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# MEADOWBANK MINE

## 2019 WILDLIFE MONITORING SUMMARY REPORT

FINAL

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- Appendix G** Whale Tail Viewshed Analysis – Roadside Survey Points
- Appendix H** 2019 Height of Land Survey Forms
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- Appendix L** 2019 Migratory Bird Protection Report
- Appendix M** 2019 Meadowbank Non-Native Plant Monitoring Study



## SECTION 1 • EXECUTIVE SUMMARY

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As a requirement of the NIRB Project Certificate, the 2019 Wildlife Monitoring Summary Report represents the 14<sup>th</sup> of a series of annual Wildlife Monitoring Summary Reports for the Agnico Eagle Mines Ltd. (Agnico Eagle) Meadowbank Mine (the project). Baseline and monitoring programs were first initiated in 1999 and will continue through the life of the mine. Details of the wildlife monitoring program for the project are provided in the Terrestrial Ecosystem Management Plan (Agnico Eagle 2019). The 2019 annual report provides the monitoring objectives, methodology, historical and current year results, and management recommendations for each monitoring program. The 2019 Wildlife Monitoring Summary Report builds on data presented in previous reports and incorporates monitoring recommendations from these reports.

The Government of Nunavut's Caribou (*Rangifer tarandus*) collaring program, ongoing for the past 12 years in the Baker Lake area, continued in 2019 with monitoring of existing collared animals. Seasonal Caribou movements within and adjacent to the Meadowbank Regional Study Area (RSA) were tracked and mapped throughout the year. Collared Caribou were present throughout the year but particularly during spring (i.e., April and May), late summer (i.e., August), and fall (i.e., October) migration. No additional collars were deployed on Baker Lake animals in 2019 but by the end of the year, 31 collars from three deployments remained active.

A Hunter Harvest Study (HHS) conducted from 2007 to 2015 was relaunched in 2019. The study included more than 60 participants of which 42 reported harvesting Caribou. Given an estimated 300 to 350 active hunters in the Hamlet of Baker Lake, the HHS represents from 12 to 14% of hunters in the community. With a total reported Caribou harvest of 647, the total Caribou harvest in Baker Lake is estimated to range from 4,621 to 5,392 Caribou. This estimate is likely high because the current study attracted some of the more successful hunters (e.g., Baker Lake Hunters and Trappers Organization members) in the community.

Six active Peregrine Falcon (*Falco peregrinus*) nests were observed and monitored at quarry sites along the AWAR in 2019, with successful nesting confirmed at one nest. Raptor nests were also monitored along the Whale Tail Haul Road and in the vicinity of the Whale Tail Pit in 2019 with occupancy levels similar to 2017 survey results. Raptor nest management plans were not required at any of the active nest sites along the Meadowbank All-Weather Access Road, the Whale Tail Haul Road, or the Whale Tail Pit area since no project-related effects on raptor nesting success were observed and mine-related activities were restricted around sites.

Numerous road closures were implemented on all project roads, particularly in April and May, to ensure safe passage to large groups of migrating Caribou herds. No Caribou fatalities occurred because of activities at the mine or along project roads. With the Authorization of the GN officer, one Wolverine (*Gulo gulo*) needed to be euthanized after attempts to deter the animal were unsuccessful.

## SECTION 2 • OVERVIEW

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### 2.1 BACKGROUND

The Agnico Eagle Mines Ltd. (Agnico Eagle) Meadowbank Mine (the project), located in the Kivalliq Region of Nunavut (**Figures 2.1 and 2.2**), received a Project Certificate No. 004 from the Nunavut Impact Review Board (NIRB) in 2006. The subsequent Water License, GN and CIRNAC Land Lease, and KIA Land Use Production Lease, allowed for the construction of a gold mine and ancillary facilities including an All-Weather Access Road (AWAR), barge unloading facilities, lay-down area, and a fuel tank farm near the Hamlet of Baker Lake. The Whale Tail Pit Project, an extension of the Meadowbank Mine, received a Project Certificate No. 008 from NIRB in 2018. The Project Certificates, and subsequent Water License and land leases, allowed development of five gold deposits in the 11 years since the start of operations at Meadowbank and the first phase of the Whale Tail satellite deposit including construction of the Whale Tail Haul Road.

Up to 2017, annual reports were based on the Terrestrial Ecosystem Management Plan (TEMP) developed by Cumberland Resources (Cumberland 2006). The TEMP was a requirement of the Meadowbank Project Certificate No. 004, Condition 54 and Whale Tail Pit Project Certificate No. 008, Condition 28. In 2018, and again in 2019, the TEMP was revised to incorporate the Whale Tail component of the project, and to reflect changes in management and monitoring approaches since 2006 (Agnico Eagle 2019). The revised TEMP also benefitted from collaborative input from the Government of Nunavut Department of Environment (GN), the Kivalliq Inuit Association (KivIA), and the Hunters and Trappers Organization (HTO) of Baker Lake through annual report reviews, technical reviews, workshops, and discussions within the Terrestrial Advisory Group (TAG). The June 2019, Version 7 TEMP provides the basis for the 2019 annual report. The scope of the TEMP is to report on monitoring of the mine during construction, operation, maintenance, reclamation, and closure.

This annual report includes data collected in 2019, the 10<sup>th</sup> year of operation, and is the 14<sup>th</sup> of a series of annual Wildlife Monitoring Summary Reports for the project. The purpose of this report is to summarize 2019 data collected from wildlife monitoring programs, and to describe natural variation and potential mine-related changes in wildlife populations within and adjacent to the Meadowbank Gold Mine. The 2019 report describes monitoring objectives and methodology, historical and current year results, mitigation activities, and management recommendations based on 2019 monitoring results.

### 2.2 PROJECT DESCRIPTION

The Meadowbank Gold Mine, with an operating life of nine (9) years (i.e., until Q3, 2019), is located approximately 90 km north of the Hamlet of Baker Lake, while the Whale Tail Pit extension, with an expected operating life of seven (7) years (2019 to 2025), is located approximately 180 km north of the Hamlet. The Whale Tail Pit extension is a proposed open-pit mine mined by truck-and-shovel operation and will produce 19 M tons of ore. The project is 300 km inland from the northwest coast of Hudson Bay and is above the tree line near the Arctic Circle. The local physiography is characterized by numerous lakes and low, rolling hills covered mainly by lichen/rock complexes, and heath tundra.

**Figure 2.1:  
Meadowbank Mine  
Project Location Map**

**Legend**

- Capital City
- Towns/Villages
- Rivers
- Water
- National Parks

**Data Sources:**  
Natural Resources Canada  
Geological Survey of Canada  
Caslys Consulting Ltd.



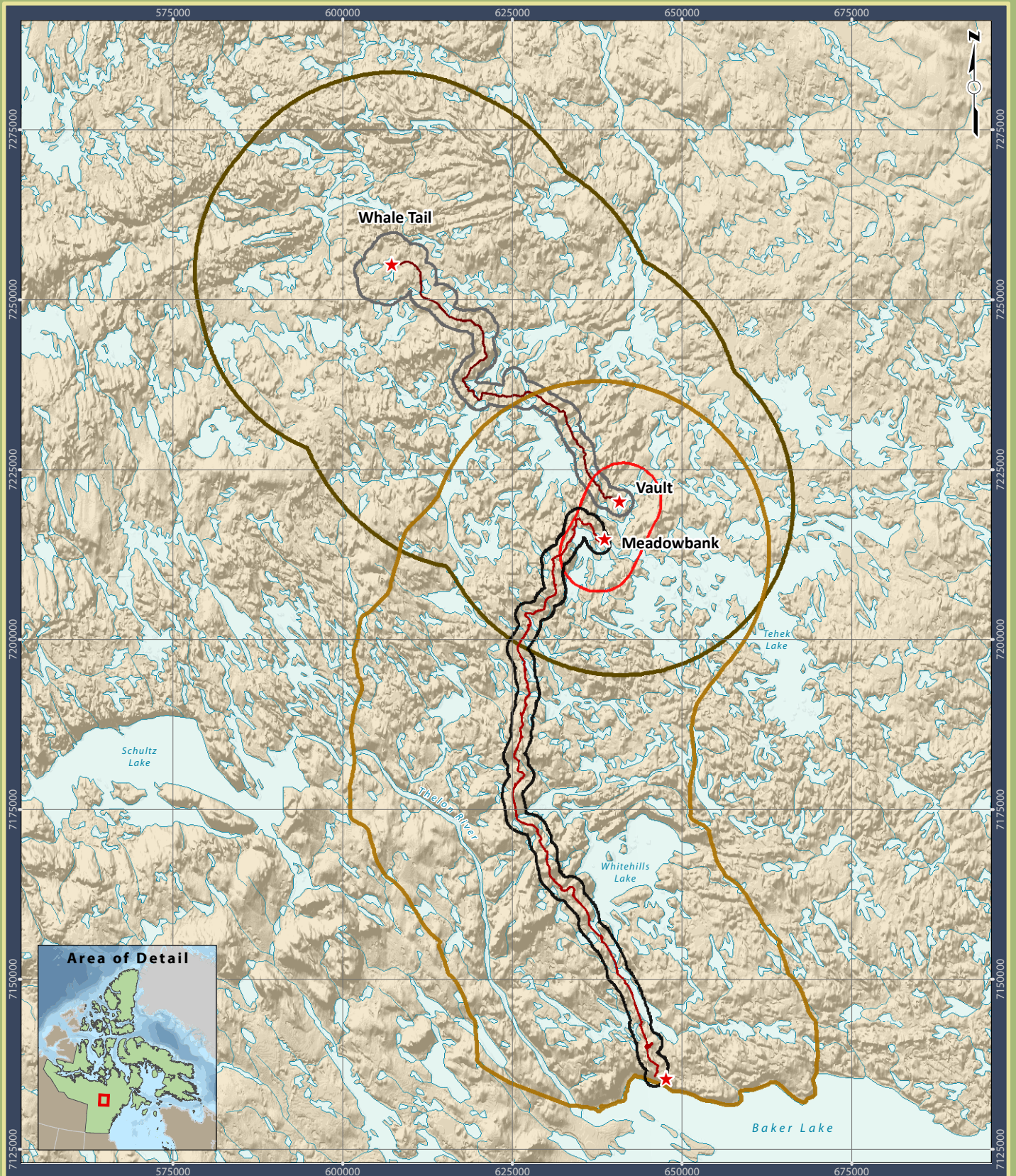
Prepared for:

**AGNICO EAGLE** **Nunavut**  
ENVIRONMENTAL  
CONSULTING LTD.

By:

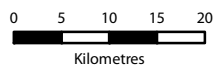
**CASLYS**  
CONSULTING





### Legend

- All-Weather Access Road
- Whale Tail Haul Road
- Meadowbank All-Weather Access Road Local Study Area (LSA)
- Meadowbank Local Study Area (LSA)
- Meadowbank Regional Study Area (RSA)
- Whale Tail Pit and Haul Road Local Study Area (LSA)
- Whale Tail Pit and Haul Road Regional Study Area (RSA)



**Projection:** UTM Zone 14 NAD83

**Data Sources:**  
Natural Resources Canada, GeoBase®  
National Topographic Database  
Agnico-Eagle Mines Limited.

**Figure 2.2: Overview of Boundaries for Meadowbank Mine Monitoring Studies**

### Meadowbank Gold Project

Prepared for:



By:





**2019 WILDLIFE MONITORING SUMMARY**

Environmental baseline studies were conducted in the project area prior to Meadowbank and Whale Tail mine approvals and integrated into project designs according to the Cumberland (2006) and Agnico Eagle (2019) TEMPs. Wildlife Valued Ecosystem Components (VECs) for the Meadowbank project were identified in consultation with regulatory agencies and Baker Lake residents, and considered criteria such as conservation status, relative abundance within the Project study area, importance in subsistence lifestyle and economy, importance in predator-prey systems, habitat requirement size and sensitivity, and contribution to local area concerns. Based on these selection criteria, key terrestrial VECs determined for the Meadowbank project were Wildlife Habitat, Ungulates, Predatory Mammals, Small Mammals, Raptors, Waterbirds, and Upland Breeding Birds. Because of limited evidence that Small Mammals were affected by the project, this VEC was not included in the Whale Tail extension project or revised TEMP. Further details can be found in the Final Environmental Impact Statements for the Meadowbank Project (Cumberland 2005) and the Whale Tail Pit (Golder 2016).

Construction of a 106.8 km AWAR between the Hamlet of Baker Lake, the nearest community, and the Meadowbank mine was completed in March 2008 and provides mine site access and re-supply, while on-site mine haul and access roads connect open pit areas to ancillary facilities. Meadowbank mine site facilities include a mill, power plant, maintenance facilities, tank farm for fuel storage, water treatment plant, sewage treatment plant, airstrip, and accommodations. Mine components include open pits, waste rock storage facilities, and a tailings storage facility.

In 2008, construction of the AWAR and numerous camp infrastructure facilities was completed, while in 2009, principal mine site construction commenced. Mine operation began in early 2010. Goose Pit was completely depleted in 2015 while Agnico Eagle continued ongoing mining operations at Portage and Vault pits and investigated expansion of the Vault area into Phaser Lake. In 2018, an expansion was made in Pit E (Portage) to extend mining and mill feed to bridge the gap between the end of mining activities in Meadowbank and the start of mining activities at Whale Tail Pit. As a result, mining activities at Meadowbank in 2019 were only ongoing in Pit E but were depleted by Q3 (October), 2019. Mining in the Vault pit continued until Q2 (June), 2019 when the ore had been depleted. The dewatering of Phaser Lake occurred during summer 2016 in preparation for mining activity in Phaser and BB Phaser Pit. Phaser Pit mining activities were completed in Q4 (October), 2018 while BB Phaser mining, which began in early 2018, was completed in Q2 (June), 2019. There are no plans to continue mining in the Meadowbank and Vault areas.

To extend mine operations and milling at Meadowbank Mine, Agnico Eagle has developed the Whale Tail Pit and Haul Road Project, approximately 55 km north of the Meadowbank mine, on a satellite deposit located on the Amaruq property in the Kivalliq Region of Nunavut. The Amaruq Exploration Access Road (AEAR) was built in 2016 and 2017 to access the Amaruq exploration site from the Meadowbank complex. The AEAR was modified into the Whale Tail Haul Road (enlargement) following regulatory approval and was completed in 2018. Construction of the Whale Tail Dike in 2018 allowed for Whale Tail Lake North Basin dewatering in Q1, 2019, the pre-stripping of future Whale Tail Pit, and the construction of major infrastructures including the permanent camp, with accommodation and kitchen facilities for approximately 400 people, sewage treatment plan, tank farm for fuel storage, and freshwater intake. Open pit mining operation at the Whale Tail deposit began in Q3 (September 30<sup>th</sup>), 2019. Permitting is underway to expand the Whale Tail operation and extend the mine life to 2025.

## 2.3 STUDY AREA BOUNDARIES

### 2.3.1 Meadowbank Mine, Vault Pit and AWAR

The Meadowbank Mine Local Study Area (LSA) includes a 5 km radius area centred on the Mine Site and a 5 km radius around the Vault Site creating an elliptical shape with a total area of 194 km<sup>2</sup>. The AWAR LSA consists of a 3 km wide corridor centred on the AWAR between Baker Lake and the Meadowbank Mine. The Regional Study Area (RSA) encompasses an area that includes a 25 km radius area around the Main and Vault sites and a 50 km wide corridor along the AWAR for a total area of 5,106 km<sup>2</sup> (**Figure 2.3**).

### 2.3.2 Whale Tail Pit and Haul Road

The Whale Tail LSA is a 3 km corridor centered on the Whale Tail Haul Road and borrow site access roads (i.e., 1.5 km on either side of the road and 1.5 km around borrow areas) and includes an approximate 1.5 km buffer around development areas at the Whale Tail Pit area, for a total area of 282 km<sup>2</sup>. The Whale Tail RSA is a 50 km corridor centred on the Haul Road alignment (i.e., 25 km on either side of the Haul Road and borrow site access roads, and 25 km around borrow areas), with a total area of 5,017 km<sup>2</sup> (**Figure 2.4**).

## 2.4 MONITORING APPROACH

Wildlife monitoring is an essential tool in protecting and maintaining wildlife occurring near the project. A comprehensive monitoring strategy, along with quantitative monitoring indicators, has been implemented and, as required, is adapted to evaluate the accuracy of impact predictions and to meet the objectives of the management strategy set out in the TEMP (Agnico Eagle 2019). Monitoring programs evaluate the effectiveness of mitigation measures and assess mine-related impact predictions. For all wildlife monitoring programs there is a certain level of uncertainty or unpredictability; therefore, residual effects identified during monitoring may require implementation of adaptive management strategies. Adaptive management is an ongoing process that evolves throughout the life of the project as better and more effective ideas are introduced in a process that is designed to be continually improving. Ongoing review of the TEMP and annual Wildlife Monitoring Summary Reports (which provide results of TEMP monitoring programs) by regulatory agencies, technical reviewers, and stakeholders will further ensure that local and regional concerns have been adequately addressed.

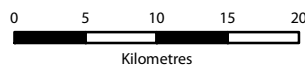
Environmental staff monitor wildlife near mine facilities (i.e., Meadowbank Mine and Whale Tail Pit) and along the AWAR, Vault Haul Road, and Whale Tail Haul Road on a regular basis (discussed in detail in **Sections 3** and **4**). Where unacceptable risks to wildlife are observed, mitigation measures are implemented to avert animals from site activities in accordance with the TEMP (Agnico Eagle 2019). Detailed reporting protocols (e.g., a dangerous animal occurrence, monthly wildlife reports submitted to the GN, road closure notification to GN, KIA, HTO, etc.) are established and implemented by on-site environmental staff. During these events, Agnico Eagle representatives communicate any issues directly with the GN Department of Environment (DoE) Conservation Officer, KIA, and the local HTO.





### Legend

- All-Weather Access Road
- Whale Tail Haul Road
- Meadowbank All-Weather Access Road Local Study Area (LSA)
- Meadowbank Local Study Area (LSA)
- Meadowbank Regional Study Area (RSA)



**Projection:** UTM Zone 14 NAD83

**Data Sources:**  
 Natural Resources Canada, GeoBase®  
 National Topographic Database  
 Agnico-Eagle Mines Limited.

**Figure 2.3: RSA and LSA  
 Boundaries for the  
 Meadowbank Mine and AWAR**

### Meadowbank Gold Project

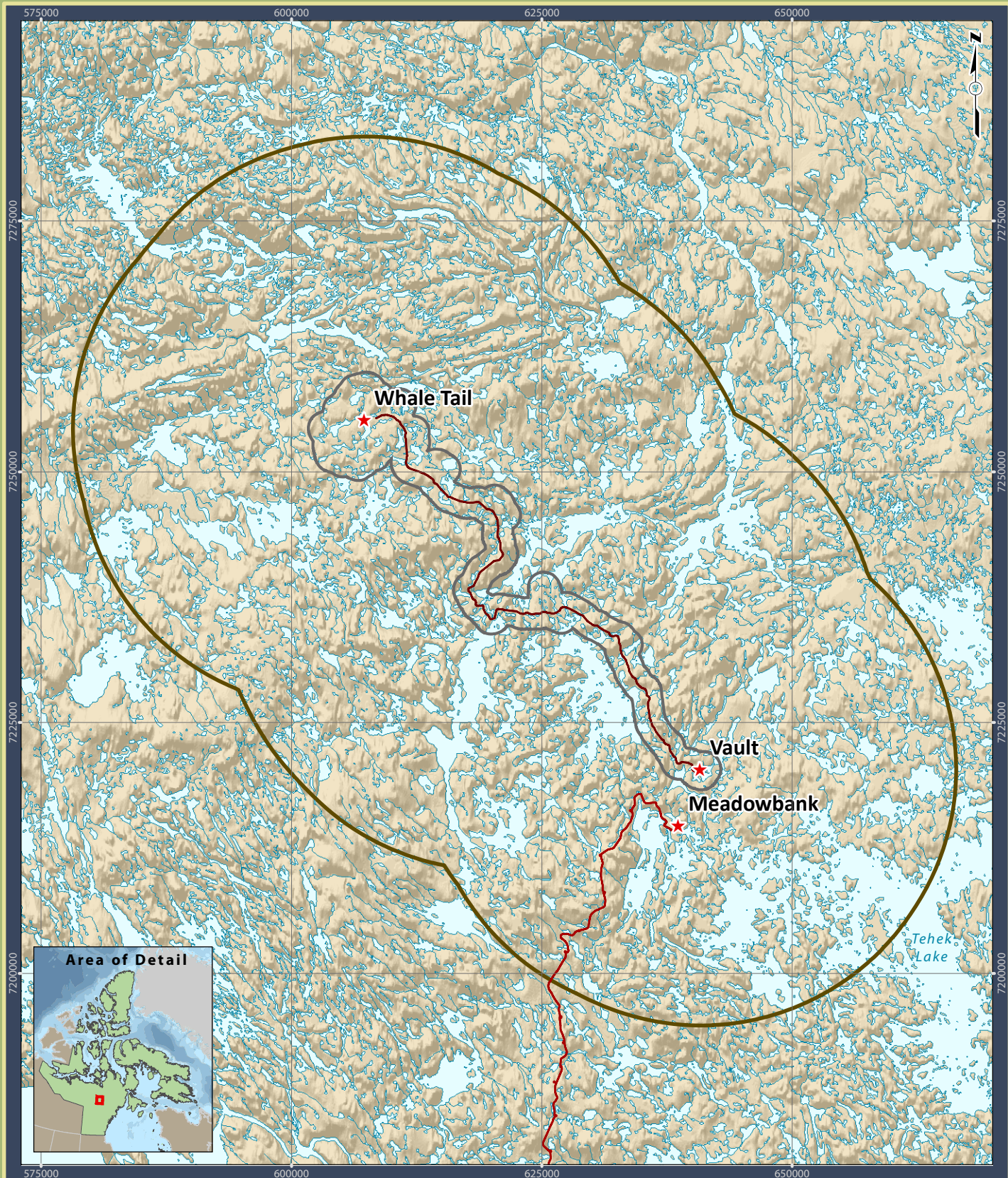
Prepared for:



By:







### Legend

- All-Weather Access Road
- Whale Tail Haul Road
- Whale Tail Pit and Haul Road Local Study Area (LSA)
- Whale Tail Pit and Haul Road Regional Study Area (RSA)



**Projection:** UTM Zone 14 NAD83

**Data Sources:**  
 Natural Resources Canada, GeoBase®  
 National Topographic Database  
 Agnico-Eagle Mines Limited.

**Figure 2.4: RSA and LSA  
 Boundaries for the  
 Whale Tail Pit and Haul Road**

### Meadowbank Gold Project

Prepared for:



By:





## 2.5 REPORT OBJECTIVES

The primary objectives of the 2019 Wildlife Monitoring Summary Report are to:

- Report the results of the 2019 wildlife monitoring programs;
- Summarize the monitoring strategy implemented over the course of the year;
- Evaluate the function and validity of implemented monitoring strategies;
- Summarize adaptive management strategies;
- Provide management recommendations for 2019;
- Allow regulators to contribute advice for improving wildlife management; and
- Include a summary of all Caribou-related monitoring, mitigation and management in one consolidated section.

## 2.6 INUIT INVOLVEMENT

Since 1999, local Inuit from the Hamlet of Baker Lake have been involved in all wildlife-related baseline and monitoring surveys. A summary of the various programs and the average number of Inuit involved since 1999 is provided in **Table 2.1**. As required by the IIBA, “Anything done by Agnico in order to implement the TEMP [...] shall incorporate Inuit Qaujimanituaugit”; therefore, traditional knowledge or IQ has been incorporated in this annual report. The projects are also monitored as part of a Memorandum of Understanding by a representative of the Baker Lake HTO consistently during the year.

**Table 2.1:** Inuit Involvement in Baseline and Monitoring Programs for the Meadowbank Mine.

Survey Description	Years Conducted (# of Years)	Average # of Inuit Involved
RSA Aerial Survey	1999, 2002 to 2008 (8) – discontinued	2
LSA Aerial Survey	1999, 2002 to 2008 (8) – discontinued	2
Breeding Bird Plots	2003 to 2012; 2015 (11)	2 to 3
Breeding Bird Transects	2005 to 2011; 2015 (8) - discontinued	2
Waterfowl Nest Surveys	2004 to 2012 (9) - discontinued	3
Whale Tail Waterbird Nest Surveys	2018 and 2019 (2)	2
Raptor Nest Surveys	2004 to 2007, 2010 to 2019 (14)	3 to 4
AWAR Ground Surveys	2004 to 2019 (16)	2 to 3
Vault Haul Road Surveys	2017 to 2019 (3)	1 to 2
Whale Tail Haul Road Surveys	2018 and 2019 (2)	1 to 2
Height of Land Surveys	2018 and 2019 (2)	1 to 2
Habitat Mapping	2004 to 2005, 2010, 2012, 2014, 2017, 2018 (7)	1
Phenology Plots	2003 to 2005 (3) - discontinued	2

## 2.7 TERRESTRIAL ADVISORY GROUP

As per Project Certificate No.008, Condition 27 of the Whale Tail Pit Final Environmental Impact Statement (EIS) Addendum (Golder 2016), Agnico Eagle has established a Terrestrial Advisory Group (TAG) consisting of representatives from Agnico Eagle, the Government of Nunavut Department of Environment (GN-DoE), Environment and Climate Change Canada (ECCC), the Kivalliq Inuit Association (KivIA), and the Baker Lake Hunters and Trappers Organization (HTO).

An MOU and Terms of Reference has been developed and signed by all parties in July 2019. Agnico Eagle will provide a summary of TAG meeting outcomes to the NIRB in the annual report beginning in 2019.

The purpose of the TAG is to:

- Measure the relevant environmental effects of the project on terrestrial wildlife;
- Confirm that the project is being carried out within the terms and conditions of the project certificate relating to the protection of terrestrial wildlife;
- Assess the accuracy of the predictions contained in the final environmental impact statement filed by Agnico Eagle with NIRB in respect of the project;
- Identify and select appropriate target species, indicators and linkages for monitoring;
- Evaluate the effectiveness of mitigation measures and to support any required improvement of those measures;
- Identify any unforeseen environmental effects caused by the project;
- Provide an early warning mechanism to identify any environmental effects caused by the project; and
- Determine and identify any cause-and-effect interactions between the project and the environment.

## 2.8 MITIGATION AUDIT

A mitigation audit is an annual requirement outlined in the 2019 TEMP. Mitigation approaches stem from current practices at existing mines or were suggested during the environmental assessment process; however, an auditing system is required to evaluate the use and effectiveness of the mitigation, following principals of adaptive management, and to identify additional mitigation measures as required. As an example, per Project Certificate No.008, Condition 32, Agnico Eagle engages with the Baker Lake HTO and other relevant parties to ensure that safety barriers, berms, and designed crossings associated with project infrastructure, including the Whale Tail Haul road, are constructed and operated as necessary to allow for the safe passage of Caribou and other terrestrial wildlife.

The audit is to be undertaken annually and summarized in the annual report, and will focus specifically on mitigation listed in Section 2 of the June 2019 TEMP. The audit will evaluate:

- What mitigation has been implemented;
- Which mitigation is perceived to be, or shown to be successful;
- If new mitigation has been implemented in response to new issues; and
- If some mitigation is redundant.

In 2019, Agnico Eagle took a staged approach to the mitigation audit (e.g., review of safety barriers, berms, and designed crossings along the Whale Tail Haul Road). A complete mitigation audit may be conducted in 2020 but this will be part of discussions within the TAG.

## SECTION 3 • ROAD SURVEYS

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### 3.1 OVERVIEW

A systematic ground survey monitoring program for the AWAR, and Vault and Whale Tail haul roads has been designed to evaluate sensory disturbance for wildlife, particularly Caribou (*Rangifer tarandus*), Muskoxen (*Ovibos moschatus*), and Predatory Mammals utilizing habitats adjacent to the roads. The program also monitors incidental mortality of species as they are encountered within the mine infrastructure, but particularly near roads.

### 3.2 OBJECTIVES

The primary objectives of the road ground survey monitoring program are to:

1. Document wildlife utilization along the AWAR, Vault Haul Road, and Whale Tail Haul Road corridors;
2. Evaluate wildlife trends along the road corridors, including identifying areas where higher densities of wildlife are observed;
3. Assess the need for adaptive mitigation, such as temporary road closures during peak Caribou migration periods;
4. Ensure that mortality thresholds for wildlife are not exceeded;
5. Confirm that Caribou are not killed through road-related mortality. The project-wide threshold mortality level for Ungulates is two (2) individuals per year (as per TEMP 2019); and
6. Confirm that Predatory Mammals are not killed through road-related mortality. The project-wide threshold mortality level for Predatory Mammals is two (2) individuals per year (as per TEMP 2019)

### 3.3 DURATION

The AWAR, Vault Haul Road, and Whale Tail Haul Road systematic ground surveys are ongoing over the operation phase of the mine and are scheduled to be conducted a minimum of once per week throughout the year, twice per week during Caribou migration (i.e., contingent on weather, road access and personnel availability), and every two days if Caribou/Muskox Group Size Thresholds (GST) are exceeded (see Figures 7 and 8 in 2019 TEMP). Agnico Eagle is committed to conducting a minimum of approximately 75 road surveys per year along the AWAR and Whale Tail Haul Road. The number of surveys along the Vault Haul Road is contingent on whether Caribou have been sighted in the area during mine site ground surveys or are known to be in the area based on collaring data. Monitoring of vehicle collisions and wildlife mortality is continual along all road segments.

### 3.4 METHODOLOGY

Road surveys were expanded beyond the AWAR to include the recently completed Vault Haul Road, beginning in 2017, and the Whale Tail Haul Road, beginning in 2018. For the Whale Tail Haul Road, Agnico Eagle has signed an MOU with the Baker Lake HTO for a wildlife monitor on the road beginning in October 2018.

The survey team typically includes two observers (one can be the driver) in a vehicle. The terrain on both sides of the road (to a maximum horizontal distance of approximately 1 km perpendicular from the road edge) is surveyed as the vehicle progresses at a maximum speed of 30 km per hour. For each sighting, the vehicle is safely parked in a road pullout and UTM coordinates are recorded along with the estimated distance of the animal(s) from the road, nearest road marker, species, number, direction of travel and a variety of other information (e.g., behavior). Where animals are sighted close to roads and a risk of collision with vehicles is possible, the environmental monitor/observers report the number of animals, location, and direction of travel to the mine radio dispatcher who informs all vehicle operators. In addition, all vehicle operators report Ungulates and Predatory Mammals seen along the road to the dispatcher.

Regular data provided to mine site personnel from the Caribou satellite-collaring program (**Section 6**) are also used to track Caribou movement and potential interactions with roads and mine facilities.

### 3.5 HISTORICAL RESULTS

Ground surveys commenced shortly following the onset of AWAR construction (2007). Sampling intensity has been comparable along the entire length of the AWAR since 2009. Surveys along the Vault Haul Road have been irregular since its completion but were included as part of regular AWAR surveys in 2016 and conducted separately beginning in 2017. Over the past 13 years (to 2018), surveys have been completed along the AWAR every 3.9 to 6.1 days (2.6 days in 2019) (see **Table 3.1**). Surveys at the Vault Haul Road have been completed every 7.8 to 20.3 days (11.8 days in 2019) (see **Table 3.2**). Surveys in 2018 along the Whale Tail Haul Road were completed every 8.6 days (2.6 days in 2019) (see **Table 3.5**).

### 3.6 2019 RESULTS

#### 3.6.1 AWAR Surveys

The number of AWAR surveys completed each season in 2019 is provided in **Table 3.1**. The number of systematic road surveys completed in 2019 (n=137) is considerably higher than the annual average of 73 surveys over the previous 12 years and the annual goal of 75 surveys. In 2019, surveys were conducted on average every 2.6 days with survey frequency relatively consistent across the seasons, with the exception of winter. By month, the highest numbers of surveys were in April, October and November corresponding with higher numbers of Caribou observed within the LSA. Raw road survey data are provided in **Appendix A**.

**Table 3.1:** Details of AWAR Wildlife Surveys from 2007 to 2019.

Season	Number of AWAR Surveys												
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*	2017	2018	2019
Spring (Apr 01 to May 25)	13	15	15	9	10	14	9	11	17	10	19	9	37
Summer (May 26 to Sep 21)	24	7	10	9	9	13	13	7	16	14	16	12	39
Fall (Sep 22 to Dec 15)	8	15	8	12	11	12	10	11	11	16	14	16	39
Winter (Dec 16 to Mar 31)	33	57	25	36	33	38	31	38	32	38	36	35	22
<b>Year End Total</b>	<b>78</b>	<b>94</b>	<b>58</b>	<b>66</b>	<b>63</b>	<b>77</b>	<b>63</b>	<b>67</b>	<b>76</b>	<b>78</b>	<b>85</b>	<b>72</b>	<b>137</b>
Duration	Mar 01 to Dec 31	Jan 02 to Dec 29	Jan 09 to Dec 16	Jan 21 to Dec 17	Jan 10 to Dec 30	Jan 04 to Dec 29	Feb 02 to Dec 27	Jan 12 to Dec 30	Jan 03 to Dec 18	Jan 02 to Dec 27	Jan 03 to Dec 29	Jan 03 to Dec 29	Jan 04 to Dec 27
Average Frequency of Surveys (over duration)*	4.1 days	3.9 days	6.1 days	5.6 days	6.0 days	4.7 days	6.0 days	5.5 days	4.7 days	4.7 days	4.3 days	5.0 days	2.6 days

\* Frequency refers to the number of days between surveys, on average over the year

**Table 3.2:** Details of Vault Haul Road Wildlife Surveys from 2017 to 2019.

Season	Number of Vault Haul Road Surveys		
	2017	2018	2019
Spring (April to May)	9	3	20
Summer (June to July)	7	0	1
Fall (August to September)	7	4	4
Winter (Jan to Mar, Oct to Dec)	24	11	6
<b>Year End Total</b>	<b>47</b>	<b>18</b>	<b>31</b>
Duration	Jan 03 to Dec 29	Jan 30 to Dec 16	Jan 25 to Nov 22
Average Frequency of Surveys (over duration)	7.8 days	20.3 days	11.8 days

\* Frequency refers to the number of days between surveys, on average over the year



## 2019 WILDLIFE MONITORING SUMMARY

Cumulative Caribou density along the AWAR for 2019 is provided in **Figure 3.1** (all seasons), **Figure 3.2** (spring and summer Caribou seasons), and **Figure 3.3** (fall and winter). In the 2019 spring Caribou season, the highest Caribou densities were observed south of the Meadowbank mine (i.e., Kms 66 to 90), while in the summer, densities were highest between just north of Whitehills Lake to the Meadowbank Mine (see **Figure 3.2**). In the fall Caribou season, reported densities were highest closest to Baker Lake (i.e., Kms 14 to 20) and in the Whitehills Lake area (i.e., Kms 32 to 54), while densities in winter were very low along the entire AWAR (see **Figure 3.3**).

The 2019 Caribou occurrence data were added to the 2008 to 2018 datasets with the resulting cumulative Caribou numbers presented in **Figure 3.4**. These data illustrate that for over 11 years of surveys, the highest cumulative Caribou abundances along the AWAR continue to be in areas closest to the Hamlet of Baker Lake, and south and north of Whitehills Lake. The 2019 data generally follow this pattern (see **Figure 3.1**).

In 2019, Caribou numbers recorded on AWAR surveys were significantly higher than in 2018 and any of the other years that the road surveys were conducted (**Figure 3.5**). The average number of Caribou observed per survey trip in April and October was the highest since surveys began indicating a strong spring and fall migration through the study area (**Table 3.3**). The frequency of Caribou observed during the remainder of the year was relatively consistent with low numbers in midwinter (i.e., December through March) and mid-summer (June to September) (**Table 3.3**).

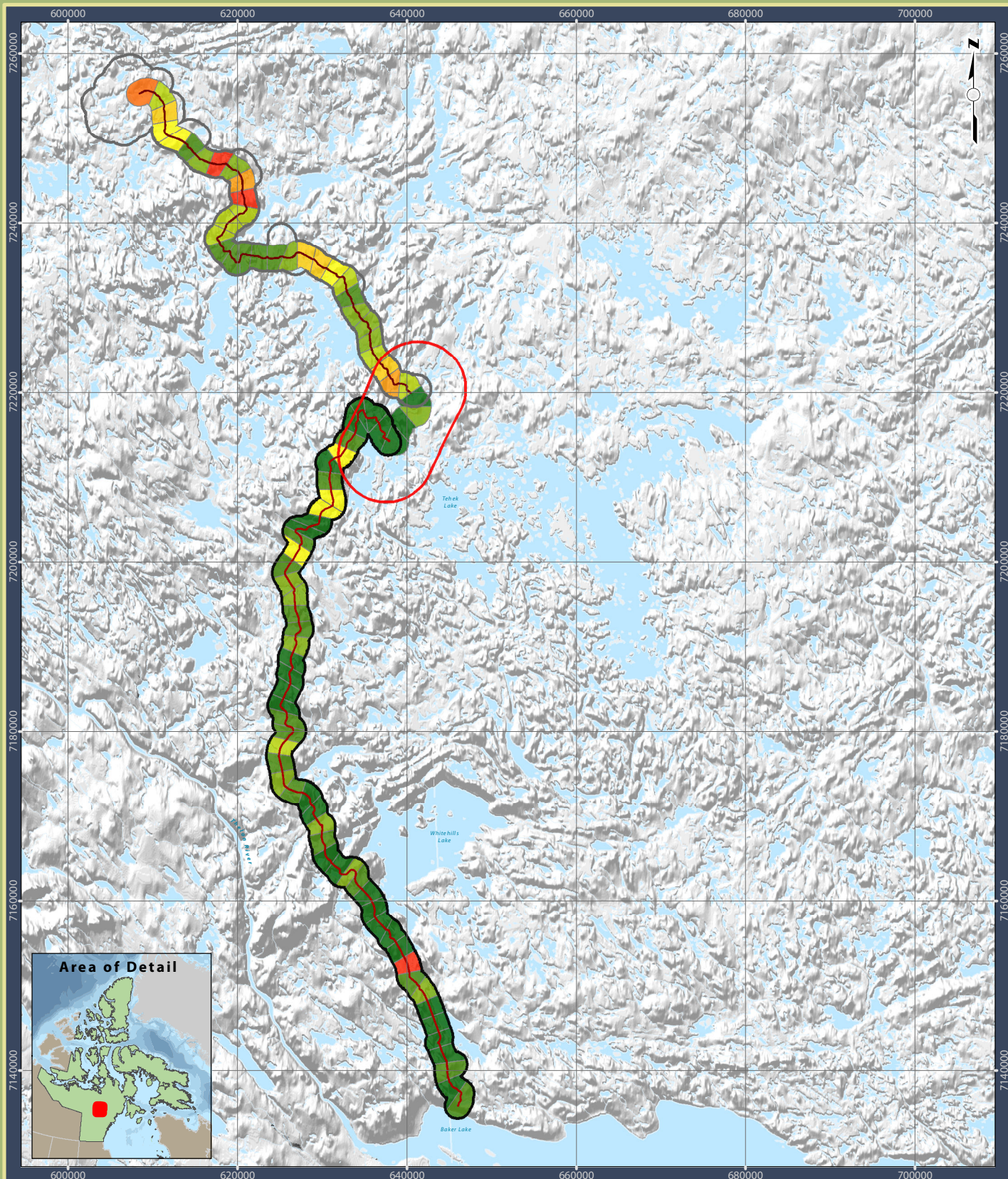
### 3.6.2 Vault Haul Road Surveys

The number of Vault Haul Road surveys completed each season in 2019 is provided in **Table 3.2**. The total number of surveys fluctuated from 47 surveys in 2017 (i.e., every 7.8 days) to 18 in 2018 (i.e., every 20.3 days) and to 31 surveys (i.e., every 11.8 days) in 2019. The highest numbers of surveys were conducted in spring, a period of high Caribou activity (**Table 3.2**). The average number of Caribou observed along the Vault Road was significantly higher than in 2018 with the highest average numbers seen in April and September (**Table 3.4**). Raw road survey data are provided in **Appendix A**.

### 3.6.3 Whale Tail Haul Road Surveys

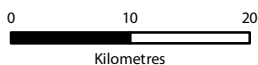
The number of Whale Tail Haul Road surveys completed each season in 2019 is provided in **Table 3.5**. Surveys were conducted on average every 2.6 days during the year. Survey frequency was lowest during the winter. On a monthly basis, the highest numbers of surveys were conducted in April, May, August and October. The highest average numbers of Caribou were seen in April, May and October, which aligns with surveys results from the AWAR and the Vault Haul Road (**Table 3.6**). Raw road survey data are provided in **Appendix B**.





### Legend

- |  |  |  |               |  |               |  |           |  |               |  |           |  |               |  |             |  |               |  |               |  |  |
|--|--|--|---------------|--|---------------|--|-----------|--|---------------|--|-----------|--|---------------|--|-------------|--|---------------|--|---------------|--|--|
| <ul style="list-style-type: none"> <li><span style="color: red;">—</span> All-Weather Access Road</li> <li><span style="color: brown;">—</span> Whale Tail Haul Road</li> <li><span style="color: brown;">—</span> Whale Tail Pit and Haul Road</li> <li><span style="border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> Road Local Study Area (LSA)</li> <li><span style="border: 2px solid red; display: inline-block; width: 20px; height: 10px;"></span> Meadowbank Local Study Area (LSA)</li> <li><span style="border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> Meadowbank All-Weather Access Road Local Study Area (LSA)</li> </ul> | <p><b>Caribou Density (per km) - 2019</b></p> <table border="0"> <tr> <td style="background-color: darkgreen; width: 20px;"></td> <td>0 - 250</td> <td style="background-color: yellow; width: 20px;"></td> <td>1,251 - 1,500</td> </tr> <tr> <td style="background-color: green; width: 20px;"></td> <td>251 - 500</td> <td style="background-color: orange; width: 20px;"></td> <td>1,501 - 1,750</td> </tr> <tr> <td style="background-color: lightgreen; width: 20px;"></td> <td>501 - 750</td> <td style="background-color: red; width: 20px;"></td> <td>1,751 - 2,000</td> </tr> <tr> <td style="background-color: limegreen; width: 20px;"></td> <td>751 - 1,000</td> <td style="background-color: darkred; width: 20px;"></td> <td>2,001 - 2,250</td> </tr> <tr> <td style="background-color: yellowgreen; width: 20px;"></td> <td>1,001 - 1,250</td> <td></td> <td></td> </tr> </table> |  | 0 - 250       |  | 1,251 - 1,500 |  | 251 - 500 |  | 1,501 - 1,750 |  | 501 - 750 |  | 1,751 - 2,000 |  | 751 - 1,000 |  | 2,001 - 2,250 |  | 1,001 - 1,250 |  |  |
|  | 0 - 250  |  | 1,251 - 1,500 |  |               |  |           |  |               |  |           |  |               |  |             |  |               |  |               |  |  |
|  | 251 - 500  |  | 1,501 - 1,750 |  |               |  |           |  |               |  |           |  |               |  |             |  |               |  |               |  |  |
|  | 501 - 750  |  | 1,751 - 2,000 |  |               |  |           |  |               |  |           |  |               |  |             |  |               |  |               |  |  |
|  | 751 - 1,000  |  | 2,001 - 2,250 |  |               |  |           |  |               |  |           |  |               |  |             |  |               |  |               |  |  |
|  | 1,001 - 1,250  |  |               |  |               |  |           |  |               |  |           |  |               |  |             |  |               |  |               |  |  |



Projection: UTM Zone 14 NAD83

**Data Sources:**  
 Natural Resources Canada, GeoBase®  
 National Topographic Database  
 Agnico-Eagle Mines Limited  
 Gebauer & Associates Ltd.

**Figure 3.1: Caribou Density along the AWAR, and Vault and Whale Tail Haul Roads (2019)**

### Meadowbank Gold Project

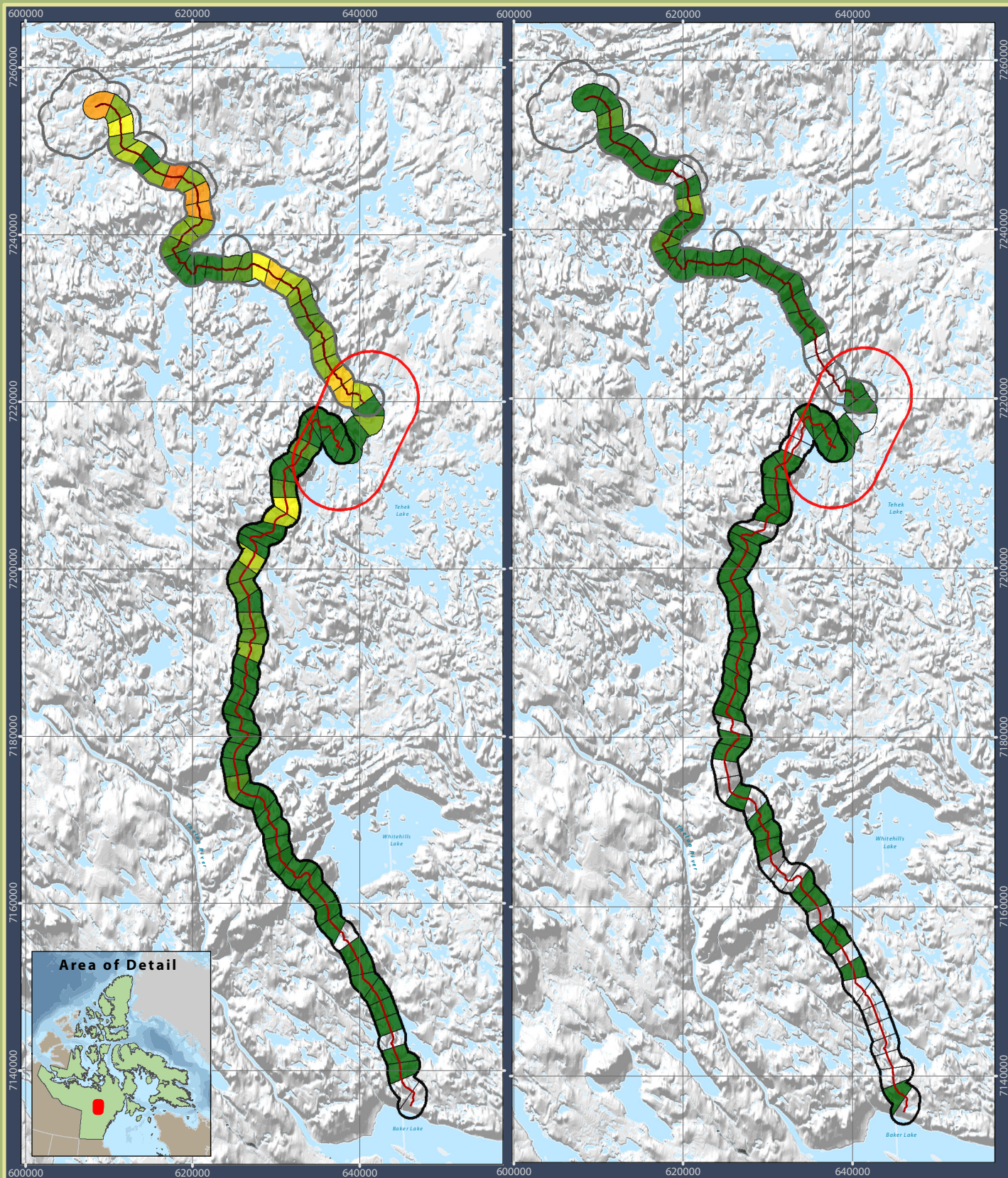
Prepared for:



By:







### Legend

- All-Weather Access Road
  - Whale Tail Haul Road
  - Whale Tail Pit and Haul Road Local Study Area (LSA)
  - Meadowbank Local Study Area (LSA)
  - Meadowbank All-Weather Access Road Local Study Area (LSA)
- | Caribou Density (per km)                             |   |
|--|---|
| <span style="color: green;">■</span> 0 - 250         | <span style="color: yellow;">■</span> 1,251 - 1,500     |
| <span style="color: darkgreen;">■</span> 251 - 500   | <span style="color: orange;">■</span> 1,501 - 1,750     |
| <span style="color: lightgreen;">■</span> 501 - 750  | <span style="color: darkorange;">■</span> 1,751 - 2,000 |
| <span style="color: limegreen;">■</span> 751 - 1,000 | <span style="color: red;">■</span> 2,001 - 2,250        |
| <span style="color: yellow;">■</span> 1,001 - 1,250  |   |

0 10 20  
Kilometres

Projection: UTM Zone 14 NAD83

**Data Sources:**  
Natural Resources Canada, GeoBase®  
National Topographic Database  
Agnico-Eagle Mines Limited  
Gebauer & Associates Ltd.

**Figure 3.2: Caribou Density along the AWAR, and Vault and Whale Tail Haul Roads in Spring and Summer 2019**

### Meadowbank Gold Project

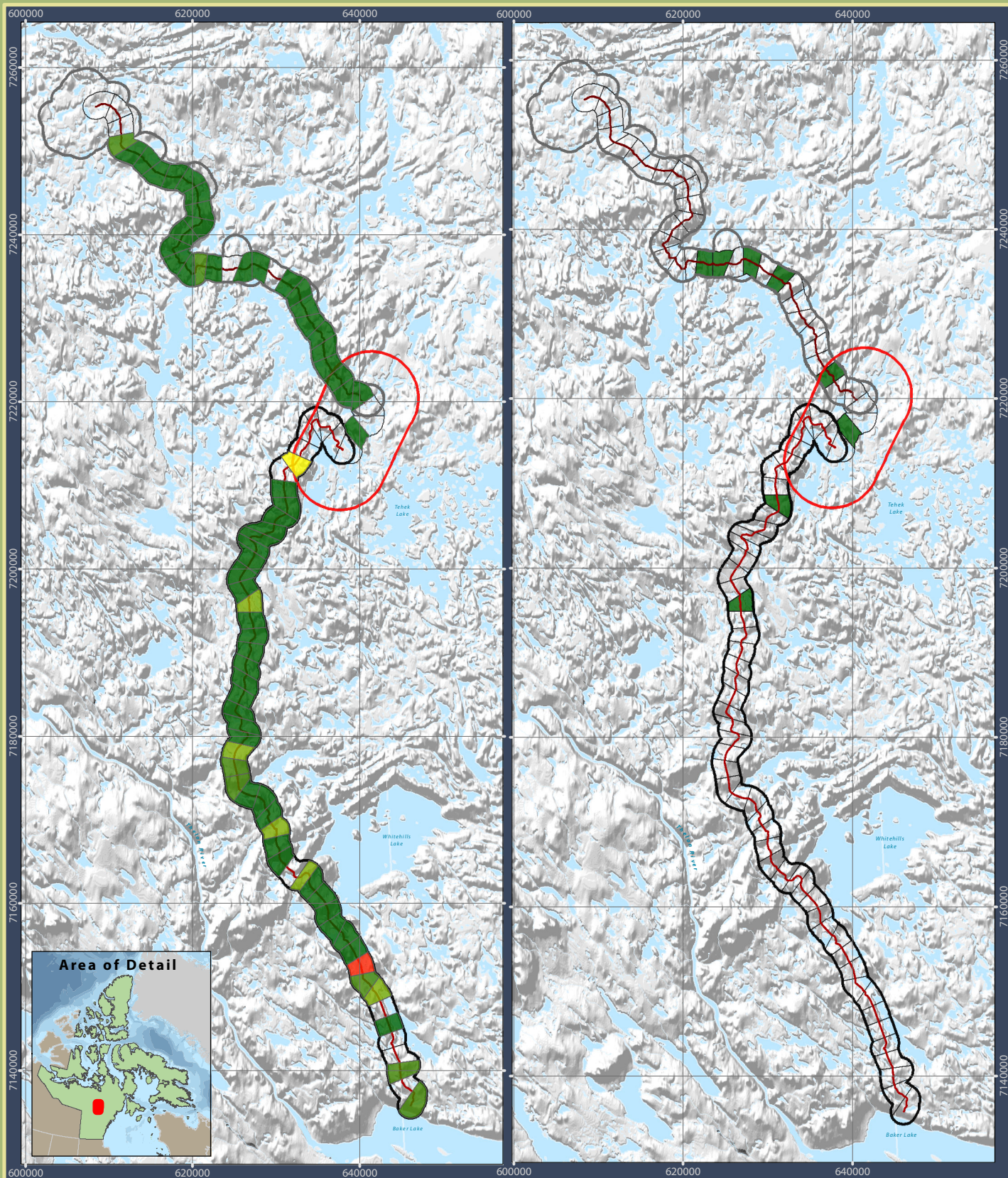
Prepared for:



By:







### Legend

- |   |   |   |
|---|---|---|
| <span style="color: red;">—</span> All-Weather Access Road  | <span style="background-color: green; border: 1px solid black;"> </span> Caribou Density (per km) | <span style="background-color: yellow; border: 1px solid black;"> </span> 1,251 - 1,500     |
| <span style="color: brown;">—</span> Whale Tail Haul Road   | <span style="background-color: darkgreen; border: 1px solid black;"> </span> 0 - 250              | <span style="background-color: orange; border: 1px solid black;"> </span> 1,501 - 1,750     |
| <span style="border: 1px solid black;"> </span> Whale Tail Pit and Haul Road Local Study Area (LSA)       | <span style="background-color: lightgreen; border: 1px solid black;"> </span> 251 - 500           | <span style="background-color: darkorange; border: 1px solid black;"> </span> 1,751 - 2,000 |
| <span style="border: 1px solid red;"> </span> Meadowbank Local Study Area (LSA)                           | <span style="background-color: limegreen; border: 1px solid black;"> </span> 501 - 750            | <span style="background-color: red; border: 1px solid black;"> </span> 2,001 - 2,250        |
| <span style="border: 1px solid black;"> </span> Meadowbank All-Weather Access Road Local Study Area (LSA) | <span style="background-color: yellowgreen; border: 1px solid black;"> </span> 751 - 1,000        | <span style="background-color: red; border: 1px solid black;"> </span> 2,001 - 2,250        |
|   | <span style="background-color: yellow; border: 1px solid black;"> </span> 1,001 - 1,250           |   |

0 10 20  
Kilometres

Projection: UTM Zone 14 NAD83

**Data Sources:**  
Natural Resources Canada, GeoBase®  
National Topographic Database  
Agnico-Eagle Mines Limited  
Gebauer & Associates Ltd.

**Figure 3.3: Caribou Density along the AWAR, and Vault and Whale Tail Haul Roads in Fall and Winter 2019**

### Meadowbank Gold Project

Prepared for:

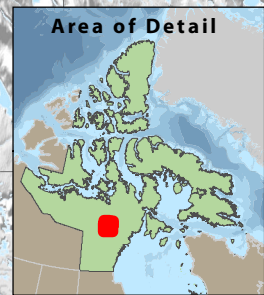
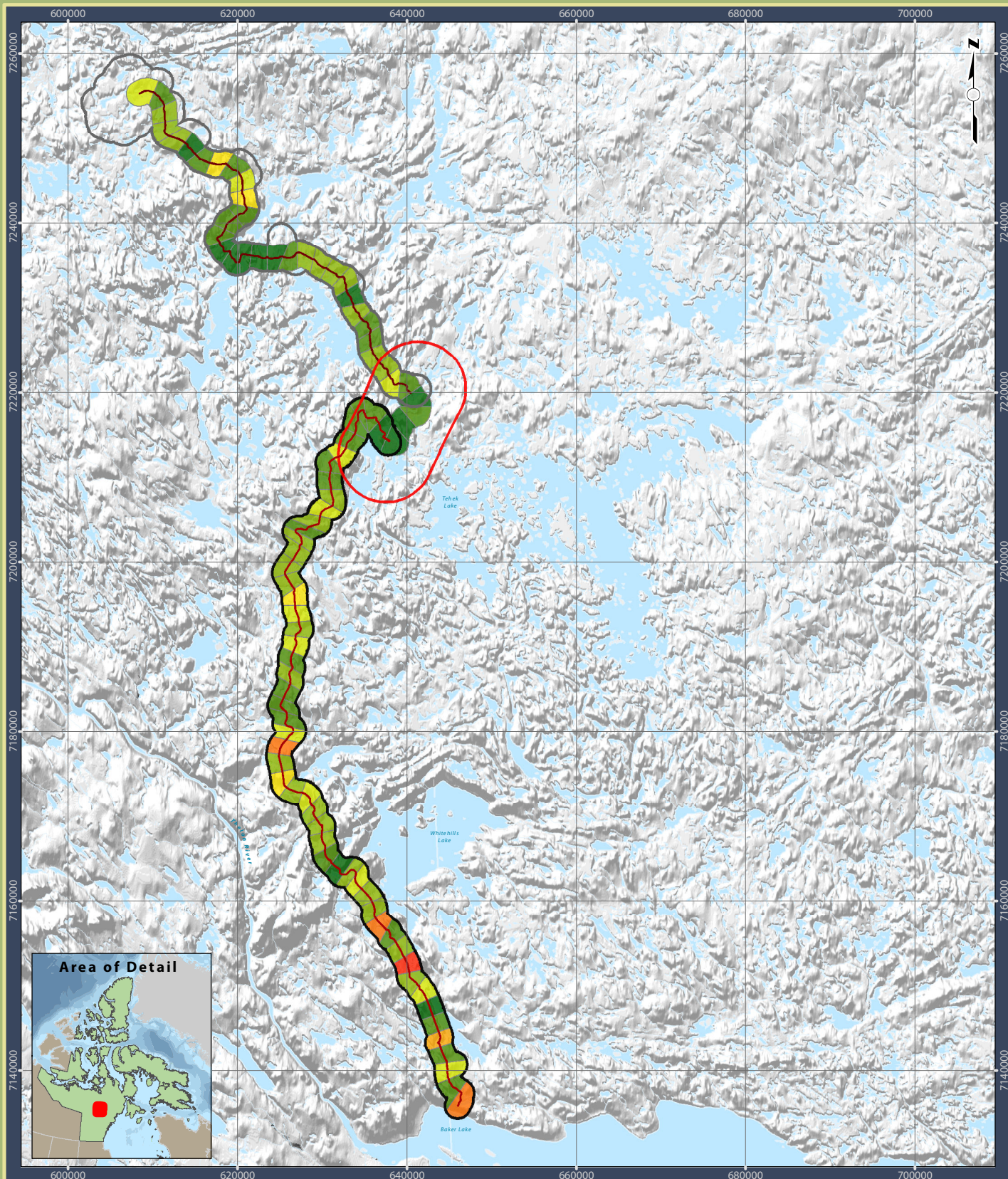
**AGNICO EAGLE**

By:

**Nunavut**  
ENVIRONMENTAL  
CONSULTING LTD

**CASLYS**  
CONSULTING



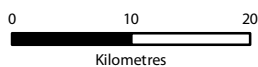


### Legend

- All-Weather Access Road
- Whale Tail Haul Road
- Whale Tail Pit and Haul Road
- Road Local Study Area (LSA)
- Meadowbank Local Study Area (LSA)
- Meadowbank All-Weather Access Road Local Study Area (LSA)

### Caribou Density (per km)

- 129 - 500
- 501 - 1,000
- 1,001 - 1,500
- 1,501 - 2,000
- 2,001 - 2,500
- 2,501 - 3,000
- 3,001 - 3,500
- 3,501 - 4,000



Projection: UTM Zone 14 NAD83

**Data Sources:**  
 Natural Resources Canada, GeoBase®  
 National Topographic Database  
 Agnico-Eagle Mines Limited  
 Gebauer & Associates Ltd.

**Figure 3.4: Caribou Density along the AWAR, and Vault and Whale Tail Haul Roads between 2008 and 2019**

### Meadowbank Gold Project

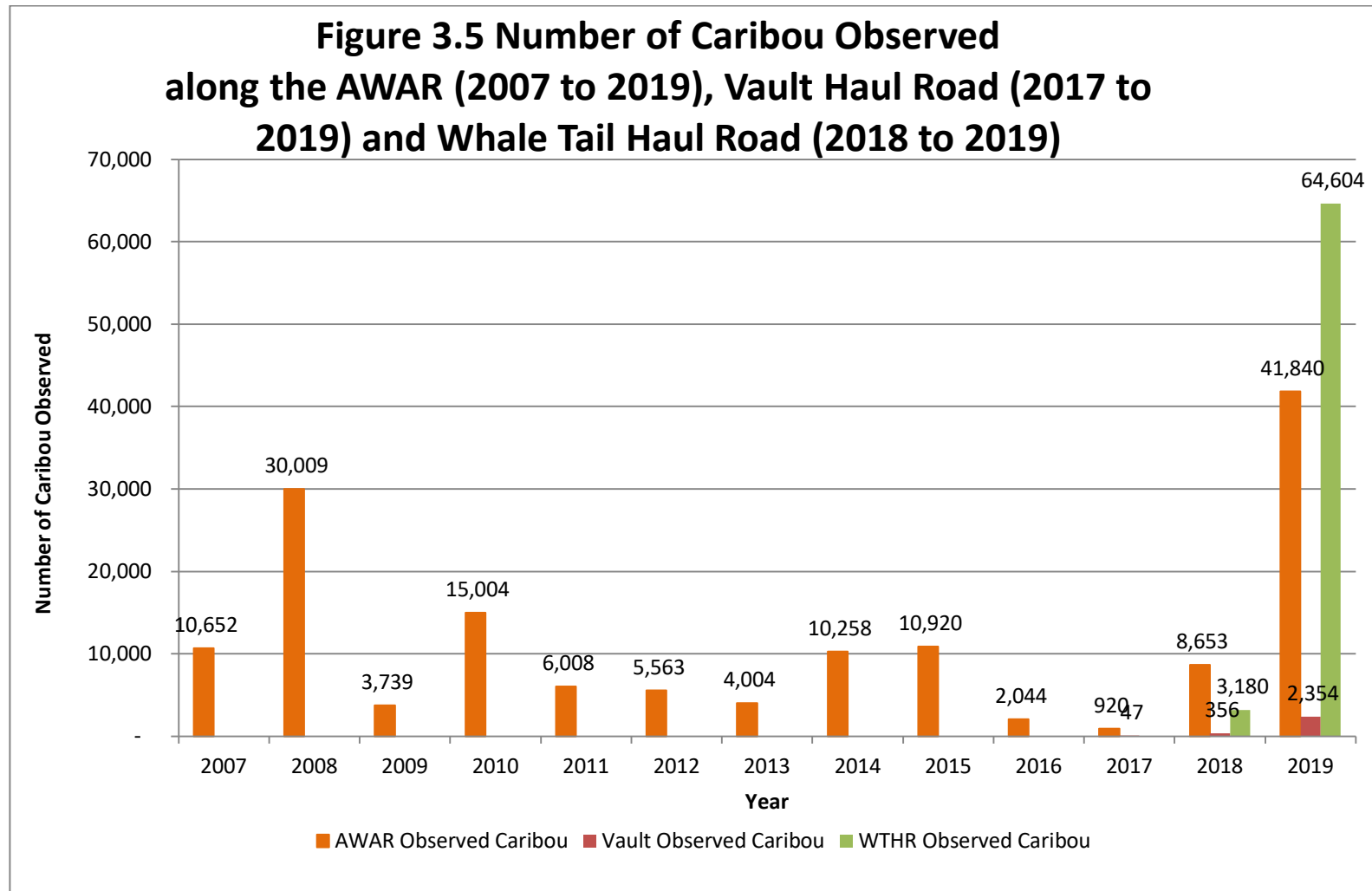
Prepared for:



By:









**Table 3.3:** Average Number of Caribou Observed Per Survey Trip along the AWAR from 2007 to 2019.

Month	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average
January	0	14.3	12.0	5.3	3.0	5.1	0	3.2	5.8	3.7	8.0	6.4	0	51
February	0	11.5	10.7	4.1	1.0	5.3	68.1	10.5	7.0	2.3	0	12.3	0	11.1
March	11.4	11.4	16.7	6.7	6.0	6.0	39.8	10.5	14.4	6.0	3.5	14.4	6.0	11.8
April	14.0	12.7	11.4	10.8	34.0	15.2	0	27.2	22.4	23.8	4.0	51.4	77.6	23.4
May	15.4	12.1	13.0	18.0	25.3	14.2	11.0	8.4	14.1	13.2	0	27.7	22.8	15.0
June	7.1	3.5	8.2	9.0	12.5	3.1	5.3	1.5	6.3	6.9	1.0	12.3	5.7	6.3
July	1.5	13.3	0	1.1	1.0	0	0	0	2.0	0	0	1.0	1.0	1.6
August	1.1	5.4	3.6	5.6	63.0	1.0	1.0	1.0	3.0	2.7	3.4	23.4	1.3	8.9
September	10.8	12.5	8.5	4.8	10.3	1.0	6.5	33.1	12.3	3.3	5.3	23.7	1.0	10.2
October	18.4	44.3	25.4	197.2	71.6	60.0	6.0	101.8	41.5	73.0	63.3	38.8	145.8	68.2
November	72.4	90.7	13.0	106.0	2.3	116.5	455.2	48.4	148.9	2.0	12.6	40.6	79.0	91.4
December	18.4	10.3	11.0	7.9	7.8	169.7	16.8	17.6	275.0	15.7	5.4	1.0	4.0	43.1

Data show the average number of Caribou observed for a month of the year, including data from all surveys done that month. Data are based on the observed number, which might be more inaccurate for larger groups or groups that are further away.

**Table 3.4:** Average Number of Caribou Observed Per Survey Trip along the Vault Haul Road from 2017 to 2019.

Month	2017	2018	2019
January	0	0	0
February	5	2	0
March	9	5	89.2
April	5	46.3	27.9
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	3	77	0
October	0	10	0
November	6	0	0
December	0	0	0

Data show the average number of caribou observed for a month of the year, including data from all surveys done that month. Data are based on the observed number, which might be more inaccurate for larger groups or groups that are further away.

**Table 3.5:** Details of Whale Tail Haul Road Surveys in 2018 and 2019.

Season	Number of Whale Tail Haul Road Surveys	
	2018	2019
Spring (April to May)	1	42
Summer (June to July)	1	38
Fall (August to September)	3	41
Winter (Jan to Mar, Oct to Dec)	36	21
<b>Year End Total</b>	<b>41</b>	<b>142</b>
Duration	Apr 19 to Dec 30	Jan 08 to Dec 23
Average Frequency of Surveys (over duration)	8.9 days	2.6 days

\* Frequency refers to the number of days between surveys, on average over the year

**Table 3.6:** Average Number of Caribou Observed Per Survey Trip along the Whale Tail Haul Road in 2018 and 2019.

Month	2018	2019
January	0	4.0
February	0	0
March	0	4.0
April	120.4	80.0
May	0	119.2
June	0	7.5
July	8.4	1.5
August	0	45.0
September	15.2	3.0
October	104.7	75.9
November	18.3	3.7
December	13.5	8.3

Data show the average number of caribou observed for a month of the year, including data from all surveys done that month. Data are based on the observed number, which might be more inaccurate for larger groups or groups that are further away

Cumulative Caribou density along the Whale Tail Haul Road for 2019 is provided in **Figure 3.1** (all seasons), **Figure 3.2** (spring and summer Caribou seasons), and **Figure 3.3** (fall and winter). In the 2019 spring Caribou Season, high Caribou densities were observed along the entire Whale Tail Haul Road but particularly closer to the Whale Tail Mine, while in the summer, densities were much lower and spread along the Haul Road (see **Figure 3.2**). In the fall Caribou season, reported densities were generally low along the length of the Whale Tail Haul Road, while densities in winter were very low (see **Figure 3.3**).

The 2019 Caribou occurrence data were added to the 2018 dataset with the resulting cumulative Caribou numbers presented in **Figure 3.4**. These data illustrate that for the two years of the surveys, the highest cumulative Caribou abundances along the Whale Tail Haul Road are north of the Vault and closer to the Whale Tail Mine site.

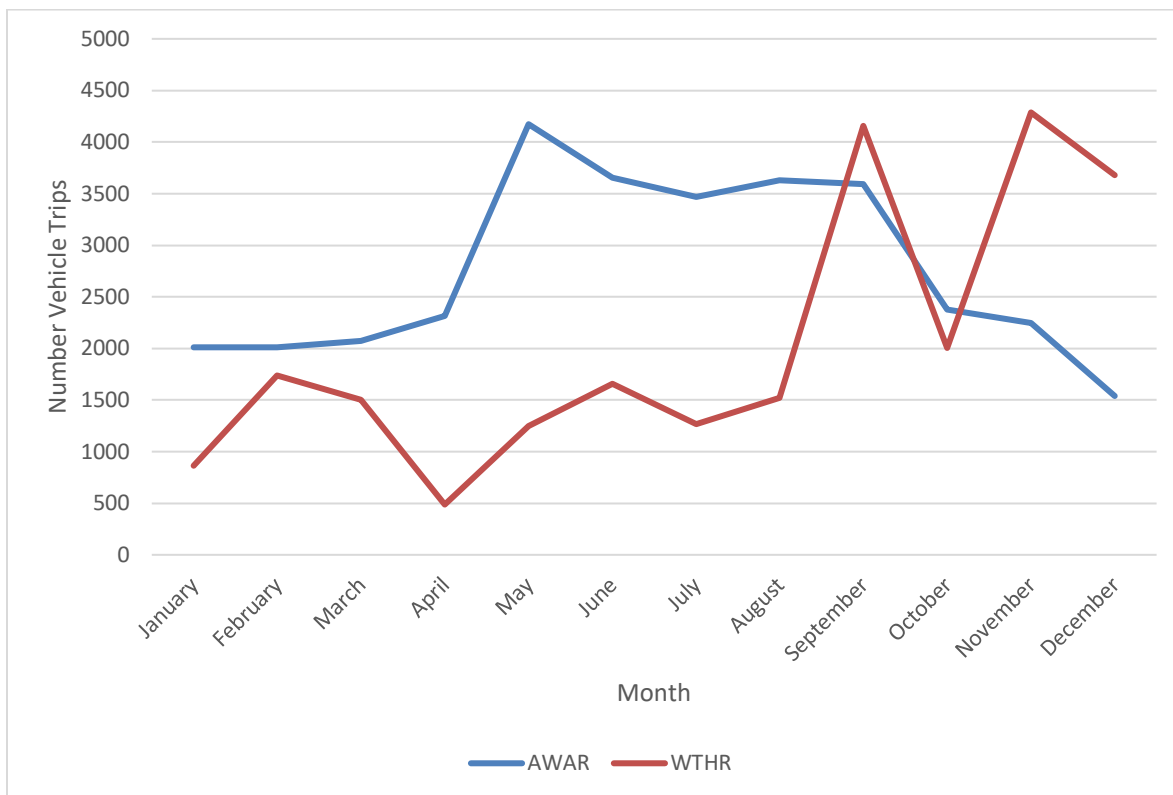
In 2019, Caribou numbers recorded on Whale Tail surveys were significantly higher than in 2017 or 2018 (**Figure 3.5**). The average number of Caribou observed per survey trip in May and August was the highest since surveys began indicating a strong spring and late summer migration through the study area (**Table 3.6**).

### 3.6.4 Traffic Data and Caribou Movements

Monthly traffic data for the AWAR and Whale Tail Haul Road is provided in **Table 3.7** while a chart depicting the changes in total number of vehicle movements is provided in **Figure 3.6**. **Table 3.7** and **Figure 3.6** clearly show lower numbers of vehicle movements during periods when Caribou numbers along the roads were the highest, which reflects the adaptive management efforts (e.g., road closures) when Caribou were observed along the roads. High numbers of Caribou along the Whale Tail Road in April and May (see **Table 3.6**) correspond with fewer vehicle movements (**Figure 3.6**), while high numbers of Caribou along the AWAR in October through December (**Table 3.3**) also correspond with fewer vehicle movements.

**Table 3.7:** Monthly Traffic Data for the Meadowbank AWAR and Whale Tail Haul Road in 2019.

Date (2019)	Meadowbank All-weather Access Road				Whale Tail Haul Road			
	Haul	Medium Equipment	Light Equipment	Total	Haul	Medium Equipment	Light Equipment	Total
January	0	740	1272	2012	632	92	140	864
February	0	818	1195	2013	762	241	735	1738
March	0	822	1252	2074	760	115	627	1502
April	8	772	1534	2314	148	107	232	487
May	911	1289	1973	4173	522	164	565	1251
June	337	1460	1860	3657	828	187	642	1657
July	33	1909	1529	3471	686	227	353	1266
August	12	2101	1516	3629	1176	169	178	1523
September	4	1947	1641	3592	2958	287	911	4156
October	14	1276	1084	2374	1280	276	448	2004
November	0	1212	1037	2249	2928	496	863	4287
December	0	855	684	1539	2778	318	584	3680
<b>Total</b>	<b>1319</b>	<b>15201</b>	<b>16577</b>	<b>33097</b>	<b>15458</b>	<b>2679</b>	<b>6278</b>	<b>24415</b>



**Figure 3.6:** Monthly Traffic Data along the AWAR and Whale Tail Haul Roads in 2019.

### 3.6.5 Wildlife Species Encountered on Road Surveys

Mammal species identified and observed during AWAR, Vault Haul Road, and Whale Tail Haul Road surveys in 2019 are included in **Table 3.8**.

## 2019 WILDLIFE MONITORING SUMMARY

**Table 3.8:** Wildlife Species Observed during AWAR, Vault Haul Road, and Whale Tail Haul Road Surveys in 2019.

Common Name	Scientific Name
<b>Mammals</b>	
Arctic Fox	<i>Vulpes lagopus</i>
Arctic Ground Squirrel	<i>Spermophilus parryii</i>
Arctic Hare	<i>Lepus arcticus</i>
Caribou	<i>Rangifer tarandus</i>
Grizzly Bear	<i>Ursus arctos</i>
Muskox	<i>Ovibos moschatus</i>
Wolf	<i>Canis lupus</i>
Wolverine	<i>Gulo gulo</i>
<b>Birds</b>	
American Golden-Plover	<i>Pluvialis dominica</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Cackling Goose	<i>Branta hutchinsii</i>
Canada Goose	<i>Branta canadensis</i>
Common Loon	<i>Gavia immer</i>
Common Raven	<i>Corvus corax</i>
Duck sp.	<i>Anas</i> sp. or <i>Clangula</i> sp.
Dunlin	<i>Calidris alpina</i>
Glaucous Gull	<i>Larus hyperboreas</i>
Goose sp.	<i>Branta</i> sp. or <i>Chen</i> sp.
Green-winged Teal	<i>Anas crecca</i>
Gull sp.	<i>Larus</i> sp.
Herring Gull	<i>Larus argentatus</i>
Iceland Gull	<i>Larus glaucoides</i>
Lapland Longspur	<i>Calcarius lapponicus</i>
Long-tailed Duck	<i>Clangula hyemalis</i>
Long-tailed Jaeger	<i>Stercorarius longicaudus</i>
Loon sp.	<i>Gavia</i> sp.
Northern Pintail	<i>Anas acuta</i>
Owl sp.	<i>Asio flammeus</i> or <i>Bubo scandiacus</i>
Parasitic Jaeger	<i>Stercorarius parasiticus</i>



## 2019 WILDLIFE MONITORING SUMMARY

Table 3.8: Continued.

Common Name	Scientific Name
<b>Birds</b>	
Ptarmigan sp.	<i>Lagopus</i> sp.
Raptor sp.	<i>Buteo</i> sp., <i>Falco</i> sp, or <i>Haliaeetus</i> sp.
Red-throated Loon	<i>Gavia stellata</i>
Rock Ptarmigan	<i>Lagopus muta</i>
Rough-legged Hawk	<i>Buteo lagopus</i>
Ross's Goose	<i>Chen rossii</i>
Sandhill Crane	<i>Grus canadensis</i>
Semipalmated Plover	<i>Charadrius semipalmatus</i>
Semipalmated Sandpiper	<i>Calidris pusilla</i>
Short-eared Owl	<i>Asio flammeus</i>
Snow Goose	<i>Anser caerulescens</i>
Snowy Owl	<i>Bubo scandiacus</i>

### 3.6.6 Road-related Mitigation

Collar location maps were instrumental in assessing the need for increased road monitoring. As the number of Caribou increased in some seasons, Caribou location maps were requested on a daily basis. Road-related mitigation related to Caribou presence in 2019 resulted in a high number of road closures and a corresponding reduction in total vehicle movements (see **Section 3.6.4**). In some seasons with high numbers of Caribou, road closures were increased to a daily basis or vehicle movements were severely restricted (e.g., light vehicles only, daily ride and convoy, etc.). In many cases, the daily ride (e.g., crew changes, food deliveries, etc.) or an occasional convoy were escorted by Environment staff in collaboration with the Baker Lake HTO wildlife monitor, which had the training to decide whether vehicles could continue along the road when Caribou were sighted. When necessary, Environment staff stopped convoys to let Caribou pass and, in at least one case, vehicles were turned back after encountering Caribou. In some cases, lower speed limits were set.

As in previous years, the security department assisted the Environment department in preventing wildlife incidences along the AWAR, Vault Haul Road, and Whale Tail Haul Road by dispatching regular wildlife warnings based on observation and monitoring data. The road supervisors and operators also ensured protection of wildlife by assisting in surveillance and closing roads as needed (see **Appendix C**). Radio notices reminding operators of the appropriate speed limit were made frequently by dispatchers. During Caribou peak migration, notices were sent to all road occupants (**Appendix C**), regulatory agencies, local groups and wildlife consultants were notified, and road survey efforts were increased to every two days. A summary of Caribou and Muskox activity and road closure notices for each of the three primary road segments is provided below.

### ***Meadowbank AWAR***

Significant movements of Caribou occurred along the Meadowbank AWAR from approximately mid-April to mid-May and from late October through November in 2019, resulted in multiple closures (see **Table 3.9** and **Appendix C**). Traffic on the Meadowbank AWAR was restricted for 27 days during the spring Caribou season and 15 days during the fall Caribou season for a total of 42 days (**Table 3.9**). No road closures were required due to the presence of Muskox herds.

**Table 3.9:** Summary of Road Restrictions Related to Ungulate Activity Along the Meadowbank All-Weather Access Road in 2019.

Date of Closure	Date Reopened	Cause	Comments
<b>Spring Caribou Season (01 April to 25 May)</b>			
06 Apr	07 Apr	Caribou	Closed at 17:00 to all traffic; Environment staff to reassess in the morning
07 Apr	08 Apr	Caribou	Open during the morning; 1 load of fuel brought then closed for the night
08 Apr	09 Apr	Caribou	Open for 1 convoy of fuel tankers and daily ride; closed for the night
09 Apr	closed	Caribou	Closed at 19:00 to all traffic
10 Apr	closed	Caribou	Closed; convoy daily ride
11 Apr	closed	Caribou	Closed; convoy daily ride
12 Apr	closed	Caribou	Closed; convoy daily ride
13 Apr	closed	Caribou	Closed; convoy 1 fuel tanker to KM 23
14 Apr	closed	Caribou	Closed
15 Apr	closed	Caribou	Closed; convoy for fuel tankers to Meadowbank and back to Baker Lake
16 Apr	closed	Caribou	Closed; convoy daily ride turned around at KM 65 due to Caribou
17 Apr	closed	Caribou	Closed; convoy for daily ride and fuel tankers to Meadowbank
18 Apr	closed	Caribou	Closed; daily ride cancelled
19 Apr	closed	Caribou	Closed; convoy daily ride and fuel tankers to Amaruk after discussion with KIA and HTO
20 Apr	closed	Caribou	Closed; convoy fuel tankers from Amaruk o Baker Lake
21 Apr	closed	Caribou	Closed
22 Apr	closed	Caribou	Closed
23 Apr	closed	Caribou	Closed; convoy daily ride

**Table 3.9:** Continued.

Date of Closure	Date Reopened	Cause	Comments
<b>Spring Caribou Season (01 April to 25 May)</b>			
24 Apr	closed	Caribou	Closed; convoy daily ride
25 Apr	closed	Caribou	Closed; convoy daily ride and fuel tankers
26 Apr	closed	Caribou	Closed; convoy daily ride
27 Apr	closed	Caribou	Closed; convoy with operators and fuel tankers
28 Apr	closed	Caribou	Closed; convoy with emulsion trucks, equipment and fuel tankers
29 Apr	closed	Caribou	Closed
30 Apr	01 May	Caribou	Closed; convoy operators and fuel tankers
01 May	01 May	Weather	Reopening authorized by Environment staff (fewer Caribou); closed for weather in the morning; reopened in the afternoon after snow removal
04 May	05 May	Caribou	Closed; convoy daily ride and fuel tankers
09 May	10 May	Caribou	Closed; Environment staff to reassess in the morning
11 May	13 May	Weather	Closed
15 May	16 May	Weather	Closed; slippery conditions; E&I to escort daily ride
<b>Fall Caribou Season (22 September to 15 December)</b>			
26 Oct	closed	Caribou	Closed at 18:00 due to Caribou presence close to Baker Lake; road crew to maintain the road; no convoy
27 Oct	closed	Caribou	Closed; Caribou close to Baker Lake; road crew to maintain the road; no convoy
28 Oct	closed	Caribou	Closed; road crew to maintain the road; no convoy
29 Oct	closed	Caribou	Closed; road crew to maintain the road; no convoy; daily ride
30 Oct	closed	Caribou	Closed; road crew to maintain the road; no convoy; daily ride
31 Oct	closed	Caribou	Closed; road crew to maintain the road; no convoy; daily ride
01 Nov	closed	Caribou	Closed; convoy organised (tankers and tractor trailer); daily ride
02 Nov	closed	Caribou	Closed; convoy organised (tankers)
03 Nov	closed	Caribou	Closed; convoy organised (tankers)
04 Nov	closed	Caribou	Closed; convoy organised.
05 Nov	05 Nov	Caribou	Reopening authorized by Environment staff and HTO monitor
18 Nov	closed	Caribou	Closed at 19:00; reopened at 12:00 on November 20 <sup>th</sup> for light vehicle

**Table 3.9:** Continued.

Date of Closure	Date Reopened	Cause	Comments
<b>Fall Caribou Season (22 September to 15 December)</b>			
19 Nov	closed	Caribou	Closed
20 Nov	closed	Caribou	Closed in afternoon due to Caribou.
21 Nov	21 Nov	Caribou	Closed; convoy organised in morning (daily ride and convoy); road open to all traffic at noon
29 Nov	29 Nov	Weather	

### ***Vault Haul Road***

Significant movements of Caribou from approximately mid-April to mid-May 2019 along the Vault Haul Road resulted in several closures (see **Table 3.10** and **Appendix C**). Traffic on the Vault Haul Road was restricted for eight (8) days during the Spring Caribou Season (**Table 3.10**).

**Table 3.10:** Summary of Road Restrictions Related to Ungulate Activity Along the Vault Haul Road in 2019.

Date of Closure	Date Reopened	Cause	Comments
<b>Spring Caribou Season (01 April to 25 May)</b>			
10 Apr	11 Apr	Caribou	Closed at 18:00 for the night.
11 Apr	12 Apr	Caribou	Closed for the night; reopened at 10:30
15 Apr	15 Apr	Caribou	Closed for 2 hours; Caribou near the Amaruq entrance
16 Apr	17 Apr	Caribou	Closed from 22:00 until 05:00 due to Caribou near the Amaruq entrance
17 Apr	17 Apr	Caribou	Closed from 18:00 until 20:00 due to Caribou near the Amaruq entrance
22 Apr	23 Apr	Caribou	Closed from 18:00
20 May	21 May	Caribou	Closed from 06:00
24 May	24 May	Caribou	Closed from 07:00 to 10:30

### ***Whale Tail Haul Road***

Significant movements of Caribou from approximately mid-April to late-May 2019, mid- to late August, and early to mid-October along the Whale Tail Haul Road resulted in multiple closures (see **Table 3.11** and **Appendix C**). Traffic on the Whale Tail Haul Road was restricted for 34 days during the Spring Caribou Season, 11 days during the Summer Caribou Season, and 15 days during the Fall Caribou Season for a total of 60 days (**Table 3.11**).

**Table 3.11:** Summary of Road Restrictions Related to Ungulate Activity Along the Whale Tail Haul Road in 2019.

Date of Closure	Date Reopened	Cause	Comments
<b>Spring Caribou Season (01 April to 25 May)</b>			
08 Apr	09 Apr	Caribou	Closed at 18:00 for night shift
09 Apr	10 Apr	Caribou	Closed at 18:00 for night shift
10 Apr	closed	Caribou	Closed at 14:30; 1 convoy done from Amaruq to Meadowbank
11 Apr	closed	Caribou	Closed; convoy for daily ride
12 Apr	closed	Caribou	Closed; convoy for daily ride
13 Apr	closed	Caribou	Closed; convoy for vacuum truck from Amaruq to Meadowbank
14 Apr	closed	Caribou	Closed
15 Apr	closed	Caribou	Closed; convoy for daily ride and heavy equipment
16 Apr	closed	Caribou	Closed; convoy for daily ride
17 Apr	closed	Caribou	Closed; convoy for daily ride
18 Apr	closed	Caribou	Closed; convoy for daily ride cancelled
19 Apr	closed	Caribou	Closed; convoy for daily ride and tankers
20 Apr	closed	Caribou	Closed; convoy for empty tankers (Amaruq to Baker Lake)
21 Apr	closed	Caribou	Closed
22 Apr	closed	Caribou	Closed; convoy for daily ride
23 Apr	closed	Caribou	Closed; convoy for daily ride
24 Apr	closed	Caribou	Closed; convoy for daily ride
25 Apr	closed	Caribou	Closed; convoy for daily ride and fuel tankers (6)
26 Apr	closed	Caribou	Closed; convoy for daily ride and empty fuel tanker
27 Apr	closed	Caribou	Closed; convoy of cargo and supplies
28 Apr	closed	Caribou	Closed; no convoy, just HOL and WLS
28 Apr	closed	Caribou	Blast canceled at 12:45; postponed at 18:30 after the situation was assessed

**Table 3.11:** Continued.

Date of Closure	Date Reopened	Cause	Comments
<b>Spring Caribou Season (01 April to 25 May)</b>			
29 Apr	closed	Caribou	Closed; convoy for daily ride
30 Apr	closed	Caribou	Closed; convoy for daily ride and fuel tanker escorted in the afternoon to Amarug
01 May	closed	Caribou	Closed; convoy for daily ride and fuel tanker escorted back to Meadowbank
02 May	closed	Caribou	Closed; convoy for daily ride
03 May	closed	Caribou	Closed; convoy for daily ride
04 May	closed	Caribou	Closed; convoy for daily ride
05 May	closed	Caribou	Closed; big convoy from Meadowbank (Jeff from KIA)
06 May	closed	Caribou	Closed; convoy for daily ride
09 May	10 May	Caribou	Closed; convoy for daily ride
18 May	19 May	Caribou	Closed; convoy for daily ride; reopened 13:00 on 19 May
20 May	21 May	Caribou	Closed; convoy for daily ride
24 May	24 May	Caribou	Closed from 07:00 to 10:30
<b>Summer Caribou Season (26 May to 21 September)</b>			
16 Aug	17 Aug	Caribou	Closed from 17:30 for the night; road reopened at 08:00
18 Aug	18 Aug	Caribou	Closed from 08:00; road reopened at 13:00
21 Aug	closed	Caribou	Closed at 4pm on the 21st Convoy for the daily ride.
22 Aug	closed	Caribou	Closed all day; convoy organized for the daily ride
23 Aug	closed	Caribou	Closed all day; convoy organized for the daily ride
24 Aug	closed	Caribou	Closed all day; convoy organized for the daily ride
25 Aug	closed	Caribou	Closed all day; convoy organized for the daily ride
26 Aug	closed	Caribou	Closed all day; convoy organized for the daily ride
27 Aug	closed	Caribou	Closed all day; convoy organized for the daily ride, tractor trailer, fuel truck, roll-off and food truck
28 Aug	closed	Caribou	Closed all day; convoy organized for the daily ride, tractor trailer, 3 fuel trucks, 2 Dyno trucks, tow haul and food truck
29 Aug	29 Aug	Caribou	Open only for the light vehicle during day and reopened at 19:30

**Table 3.11:** Continued.

Date of Closure	Date Reopened	Cause	Comments
<b>Fall Caribou Season (22 September to 15 December)</b>			
01 Oct	closed	Caribou	Closed all day; convoy for daily ride and food truck
02 Oct	closed	Caribou	Closed all day; convoy for daily ride and food truck
03 Oct	closed	Caribou	Closed all day; convoy for daily ride and food truck
04 Oct	closed	Caribou	Closed all day; convoy for daily ride, food truck, vacuum truck, and Dyno truck
05 Oct	closed	Caribou	Closed all day; convoy for food truck
06 Oct	closed	Caribou	Closed all day; convoy for food truck
07 Oct	closed	Caribou	Closed all day; convoy for daily ride and food truck
08 Oct	closed	Caribou	Closed all day; convoy for daily ride and food truck
09 Oct	closed	Caribou	Closed all day; convoy for daily ride and food truck
10 Oct	closed	Caribou	Closed all day; convoy for daily ride and food truck
11 Oct	closed	Caribou	Closed all day; convoy for daily ride and food truck
12 Oct	closed	Caribou	Closed all day; convoy for food truck, Dyno truck, tow haul, and 6 pickups
13 Oct	closed	Caribou	Closed all day; convoy for food truck, tractor trailer, and tanker
14 Oct	closed	Caribou	Closed all day; convoy for daily ride and food truck,
15 Oct	15 Oct	Caribou	Closed all day; convoy for daily ride and food truck; reopened at 12:00 with speed restriction

### 3.6.7 Caribou Responses to Mitigation

The number and frequency of road surveys in 2019 demonstrate Agnico Eagle's commitment to avoiding impacts to Caribou from the AWAR, Vault Haul Road, and Whale Tail Haul Road. Mitigation measures such as reduced speeds and multiple road closures appear to be minimizing road-related effects including mortality and restricted caribou passage. Incidental sightings in 2019 (see **Appendix E**) and the road survey data (**Appendices A** and **B**) showed that Caribou crossed roads during April and May, and July through November (see **Table 3.12**), which was supported by collar data (**Section 6.6**). A total of 1,542 individual Caribou were observed crossing along the Meadowbank AWAR while 1,696 individuals were observed crossing along the Whale Tail Haul Road. Caribou movement patterns continue to require close monitoring and analysis in 2020.



## 2019 WILDLIFE MONITORING SUMMARY

Table 3.12: Observations of Caribou Crossing Mine Roads in 2019.

Date	Number	Location	Notes
<b>Meadowbank AWAR and Mine Site, and Vault Haul Road</b>			
17 April	100	KM 69	Crossing the road (Appendix E)
22 April	10	KM 92	Crossing the road (Appendix E)
23 May	6	Diversion ditch near tailings	Crossing the road (Appendix E)
26 May	10	Exploration Camp	Crossing the road (Appendix E)
18 July	1	KM 74	Crossing the road (Appendix E)
10 August	1	KM 113, Vault Haul Road	Crossing the road (Appendix E)
21 August	1	Marginal Y, Mine Site	Crossing the road (Appendix E)
09 October	100	Vault Haul Road	Crossing the road (Appendix E)
22 October	10	AWAR	Crossing the road (Appendix E)
01 November	150	KM 53	Crossing the road (Appendix E)
02 November	200	KM 19	Crossing the road (Appendix E)
02 November	300	KM 50	Crossing Road (Appendix A)
03 November	400	KM 53	Crossing the road (Appendix E)
04 November	52	KM 52	Crossing the road (Appendix E)
11 November	180	KM 113, Vault Haul Road	Crossed the road South bound (Appendix A)
17 November	21	KM 33	Crossed East to West (Appendix A)
<b>Total</b>	<b>1,542</b>		
<b>Whale Tail Haul Road</b>			
12 April	11	KM 123	Crossing road (Appendix B)
12 April	100	KM 121	Crossing road (Appendix B)
12 April	20	KM 123	Crossing road (Appendix B)
14 April	17	KM 138	Crossing road (Appendix B)
14 April	50	KM 136	Crossing road (Appendix B)
15 April	12	KM 126	Crossed (Appendix B)
19 April	8	Not Indicated	Crossing the road (Appendix E)
19 April	3	Not Indicated	Crossing the road (Appendix E)
20 April	30	Not Indicated	Crossing the road (Appendix E)
02 May	100	Not Indicated	Crossing the road (Appendix B and E)
02 May	500	Not Indicated	Crossing the road (Appendix B and E)
03 May	100	Not Indicated	Crossing the road (Appendix B and E)
26 May	7	KM 124	Crossing the road (Appendix E)
27 May	7	KM 124	Crossing the road (Appendix E)
03 July	20	KM 126	Crossing the road (Appendix E)

**Table 3.12:** Continued.

Date	Number	Location	Notes
<b>Whale Tail Haul Road</b>			
12 July	1	KM 133	Crossing the road (Appendix E)
12 July	1	KM 133	Crossing the road (Appendix E)
15 July	2	KM 140	Crossing the road (Appendix E)
16 July	1	KM 127	Crossing the road (Appendix E)
17 July	1	KM 169	Crossing the road (Appendix E)
17 July	1	KM 133	Crossing the road (Appendix E)
18 July	1	KM 171	Crossing the road (Appendix E)
19 July	1	KM 141	Crossing the road (Appendix E)
21 July	1	KM 145	Crossing the road (Appendix E)
21 July	1	KM 145	Crossing the road (Appendix E)
23 July	1	KM 131	Crossing the road (Appendix E)
14 August	1	KM 155	Crossing the road (Appendix E)
14 August	1	KM 168	Crossing the road (Appendix E)
15 August	1	KM 123	Crossing the road (Appendix E)
15 August	1	KM 154	Crossing the road (Appendix E)
23 August	50	KM 168	Crossing the road (Appendix E)
24 August	1	Not Indicated	Crossing the road (Appendix E)
24 August	200	Not Indicated	Crossing the road (Appendix E)
26 August	11	KM 169	Crossing (Appendix B)
26 August	1	KM 126	Crossing (Appendix B)
26 August	1	KM 170	Crossing (Appendix B)
27 August	3	KM 141	Crossing the road (Appendix E)
27 August	2	KM 167	Crossing the road (Appendix E)
06 September	3	Not Indicated	Crossing the road (Appendix B and E)
22 September	8	KM 142	Crossing the road (Appendix E)
22 September	30	KM 139	Crossing the road (Appendix E)
09 October	100	KM 172	Crossing the road (Appendix E)
09 October	75	KM 150	Crossing the road (Appendix E)
11 October	200	KM 172	Crossing the road (Appendix E)
22 October	10	Not Indicated	Crossing the road (Appendix E)
<b>Total</b>	<b>1,696</b>		

### 3.6.8 Road-related Wildlife Mortality

The following wildlife mortalities, associated with the Meadowbank AWAR, Vault Haul Road, and Whale Tail Haul Road were recorded in 2019 (**Table 3.13**; see reports in **Appendices A, B and D**). No Caribou mortality was associated with the AWAR, Vault Haul Road, and Whale Tail Haul Road in 2019. Cumulative road-related mortality data are provided in **Table 3.14**. Upon discovery of any unreported roadkill remains, environment staff and/or road supervisors reminded employees of road rules and the need to enforce these rules. All employees were informed that wildlife have a right of way at all times, and that they should stop vehicles and wait for wildlife to cross the road.

**Table 3.13:** Wildlife Mortalities Related to the Meadowbank AWAR, Vault Haul Road, and Whale Tail Haul Road and Non-Mine Related Mortalities in 2019.

Date	Species	Count	Mine Related	Location	Comments
28 Feb	Arctic Hare	1	Yes	Meadowbank AWAR KM 46	Presumably killed by a vehicle
13 Jul	Arctic Hare	1	Yes	Meadowbank AWAR KM 50	Reported by road dispatch; presumably killed by a vehicle
23 Jul	Ptarmigan	1	Yes	Whale Tail Haul Road KM 161	Presumably killed by a vehicle
03 Sep	Sik Sik	1	Yes	Whale Tail Haul Road KM 116	Presumably killed by a vehicle
11 Oct	Arctic Hare	1	Yes	Meadowbank AWAR	Reported on road survey; presumably killed by a vehicle
04 Nov	Arctic Fox	1	Yes	Whale Tail Haul Road KM 135	Driver documented carcass but Environment staff did not find; presumably killed by a vehicle (see <b>Appendix D</b> )
15 Nov	Caribou	1	No	Meadowbank AWAR KM 94	Carcass was ~50 m E of the road; a wolf was observed on the ground close to the carcass (see <b>Appendix D</b> ); presumably killed by wolves

**Table 3.14:** Summary of Road-related Wildlife Fatality Records (2007 to 2019).

Year	Caribou	Grizzly Bear	Wolverine	Wolf	Fox	Small Mammals	Small Birds	Unidentified Small Animal
<b>AWAR and Vault Haul Road</b>								
2007	3 <sup>1</sup>	0	0	0	0	3	3	0
2008	10 <sup>2</sup>	0	0	2	13	7	17	0
2009	1 <sup>3</sup>	0	0	0	1	6	2	0
2010	1	0	0	0	2	6	2	0
2011	2 <sup>3</sup>	0	0	1	0	5	4	0
2012	2 <sup>4</sup>	0	1	0	0	3	1	0
2013	5	0	0	0	1	1	1	0
2014	0	0	0	0	0	0	0	0
2015	0	0	0	0	1	4	2	1
2016	0	0	0	0	2	0	1	0
2017	0	0	0	0	5	3	3	0
2018	0	0	0	0	0	2	0	0
2019	0	0	0	0	0	3	0	0
<b>Whale Tail Haul Road</b>								
2018	0	0	0	0	0	2	0	0
2019	0	0	0	0	1	1	1	0

<sup>1</sup> Two confirmed roadkill cases; <sup>2</sup> Two apparent roadkill cases; <sup>3</sup> Cause of death unconfirmed; <sup>4</sup> One cause of death unknown

### 3.7 ACCURACY OF IMPACT PREDICTIONS

**Table 3.15** provides a summary of the impact predictions identified in the TEMP (Agnico Eagle 2019). The 2019 AWAR, Vault Haul Road, and Whale Tail Haul Road survey data were compared to the impact prediction thresholds to evaluate adherence to the impact predictions and the provision of adaptive management, as either a necessary or proactive measure. None of the thresholds were exceeded in 2019 (**Table 3.15**).

### 3.8 MANAGEMENT RECOMMENDATIONS

The AWAR, Vault Haul Road, and Whale Tail Haul Road survey data are important for documenting time periods when the area near the road is utilized by various wildlife species and for evaluating the need, if any, for implementing adaptive management (e.g., temporary road closures and radio announcements). Moreover, Caribou density can be compared graphically across years, which can be used to track changes in density and preferential migration corridors. The road sections with higher use are prioritized for temporary road closures, speed reductions or additional adaptive management strategies. The road survey data are used in conjunction with satellite-collaring and mortality data to successfully manage road operations during heavy wildlife use periods.

**Table 3.15:** Accuracy of Impact Predictions – Sensory Disturbance and Mortality along the AWAR, Vault Haul Road, and Whale Tail Haul Road in 2019.

Potential Effect	Threshold	Threshold Exceeded (2019)	Adaptive Management Implemented	Status
Sensory Disturbance	No threshold but Decisions Trees followed when Caribou are seen near mine facilities	NA	YES. Multiple road closures and notices. Use of Decision Tree for Management and Monitoring.	AWAR, Vault Haul Road, and Whale Tail Haul Road surveys  Satellite-collaring data
Project-related Mortality	Caribou or Muskoxen will not be killed or injured by vehicle collisions. Threshold level of mortality is two (2) individuals per year.	NO	NO	AWAR, Vault Haul Road, and Whale Tail Haul Road surveys  Satellite-collaring data surveys
Project-related Mortality	Predatory mammals (i.e., Grizzly Bear, Wolverine, Wolf) will not be killed or injured by vehicle collisions. Threshold level of mortality is two (2) individuals per year.	NO	NO	AWAR, Vault Haul Road, and Whale Tail Haul Road surveys  Security surveys
Project-related Mortality	Raptors or Waterbirds will not be killed along project roads. Threshold is one (1) individual due to vehicle collision per year.	NO	NO	AWAR, Vault Haul Road, and Whale Tail Haul Road surveys



## SECTION 4 • PITS AND MINE SITE GROUND SURVEYS

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### 4.1 OVERVIEW

The mine site ground survey monitoring program (i.e., for Meadowbank, Vault, and Whale Tail) has been designed to verify that impacts to wildlife in and around the mine site LSA are not occurring. The program has a strong emphasis on monitoring mortality and disturbance of various wildlife groups utilizing habitats near the mine site. In addition, the mine site ground survey monitoring program is an integral component of the monitoring strategy for evaluating sensory disturbance indicators for Caribou.

### 4.2 OBJECTIVES

The primary objectives of the mine site ground surveys are to:

1. Use Decision Trees when Caribou are seen near mine facilities to determine the level of adaptive management (e.g., road closures) required;
2. Confirm that Caribou will not be killed through other mine-related mortality such as falling in pits, tailings sludge, or other means. The cumulative mine threshold level of mortality is two (2) individuals per year;
3. Verify that measures are in place such that Grizzly Bears, Wolverines or Wolves will not need to be destroyed at the mine site. The threshold level of mortality for Predatory Mammals is two (2) individuals per year; and
4. Verify that high value habitats (e.g., sedge meadows) are avoided, and all activities within 100 m of a bird nest site during the latter part of the nest stage (fledgling) are avoided.

### 4.3 DURATION

The mine site ground surveys are to be conducted regularly by Agnico Eagle environmental personnel over the operation and closure phases of the mine to verify that changes to habitats around the mine site do not cause effects to wildlife and their use of habitat.

### 4.4 METHODOLOGY

#### 4.4.1 Mine Site Inspections

In 2019, environmental personnel conducted regular mine site inspections focusing on waste management, spills, hazardous waste management, and wildlife monitoring. Formal mine site inspections were carried out at least weekly as part of broader environmental on-site management. Surveys were also conducted prior to blasting. During these inspections, non-conformities were identified and rapidly addressed by the responsible department.

Weekly and pre-blasting inspections included:

- Regular monitoring of Caribou and Muskox near the facilities. Large mammal presence within the mine is documented during daily and weekly (formal) inspections. Any issues related to safety or proximity effects are identified and the appropriate mitigation is implemented. If risks to animal health are perceived, efforts are made to avoid the wildlife and provide them the right of way. In 2019, a minimum of weekly mine-site ground survey inspections were conducted;
- Regular monitoring of all large mammals on the site;
- Regular monitoring of breeding birds (especially in the spring). No active nests were found in 2019 at the Meadowbank and Whale Tail sites, therefore no additional monitoring occurred; and
- Inspections of waste management areas, bins, and hazardous material storage.

Environment department inspections and wildlife ground surveys focus on migratory birds, Ungulates, Arctic Fox, Wolf, Grizzly Bear, and Wolverine. Through these observations, those of other Agnico Eagle employees, and incidence reports provided to the Environment department, technicians follow up as needed to ensure the protection of wildlife near the mine site. Observations, along with monitoring and deterrence activities, are recorded in **Appendix E**. Monthly summary reports and wildlife observation data are submitted to the GN, while quarterly reports are submitted to the KIA.

No ancillary construction activity was undertaken without environmental notification and all activities were within the predicted and approved mine footprint or permit area as confirmed through environmental inspections, ground surveys, and coordination with engineering and site services on the mine site. All areas used by the mine have been accepted and approved by regulators and the KIA through submission and acceptance of annual reports and updated management plans.

#### 4.4.2 Incidental Mine Site Wildlife Observations

All mine site personnel, including construction and support staff, are required to document and report wildlife observed within the boundaries of the mine as well as ancillary areas (e.g., AWAR and haul roads). The protocol involves filling out a wildlife log form located in designated areas or by notifying staff in the Environment department, which is intended to ensure that potential problem animals are identified. Completed incidental wildlife log forms are collected on a regular basis for review by environmental personnel. Pertinent data, and daily and weekly mine site inspection reports are consolidated and entered into a database (**Appendix E**). Monthly summary reports and wildlife observation data are submitted to the GN. Quarterly reports are submitted to the KIA.

## 4.5 2019 RESULTS

### 4.5.1 Incidental Wildlife Observations

Mine site incidental observations were consolidated from the daily and weekly inspection reports, and observations by mine personnel (see **Appendix E**). Observations were used by environmental personnel to monitor wildlife activity within the mine site and identify potential problem animals. A summary of observations that required action is provided in **Table 4.1** while a summary of total wildlife observations by species and month is provided in **Table 4.2**. Total wildlife observations were much higher in 2019 than in 2018, largely because of significant movements of Caribou in April and May and Snow Geese in August and September.

As expected, total bird sightings were highest in summer while Wolverine sightings were highest in winter (see **Figure 4.1**). For birds, the noticeable peak in sightings in August and September were due to large numbers of Snow Geese migrating through the study area. In 2019, peak Caribou sightings were during the spring and fall migratory period (**Figure 4.1**). The very large peak in April and May reflects the large numbers of Caribou migrating through the study area in 2019 relative to 2018.

When wildlife was observed in and around the mine site, monitoring frequency increased. In 2019, the frequency of wildlife activity and deterrence actions taken (31 actions) were similar to 2018 (32) but still higher than in 2017 (21). Deterrence actions were primarily required for Wolverine and Wolves (i.e., >80% of actions) and particularly in the winter months (i.e., January, February and December) (see **Table 4.1**). Deterrence actions implemented in and around the Meadowbank and Whale Tail mine sites ranged from minimal actions (i.e., blocking the road, approaching animals or herds on foot or by vehicle) to more aggressive use of flares and scare cartridges. In 87% of cases, deterrence proved effective (**Table 4.1** and **Appendix E**). Deterrence efforts related to nesting birds within the Whale Tail flooding areas, is described in **Section 14**.

Trends and unique wildlife observations around the mine site are discussed in the following sections. In a few cases, observations led to direct action to prevent human-wildlife conflict.

### 4.5.2 Waterbird Monitoring

To minimize accidental waterbird confinement around the Meadowbank and Whale Tail sites, entrapment in the tailings, and mortality, regular inspections were completed throughout the migratory period and during weekly or daily inspections, as deemed necessary by environmental personnel. Waterbird species recorded by mine personnel between May and September included Canada Goose, Snow Goose, Long-tailed Duck, and ducks (see **Table 4.2**).

### 4.5.3 Raptor Monitoring

Raptor monitoring was conducted as part of routine mine site inspections of the pit and other areas to ensure adequate bird protection and management. Peregrine Falcons were observed around project facilities from May to September, with most records from June to August, while Rough-legged Hawks were observed on several occasions in May and October. Other raptor species observed included Bald Eagle (July to September), Snowy Owl (August to October), and Short-eared Owl (September) (see **Table 4.2** and **Appendix E**). No deterrence activities were required for raptors in 2019 (see **Table 4.1**).

**MEADOWBANK GOLD MINE PROJECT**  
**2019 WILDLIFE MONITORING SUMMARY**

**Table 4.1:** Wildlife Presence Requiring Action at the Meadowbank and Whale Tail Sites in 2019 (from **Appendix E**).

Date	Species	#	Location	Behavior	Action
<b>JANUARY</b>					
08 January	Wolverine	1	Behind incinerator at Amaruq	Running	Deterred. Successful
09 January	Wolverine	1	Behind incinerator at Amaruq	Running	Deterred. Successful
11 January	Arctic Fox	1	Incinerator at Amaruq	Eating	Deterred. Unsuccessful
13 January	Arctic Fox	1	Nova Camp, Meadowbank	Sick or injured	Deterred. Successful
21 January	Wolverine	1	Amaruq Camp	Walking	Deterred. Successful
<b>FEBRUARY</b>					
03 February	Wolverine	1	Lake A53, Amaruq	Running	Deterred. Successful
18 February	Wolverine	1	Amaruq Camp	Fleeing	Deterred. Successful
18 February	Wolverine	1	Behind the kitchen, Amaruq Camp	Walking	Deterred. Unsuccessful. Euthanized 22 February (see <b>Appendix D</b> )
<b>APRIL</b>					
06 April	Wolf	1	Whale Tail Exploration Camp	Walking	Deterred. Successful
07 April	Wolf	1	Emulsion Road, Whale Tail	Walking	Deterred. Successful
26 April	Arctic Fox	1	Behind Clinic, Whale Tail	Sick or wounded	Deterred. Successful
<b>MAY</b>					
29 May	Wolf	1	Whale Tail Camp	Walking	Deterred. Successful
30 May	Wolf	1	Landfill, Meadowbank	Eating	Deterred. Successful
31 May	Wolverine	1	Landfill, Meadowbank	Eating	Deterred. Successful
<b>JUNE</b>					
22 June	Wolf	1	Near Incinerator, Meadowbank	Walking	Deterred. Successful

**MEADOWBANK GOLD MINE PROJECT**  
**2019 WILDLIFE MONITORING SUMMARY**

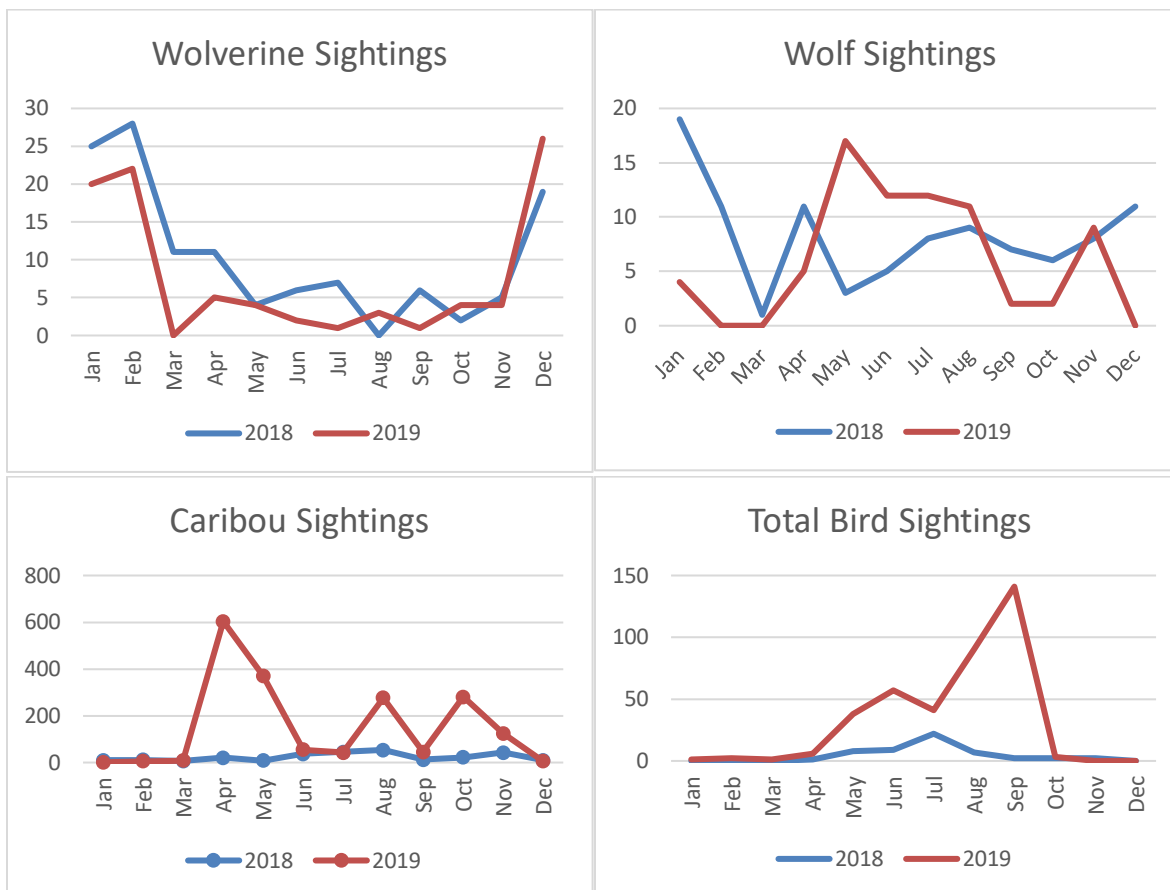
**Table 4.1:** Continued.

Date	Species	#	Location	Behavior	Action
<b>JULY</b>					
01 July	Wolf	1	Landfill, Meadowbank	Observing	Deterred. Successful
22 July	Wolf	1	Landfill, Meadowbank	Observing	Deterred. Successful
29 July	Wolf	1	Landfill, Meadowbank	Observing	Deterred. Successful
<b>AUGUST</b>					
01 August	Caribou	1	FGL Area, Whale Tail	Walking	Deterred. Unsuccessful
02 August	Caribou	1	FGL Area, Whale Tail	Grazing	Deterred. Successful
<b>SEPTEMBER</b>					
15 September	Wolf	1	Landfill, Meadowbank	Running	Deterred. Successful
<b>NOVEMBER</b>					
23 November	Wolverine	1	Tailings Road, Meadowbank	Running	Deterred. Successful
30 November	Arctic Fox	1	Energy & Infrastructure Garage, Whale Tail	Running	Deterred. Successful
<b>DECEMBER</b>					
03 December	Wolverine	1	Landfill, Meadowbank	Running	Deterred. Unsuccessful
14 December	Wolverine	1	Incinerator, Meadowbank	Running (1030 am)	Deterred. Successful
14 December	Wolverine	1	Incinerator, Meadowbank	Running (6 pm)	Deterred. Successful
28 December	Wolverine	1	Assay Lab, Meadowbank	Running	Deterred. Successful
29 December	Wolverine	1	Airport, Meadowbank		Deterred. Successful
31 December	Wolverine	1	Meadowbank Camp, Nova, Dorm 12	Walking (0715 am)	Deterred. Successful
31 December	Wolverine	1	Main entrance, Meadowbank	Walking (0800 am)	Deterred. Successful
31 December	Wolverine	1	Nova Camp, Meadowbank	Running (1400 pm)	Deterred. Successful



**Table 4.2:** Total Wildlife Records by Species and Month at the Meadowbank and Whale Tail Sites in 2019 (from **Appendix E**).

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Mammals</b>												
Arctic Fox	3	4	4	9	1	3	5	2	4	10	6	5
Arctic Hare	4	1		14	10	11	12	3	5	5		1
Caribou	1	5	9	604	371	55	42	276	45	280	125	6
Grizzly Bear				1	2			1				
Muskox	7	7	8	37	9	18	63	39	8	11	18	6
Sik Sik								3	4			
Weasel											2	
Wolf	4			5	17	12	12	11	2	2	9	
Wolverine	20	22		5	4	2	1	3	1	4	4	26
<b>Birds</b>												
Bald Eagle							6	15	3			
Canada Goose					3	10	2	10				
Common Raven	1	1	1	4		1	1	3	1			
Duck					2	4	1	1				
Gull							1	2				
Long-tailed Duck									1			
Peregrine Falcon					5	9	8	10	4			
Ptarmigan		1			2	10	7	2	2	5		
Rough-legged Hawk					13	7	9	18	2	2		
Sandhill Crane					13	15	6	7	3			
Short-eared Owl									1			
Snow Goose						1		21	120			
Snowy Owl				2				1	4	1		
<b>Total Birds</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>6</b>	<b>38</b>	<b>57</b>	<b>41</b>	<b>90</b>	<b>141</b>	<b>3</b>	<b>0</b>	<b>0</b>



**Figure 4.1:** Total Incidental Sightings of Wolverine, Wolf, Caribou, and Birds by Month at the Meadowbank and Whale Tail Sites in 2019.

#### 4.5.4 Caribou and Muskox Protection

Caribou were observed on a regular and year-round basis in and around the Meadowbank and Whale Tail sites and along the AWAR, Vault Haul Road, and Whale Tail Haul Road in 2019. The highest number of Caribou reports were from April, May, August, October, and November (see **Table 4.2**) with group sizes of 1,000 individuals on April 9<sup>th</sup>, April 30<sup>th</sup>, and May 2<sup>nd</sup>, 3,000 individuals on August 16<sup>th</sup>, 4,000 on October 27<sup>th</sup>, and 2,000 on October 29<sup>th</sup> (see **Appendix E**). Because of the high numbers of Caribou close to project facilities in 2019, numerous road closures and restrictions were required along the AWAR, Vault Haul Road, and Whale Tail Haul Road (see **Tables 3.4 to 3.6**).

Muskox individuals and herds, ranging in size from two to 38 individuals, were reported on numerous occasions in 2019 but particularly between April and August (**Table 4.2; Appendix E**). No mitigation measures or deterrence efforts were required for Muskox.

### 4.5.5 Predatory Mammal Deterrence and Protection

Improved practices for waste segregation and incineration, the use of enclosed food waste facilities, and skirting around buildings have improved Arctic Fox protection and decreased fox-human interactions (see **Table 4.3**). No deterrence efforts were required for Muskox or birds in 2019 (**Table 4.3**).

**Table 4.3:** Summary of Deterrence Activities at the Meadowbank Mine and Whale Tail Sites from 2015 to 2019.

Species	2015	2016	2017	2018	2019
<b>Mammals</b>					
Arctic Fox	6	6	2		4
Caribou	10	24			2
Red Fox	1				
Wolf	1	4	9	14	9
Wolverine	5	3	10	17	16
<b>Total</b>	<b>23</b>	<b>37</b>	<b>21</b>	<b>31</b>	<b>31</b>
<b>Birds</b>					
Ducks	2	5			
Ducks & Geese	1				
Geese		3			
Snow Goose				1	
Tundra Swan	1				

Wolverines were regularly observed around the Meadowbank and Whale Tail sites primarily during the winter months in 2019 (see **Table 4.2**, **Figure 4.1**, and **Appendix E**). Deterrence actions, which followed the Wildlife Protection and Response Plan (Appendix C in 2019 TEMP), were required on 16 occasions primarily in January and December (**Table 4.1**). One Wolverine, which was not successfully deterred from the site, was dispatched on February 22<sup>nd</sup> (see **Section 4.5.6.2** and **Table 4.3**). Well-defined food-handling practices and employee awareness programs have minimized Wolverine fatalities or Wolverine-human interactions but the number of deterrence efforts were similar to 2018 (see **Table 4.3**).

Wolves were also regularly observed around the Meadowbank and Whale Tail sites primarily in the summer months, unlike the pattern of winter observations in 2018 (see **Table 4.2**, **Figure 1**, and **Appendix E**). Deterrence actions were required on nine (9) occasions from April through September (**Table 4.1**). Notices were sent on a periodic basis to Meadowbank employees regarding the presence of wildlife, waste management procedures, and requesting all sea cans and doorways be closed.

## 2019 WILDLIFE MONITORING SUMMARY

Grizzly Bears were reported on four (4) occasions in 2019 (**Table 4.2; Appendix E**). No deterrence action was required.

### 4.5.6 Wildlife Mortality – Meadowbank and Whale Tail Sites

A summary of recorded wildlife fatalities near or within the mine site in 2019 is provided in **Table 4.4**, and a summary of fatalities to date is provided in **Table 4.5**. Copies of mortality incident reports can be found in **Appendix D**. Road-related fatalities are tabulated and discussed in **Section 3.6.6**.

**Table 4.4:** 2019 Mine Site Wildlife Fatality Log.

Date	Species	Count	Mine Related	Location	Comments
22 Feb	Wolverine	1	Yes	Amaruq Camp	Dispatched after deterrence actions were unsuccessful and authorization received from DoE (see <b>Appendix D</b> )
27 Aug	Stickleback	multiple	Yes	NE Pond, Amaruq	Sticklebacks were being impinged and killed on intake screen of pump for NE discharge (see letter to DFO - <b>Appendix D</b> )
21 Dec	Arctic Fox	1	Yes	Meadowbank Site, near HAZMAT area	Found in middle of road; roadkill incident; taken to incinerator (see <b>Appendix D</b> )

**Table 4.5:** Summary of Mine Site Related Wildlife Fatality Records for Caribou and Predatory Mammals (2007 to 2019).

Year	Caribou	Grizzly Bear	Wolverine	Wolf
2007	0	0	0	0
2008	0	0	0	2
2009	0	0	0	4
2010	0	0	0	1
2011	0	0	1	4
2012	0	0	0	1
2013	0	0	1	0
2014	0	0	0	1
2015	4 <sup>1</sup>	0	0	1 <sup>2</sup>
2016	1 <sup>3</sup>	0	0	0
2017	1 <sup>3</sup>	0	1	3 <sup>4</sup>
2018	0	0	1	2 <sup>5</sup>
2019	0	0	1	0

<sup>1</sup> One Caribou died of natural causes while three were killed by Wolves.

<sup>2</sup> Naturally injured Wolf that needed to be euthanized.

<sup>3</sup> One Caribou killed by Wolves.

<sup>4</sup> One Wolf likely killed by Wolverine.

<sup>5</sup> Wolf died at mine site of head injuries; did not need to be dispatched

## ***Caribou***

No Caribou mortalities related to project activities were reported at the mine site in 2019. All incident reports, observations, deterrence activities, and environment team responses to Caribou sightings are included in **Appendix E**.

## ***Predatory Mammals***

All incident reports, observations, deterrence activities, and environment team responses to predatory mammal sightings are included in **Appendices E and F**.

One Wolverine, which was accessing the kitchen grease trap at the Amaruq camp site by going under the sleeping quarters and water treatment plant, was euthanized on February 22<sup>nd</sup> when deterrence actions beginning 18 February were not successful (see **Appendix D**). Written wildlife destruction authorization was received from the Baker Lake Conservation Officer, Robert Arsenault (see **Appendix D**). Adaptive mitigation actions taken included, placing metal sheets onto the walls of the grease trap and kitchen area, ensuring sheeting covers extended to the ground, and being more vigilant in deterring wildlife when reported around the Amaruq site.

## ***Other Wildlife***

On December 21<sup>st</sup>, an Arctic Fox carcass was found in the middle of the road near the HAZMAT area of the Meadowbank camp (see **Appendix D**). The carcass was taken to the incinerator to avoid attracting other scavengers to the area.

In late August, a number of sticklebacks were impinged and killed on the intake screen of a second pump at the NE pond at Amaruq (see **Appendix D**), and the Department of Fisheries was notified on August 29<sup>th</sup>. The pump was stopped until mitigation measures were put in place to prevent reoccurrence. Mitigation measures consisted of inspecting the intake pump and downstream lake area on a daily basis, and modifying the pumping intake location in a manner to limit access by small-bodied fish.

## **4.6 ACCURACY OF IMPACT PREDICTIONS**

**Table 4.6** provides a summary of the impact predictions identified in the TEMP (Agnico Eagle 2019) that are evaluated, in part, by the mine site ground surveys. Specifically, the 2019 mine site ground survey monitoring data were compared to the impact prediction thresholds to evaluate adherence to the impact predictions and the provision of adaptive management, as either a necessary or proactive measure. None of the thresholds were exceeded in 2019 (**Table 4.6**).



## 2019 WILDLIFE MONITORING SUMMARY

**Table 4.6:** Accuracy of Impact Predictions – Mine Site Wildlife Disturbances.

Potential Effect	Threshold	Threshold Exceeded (2019)	Adaptive Management Implemented	Status
Sensory Disturbance	No threshold but Decisions Trees followed when Caribou are seen near mine facilities	NA	YES. Multiple road closures and notices. Use of Decision Tree for Management and Monitoring.	Satellite-collaring data Road surveys Daily and weekly pit and mine-site ground surveys Incidental wildlife reporting Motion sensing cameras
Disturbance to Nesting Raptors	Raptor nest failures will not be caused by mine-related activities. Threshold is one (1) nest failure per year.	NO	NO	Daily and weekly pit and mine-site ground surveys Incidental wildlife reporting Dedicated raptor nest surveys Road surveys
Disturbance of Nesting, Roosting or Moulting Waterfowl	Mine facilities and activities will not affect the breeding success of Waterbirds occurring in the area or disturb large concentrations of roosting or moulting Waterbirds. Threshold level is one (1) nest failure per year.	NO	NO	Daily and weekly pit and mine-site ground surveys Waterbird nest surveys
Project-related Mortality	Destruction of two (2) problem Grizzly Bear, Wolverine, or Wolf per year.	NO. One (1) Wolverine dispatched in 2019	NO	Daily and weekly pit and mine-site ground surveys
Project-related Mortality	Two (2) Caribou or Muskoxen mortality per year because of mine-related activities (e.g., falling into pits, tailing, sludge or other means)	NO	NO	Daily and weekly pit and mine-site ground surveys
Project-related Mortality	Raptors and Waterbirds will not be killed at the mine site. Threshold is one (1) individual per year.	NO	NO	Daily and weekly pit and mine-site ground surveys

## 4.7 MANAGEMENT RECOMMENDATIONS

The following are specific management recommendations for the mine site ground survey monitoring program:

- Continue to conduct informal and formal, daily and weekly, pit and mine surveys to document wildlife activity and to verify that effects to wildlife are not occurring because of mine-related activities;
- Continue raptor nest monitoring around the Meadowbank and Whale Tail LSAs, and along the AWAR, Vault Haul Road, and Whale Tail Haul Road;
- Continue to apply the Wildlife Protection and Response Plan (Appendix C, 2019 TEMP), which includes waste provisions, training, incident reporting, and protocols for problem wildlife. Efforts should be taken to ensure all perishable garbage is directed to the incinerator;
- Continue training and re-education to ensure that incidental wildlife reporting is completed by all mine site personnel so that environmental personnel can remain informed of pertinent wildlife-related activity near the mine site;
- Monitor tailings ponds daily during the waterbird migration period, beginning in mid-May. Increase the frequency of deterrent use if required; and
- Gather detailed information (e.g., sex; age) on deceased animals and include in incident reports.

## SECTION 5 • WILDLIFE HABITAT MONITORING

### 5.1 OVERVIEW

The wildlife habitat mapping monitoring program was developed to describe the overall area of different Ecological Land Classification (ELC) units lost due to mine-related activities (i.e., during construction, operation, decommissioning, and post-closure phases) at three primary locations: Meadowbank Main and Vault sites (which together encompass the mine site), the AWAR, and the Whale Tail Pit and Haul Road. The initial strategy in the impact assessments for Meadowbank and Whale Tail was to compare predicted habitat losses due to mine development to actual losses (i.e., from the environmental assessments); however, regular infrastructure extensions and expansions, changes to the project, and subsequent regulatory approvals, made this approach difficult to implement. The current approach is to compare habitat losses from development to permitted areas, which encompass all proposed development.

### 5.2 OBJECTIVE

The primary initial objective of the habitat mapping monitoring program was to confirm that habitat losses identified in the TEMP (Agnico Eagle 2019) and the Whale Tail Pit EIS Addendum (Golder 2016) for the mine sites, haul roads, and AWAR, plus any subsequent approved extensions, have not exceeded threshold limits. As indicated above, this approach was difficult to execute due to regular mine plan changes and subsequent approvals; therefore in 2018, habitat losses were compared to permitted areas, which encompass mine development areas. A summary of each monitoring parameter, predicted losses, permitted areas, and thresholds for the Meadowbank Mine and Whale Tail components is included in **Tables 5.1** and **5.2**, respectively.

**Table 5.1:** Habitat Mapping Monitoring Parameters, Predicted Footprint Losses, Permitted Areas, and Thresholds for the Meadowbank Mine, AWAR and Vault Haul Road.

Monitoring Parameter	Mine Site Predicted Loss	Mine Site Permitted Area	AWAR / Vault Haul Road Predicted Loss	Threshold
Wildlife Habitat	867 ha	1,532 ha	281 ha <sup>1</sup>	>5% Predicted
Ungulate – High Suitability Habitat	240 ha (growing) 191 ha (winter)	531 ha (growing) 407 ha (winter)	63 ha (growing) 188 ha (winter)	>10% Predicted
Small Mammals – High Suitability Habitat	Given the minimal effects associated with the Meadowbank project, habitat loss effects on Small Mammals were screened out during the EA (Golder 2016)			
Waterbirds – High Suitability Habitat	518 ha	417 ha	22 ha	>10% Predicted
Breeding Birds – High Suitability Habitat	322 ha	736 ha	170 ha	>10% Predicted

<sup>1</sup> Permitted areas along the AWAR and Vault Haul Road is 348 ha.

## 2019 WILDLIFE MONITORING SUMMARY

**Table 5.2:** Habitat Mapping Monitoring Parameters, Predicted Footprint Losses, Permitted Areas, and Thresholds for the Whale Tail Pit and Haul Road.

Monitoring Parameter	Whale Tail Predicted Loss	Whale Tail Permitted Area	Threshold
Wildlife Habitat	820 ha	1,473 ha	>5% Predicted
Ungulate – High Suitability Habitat	30 ha (growing) 342 ha (winter)	76 ha (growing) 602 ha (winter)	>10% Predicted
Small Mammals – High Suitability Habitat	Given the minimal effects associated with the Meadowbank project, habitat loss effects on Small Mammals were screened out during the EA (Golder 2016)		
Waterbirds – High Suitability Habitat	Given the minimal effects associated with the Meadowbank project, habitat loss effects on Waterbirds were screened out during the EA (Golder 2016)		
Breeding Birds – High Suitability Habitat	Given the minimal effects associated with the Meadowbank project, habitat loss effects on Breeding Birds were screened out during the EA (Golder 2016)		

### 5.3 DURATION

The total area of habitat disturbance associated with mine site and ancillary facility construction was mapped following significant construction completion (2010) and was to be mapped annually during the operation phase as detailed in the TEMP (Cumberland 2006). At the end of 2010, a detailed ELC habitat loss analysis found that habitat losses to date were substantially lower than predicted and that no habitat loss thresholds for VECs were exceeded. Given this outcome, another detailed ELC habitat loss analysis was not provided until the 2012 report, which had similar conclusions as those in 2010. The 2014 habitat analysis determined that habitat losses were still below predicted losses but that some of the thresholds were being reached. A partial analysis was conducted in 2017 while a full and through analysis using a revised approach (see **Section 5.1**) was completed in 2018.

The current habitat mapping monitoring program is intended to be completed every three years post-construction or if changes are greater than 25% of the overall mine site footprint from the previous year evaluation. This frequency may be reduced during the operation phase if the amount of new disturbance and reclamation areas is relatively unchanged. Following decommissioning, vegetation mapping will be conducted in the first two years post-closure and every three years thereafter until Year 11 post-closure to verify that thresholds have been met. The next complete habitat analysis is scheduled for 2021.

## 5.4 HISTORICAL RESULTS

### 5.4.1 Meadowbank Mine Site

In 2014, construction of the Main Site construction was almost complete, including most of the infrastructure for the Vault Pit area, although much of the pit and waste rock storage area had not yet been disturbed. ELC results for the mine site footprint, based on as-built drawings from 2014, were compared to predicted ELC unit losses from the 2005 EIS, plus approved extensions. Actual habitat loss for the mine site in 2014 was calculated to be 775.7 ha, which was 91.1 ha less than the predicted total habitat loss of 866.8 ha for the mine site. Differences between predicted and actual habitat losses were greatest in Heath Tundra, Birch and Riparian Shrub, and Lichen ELC units, all of which are High suitability habitat for ungulates during the winter season. Although no thresholds (>5 to 10% above predicted losses) for the loss of High suitability habitat were exceeded for any VECs, threshold levels for the mine site were almost reached in 2014. Consequently, commitments were made to remove the material stored in the NPAG extension area (which was approved by NWB) and use it for capping of the North Cell Tailings Storage Facility during the closure/reclamation phase of the mine.

In 2017, the mine development footprint had changed substantially since the 2014 analysis (see **Figure 5.1**). The Vault Pit was fully operational and had expanded into the Phaser Lake area. Although the Phaser Lake extension was completed with approval from the NIRB and the Nunavut Water Board (NWB), the size of the extension area was not available for habitat calculations in the 2017 report. Actual habitat loss for the mine site in 2017 was calculated to be 1,021 ha, which was 154 ha more than the predicted total habitat loss of 867 ha for the mine site. The difference between predicted and actual habitat losses was primarily attributable to the final extent of the Vault waste dump, the Phaser Lake extension of the Vault Pit area (i.e., not included in the 867 ha calculation), and the as-built layout of the NPAG expansion of the Portage Waste Rock Facility. Differences between predicted and actual habitat losses were greatest for the Sedge, and Birch and Riparian Shrub ELC units, both of which are High suitability habitat for ungulates during the winter season. Greater than 10% differences between predicted and actual habitat losses were also observed in Heath Tundra, Lichen, Lichen-Rock, and Rock and Boulder ELC units. Additionally, losses of High suitability habitat exceeded established thresholds for Ungulates (growing and winter season), Small Mammals, and Other Breeding Birds.

For the 2018 habitat analysis, the approach was revised to compare habitat losses to total area within Agnico Eagle's permitted areas, which also encompasses future work. For all ELC units combined, overall habitat losses (i.e., 1,129 ha) were 26% less than the habitat available within permitted areas (i.e., 1,532 ha) of the Meadowlark Mine Site; therefore, thresholds were not surpassed. Similar to the overall habitat loss assessment, high suitability habitat losses for Ungulates, Small Mammals, Waterbirds, and Other Breeding Birds were all well below high suitability habitats available within permitted areas, also not surpassing any thresholds.



### 5.4.2 AWAR

The ELC results for the AWAR had not changed since the 2010 analysis, and habitat loss analyses were not required. The 2010 ELC results for the AWAR were compared to ELC unit losses predicted in the 2005 EIS report. Construction of the AWAR required considerably less area (173 ha) than predicted in the 2005 EIS (281 ha) and for each ELC unit, actual habitat losses were less than predicted. ELC habitat loss values for the AWAR in 2010 were compared to predicted High suitability habitat losses for Ungulates (growing and winter season), Waterbirds, Other Breeding Birds, and Small Mammals. In all cases, the actual High suitability habitat losses were significantly less than predicted losses and no thresholds (i.e., >5 to 10% above predicted losses) were exceeded.

### 5.4.3 Whale Tail Pit and Haul Road

A thorough habitat loss analysis was conducted in 2018 and habitat loss outcomes were compared to permitted areas. For all ELC units, habitat losses were less than the habitat available within permitted areas; therefore, thresholds were not surpassed. As with the overall habitat loss assessment, high suitability habitat losses for Ungulates was well below high suitability habitats available within permitted areas; therefore, again no thresholds have been surpassed.

## 5.5 MANAGEMENT RECOMMENDATIONS

Calculated habitat loss for the project is well below habitats available within the permitted areas, as are high suitability habitat losses for wildlife VECs. Given this outcome, the next habitat analysis is planned for 2021.

## SECTION 6 • CARIBOU SATELLITE-COLLARING PROGRAM

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### 6.1 OVERVIEW

Agnico Eagle continues to collaborate with the GN DoE in a Caribou satellite-collaring program that includes data collected within the Meadowbank and Whale Tail RSAs, as per the MOU (renewed in 2017) with government partners. The GN biologists discuss collar deployments with hunters and Elders and get approval prior to proceeding. Discussions are ongoing between Agnico Eagle, GN, and other partners on the best path forward to ensure Caribou migration maps continue to integrate Elders and local HTO input.

Information pertaining to the identification and location of various herds that use the Meadowbank and Whale Tail RSAs at different times of the year are important components of ongoing monitoring and management efforts at the mine site and along project roads.

### 6.2 OBJECTIVES

The satellite-collaring program was developed to provide information on the distribution of Caribou occurring within the Meadowbank and Whale Tail RSAs and contribute data to ongoing satellite-collaring programs for the Ahiak, Qamanirjuaq, and other herds. The satellite-collaring program, along with GN DoE regional data, is an important monitoring and management tool that provides a regional perspective on Caribou activity near mine operations. Another key objective of the program is to provide timely information for the Caribou management and monitoring strategy at the Meadowbank and Whale Tail sites (i.e., Decision Tree approach; see 2019 TEMP [Agnico Eagle 2019]).

To determine whether Caribou approaching the mine and roads are being disturbed (e.g., if their movement is deflected to avoid the project), a comprehensive analysis of satellite collaring data since 2008 was undertaken by the GN and Agnico Eagle, led by the GN.

### 6.3 DURATION

The satellite-collaring program was initially designed to continue for five consecutive years in accordance with the original TEMP (Cumberland 2006), but collar deployments have continued beyond this period as part of a long-term Caribou monitoring strategy for the region. Caribou in the Baker Lake area were first collared in May 2008, and the program has continued for more than a decade.

## 6.4 METHODOLOGY

Caribou are carefully netted by the contracted satellite-collaring crew via helicopter and fitted with either an Advanced Research and Global Observation Satellite (ARGOS) GPS Type IV or Iridium satellite-collar. Collar data are regularly<sup>1</sup> retrieved electronically via satellite and distributed to GN DoE and Nunavut Environmental personnel by CLS America, the data-management company.

Deployed collar data were included in a population distribution analysis completed for the GN (Nagy et al. 2011). The clustering and movements of each collared Caribou are examined and assigned to the sub-population (i.e., Ahlak, Beverly, Lorillard, Qamanirjuaq, and Wager Bay) that best fits the animal's movement characteristics.

## 6.5 HISTORICAL RESULTS

Collaring was originally scheduled to commence in 2007 but was postponed for one year due to logistical constraints. Seven deployments, with a total of 115 collars, have been completed in the area around Baker Lake since Agnico Eagle became involved in the collaring program. The following numbers of collars were successfully deployed since 2008:

- 9 collars (Agnico Eagle) in May 2008;
- 21 collars (shared by Agnico Eagle and AREVA) in November 2009;
- 13 collars (Agnico Eagle) in April 2011;
- 15 collars (shared by Agnico Eagle and AREVA) in April 2013;
- 10 collars (Agnico Eagle) in April 2015;
- 13 collars (Agnico Eagle) in May 2016; and
- 34 collars (Agnico Eagle) in April 2018

Also included in **Section 6** figures are collared Caribou from the Qamanirjuaq herd, which are part of a separate GN program, and collars from a Government of the Northwest Territories (GNWT) program on the Beverly herd. These telemetry data are included because of the proximity of animals to the Meadowbank RSA. As discussed above, historical collar data have all been assigned to one of the five major sub-populations (Nagy et al. 2011).

## 6.6 2019 RESULTS

At the beginning of the 2019 monitoring year, 35 of the Baker Lake collared Caribou were still active, including three (3) from the 2015 deployment, four (4) from the 2016 deployment, and 28 from the April 2018. By the end of 2019, 31 collars were active, comprised of three (3) from the 2015 deployment, four (4) from the 2016 deployment, and 24 from the 2018 deployment. A summary of 2019 locations and movement patterns for Caribou collared around Baker Lake by season is described below and summarized in **Figure 6.1**.

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<sup>1</sup> Data are often retrieved on a daily basis but may vary depending on signal strength and weather conditions.





**2019 WILDLIFE MONITORING SUMMARY**

Seasonal movements of collared Caribou in close proximity to the Meadowbank RSA and LSA in 2019 are shown in **Figure 6.2**. Note that the seasons indicated in the figures and discussed further align with those identified in the 2019 TEMP (i.e., Spring – 01 April to 25 May; Summer – 26 May to 21 September; Fall – 22 September to 15 December; and Winter 16 December to March 31). In 2019, most Caribou appeared to migrate through the RSA and across the AWAR and Whale Tail Haul Road without major deflections. This positive result may be due to the number of road closures, timing of initial road closures and/or a combination thereof that were initiated in 2019 in response to Caribou presence.

Movements for Qamanirjuaq herd collared animals, a program also supported by Agnico Eagle, and animals collared by the GNWT are provided for context in **Figure 6.1**. At the beginning of 2019, 40 collars were active (i.e., 11 from the 2016 deployment, 8 from 2016, and 21 from 2017). In late April 2019, an additional 35 animals from the Qamanirjuaq herd were fitted with collars. By the end of 2019, 55 of the Qamanirjuaq collars were active (i.e., 6 from the 2016 deployment, 17 from 2017, and 32 from 2019). Seasonal movements of all collared Caribou are discussed below.

**Spring (01 April to 25 May)**

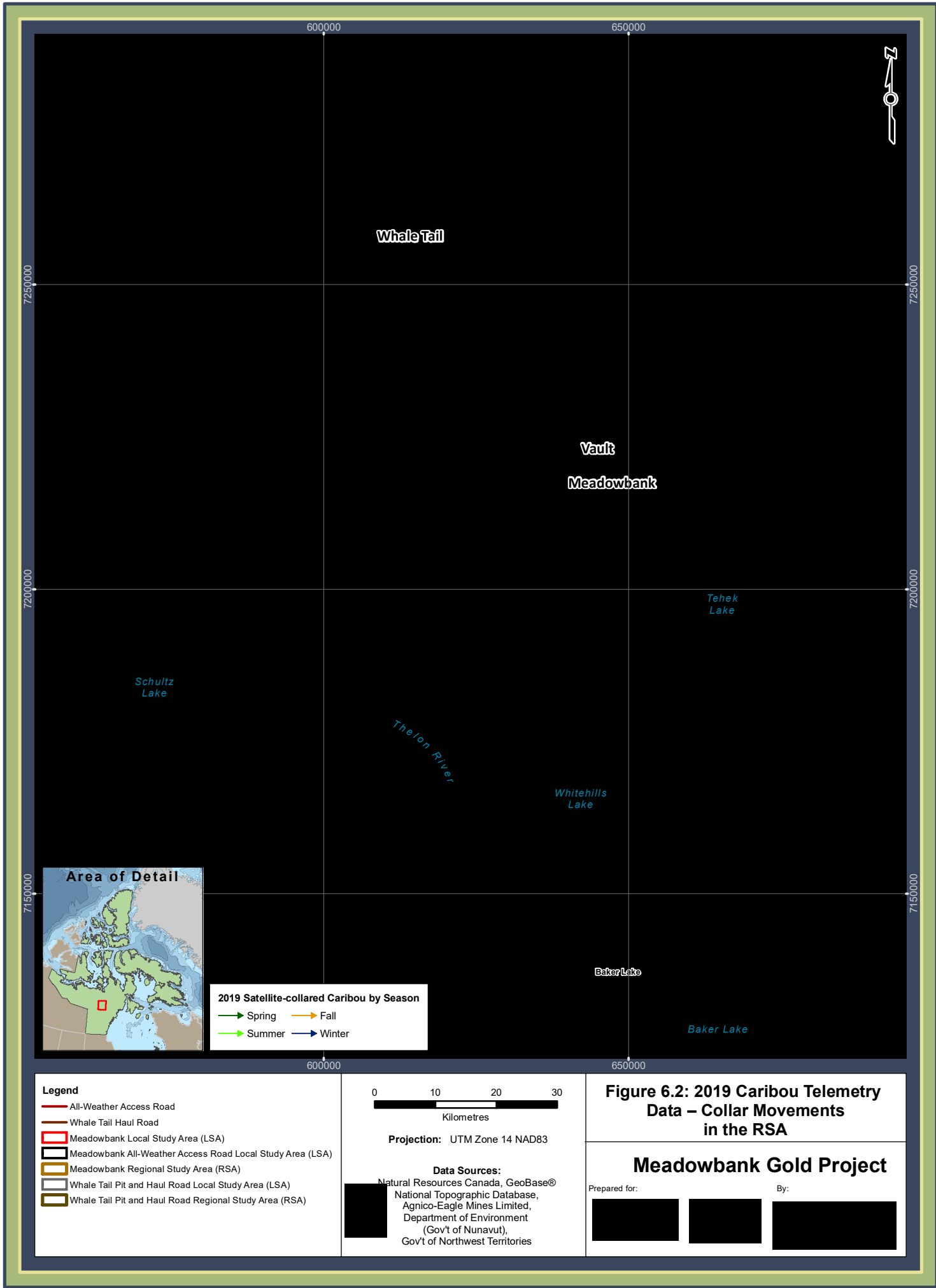
In 2019, spring collar data indicated movement of Caribou across the entire length of the AWAR and Whale Tail Haul Road (**Figure 6.3**), which was supported by road survey data (**Section 3**). Caribou moving across the AWAR appeared to be primarily from the Lorillard and Wager Bay Caribou herds while individuals moving across the Whale Tail Haul Road appeared to be from the Ahiak herd (**Figure 6.3**). The majority of collared Ahiak animals moved in a northeast direction well to the west of the Meadowbank RSA. A significant movement of the Qamanirjuaq herd to calving grounds occurred south of Chesterfield Inlet (**Figure 6.3**).

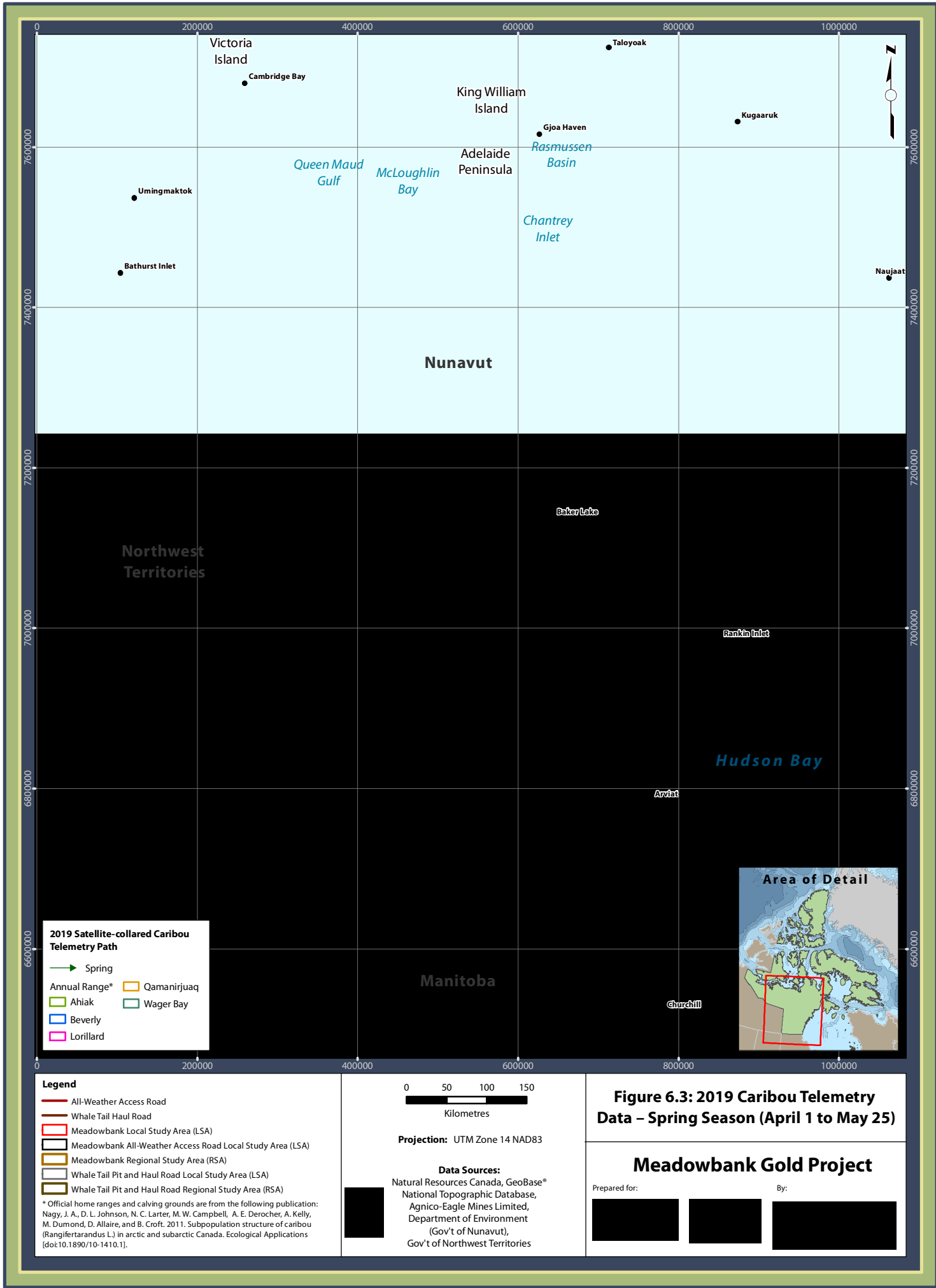
**Summer (26 May to 21 September)**

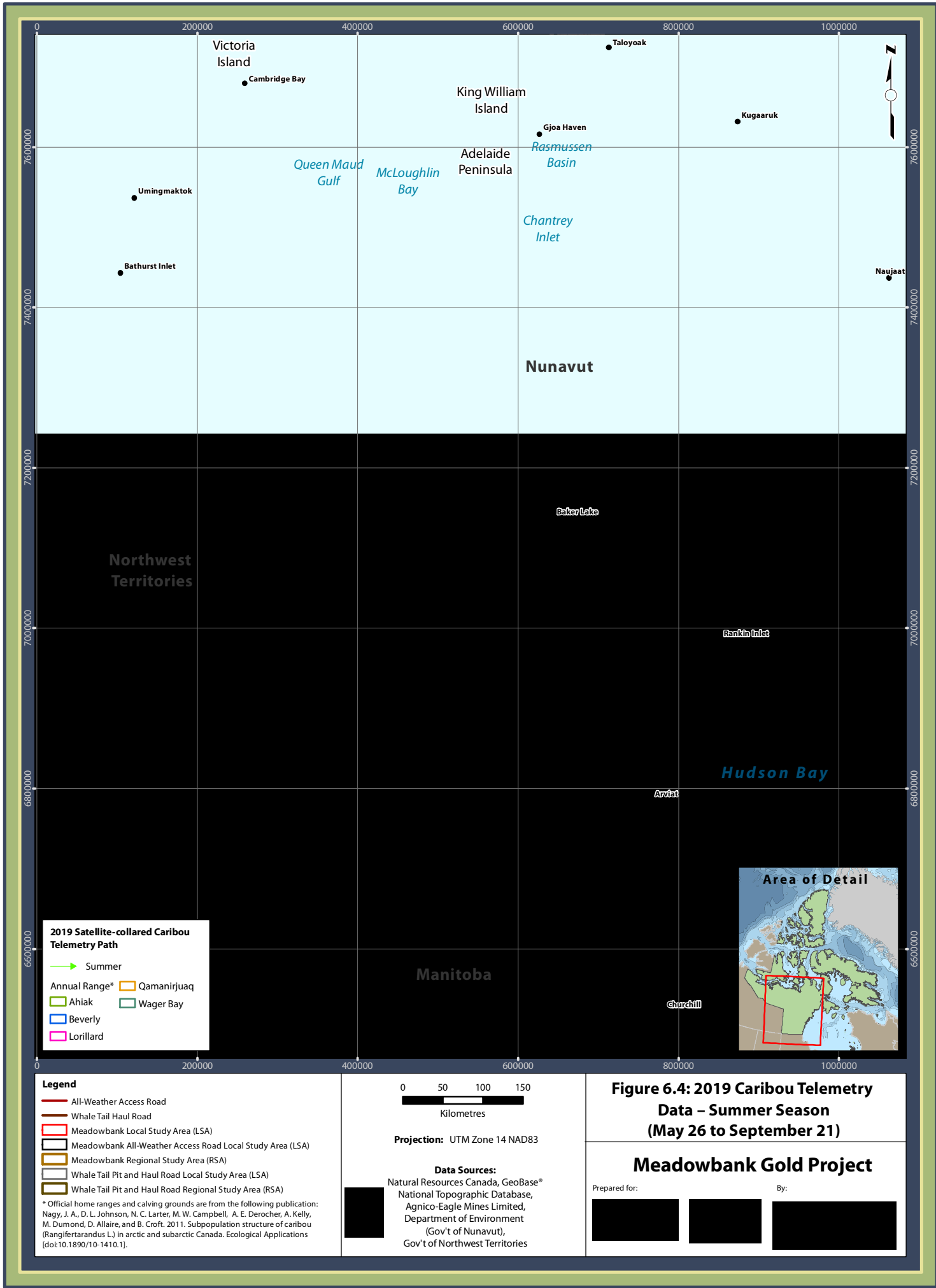
At least two individuals from the Ahiak herd spent a considerable amount of time in the vicinity of the Whale Tail Pit LSA during summer 2019 (**Figure 6.4**). Interestingly, one Caribou that had migrated with the Qamanirjuaq herd to calving grounds south of Chesterfield Inlet crossed the inlet just east of Baker Lake and wandered in a northwest direction through the Whale Tail RSA to join the Ahiak herd (**Figure 6.4**). The majority of collared Ahiak animals were well to the northwest and west of the Meadowbank RSA. South of Chesterfield Inlet, collared Qamanirjuaq animals moved in a largely clockwise direction in an area generally west of Arviat (**Figure 6.4**).

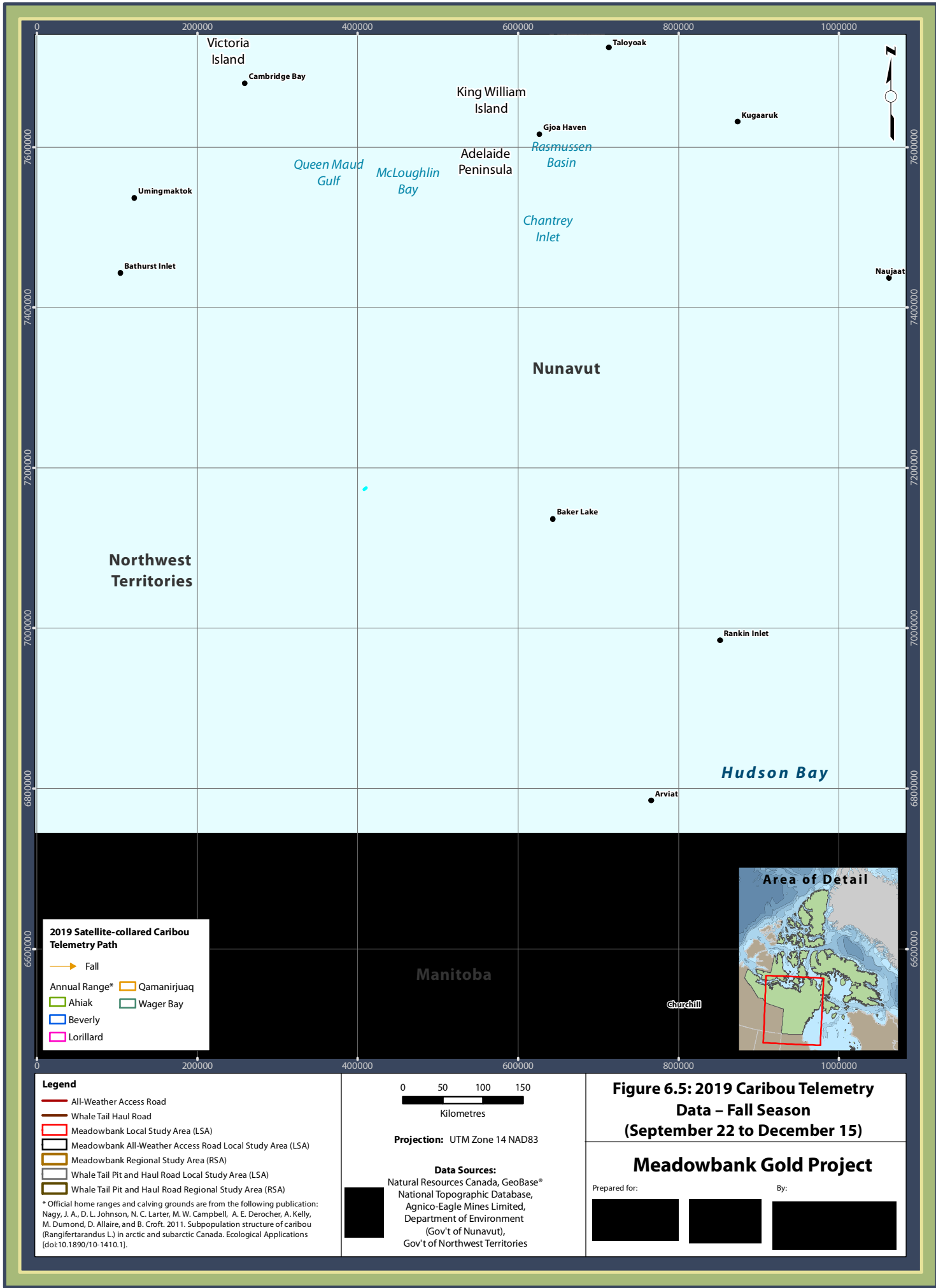
**Fall (22 September to 15 December)**

At least five collared Caribou from the Wager Bay and Lorillard herds moved across the AWAR in fall 2019 (**Figures 6.2** and **6.5**). This movement corresponded with a large number of Caribou observed on road surveys (see **Section 3**) and an increased number of animals harvested by hunters (see **Section 10**). Collared Ahiak animals were well west of the Meadowbank RSA in an area southeast of Bathurst Inlet (**Figure 6.5**). South of Baker Lake, collared Qamanirjuaq animals moved further south into northern Manitoba and then migrated in a western direction toward the Northwest Territories (**Figure 6.5**).











**Winter (16 December to 31 March)**

Collared Caribou were not present in the Meadowbank or Whale Tail RSAs during the winter of 2019 (**Figure 6.6**). A cluster of collared Lorillard and Wager Bay animals were present in the Aberdeen Lake area, which was also frequented by some hunters in 2019 (see **Section 10**). Qamanirjuaq and Ahiak collared animals wintered in western Nunavut and northeastern Northwest Territories (**Figure 6.6**).

**All Seasons**

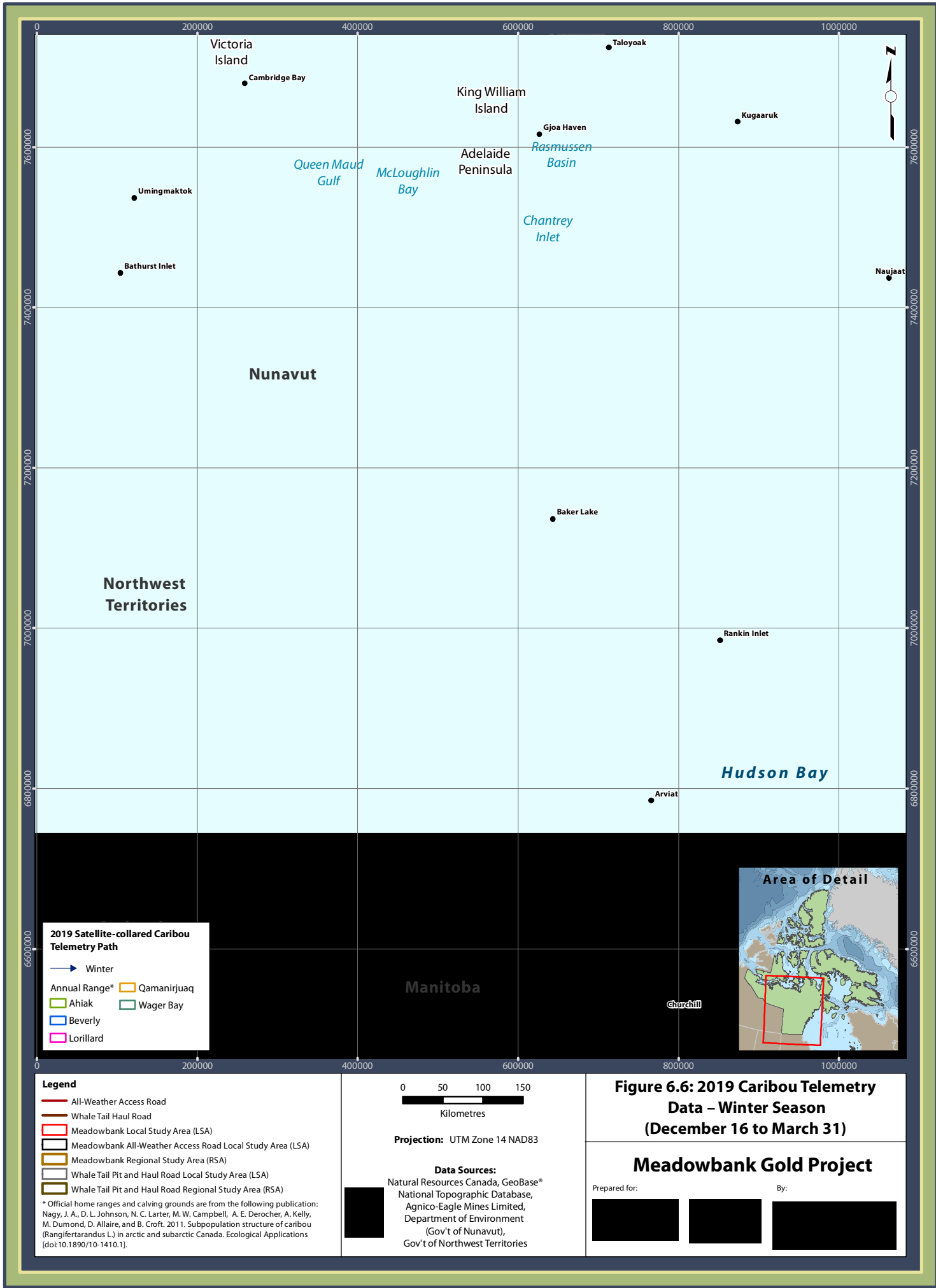
An overview of collared Caribou distribution in 2019 for all seasons is provided in **Figure 6.1**. These data include all remaining active collars from 2015, 2016, 2017, 2018 and 2019 deployments around the Baker Lake area. General trends in seasonal distribution are evident and generally comparable to findings from previous years for animals collared in this area. Collared Caribou calved (light green symbol) in five distinct areas: 1) around McLoughlin Bay and Rasmussen Basin and Kugaruk (Ahiak herd); 2) north and west of Repulse Bay (Wager Bay herd); 3) between Chesterfield Inlet and Wager Bay, towards Hudson Bay (Lorillard herd); 4) south of Chesterfield Inlet in the traditional calving grounds of the Qamanirjuaq herd; and 5) along the Queen Maud Gulf and McLoughlin Bay (Beverly). By the end of 2019, collared animals were congregated either between Aberdeen Lake and Dubawnt Lake, on Qamanirjuaq wintering grounds in the Northwest Territories, and in northeastern Northwest Territories (**Figure 6.1**).

As in most monitoring years to date, few collared Caribou were found within the Meadowbank and Whale Tail RSAs during the calving season (i.e., summer). In addition, no collared individuals were found in the RSAs during the winter season. Within the Meadowbank and Whale Tail RSAs, collared Caribou were present predominantly during the spring and fall periods (**Figure 6.2**).

At the end of 2019, 31 satellite collars originally deployed near Baker Lake continued to be active and tracked, with results being downloaded on a regular basis. Caribou collaring maps are posted at the Meadowbank mine site for staff to observe; however, maps are slightly out of date and do not depict current locations (i.e., in order not to facilitate hunting pressure).

**6.7 CARIBOU MIGRATION PATTERNS**

A summary of Caribou migration patterns, which synthesizes migration information from satellite-collaring data to 2012 and was developed by the GN for the spring and fall migrations, was provided in the 2014 annual report. The seasonal range maps are currently being updated by the GN and will include an update on migration corridors. As these figures have not been updated, they are not discussed in this year's report.



## 6.8 ACCURACY OF IMPACT PREDICTIONS

A summary of the impact predictions identified in the TEMP is provided in **Table 6.1**. The 2019 satellite-collaring data were compared to the impact prediction thresholds to evaluate adherence to the impact predictions and the provision of adaptive management, as either a necessary or proactive measure.

**Table 6.1:** Accuracy of Impact Predictions – Satellite-collaring Data

Potential Effect	Threshold	Threshold Exceeded (2019)	Adaptive Management Implemented	Status
Sensory Disturbance	No threshold but Decisions Trees followed when Caribou are seen near mine facilities	No	YES. Multiple road closures and notices. Use of Decision Tree for management and monitoring. Ongoing analysis by GN (in partnership with Agnico Eagle)	Satellite-collaring data Daily and weekly pit and mine-site ground surveys AWAR and Haul Road surveys HOL Surveys Motion sensing cameras
Hunting by Baker Lake Residents	Caribou herds will not be significantly affected by year-round access to the RSA.	No	NA	Satellite-collaring data Hunter Harvest Study

## 6.9 MANAGEMENT RECOMMENDATIONS

The 2019 satellite-collaring data depicted Caribou movements within and through the Meadowbank and Whale Tail RSAs and LSAs during most seasons but particularly during spring and fall. Most 2019 Caribou activity was observed during the spring and fall migration requiring numerous road closures and restrictions along the Whale Tail Haul Road and Meadowbank AWAR. Agnico Eagle and regulatory agencies are committed to conducting more detailed analyses of Caribou monitoring data, satellite collar data, hunter harvest activity, and other potential influences on Caribou movement and migration to adaptively manage and minimize project-related effects on Caribou. Agnico Eagle is also exploring the link between Caribou road crossings and road closures and several technical memorandums have been presented to the TAG regarding effects to Caribou.

Agnico Eagle environment department should continue to closely monitor Caribou movement in the weeks leading up to seasonal migrations using the latest available satellite-collaring and monitoring data (e.g., road surveys) as well as incidental reports from staff. As a proactive adaptive management strategy, notification and announcements, staff re-education, specific dispatch protocols, and temporary road closures should continue to be implemented. Where applicable, Caribou management and monitoring should be conducted according to protocols outlined in the 2019 TEMP, including continued use of a decision tree. Issues and concerns that arise should be discussed with regulatory personnel and during TAG meetings to ensure that a balance is achieved between Caribou protection and conservation, and mine operation. Infographic tools developed to assist in presenting and educating site staff and road users on key information and actions should continue to be used.

## SECTION 7 • HEIGHT OF LAND MONITORING

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### 7.1 OVERVIEW

The purpose of the Height of Land (HOL) surveys is to serve as another level of Ungulate monitoring along the Whale Tail Haul Road.

In 2019, Agnico Eagle advanced the idea of using Roadside Survey Points instead of HOL locations because of safety and logistical reasons. A viewshed analysis and report were prepared by Golder (2020a – see **Appendix G**). Agnico Eagle, subject to approval by the TAG, intends to begin using the Roadside Survey Points in 2020. If this is the case, the approach and methodology will be described in the 2020 annual wildlife monitoring report.

### 7.2 OBJECTIVES

The HOL surveys provide an ‘early warning’ system of the presence of Caribou in proximity to the Whale Tail Pit and Haul Road.

### 7.3 DURATION

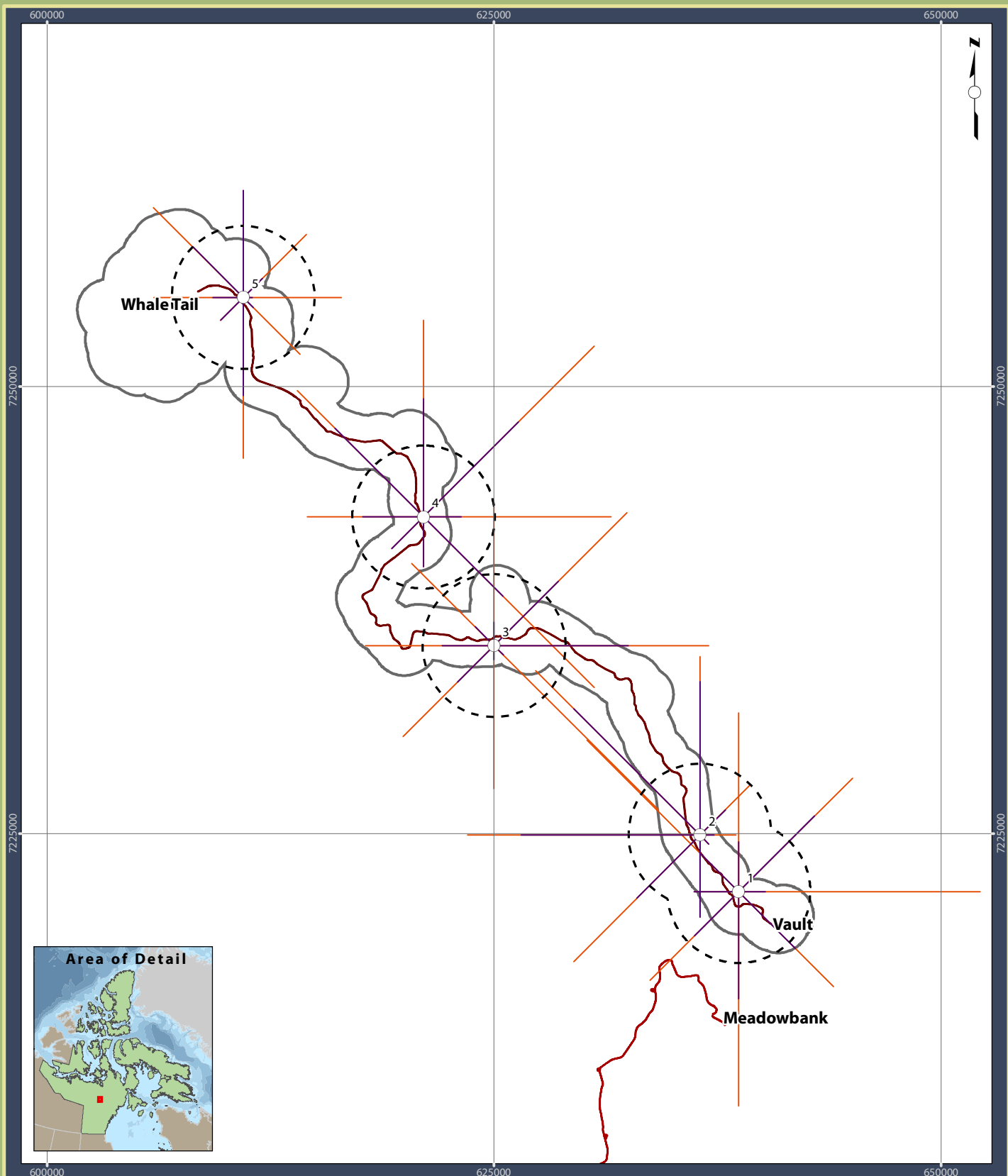
The HOL surveys are scheduled to be conducted once per week from January to April and from July to August. From May to June and September to December, the prime migratory period for Caribou, the frequency of surveys will increase to twice per week unless triggers (see **Section 9**) require surveys every two days.

### 7.4 METHODOLOGY

Five easily accessible HOL survey locations were established in 2017 along the Whale Tail Haul Road (see **Figure 7.1**). The locations are within 500 m of the Whale Tail Pit Haul Road and provide an unobstructed view (up to 360°) of the surrounding terrain. While conducting the ground surveys, two observers stop at the HOL locations and survey the area for 20 minutes using a combination of naked eye, binoculars, and scope. The surveyors independently view the landscape for Caribou starting at opposite cardinal directions and scan 180° for five minutes at a time, but move 90° every 5 minutes. Results are then compared to determine if Caribou Group Size Threshold (GST; see **Section 9**) is triggered, but consensus on numbers is not necessary as each survey will generate a separate result for each observer so that variability can be incorporated into detection rates.

### 7.5 2019 RESULTS

Fifty HOL surveys were conducted between 09 January and 15 December 2019. Because of weather-related issues, particularly in during the winter months, not all five HOL locations could be surveyed on each of the survey days. A summary of survey results by Caribou season is provided in **Table 7.1**. Raw data is provided in **Table 7.2** while field survey sheets can be found in **Appendix H**.



### Legend

- |   |                     |                                   |
|---|---------------------|-----------------------------------|
| Whale Tail Haul Road                                | Sightline Lowlands  | Maximum Observable Area Lowlands  |
| All-Weather Access Road                             | Sightline Highlands | Maximum Observable Area Highlands |
| Height-of-Land Survey Location                      |                     |                                   |
| Buffer (4 km)                                       |                     |                                   |
| Whale Tail Pit and Haul Road Local Study Area (LSA) |                     |                                   |



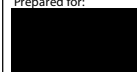
**Projection:** UTM Zone 14 NAD83

**Data Sources:**  
 Natural Resources Canada, GeoBase®  
 National Topographic Database  
 Agnico-Eagle Mines Limited.

**Figure 7.1 Location of Height of Land Surveys along the Whale Tail Haul Road (and View Corridors)**

### Meadowbank Gold Project

Prepared for:



By:





**Table 7.1:** Cumulative Number of Wildlife Observed on Height-of-Land Surveys along the Whale Tail Haul Road in 2019.

Species	Caribou Seasons			
	Spring 01 Apr to 25 May	Summer 26 May to 21 Sep	Fall 22 Sep to 15 Dec	Winter 16 Dec to 31 Mar
<b>MAMMALS</b>				
Arctic Hare	2	3	3	
Caribou	842	177	529	
Muskox	17	16		32
Wolf			1	
Wolverine			1	1
<b>BIRDS</b>				
Canada Goose		6		
Geese sp.		167		
Gull sp.		2		
Owl sp.		2		
Ptarmigan sp.		19	15	
Snow Bunting		10		
Snow Goose		346		

## 7.6 MANAGEMENT RECOMMENDATIONS

In 2019, an effort was made to identify Roadside Observation Points that could more easily and safely be surveyed (Golder 2020a – **Appendix H**). Based on discussions within the TAG, these Roadside Observation Points will be used in 2020 and replace the HOL surveys.

**MEADOWBANK GOLD MINE PROJECT**  
**2019 WILDLIFE MONITORING SUMMARY**

**Table 7.2:** Height-of-Land Survey Data along the Whale Tail Haul Road in 2019. Highlighted cells were not surveyed.

Date (2019)	Observations (4 directions-360°)	HOL 1	HOL 2	HOL 3	HOL 4	HOL 5	Comments
<b>Winter Season (01 January to 31 March)</b>							
01 Jan	All directions				-	-	No observations
10 Jan	N – 5 minutes			-			Muskox resting 350 m from HOL
	E – 5 minutes			-			
	S – 5 minutes			-			
	W – 5 minutes			30 Muskox			
30 Jan	All directions			-	-	-	No observations
06 Feb	All directions	-	-	-	-	-	No observations
27 Feb	N – 5 minutes	-	-	-	1 Wolverine	-	Wolverine walking >1km from HOL; Muskox resting >1.5km from HOL
	E – 5 minutes	-	-	-	2 Muskox	-	
	S – 5 minutes	-	-	-	-	-	
	W – 5 minutes	-	-	-	-	-	
13 Mar	All directions	-	-	-	-	-	No observations; visibility very poor
<b>Spring Season (01 April to 25 May)</b>							
04 Apr	N – 5 minutes		-	-	-	-	Caribou walking slowly 850 m from HOL
	E – 5 minutes		-	-	-	-	
	S – 5 minutes		11 Caribou	-	-	-	
	W – 5 minutes		-	-	-	-	
06 Apr	All directions		-	-			No observations
20 Apr	N – 5 minutes	-	45 Caribou	-	9 Caribou	-	Almost all observations >1 km from HOL stations; some Caribou at HOL 5 were 650 m away
	E – 5 minutes	-	-	-	-	-	
	S – 5 minutes	43 Caribou	37 Caribou	-	-	-	
	W – 5 minutes	-	-	-	-	72 Caribou	
21 Apr	N – 5 minutes	-	6 Muskox	-	40 Caribou	-	Observations ranged from 1 to 3 km away from HOL stations
	E – 5 minutes	-	-	-	-	-	
	S – 5 minutes	160 Caribou	-	-	-	29 Caribou	
	W – 5 minutes	117 Caribou	9 Muskox	14 Caribou	68 Caribou	-	

**MEADOWBANK GOLD MINE PROJECT**  
**2019 WILDLIFE MONITORING SUMMARY**

**Table 7.2:** Continued.

Date (2019)	Observations (4 directions-360°)	HOL 1	HOL 2	HOL 3	HOL 4	HOL 5	Comments
Spring Season (01 April to 25 May)							
08 May	N – 5 minutes	40 Caribou	-				Caribou observed from 800 to 1000 m from HOL stations
	E – 5 minutes	-	40 Caribou				
	S – 5 minutes	-	20 Caribou				
	W – 5 minutes	-	-				
09 May	N – 5 minutes	-	-	-	-	-	No observations
10 May	All directions	-	-				No observations
15 May	N – 5 minutes	1 Arctic Hare	-	-	-	-	Muskox resting 1 km from HOL; Caribou walking slowly 2.5 km from HOL
	E – 5 minutes	-	-	-	-	-	
	S – 5 minutes	2 Muskox	-	-	-	-	
	W – 5 minutes	65 Caribou	-	-	-	-	
16 May	All directions	-	-	-	-	-	No observations
16 May	N – 5 minutes	-	-	-	-	-	Caribou grazing 500 m from HOL station
	E – 5 minutes	-	-	-	-	-	
	S – 5 minutes	-	1 Arctic Hare	-	-	-	
	W – 5 minutes	-	12 Caribou	-	-	-	
19 May	All directions	-	-	-			No observations
22 May	N – 5 minutes	-	-	-	-	-	Caribou grazing 2 km from HOL station
	E – 5 minutes	-	-	-	-	-	
	S – 5 minutes	-	-	-	-	-	
	W – 5 minutes	20 Caribou	-	-	-	-	
Summer Season (26 May to 21 September)							
28 May	All directions	-	-	-	-	-	No observations
30 May	N – 5 minutes	-	-	-	-	-	No other observations
	E – 5 minutes	-	-	-	-	-	
	S – 5 minutes	-	-	-	-	-	
	W – 5 minutes	-	-	1 Ptarmigan	-	-	

**MEADOWBANK GOLD MINE PROJECT**  
**2019 WILDLIFE MONITORING SUMMARY**

**Table 7.2:** Continued.

Date (2019)	Observations (4 directions-360°)	HOL 1	HOL 2	HOL 3	HOL 4	HOL 5	Comments
<b>Summer Season (26 May to 21 September)</b>							
05 Jun	N – 5 minutes	-	-	3 Caribou	15 Geese	-	Caribou walking from 1 to 2 km from HOL stations
	E – 5 minutes	-	-	-	6 Caribou	-	
	S – 5 minutes	-	-	-	-	-	
	W – 5 minutes	-	-	-	1 Arctic Hare	-	
20 Jun	N – 5 minutes	-	-	-	-	1 Arctic Hare	No Caribou observations
	E – 5 minutes	-	-	-	-	1 Ptarmigan	
	S – 5 minutes	-	-	6 Canada Goose	-	-	
	W – 5 minutes	-	-	2 Ptarmigan	-	-	
17 Jul	N – 5 minutes	-	-	-	1 Muskox	-	Muskox from 500 to 1000 m from HOL stations
	E – 5 minutes	1 Muskox	-	-	-	-	
	S – 5 minutes	-	-	-	-	-	
	W – 5 minutes	-	-	-	-	-	
24 Jul	N – 5 minutes	-	-	-	-	-	Muskox foraging 1000 m from HOL station
	E – 5 minutes	1 Arctic Hare	-	1 Gull	-	-	
	S – 5 minutes	-	-	-	-	-	
	W – 5 minutes	14 Muskox	-	-	-	1 Gull	
29 Jul	All directions	-	-	-	-	-	No observations
14 Aug	All directions	-	-	-	-	-	No observations
21 Aug	N – 5 minutes	-	-	-	-	-	Caribou 400 m to 1.5 km from HOL stations
	E – 5 minutes	-	-	-	-	1 Caribou	
	S – 5 minutes	-	-	1 Caribou	-	-	
	W – 5 minutes	-	-	-	-	4 Caribou	
26 Aug	N – 5 minutes	-	-	57 Caribou	-	-	Caribou resting and foraging 700 to 800 m from HOL stations
	E – 5 minutes	-	-	-	-	-	
	S – 5 minutes	-	-	-	-	-	
	W – 5 minutes	-	-	48 Caribou	-	-	

**MEADOWBANK GOLD MINE PROJECT**  
**2019 WILDLIFE MONITORING SUMMARY**

**Table 7.2:** Continued.

Date (2019)	Observations (4 directions-360 <sup>o</sup> )	HOL 1	HOL 2	HOL 3	HOL 4	HOL 5	Comments
Summer Season (26 May to 21 September)							
27 Aug	N – 5 minutes					-	Caribou resting and foraging 900 m to 2 km from HOL stations
	E – 5 minutes					-	
	S – 5 minutes					6 Caribou	
	W – 5 minutes					1 Caribou	
29 Aug	N – 5 minutes	-	-	-	-	-	Caribou walking slowly and foraging 1 to 2 km from HOL stations
	E – 5 minutes	-	-	-	1 Owl	13 Caribou	
	S – 5 minutes	-	-	-	-	-	
	W – 5 minutes	-	-	2 Caribou	-	14 Caribou	
04 Sep	N – 5 minutes	40 Snow Geese	-	80 Snow Geese	-	-	Snow Geese foraging ~1 km from HOL stations; Caribou grazing 1 to 2 km away
	E – 5 minutes	40 Snow Geese	20 Snow Geese	2 Caribou	60 Snow Geese	10 Snow Geese	
	S – 5 minutes	-	-	20 Snow Geese	-	-	
	W – 5 minutes	-	-	-	1 Owl	-	
11 Sep	N – 5 minutes		-	-	30 Geese	-	Geese foraging and flying; Caribou foraging, walking slowly and resting 1 to 2 km from HOL stations
	E – 5 minutes		33 Geese	33 Geese	-	3 Caribou 6 Snow Geese	
	S – 5 minutes		-	-	-	16 Caribou	
	W – 5 minutes		-	10 Geese	20 Geese	-	
12 Sep	All directions	-					No observations
19 Sep	N – 5 minutes	10 Snow Bunting	-	6 Geese	20 Snow Geese		Geese flying over or foraging close to the HOL stations
	E – 5 minutes	-	-	-	-		
	S – 5 minutes	20 Geese	-	15 Ptarmigan	50 Snow Geese		
	W – 5 minutes	-	-	-	-		
Fall Season (22 September to 15 December )							
25 Sep	N – 5 minutes		-			-	Hares resting 100 m from HOL station
	E – 5 minutes		3 Arctic Hare			-	
	S – 5 minutes		-			-	
	W – 5 minutes		-			-	



**MEADOWBANK GOLD MINE PROJECT**  
**2019 WILDLIFE MONITORING SUMMARY**

**Table 7.2:** Continued.

Date (2019)	Observations (4 directions-360°)	HOL 1	HOL 2	HOL 3	HOL 4	HOL 5	Comments
<b>Fall Season (22 September to 15 December )</b>							
11 Oct	N – 5 minutes				-	-	Caribou foraging, walking slowly, and running (wolf) 950 m to 2.5 km from HOL stations
	E – 5 minutes				31 Caribou	-	
	S – 5 minutes				-	200+ Caribou	
	W – 5 minutes				-	48 Caribou 1 Wolf	
14 Oct	N – 5 minutes			-	-	-	Caribou foraging and resting 1 km from HOL station
	E – 5 minutes			-	250+ Caribou	-	
	S – 5 minutes			-	-	-	
	W – 5 minutes			-	-	-	
18 Oct	N – 5 minutes	-	15 Ptarmigan	-			Ptarmigan 300 m from HOL station
	E – 5 minutes	-	-	-			
	S – 5 minutes	-	-	-			
	W – 5 minutes	-	-	-			
23 Oct	All directions	-	-	-	-	-	No observations
24 Oct	All directions		-	-	-		No observations; poor visibility because of fog
30 Oct	N – 5 minutes					1 Wolverine	Wolverine right beside HOL station
	E – 5 minutes					-	
	S – 5 minutes					-	
	W – 5 minutes					-	
30 Oct	All directions			-	-		No observations
13 Nov	All directions	-	-		-	-	No observations
16 Nov	All directions		-	-			No observations
17 Nov	All directions		-	-		-	No observations
24 Nov	All directions	-		-			No observations

**Table 7.2:** Continued.

Date	Observations	HOL 1	HOL 2	HOL 3	HOL 4	HOL 5	Comments
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**MEADOWBANK GOLD MINE PROJECT**  
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(2019)	(4 directions-360°)						
Fall Season (22 September to 15 December )							
27 Nov	All directions				-	-	No observations
28 Nov	All directions						No observations; poor visibility
12 Dec	All directions			-	-	-	No observations
15 Dec	All directions				-	-	No observations

## SECTION 8 • REMOTE CAMERAS

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### 8.1 OVERVIEW

The use of remote cameras was first introduced in October 2018 as another technique to monitor Caribou interactions (e.g., behavior) with project roads equipment or other industrial features (e.g., roadside marker flags). The approach is one of several monitoring techniques to ensure that the best Caribou management practices and mitigation are implemented for the project.

### 8.2 OBJECTIVES

The primary objective of using remote cameras is to monitor Caribou behavioral interactions with project roads and equipment, and adapt management practices and mitigation as required.

### 8.3 DURATION

The use of remote cameras will continue indefinitely but camera results will be analyzed and discussed at TAG meetings to ensure that the monitoring objectives are being achieved.

### 8.4 METHODOLOGY

Remote cameras can be used and set to be triggered based on motion/heat and/or on a time series to view video footage of Caribou interaction with project infrastructure such as roads and equipment. In November 2019, a detailed remote camera protocol was developed by Golder (2019) (see **Appendix I**).

### 8.5 2019 RESULTS

Results from the 2018 remote camera program have been summarized in a Technical Memorandum by Golder (2020b) and is included in **Appendix J** (see also Photo below). Results from the 2019 remote camera program are not yet available.

### 8.6 MANAGEMENT RECOMMENDATIONS

Subject to results of the analysis under the remote camera program, the program may be revised or no longer required after collecting data for consecutive seasons over three years to establish trends. Communications with the TAG on this program will be ongoing.



## SECTION 9 • CARIBOU MANAGEMENT DECISION TREE

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### 9.1 OVERVIEW

Introduced in 2018, the 2019 TEMP describes the use of decision trees or charts that outline monitoring and mitigation (adaptive monitoring) measures for Ungulates for each of five phases: 1) Caribou and mining operations; 2) Caribou and haul roads; 3) Caribou and the AWAR; 4) Caribou and blasting; and 5) Muskox and operations (see Agnico Eagle 2019).

### 9.2 OBJECTIVES

The monitoring objectives are to:

- 1) Detect if effect thresholds have been exceeded;
- 2) Test the efficacy of mitigation; and
- 3) Understand project-related effects to Ungulates. For Ungulates, the decision charts are also an objective to manage sensory disturbance to Caribou approaching the project, leading to monitoring to detect Caribou approaching the project and mitigation to reduce sources of sensory disturbance.

Monitoring activities for Ungulates will be carried out prior to, during, and following construction. The use of decision trees for managing disturbance to Ungulates is an ongoing and continuous monitoring strategy for the life of the project. Monitoring intensity is increased as Ungulates approach the project.

### 9.3 DURATION

Monitoring activities for Ungulates will be carried out prior to, during, and following construction. The use of decision trees for managing disturbance to Ungulates is an ongoing and continuous monitoring strategy for the life of the project. Monitoring intensity is increased as Ungulates approach the project.

### 9.4 METHODOLOGY

The approach involves monitoring the number of Ungulates in close proximity to mining operations through various monitoring tools including Caribou collaring data, HOL surveys, AWAR and haul road surveys, and pit and mine site grounds surveys. Depending on the number of Ungulates observed (i.e., Caribou Group Size Threshold – GST), proximity to the road, and time of year, different monitoring levels are triggered (i.e., Level 1, Level 2, Level 3). For example, triggers may result in pit and mine site ground surveys and/or haul road surveys increased up to every two days, and Caribou satellite data reviewed on a daily basis.

For the purposes of monitoring, a “group of Caribou” is defined as: “An aggregation of caribou that are sufficiently close together that they can see and react to another animal’s behaviour, and have the potential of responding should one or more animal in the aggregation become startled.” For further details on the reasoning behind Caribou GSTs and the decision chart approach, refer to the 2019 TEMP



(Agnico Eagle 2019). The GST approach and monitoring/management outcomes will be reviewed by the TAG on a regular basis to determine whether an acceptable balance has been achieved between mining operations and conserving Caribou populations. As GSTs are the main trigger for mitigation and management, understanding their efficacy for overall herd protection is of high importance.

## **9.5 2019 RESULTS**

Use of the decision tree and trigger approach was used on multiple occasions in 2019. In many cases where groups of Caribou were observed close to the road, closures or restrictions were implemented (see **Tables 3.4 to 3.6**). Project-tolerant animals are defined in the TEMP as an animal or group of animals observed within a mitigation distance buffer for greater than 72 hours during the winter or 48 hours during other seasons; and not visibly disturbed by the Project. To understand visible disturbance to the animals, behavioural monitoring (i.e., group scans) will be completed when the animal(s) are encountered and at least once per day until they are deemed project-tolerant.

## **9.6 ACCURACY OF IMPACT PREDICTIONS**

An objective of the decision chart approach is to reduce sensory disturbance to Caribou approaching the project. The objective is not linked to an impact prediction as the monitoring is to trigger mitigation rather than to test a threshold.

## **9.7 MANAGEMENT RECOMMENDATIONS**

Decisions and outcomes resulting from the use of the decision tree approach in 2019 should be analyzed to determine whether adjustments to the approach need to be made and discussed in TAG meetings. A dedicated log of decisions and outcomes should be kept in 2020 to facilitate future analyses of the effectiveness of this monitoring approach.

## SECTION 10 • HUNTER HARVEST STUDY

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### 10.1 OVERVIEW

As outlined in the TEMP (Cumberland 2006) and as a requirement of NIRB Project Certificate No. 004 Terms and Conditions 51 and 54, the Baker Lake Hunter Harvest Study (HHS) was initiated in March 2007 by Agnico Eagle in association with the Baker Lake HTO to monitor and document the spatial distribution, seasonal patterns, and harvest rates of hunter kills and angler catches within the Meadowbank RSA.

After low participation during the first year of the study, methods were strategically adapted, participation increased steadily, and valuable information on harvest patterns in the Baker Lake area was collected. The HHS, through regular visits, contributed to developing a strong relationship with local harvesters, the HTO, and GN DoE. Data were provided annually in monitoring reports from 2007 to 2015. The HHS was suspended for three years (2016 and 2018) to develop new approaches and direction.

Following consultation with the HTO, KivIA, GN, and other agencies in November 2016 (Winnipeg) and June 2017 (Ottawa), Agnico Eagle reinitiated the HHS in March 2019. The study approach was similar to previous years but suggestions and guidance received during the consultation period were incorporated into the study.

### 10.2 OBJECTIVES

The primary objectives of the HHS are to monitor potential project-related effects on harvesting of wildlife by residents of Baker Lake. This objective is achieved by estimating the following key metrics:

1. The distribution of Caribou, Muskox, and Wolverine harvest by residents of Baker Lake; and
2. The total level (or an index of) Caribou, Muskox, and Wolverine harvest by residents of Baker Lake.

Other objectives of the HHS established in consultation with TAG or other participants include:

- 1) Supporting creel surveys by gathering information on Arctic Char (*Salvelinus alpinus*), Lake Trout (*Salvelinus namaycush*), Lake Whitefish (*Coregonus clupeaformis*), and Arctic Grayling (*Thymallus arcticus*) catch rates and Inuit-use patterns in the Baker Lake area;
- 2) Understanding regional distribution of hunting and fishing activity;
- 3) Investigating seasonal timing of hunting and fishing activity; and
- 4) Determining whether increased harvest and catch rates are associated with the AWAR.

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As discussed during consultation with stakeholders, HHS will further seek to: a) increase and maintain the hunter participant rate in the future of the program; b) improve resource protection; c) improve hunter awareness and education; d) increase the integration of Inuit Qaujimajatuqangit and Traditional Knowledge; f) increase availability of data to support a collective approach to understanding wildlife harvest; and g) assist Agnico Eagle in mitigative actions and the GN in management decisions.

**10.3 METHODOLOGY**

The wildlife species that are the focus of the Hunter Harvest Study are Caribou, Muskox and Wolverine; however, harvest data on other species, such as Wolf, Arctic Fox, geese and other birds is also collected. The few species in the study were deliberately chosen to make data entry and collection as simple as possible. To support creel surveys, data on fish harvest (Arctic Char, Lake Trout, Lake Whitefish, and Arctic Grayling) are also collected.

Inuit and non-Inuit residents, at least 16 years of age, are eligible to participate in the harvest survey. Harvest calendars are provided on a household basis rather than an individual basis in order to simplify data entry and collection. The harvest calendar is attractive and consists of local photographs of wildlife and Baker Lake residents (see **Appendix H** for 2019 calendar). Space is provided for each calendar day where harvest details can be documented. A map is provided at the end of the calendar that delineates a 4 km<sup>2</sup> UTM grid within the Baker Lake and Meadowbank areas. Each grid has a unique code to facilitate recording of information. When calendars are issued, participants or participating households are encouraged to write harvest details (e.g., number of animals, sex, age and location [i.e., grid code]) for the appropriate date on the calendar.

Participants were interviewed in person four times during the year (i.e., March, June, and October 2019, and January 2020) by the harvest study coordinator. During the January 2020 interviews, remaining data from 2019 were collected. The purpose of the interviews is to ensure all harvest data are recorded on the calendars and collect incidental information to compliment calendar data, including notable Caribou movements, aggregations, and unique observations. Between interview periods, participants were often contacted by phone or social media to encourage recording of harvest data.

Improvements to the 2019 Hunter Harvest Study included: 1) increasing the amount of time researchers spent in the community interacting with participants; 2) building long-term relationships between participants and researchers; 3) increasing engagement with participants on social media platforms such as Facebook and Instagram; and 4) increasing incentives for participating in the study (e.g., prizes).

**10.4 HISTORICAL RESULTS**

The Baker Lake HTO member list (provided by Ms. Joan Scottie [HTO Board Member] in 2008) consisted of 683 local area hunters/trappers/fishermen (collectively termed 'hunter' for the remainder of this memo), a number that has likely changed since then. The 2008 member count was a highly conservative (i.e., high) estimate of the number of individuals that hunt, trap or fish in the community as the list typically includes entire families. If just the heads of each household are counted, there were 389 potential hunters within the Baker Lake community in 2008. Although this value is still likely conservative (given that many of these individuals do not actively hunt or fish), the number is more

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comparable to the comprehensive 5-year Nunavut Wildlife Harvest Study (NWMB 2005) in which 336 Baker Lake hunters were contacted / interviewed.

Between 1996 and 2001, 18% of Caribou harvests were estimated to be within 5 km of the AWAR (prior to construction) and 67% of harvests occurred within the RSA (NWMB 2005). In the first year of the HHS study (2007), prior to completion of the AWAR, 34% of harvests were reported within 5 km of the AWAR alignment and 79% were recoded within the RSA. The HHS data (2007 to 2015) fluctuate between 34 and 43% of reported harvest within 5 km of the AWAR, and between 73 and 85% within the RSA.

In 2008, 296 Caribou were reported as being harvested by Baker Lake HHS study participants. Harvest numbers steadily increased to 685 in 2011, and then decreased to 269 in 2014, the lowest reported harvest in seven years. Assuming that an average of approximately 10% of all Baker Lake hunters actively participated in the study (5% estimated for 2014), extrapolation of historical HHS values suggests approximately 3,000 to 6,000 Caribou are harvested each year in the Hamlet of Baker Lake. These estimates are in general agreement with historical harvest studies. Specifically, using the upper limit of the standard error in the Nunavut Wildlife Harvest Study, between 2,230 and 3,116 Caribou were harvested each year between 1996 and 2001 (NWMB 2005). Similarly, the Interdisciplinary Systems (IDS) report (IDS 1978) estimated an annual Caribou harvest in Baker Lake of 4,100 during the 1970s.

Based on the NWMB (2005) and HHS results (2007 to 2015), highest Caribou harvests have occurred in September and October, with a second smaller peak in March and April. The similar pattern between the studies indicates that seasonal hunting preferences have not changed markedly in the last decade.

Reported counts for Muskox and Wolverine remained low, precluding any interpretation of potential mine-related effects. Low densities of these species and their general aversion to humans require hunters to hunt well away from the AWAR; therefore, the presence of the AWAR is thought to have little effect on participant hunting patterns for Muskox and Wolverine. Wolverine harvest reports decreased from a maximum of 15 animals in 2010 to one (1) animal in 2015.

## **10.5 2019 RESULTS – WILDLIFE HARVESTS**

### **10.5.1 Number of Hunters**

The hunter harvest study included 66 participants by the end of 2019. Of these, Caribou hunting data had been collected from 42 participants, which is considerably higher than the 28 participants that reported Caribou harvests in 2015, and higher than the average of 35 successful hunters between 2007 and 2015.

Based on the previous discussion of total numbers of hunters in the Hamlet of Baker Lake (**Section 10.4 Historical Results**), there were 389 potential hunters within the Baker Lake community in 2008. The number is comparable to the comprehensive 5-year Nunavut Wildlife Harvest Study (NWMB 2005) in which 336 Baker Lake hunters were contacted and interviewed. Recent discussions with Baker Lake HTO members suggest the total number of hunters is over 300. Given the historical and current number of hunters in Baker Lake, an estimate of 300 to 350 active hunters is used in this analysis. Based on

these numbers, the 42 hunters reporting Caribou harvest in 2019 conservatively represent from 12 to 14 % of total hunters in the community.

### 10.5.2 Distribution of Hunting

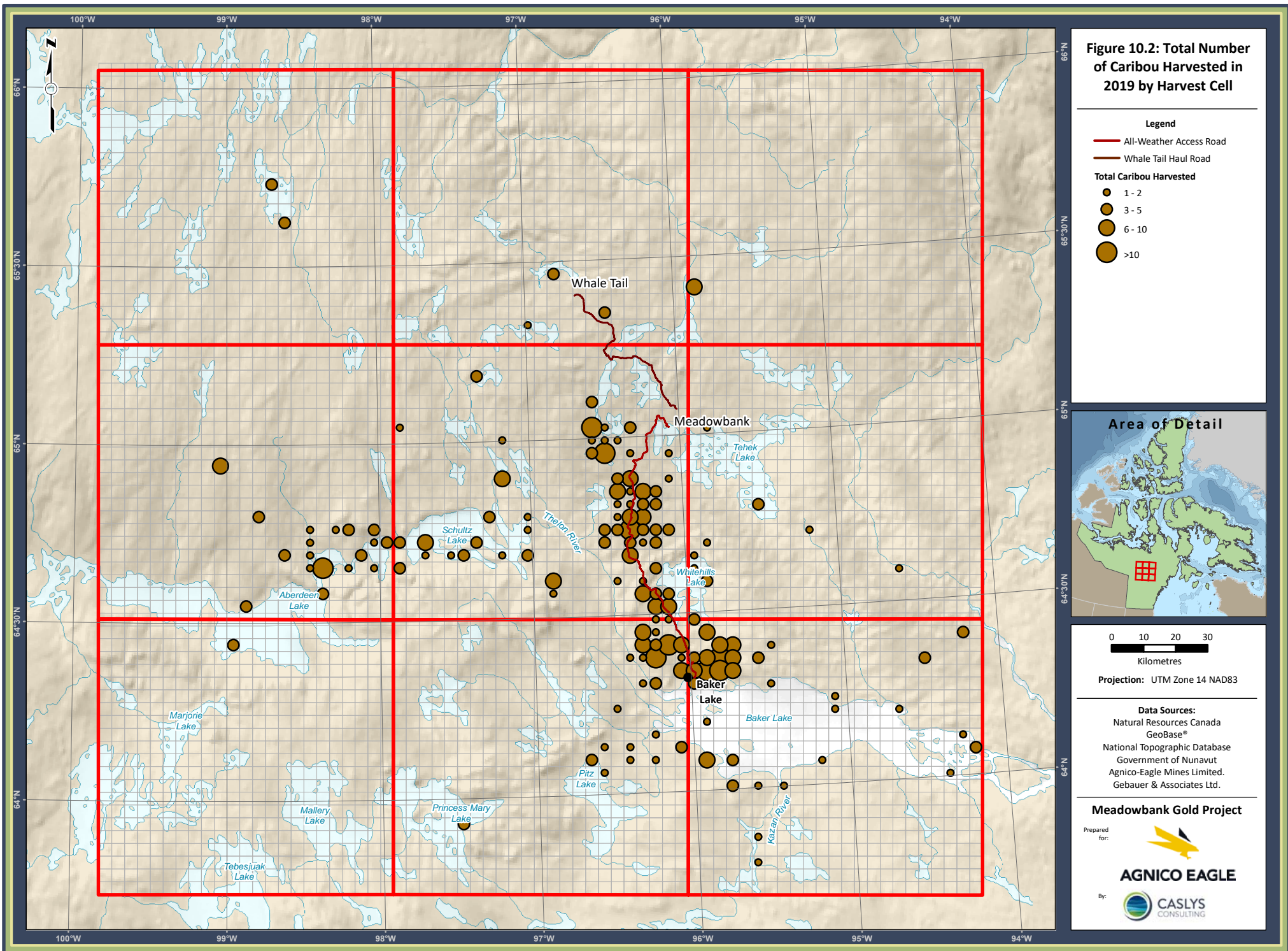
**Figure 10.1** shows the distribution of Caribou harvest within the Hunter Harvest Study data collection area. Hunting is concentrated in the Baker Lake area, along the road to approximately KM 85, along the Thelon River system in the vicinity of Schultz and Aberdeen lakes, and on the southwest shore of Baker Lake. Annual variation in harvest location and intensity is attributable to numerous factors. For instance, many hunters have stated during informal discussions that they have a ‘favorite’ hunting area that they frequent each year. Some hunters have stated that they prefer hunting in ‘convenient’ locations, whereas other hunters prefer remote locations well away from frequented areas. A percentage of hunters also enjoyed partaking in long distance hunting trips over multiple days.

Between 1996 and 2001, 18% of Caribou harvests were estimated to be within 5 km of the AWAR (prior to construction) and 67% of harvests occurred within the RSA (NWMB 2005). In the first year of the HHS study (2007), prior to completion of the AWAR, 34% of harvests were reported within 5 km of the AWAR alignment and 79% were recorded within the RSA (see **Table 10.1**). The HHS data (2007 to 2015) fluctuated between 34 and 54% of reported harvest within 5 km of the AWAR, and between 73 and 85% within the RSA. The 2019 HHS data indicated that 34% of reported harvest occurred within 5 km of the AWAR, and 64% occurred within the RSA, representing the lowest proportion of Caribou harvested within 5 km of the AWAR since the road was built (see **Table 10.1**). One of the reasons for this may have been because of the large number of Caribou harvested in the vicinity of Baker Lake in fall 2019. As was the case in other years, threshold levels of 20% set for monitoring the effects of the Meadowbank mine development on the distribution of Caribou harvest were not exceeded (see **Figure 10.2**).

### 10.5.3 Magnitude of Hunting

In 2019, a total of 647 Caribou were reported as being harvested by 42 participants (see **Table 10.2**). Given that the 42 hunters represent an estimated 12 to 14% of the Baker Lake hunting community, assuming that the average number of Caribou shot per hunter is similar, the total estimated number of Caribou harvested in 2019 ranges from 4,621 to 5,392 animals. This estimate is considered to be conservative (i.e., high) since the Baker Lake Hunter Harvest Study targeted known hunters in the community with some known to be particularly successful.

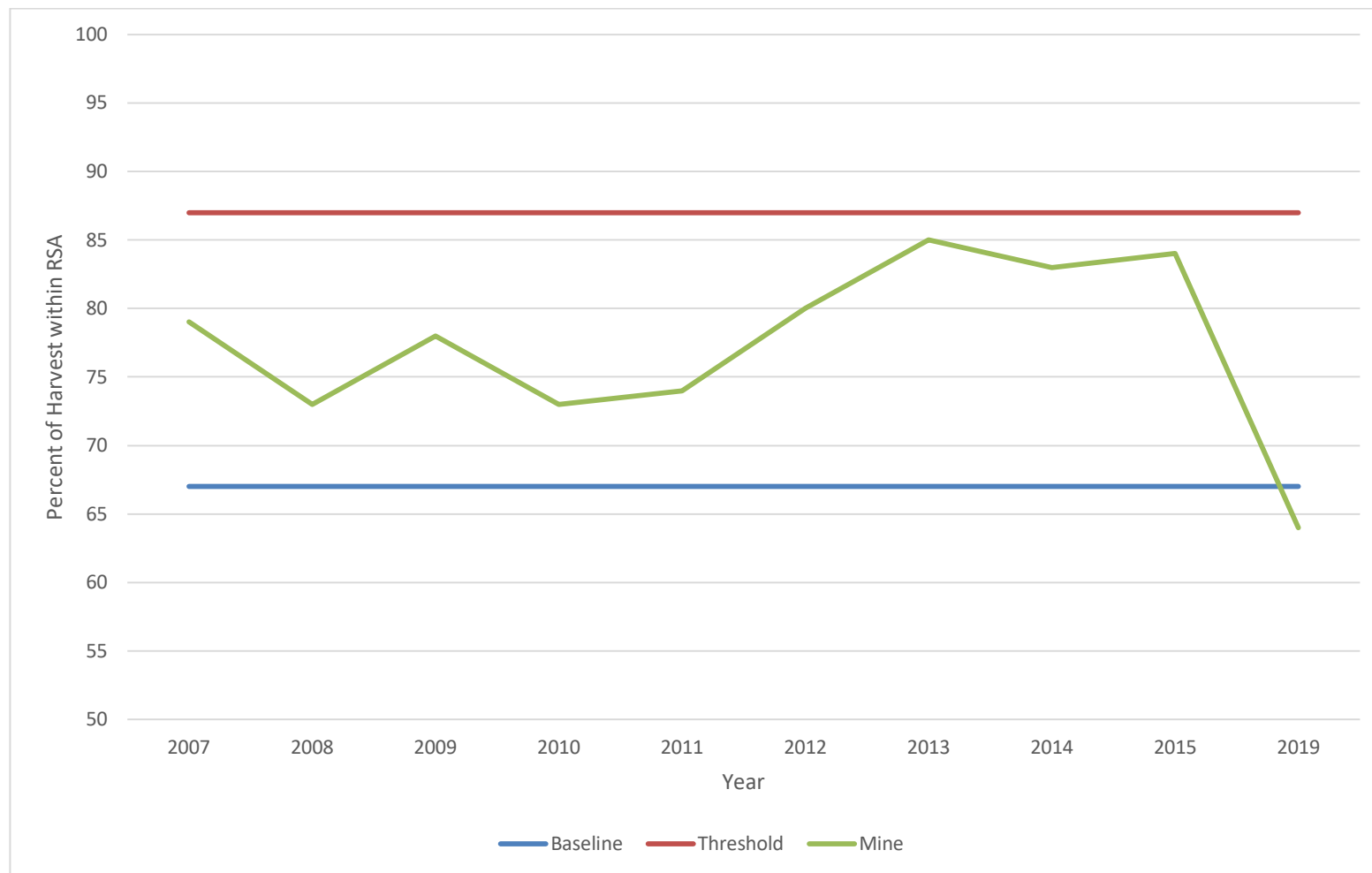




**Table 10.1:** Caribou Harvest Distribution along the AWAR and within the Meadowbank LSA and RSA (1996 to 2001 [NWMB], and 2007 to 2015 and 2019 [Baker Lake HHS]).

Study	Participation Rate within 5 km of AWAR (% of total hunters)	Average Caribou Harvest within 5 km of AWAR per participant	% of annual harvest within 5 km of AWAR	% of harvest within Meadowbank LSA	% of harvest within Meadowbank RSA
NWMB 1996 to 2001	n/a	n/a	18	7	67
Baker Lake HHS 2007	17 (49%)	4.8	34	12	79
Baker Lake HHS 2008	16 (94%)	6.9	37	28	73
Baker Lake HHS 2009	27 (75%)	7.9	36	20	78
Baker Lake HHS 2010	33 (89%)	7.3	38	22	73
Baker Lake HHS 2011	40 (85%)	7.1	42	25	74
Baker Lake HHS 2012	31 (67%)	5.6	35	20	80
Baker Lake HHS 2013	38 (86%)	4.8	43	27	85
Baker Lake HHS 2014	19 (70%)	5.7	40	28	83
Baker Lake HHS 2015	24 (67%)	6.9	54	34	84
Baker Lake HHS 2019	40 (95%)	5.4	34	22	64
Average (2007 to 2019)	29 (78%)	6.2	39	24	77

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**Figure 10.2:** Percent of Caribou Harvest within the RSA from 2007 to 2015, and 2019 Compared to Baseline and Threshold Levels.

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**Table 10.2:** Hunter Caribou Harvest Statistics from the NWMB (2005) Study and Baker Lake HHS (2007 to 2015; 2019).

**Baker Lake Wildlife Harvest Study – Agnico Eagle Mines Ltd.**

Year	January	February	March	April	May	June	July	August	September	October	November	December	Yearly Total
2007		7	89	22	44	6	6	6	37	14	5	2	238
2008	13	15	14	10	19	14	25	34	56	47	24	25	296
2009	42	52	41	28	28	18	30	88	114	102	11	33	587
2010	27	35	34	66	47	41	46	67	82	117	48	18	628
2011	14	47	64	53	78	39	42	35	123	108	2	75	680
2012	43	30	60	71	41	44	13	19	39	37	72	27	496
2013	5	47	55	28	18	18	20	46	76	40	35	32	420
2014	13	26	20	42	7	11	4	5	43	68	14	16	269
2015	7	9	17	13	6	46	12	8	66	74	35	12	305
2019	7	25	72	86	30	39	17	29	52	187	55	48	648
Total #	171	293	466	419	318	276	215	337	688	794	301	288	4,566
Average	19.0	29.3	46.6	41.9	31.8	27.6	21.5	33.7	68.8	79.4	30.1	28.8	456.6
% of Total	3.7	6.4	10.2	9.2	7.0	6.0	4.7	7.4	15.1	17.4	6.6	6.3	100.0%

**MEADOWBANK GOLD MINE PROJECT**  
**2019 WILDLIFE MONITORING SUMMARY**

**Table 10.2:** Continued.

**Nunavut Wildlife Harvest Study - Nunavut Wildlife Management Board (NWMB)**

Year	January	February	March	April	May	June	July	August	September	October	November	December	Yearly Total
1996						141	190	490	428	435	202	178	2,064
1997	118	144	146	167	217	159	162	354	322	553	295	196	2,833
1998	137	124	192	193	159	85	163	153	272	407	254	135	2,274
1999	137	131	99	211	222	111	148	433	528	409	74	66	2,569
2000	96	86	75	135	213	76	187	333	309	98	186	163	1,957
2001	150	126	146	156	127								705
Total #	638	611	658	862	938	572	850	1,763	1,859	1,902	1,011	738	12,402
Average	127.6	122.2	131.6	172.4	187.6	114.4	170	352.6	371.8	380.4	202.2	147.6	2,067
% of Total	5.1	4.9	5.3	7.0	7.6	4.6	6.9	14.2	15.0	15.3	8.2	6.0	100.0



#### 10.5.4 Seasonal Distribution and Timing of Hunting

Based on the NWMB (2005) and HHS results (2007 to 2015; 2019), highest Caribou harvests have occurred in September and October, with a second smaller peak in March and April (see **Figure 10.3**). The similar pattern between the studies indicates that seasonal hunting preferences have not changed markedly in the last decade. More details on the seasonal timing of harvest in 2019 can be found in **Figure 10.4** (i.e., numbers of animals harvested, numbers of participants, and average number of animals harvested by participant by month) and **Figure 10.5** (i.e., Caribou harvest numbers by season and proximity to the access roads).

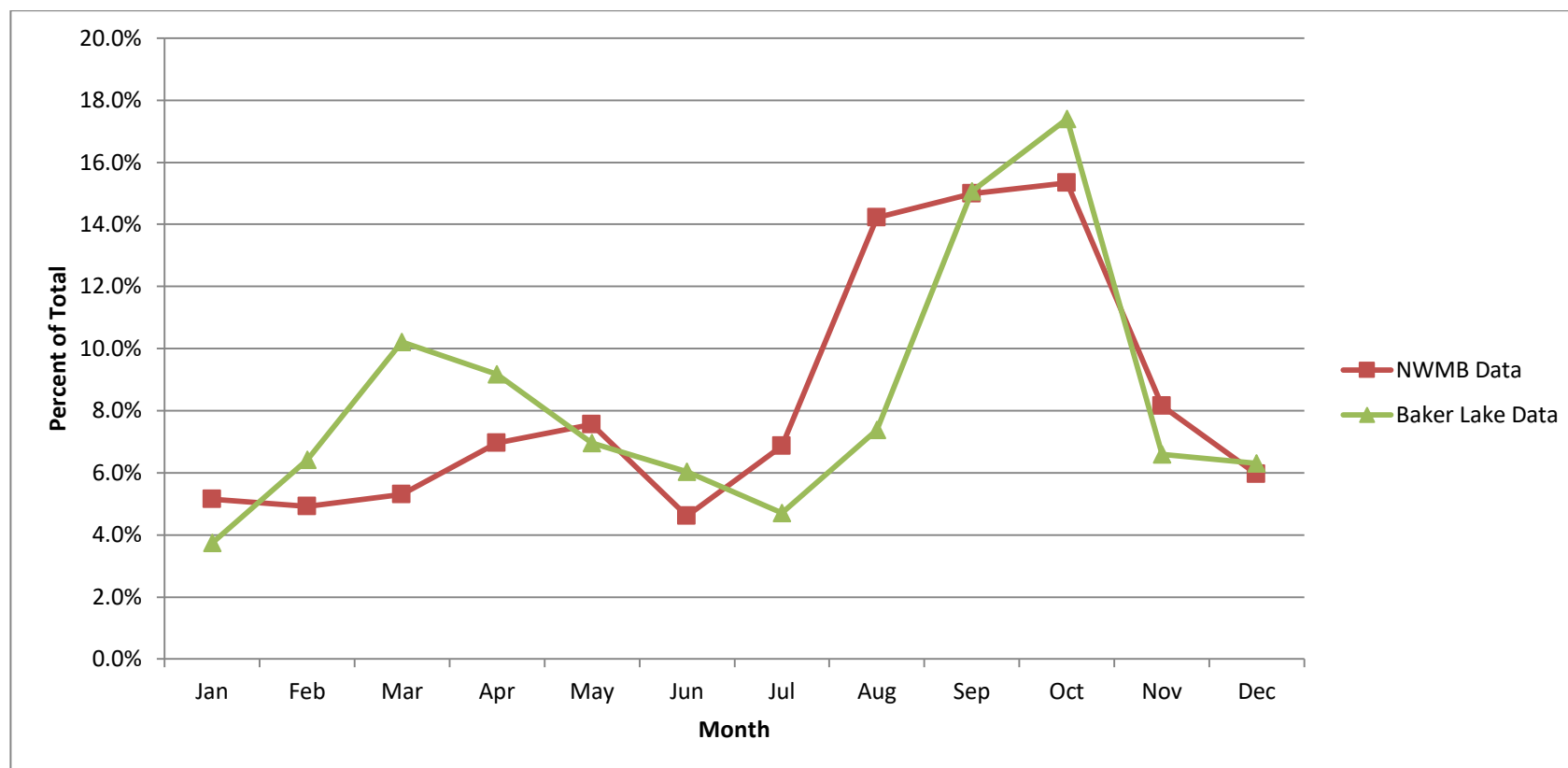
The seasonal distribution of hunting is illustrated in **Figures 10.6a**, which includes all 2019 results, and **Figures 10.6b** to **10.6e**, representing the spring, summer, fall and winter Caribou seasons outlined in the TEMP. In spring, the majority of Caribou hunting occurs in the vicinity of Baker Lake and along the Thelon River system (**Figure 10.6b**). Although large numbers of Caribou were moving across the northern part of the AWAR and the Whale Tail Haul Road in April (see **Section 3**), few Caribou were hunted in this area. During the summer, Caribou were harvested across a much larger area but particularly along the AWAR and in areas along Baker Lake accessible by boat (**Figure 10.6c**). In the fall, hunting was much more concentrated along the AWAR and in the Baker Lake area (**Figure 10.6d**). The large numbers harvested just north of Baker Lake in the fall reflects the large herd of Caribou that moved through the area in October 2019 (see **Section 3**). In winter, very few Caribou were hunted along the AWAR (**Figure 10.6e**), primarily because few Caribou were present (see **Section 3**). Successful hunters were those that travelled further afield by snowmobile (e.g., Schultz Lake area and southwest end of Baker Lake).

#### 10.5.5 Other Wildlife Species

Reported harvests for Muskox remained low, precluding any interpretation of potential mine-related effects; however, most harvests were well away from the AWAR and relatively close to Baker Lake (see **Figure 10.7**). Most Wolverines were hunted close to Baker Lake and regularly visited areas such as participant's cabins and the Prince River bridge suggesting that they are hunted opportunistically (see **Figure 10.8**). Wolves were either trapped close to Baker Lake or hunted in larger numbers west of Schultz Lake and north of Aberdeen Lake in winter (**Figure 10.8**). Relatively low densities of Wolves and their general aversion to humans requires hunters to hunt well away from the AWAR. The presence of the AWAR is thought to have little effect on participant hunting patterns for Muskox, Wolverine and Wolf.

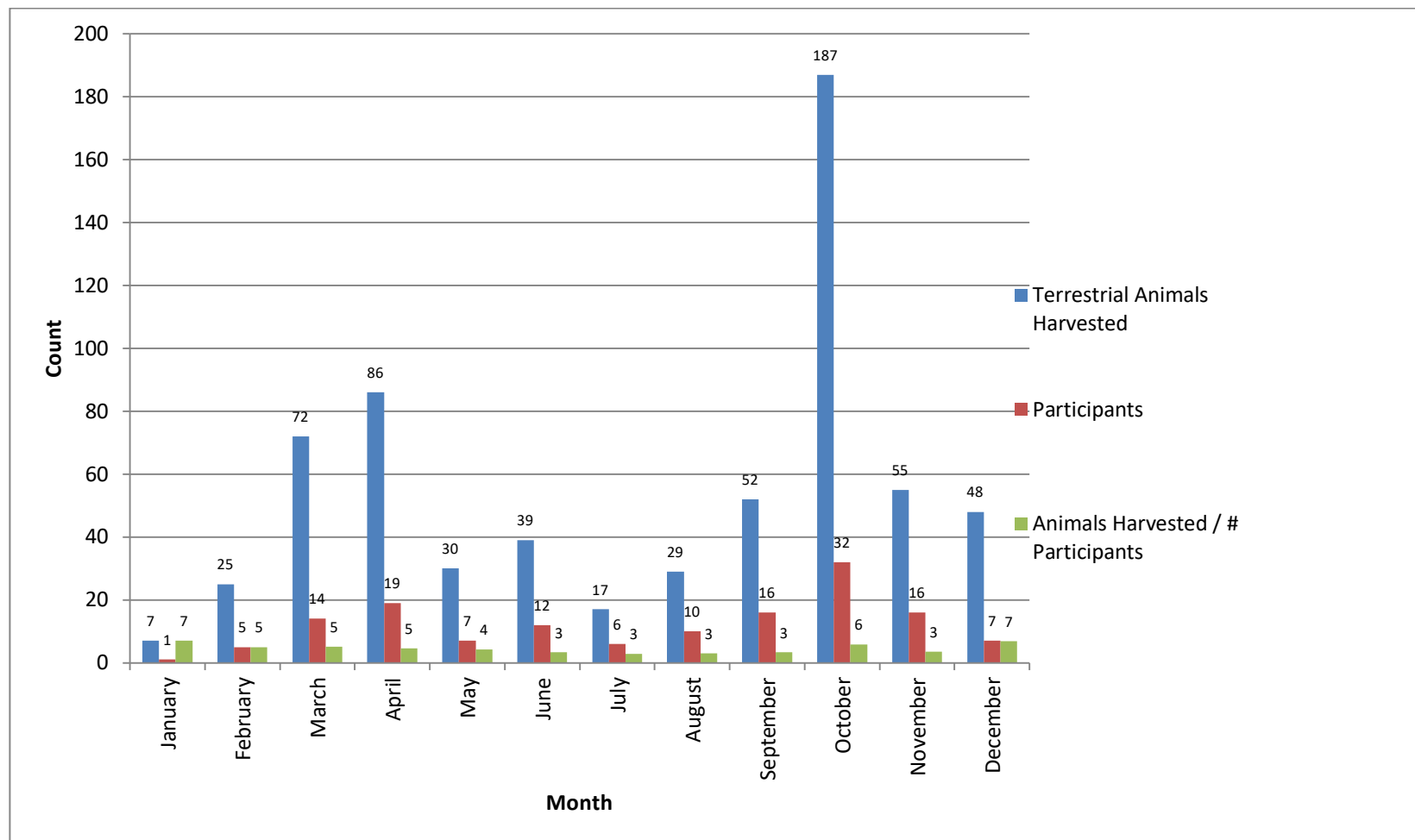
Arctic Fox was primarily trapped in the vicinity of Baker Lake while one Grizzly Bear was taken near Aberdeen Lake (**Figure 10.7**). Duck, goose and swan egg collections were reported in greater numbers in 2019 with primary collection areas being Schultz Lake and the southwest shore of Baker Lake (**Figure 10.9**).

MEADOWBANK GOLD MINE PROJECT  
2019 WILDLIFE MONITORING SUMMARY



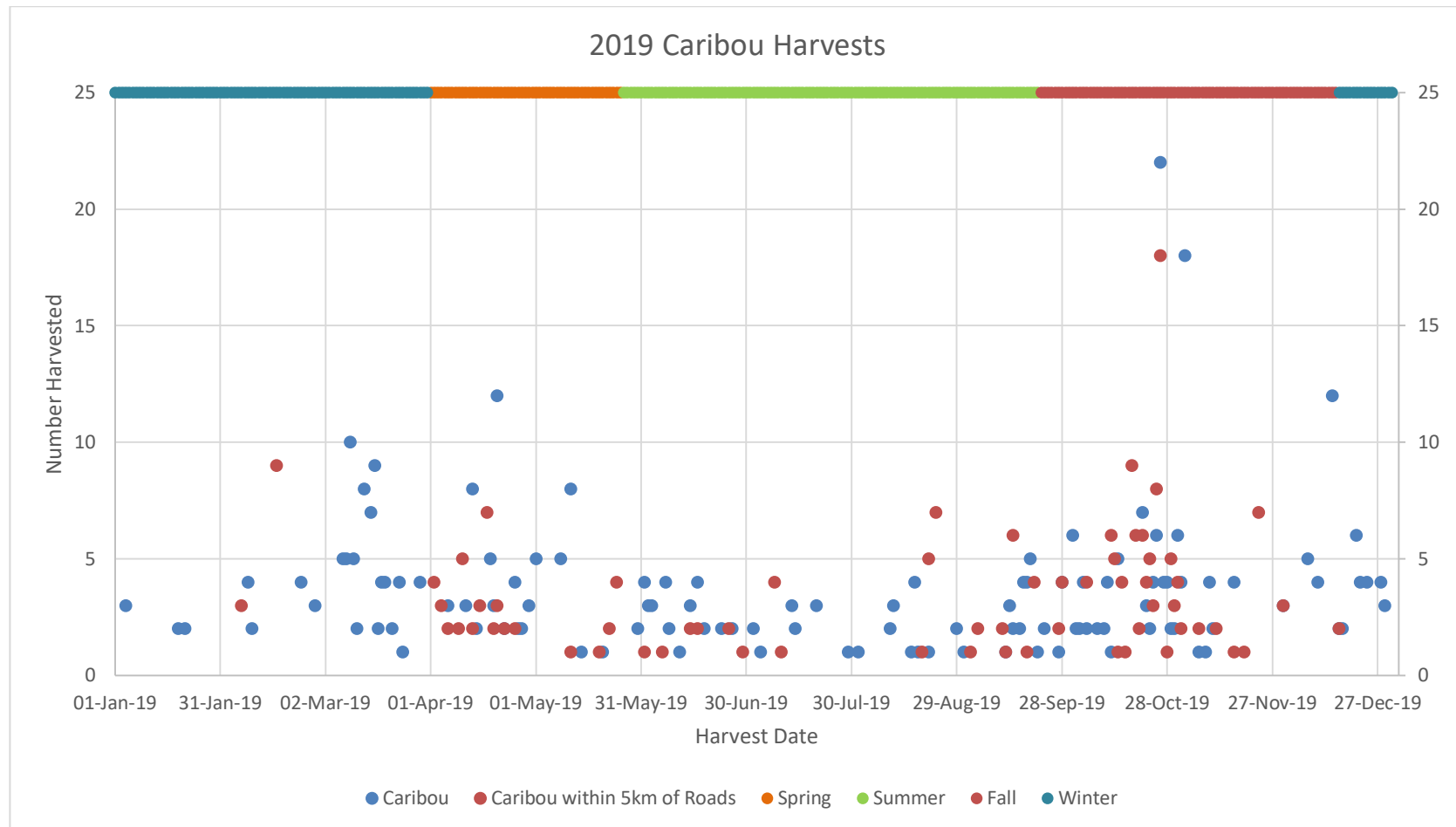
**Figure 10.3:** Seasonal Trends in Caribou Harvest from the Baker Lake Hunter Harvest Study (2007 to 2015; 2019) and the NWMB Study (1996 to 2001)

**MEADOWBANK GOLD MINE PROJECT**  
**2019 WILDLIFE MONITORING SUMMARY**

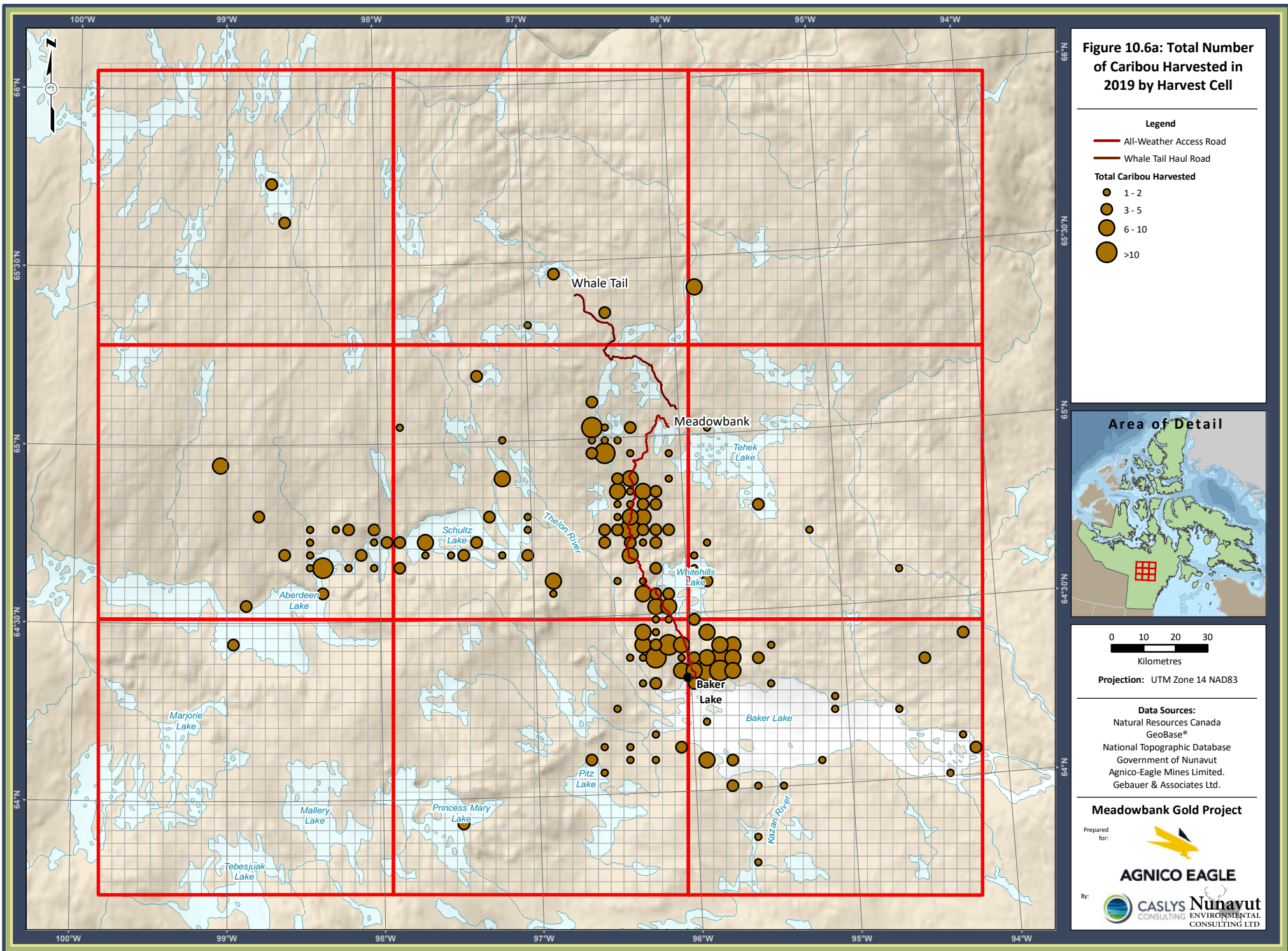


**Figure 10.4:** Terrestrial Animals Harvested per Month and by Participant in 2019.

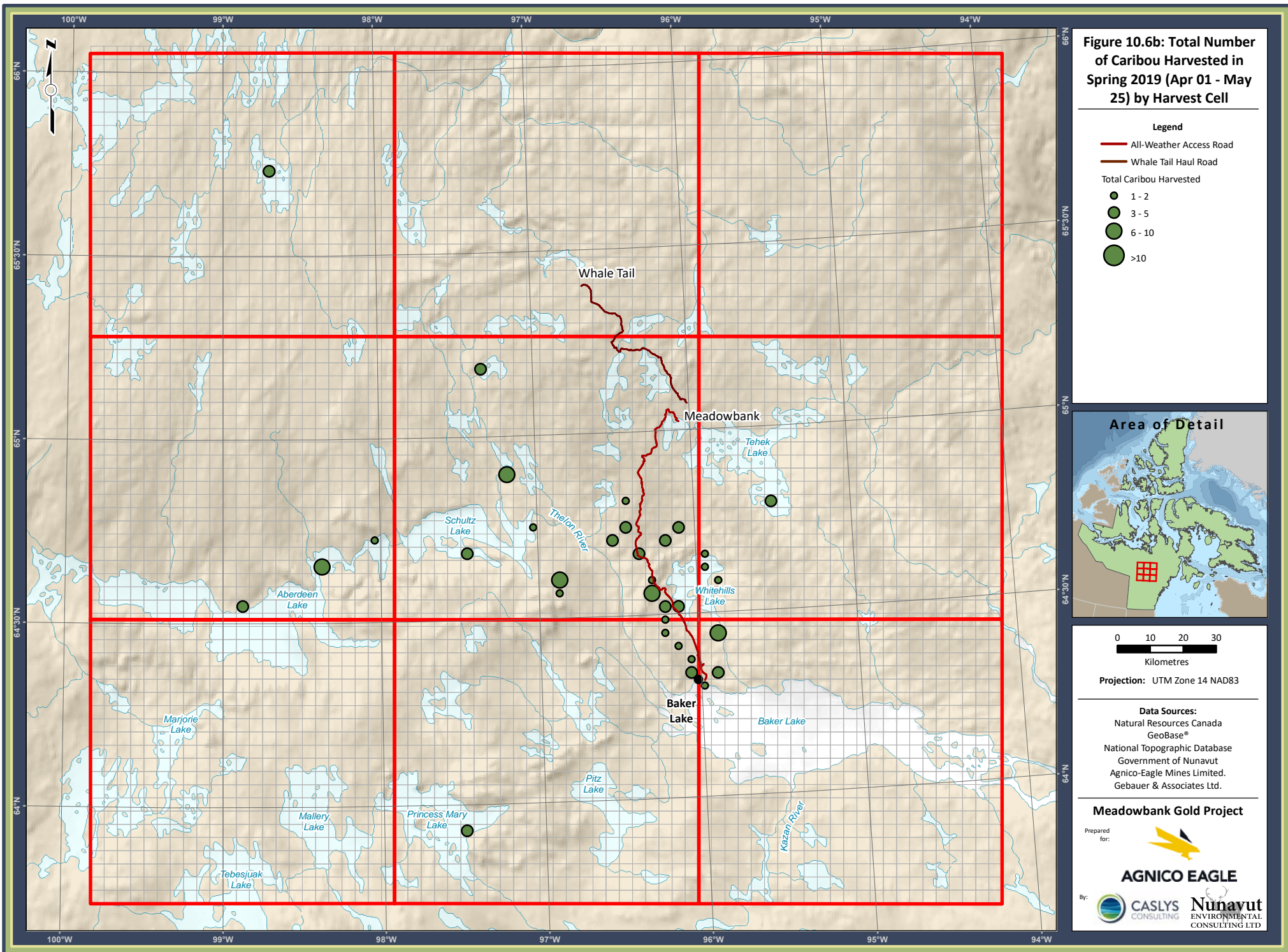
**MEADOWBANK GOLD MINE PROJECT**  
**2019 WILDLIFE MONITORING SUMMARY**

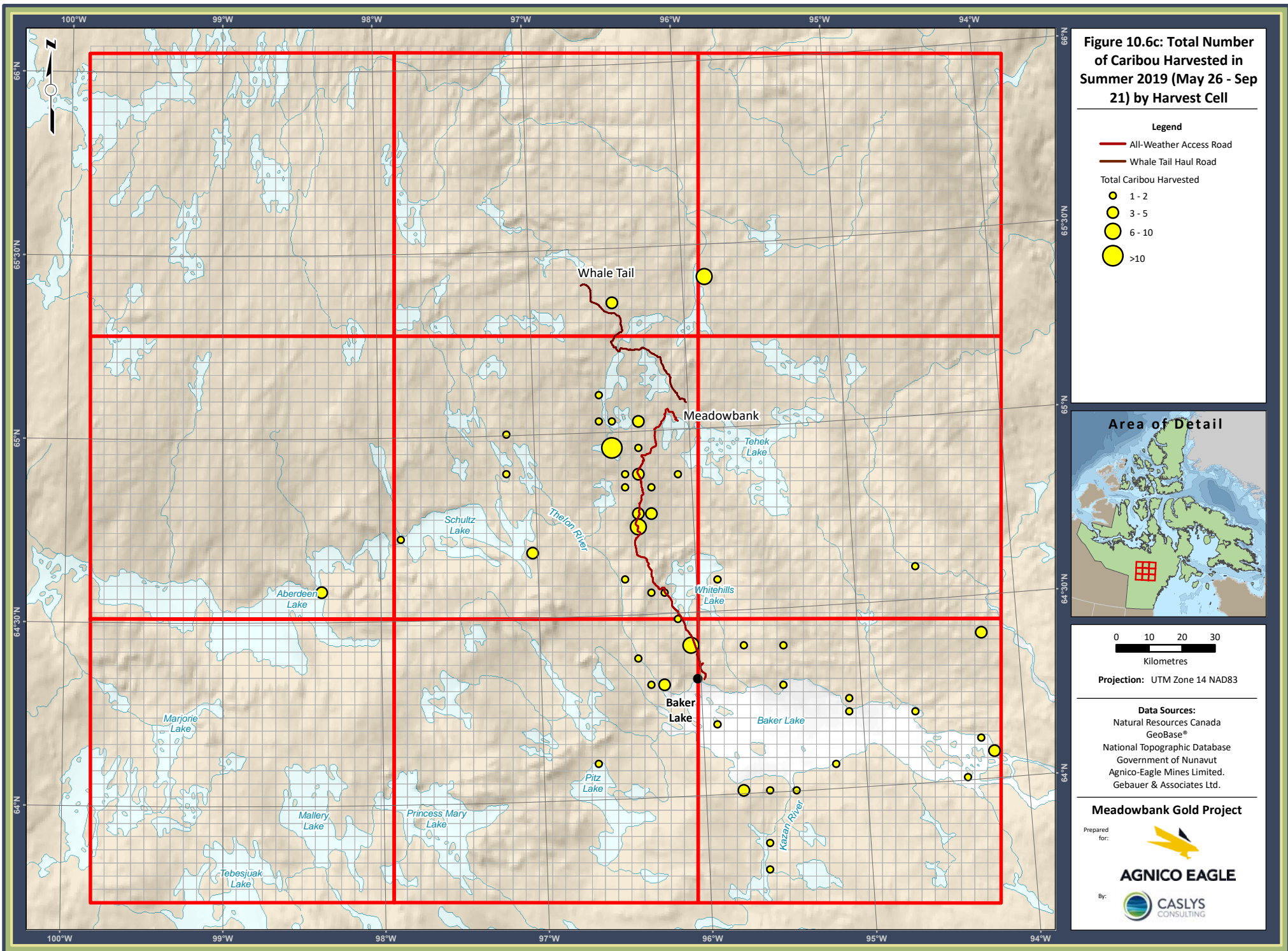


**Figure 10.5:** Number of Caribou harvested in each Caribou Season and Proximity to Access Roads in 2019.

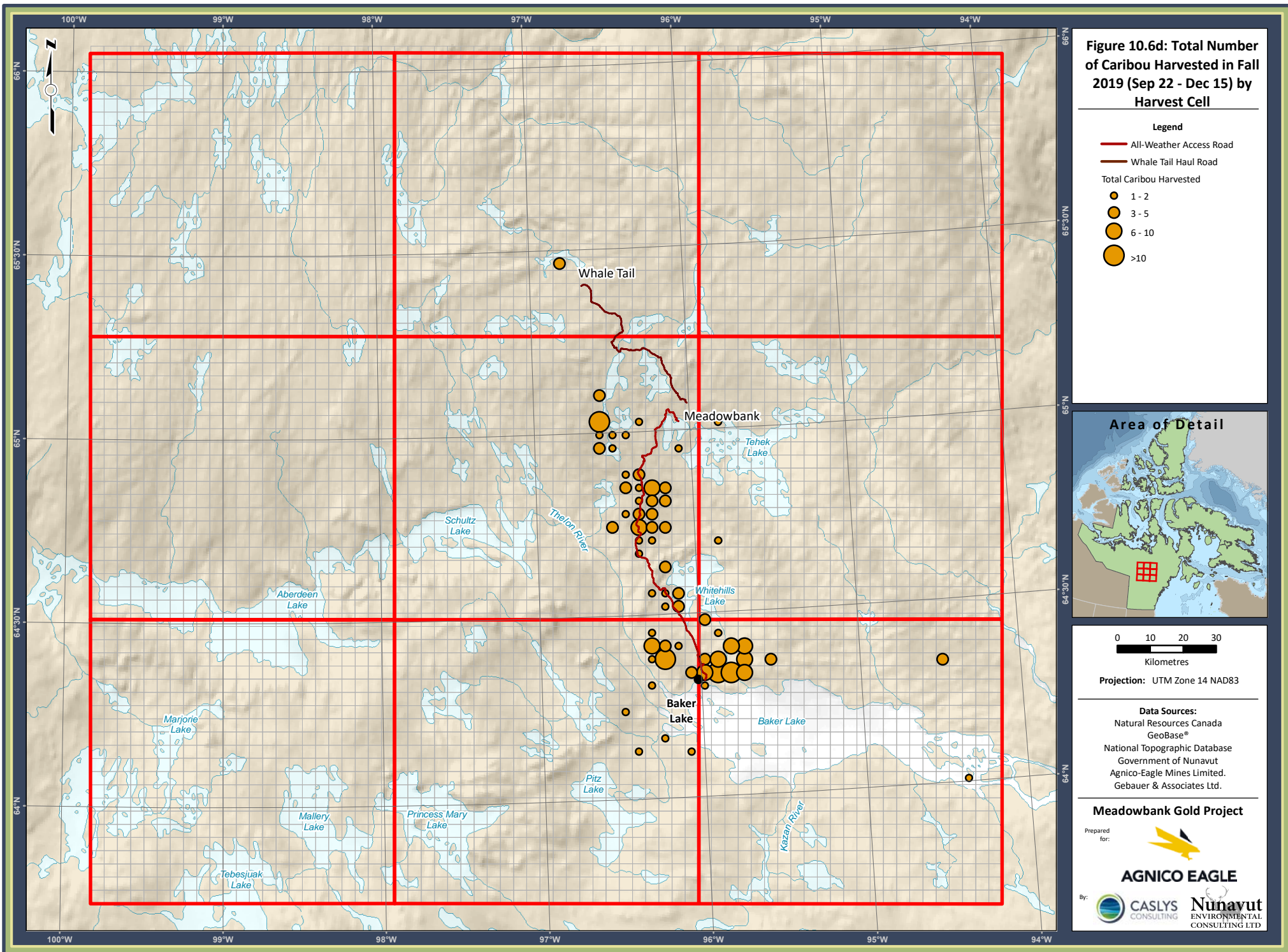


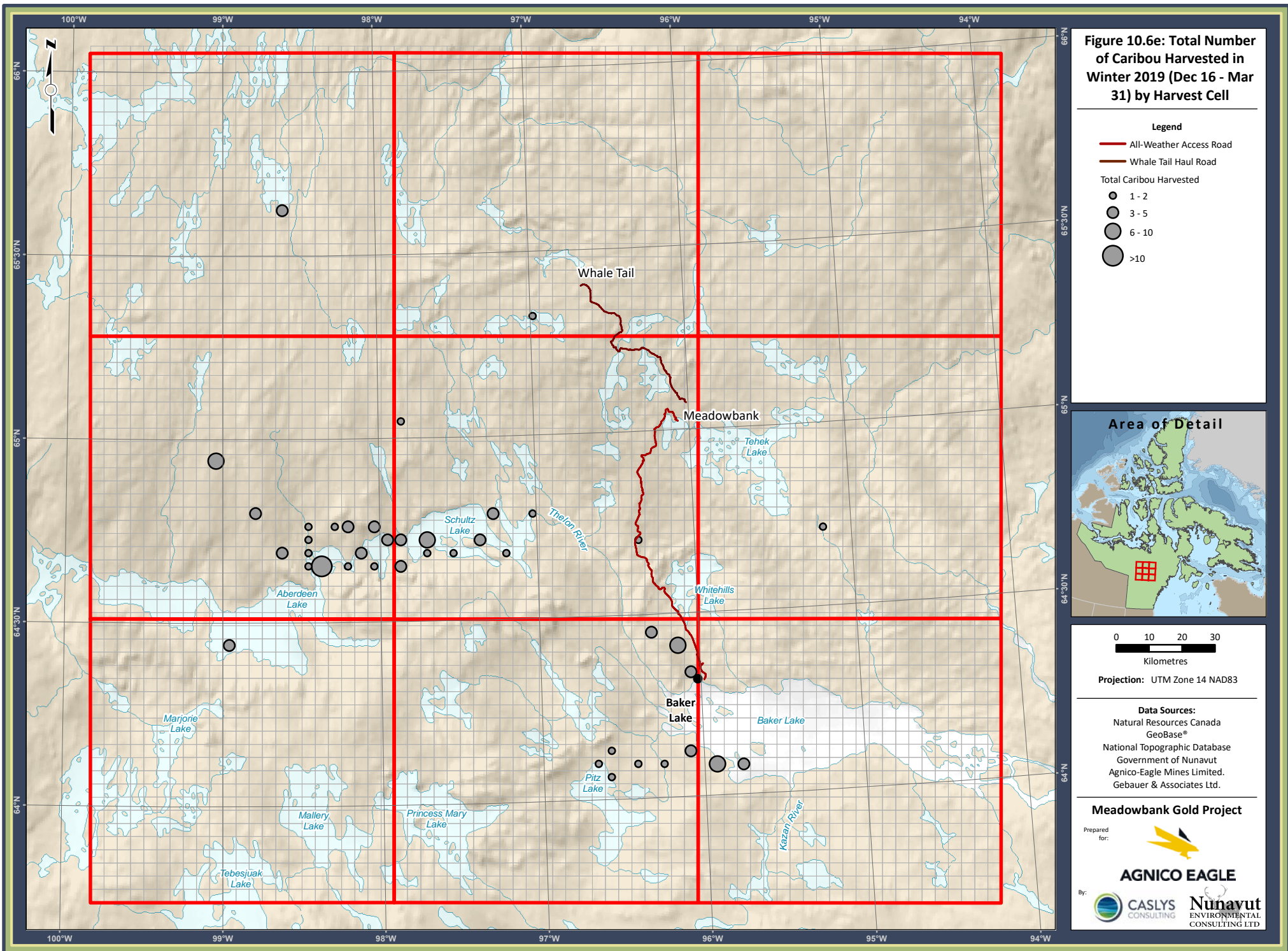




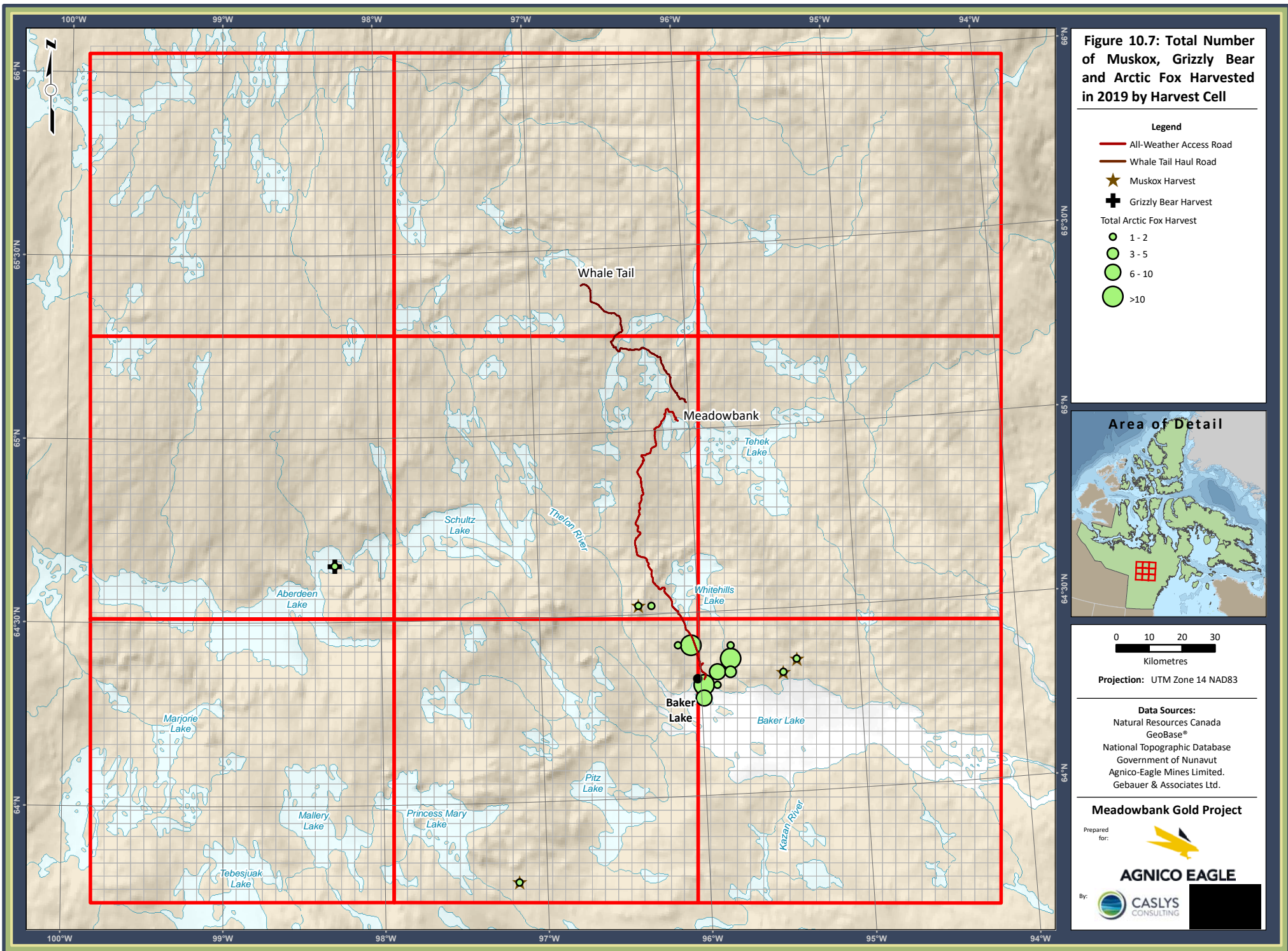




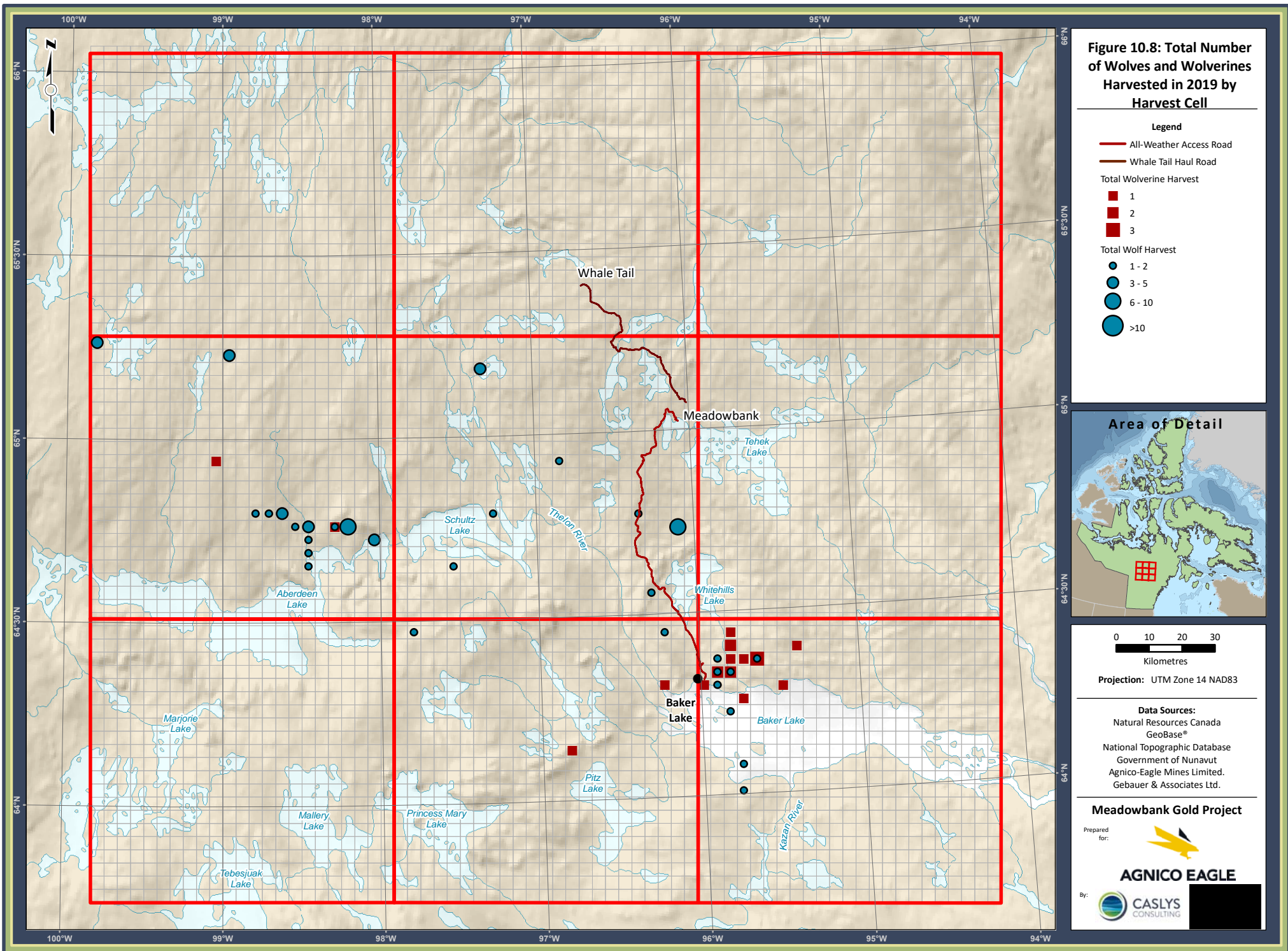










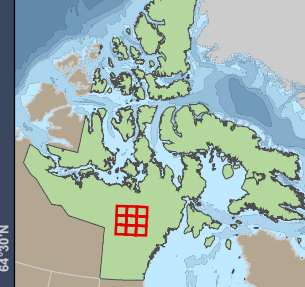


**Figure 10.9: Total Number of Birds and Eggs Harvested in 2019 by Harvest Cell**

**Legend**

- All-Weather Access Road
- Whale Tail Haul Road
- Total Bird and Egg Harvest
  - 1 - 2
  - 3 - 5
  - 6 - 10
  - >10

**Area of Detail**



Projection: UTM Zone 14 NAD83

**Data Sources:**

Natural Resources Canada  
GeoBase®  
National Topographic Database  
Government of Nunavut  
Agnico-Eagle Mines Limited,  
Gebauer & Associates Ltd.

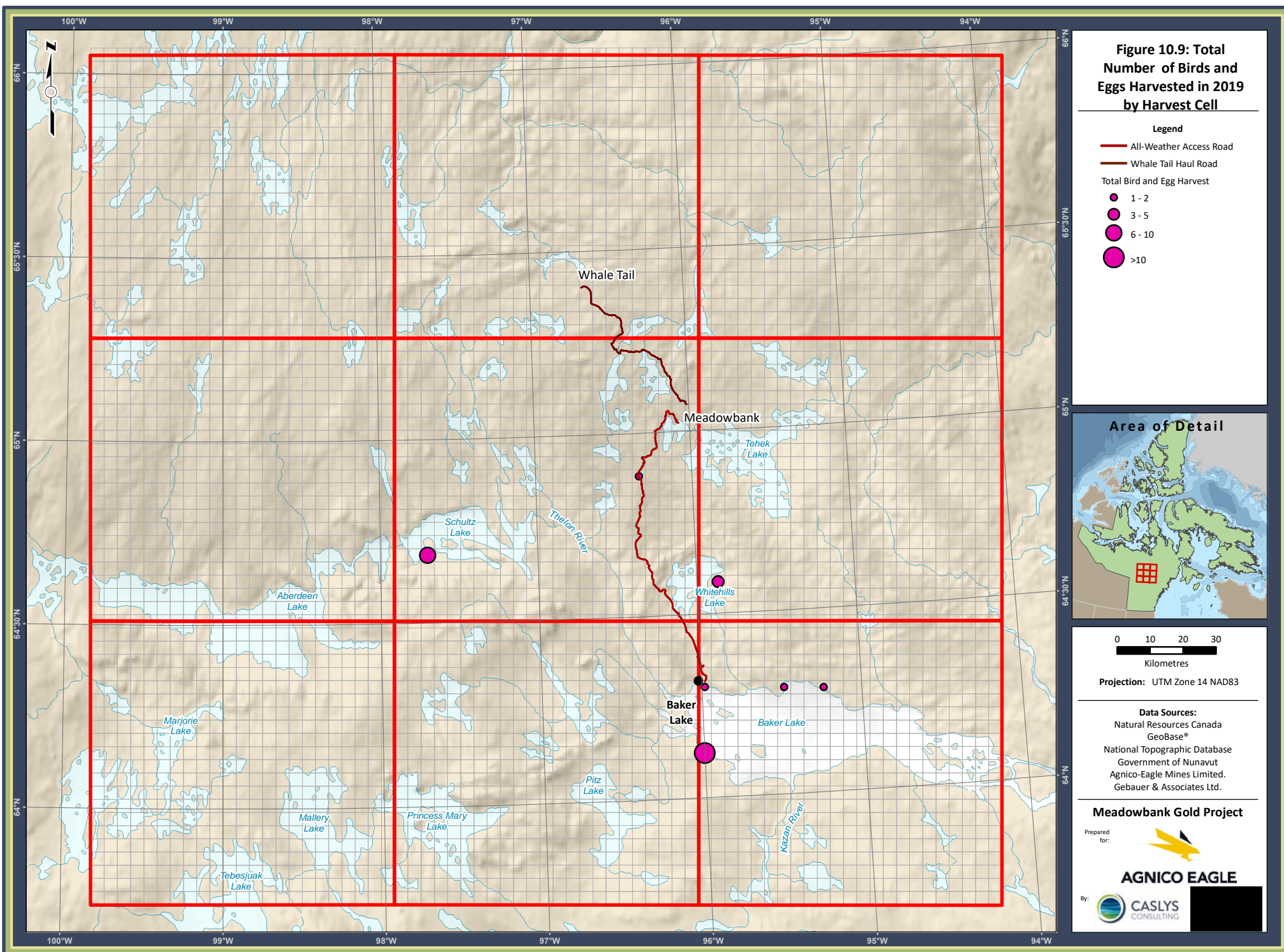
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## 10.6 2019 RESULTS – FISH HARVEST

### 10.6.1 Number of Fisherman

The number of fisherman reporting successful fishing trips in 2019 was 26, which is higher than the average of 22 fisherman between 2007 and 2015, and higher than the 16 fisherman reporting success in 2015. Interestingly, the highest numbers of fisherman reporting success in 2019 were in the April to June period (see **Table 10.3**) despite the highest numbers of fish being caught in the winter months by a small group of fisherman (see **Section 10.6.4 Magnitude of Fishing**).

**Table 10.3:** Number of Fisherman in the Baker Lake Who have Recorded Fishing Success by Year and Month.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007			4	6	7	1	1		1			
2008	1	1	2	6	6	6	4	3			2	1
2009	2	2	5	10	9	9	9	6	1	8	2	2
2010			6	13	18	17	13	4	2	2	3	1
2011	1	3	6	15	21	18	9	6	2	9	9	5
2012	3	1	1	7	7	18	12	4	3	9	7	3
2013			2	5	4	11	9	1		2	1	1
2014	2	1	1	4	6	3	4	2		2	2	2
2015	1	1	1	2	9	8	6	2		3	4	2
2019	1	2	3	12	14	15	7	3	1	1	8	4
<b>Total</b>	<b>11</b>	<b>11</b>	<b>31</b>	<b>80</b>	<b>101</b>	<b>106</b>	<b>74</b>	<b>31</b>	<b>10</b>	<b>36</b>	<b>38</b>	<b>21</b>

### 10.6.2 Composition of Catch

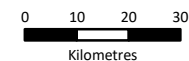
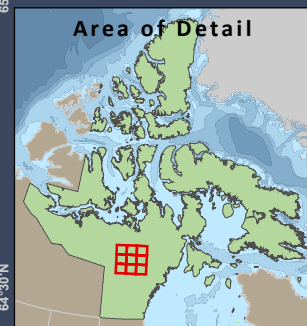
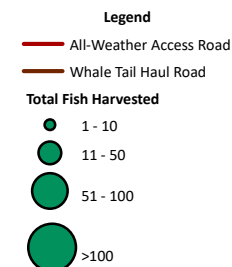
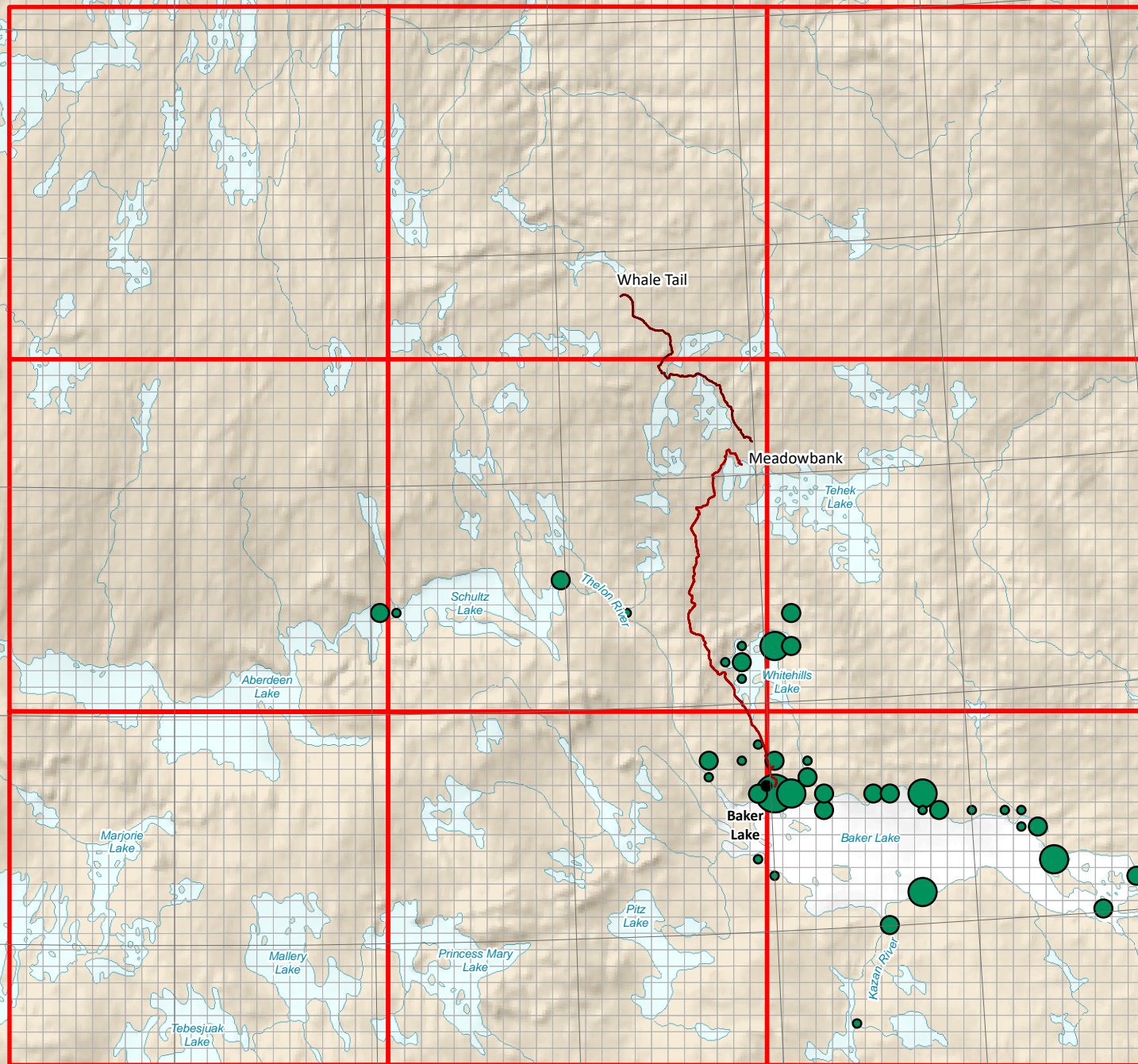
Three fish species were reported as being caught in 2019: Arctic Char, Lake Trout and Lake Whitefish. The most common fish species captured, Lake Whitefish, represented 58% of the total catch in 2019, which was higher than the average of 34% between 2007 and 2015 (see **Table 10.4**). In interviews, some fisherman indicated that Lake Whitefish numbers in Baker Lake were particularly high in 2019.

**Table 10.4:** Total Number of Fish Caught between 2007 and 2015, and in 2019.

Species	2019	2015	2014	2013	2012	2011	2010	2009	2008	2007	Total
Arctic Char	89	41	22	96	24	113	103	117	24	3	632
Arctic Grayling		29			1	1	3	1			35
Lake Trout	900	370	353	490	1,014	1,710	860	525	825	210	7,257
Lake Whitefish	1573	1386	651	50	471	460	326	51	192		5,160
Unidentified Fish	119										119
<b>Totals</b>	<b>2,681</b>	<b>1,826</b>	<b>1,026</b>	<b>636</b>	<b>1,510</b>	<b>2,284</b>	<b>1,292</b>	<b>694</b>	<b>1,041</b>	<b>213</b>	<b>13,203</b>



**Figure 10.10: Total Number of Fish Harvested in 2019 by Harvest Cell**



Projection: UTM Zone 14 NAD83

**Data Sources:**  
Natural Resources Canada  
GeoBase®  
National Topographic Database  
Government of Nunavut  
Agnico-Eagle Mines Limited.  
Gebauer & Associates Ltd.

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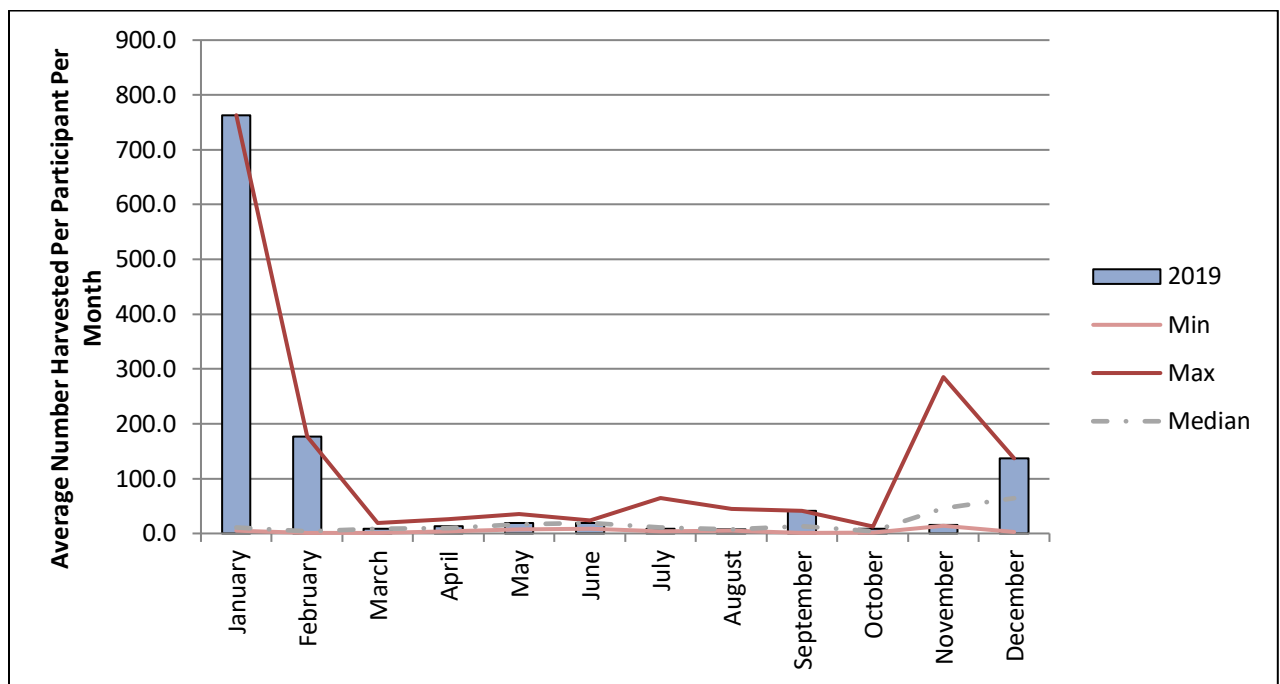


### 10.6.3 Distribution of Fishing

Fishing trips, regardless of success rate, did not generally occur beyond the immediate areas of Baker Lake, Whitehills Lake, and along the AWAR (see **Figure 10.10**). Some fishing occurred along the Thelon River system and associated lakes (**Figure 10.10**) during the summer when these areas can be accessed by boat. Results indicate that study participants are less willing to travel long distances to catch fish, regardless of AWAR access, likely due to the abundance of fish in close proximity to the Hamlet of Baker Lake.

### 10.6.4 Magnitude of Fishing

The average number of fish harvested per fisherman was highest in the winter months, which reflects the high catches of Lake Whitefish and Lake Trout caught in nets set under the ice (**Figure 10.11**). In 2019, the most commonly captured fish species, in order of abundance, were Lake Whitefish, Lake Trout and Arctic Char (see **Table 10.4**).



**Figure 10.11:** Average Number of Fish Caught per Participant in 2019 and the Minimum and Maximum Range from 2007 to 2015.



### 10.6.5 Seasonal Timing of Fishing

In 2019, fishing periods with the most active fisherman was from April to June (see **Table 10.3**). The periods with the most fish caught included the winter months (especially January), which reflects the high number of Lake Whitefish caught with nets below the ice, and spring (i.e., May and June), when Arctic Char and Lake Trout catches are the highest (**Figure 10.12**). This trend is reflected in the overall trend between 2007 and 2015 (**Figure 10.12**).

## 10.7 ACCURACY OF IMPACT PREDICTIONS

**Table 10.5** provides a summary of the impact predictions identified in the TEMP (Cumberland 2006). The 2019 HHS data were compared to the impact prediction thresholds to evaluate adherence to the impact predictions and the provision of adaptive management, as either a necessary or proactive measure. No thresholds were surpassed in 2019.

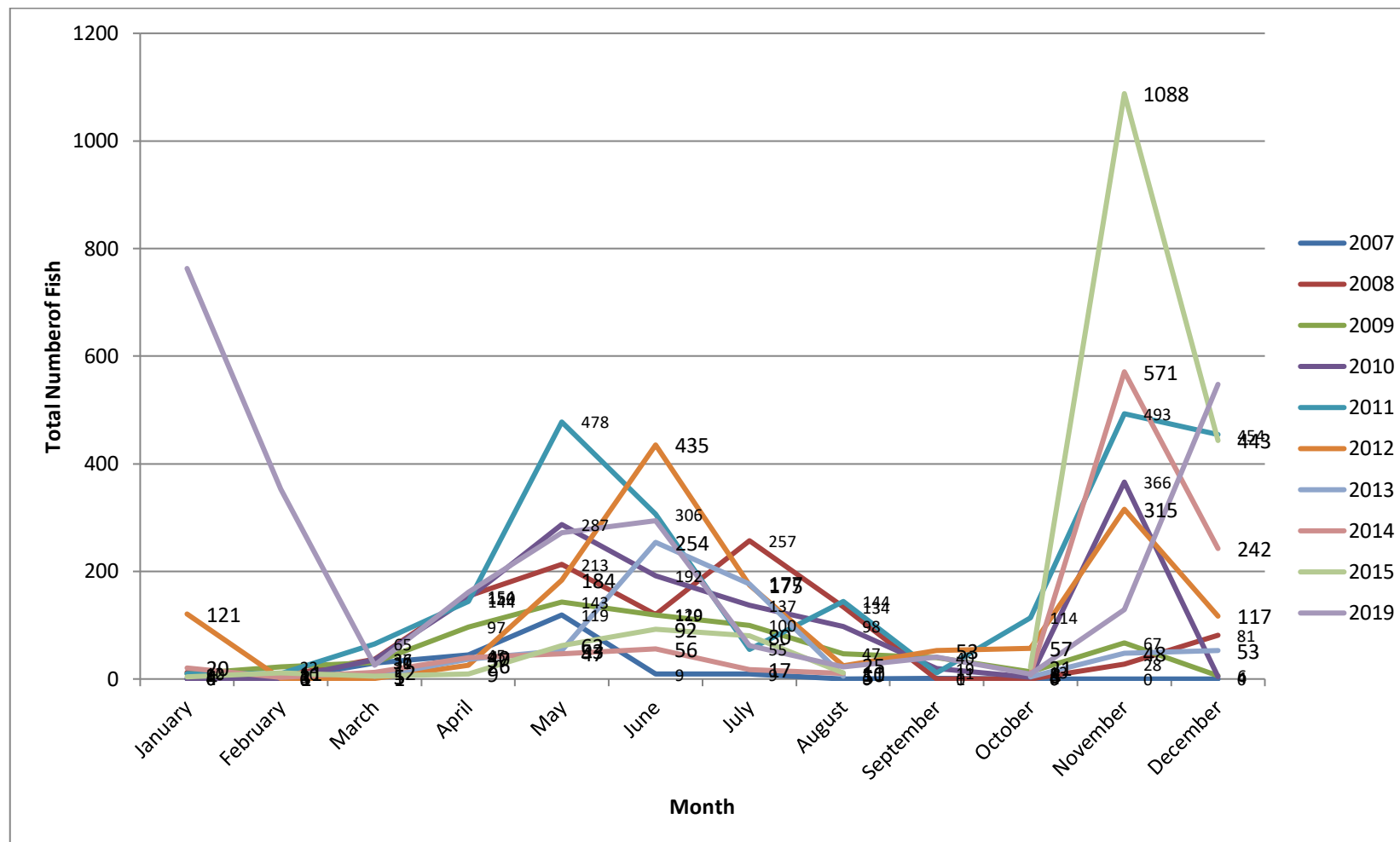
**Table 10.5:** Accuracy of Impact Predictions – Baker Lake Hunter Harvest Study

Potential Effect	Threshold	Threshold Exceeded (2019)	Adaptive Management Implemented	Status
Hunting by Baker Lake Residents	The AWAR will not result in significant changes in the spatial distribution, seasonal pattern, or harvest levels of Caribou kills by Baker Lake hunters. Changes will not exceed 20% of historical harvest activities within the RSA	NO (64% of harvest in RSA in 2019 compared to 67% baseline; average of 77% of harvest within RSA since 2007)	Future discussion with HTO and GN representatives required to identify management options	Hunter Harvest Study

## 10.8 MANAGEMENT RECOMMENDATIONS

The Hunter Harvest Study should be continued on an annual basis to monitor the hunting patterns of Baker Lake residents and the potential effects of the mine. Quarterly meetings with participants are particularly important in maintaining contact, building relationships, expanding the study and collecting good harvest data.

MEADOWBANK GOLD MINE PROJECT  
2019 WILDLIFE MONITORING SUMMARY



**Figure 10.12:** Seasonal Trends in Fishing in the Baker Lake Area between 2007 and 2015, and in 2019.

## SECTION 11 • INTEGRATED CARIBOU MONITORING RESULTS

---

### 11.1 OVERVIEW AND OBJECTIVES

Management of mine-related effects on Caribou is the greatest wildlife-related challenge facing operation and environmental managers at the Meadowbank mine. As such, a variety of Caribou monitoring programs have been developed (see **Sections 3** through **10**). To facilitate an understanding of mine-related effects on Caribou, this section summarizes Caribou monitoring data collected in 2019 and lists potential mine-related effects.

### 11.2 INTEGRATED RESULTS

**Table 11.1** summarizes results from each of the eight programs that monitored Caribou activity and responses to mine-related activity in 2019, while **Table 11.2** summarizes potential mine-related effects on Caribou in 2019.

**Figures 11.1 to 11.4** depict combined data from road surveys (i.e., AWAR, Vault Haul Road and Whale Tail Haul Road), the Caribou collaring program, and the Hunter Harvest Study. In spring, walklines of collared migrating Caribou (i.e., primarily Ahiak) correspond with the higher numbers of Caribou observed along the northern portion of the AWAR and along the Whale Tail Haul Road (see **Figure 11.1**). The walklines also correspond with a moderate amount of harvesting activity in the Whitehills Lake area. During the summer, the low numbers of collared Caribou in the Meadowbank and Whale Tail RSAs corresponded with low numbers of Caribou observed on road surveys and limited harvesting activity along the AWAR (**Figure 11.2**). With lower numbers of Caribou in the Baker Lake area, harvest was much more spread out than in other seasons. In the fall, Caribou migration, as depicted by walklines, Caribou road survey results, and Caribou harvesting activity were all high along the southern two-thirds of the AWAR (**Figure 11.3**). Unlike the spring migration, when Caribou from primarily the Ahiak herd were present in northern areas of the Meadowbank project (e.g., Whale Tail Haul Road), Caribou present in the fall were primarily from the Lorillard and Wager Bay herds. In winter, collared Caribou were well to the west of the study area resulting in a corresponding low number of Caribou observed on road surveys or harvested by Baker Lake residents (**Figure 11.4**).

**2019 WILDLIFE MONITORING SUMMARY**

**Table 11.1:** Summary of Caribou Monitoring Activities and Management Responses at the Meadowbank and Whale Tail projects in 2019.

Monitoring Program	Summary of 2019 Monitoring Results	Summary of 2019 Management Responses
<b>Section 3</b> Road Surveys	High number of road surveys conducted. High numbers of Caribou along the Whale Tail Haul Road in April, May, and October and high numbers along the AWAR in April, October and November	Traffic along the Whale Tail Haul Road restricted for 34 days in the spring season, 11 days during the summer, and 15 days during the fall. Traffic along the AWAR restricted for 27 days during the spring season and 15 days during the fall.
<b>Section 4</b> Pits and Mine Site Ground Surveys	Numerous mine site surveys conducted. Highest numbers reported in April, May August, October and November	Traffic restricted on mine roads limiting movements of most vehicles.
<b>Section 5</b> Wildlife Habitat Monitoring	Not conducted in 2019	Not conducted in 2019
<b>Section 6</b> Caribou Satellite-Collaring Program	At the beginning of 2019, 35 active Baker Lake collars. Significant movements of collared Caribou observed in the spring along the northern portion of the AWAR and the entire Whale Tail Haul Road, and in fall along the southern portions of the AWAR.	When Caribou within the RSA, requests for telemetry locations increased to daily. As collared Caribou approached mine facilities, the number of mine site and road surveys increased. A high number of adaptive management actions taken (e.g., road closures).
<b>Section 7</b> Height of Land	Fifty HOL surveys were conducted along the Whale Tail Haul Road in 2019 (access in winter restricted to some locations). High numbers of Caribou documented in spring and fall, and moderate numbers observed in summer.	Results from surveys used to notify Operation and Environment staff so that adaptive management actions (e.g., road closures) could be taken.
<b>Section 8</b> Remote Camera	Some documentation of Caribou road crossings.	No actions in response to remote camera data
<b>Section 9</b> Caribou Management Decision Tree	Decision tree used when Caribou were close to project facilities as outlined in the 2019 TEMP.	Decision tree process uses data from the road, mine site, and HOL surveys, and satellite collaring to determine the scale of Caribou monitoring and management required.
<b>Section 10</b> Hunter Harvest Study	Of 66 participants, 42 documented Caribou harvests. Given that the 42 Caribou hunters represent an estimated 12 to 14% of hunters in Baker Lake, total reported Caribou harvest of 647 Caribou may indicate total Baker Lake harvest ranging from 4,621 to 5,392 animals	The number of Caribou harvested within the project RSA in 2019 (64%) was lower than the baseline level of 67%. Total estimated harvest is likely higher than actual harvest because several highly productive hunters are part of the study but overall numbers are higher than previous estimates. Other than sign-in requirements for hunters along the AWAR, no other management response occurred

**MEADOWBANK GOLD MINE PROJECT**  
**2019 WILDLIFE MONITORING SUMMARY**

**Table 11.2:** Summary of Meadowbank and Whale Tail Mine-related Effects on Caribou in 2019.

Monitoring Program	Potential Effect	Threshold	Threshold Exceeded (2019)	Adaptive Management Implemented
<b>Section 3</b> Road Surveys	Sensory Disturbance	No threshold but Decisions Trees followed when Caribou are seen near mine facilities	NA	YES. Multiple road closures and notices. Use of Decision Tree for Management and Monitoring.
	Project-related Mortality	Caribou or Muskoxen will not be killed or injured by vehicle collisions. Threshold level of mortality is two (2) individuals per year.	NO	NO
<b>Section 4</b> Pits and Mine Site Ground Surveys	Sensory Disturbance	No threshold but Decisions Trees followed when Caribou are seen near mine facilities	NA	YES. Multiple road closures and notices. Use of Decision Tree for Management and Monitoring.
<b>Section 5</b> Wildlife Habitat Monitoring	Not conducted in 2019	NA	NA	NA
<b>Section 6</b> Caribou Satellite-Collaring Program	Sensory Disturbance	No threshold but Decisions Trees followed when Caribou are seen near mine facilities	NO	YES. Multiple road closures and notices. Use of Decision Tree for management and monitoring. Ongoing analysis by GN (in partnership with Agnico Eagle)
<b>Section 7</b> Height of Land	Sensory Disturbance	No threshold but Decisions Trees followed when Caribou are seen near mine facilities	NA	YES. Multiple road closures and notices. Use of Decision Tree for Management and Monitoring.
<b>Section 8</b> Remote Camera	Road Barrier to Crossing	No thresholds	NA	NA

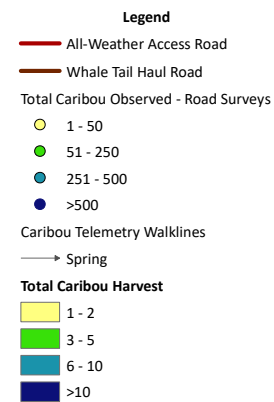


**MEADOWBANK GOLD MINE PROJECT**  
**2019 WILDLIFE MONITORING SUMMARY**

**Table 11.2:** Continued.

Monitoring Program	Potential Effect	Threshold	Threshold Exceeded (2019)	Adaptive Management Implemented
<b>Section 9</b> Caribou Management Decision Tree	Sensory Disturbance	No threshold but Decisions Trees followed when Caribou are seen near mine facilities	NA	YES. Multiple road closures and notices. Use of Decision Tree for Management and Monitoring.
<b>Section 10</b> Hunter Harvest Study	Hunting by Baker Lake Residents	The AWAR will not result in significant changes in the spatial distribution, seasonal pattern, or harvest levels of Caribou kills by Baker Lake hunters. Changes will not exceed 20% of historical harvest activities within the RSA	NO (64% of harvest in RSA in 2019 compared to 67% baseline; average of 77% of harvest within RSA since 2007)	Future discussion with HTO and GN representatives required to identify management options

**Figure 11.1 Caribou  
Compilation Spring 2019  
(Apr 1 - May 25)**



Projection: UTM Zone 14 NAD83

**Data Sources:**  
 Natural Resources Canada  
 GeoBase®  
 National Topographic Database  
 Government of Nunavut  
 Agnico-Eagle Mines Limited.  
 Gebauer & Associates Ltd.

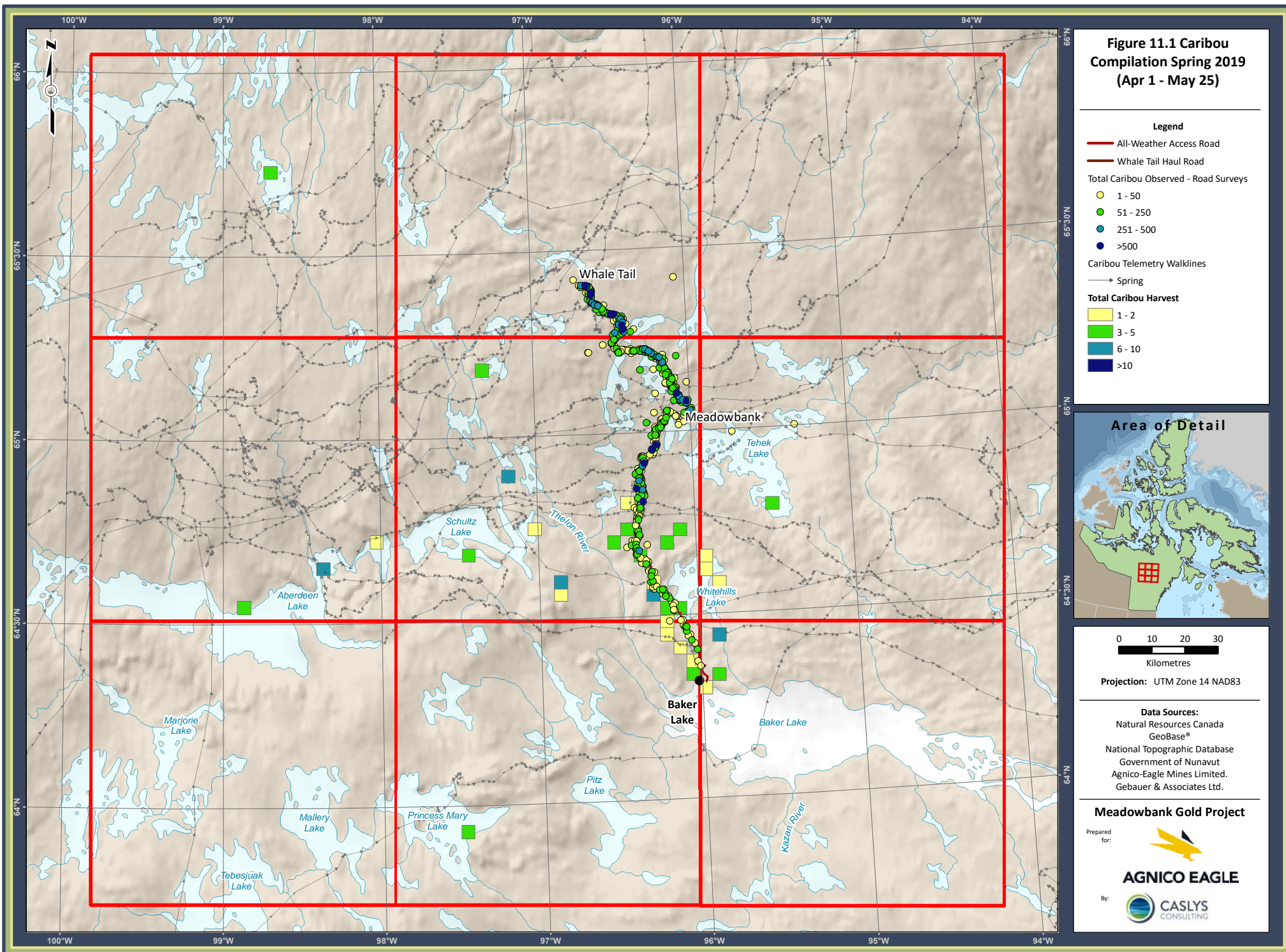
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By:



**Figure 11.2 Caribou  
Compilation Summer 2019  
(May 26 - Sep 21)**

**Legend**

- All-Weather Access Road
- Whale Tail Haul Road
- Total Caribou Observed - Road Surveys
  - 1 - 50
  - 51 - 250
  - 251 - 500
  - >500
- Caribou Telemetry Walklines
  - Summer
- Total Caribou Harvest
  - 1 - 2
  - 3 - 5
  - 6 - 10
  - >10

**Area of Detail**



Projection: UTM Zone 14 NAD83

**Data Sources:**

Natural Resources Canada  
GeoBase®  
National Topographic Database  
Government of Nunavut  
Agnico-Eagle Mines Limited.  
Gebauer & Associates Ltd.

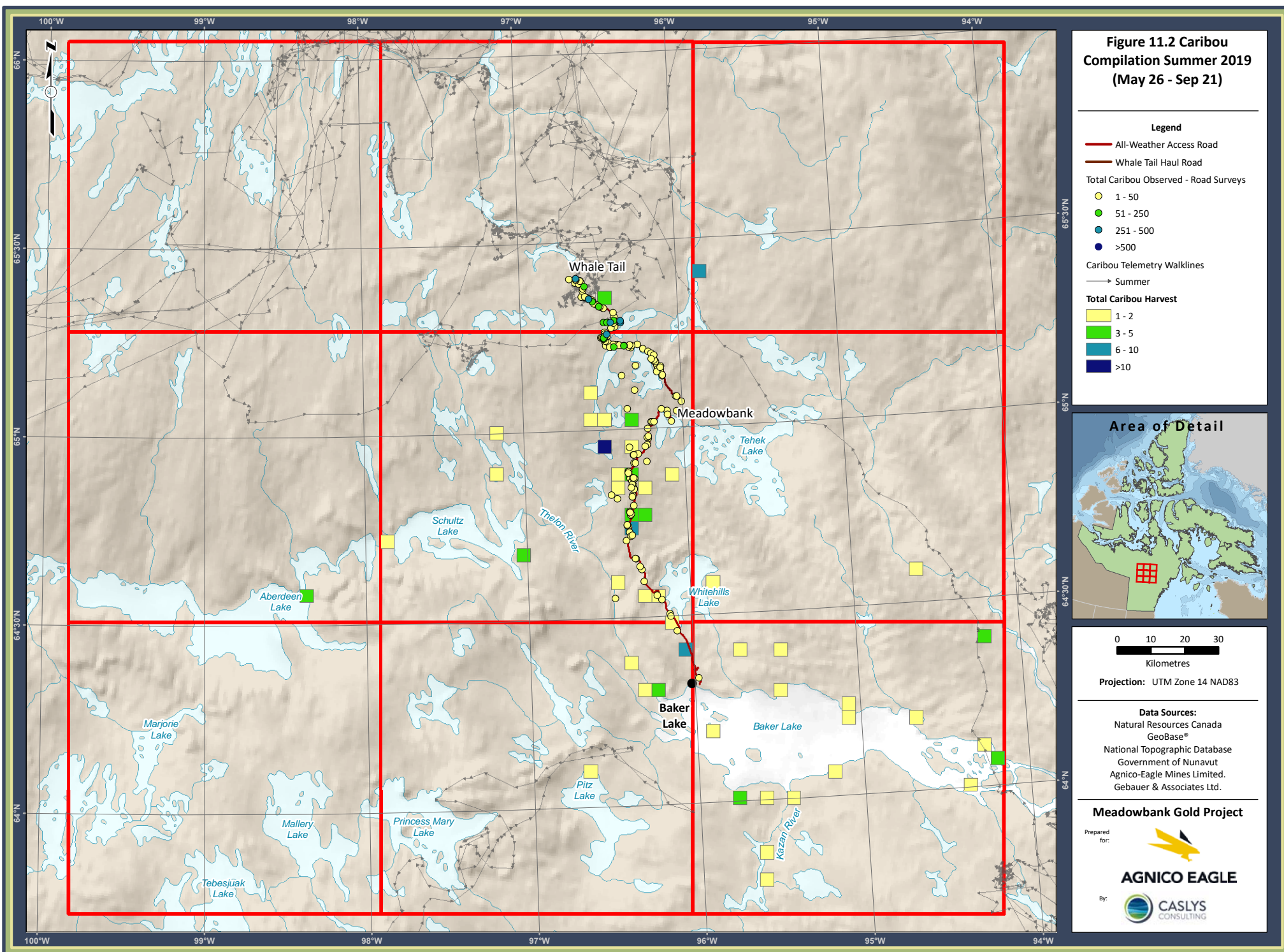
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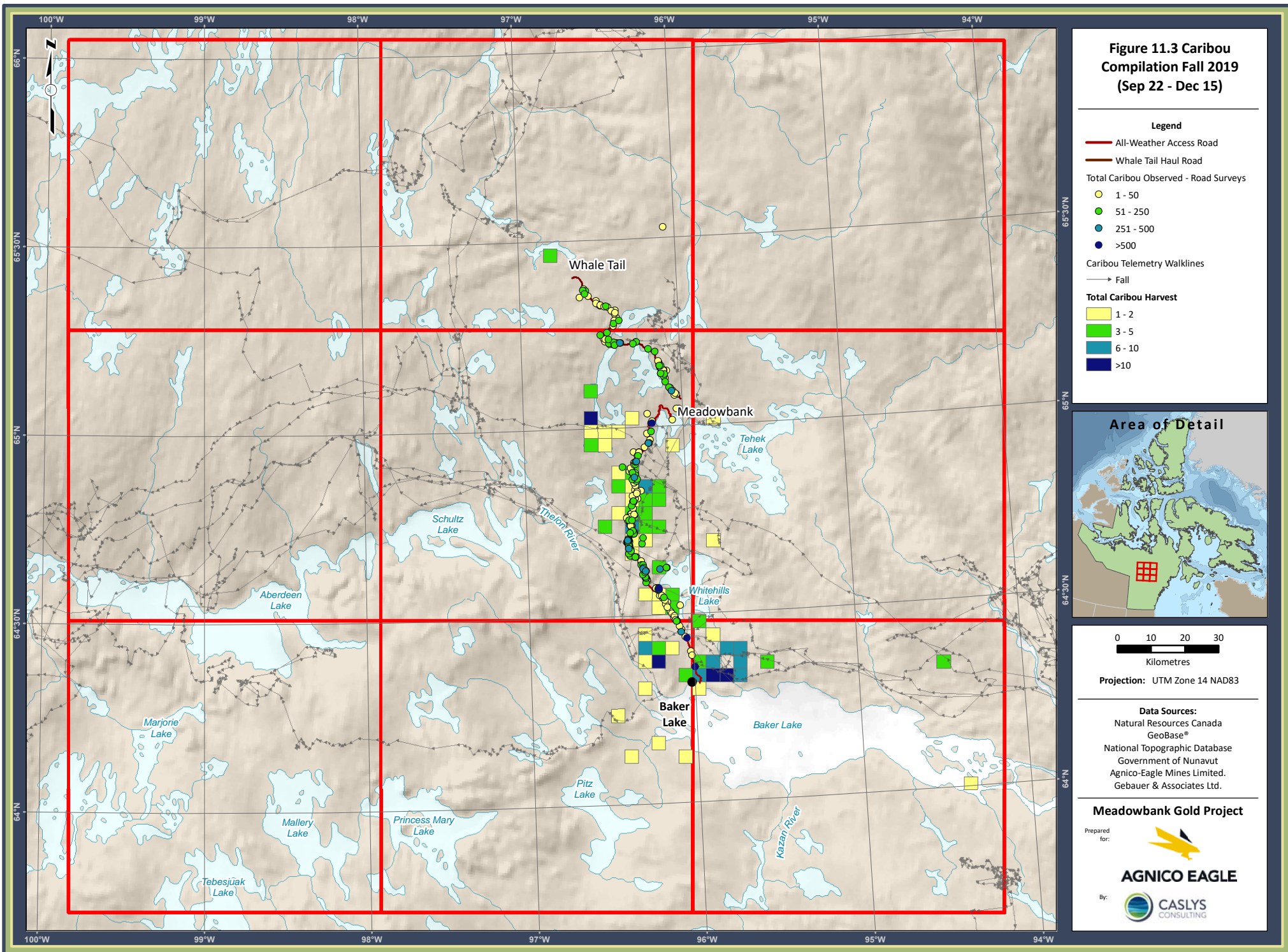


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By:







**Figure 11.4 Caribou  
Compilation Winter 2019  
(Dec 16 - Mar 31)**

**Legend**

- All-Weather Access Road
- Whale Tail Haul Road
- Total Caribou Observed - Road Surveys
  - 1 - 50
  - 51 - 250
  - 251 - 500
  - >500
- Caribou Telemetry Walklines
  - Winter

**WINTER**

- 1 - 2
- 3 - 5
- 6 - 10
- >10

**Area of Detail**



Projection: UTM Zone 14 NAD83

**Data Sources:**

Natural Resources Canada  
GeoBase®  
National Topographic Database  
Government of Nunavut  
Agnico-Eagle Mines Limited.  
Gebauer & Associates Ltd.

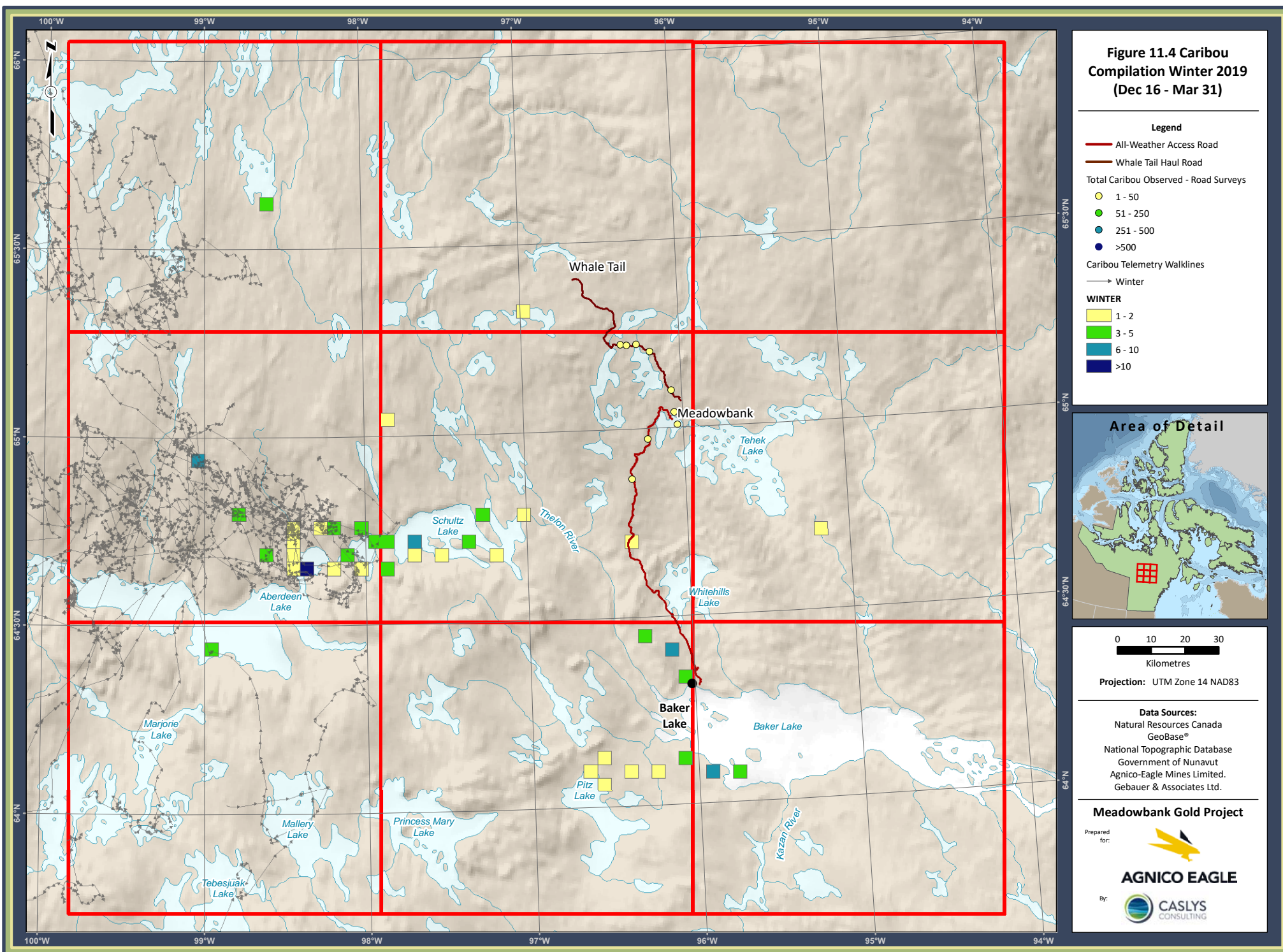
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## SECTION 12 • PREDATORY MAMMAL DEN MONITORING

---

### 12.1 OVERVIEW

Predatory Mammals, representing a valued ecosystem component (VEC), occur and are known to den in the vicinity of the Meadowbank and Whale Tail project facilities. Sensory disturbances near active dens such as blasting, vehicles and, most significantly, ground personnel, may negatively impact denning success by inducing stress responses in the adult mammals, which can result in den abandonment.

Predatory Mammal den monitoring is applicable to four species: Arctic Wolf (natal dens), Grizzly Bear (natal/overwintering dens), Arctic Fox (natal dens), and Wolverine (natal dens).

### 12.2 OBJECTIVES

The purpose of the Predatory Mammal den monitoring program is to identify and monitor active dens in close proximity to mining operations in order to protect any detected dens from disturbance.

### 12.3 DURATION

The den monitoring program is ongoing during the lifetime of the mine

### 12.4 METHODOLOGY

Data will be collected on Predatory Mammal abundance and behaviour during ground surveys, vehicle surveys, and HOL surveys. Active den sites identified during baseline studies will also be monitored. If a wildlife technician suspects or confirms that an active den is present within the active footprint and vicinity of Project facilities or roads, a den management plan will be prepared. The plan will include consultation with the GN with respect to obligations under *The Wildlife Act*, SNU 2003, c. 26. Ground personnel and vehicle access will be restricted in the vicinity of the den as needed to minimize disturbances at the den. The den management plan outlines a monitoring schedule (dependent on seasonal timing) and will inform further mitigation strategies as required. See Figure 13 and Appendix I of the 2019 TEMP (Agnico Eagle 2019) for den management and protection plan components.

### 12.5 HISTORICAL RESULTS

Active den sites of Wolf and previous dens of Grizzly Bear were identified during baseline surveys at the Whale Tail site and along the Whale Tail Haul Road (Dougan 2019; see **Figure 12.1**).

### 12.6 2019 RESULTS

Predatory mammal dens were not monitored in 2019 as potential effects due to mine-related activities were not identified.

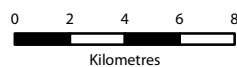




## Legend

### Predator Mammal Den Location

- Arctic Wolf Den
- Arctic Wolf Nursery
- Barren-Ground Grizzly Bear Den
- Whale Tail Haul Road
- All-Weather Access Road
- Whale Tail Pit and Haul Road Local Study Area (LSA)



Projection: UTM Zone 14 NAD83

**Data Sources:**  
Natural Resources Canada, GeoBase®  
National Topographic Database  
Agnico-Eagle Mines Limited.

**Figure 12.1 Predator Mammal Den Sites Identified within the Whale Tail Local Study Area in 2017**

## Meadowbank Gold Project

Prepared for:

**AGNICO EAGLE**

By:

**Nunavut**  
ENVIRONMENTAL  
CONSULTING LTD

**CASLYS**  
CONSULTING

## 12.7 ACCURACY OF IMPACT PREDICTIONS

A summary of the impact predictions identified in the TEMP (Agnico Eagle 2019) is provided in **Table 12.1**; however, no impacts to denning predators were observed in 2019.

**Table 12.1:** Accuracy of Impact Predictions – Disturbance to Denning Predatory Mammals for the Meadowbank and Whale Tail Projects.

Potential Effect	Threshold	Threshold Exceeded (2018)	Adaptive Management Implemented	Status
Disturbance to Denning Predators	Predatory mammal den failures will not be caused by mine-related activities. Threshold is one den failure per year.	NO	NO	AWAR and haul road Surveys Daily and weekly systematic pit and mine site ground surveys Incident and vehicle encounter HOL surveys

## 12.8 MANAGEMENT RECOMMENDATIONS

When an active den site is identified in close proximity to project facilities, a den management plan should be developed that outlines a monitoring schedule and appropriate mitigation strategies. See Figure 13 and Appendix I of the 2019 TEMP (Agnico Eagle 2019) for den management and protection plan components.



## SECTION 13 • RAPTOR NEST MONITORING

---

### 13.1 OVERVIEW

The raptor nest survey monitoring program has been designed to confirm that mine-related activities do not result in inadvertent negative effects on nesting raptors. Raptor surveys along the proposed AWAR alignment in 2005 (i.e., prior to construction) indicated that only low suitability habitat for nesting raptors was available. During AWAR construction in 2007/2008, excavated and blasted rock materials were extracted from numerous quarries along the alignment, resulting in some moderate and high suitability raptor nesting habitat areas characterized by steep rock walls. Established Peregrine Falcon nests within some of these quarries are monitored on an annual basis to evaluate occupancy.

In the Whale Tail Pit and Haul Road study area, researchers from the University of Alberta identified 56 occupied raptor nests during surveys in 2015, 2016, 2017 and 2019 (see **Appendix L** for 2019 results). The most common nesting species was Peregrine Falcon, followed by Gyrfalcon (*Falco rusticolus*) and Rough-legged Hawk. Nests of Common Raven (*Corvus corax*) were also identified during the raptor nest surveys. Most occupied nests (43) were located north of the Whale Tail Pit study area, while the remainder (13) were along the Whale Tail Haul Road. None of the occupied nests will be disturbed by proposed development activities, but four nests (i.e., 1 Peregrine Falcon; 3 Rough-legged Hawk), are located in the Whale Tail LSA.

### 13.2 OBJECTIVES

The primary objectives of the raptor nest survey monitoring program are to:

1. Confirm that raptor nest failures are not caused by mine-related activities. The threshold level is one (1) nest failure per year; and
2. Confirm that no project-related mortality of raptors occurs. The threshold level of mortality is one (1) individual per year.

### 13.3 DURATION

Raptor nest monitoring is to continue annually during the operation and decommissioning phases of the mine in accordance with the TEMP (Agnico Eagle 2019).

### 13.4 METHODOLOGY

#### 13.4.1 Overview

Raptor nest monitoring is conducted according to Figure 14 in the 2019 TEMP while management and mitigation approaches are according to the 'Peregrine Falcon Management and Protection Plan on the Meadowbank Gold Project Site' (see Appendix E of the 2019 TEMP).

**2019 WILDLIFE MONITORING SUMMARY**

A dedicated raptor nest survey (i.e., search for new nests) was in 2019 at the Whale Tail site (see **Appendix L**), but raptor activity and potential nest locations were also noted on other surveys including road surveys, HOL surveys, freshet monitoring, and on-site environmental monitoring. A dedicated and thorough raptor nest survey is also planned for the Meadowbank and Whale Tail mine sites, and all access roads in 2020. Of note is that the small number of nests monitored annually do not allow for the statistical power to determine whether potential nest failures are mine-related.

**13.4.2 Meadowbank Mine and AWAR**

Between 2000 and 2009, raptors were periodically recorded during AWAR road surveys, waterbird nest surveys, and aerial surveys and investigated further, as required; however, given the overall low probability of raptor occurrence within the LSA and RSA, a specific raptor survey was not scheduled. In 2009, an active Peregrine Falcon nest at Quarry 19 prompted the initiation of a dedicated raptor nest survey in 2010. Surveys from 2011 through 2019 continued this work, focusing particularly on quarries along the AWAR. Sporadic surveys in specific areas (i.e., Portage, Goose, and Vault pits, fuel tank storage) were also conducted when raptors were observed during mine site environmental inspections or employees reported any sightings. Visual checks of active falcon nest sites were conducted during regular ground reconnaissance surveys along the AWAR. Non-disruptive monitoring techniques, which included monitoring nests from a vehicle within the quarry or from the AWAR, ensured that active nests were not approached by Agnico Eagle personnel. Using these techniques, environmental personnel were able to monitor nest success throughout the summer season. Nest monitoring was not completed along the Vault Road since neither quarries nor potential raptor habitat are present. Any observed raptor activity in this area is documented through regular mine site inspection and road surveys.

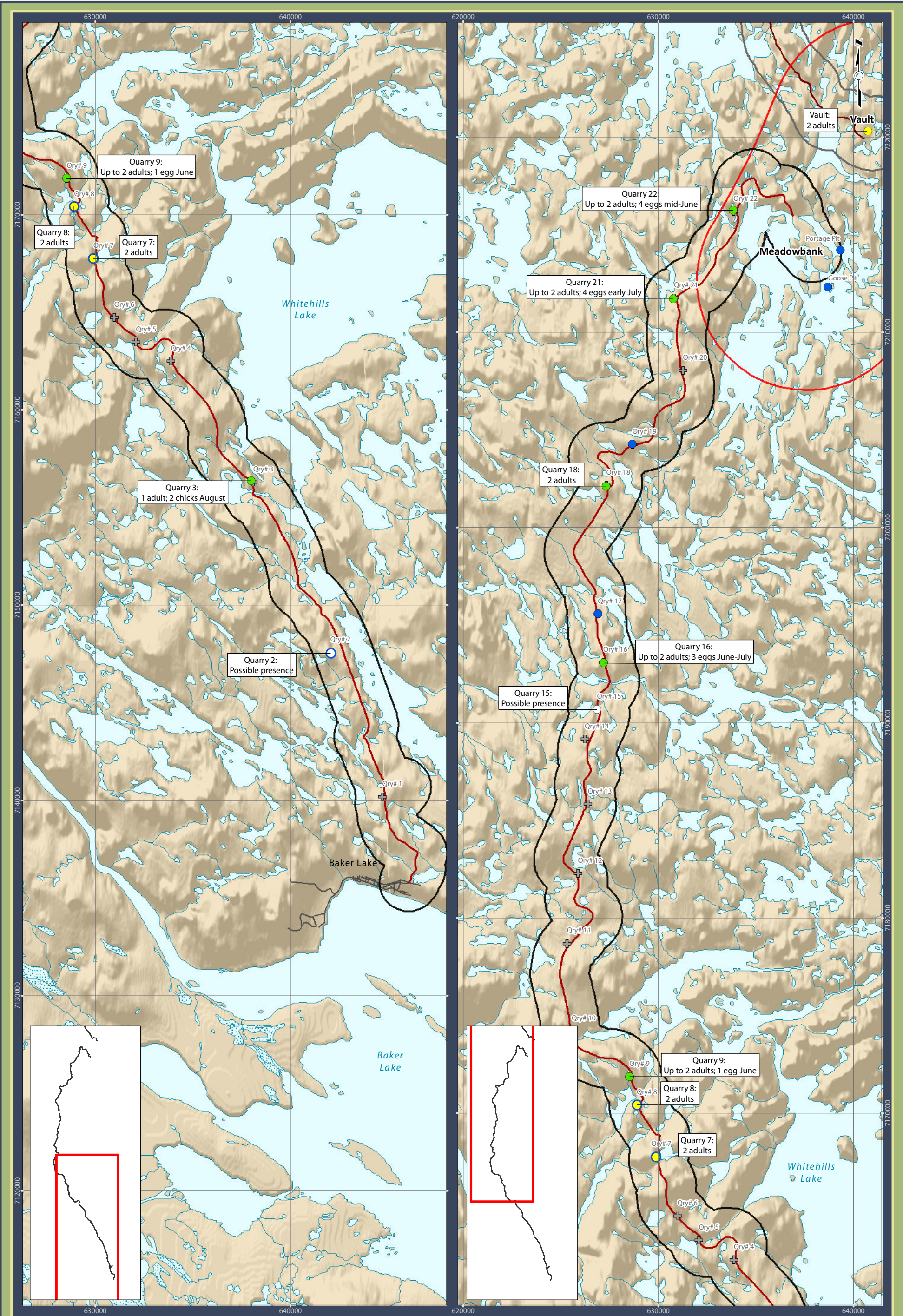
**13.4.3 Whale Tail Pit and Haul Road**

Raptor nests in the Whale Tail Pit and Haul Road study area were previously identified by researchers from the University of Alberta during the environmental assessment process (i.e., 2015 to 2017, and 2019). Surveys were conducted from a helicopter by trained observers. Nest monitoring was conducted in the Whale Tail area, including the Haul Road, in June 2019 but none of the identified active nests are in close proximity to project facilities or were effected by project activities in 2019 (**Appendix L**).

**13.5 HISTORICAL RESULTS****13.5.1 Meadowbank Mine and AWAR**

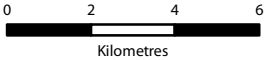
Single nesting pairs of Peregrine Falcon were recorded in 1996 and 2005 in the Mine RSA, but nests near mine facilities have only been routinely recorded since 2009, at which time dedicated nesting surveys were included in the monitoring program. Thirteen unique Peregrine Falcon nesting sites have been recorded between 2009 and 2019; eleven of these were in quarries along the AWAR, one nest was located on the Portage Pit wall (observed in 2012 and 2013), and one nest was in Goose Pit (observed in 2016) (**Figure 13.1**). Not all nesting sites are active every year.





**Legend**

- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>Raptor Nest - Active (2019)</li><li>Raptor Nest - Historical</li><li>Raptor Sighting - Near Historical Nest</li><li>Raptor Sighting - No Nest</li><li>Extensive Whitewash - Near Historical Nest</li><li>Extensive Whitewash - No Nest</li></ul> | <ul style="list-style-type: none"><li>Quarry location</li><li>All-Weather Access Road</li><li>Whale Tail Haul Road</li><li>Meadowbank All-Weather Access Road</li><li>Local Study Area (LSA)</li><li>Meadowbank Local Study Area (LSA)</li></ul> |
|--|--|



Projection: UTM Zone 14 NAD83

**Data Sources:**  
Natural Resources Canada, GeoBase®  
National Topographic Database  
Agnico-Eagle Mines Limited  
Gebauer & Associates Ltd.



**Figure 13.1: Raptor Nest Locations for the AWAR and Meadowbank Mine Site (2009 to 2019)**

**Meadowbank Gold Project**

Prepared for:



By:





### 13.5.2 Whale Tail Pit and Haul Road

Of 56 nests recorded between 2015 and 2017 within the Whale Tail Pit and Haul Road RSA, four were located within the Whale Tail Pit LSA but none were close to project facilities (see **Figure 13.2**); therefore, monitoring was not conducted at any of the nests.

## 13.6 2019 RESULTS

### 13.6.1 Meadowbank Mine and AWAR

In 2019, six active Peregrine Falcon nests were documented in Quarries 3, 9, 16, 18, 21 and 22, with only the nest at Quarry 9 recorded for the first time. No falcon activity was observed at previous nest sites at Quarry 2 (2018), Quarry 7 (2017), Quarry 8 (2017), Quarry 17 (2017), Quarry 19 (2018), Portage Pit (2013), and Goose Pit (2016) (see **Table 13.1**). In addition to the six active nest sites documented in 2019, falcon activity was observed at four additional quarry sites (i.e., Quarries 2, 7, 8, and 15) and one pit (Vault) during the monitoring program. Cumulative information on Peregrine Falcon nests from 2009 to 2019 is summarized in **Table 13.1** and **Figure 13.1**.

Once an active nest has been identified, mine-related activity (e.g., vehicle operation, heavy equipment, aircrafts, blasting etc.) is automatically halted within the quarries with the only disturbance being traffic on the nearby AWAR. For example, at Quarry 22, no remediation of contaminated soils is conducted when falcons are present in the quarry. In addition, to minimize direct disturbance to nesting birds and as per Alistair Franke recommendations, intensive monitoring, which would require approaching nests by foot, is not conducted. Agnico Eagle is also careful not to broadcast locations of nesting birds to avoid inadvertent disturbance by curious mine employees.

Observations made throughout the nesting season on raptor activity and nesting success are detailed in **Table 13.2**. Nesting success was confirmed through the presence of aggressive adults, eggs, or chicks at the six active nesting sites along the AWAR in 2019. Specific raptor nest management plans were not warranted at any of the active nest sites, as mine-related activity was restricted within the quarries.

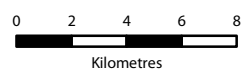
Additional observations of raptor activity around the mine site are included in **Appendix E**, which lists all incidental sightings, and in **Table 4.2**, which summarizes incidental sightings by month. The first Peregrine Falcon of the season along the AWAR was observed at Quarry 16 on 09 May and individuals or pairs were seen regularly until September. The first Rough-legged Hawk of the year was observed on 14 May and many other individuals were observed through to October. Bald Eagles were occasionally recorded between July and September, and one Snowy Owl was observed along the Vault Haul Road on 09 October. Bald Eagle, Peregrine Falcon, and Rough-legged Hawk were observed during AWAR surveys.





### Legend

- Whale Tail Haul Road
  - All-Weather Access Road
  - Whale Tail Pit and Haul Road Local Study Area (LSA)
- Raptor Nest Locations**
- Gyrfalcon Nest
  - Rough-legged Hawk Nest
  - Peregrine Falcon Nest
  - Gyrfalcon & Rough-legged Hawk Nest
  - Peregrine Falcon & Rough-legged Hawk Nest



**Projection:** UTM Zone 14 NAD83

**Data Sources:**  
 Natural Resources Canada, GeoBase®  
 National Topographic Database  
 Agnico-Eagle Mines Limited.

**Figure 13.2: Raptor Nest Locations for the Whale Tail Pit and Haul Road (2015 to 2019)**

### Meadowbank Gold Project

Prepared for:



By:





**MEADOWBANK GOLD MINE PROJECT**  
**2019 WILDLIFE MONITORING SUMMARY**

**Table 13.1:** Record of Peregrine Falcon and Nesting (Yes) along the AWAR and in the Meadowbank LSA between 2009 and 2019.

Quarry	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Comments
1	No	No	No	No	No	No	No	No	No	No	No	No raptor activity observed
2	No	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No	Extensive whitewash; possible presence
3	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	One adult observed regularly and two chicks seen in August
4 to 6	No	No	No	No	No	No	No	No	No	No	No	No raptor activity observed
7	No	No	No	No	No	No	No	Yes	Yes	No	No	Pair of adults observed on two occasions
8	No	No	No	No	No	No	No	No	Yes	No	No	Pair of adults observed on one occasion
9	No	No	No	No	No	No	No	No	No	No	Yes	One to two adults seen regularly and one egg noted in June
10 to 14	No	No	No	No	No	No	No	No	No	No	No	No raptor activity observed
15	No	No	No	No	No	No	No	No	No	No	No	Extensive whitewash; possible presence
16	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	One to two adults seen regularly and three eggs noted in June and July
17	No	No	No	No	No	No	No	No	Yes	No	No	No raptor activity observed
18	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Pair of adults seen on three occasions; aggressive on other occasions suggesting nest presence
19	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No raptor activity observed
20	No	No	No	No	No	No	No	No	No	No	No	No raptor activity observed
21	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	One to two adults seen regularly and four eggs noted in early July
22	No	No	No	No	No	No	No	No	Yes	Yes	Yes	One to two adults seen regularly and four eggs noted in mid-June
Portage	No	No	No	Yes	Yes	No	No	No	No	No	No	No raptor activity observed
Vault	NA	NA	NA	NA	No	No	No	No	No	No	No	Two adults flying circling above pit and landing on north wall in early June
Goose	NA	NA	No	No	No	No	No	Yes	No	No	No	No raptor activity observed

**MEADOWBANK GOLD MINE PROJECT**

**2019 WILDLIFE MONITORING SUMMARY**

**Table 13.2:** Raptor Nests Identified and Monitored at the Mine Site and along the AWAR between Baker Lake and the Meadowbank Mine Site in 2019.

Quarry or Pit Location	GN Site # <sup>1</sup>	Species	Location (UTM)	2019 Observation Date	Observations	Mitigation Actions Taken
3	4004	Peregrine Falcon	14W 0638009 7156419	07 June	1 falcon observed	No other mining-related activity permitted within quarry; closets activity is traffic on AWAR; birds are not approached on foot
				27 June	1 falcon observed	
				08 July	2 eggs in nest	
				19 July	1 falcon observed	
				04 August	1 falcon and 2 chicks	
9		Peregrine Falcon	14W 0628555 7171894	07 June	2 falcons observed	No other mining-related activity permitted within quarry; closets activity is traffic on AWAR; birds are not approached on foot
				15 June	1 falcon observed	
				18 June	2 falcons and 1 egg in nest	
				19 July	1 falcon observed	
				04 August	1 falcon observed	
16	4007	Peregrine Falcon	14W 0627212 7193129	28 May	2 falcons observed	No other mining-related activity permitted within quarry; closets activity is traffic on AWAR; birds are not approached on foot
				07 June	1 falcon observed	
				18 June	2 falcons and 3 eggs in nest	
				27 June	1 falcon observed	
				05 July	2 falcons and 3 eggs in nest	
				19 July	1 falcon observed	
18		Peregrine Falcon	14W 0627321 7202148	07 June	2 falcons observed	No other mining-related activity permitted within quarry; closets activity is traffic on AWAR; birds are not approached on foot
				05 July	2 falcons and nest observed but very difficult access to assess nest	
				19 July	2 falcons observed and apparently guarding nest	

**Table 13.2:** Continued.



**MEADOWBANK GOLD MINE PROJECT**  
**2019 WILDLIFE MONITORING SUMMARY**

Quarry or Pit Location	GN Site # <sup>1</sup>	Species	Location (UTM)	2019 Observation Date	Observations	Mitigation Actions Taken
21	4009	Peregrine Falcon	14W 0630781 7211705	07 June	2 falcons observed	No other mining-related activity permitted within quarry; closets activity is traffic on AWAR; birds are not approached on foot
				27 June	1 falcon observed	
				05 July	2 falcons and 4 eggs in nest	
				19 July	2 falcons observed	
				25 July	1 falcon observed	
22	2017C <sup>2</sup>	Peregrine Falcon	14W 0633625 7216088	07 June	2 falcons observed	No remediation of contaminated soils when falcons are present and nesting; no other mining-related activity permitted within quarry; birds are not approached on foot
				18 June	2 falcons and 4 eggs in nest	
				27 June	1 falcon observed	
				05 July	1 falcon observed	

<sup>1</sup> Government of Nunavut (GN) Raptor Database site number

<sup>2</sup> Unique nest identifier (awaiting GN Raptor Database site number)

### 13.6.2 Whale Tail Pit and Haul Road

Active raptor nests were monitored within the Whale Tail Pit and Haul Road LSA in June 2019; however, no nests were disturbed by project activities. For the four nest sites within 1.5 km of project facilities, management recommendations were provided (**Appendix L**). Except for Rough-legged Hawks, occupancy rates were the same as in 2017 (i.e., 23 of 41 known Peregrine Falcon nests occupied; 2 of 4 known Gyrfalcon nests occupied). For Rough-legged Hawks, occupancy rates declined from 16 of 21 known nests in 2017 to 7 of 21 in 2019.

Raptor species recorded along the Whale Tail Haul Road between May and September, included Bald Eagle, Peregrine Falcon, Rough-legged Hawk, and Snowy Owl (see **Appendix E**). One Short-eared Owl was seen on 03 September along the Whale Tail Haul road near the Amaruq site.

## 13.7 ACCURACY OF IMPACT PREDICTIONS

A summary of the impact predictions identified in the TEMP (Agnico Eagle 2019) is provided in **Table 13.3**. The 2019 raptor monitoring data were compared to the impact prediction thresholds to evaluate adherence to impact predictions and provision of adaptive management, as either a necessary or proactive measure. No thresholds were surpassed in 2019.

**Table 13.3:** Accuracy of Impact Predictions – Disturbance to Nesting Raptors for the AWAR and Mine Site, and Raptor Mortality.

Potential Effect	Threshold	Threshold Exceeded (2019)	Adaptive Management Implemented	Status
Disturbance to Nesting Raptors	Raptor nest failures will not be caused by mine-related activities. Threshold is one nest failure per year.	NO (note – limited data on nesting success)	NO (all mine-related activity is already restricted at active sites)	AWAR and haul road surveys Dedicated raptor nest surveys Daily and weekly systematic pit and mine site ground surveys
Raptor Mortality	One (1) individual	NO	NO	AWAR and haul road surveys Daily and weekly systematic pit and mine site ground surveys Incident and vehicle encounter reports

### 13.8 MANAGEMENT RECOMMENDATIONS

Quarrying activities along the AWAR corridor have created moderate to high suitability Peregrine Falcon nesting habitat. Falcons are expected to continue to use select quarries for the foreseeable future, which may necessitate the implementation of a raptor nest management plan for nests where mine-related activity is unavoidable; however, this was not necessary in 2019.

In 2020, Agnico Eagle will be conducting a comprehensive raptor nest survey of the Meadowbank and Whale Tail sites, including areas along the Whale Tail Haul Road.

Agnico Eagle will continue to:

- Conduct raptor nest surveys annually at each of the quarries along the AWAR early in the nesting season (mid- to late June) to confirm the status of previously confirmed raptor nests, assess the presence of new raptor nests, and determine the need, if any, for a raptor nest management plan;
- Monitor active raptor nests regularly in the breeding season to confirm nest success or failure;
- Ensure that environmental personnel maintain accurate records of nesting activity and success for all active nests for the duration of these surveys;
- Monitor pits and waste rock piles at the mine site to avert nesting attempts by raptors. If a nest is established, the Peregrine Falcon Management and Protection Plan will be followed;
- Monitor the Whale Tail Pit and Haul Road areas during many of its field programs (e.g., freshet monitoring, HOL surveys etc.) to determine whether active nests are present. If a nest is in close proximity to project facilities and is at risk of disturbance, the Peregrine Falcon Management and Protection Plan will be followed; and
- Further discussions will be held within the TAG and with Alistair Franke regarding the feasibility of conducting statistically powerful surveys that can distinguish between mine and natural effects on nesting success.

## SECTION 14 • WATERBIRD NEST MONITORING

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### 14.1 OVERVIEW

The Whale Tail expansion requires the construction of two dikes within Whale Tail Lake to divert water from the proposed pit to surrounding lakes and tributaries, resulting in flooding that will elevate water levels by 4 m and inundate approximately 157 ha of tundra during the active bird nesting window. To investigate mitigation options for minimizing flooding-related impacts to birds, Trent University, in collaboration with Environment and Climate Change Canada and Agnico Eagle, conducted active bird nest surveys and experimented with deterrent options in summer 2018 and 2019 at the Whale Tail site.

### 14.2 OBJECTIVES

The purpose of the research is to assess the degree of risk posed to migratory birds by mining-induced flooding during the nesting period, and to determine the most effective bird deterrents and how they should be applied. The specific study objectives are:

- 1) Determine breeding densities and timing of bird nest initiation at the study site;
- 2) Investigate the relationship between nesting phenology and timing of snowmelt;
- 3) Understand the degree to which deterrents can reduce nesting densities in specific areas;
- 4) Document individual behavioural responses to deterrent applications and changes in response over time; and
- 5) Assess the dispersal distance of deterred/impacted birds, to understand whether birds displaced from flooded areas nest nearby.

### 14.3 DURATION

The study was initiated in 2018 and will continue until 2020.

### 14.4 METHODOLOGY

Detailed methods are outlined in the '2019 Migratory Bird Protection Report' (Agnico Eagle 2020) (see **Appendix M**).

### 14.5 2019 RESULTS

#### 14.5.1 Survey Results

During the flooding, six (6) nests of three (3) species were lost due to direct impacts of the high water. Overall an average loss of 3.8 nests per km<sup>2</sup> was estimated by taking the number of nests observed to be lost and dividing it by the total proposed flood zone of Whale Tail Lake (1.575 km<sup>2</sup>). The species that lost nests were Lapland Longspur (4), Semipalmated Sandpiper (1) and Herring Gull (1). Despite nest loss due to flooding and significant habitat loss, nests in the proposed flood zone had an estimated success rate of 56% (Agnico Eagle 2020). Further discussion is provided in **Appendix M**.



### 14.5.2 Effectiveness of Deterrents

Complete results describing the effectiveness of the tested deterrents will be provided upon study completion; however, results to date demonstrate that deterrents were not effective at deterring birds from nesting. In addition, deployment and maintenance of the deterrents was extremely time consuming. As a result, the study authors do not recommend the use of the tested deterrents for mitigating nest loss due to disturbance such as flooding. Further discussion of the effectiveness, cost and practicality of deterrents is provided in **Appendix M**.

### 14.5.3 Next Steps

In 2020, the study will continue to determine whether re-colonisation occurs in the flooded areas around Whale Tail Lake as the flood waters recede. The study will require monitoring of the 16 plots within the flood zone surrounding Whale Tail Lake. The purpose of the study is to understand how nesting birds react to the elimination of previously suitable habitat, whether bird densities change between years as the water line moves, and the role elevation has in the selection of nest sites.

## SECTION 15 • BREEDING BIRD MONITORING

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### 15.1 OVERVIEW

The breeding bird PRISM (Program for Regional and International Shorebird Monitoring) plot and bird transect monitoring programs were designed to evaluate potential project-related changes in breeding bird species abundance, richness, and diversity over time. The program is one component of the larger monitoring strategy to evaluate the success of mitigation measures implemented to minimize the amount of vegetation (i.e., bird habitat) removed or degraded (e.g., dust fall) by the project, and whether certain mine activities such as the mine site or AWAR have resulted in reduced or compromised habitat function or effectiveness (i.e., zone of influence) for breeding birds.

For the breeding bird transects, data analysis in 2011 and 2015 indicated that no road-related effects had occurred to date, and thresholds had not been exceeded; therefore, annual transect surveys were permanently suspended after 2015.

### 15.2 OBJECTIVE

The objective of the breeding bird plot monitoring program is to confirm that a mine-related change of 20% function, determined by an increase or decrease in local breeding bird abundance, richness, and diversity, has not occurred. The program uses the widely accepted Canadian Wildlife Service's (CWS) PRISM protocols (CWS 2005). A secondary objective of the monitoring program is to determine more effective ways to prevent disturbance to nesting birds based on feedback from mitigation measures and observations.

### 15.3 DURATION

The breeding bird plot monitoring program is to continue every year during the construction period and for at least the first three full years of mine operation (2010 to 2012) in accordance with the TEMP (Cumberland 2006). The last PRISM plot survey was conducted in 2015.

### 15.4 RECOMMENDATIONS

For the breeding bird PRISM plots, data analysis in 2015 showed that most bird community indices were variable with little difference in overall trends between mine and control plots. Thresholds had not been exceeded and no additional management or mitigation considerations were necessary.

In 2019, the Canadian Wildlife Service requested a detailed analysis of all PRISM and bird transect data to date and a comprehensive report outlining protocols and analytical results. If no effects are evident, bird monitoring can be shifted to: 1) PRISM plots randomly selected by CWS staff; and 2) a Breeding Bird Survey (BBS) as per standard BBS protocols. Agnico Eagle is planning on conducting the analysis and submitting the report in 2020.

## SECTION 16 • INVASIVE PLANTS

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### 16.1 OVERVIEW

In 2019, Agnico Eagle initiated a non-native plant monitoring study to assess and monitor the potential introduction of non-native plant species, including weeds or invasive species (see Golder 2020c).

### 16.2 OBJECTIVE

The primary objective of the invasive plant survey was to assess and monitor the potential introduction of non-native plant species in areas where colonization was most likely (e.g., disturbed areas). The non-native plant information collected provides an understanding of the presence or spread of non-native plant species and informs on the efficacy of current cleaning and protection measures on site as per the TEMP. The results may serve as a basis for the development of a non-native plant management plan (if needed).

### 16.3 DURATION

The distribution of invasive plants is monitored on an annual basis through site inspections.

### 16.4 METHODOLOGY

Surveys at the Meadowbank Complex were conducted by a Golder Ecologist between August 9 to 16 2019 and focused on 14 non-native vascular plant species (see Golder 2020c; **Appendix N**). Due to the large extent of the Meadowbank Complex area, non-native plant surveys were executed as targeted surveys focused within high-priority or potential areas. High-potential areas were surveyed, including highly trafficked areas (e.g., fuel station, wastewater discharge area, areas surrounding buildings, shipping containers, and the dump). Due to time constraints, the AWAR was surveyed from the Meadowbank Mine site to KM 70 only at slow speed, while observing for weed infestations along road margins. Periodic stops were undertaken to complete meanders in areas with high potential (i.e., pull-outs, work areas, etc.). Observers looked for obvious signs of non-native plant occurrences such as showy inflorescence, fruiting structures, and other key characteristics that distinguished non-native species from endemic plant species.

When non-native or invasive plant species were encountered, the following information was recorded: site ID; surveyor name; GPS coordinates; photos of the occurrence / infestation; species name; estimated area of infestation; estimated number of plants (e.g., <10, 10 to 100, 100 to 1,000, >1,000) of each species; estimated cover of bare ground; growth stage (i.e., seedling, in bud, seed set, expired); recommended action for each species; and record of any hand pulling completed.

## 16.5 RESULTS

A total of 107 locations were surveyed (Golder 2020c; **Appendix N**). No non-native plants (i.e., in Canada) were recorded along the Whale Tail Haul Road and AWAR, and within the Whale Tail and Meadowbank Mine footprints; however, populations of Flixweed (*Descurainia sophia*) and Scentless Chamomile (*Matricaria perforata*), both non-endemic to the Arctic, were observed within the surveyed locations.

A single stem of Scentless Chamomile, a species of concern listed as Secondary Noxious and Noxious in the Canadian Weed Seeds Order (*Seeds Act* 2016) was observed near a building close to the water at the Meadowbank Mine site (see Golder 2020c). The plant was hand pulled and disposed of safely by an Agnico Eagle employee on 15 August 2019.

Flixweed, an introduced agricultural weed (ABMI 2019) that is not native to Nunavut, was observed on the Meadowbank Mine site at a number of locations but particularly along the perimeter of the airstrip (e.g., southwest border; exceeding 1,000 individuals), and the southwest edge of the Meadowbank Mine site around the workshop and shipping container storage areas. Observed Flixweed populations have not encroached onto the tundra and all observations were limited to disturbed areas.

## 16.6 RECOMMENDATIONS

Although not listed as a non-native plant by the Canadian Endangered Species Conservation Council (CESCC), the presence of the noxious weed, Scentless Chamomile, should be continually monitored to prevent further infestations. Although Flixweed has not migrated from disturbed areas, it should be controlled to contain the infestation and prevent spread north to new locations.

Continued and thorough cleaning of equipment and materials prior to entering the site, as per the TEMP, will prevent seed of non-native species from being introduced. Surveys for the 14 non-native plant species identified by CESCC and other non-native species should be completed annually. The procedure, NU-PRO- ENV- Invasive Species Inspection Prior to Loading onto Shipping Vessel, is also being followed.

Mechanical control, such as mowing or hand pulling, is recommended for any identified non-native plant species. If hand pulling with a shovel, the plant material can be collected in bags and disposed of at an offsite location or incinerated.

## SECTION 17 • SUMMARY

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The 2019 Wildlife Monitoring Summary Report describes the data collected to date from the various monitoring programs and describes natural and mine-related variability, and potential mine-related effects within wildlife populations.

In 2019, monitoring efforts focused on areas immediately around the mine site and along the AWAR, Vault Haul Road, and Whale Tail Haul Road. Survey and monitoring emphasis was on evaluating current habitat losses, monitoring nesting success of raptors, and monitoring and managing wildlife presence, particularly Caribou, near the mine facilities and infrastructure. Regional-scale monitoring efforts focused on Caribou movement through ongoing satellite-collaring studies. A summary of potential project effects, threshold levels, and the 2019 monitoring results is provided in **Table 17.1**.

Collared Caribou and large herds crossed the AWAR, Vault Haul Road, and Whale Tail Haul Road during the 2019 spring and fall migrations. Overall very high Caribou numbers were recorded along project roads during surveys in 2019 with numbers in April higher than in any other previous year. Mitigation measures (e.g., convoying, reduced speed limits, limiting vehicle volumes, and road closures) for Caribou along the roads appeared to facilitate passage of Caribou across the roads as compared to what was observed in 2018. Of note, is that Caribou movements in 2018 may have been affected by a satellite-collaring program in late April and early May.

Further studies by Agnico Eagle and the GN are underway to understand different and/or additional mitigation triggers, and the effects of the mine roads on fine-scale Caribou movement and timing of Caribou reaching calving grounds and successfully calving. The Baker Lake HTO, GN personnel, and other stakeholders will meet within the Terrestrial Advisory Group (TAG) in 2020 to discuss the effectiveness of targeted monitoring of Caribou movement around mine facilities. By the end of 2019, 31 collars remained active, which provides excellent data for monitoring Baker Lake herds in 2019. Another deployment planned for April 2020 may be affected by the Covid-19 crisis.

In 2019, one Wolverine was euthanized under authorization of the GN Conservation Officer; however, the threshold level for mine site or road-related mortalities for Predatory Mammals (i.e., Grizzly Bear, Wolverine and Wolf) of two [2] individuals) was not exceeded. Grizzly Bears were observed near mine facilities in 2019 but no deterrence was required. Numerous closures of the AWAR and Whale Tail Haul Road were required in 2019 to permit safe passage of migrating Caribou, and no road or mine-related mortality of Caribou occurred.

Six active Peregrine Falcon nests were observed and monitored at quarry sites along the AWAR in 2019, with successful nesting confirmed at one nest. Raptor nests were also monitored along the Whale Tail Haul Road and in the vicinity of the Whale Tail Pit in 2019 but no nests were affected by project activities or required detailed management plans. Bird studies in the flooding zone at Whale Tail by Trent University researchers found that visual deterrents were not successful in preventing birds from nesting. A small number of nests (i.e., 6) of three species were inundated by rising waters during flooding activities.





**2019 WILDLIFE MONITORING SUMMARY**

Monitoring programs will continue to evolve throughout the life of the mine, contingent on data quality objectives and the need for adaptive management strategy implementation and subsequent effectiveness monitoring. Adjustments to the intensity and frequency of monitoring, and the extent of analyses will vary between years depending on observed trends to date, data gap analysis, and determinations of effect.

**Table 17.1:** Potential Project Effects, Thresholds, and Results of Monitoring in 2019.

Potential Effect	Thresholds	Monitoring Methods	Frequency	Completed in 2019	Threshold Exceeded (2019)
<b>Vegetation (Wildlife Habitat)</b>					
Habitat Loss (Compared to Permitted Areas)	Meadowbank = 1,532 ha AWAR = 348 ha Whale Tail = 1,473 ha Threshold is >5% habitat loss of permitted area	Ground Surveys; Mapping and GIS analyses – ELC habitat mapping	Every three years	NO	NA
Habitat Reclamation following Mine Closure	NA	Ground Surveys; Mapping and GIS analyses – ELC habitat mapping	Every three years to 11 years post-closure	NO	NA
<b>Ungulates</b>					
Habitat Loss and Degradation (Compared to Permitted Areas)	Meadowbank Growing = 531 ha Winter = 407 ha Whale Tail Growing = 76 ha Winter = 602 ha	Ground Surveys; Mapping and GIS analyses – ELC habitat mapping	Every three years	NO	NA
Sensory Disturbance	No threshold but Decisions Trees followed when Caribou are seen near mine facilities	AWAR, Vault Haul Road, and Whale Tail Haul Road surveys; Satellite-collaring data; HOL surveys; Daily and weekly pit and mine-site ground surveys; Incidental wildlife reporting; Motion sensing cameras	Daily / weekly	YES	NA
Project-related Mortality - Vehicle Collisions	2 individuals (cumulative across mine)	AWAR, Vault Haul Road, and Whale Tail Haul Road surveys; Daily and weekly pit and mine-site ground surveys; Collision reporting system	Mine site – daily AWAR and haul roads – up to every two days at peak migration	YES	NO

**Table 17.1:** Continued.

Potential Effect	Thresholds	Monitoring Methods	Frequency	Completed in 2019	Threshold Exceeded (2019)
Hunting by Baker Lake Residents	20% Change in Harvest Patterns in RSA from Historic	Hunter Harvest Study	Yearly	YES	<b>NO.</b> Harvest rates in RSA below baseline levels
Other Mine-related Mortality	2 individual (cumulative across mine)	Daily and weekly pit and mine-site ground surveys; Collision reporting system	Daily	YES	<b>NO</b>
<b>Predatory Mammals</b>					
Disturbance to denning predators	1 den failure	Den site surveys	As required	Not required	<b>NO</b>
Project-related Mortality	2 individuals (cumulative across mine)	AWAR, Vault Haul Road, and Whale Tail Haul Road surveys; Daily and weekly pit and mine-site ground surveys; Collision reporting system	Mine site – daily AWAR and haul roads – up to every two days at peak migration	YES	<b>NO.</b> One (1) Wolverine dispatched in 2019
<b>Raptors</b>					
Disturbance of Nesting Raptors	1 Nest Failure	Daily and weekly pit and mine-site ground surveys; Incidental wildlife reporting; Dedicated raptor nest surveys; AWAR, Vault Haul Road, and Whale Tail Haul Road surveys	Nests within 200 m - daily Nests from 200 to 1000 m - weekly	YES	<b>NO</b>
Project-related Mortality	1 individual (cumulative across mine)	AWAR, Vault Haul Road, and Whale Tail Haul Road surveys; Daily and weekly pit and mine-site ground surveys; Collision reporting system	Mine site – daily AWAR and haul roads – up to every two days at peak migration	YES	<b>NO</b>

**Table 17.1:** Continued.

Potential Effect	Thresholds	Monitoring Methods	Frequency	Completed in 2019	Threshold Exceeded (2019)
<b>Waterbirds</b>					
Disturbance of Nesting Waterfowl	1 Nest Failure	Daily and weekly pit and mine-site ground surveys; Waterbird nest surveys	Yearly - for active nests within 200 m	YES	<b>NO</b>
Project-related Mortality	1 individual (cumulative across mine)	AWAR, Vault Haul Road, and Whale Tail Haul Road surveys; Collision reporting system	Mine site – daily AWAR and haul roads – up to every two days at peak migration	YES	<b>NO</b>
<b>Other Breeding Birds</b>					
Changes in Breeding Bird Populations	20% Change from Natural	Breeding Bird PRISM Plots and Transects	PRISM – every three years Transects - suspended	NO	<b>NA</b>

## SECTION 18 • LITERATURE CITED

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