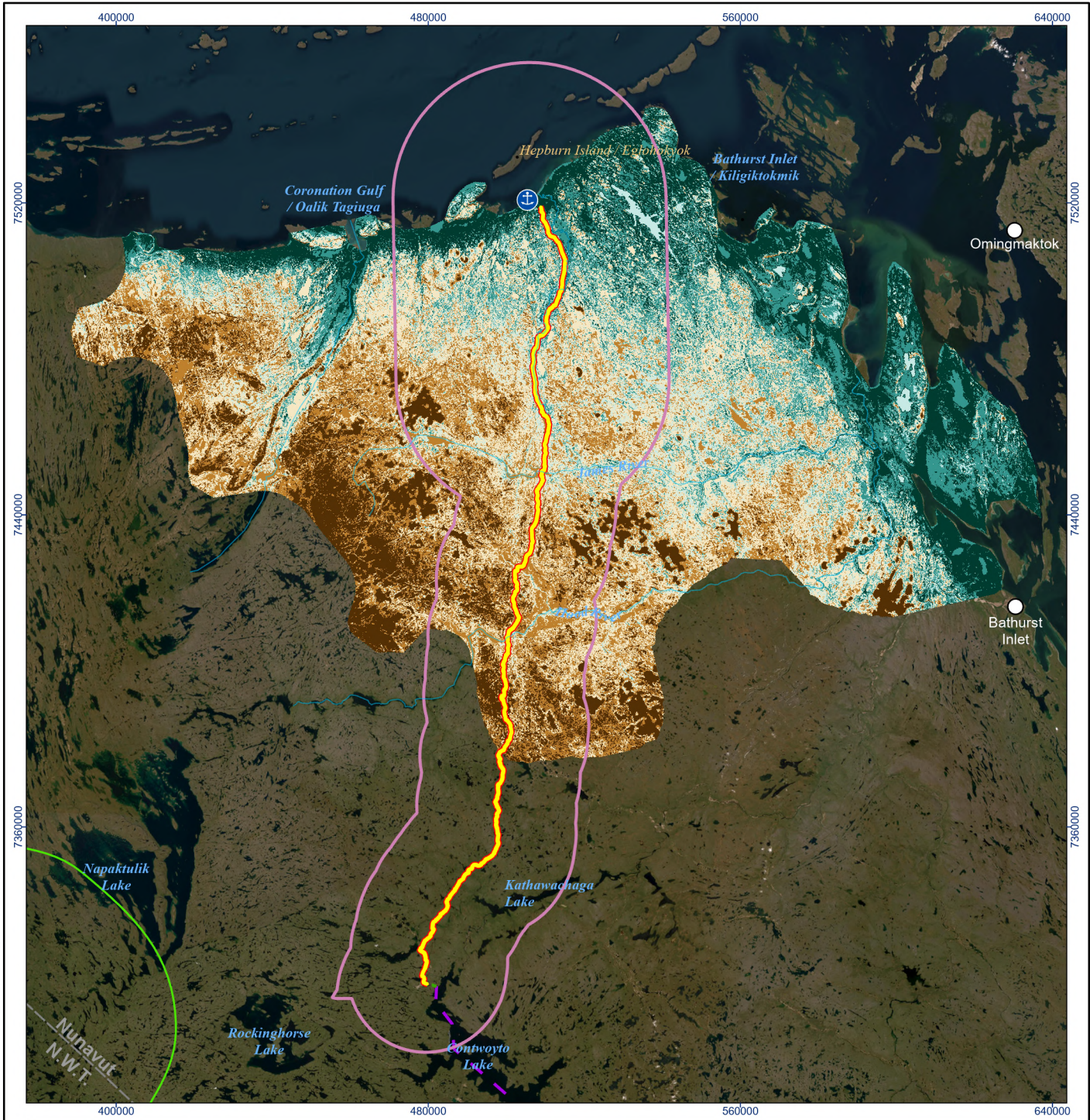
*C4Kug "When they are crossing the ocean in fall, from the Victoria Island to mainland, and when it's freezing up, the ice wasn't too thick and the caribou drowned (area of weak ice all around Hepburn Island). Dead caribou from Victoria pile up" (NTKP 2018).*

#### **4.3.5 Habitat Use and Diet**

From 2015 to 2024 during pre-spring migration staging and post-fall migration (April 15 to May 28, November 9 to 30)—reflective of immediate arrival on the mainland after fall migration ice crossing and staging prior to spring migration to Victoria Island—caribou selected relatively flat terrain at low elevations (see Appendix A). Relatively low-to-moderate coverage of shrub-lichen-moss landcover was selected. Elevation and shrub-lichen-moss landcover were the most important indicators of resource selection. Approximately 38% of the Dolphin and Union herd mainland range is considered 'selected' habitat (moderate-to-high relative quality) by caribou during pre-spring migration staging and immediate post-fall migration (see Figure 4.39).

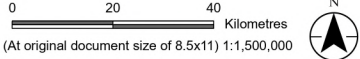
During winter (December 1 to April 14), caribou used a relatively wider range of elevations, often higher than during pre-spring migration staging and post-fall migration, and relatively flat terrain (see Appendix A). Relatively low-to-moderate coverage of grass-lichen-moss landcover was selected, but in areas of moderate vegetation density (i.e., NDVI). Elevation and vegetation density were the most important indicators of winter resource selection. Approximately 50% of the Dolphin and Union herd mainland range is considered 'selected' habitat (moderate-to-high relative quality) by caribou during winter (see Figure 4.40).

Path: L:\PROJECTS\2024\W14\Y0376\_GBRP\Wildlife\BaselineUpdates\_2025\_V3\_aprx24\Y0376\_WildBaseline\_Fig4-39\_DUH\_RSFS\Shoulder\_20260221\_Revise02\_2026-02-23 By: OliviaLeblanc



- 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



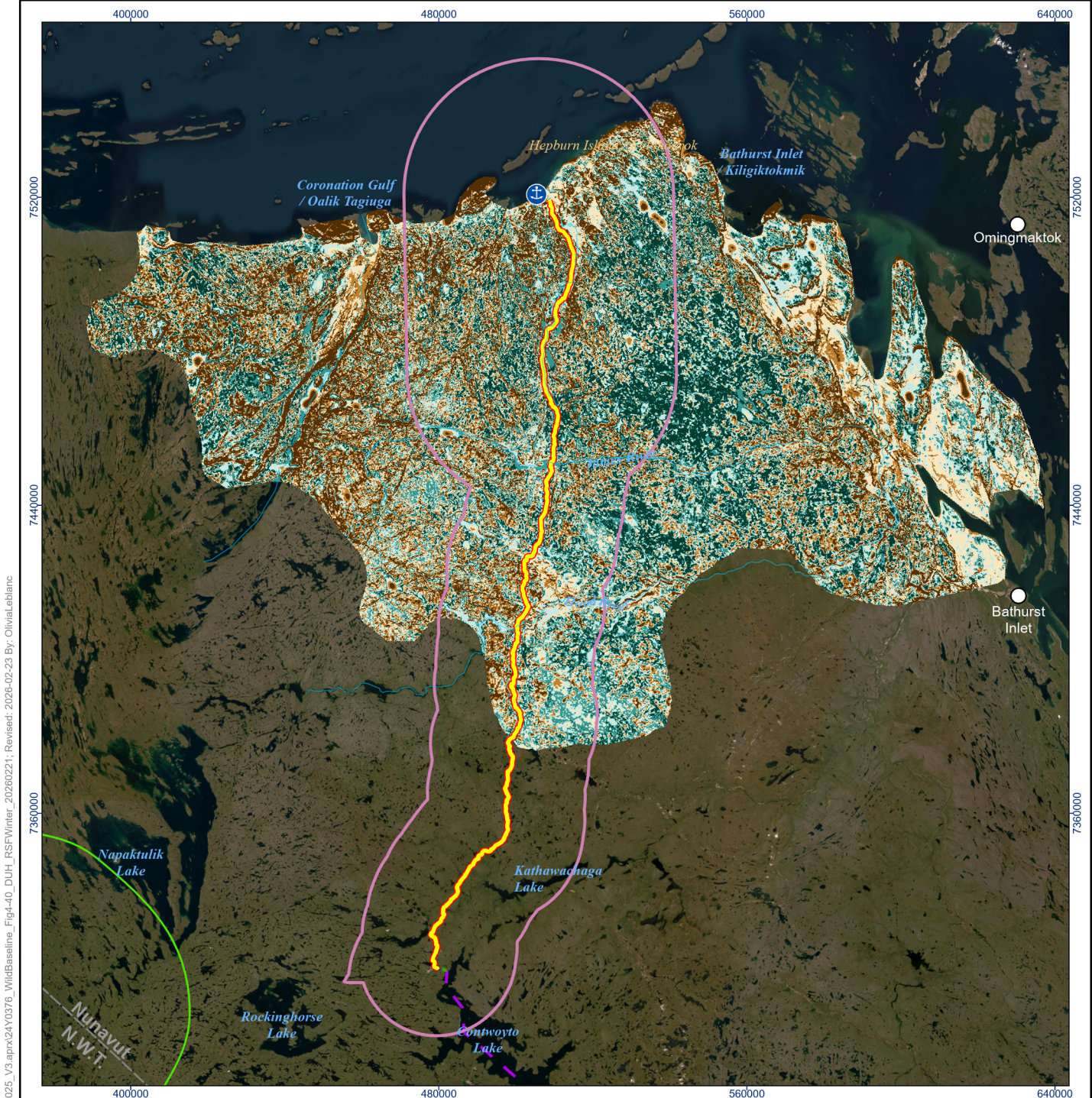
Project Location: West Kitikmeot Region, Nunavut  
Prepared by: OliviaLeblanc on 2026-02-23

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

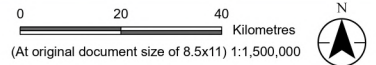
Figure No. **4.39**  
Title: **Dolphin and Union Caribou Herd Pre-Spring Migration Staging and Post-Fall Migration Resource Selection**

**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

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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**
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  - Very Low
  - Low
  - Moderate
  - Mod-High
  - High



**Project Location** West Kitikmeot Region  
Nunavut

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

Prepared by OliviaLeblanc on 2026-02-23

24Y0376

**Figure No.**  
**4.40**

**Title**  
**Dolphin and Union Caribou Herd  
Winter Resource Selection**

**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

Path: L:\PROJECTS\2024\WKR\24Y0029\_GBRPWildlifeBaselineUpdates\_2025\_V3\_aprx24Y0376\_WildBaseline\_Fig4-40\_DUH\_RSFWinter\_20260221\_Revise2026-02-23 By: OliviaLeblanc

Disclaimer: EDI Environmental Dynamics Inc. has made every effort to verify this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

Late winter forage by Dolphin and Union caribou on Victoria Island (prior to the resumption of migration in the 1980s) included dwarf shrub *Dryas* sp., willow (*Salix* spp.), and *Carex* spp. (Gunn unpublished data, in Gunn et al. 1997). Late winter diet on the mainland had greater amounts of Arctic heather (*Cassiope tetragonia*), lichen, shrub and twigs (Hughes 2006). Caribou are widely known to use lichens as a reliable source of energy, particularly in winter, and lichens are expected to comprise one of the primary forage items while on the mainland in winter. Inuit Knowledge suggests that during winter on the mainland, caribou forage on willow, tamarack, heather, lichen, puffballs and berries and that there is greater forage availability on the mainland as compared to Victoria Island (Wolfden Resources Inc. 2006).

Foraging activities similar to other mainland caribou herds would be likely during the year, where calving and post-calving caribou would select areas with high amounts of green plant biomass. Forage items throughout the year likely include graminoids (grasses), sedges, forbs, mosses, mushrooms and willows leaves (Dumond 2007a, NTKP 2018). The aggregation of caribou in fall along the southern coast of Victoria Island has the potential to alter the availability of forage, especially if the formation of ice is delayed and caribou remain congregated while waiting for ice to form (COSEWIC 2017). Inuit elders have suggested that the overall availability of forage on Victoria Island has increased with climate change (Wolfden Resources Inc. 2006).

#### 4.4 Bluenose-East Caribou (Mainland Caribou)

Prior to the mid-1990s, the Bluenose-East herd was part of a single herd known as the Bluenose herd. Aerial survey and collar data showed use of different seasonal ranges throughout each year and especially of different calving range leading to the designation of these caribou as three herds: the Cape Bathurst, Bluenose-West and Bluenose-East caribou herds (Nagy et al. 2005; Advisory Committee for Cooperation on Wildlife Management 2021). From these three herds, the Bluenose-East caribou herd's range is in closest proximity to Grays Bay.

Summary reports from the ILUOP study (NTKP 2018) indicated that Bluenose-East caribou calved from Bluenose Lake (*Tahikpak*) to the Dease Arm of Great Bear Lake (*Emakyoak*) up until the 1960s. After this time, Bluenose-East caribou began to shift their calving range east towards the coast and by the 1990s they calved closer to Kugluktuk (NTKP 2018).

*C23 "The caribou are starting to give birth around here by the ocean; closer to the Kugluktuk coast than inland. The calving grounds are starting to change from around Bluenose Lake, to east of there, on the other side of Dismal Lakes or near the Hope Lake area. Caribou are starting to use these areas to give birth to their young. They don't go far inland anymore. For that reason, there are caribou around the ocean during the summer ..."* (NTKP 2018).

These days, the Bluenose-East caribou calve east of Bluenose Lake in the headwaters of the Rae and Richardson rivers. Collaring studies have shown that like the Bluenose-West, these caribou also migrate towards the treeline for the rut in October, however they rut northeast of Great Bear Lake, and winter north, east, and south of Great Bear Lake (Advisory Committee for Cooperation on Wildlife Management 2021).

#### 4.4.1 Management

The Bluenose-East caribou herd is managed by the Sahtú and Wek'èezhì Renewable Resources Boards in the NT and the NWMB in NU, with the Advisory Committee for Cooperation on Wildlife Management (ACCWM). The Bluenose Caribou Management Plan Working Group (BCMPWG) was formed to develop a management plan that covers all three herds. The BCMPWG consists of representatives of:

- Wildlife Management Advisory Council;
- Gwich'in Renewable Resources Board;
- ʔehdzo Got'įnę Gots'e Nákedı (Sahtú Renewable Resources Board);
- Wek'èezhì Renewable Resources Board;
- Kitikmeot Regional Wildlife Board;
- Kugluktuk Hunters and Trappers Organization;
- Dehcho First Nations;
- Tukut Nogait National Park Management Board;
- Tłıchǫ Government;
- GNWT-ECC;
- GN-DOE;
- NWMB; and
- Parks Canada.

In 2020, the BCMPWG updated the plan with the involvement of the management boards. The plan was prepared and amended under the authority of the ACCWM (Advisory Committee for Cooperation on Wildlife Management 2021). The main goal of the plan is to make sure there are caribou for today and for future generations. The management goals are to:

- Maintain herds within the known natural range of variation;
- Conserve and manage caribou habitat; and,
- Make sure that harvesting is respectful and sustainable.

Two supporting documents for the plan are also available:

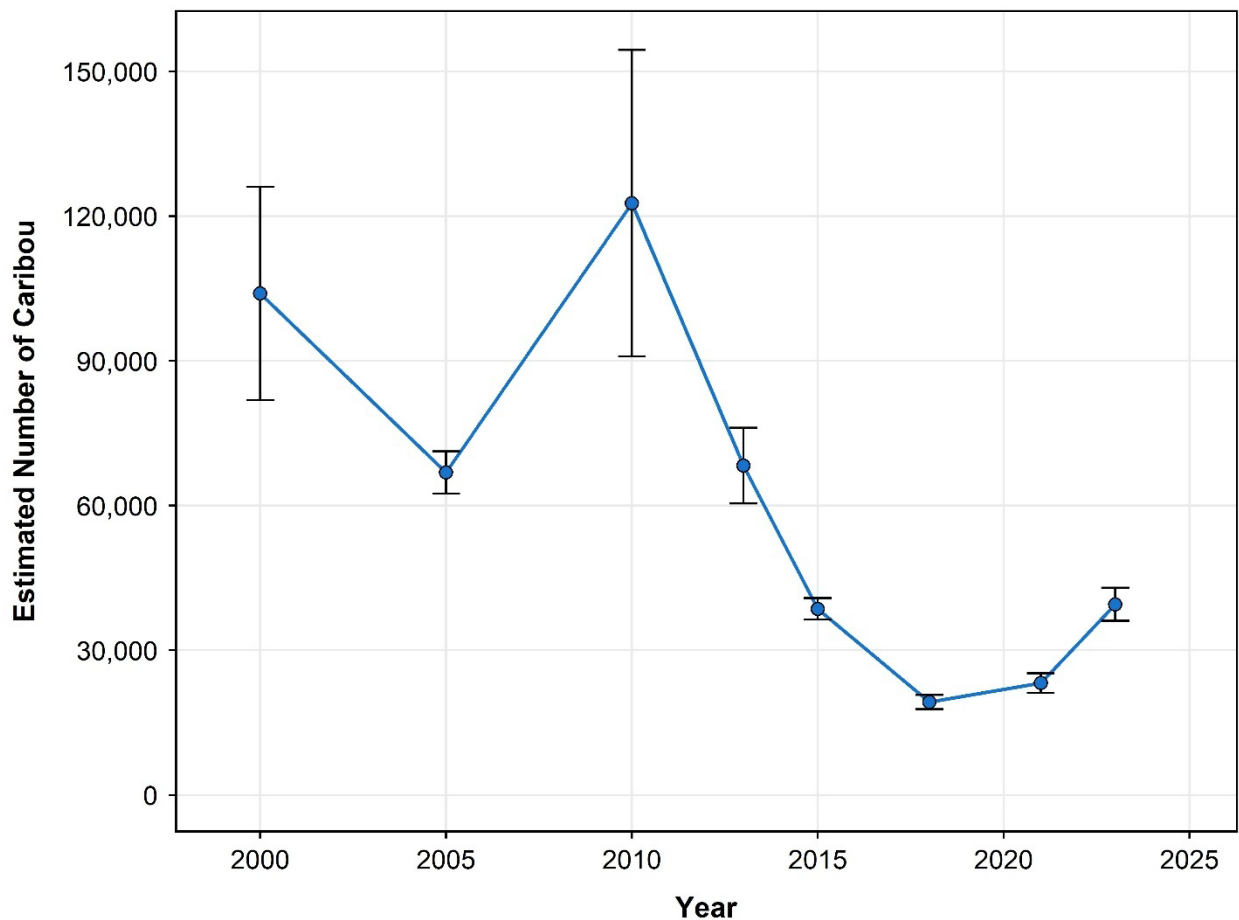
- An Environment and Natural Resources (GNWT) companion document ("*Technical Report on the Cape Bathurst, Bluenose-West, and Bluenose-East Barren-Ground Caribou Herds*") that provides more detail on herd status and scientific research (referred to here as the 'Scientific Report'); and,
- A summary of information recorded during the community engagements (referred to here as the 'Community Report').

Caribou management decisions in the NT are made collaboratively. The GNWT works side by side with Indigenous governments and organizations, renewable resources boards, and affected communities. In the case of Bluenose-East herd, the Sahtú and Wek'èezhì Renewable Resources Boards in the NT and the NWMB in NU are key decision-making bodies.

### 4.4.2 Population

Between 2000 and 2006, the Bluenose-East herd experienced a decline from an estimated  $104,000 \pm 22,100$  caribou in 2000 (Patterson et al. 2004) to  $66,854 \pm 4,388$  caribou in 2005 (Nagy and Johnson 2006). In 2010, the herd size estimate increased to  $122,697 \pm 31,756$  caribou (Adamczewski et al. 2017). Calving ground surveys then documented a decline in herd size with  $68,295 \pm 7,847$  caribou in 2013 (Boulanger et al. 2014b),  $38,592 \pm 2,233$  caribou in 2015 (Boulanger et al. 2016), and  $19,294 \pm 1,475$  caribou in 2018 (Boulanger et al. 2019). Following this decline, the estimated herd size has continued to increase:  $23,202 \pm 2,029$  caribou in 2021 (Boulanger et al. 2022) and  $39,525 \pm 3,423$  caribou in 2023 (Boulanger et al. 2024) (see Figure 4.41).

**Figure 4.41 Bluenose-East Herd Population Estimates ( $\pm$  SE) from 2000 to 2023**



Thresholds for the Bluenose-East herd were determined by the ACCWM based on known historic highs and lows, with input received from community and technical experts in a consensus-based process. The ACCWM met in November 2023 to discuss community-based monitoring and scientific information for the Bluenose-East caribou herd (Advisory Committee for Cooperation on Wildlife Management 2024). Based on the new population survey results provided and the subsequent discussions, the ACCWM determined that the Bluenose-East herd population is increasing. However, the ACCWM recognizes that, even though there are some very positive community and scientific observations, the observed population level has not yet exceeded the ~60,000 threshold to warrant the change to a green status (Advisory Committee for Cooperation on Wildlife Management 2024).

### **4.4.3 Harvest and Mortality**

#### **4.4.3.1 Harvest**

Nine communities harvest from the Bluenose-East herd, including Wrigley, Norman Wells, Tulit'a, Délı̄nɛ, Whatı̄, Gamèti, Behchokö, Paulatuk, and Kugluktuk; however, as of 2006, only harvest by Indigenous members is permitted (Advisory Committee for Cooperation on Wildlife Management 2011). In the Sahtú, Délı̄nɛ is the primary community that harvests from the Bluenose-East herd. There has also been increased harvest by Tı̄chq̄ communities following reductions in the Bathurst caribou harvest in 2010.

Due to concern over declining abundance of the Bluenose-East herd, the WRRB recommended harvest targets of approximately 2,800 caribou beginning in the 2010–2011 harvest season, with a recommended 85 bull:15 cow ratio (Wek'èezhı̄ Renewable Resources Board 2016b). Closure of outfitting and resident hunting in the North Slave region in 2010 covered some areas where Bluenose-East caribou winter. For the 2015–2016 season the WRRB (2016c) recommended a harvest target of 950 bulls-only for Indigenous harvest of the Bluenose-East herd (including NU). As with the Bathurst herd, management of the Bluenose-East caribou is rapidly evolving.

In the Sahtú region, the Sahtú Renewable Resources Board recommends harvest levels for the Bluenose-East herd. Through a community conservation model for caribou management the Sahtú Renewable Resources Board imposed a TAH of 129 and a five-animal limit on tsi' da gha máhsı ts'ı̄nı̄we (ceremonial harvest of females) for the entire Sahtú Settlement area, while maintaining a zero tsi' da (female) harvest limit in the hunting regulations (Bluenose East ʔekwé' Hearing, 2016). In the Tı̄chq̄ region, the WRRB determines harvest levels, and they determined that a TAH of 750 bulls-only shall be implemented for all users of the Bluenose-East caribou herd within Wek'èezhı̄ for the 2016/17, 2017/18, and 2018/19 harvest seasons (Wek'èezhı̄ Renewable Resources Board 2016c). In 2019/20, the TAH was reduced to 193 bulls based on a reduction in the Bluenose East population estimate (Wek'èezhı̄ Renewable Resources Board 2019) but the TAH was increased to 395 bulls for the 2024/25 and 2025/26 harvest seasons (Wek'èezhı̄ Renewable Resources Board 2025).

#### **4.4.3.2 Mortality**

Small changes in adult female survival can have a large influence on herd population size (Boulanger et al. 2011). Adult female mortality rate for the Bluenose-East caribou herd has not been estimated; however, adult female survival has been relatively high, averaging 85% from 2015–2019 and reach 89% in 2020 (Boulanger et al. 2022).

For discussion of the predator-caused mortality of mainland caribou like the Bluenose-East herd, refer to Section 4.2.3.2.

#### **4.4.3.3 Parasites and Disease**

The health of an individual caribou can be affected by disease and parasites (Hughes et al. 2009), and therefore, their reproduction and survival. One of the most common diseases that occur in caribou in the NT is called Besnoitiosis (Davison 2016). This is caused by a very small protozoan parasite (*Besnoitia tarandi*) that result in caribou hair loss on the lower legs and face of animals that usually look quite healthy. The second's most common disease in mainland caribou is Brucellosis, which is caused by the bacteria *Brucella suis* (Government of Nunavut n.d.) affecting leg joints and reproductive organs.

C457 “There are some caribou (Bluenose) we harvest that have brucellosis once in a while. This is some kind of bone disease with green slime on their joints. They say it is ok if you cook the meat well. But it all depends on how much of it is on the caribou. They look normal until you cut them open.” (Banci and Spicker 2024).

Other diseases and parasites affecting mainland caribou include tapeworms, lungworms, and sarcocystosis (Davison 2016). The tapeworms, *Taenia hydatigena*, *Echinococcus granulosus*, and *Taenia krabbei*, commonly occur in caribou in the NT. Tapeworm cysts are commonly found in liver, lungs, or muscles of infected animals, but can occur in other organs as well. Lung worm, including *Echinococcus granulosus dictyocaulus spp.* and *Protostrongylus*, are found in the lungs of caribou either as a cyst (larva) or adult worm. Sarcocystis is a small single-celled parasite that causes cysts in muscle tissue. The prevalence of these parasites in the Bluenose-East herd is unknown (Davison 2016).

### **4.4.4 Movements and Distribution**

#### **4.4.4.1 Overview**

The Bluenose-East caribou herd is a migratory herd, spending their winters below treeline in the taiga plains high Arctic subregion within the NT (Davison 2016). Spring migration occurs between April and late-May, whereby pregnant cows moving quickly and directly from their wintering areas below the treeline into the tundra in NU for calving. Calving typically occurs west and southwest of Kugluktuk, which includes an area east of Bluenose Lake around the Rae River and Richardson River (Davison 2016). Pregnant cows arrive on the calving grounds first in the spring, while non-breeding cows, bulls, and juveniles typically arrive later (Russell et al 1993 in Davison 2016). Caribou remain in this area throughout June (i.e., the calving and post-calving seasons).

During early summer (i.e., end of June until mid-July), some caribou will remain on the calving grounds whereas others move towards the coastline (Nagy et al. 2005). As summer progresses, the Bluenose-East herd starts to move southerly towards the northeast shoreline of Great Bear Lake (Nagy et al. 2005). Insect harassment is a major concern for caribou throughout the summer. Caribou will apply strategies such as aggregations to reduce the number of insects that may harass individual caribou, as well as finding remnant snow patches and waterbodies to temporarily inhabit, seeking relief from insect harassment (Toupin et al. 1996; Davison 2016; Joly et al. 2020).

During the fall, the Bluenose-East caribou herd continues its southerly movement and back into the treeline, occurring on lands east and south of Great Bear Lake (Nagy et al 2005). Caribou start to gather in large groups and the rutting season occurs.

In winter, the Bluenose-East herd primarily occur south and east of Great Bear Lake (Nagy et al. 2005, Adamczewski et al. 2016); however, some individuals spend the winter near the treeline in between Kugluktuk and Great Bear Lake. Males are typically more dispersed during the winter, travelling further south than females (Carruthers et al. 1986). Females with young occurred in forested areas that had high snow depths and a high density of small lakes (i.e.,  $\leq 1 \text{ km}^2$ ) whereas males occupied forested areas with shallower snow depths and fewer small lakes (Carruthers et al. 1986).

The Bluenose-East herd's distribution spans from the Arctic coastline along the Amundsen Gulf in the north to the north shores of Lac La Martre in the south (Nagy et al. 2005). During the winter, many caribou occur south of Great Bear Lake, reaching as far west as Déljñę and near the Mackenzie River to east of Wekweęti near the treeline; the herd range eastern boundary extends to the west shoreline of Takijuq Lake (see Figure 4.1). GPS collar data for the Bluenose-East caribou herd (1996 to 2025) (Government of Northwest Territories 2025b) confirms that most caribou remain east of Takijuq Lake and southwest of Contwoyto Lake, limiting interactions between the herd and the Project.

#### **4.4.5 Habitat Use and Diet**

The Bluenose-East herd primarily uses tundra habitats above the treeline during the calving, post-calving, and summer seasons (Nagy et al. 2005). In late-summer, the Bluenose-East herd migrates south below the tree line, inhabiting the taiga plains high subarctic ecoregion until the following spring migration. This ecoregion is characterized by continuous permafrost, fewer wetlands due to lower amounts of precipitation, and open, stunted forests mainly of white spruce (Ecosystem Classification Group 2009). Peatlands are extensive throughout this ecoregion.

The diet of the Bluenose-East herd varies with the seasons, as with other caribou species. In summer, caribou primarily consume leaves of willows, sedges, and other tundra plants, as well as flowering tundra plants and mushrooms (Webber et al. 2022). Lichens can comprise between 17-22% of a caribou's summer diet (Boertje 1984). Before winter arrives, they shift their diet to include dried sedges and small shrubs like blueberry. Caribou rely heavily on lichens during winter, especially in areas with deep or crusted snow (Webber et al. 2022). During winter, they need habitats with arboreal lichens and shallower snow to dig for ground lichens. While caribou primarily eat plant matter, they may occasionally consume meat or bone; they are herbivores, but their diet can be flexible depending on what is available in their environment (Webber et al. 2022).

## 4.5 Other Caribou Herds

Beverly/Ahiak caribou, which are considered as one herd by some biologists and two herds by others (e.g., GN), are mainland caribou that also occur in proximity to the Project. Individuals may occasionally venture into the RSA in some years (detailed below), potentially interacting for brief periods of time with the Project. Peary caribou are an island caribou that are not present within the RSA; however, marine shipping routes pass through areas known to be used by Peary caribou. Further details on the Beverly/Ahiak herd and Peary caribou are provided below.

### 4.5.1 Beverly/Ahiak Caribou (Mainland Caribou)

Kitikmiut does not separate Bathurst, Beverly, or Ahiak caribou, although they recognized that some caribou calved at Bathurst Inlet and other caribou (Beverly/Ahiak) calved in the Perry River and Ellice River areas. The Kitikmiut refer to Beverly/Ahiak caribou as “mainland caribou” and note the overlap between these caribou and Bathurst caribou is extensive. They over-wintered together and, as a result, migrated together. Victoria Island and mainland caribou frequently mix in the fall, winter, and spring. Beverly/Ahiak caribou calving range overlaps with the Bathurst herd, and the winter ranges of Beverly/Ahiak, Bathurst, and Victoria Island herds also overlap (NTKP 2018, Banci and Spicker 2024).

#### 4.5.1.1 Herd Classification

The GN and GNWT consider Beverly caribou and Ahiak caribou to form separate herds. However, caribou biologists have argued that the Beverly herd’s dramatic decline from 1994 to 2011 led to the abandonment of traditional calving grounds and a switch to use of the Ahiak herd’s calving grounds, effectively combining the herds into the Beverly/Ahiak herd (Adamczewski et al. 2015). For management purposes, the Beverly and Qamanirjuaq Caribou Management Board consolidate Beverly/Ahiak caribou given their degree of overlap and shared range use. For the purposes of this Baseline Report, Beverly/Ahiak caribou are considered one herd from 2011-onwards due to their ecological overlap.

#### 4.5.1.2 Populations

The Beverly caribou herd has long been associated with the Central Arctic, calving in traditional areas within the Thelon Game Sanctuary, and wintering as far south as northern Saskatchewan (Adamczewski et al. 2015; see Figure 4.1). The herd was estimated to number  $276,000 \pm 106,600$  caribou in 1994 (Campbell et al. 2012). Subsequent monitoring by surveys and using collars remained limited until the late 2000s. At that time, observations of calving on the traditional Beverly calving range dwindled, and by 2009 a concentrated area of breeding cows and calves could no longer be defined. A few collared cows in the late 2000s switched from the traditional Beverly calving range to the Ahiak calving range along the Queen Maud Gulf, about 250 km north of the traditional Beverly calving range. A survey completed in 2011 estimated the Beverly population to be  $124,189 \pm 13,996$  caribou (Campbell et al. 2012). Given available data, Adamczewski et al. (2015) suggested that a true numerical decline in herd size occurred, driven by low cow survival and poor calf productivity, which led the few remaining Beverly cows to switch to the neighbouring Ahiak calving range. An alternative explanation is that a broader range shift was the primary factor accounting for the decline on the traditional Beverly calving range from 1994 to 2009 (Nagy et al. 2011; Campbell et al. 2012). Debate about herd classification aside, caribou from the

“original” Beverly herd have never been recorded within or near the Project area (Adamczewski et al. 2015).

The Ahiak herd (initially known as the Queen Maud Gulf herd) is one of the most poorly monitored of the large migratory mainland caribou herds. The herd was initially estimated at roughly 200,000 animals in 1996 (Gunn et al. 2000). Surveys completed in June 2011 had an abundance estimate of  $71,340 \pm 3,882$  caribou (Campbell et al. 2012). No additional surveys of the Ahiak caribou herd have occurred since 2011.

The Beverly/Ahiak abundance estimates for 2018 suggested a total of  $103,372 \pm 5,109$  caribou based on a whole herd estimate of adult females (Campbell et al. 2019). In 2023, the Beverly/Ahiak herd population estimate was found to increase to 152,000 animals (Beverly & Qamanirjuaq Caribou Management Board 2025).

#### **4.5.1.3 Distribution**

GPS collar data of Beverly/Ahiak caribou (2008 to 2025) provided by the GN (Government of Nunavut 2025) suggests no interaction between the herd and the Project; caribou remain east and south of the Project alignment. Whereas GPS collar data of Beverly caribou (2006 to 2024) provided by the GNWT (Government of Northwest Territories 2024c) suggests their range extends west of the Project until the western shore of Takijuj Lake and as far north as the Hood River. The defined annual range for the Beverly/Ahiak herd partially overlaps with the RSA (see Figure 4.1). Post-2011, calving occurs within the Queen Maud Gulf area, and wintering varies from tundra habitats just north of tree line, to forested and tree line transition areas near the east end of Great Slave Lake (see Figure 4.1). More recent survey observations and collared cow telemetry locations have also documented a general shift in the calving distribution east from the Perry River area, towards the Adelaide Peninsula’s western and southern extents (Campbell et al. 2025).

#### **4.5.2 Peary Caribou**

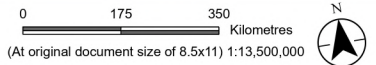
Peary caribou (*Rangifer tarandus pearyi*) is a distinct subspecies that is largely restricted to the high and mid-Arctic islands in NU and NT (see Figure 4.42). Peary caribou are characterized by a small body, very light white coat, and short legs (Species at Risk Committee 2012).

Although Peary caribou are not present within the RSA, the proposed Project will likely trigger an increase in the use of shipping routes from the port site at Grays Bay in the Coronation Gulf, potentially passing by some of the Arctic islands inhabited by Peary caribou. Within the likely marine shipping routes from Grays Bay, Peary caribou are known to make extensive movements between Prince of Wales and Somerset islands (Miller et al. 2005). Peary caribou move between islands primarily during winter, when the narrow straits are frozen; however, they may swim between some islands during summer (Species at Risk Committee 2012). Sea ice is a corridor for Peary caribou, enabling inter-island connectivity and genetic mixing. Reducing extent and duration of sea-ice cover may result in consequences for population viability of these island-dwelling caribou (Jenkins et al. 2016).

Path: L:\PROJECTS\2024\W\H\24\Y0376\_GBRP\Wildlife\Baseline\Updates\_2025\_V3\_aprx\24\Y0376\_WildBaseline\_Fig4-42\_PearyCaribouRange\_20260221; Revised: 2026-02-23 By: OliviaLeblanc



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



**Project Location** West Kitikmeot Region  
Nunavut

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

Prepared by OliviaLeblanc on 2026-02-23

**Figure No.**  
**4.42**

**Title**  
**Range of Peary Caribou in Nunavut and Northwest Territories**

**Notes**

1. Coordinate System:  
Name: NAD 1983 CSRS Northwest Territories Lambert
2. Data Sources: Government of Canada, Stantec, Natural Resources Canada, Government of Canada (<https://www.nr.can.gc.ca/earth-sciences/geography/download-geographical-names-data/9245>)
- Publication Date: Unknown
- Downloaded: September 7, 2021
- Last Checked: September 7, 2021

Disclaimer: EDI Environmental Dynamics Inc. has made every effort to verify this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

## 4.6 Muskox

Muskox is an important species to Kitikmeot Inuit for meat, clothing, and other uses (Banci and Spicker 2024). Prior to the arrival of Europeans, muskox was one important element in Inuit diet that by necessity was varied, in space and in time. Muskoxen were harvested when caribou and seals were not available. Inuit hunted them during all seasons except summer. Nunamiut (i.e., Inuit that primarily resided inland rather than in coastal areas) hunted muskox during the winter, as they were a source of fresh meat when caribou were wintering in the boreal forest and not accessible (Banci and Spicker 2024). Muskox provided a wealth of materials, including the hides, horns, and under wool (*qiviut*). Muskox is an important source of local meat for commercial export and are increasingly used for guided sport hunts as well as a resource for tourism and wildlife viewing.

Muskox populations range over most of the Arctic islands and much of the mainland tundra of NU and NT (Government of Nunavut 2000; Gunn and Adamczewski 2003; Leclerc 2015). After receiving protection from hunting in the early 1900s and the implementation of conservative harvest management since the 1960s, muskox has expanded and recolonized their historic range, recovering from near extinction in the late 19th and early 20th centuries caused primarily by unregulated commercial hunting (Barr 1991; Fournier and Gunn 1998; Leclerc 2015).

Inuit Knowledge identifies historically (i.e., pre-1974), muskox primarily occurred along the west shoreline of Bathurst Inlet, along the Burnside River, near Napaktolik Lake, around the Tree River, and near the coastline on either side of Grays Bay (see Figure 4.43). Since 1974, Inuit Knowledge has identified muskox occurring near the Hood River near the proposed Project, as well as on either side of Contwoyto Lake.

Muskox harvest management zones within NU were revised in 2013. At present, there are three muskox harvest management zones in the West Kitikmeot. The Project area sits within the Kugluktuk sub-management unit of MX/11 (central mainland), with the Bathurst Inlet sub-management unit to the east of the RSA (Leclerc 2015; Leclerc et al. 2024).

### 4.6.1 Population

According to Inuit Knowledge there were times when muskox numbers were limited; however, today the muskox population within the Kitikmeot generally is large and harvesters are speaking of more muskoxen and fewer caribou (Klengenberg in Golder Associates Ltd. 2010).

When the Kitikmiut elders were children, during the first half of the 1900s, muskoxen were scarce. The elders remembered stories told by their parents and grandparents of times when muskoxen had been abundant. The widespread decline of muskox populations throughout the 1800s to supply whalers and the fur trade inflicted hardship on Inuit. A regulation implemented in 1917 prohibited hunting of muskoxen by European and Inuit alike (Abrahamson et al. 1964). This regulation did not deter Inuit from hunting the animals if they needed food, but it ended up causing conflict among Inuit and the authorities. In recent times populations have recovered and muskoxen have recolonized areas that have been vacant for many years (Banci and Spicker 2024).

Figure 4.43 Kitikmiut Knowledge of Omingmak (Muskox) in the Kogloктоаkyok (Grays Bay) Project Area. Figure adopted from Banci and Spicker (2024)

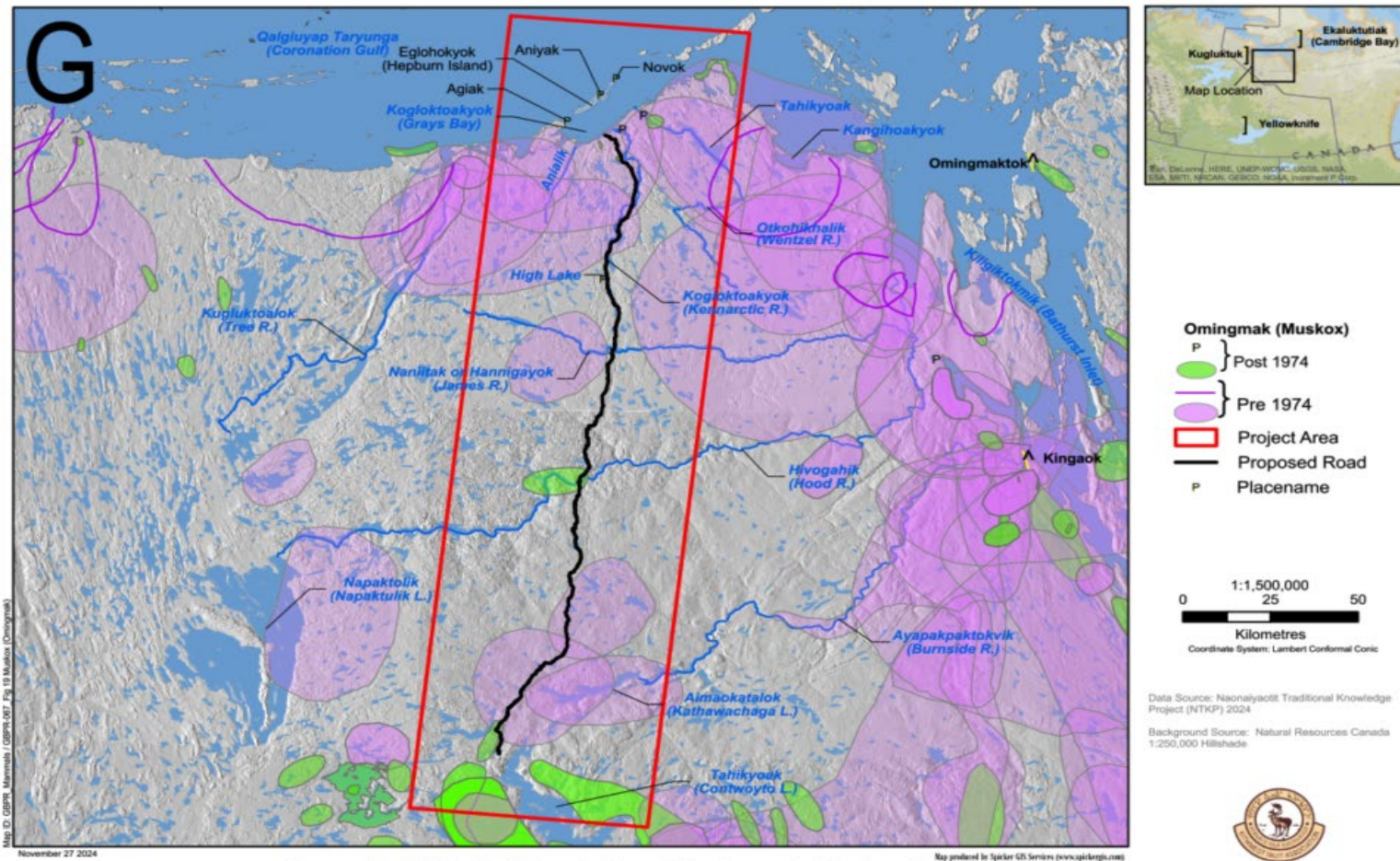


Figure 19: Kitikmiut Knowledge of Omingmak (Muskox) in the Kogloктоаkyok (Grays Bay) Project Area

*“Musk-oxen were common and occasionally hunted, especially when starvation threatened” [Period II (1916–1955) in the Tree River Area] (NTKP 2018).*

*“Musk-oxen were taken at various places throughout the area [Period II (1916–1955) in the Contwoyto Lake Area], apparently most frequently northeast of Contwoyto Lake” (NTKP 2018).*

*“Musk-oxen were plentiful in the area [Period II (1920–1955) in the Bathurst Inlet – Old Area], but they were hunted only in necessity” (NTKP 2018).*

*“... hunters report an increase in the number of musk-oxen in the area” [Period III (1955–1974) in the Bathurst Inlet – Old Area] (NTKP 2018).*

In recent years a decline has occurred on Victoria Island (Thorpe Consulting Services Ltd. 2014a, Leclerc 2015). The Inuinnaqtun place name of Bay Chimo, located east of the RSA, is *Omingmaktuk* meaning “place of muskox,” suggesting previous times when the animal was plentiful in the area. However, the muskox population was sensitive to weather extremes:

*“One summer the ice did not melt on the sea. A blizzard struck. Cold rain was followed by sleet; then heavy frost mantled the land. Ice, thick and slippery, encrusted everything — rocks, moss, and weeds. Muskox drifted side by side with the caribou towards the sea. The terrible season pushed them clear off the land. They were not strong enough to break the ice and fill their bellies with grass. Hunger killed them right and left, and many of our people also died during that long winter. Since then we have often starved” (de Coccola and King 1954).*

A compilation of muskox surveys within NU and NT tallied almost 140,000 muskoxen in 1997, approximately 20,000 of which occurred in mainland populations (Fournier and Gunn 1998). Surveys of the Project area for muskoxen have occurred sporadically in the past, but these have often used unstratified and non-systematic survey designs (Gunn 1990). Many of the surveys located “west of” or “around” Bathurst Inlet may have covered only a portion of the Project area.

Estimates of the population “west of Bathurst Inlet” were 450 in 1958 and 150 in 1970 (Barr 1991), but it is unclear what areas these estimates refer to. Gunn (1990) estimated 3,400 ( $\pm 460$  SE) muskoxen during a 1986 stratified survey between Contwoyto Lake and southwestern Bathurst Inlet. The proportion of calves to total muskoxen during the 1986 survey was 12%. This is considered low but is consistent with other counts among northern mainland populations where pregnancy rates and/or calf survival generally appear to be low (10 to 15%; Gunn and Case 1984, Gunn and Fournier 2000a). The northern half of the West Kitikmeot (formerly MX/12) survey area was estimated to contain 1,400 muskoxen in 1991, while the Bathurst Inlet area (formerly MX/14) was estimated at 2,192 ( $\pm 494$  SE) muskoxen in 1986 (Fournier and Gunn 1998).

A comprehensive muskox survey of an area stretching from Kugluktuk to well south of Bathurst Inlet and covering most of the western portion of zone MX/11 (formerly zone MX/19 and the western section of MX/14) was completed during August 2005 (Dumond 2007b). This survey estimated 2,141 ( $\pm 586$  SE,  $n = 46$ ) muskoxen in the former MX/19 zone—an increase from the 1991 survey; however, the eastern section of the survey area (western MX/14 zone; Bathurst Inlet area) estimated only 434 ( $\pm 168$  SE,  $n = 19$ ) muskoxen; a drastic decrease from the 1986 survey estimate (Dumond 2007b).

In 2005, calf numbers appeared to be low, comprising only 6.1% of muskoxen in the western portion of MX/11 (former MX/19 zone; Dumond 2007b). Data collected within the High Lake area during this 2005 survey was provided to the Project. Only one muskox was observed on the five transects flown within the High Lake area, resulting in low estimated density (0.14 muskoxen/100 km<sup>2</sup>) and population size (five in total) for the block containing the High Lake area. A systematic strip transect of MX/11 (subdivision Kugluktuk) was completed in September 2013 by the GN-DOE, covering a total transect area of 7,018 km<sup>2</sup>, which included a portion of the northern RSA. Calves comprised 10% of the population (Leclerc 2015). The estimated population size was 6,746 ( $\pm 904$  SE,  $n = 1,331$ ), and density was estimated at 19.0 muskoxen/100 km<sup>2</sup> (Leclerc 2015). This increase is consistent with the observed increase in muskox population in the area since the early 1990s (Leclerc 2015).

In March 2022 the GN-DOE completed aerial surveys for muskoxen in MX/11. The estimated population size was 10,246 (SE  $\pm 2,309.6$ ) (Leclerc et al. 2024). The strata with the highest density of muskoxen was Strata 1 (located west of the Project) with 24 muskoxen/100 km<sup>2</sup> while the Project area (Strata 3) had next highest density estimate of 9 muskoxen/100 km<sup>2</sup> (Leclerc et al. 2024). The estimates from the 2022 survey cannot be compared to the 2013 survey as different survey methodologies were used.

Ungulate aerial surveys completed within the RSA between 2004 and 2013 generally found lower muskox densities compared to the GN-DOE 2022 survey results (see Table 4.12). Most surveys occurred between March and June in a given year; however, some years had surveys occur between August and October (see Table 4.12). One survey completed in September 2010 found a density of 40 muskoxen/100 km<sup>2</sup>; however, the total area surveyed was relatively small which influences the density estimate. Overall muskox densities ranged between 0–8.8 muskoxen/100 km<sup>2</sup> depending on the survey period. The number of calves observed were low in all years, with no calves observed during many survey periods, and some years with no calves observed from multiple surveys. Muskox calving typically occurs between mid-April and early June; however, some newborn calves can arrive in late-June and early-July (Gunn and Adamczewski 2003). Therefore, some of the ungulate aerial surveys occurred before muskox calving occurred.

Grays Bay Road and Port Project  
Terrestrial Wildlife Baseline Report

Section 4: Ungulates  
March 2026

**Table 4.12 Muskox Observations During Baseline Studies from 2004–2013 within the RSA**

Year	Survey date	Transects surveyed	Survey Area (km <sup>2</sup> )	# Muskoxen on transect	Calves	Percent calves	Density (per 100 km <sup>2</sup> )	# Muskoxen off transect	Calves	Percent calves
<b>2004</b>	22–23 May	N/A	460	2	0	0.0	0.4	79	10	12.7
	10–11 Jun	N/A	460	2	0	0.0	0.4	38	4	10.5
	19–21 Aug	N/A	2147	137	13	9.5	6.4	71	4	5.6
	15–18 Oct	N/A	2169	26	2	7.7	1.2	33	0	0.0
<b>2005</b>	10–12 Mar	1–19	1099	17	0	0.0	1.5	20	0	0.0
	10–11 Apr	1–19	1099	0	0	0.0	0.0	7	0	0.0
	22–23 May	1–20	1140	8	0	0.0	0.7	0	0	0.0
	10–11 Jun	1–20	1140	8	0	0.0	0.7	27	0	0.0
	29-Jun	11–20	466	0	0	0.0	0.0	0	0	0.0
<b>2006</b>	21–23 Mar	1–20	1140	34	1	2.9	3.0	73	3	4.1
	19–22 Apr	1–20	1140	69	0	0.0	6.1	0	0	0.0
	24–25 May	1–20	1140	97	14	14.4	8.5	2	0	0.0
	10–11 Jun	1–20	1140	21	0	0.0	1.8	58	0	0.0
	26–27 Jun	1–20	1140	0	0	0.0	0.0	28	5	17.9
<b>2008</b>	26–30 Mar	4–29	1355	13	0	0.0	1.0	0	0	0.0
	20–22 Apr	1–13	846	0	0	0.0	0.0	0	0	0.0
	20–21 May	1–35	1597	2	0	0.0	0.1	0	0	0.0
	12–14 Jun	1–35	1597	8	0	0.0	0.5	11	1	9.1
	3–5 Jul	1–35	1597	46	0	0.0	2.9	41	0	0.0
<b>2010</b>	18–19 Sep	31–35	58	23	0	0.0	40.0	0	0	0.0

**Grays Bay Road and Port Project  
Terrestrial Wildlife Baseline Report**

Section 4: Ungulates  
March 2026

Year	Survey date	Transects surveyed	Survey Area (km <sup>2</sup> )	# Muskoxen on transect	Calves	Percent calves	Density (per 100 km <sup>2</sup> )	# Muskoxen off transect	Calves	Percent calves
<b>2012</b>	24–26 Mar	2–35	1544	5	0	0.0	0.3	0	0	0.0
	25–27 Apr	1–35	1597	51	0	0.0	3.2	0	0	0.0
	20–23 May	1–35	1597	27	0	0.0	1.7	0	0	0.0
	9–12 Jun	2–35	1544	109	0	0.0	7.1	41	0	0.0
	8–11 Jul	2–35	1544	89	0	0.0	5.8	1	0	0.0
	16–19 Aug	1–35	1597	141	0	0.0	8.8	1	0	0.0
	13–15 Sep	2–35	1544	93	0	0.0	6.0	1	0	0.0
<b>2013</b>	7–8 Feb	1–20	1140	58	0	0.0	5.1	0	0	0.0
	14–15 Apr	1–20	1140	21	0	0.0	1.8	75	0	0.0
	17–23 May	1–35	1597	0	0	0.0	0.0	24	5	20.8
	6–9 Jun	14–35	751	27	5	18.5	3.6	0	0	0.0
	1–3 Aug	14–35	751	28	0	0.0	3.7	32	3	9.4
	12–15 Sep	14–35	751	31	0	0.0	4.1	0	0	0.0

## 4.6.2 Harvest and Mortality

Muskoxen have long been harvested in the region, with accounts of muskoxen harvest in the Tree River, Contwoyto Lake, and Itchen Lake (*Tahikaffaloknahik*) areas dating back to the 19th century (Freeman 1976). The first muskox management unit around Kugluktuk, MX/19, was only established in the 1990s, and had an original quota of 20 muskoxen (Dumond 2006). Increases in muskox sightings allowed an increase in TAH to 75 muskoxen following results of the 2005 survey (Dumond 2007b), and this quota was maintained until the 2013 GN-DOE survey. Records from 2005 showed a total of 67 muskoxen recorded as harvested near Kugluktuk (MX/11 management unit; (Leclerc 2025a).

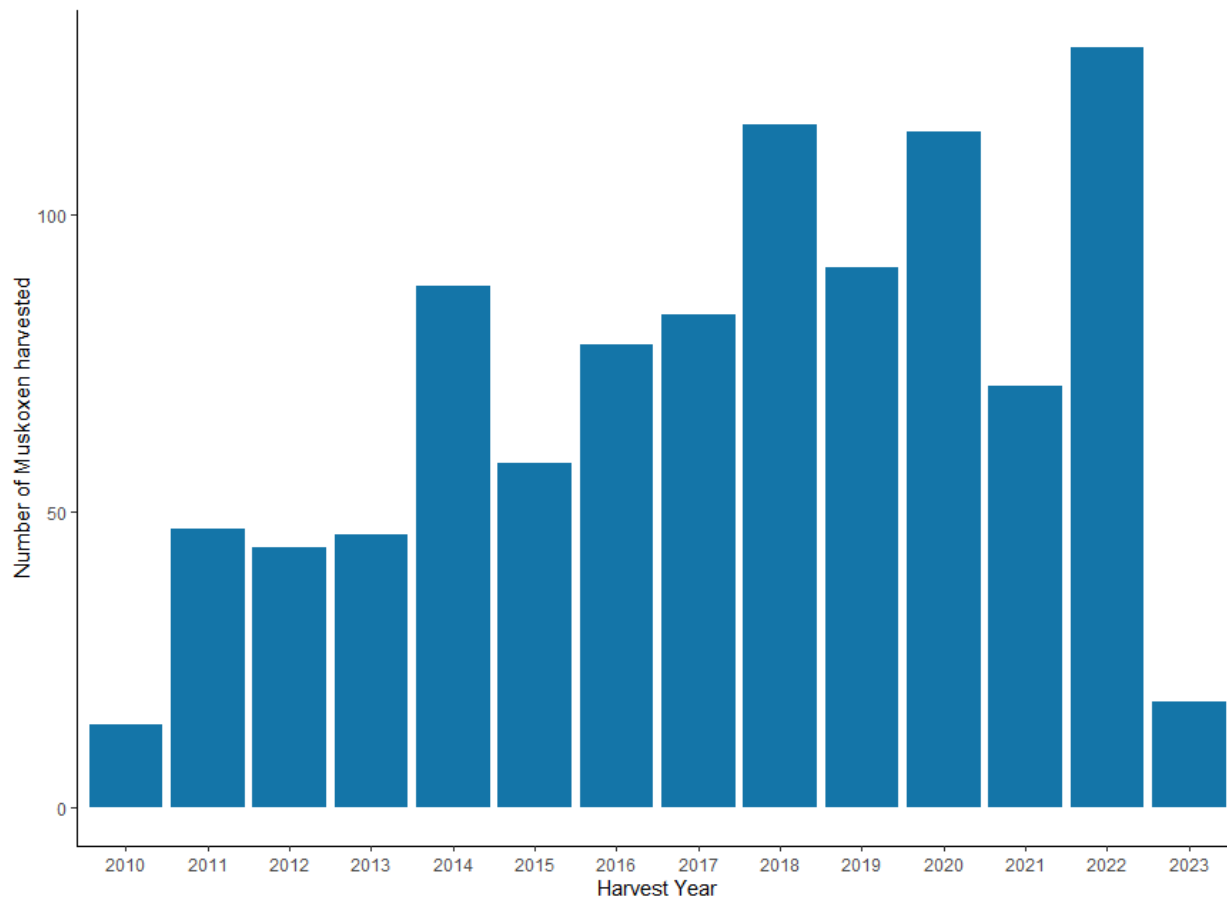
Aerial surveys completed in 2013 for the western subdivision of MX-11 in the West Kitikmeot region. The population estimate for the area surveys was  $6,746 \pm 904.25$  (SE). Previous survey results for the eastern half of MX-11 estimated 750 muskoxen for a total population estimate in MX-11 of 7,500 muskoxen (Leclerc 2015). This increased population estimate resulted in the TAH being increased to 225 muskoxen, which constitutes a harvest rate of 3% (Leclerc 2015). In 2023, TAH in MX/11 was increased from 225 to 350 muskoxen based on an estimated population increase to 10,246 muskoxen in 2022; this maintains the harvest rate of 3% of the population (Nunavut Wildlife Management Board 2023). None of the muskoxen spatially documented as harvested by communities in the West Kitikmeot occurred within 100 km of the RSA (Priest and Usher 2004). The number of muskoxen harvested has varied amongst years, and the TAH has never been filled for a given year since 2010 (Leclerc 2025c; Leclerc et al. 2024; see Figure 4.44).

Records from 2010 to 2023 showed that 995 muskoxen were recorded as harvested (Leclerc 2025a, b). The year with the highest number of muskoxen harvested was 2022 with a total of 128 individuals, followed by 2018 with 115 muskoxen, 2020 with 114 muskoxen, and 2014 with 88 individuals harvested (see Figure 4.44). The years with the fewest numbers of harvested muskoxen were 2023 with 18 muskoxen and 2010 with only 14 muskoxen recorded as harvested (see Figure 4.44).

A total of nine wolves and four grizzly bears (two adults and two cubs) were observed in MX/11 during the 2013 survey, revealing relatively high predator sightings of 20 wolves/100 hours and 13 grizzly bears/100 hours for the entire MX/11 unit (Leclerc 2015). During 2022 surveys, there were 11 observations of predators including 9 wolves, and two wolverines; no grizzly bears were observed as the surveys took place while grizzly bears would be hibernating (Leclerc et al. 2024). Wolves and grizzly bear predation on muskox is well-observed and documented in the area (NTKP 2018; Allen Kapolak (Kingauk), in Golder Associates Ltd. 2003; Thorpe Consulting Services Ltd. 2014b).

Several diseases and parasites affect muskoxen in the region. Bacterial infections are present but are thought to be rare in some muskox populations (Gunn and Adamczewski 2003), and may be associated with recent widespread muskox mortalities in the Canadian Arctic (Kutz et al. 2015). Several internal parasites have been confirmed including enteric and tissue nematodes (13 species), cestodes (i.e., tapeworms; four species), trematodes (i.e., flatworms; one species), gastrointestinal and tissue protozoa (i.e., single-celled organisms; 12 species), and arthropod ectoparasites (one species; Kutz et al. 2012). The life cycle of some of these parasites has been accelerated due to changes in the Arctic climate, potentially augmenting their effects on populations (Kutz et al. 2012).

**Figure 4.44** Total number of muskoxen recorded as harvested in the Kitikmeot region between the year 2010 and 2023.



Note: Data summarized for 2010 and 2023 are partial datasets for each year.

### 4.6.3 Movements and Distribution

Muskox distribution changes regularly and that is why they can be seen one year and not the next:

*C562 “The muskox move slowly and they do not like to be by the ocean. They like rougher areas than the caribou when they can give birth to their young. Each year you will see them in a different place – they move slowly. You will find them all the way to Tahikyoak [Contwoyto Lake] from the coast. ... They have their young away from rivers and wolves (Banci and Spicker 2024).*

*C562 “Muskox move. You hardly see them on islands, they stay away from the ocean. There are lots of muskox all the way down to Contwoyto Lake from the coast. Each year is different, they move, they shift slowly. They like rougher areas than caribou, that is where they make babies. (Despite this description, he mapped a small area with muskox south Kogloktokyoak) (NTKP 2018).*

*C427 “MuskoX calve where it is mostly flat, less rock, near mountains and away from rivers and wolves. He mapped a calving area 30 km south of the mouth of the Kugluktoalok” (NTKP 2018).*

*C110 “Most the time you find muskoX here, this whole area (all of Kent Peninsula). They are all over, but sometimes they are hard to see at different times of the year...” (NTKP 2018).*

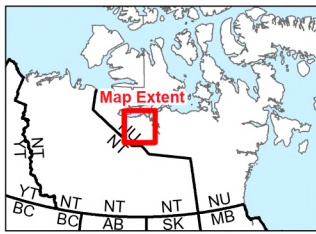
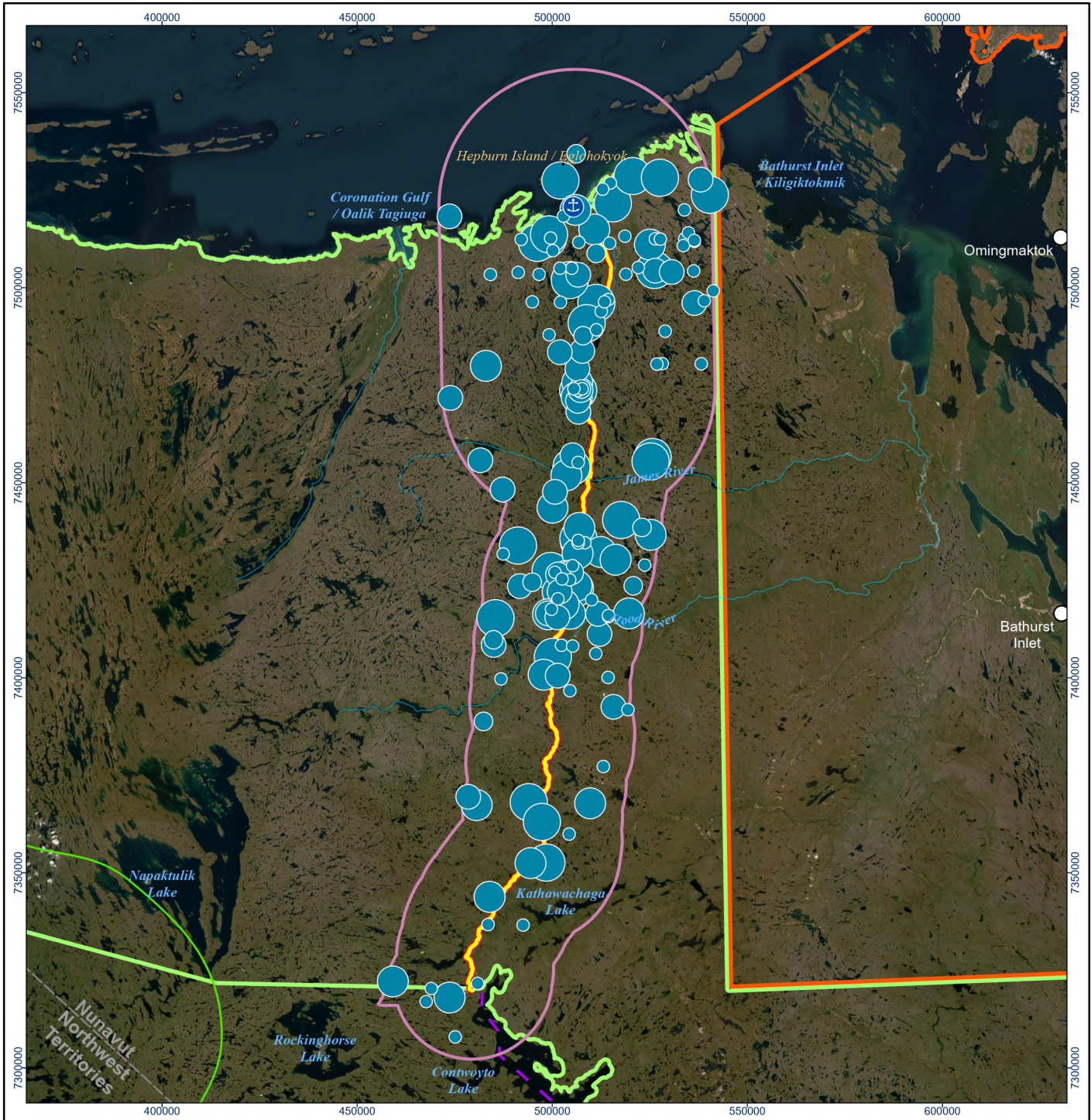
In some areas, muskoxen exhibit migrations between seasonal habitats. West of Kugluktuk, the mean maximum straight-line distance between muskoxen summer and winter ranges was 75 to 85 km, with a maximum straight-line distance of 138 km between seasonal ranges (Gunn and Fournier 2000a).

During the 2005 GN distribution and abundance survey completed between Kugluktuk and Bathurst Inlet, muskoxen had a very uneven distribution, with 81% of the populations within the northwestern corner of the study area closer to Kugluktuk (Dumond 2007b).

The GN-DOE completed surveys for muskoxen within MX/11 between March 15–27, 2022 to determine species abundance to inform TAH quotas. These surveys found muskoxen had an uneven distribution within MX/11. The area east of the Coppermine River and north of Napaktulik Lake (northwest extent of survey area) has consistently been an area of high density (Leclerc et al. 2024). There were also large numbers of muskoxen identified near Baillie Bay which is located on the west side of Bathurst Inlet (Leclerc et al. 2024). Some muskoxen were identified within the RSA with one large group (between 51-75 individuals); otherwise it was small groups between 1–26 individuals (Leclerc et al. 2024).

Group size tends to be largest during winter (Heard and Williams 1992), when distribution is smallest, and may average from 12 to 28 animals in mainland populations (excluding single bulls; Gunn and Fournier 2000a). Group size observed during Project aerial surveys and incidental observations ranged from single bulls to 81 animals and averaged 20 animals (excluding single bulls). With the exception of two observations in October 2004, observations of groups with 20 or more animals were recorded between February and September; however, surveys generally did not cover the months of October to January when groups are expected to be the largest (Heard and Williams 1992).

Aerial surveys completed in the RSA between 2004 and 2013 showed muskoxen distributed throughout the surveyed area (see Figure 4.45). Preliminary mapping suggested low abundance of muskoxen within the RSA. The bulk of muskoxen observed during the 2005 survey were located well west of the RSA (north and northwest of Napaktulik Lake) and west and southwest of Bathurst Inlet (Dumond 2007b). Surveys completed in 2022 in MX/11 included the RSA. The Project area (Strata 3) had a density estimate of 9 muskoxen/100 km<sup>2</sup> with more muskoxen detected in the northern portion of the RSA (Leclerc et al. 2024).



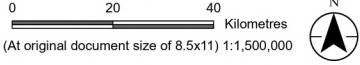
- Grays Bay Port
- Grays Bay Road
- Tibbitt to Contwoyto Winter Road
- Territorial Boundary
- Treeline
- Watercourse
- Wildlife Regional Study Area (RSA)

**Muskox Management Units**

- MX/14
- MX/19

**Muskoxen Group Sizes**

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



**Project Location** West Kitikmeot Region  
Nunavut

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

Prepared by OliviaLeblanc on 2026-02-23

24Y0376

**Figure No.**  
**4.45**

**Title**  
**Incidental and Aerial Survey Observations of Muskoxen within the Grays Bay Road and Port Project RSA, 2004–2013**

Path: L:\PROJECTS\2024\W14\Y0376\_GBRPWildlifeBaselineUpdates\_2025.aprx\24Y0376\_WildBaseline\_Fig4-45\_Muskox\_Observations\_20260222; Revised: 2026-02-23 By: OliviaLeblanc

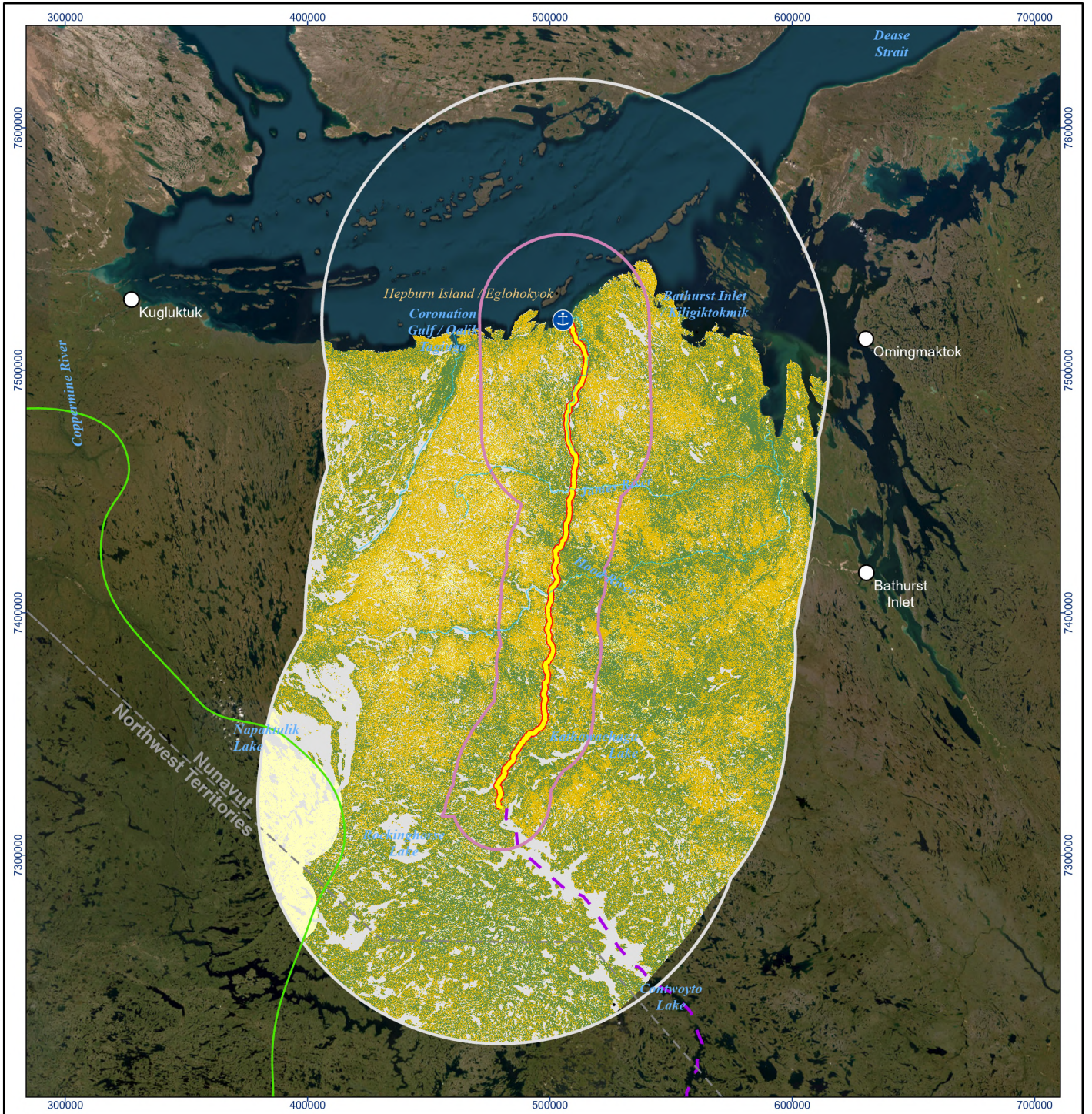
**Notes**  
 1. Coordinate System: WGS 1984 UTM Zone 12N  
 2. Data Sources: Government of Canada, Stantec, Natural Resources Canada, Government of Canada (<https://www.nrcan.gc.ca/earth-sciences/geography/download-geographical-names-data/9245>)  
 Publication Date: Unknown  
 Downloaded: September 7,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

Disclaimer: EDI Environmental Dynamics Inc. has made every effort to verify this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

#### **4.6.4 Habitat Use and Diet**

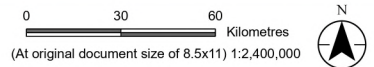
Muskoxen are predominantly grazers adapted to foraging on graminoids but will also browse on shrubs and forage selectively for forbs and seeds. In most areas, the diet is dominated by sedges, grasses and willows, and the proportions of each likely reflect local availability and plant phenology (Ferguson 1991; Gunn and Sutherland 1997, Larter and Nagy 2004). In general, summer habitats consist of wetter low-lying areas; including river valleys, lakeshores, seepage meadows, or coastal plains (Klein et al. 1993; Danks and Klein 2002; Gunn and Adamczewski 2003). Muskoxen may remain in lowland habitats through the early winter, but by late winter, they often shift to windblown hilltops, slopes, and plateaus where snow has been blown away; winter snow depths of 20 to 50 centimetre (cm) may limit the ability of muskoxen to crater for food (Klein et al. 1993; Gunn and Adamczewski 2003). Inuit hunters in the Bathurst Inlet region report that muskoxen often concentrate in lowland habitats along drainages and on the coast in June and July to feed on greening vegetation, but return to the uplands as the willow leaves turn yellow (J. Tikhak in Gunn 1990). Inuit Knowledge holders also note important muskox habitat to include eskers and islands (Golder Associates Ltd. 2003).

Habitat suitability modelling for muskoxen was completed for two seasons: summer (growing season) and late winter (see Figure 4.46 and Figure 4.47). During the summer season, high-quality habitats generally occur in wet to dry graminoid tundra and are most concentrated along the major drainages and other low-lying areas. Modelled high-quality habitat was more common in the Ulu to Grays Bay area, and broadly through areas west of Contwoyto Lake. Approximately 29% (18,761 km<sup>2</sup>) of the area modelled was considered high-quality summer muskox habitat, 31% (22,854 km<sup>2</sup>) medium-quality habitat, 5% (3,659 km<sup>2</sup>) low-quality habitat, and 14% (10,314 km<sup>2</sup>) nil-quality habitat. During the late winter, high-quality habitats are more restricted and are found in drier graminoid tundra. In late winter, 20% (15,129 km<sup>2</sup>) of the area modelled was considered high-quality muskox habitat, 33% (24,594 km<sup>2</sup>) medium-quality habitat, 7% (5,551 km<sup>2</sup>) low-quality habitat, and 14% (10,314 km<sup>2</sup>) nil-quality habitat.



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

- Muskox Regional Assessment Area
- Muskox Summer Habitat Suitability Classes**
- Nil
  - Low Suitability
  - Moderate Suitability
  - High Suitability

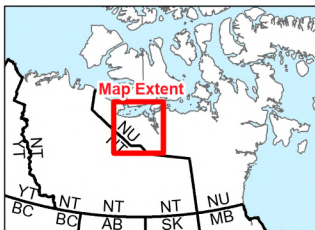
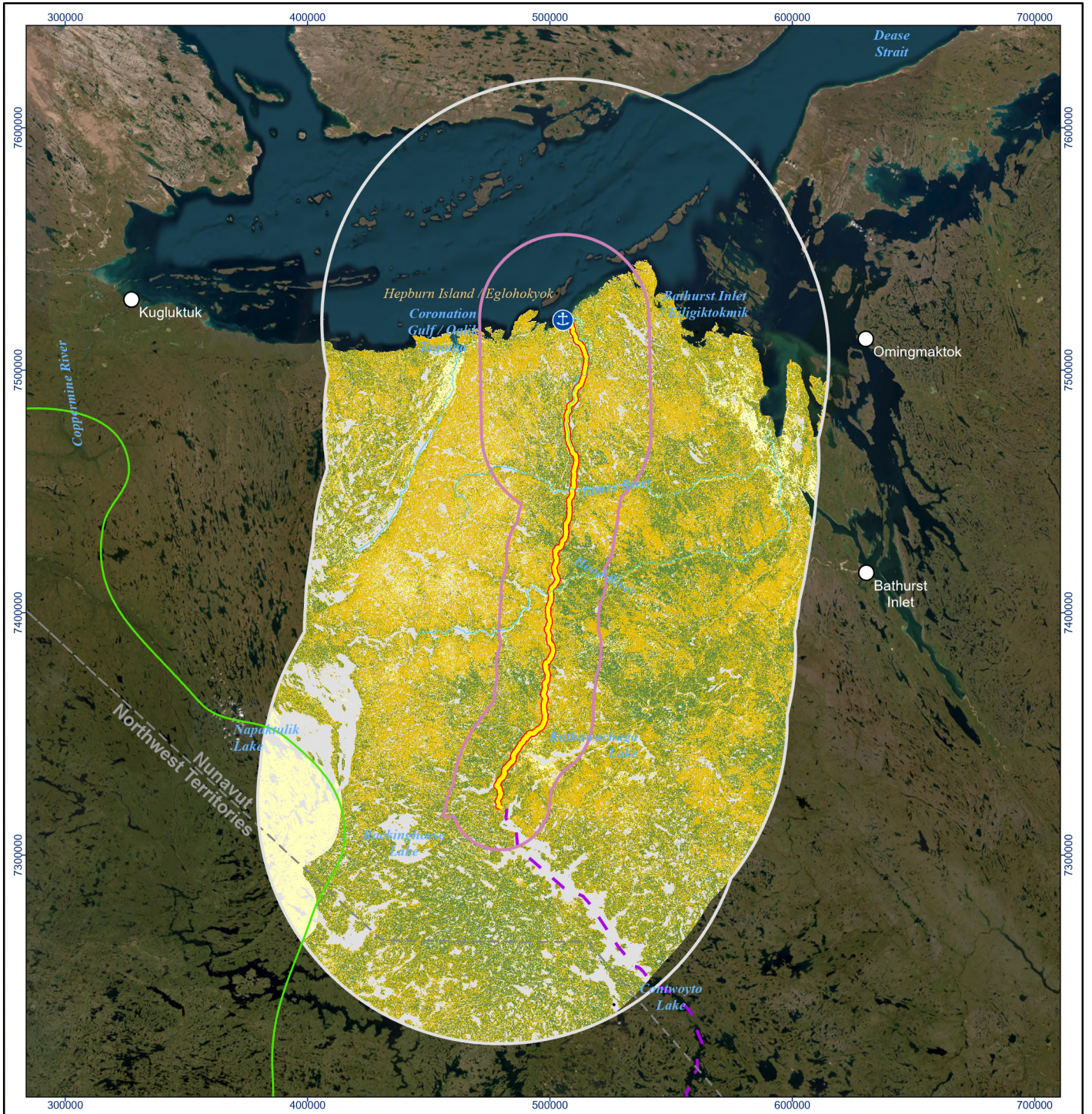


Project Location: West Kitikmeot Region, Nunavut  
Prepared by: Olivia Leblanc on 2026-02-23

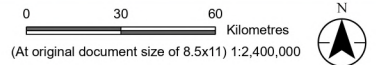
Client/Project: 24Y0376  
West Kitikmeot Resources Corp (WKR)  
Grays Bay Road and Port

Figure No.  
**4.46**

**Muskox Summer (Growing Season)  
Habitat Suitability Map**



- Grays Bay Port
  - Grays Bay Road
  - Tibbitt to Contwoyto Winter Road
  - Territorial Boundary
  - Treeline
  - Watercourse
  - Wildlife Regional Study Area (RSA)
  - Muskox Regional Assessment Area
- Muskox Winter Habitat Suitability Classes**
- Nil
  - Low Suitability
  - Moderate Suitability
  - High Suitability



Project Location: West Kitikmeot Region, Nunavut. Prepared by Olivia Leblanc on 2026-02-23

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

Figure No. **4.47**  
 Title: **Muskox Late Winter Habitat Suitability Map**

**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

Path: L:\PROJECTS\2024\W1H24\Y0376\_GBRPW\Wildlife\BaselineUpdates\_2025.aprx\24Y0376\_WildBaseline\_Fig4-47\_Muskox\_Winter\_HabSuit\_2026-02-23 By: OliviaLeblanc

Disclaimer: EDI Environmental Dynamics Inc. has made every effort to verify this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

## 4.7 Moose

Moose located east of the Mackenzie Mountains belong to the subspecies *Alces alces andersoni* (Hundertmark and Bowyer 2004). The general status for moose within NU is Unrankable (Canadian Endangered Species Conservation Council 2022). Within NU, moose only exist within the Kivalliq Region near the treeline and within the Kitikmeot Region within treeline and along coastal tundra areas (Wildlife Research Section 2007). Although moose are infrequently harvested in NU, moose harvest is often opportunistic and rarely a targeted species. Due to their limited abundance and distribution in NU, moose are not actively managed in the territory.

Inuit Knowledge shows that moose occur near the coastline of the Coronation Gulf from west of the Tree River (*Kugluktoalok*) to Bathurst Inlet (*Killigiktokmik*) (see Figure 4.48). More recently, moose have been identified further south along the Tree River as well as the east portion of the James River (*Naniitak* or *Hannigayok*).

Project survey data indicate that moose are only present in low numbers and are predominantly found in river valleys near the Coronation Gulf, which is confirmed by Inuit Knowledge (especially near Grays Bay; John Akana in Wolfden 2006 [Volume 3, Section 4]). During a muskox aerial survey completed in 2022 within muskox management unit MX-11, incidental observations of moose were also documented (Leclerc et al. 2024). Moose were primarily detected within the stratum of MX-11 where the proposed Project is located. Moose were detected throughout the stratum with a higher number of observations along the Tree River, the Burnside River, and on the mainland just west of Bathurst Inlet.

*“Moose were hunted among the willows of Tree River and in the surrounding hills [Period II (1916-1955) in the Tree River Area]. They were a supplementary source of food rather than a staple” (NTKP 2018).*

*“Sometimes they found moose near the mouth of the Hood River” [Period II (1920-1955) in the Bathurst Inlet – Old Area] (NTKP 2018).*

*“Moose could be found among the willows near the mouth of Hood River and throughout Banks Peninsula” [Period II (1920-1955) in the Arctic Sound and Daniel Moore Bay Area] (NTKP 2018).*

*C51 “All of this, all this with a circle, is a moose area (large area for moose by Banks Peninsula and over to the west). It’s all moose habitat” (NTKP 2018).*

*C51 “There are moose at Contwoyto Lake too. My nephew shot one, right at the middle of Contwoyto. It was headed in the right direction, south” (Banci and Spicker 2024).*

*C51 “There were five moose in this area (James River) that I’ve seen and there was another bunch in this creek here. That was in the summer, this time of year, August (late 2000’s)” (Banci and Spicker 2024).*

*C110 “There was always moose in that area all the time.... Arctic Sound area” (NTKP 2018).*

Figure 4.48 Kitikmiut Knowledge of Tuktuvak (Moose) in the Kogloктоayok (Grays Bay) Project Area – adopted from Banci and Spicker (2024)

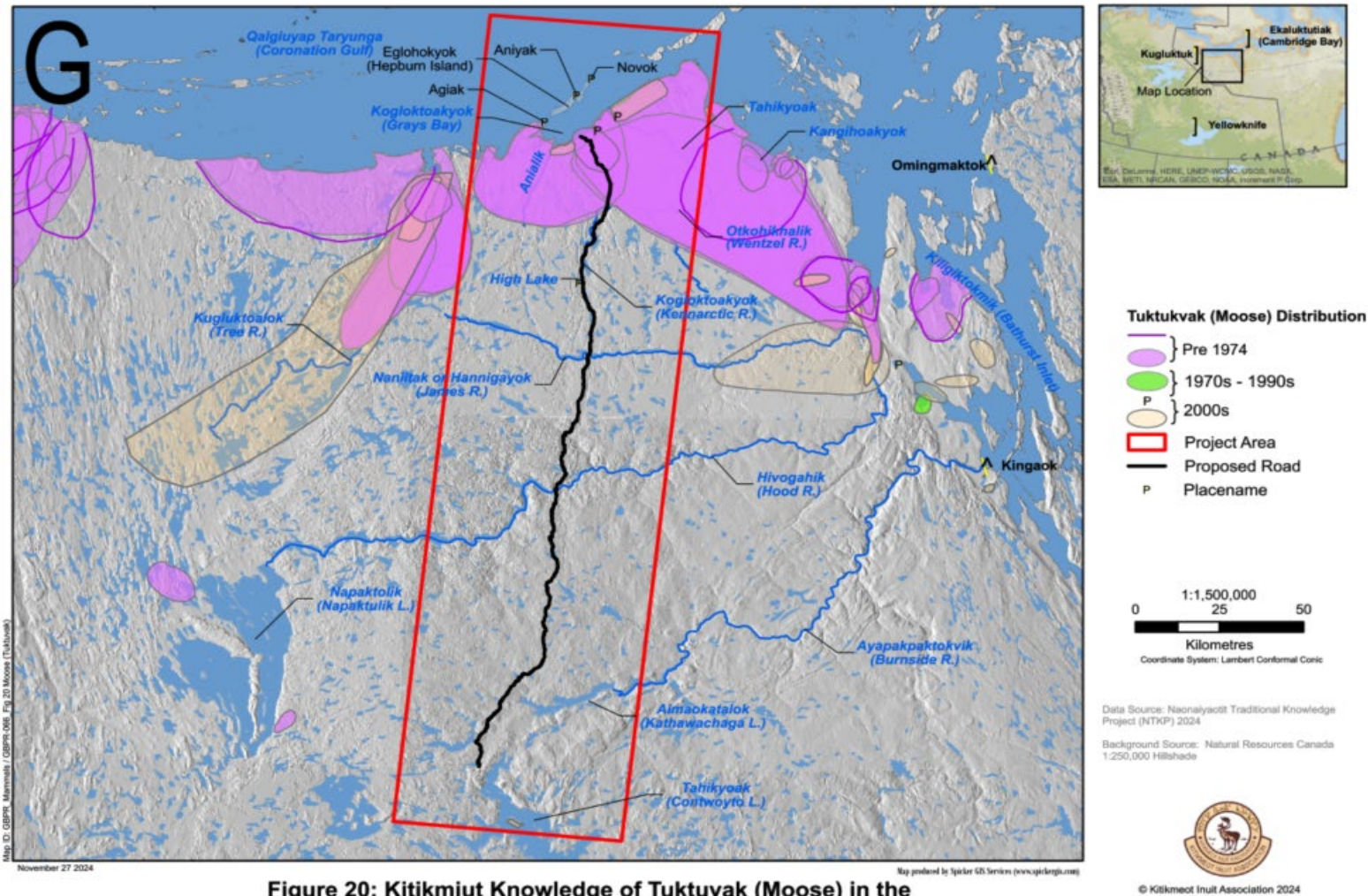


Figure 20: Kitikmiut Knowledge of Tuktuvak (Moose) in the Kogloктоayok (Grays Bay) Project Area

*C114 “And Arctic Sound... that’s quite a while ago, 30 years ago (1980s). There were lots. There used to be moose across there...” (Banci and Spicker 2024).*

*C17 “I’ve seen moose at about the same place around here, by Kringaun Hill, south of Kingaok. Tony Akolok thought it was a horse. He was about fifteen or seventeen years old and he was out hunting alone. He came back and said, ‘Dad. I’ve seen a horse’. I couldn’t believe him so we went to see what it was (NTKP 2018).*

*“Allen shot a moose not too long ago, around northwest side of Portage Bay.... We see one about maybe every four to six years. We are getting more now (1995) it seems compared to back then We see them just in winter, when we can travel with skidoos” (NTKP 2018).*

#### **4.7.1 Population**

Within the Taiga Shield Ecozone north of Great Slave Lake, moose density was estimated to be 2.0–3.5 moose/100 km<sup>2</sup> (Cluff 2005). Within the RSA, moose observations from baseline studies completed between 2004 and 2013 were mostly limited to vegetated creek and river edges in the High Lake to Grays Bay area. Densities are thought to be relatively low in the northern RSA and very low to nil in the southern RSA, with some dispersal of moose north from treeline.

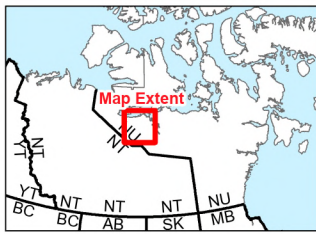
#### **4.7.2 Harvest and Mortality**

Within the Project area, moose harvest is likely very minimal, as densities within the region are sparse. Between 1916 and 1959 people hunted moose in the willows along the Tree River (west of the Project area); however, moose were supplementary to other harvested species (Freeman 1976). People in Kugluktuk have also harvested moose for many years (Treseder and Graf 1985). Community members from Bathurst Inlet have also harvested moose in the last several decades (N. Thorpe, pers. obs.). Moose are regularly harvested in the Tree River area west of Grays Bay (Thorpe Consulting Services Ltd. 2014a).

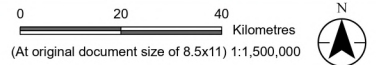
*C569 “We lived in Kugluktoalok (Tree River) and travelled to Grays Bay to hunt and trap. The Grays Bay area was a yearly traditional hunting trip in early winter, as soon as the ice froze the caribou crossed. The area had game, moose, caribou, muskox. Compared to Kugluktoalok, it was a hunting oasis” (Banci and Spicker 2024).*

Moose harvest is regulated in NU, whereby the annual harvest limit is one moose per resident (i.e., Canadian citizen or landed immigrant who has been living in NU for at least three months), non-resident, and non-resident foreigner (Government of Nunavut 2024b). Inuit hunters have no restrictions on harvesting moose. Harvest within the region is minimal, with only two moose harvested in the Bathurst Inlet area and a reported five to seven moose harvested annually by residents of Kugluktuk between 1996 and 2001 during the Nunavut Wildlife Harvest Study (Priest and Usher 2004). During the 1998/1999 hunting season, only two moose harvest tags were given to resident hunters in the Kitikmeot Region, resulting in an estimated kill of zero (Carrière 2012). More recently, records near Kugluktuk (MX/11) showed a total of 98 moose reported as harvested during March 2022 (Leclerc 2025a). Moose harvest locations in proximity to the Project area are presented in Figure 4.49.

Path: L:\PROJECTS\2024\W14\Y0376\_GBRPW\Wildlife\Baseline\Updates\_2025.aprx\24Y0376\_WildBaseline\_Fig4-49\_Moose\_Mortalities\_20260222; Revised: 2026-02-23 By: OliviaLeblanc



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



Project Location: West Kitikmeot Region, Nunavut. Prepared by OliviaLeblanc on 2026-02-23.

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

Figure No. **4.49**

**Documented Moose Mortalities in the Vicinity of the Grays Bay Road and Port Project Regional Study Area, 2005–2022**

Disclaimer: EDI Environmental Dynamics Inc. has made every effort to verify this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

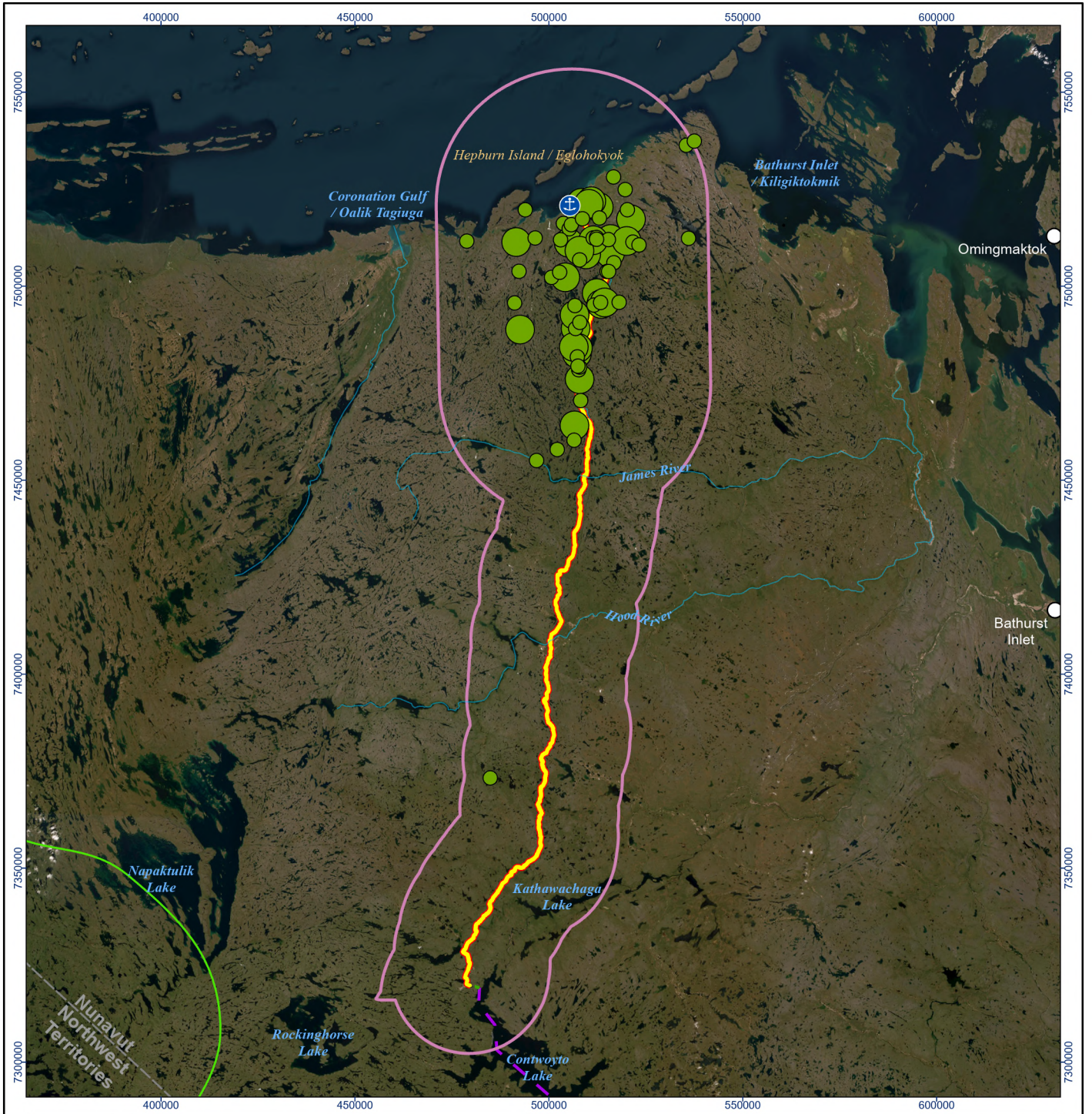
Within the Project area wolves likely prey opportunistically upon moose, although the extent of predation is unknown. Moose are hosts to a variety of parasites, many of which are shared with caribou (Kutz et al. 2012). The interaction among moose, caribou, predators and parasites is certainly complex, and it is not known to what extent moose support predation and parasite transmission to caribou in the region.

### **4.7.3 Movements and Distribution**

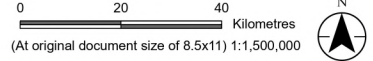
Moose have been recorded in the Bathurst Inlet and Tree River areas since the early 1950s and 1960s, and in the Coppermine River area as early as 1872 (Kelsall 1972). Historical records show that very few moose were observed north of the Thelon River between the Coppermine River and Bathurst Inlet (Kelsall 1972). Banfield (1974) showed moose distribution in western NU to include the Coppermine River, and a buffer along Coronation Gulf and the western side of Bathurst Inlet. Graf (1992) cited reports of moose inhabiting some river valleys on the tundra as far north as the Arctic coast. On the tundra of Low Arctic Ecozone, moose were believed to occur in small concentrations in areas of thick willow growth (Treseder and Graf 1985). More recently, moose distribution in NU and NT was incorrectly aligned as the northern extent of treeline (Karns 1997; Bowyer et al. 2003). Tundra and subalpine shrub communities at higher latitudes and elevations in Alaska support sizable populations of moose (Peek 1997), and given the propensity for moose to disperse long distances (Hundertmark and Bowyer 2004), it would not be unexpected to observe moose well beyond treeline in areas of adequate shrub forage. Ease of hunting in tundra environments may limit their distribution and expansion within NU. Inuit Knowledge identifies that moose have increased in numbers and distribution (Banci and Spicker 2024).

Ungulate surveys were completed within the RSA from 2004 to 2013, and documented moose primarily throughout the High Lake to Grays Bay area, with no survey observations south of the James River. Combined with incidental observations, including one well south of the James River, it is apparent that the highest concentrations occur in the High Lake to Grays Bay area, specifically from 10–15 km south of High Lake to the coast, and only one incidental observation in the southern RSA, approximately 40 km south of the Hood River (see Figure 4.50). Moose were observed in all survey seasons (i.e., from March to October) including all age and sex classes.

During track surveys completed in March and April 2012, moose tracks were observed between Ulu and Grays Bay, with three sets of tracks south of High Lake, and nine sets of tracks north of High Lake. Many moose fecal pellets were found during borrow pit surveys in the High Lake area; however, one pellet group was found approximately 20 km northwest of Lupin. In 2012 and 2013, four observations of cows with twins in the High Lake area were noted; it is believed there were two sets of cows with twins in the area. In 2025, a cow with twins was identified approximately 2 km south of the coastline of Grays Bay in a creek's riparian area. Moose pellets were regularly identified during wildlife surveys in 2025 near the proposed port site and aerodrome, and an adult female moose skull was identified near the port site in 2025.



- Grays Bay Port
- Grays Bay Road
- Grays Bay Winter Road
- Tibbitt to Contwoyto Winter Road
- Territorial Boundary
- Treeline
- Watercourse
- Wildlife Regional Study Area (RSA)
- Moose Observations**
- 1 Moose
- 2 - 4 Moose



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. **4.50**  
 Title  
**Moose Observations within the Grays Bay Road and Port Project RSA, 2004–2013**

Path: L:\PROJECTS\2024\WKR\24Y0376\_GBRPWildlifeBaselineUpdates\_2025.aprx\24Y0376\_WildBaseline\_Fig4-50\_Moose\_Observations\_2026-02-23 By: OliviaLeblanc

Disclaimer: EDI Environmental Dynamics Inc. has made every effort to verify this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

#### 4.7.4 Habitat Use and Diet

Due to their large size, moose require a considerable amount of forage to maintain daily activity. Moose are often associated with dense shrub habitats that provide abundant browse, such as willows in riparian and subalpine areas, or recently burned areas (Dussault et al. 2005). Generally, moose select for habitats that provide either abundant browse or other foraging opportunities or provide cover from predators (especially for cows with calves). Moose within the RSA are at the northern edge of their range in relatively poor habitat, and likely are highly selective for areas with sufficient forage. In the RSA, habitat is primarily confined to river valleys and slopes with high shrub cover. The Grays Bay area is cited as having lots of willow that attract moose (Thorpe Consulting Services Ltd. 2014a). Most observations of moose during surveys were in valley-bottom or shrub habitats along river systems or coastal plains. These few sightings conform to the distribution reported by Banfield (Banfield 1974), and are likely related to higher shrub cover in these areas (Thorpe Consulting Services Ltd. 2014a).

## 5 Carnivores

A variety of large carnivores and furbearers, such as grizzly bears, wolverines, wolves, and foxes (both Arctic foxes and red foxes) are found in the Kitikmeot Region. These species represent the dominant predators within the local food chain and play a role in the population dynamics of caribou and other prey species on the tundra. Ungulate prey bases (predominantly caribou and muskox, but also moose) provide a food source to support large carnivores. Medium-sized carnivores such as fox and wolverine often scavenge ungulate and seal carcass remains, or prey on small mammals, waterfowl, and upland bird eggs and young. Small mammals also contribute to the prey base of all carnivores. Many of these species are also harvested by Inuit and represent a source of income for local people.

*C44 "I travelled in the Grays Bay area just to go trapping, looking for wolverine and other animals. I've travelled all over, even hunting for wolves. Even further up on the lakes. There's lots of animals there. There are lots of foxes and all kind of animals that are there, so I went there to trap and track down other animals" (NTKP 2018).*

*C44 JN-11 "I used to travel on that line just to go trapping. All the way up, all the way up that way I travelled to hunt. (He encircled a large area south of Grays Bay for winter hunting and trapping)" (NTKP 2018).*

*C43 JO-10 He mapped an area with wolves, wolverines and grizzly bears 5 km south of Grays Bay (NTKP 2018).*

*C43 "I used to trap right from my home here (cabin at the mouth of Koglokoakyok), all the way around. When I got raw meat, I go out and I baited the traps" (NTKP 2018).*

*C563 "I used to hunt wolves along Koglokoakyok" (NTKP 2018).*

*C4Kug "This is the area where I hunted kalvik and wolves, and fox (from along the coast from Kugluktoalok (Tree River) and then down the Otkohikhalik (Wentzel River))" (NTKP 2018).*

*"Wolves and wolverine were also taken, usually during trapping, but some were hunted in early spring in the hills southeast of Tree River and near Daniel Moore Bay" [Period II (1916-1955) in the Tree River Area] (NTKP 2018).*

*"There were always large numbers of wolves and wolverines in the whole area [Period II (1916-1955) in the Contwoyto Lake Area], and they were often found near the meat caches. Their furs were valued for personal use, but these animals were also hunted and trapped vigorously along the trap lines because they destroyed foxes taken in traps. Near the end of Period II, when the price paid for wolf pelts increased, many more people began to hunt them" (NTKP 2018).*

*"Wolves and wolverines were abundant in this area" [Period II (1920-1955) in the Bathurst Inlet – Old Area] (NTKP 2018).*

*"Grizzly bears were not common, but when signs of one were seen, it might be tracked for a long distance" [Period II (1916-1955) in the Tree River Area] (NTKP 2018).*

*“Throughout this area [Period II (1916-1955) in the Contwoyto Lake Area], Barren Ground grizzly bears were hunted, usually when encountered, because they were too scare for systematic hunting. They were usually tracked down and shot when signs of them had been seen” (NTKP 2018).*

*“Barren Ground grizzly bears were hunted when encountered” [Period II (1920-1955) in the Bathurst Inlet – Old Area (NTKP 2018).*

Within the Kitikmeot Region, carnivores are typically wide-ranging and use a variety of habitat types; their numbers and distribution are often driven by the availability of prey species and other sources of food. However, denning habitat can be limiting as permafrost and the abundance of exposed bedrock result in a lack of substrate in which to dig dens in much of the area. For many species, eskers play a critical role as one of the few available habitats suitable for denning (Mueller 1995).

*C562 “The wolf usually go where the caribou are. Wolverines go anywhere. They eat grass and go wherever they can dig a hole in. Summertime they usually go in the shallow parts of rivers and lakes and catch fish” (NTKP 2018).*

*C562 “He mapped a grizzly den on the banks of Kogloктоаkyok and noted that they den in sandy banks” (NTKP 2018).*

*C427 “Wolverines are the worst. They like rocky areas. There must be tons of wolverines in here. They den in rock cracks” (NTKP 2018).*

*C562 “The foxes, wolves and bears den on the sides of rivers, eskers, willows, and grasslands. Hikhik and grizzlies den in eskers. Along the rivers you find wolf and fox dens. In rough country are wolverine and akhak” (NTKP 2018).*

*C562 “The arctic fox (white fox) and the red fox live in the soft sides of the shores. You also have cross fox here. They den in the banks of rivers, eskers, where there is a nice hump you could find a fox hole. Flat areas. West of here are lots of foxes, in the small hills (NTKP 2018).*

## 5.1 Methods

### 5.1.1 Field Studies

Field studies to determine the distribution and ecology of carnivores were completed from 2004 to 2012 within the Project RSA (see Table 5.1). Carnivore data were also collected incidentally, in combination with other terrestrial wildlife studies (e.g., aerial snow-tracking survey), or just outside of the RSA as part of previous studies (e.g., Izok area).

**Table 5.1 Carnivore Studies Completed Within the Project Area, 2004–2012**

Survey Year	Survey Timing	Target Species	Purpose	Method
2004	May	Carnivores	Presence	Snow tracking
2005	May	Carnivores	Den site use	Esker/den aerial surveys
2006	August–September	Carnivores	Den site use	Esker/den aerial surveys
2007	September	Carnivores	Den site use	Esker/den aerial surveys
2008	April	Wolverine	Distribution and abundance	DNA hair snagging
	May	Carnivores	Den site use	Esker/den aerial surveys
2012	April <sup>1</sup>	Wolverine	Distribution and abundance	DNA hair snagging
	May	Carnivores	Den site use	Esker/den aerial surveys
	June–August <sup>1</sup>	Grizzly bear	Distribution and abundance	DNA hair snagging

Note:

<sup>1</sup> The wolverine and grizzly bear DNA hair-snagging programs completed in 2012 were located outside of the RSA, near Izok.

## Den Site Surveys

Carnivore denning surveys were completed in areas along the proposed road alignment from 2005 to 2012. Surveys were completed via helicopter typically around the third week of May or early to mid-fall (see Table 5.2). The surveys involved low altitude flying (20 to 40 m) by helicopter at 75 to 85 km/h along eskers and other glacio-fluvial deposits, with three observers onboard to search for denning activity. Den surveys focused on a 5 km buffer surrounding the road alignment and Project footprint. A den site database containing previously located den sites (previous baseline studies completed from 2005 to 2008, including data supplied by GNWT-ECC and the GN-DOE) provided locations to re-visit. Due to the long-term fidelity of wolves to den sites, both inactive and active den sites were revisited. The location of new carnivore den sites, and site-specific data such as slope, aspect, landform type, and any evidence of bones or scat present were recorded where possible. To prevent disturbance of active den sites, the helicopter did not land at active sites—only some inactive sites were visited on the ground. The track file of the helicopter flight path was also recorded to document the survey extent. Dens incidentally located throughout the field seasons during other surveys were also added to the database.

**Table 5.2 Carnivore Denning Surveys Completed in the Grays Bay Road and Port Project RSA from 2005 to 2012**

Year	Survey Date	Focus Area
2005	20–21 May	High Lake to Grays Bay road alignment + 5 km buffer
2006	31 August–2 September	Jericho to High Lake road alignment + 5 km buffer
2007	19–21 September	Jericho to High Lake road alignment + 5 km buffer
2008	14–18 May	Entire road alignment + 5 km buffer
2012	18–19 May	Entire road alignment + 5 km buffer

## **Regional Information**

Grizzly bear, wolf, and wolverine harvest and mortality data for the respective assessment areas were obtained from GN and GNWT and were summarized for each species. Grizzly bear kill data from 1995 to 1998 (Wolfden 2006) were combined with data from 1999 to 2015 obtained from the GN-DOE (M. Awan, GN, unpublished data, December 2016). Kill data were also obtained from the GNWT Environment and Natural Resources WMIS system for 1996 to 2010. The GN-DOE data had reference to kill type (problem, sport, etc.) but the GNWT data did not. The most recent (2013–2019) grizzly bear harvest data were obtained from the GN-DOE in 2021 (Awan 2021).

DNA programs for grizzly bear and wolverine, albeit developed independent of the main RSA, are also included in this report to provide regional- and population-level information to the Project. Workshops held by government regulators, monitoring agencies, and northern communities have called on the mining industry to contribute to large-scale regional monitoring of grizzly bear populations as well as community-based monitoring programs. DNA hair-snagging surveys were completed in 2008 and 2012 in the High Lake and Izok areas, respectively, for wolverine, and in 2012 in the Izok area for grizzly bear. As a result, grizzly bear DNA mark-recapture programs have been and are being completed by the mining industry in the Canadian Arctic. The 2012 Izok grizzly bear DNA inventory was designed to contribute to this effort and to meet GN-DOE requirements for wildlife monitoring. Between 2021–2023 a grizzly bear DNA hair snagging program was completed in the Kitikmeot Region in order to obtain density and population abundance estimates (Awan et al. 2025). In 2018 and 2019, a DNA hair snagging study was completed in the Kitikmeot Region targeting wolverines (Awan et al. 2020).

### **5.1.1.1 Grizzly Bear**

Grizzly bear management requires an understanding of population size and trend. Monitoring programs for grizzly bears associated with industrial projects in the Arctic have used a number of study designs, including vegetation plots for bear sign and incidental sightings (BHP Billiton 2006). A review of monitoring programs for the NT diamond mines concluded that the primary objective of grizzly bear monitoring should be to determine if mine-related activities influence relative abundance and distribution over time, and that DNA inventories should form the basis of monitoring (Handley 2010).

Grizzly bear monitoring within the RSA included collection of incidental sighting information since 2004 and denning surveys completed since 2005; and within the region a DNA inventory in the Izok area in 2012. The objectives of the grizzly bear DNA inventory were to estimate grizzly bear abundance and distribution within the Izok area prior to mineral development and contribute to regional-level monitoring of grizzly bear populations in NU and the NT. The study design for the grizzly bear DNA inventory was based on studies completed elsewhere in the Arctic, including a GN-DOE study near Kugluktuk (Dumond et al. 2015), and 2012–2014 NT diamond mines study near Lac de Gras (Barrueto et al. 2023). All of those projects were based on methods developed in British Columbia (Woods et al. 1999).

The Izok grizzly bear DNA inventory was completed by wildlife personnel and a community member from Kugluktuk from June 17 to August 15, 2012. It consisted of 69 grizzly bear hair-snagging tripods which were set out in a series of 10 x 10 km grids within a circular 6,900 km<sup>2</sup> study area centred on Izok Lake (*Qaumavaktuq*). The tripods consisted of six 2 inch x 4 inch pieces of lumber, secured at the corners with

aircraft cable; each upright piece of lumber was wrapped with double-stranded barbed wire to trap grizzly bear hair (see Photo 5.1). Tripods were deployed roughly in the middle of each grid cell, although difficulty with access or water bodies occasionally resulted in placement away from cell centres. Lures (Forsyth Animal Lures, Alix, Alberta) were spread or poured atop the tripod on a piece of felt underlain by moss for absorption, and on a pile of moss in the centre of the tripod.

**Photo 5.1** Grizzly Bear Hair-snagging Tripod Assembled as Part of the 2012 Project DNA Inventory



Sites were revisited four times at 14-day intervals to collect hair and re-bait with different combinations of blood, fish oil, and trapping lures. After each 14-day interval, hair samples were removed with forceps, placed in coin envelopes, and labelled with tripod number, session number, leg number, and cluster and barb number (an alpha-numeric combination, e.g., cluster 1, barb c = 1c) to facilitate subsampling at the lab. Clusters were defined as consecutive hair samples on adjacent barbs that were assumed to be from one individual. Hair samples were dried each night and stored cool and dry. All samples were sent to Wildlife Genetics International (WGI; Nelson, BC, Canada) for microsatellite genotyping. Individuals were identified for each 7-locus genotype, and a gender test was completed.

Similar research involving the collection of grizzly bear DNA in the Arctic has been hampered by poor DNA sample quality, possibly due to ultraviolet (UV) exposure from extensive daylight hours (D. Paetkau, pers. comm., May 7, 2012). To better understand the ideal interval between sessions, remote, motion-sensing wildlife cameras were deployed at 10 tripod locations to determine when bears were visiting the tripods. This demonstrated the temporal pattern of site visits after baiting and helped to determine how long grizzly bear DNA on hair is viable in a northern UV-exposed environment. Spatially explicit mark-recapture analysis was completed to estimate the number and density of grizzly bears present in the study area, as well as test the robustness of the study design (Boulanger 2013a).

A DNA hair snagging program was completed in the Kitikmeot Region targeting grizzly bears between 2021 and 2023 in order to obtain density and population abundance estimates (Awan et al. 2025). This study was broken into 3 different areas within the Kitikmeot region. Sampling of the western study area (54,275km<sup>2</sup>) occurred in 2021, the central study area (51,500 km<sup>2</sup>) in 2022, and the eastern study area (50,750km<sup>2</sup>) in 2023 (Awan et al. 2025). The results from this study are presented herein.

#### **5.1.1.2      *Wolf and Fox***

Carnivore denning surveys were largely focused on wolf den location and habitat selection; however, fox dens were also recorded. Incidental sightings were also recorded during baseline studies.

#### **5.1.1.3      *Wolverine***

Baseline monitoring of wolverines at developments in the Arctic have used several study designs in recent years, including various methods of snow track counts (e.g., Diavik Diamond Mines Inc. 2006). Wolverine monitoring within the RSA has included incidental sightings since 2004, and a DNA inventory at High Lake in 2008. Regionally, another DNA hair-snagging survey was completed in the Izok area in 2012. In 2018 and 2019, a DNA hair snagging study was completed in the Kitikmeot Region targeting wolverines (Awan et al. 2020).

A review of monitoring programs for the NT diamond mines concluded that the primary objective of wolverine monitoring should be to estimate abundance and distribution and that DNA inventories (Mulders et al. 2007) should form the basis of monitoring (Handley 2010). Baseline abundance estimates are designed as an initial 2-year program, followed by re-sampling every two or three years (Boulanger and Mulders 2008). The second year of the High Lake survey was not followed up in 2009 because the supporting project was placed on hold.

The DNA inventory study design at both High Lake and Izok was identical and was based on the work of Mulders et al. (2007) except that a 5 x 5 km grid was used in the 2008 and 2012 surveys as opposed to a 3 x 3 km grid. During April two crews worked simultaneously for the one month period to set out 120 baited 4" x 4" rough lumber posts, each of which wrapped with double-stranded barbed wire to trap wolverine hair (see Photo 5.2). Posts were baited with meat (bison roadkill obtained from ECC) and marked with a trapping lure (O'Gorman Enterprises Inc, Broadus, Montana). Posts were set out in a series of 5 x 5 km cells that surrounded the High Lake and Izok areas, covering a 3,000 km<sup>2</sup> study area (see Figure 5.1). Posts were deployed at cell centre or within 200 m of cell centre in the best apparent wolverine habitat or travel route. After a 10-day interval, hair samples were removed with forceps, placed in coin envelopes, and labelled with post number, post side, and vertical location (upper, middle, lower, ground) to facilitate subsampling at the lab. Hair samples were dried each night and stored cool and dry.

**Photo 5.2**      **Wolverine Hair-snagging Post Assembled as Part of the 2008 and 2012 Project DNA Inventory**



All samples were sent to WGI (Nelson, BC, Canada) for microsatellite genotyping. Samples were genotyped such that one good sample was selected from each post, and a second sample was genotyped for any post at which hairs were found on more than one side, taking the two samples from different sides. Samples were subjected to commercial DNA extraction methods and then genotyped with an automated DNA sequencing machine using seven microsatellite markers based on previous wolverine work (D. Paetkau, pers. comm., May 7, 2012). Individuals were identified for each 7-locus genotype, and a gender test was completed.

Spatially explicit mark-recapture analysis was completed to estimate the number and density of wolverines present in each study area, as well as test the robustness of the study design (Boulanger 2013b).

### **5.1.2      Habitat Suitability Mapping**

Habitat suitability mapping was completed for grizzly bear and wolverine using ratings based on RSF analysis from the central mainland Arctic (Johnson et al. 2005). The RSF values published by Johnson et al. (2005) have been used to derive relative habitat suitability for grizzly bears and wolverines in a number of developments (e.g., Miramar Hope Bay Ltd. 2005; Rescan Environmental Services Ltd. 2005). Johnson et al. (2005) developed seasonal RSF models using combined cover classes developed during the WKSS, which were aligned with the current Project land cover classification from Northern Land Cover (Olthof et al. 2009, 2015). These seasons were developed based on dietary patterns of grizzly bear and wolverine in the central mainland Arctic, primarily as affected by presence or absence of caribou. Caribou distribution varies seasonally between northern and southern portions of the Project area. Given

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this factor and model uncertainty in some of the seasonal models (Johnson et al 2005), seasonal habitat selection coefficients were standardized to values ranging from zero to one, then averaged amongst seasons for each species to develop annual habitat ratings for grizzly bear and wolverine (reworked data provided by C. Johnson [unpublished data]). The habitat ratings were categorized into four habitat suitability classes using quartiles, with the upper quartile representing the most strongly selected and presumably the most valuable cover type (C. Johnson, pers. comm., March 27, 2006):

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

**Table 5.3 Habitat Suitability Ratings Used for Grizzly Bear and Wolverine HSI Modelling**

Cover Type ID	Description	Layer Source	Grizzly Bear	Wolverine
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	M	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	L
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	L
5	Low shrub (<40cm; >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	H	L
6	Tall shrub (>40cm; >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	H	L
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	H	L
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	L	M

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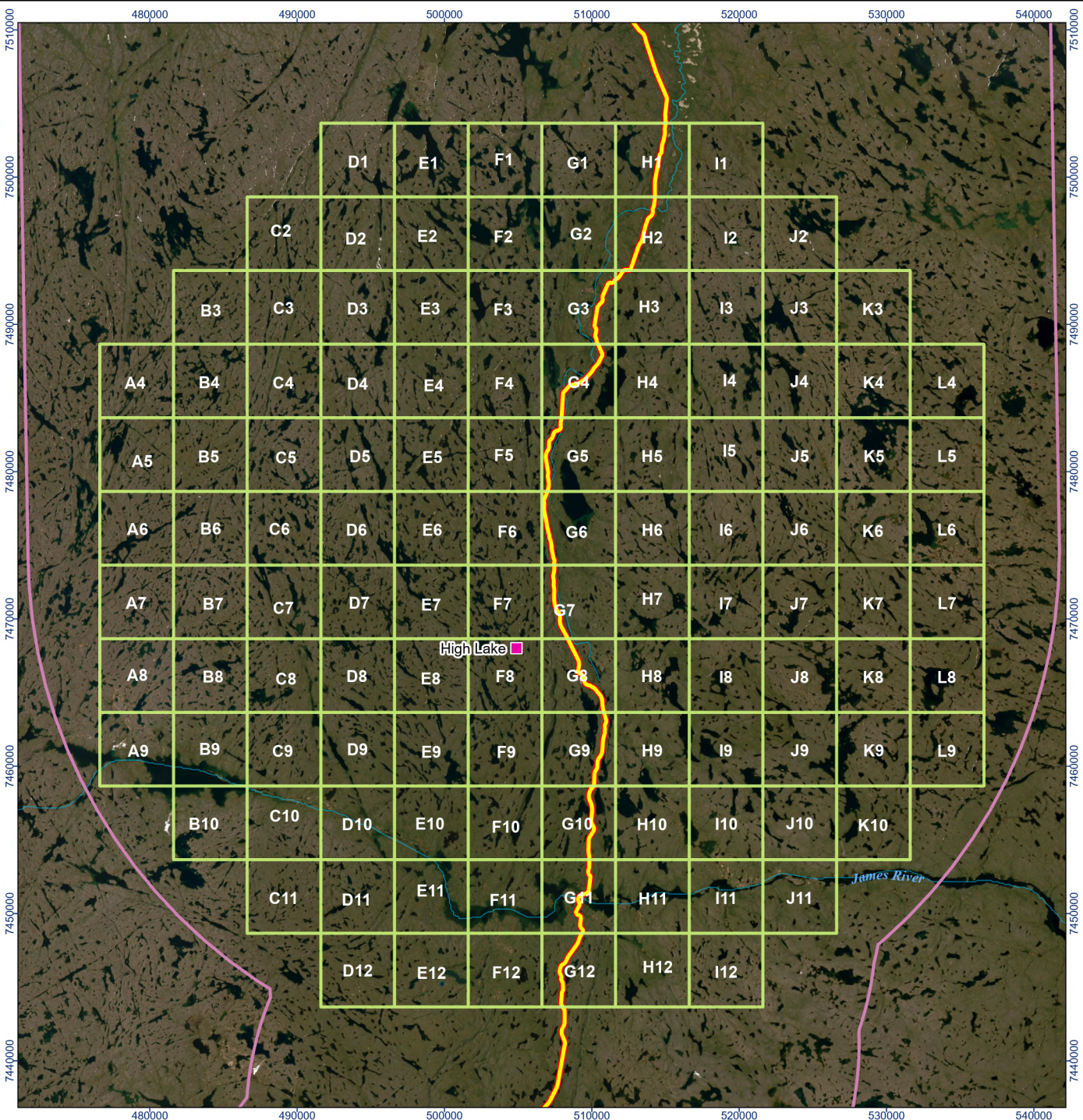
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Cover Type ID	Description	Layer Source	Grizzly Bear	Wolverine
9	Sparsely vegetated till-colluvium (2–10% cover): Barren surfaces with 2–10% vegetation cover on nonacidic and calcareous bedrock and colluvium. Vegetation cover generally consists of graminoids and prostrate dwarf shrubs.	NLC	M	M
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	M
12	Topographic shadow.	NLC	No Data	No Data
13	Barren: <2% vegetation cover on nonacidic and calcareous parent material.	NLC	M	M
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	H
20	Water: Lakes, reservoirs, rivers, streams, or salt water.	EOSD/ NLC	Nil	Nil
31	Ice/snow: Areas permanently covered by snow and ice (glaciers).	EOSD/ NLC	L	L
32	Rock/Rubble: Bedrock, rubble, talus, blockfield, rubblely mine spoils, or lava beds.	EOSD	L	M
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	M	M
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	M	L
51/52	Shrub Types: Minimum 20% ground cover or one-third of total vegetation is shrub.	EOSD	H	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	M	H
100	Herb: Minimum 20% ground cover or one-third of total vegetation is herb (grasses, crops, forbs, graminoids).	EOSD	M	H
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	M	L
231/232	Mixedwood Types: Neither coniferous nor broadleaf tree account for 75% or more of the total basal area.	EOSD	L	L

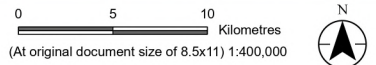
Notes:

NLC = Northern Land Cover; EOSD = Earth Observation for Sustainable Development of Forests; H = high suitability; M = moderate suitability; L = low suitability.

Path: L:\PROJECTS\2024\W\H\24\Y0376\_GBRP\BridBaselineUpdates\_2025.aprx\24Y0376\_WildBaseline\_Fig5-1\_WolverineDNAGrid\_20260220\_2025.aprx\24Y0376\_WildBaseline\_Fig5-1\_WolverineDNAGrid\_20260220\_2025.aprx By: OliviaLeblanc



- Advanced Mineral Exploration Site
- Grays Bay Road
- Watercourse
- Wolverine DNA Sampling Grid
- Wildlife Regional Study Area (RSA)



Project Location: West Kitikmeot Region, Nunavut  
Prepared by OliviaLeblanc on 2026-02-20

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

Figure No. 5.1  
Title

**Wolverine DNA Survey Grid in the Grays Bay Road and Port Project Regional Study Area**

Disclaimer: EDI Environmental Dynamics Inc. has made every effort to verify this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

## 5.2 Grizzly Bear

Grizzly bears are a high-profile species of local and national interest. They remain highly valued and respected in the lore of the local Inuit (Wildlife Management Advisory Council (North Slope) 2008, Clark and Slocombe 2011a; NTKP 2018). Industrial development presents several threats to bear populations including the potential for increased mortality resulting from hunting (via increased access and knowledge of the area), the destruction of ‘problem’ bears, collisions with vehicles, and the alteration and fragmentation of habitat. Developments within the Arctic may present a relatively higher risk to grizzly bear populations due to the natural low density of bears in these areas, the relative scarcity of high-quality habitat and corresponding large area requirements, and the increased vulnerability of bears in open tundra habitats (COSEWIC 2012). Despite these challenges, grizzly bear populations in the Arctic appear to have increased and their range has expanded in recent years (Gunn 1991; Dumond 2007a; Slavik 2010; Clark and Slocombe 2011b; COSEWIC 2012). In Kugluktuk, as in other communities in NU, community members are increasingly frustrated with nuisance grizzly bears coming closer to communities in recent years (Wildlife Management Advisory Council (North Slope) 2008; Clark and Slocombe 2011b; Thorpe Consulting Services Ltd. 2014a).

*C427 “The bear population is growing in the Kugluktuk area. They are moving to Kugluktuk area from other areas. Gjoa Haven people say they have been seen on Victoria Island and on Holman Island. Some say the grizzlies are eating young polar bear cubs, as they’ve found dead cubs in an area with a big grizzly.*

*Long ago there never use to be any bears in the north like Victoria island. They are moving north even along the coast line. We don’t know why it’s happening. Maybe because there too many mines” (NTKP 2018).*

*C565 “These days there are lots of bears. Long ago never used to be any bears on Victoria Island, but now lots of grizzly bears are coming. They are moving north” (NTKP 2018).*

Inuit Knowledge has identified that grizzly bears tend to occur near the coastline within the Project area, as well as further south around Napaktulik Lake and Contwoyto Lake (see Figure 5.2). Much of the areas identified for grizzly bear are associated with Inuit travel routes through the region, thereby accounting for more observations and/or hunting opportunities of grizzly bear. Inuit Knowledge also recognizes that grizzly bear occurs near all major rivers located within the Project area.

In NU, Inuit have the right to harvest grizzly bears at any time of the year up to the full level of their economic, social, and cultural needs, with no limits (Awan 2021). Inuit and Inuvialuit hunt grizzlies for hides more than for subsistence (Wildlife Management Advisory Council (North Slope) 2008). Hunters and Trappers Organizations can elect to impose restrictions on harvest within their respective communities. Non-residents are subject to a trophy fee, and harvest reporting is mandatory.