

APPENDIX F

Hunter Harvest Study



MEADOWBANK COMPLEX MINE

2024 HUNTER HARVEST STUDY AND CREEL SURVEY SUMMARY REPORT

07 MARCH 2025

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EXECUTIVE SUMMARY

A Baker Lake Hunter Harvest Study (HHS) conducted from 2007 to 2015 was relaunched in 2019 and continued into 2024. The 2024 study included 77 participants of which 64 reported harvesting Caribou (*Rangifer tarandus*). Given an estimated 300 to 350 active hunters in the Hamlet of Baker Lake, the HHS represents from 18 to 21% of hunters in the community. With a total reported Caribou harvest of 820 individuals in 2024, the total Caribou harvest in Baker Lake in 2024 was estimated to range from 3,905 to 4,556 Caribou, which is higher than the annual estimated harvest between 1996 and 2001 (2,230 and 3,116; NWMB 2004) but comparable to other years of the HHS.

Compared to the average across other years, Caribou in 2024 were harvested at a higher percentage within 5 km of the All-Weather Access Road (i.e., 48%) and at a higher percentage (82%) within the Regional Study Area (RSA); however, harvest levels in 2024 were within threshold levels established during the impact assessment (i.e., Caribou harvest levels within the RSA).

No Muskox (*Ovibos moschatus*) and 15 Wolverine (*Gulo gulo*) were harvested in 2024, which is lower than in 2023 (i.e., 7 and 18, respectively). A total of 143 Wolves (*Canis lupus*) were reported as being harvested in 2024, which is considerably higher than the 47 reported in 2023 and 92 reported in 2022. Two Grizzly Bear (*Ursus arctos*) were also harvested, although one was harvested outside the HHS boundaries. Several bird species were harvested in 2024 with ptarmigan (*Lagopus* sp.) and Canada Goose (*Branta canadensis*) being the most common species. For the third year in a row, marine mammals (i.e., Ringed Seal, *Pusa hispida*) were reported as being harvested by Baker Lake hunters, but all were harvested outside the HHS boundaries.

Lake Trout (*Salvelinus namaycush*) and Lake Whitefish (*Coregonus clupeaformis*) were the most common fish species caught by fisherman in 2024, with Lake Trout reported at lower numbers (i.e., 356 individuals) than the average for the study from 2007 to 2023 (i.e., 667).

SECTION 1 • OVERVIEW

As outlined in the original TEMP (Cumberland 2006) and the June 2019 version (Agnico Eagle 2019), 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. The HHS was conducted in association with the Baker Lake Hunters and Trappers Association (HTO) to monitor and document the spatial distribution, seasonal patterns, and harvest rates of hunter kills and angler catches within the Meadowbank Regional Study Area (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 the Government of Nunavut, Department of Environment (GN). Data were provided annually in monitoring reports from 2007 to 2015 and in 2019 to 2023.

The HHS was suspended for three years (2016 to 2018) to develop new approaches and direction. Following consultation with the HTO, Kivalliq Inuit Association (KivIA), GN, and other agencies in November 2016 (Winnipeg) and June 2017 (Ottawa), Agnico Eagle reinitiated the HHS in March 2019, which for the first time also encompassed the Whale Tail RSA as part of the Meadowbank Complex. The study approach was similar to previous years, but suggestions and guidance received during the consultation period were incorporated into the study. The study was conducted from 2020 to 2024 and continues into 2025.

SECTION 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 (*Rangifer tarandus*), Muskox (*Ovibos moschatus*), and Wolverine (*Gulo gulo*) 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 the Terrestrial Advisory Group (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 Meadowbank All-Weather Access Road (AWAR) and Whale Tail Haul Road (WTHR).

As discussed during consultation with stakeholders, the 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 (IQ) and Traditional Knowledge (TK); e) increase availability of data to support a collective approach to understanding wildlife harvest; and f) assist Agnico Eagle in mitigative actions and the GN in management decisions.

SECTION 3 • METHODOLOGY

The wildlife species that are the focus of the HHS are Caribou, Muskox, and Wolverine; however, harvest data on other species, such as Grizzly Bear (*Ursus arctos*), Wolf (*Canis lupus*), Arctic Fox (*Vulpes lagopus*), geese, and other birds are 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 (i.e., 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, to simplify data entry and collection, and reflect household hunting patterns. The harvest calendar is attractive and consists of local photographs of wildlife and Baker Lake residents primarily taken by HHS participants (see **Appendix A**). At the end of the calendar are maps that delineate a 4 km² UTM grid within the Baker Lake and Meadowbank Complex 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 three times during the year (i.e., June 2024, November 2024, and January 2025) by the harvest study coordinator. During the January 2025 interviews, remaining data from 2024 were collected. The purpose of the interviews is to ensure all harvest data are recorded on the calendars and to 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.

Features of the 2024 HHS included: 1) building long-term relationships between participants and researchers; 2) increasing engagement with participants on social media platforms such as Facebook and Instagram; 3) continuing incentives for participating in the study (e.g., gas vouchers and prizes); and 4) special prizes for the 20 longest standing participants.

SECTION 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, a number that has likely changed since then. The member count in 2008 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 comparable to the comprehensive 5-year Nunavut Wildlife Harvest Study (NWMB 2004) in which 336 Baker Lake hunters were contacted and 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 2004). 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. The HHS data (2007 to 2015 and 2019 to 2023) fluctuated between 34 and 43% of reported harvest within 5 km of the AWAR, and between 62 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 680 in 2011, and then decreased to 269 in 2014, the lowest reported harvest in seven years, and 305 in 2015. Between 2016 and 2018 (3 years) the HHS was not conducted. Total Caribou harvests in 2019 (648 animals) and 2020 (652) were higher than in 2021 (513), lower than in 2022 (766), and comparable to 2023 (646). If an average of approximately 20% of all Baker Lake hunters actively participated in the study (5% estimated for 2014), extrapolation of historical HHS values suggests approximately 3,000 to 4,000 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 (NWMB), between 2,230 and 3,116 Caribou were harvested each year between 1996 and 2001 (NWMB 2004). 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 (2004) and HHS results (2007 to 2015 and 2019 to 2023), highest Caribou harvests have occurred between August and December with a second smaller peak between March and May. The similar pattern between the studies indicates that seasonal hunting preferences have not changed markedly in the last two decades.

Reported harvests of Muskox and Wolverine were relatively high in 2023. 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 15 animals in 2010 to one (1) animal in 2015; however, in 2019, 2020, 2022, and 2023 reported Wolverine harvests were at all-time highs of 18, 22, 25, and 18 individuals, respectively.

SECTION 5 • 2024 HUNTER HARVEST STUDY RESULTS

5.1 NUMBER OF HUNTERS

The HHS included 77 participants by the end of 2024, which is higher than participants in 2023, 2022, and 2021 (i.e., 75, 59, and 55 respectively). Higher numbers in 2024 are because of a higher number of new participants relative to those that have left the study. Of the 2024 participants, Caribou harvest data were collected from 64 participants, which is slightly higher than the 63 participants reporting Caribou harvests in 2023 and considerably higher than the 55 hunters reporting harvests in 2022. The 64 participants reporting Caribou harvest in 2024 is the highest number since the HHS began.

Based on the previous discussion of total numbers of hunters in the Hamlet of Baker Lake (**Section 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 2004) in which 336 Baker Lake hunters were contacted and interviewed. Discussions with Baker Lake HTO members in 2019 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 64 hunters reporting Caribou harvest in 2024 conservatively represent from 18 to 21% of total hunters in the community.

5.2 DISTRIBUTION OF HUNTING

Figure 5.1 shows the distribution of Caribou harvest within the HHS data collection area. Hunting is highly concentrated in the vicinity of the Hamlet of Baker Lake and along the AWAR to approximately Km 85. More moderate harvests were reported along the northeastern and southwestern shores of Baker Lake, while limited hunting was reported within the Thelon River system to Aberdeen 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 Meadowbank RSA (NWMB 2004). 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 Meadowbank RSA (see **Table 5.1**). The HHS data (2007 to 2015 and 2019 to 2023) fluctuated between 30 and 54% of reported harvest within 5 km of the AWAR, and between 62 and 85% within the Meadowbank RSA. The 2024 HHS data indicated that 48% of reported harvest occurred within 5 km of the AWAR and 82% occurred within the Meadowbank RSA, which are within the ranges observed in the study to date (see **Table 5.1**). As was the case in other years, threshold levels of 20% set for monitoring the effects of the Meadowbank mine development (note – does not include the Whale Tail mine, which was approved under a separate permit with a different effects assessment) on the distribution of Caribou harvest within the RSA were not exceeded (see **Figure 5.2**).

Figure 5.1: Total Number of Caribou Harvested in 2024

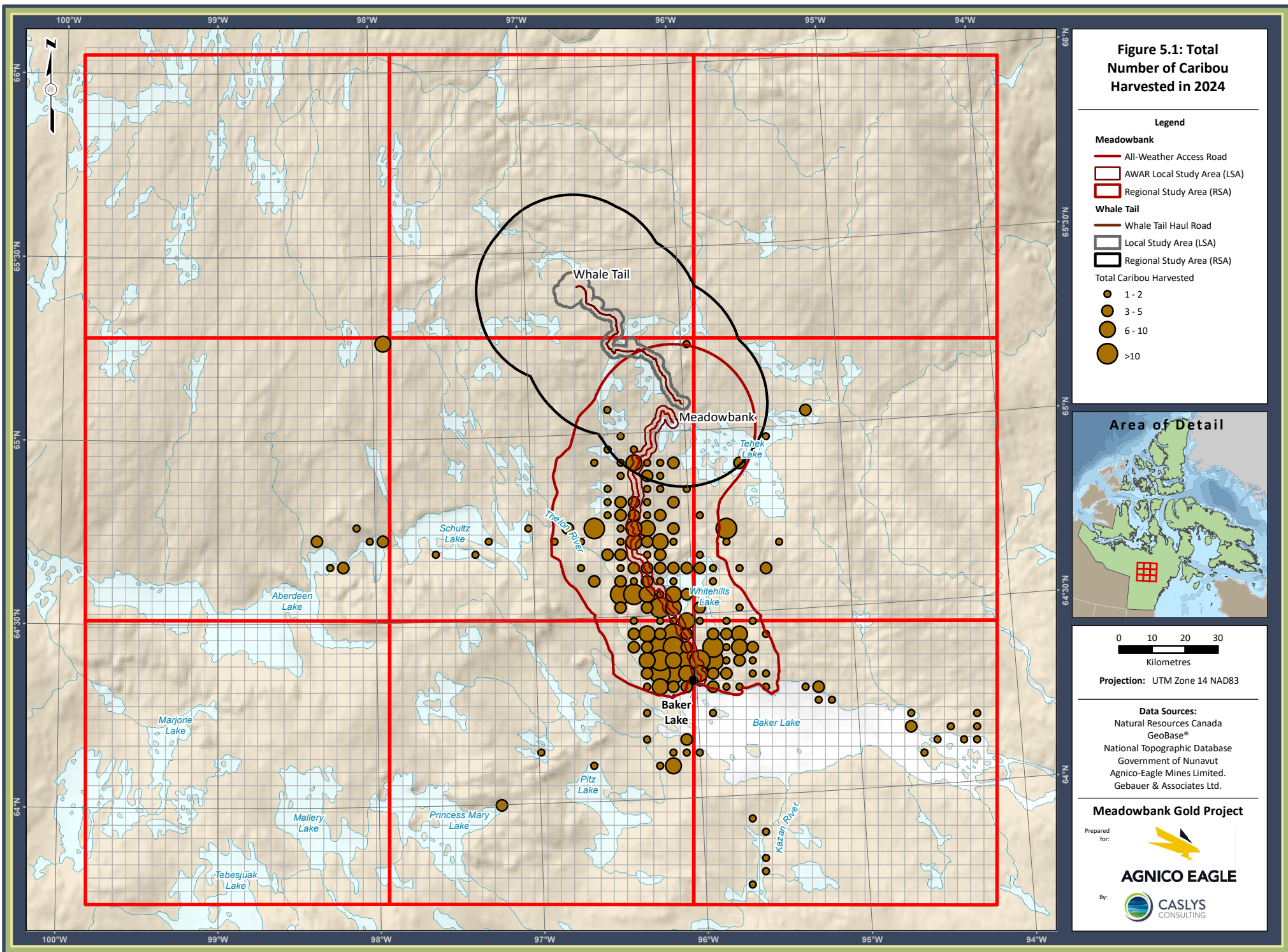


Table 5.1: Caribou Harvest Distribution along the AWAR and within the Meadowbank LSA and RSA (1996 to 2001 [NWMB], and 2007 to 2015 and 2019 to 2024 [Baker Lake HHS]).

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 Annual Harvest within Meadowbank LSA	% of Annual 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
Baker Lake HHS 2020	34 (79%)	5.8	30	19	62
Baker Lake HHS 2021	34 (87%)	6.6	43	32	71
Baker Lake HHS 2022	50 (91%)	6.0	39	24	70
Baker Lake HHS 2023	43 (68%)	5.6	37	17	71
Baker Lake HHS 2024	54 (84%)	7.3	48	24	82
Average (2007 to 2023)	32 (79%)	6.2	39	24	75
Average (2007 to 2024)	32 (79%)	6.2	39	24	75

In 2024, no Caribou were harvested within 5 km of the WTHR, which compares to no reported harvest during the NWMB harvest study, one (1) Caribou harvest in 2023, no Caribou in 2022, and three (3) in 2021 (see **Table 5.2**). Overall harvest numbers were too low to determine whether harvests have increased following construction of the WTHR. Within the Whale Tail RSA (note – overlaps with the Meadowbank RSA), a total of 33 harvests were reported in 2024, which is just below the average across the first 14 years of the study. Given the low numbers of reported harvests close to the WTHR and the prohibition of the public from the WTHR, it is unlikely that the presence of the road has resulted in increased harvest in this area.

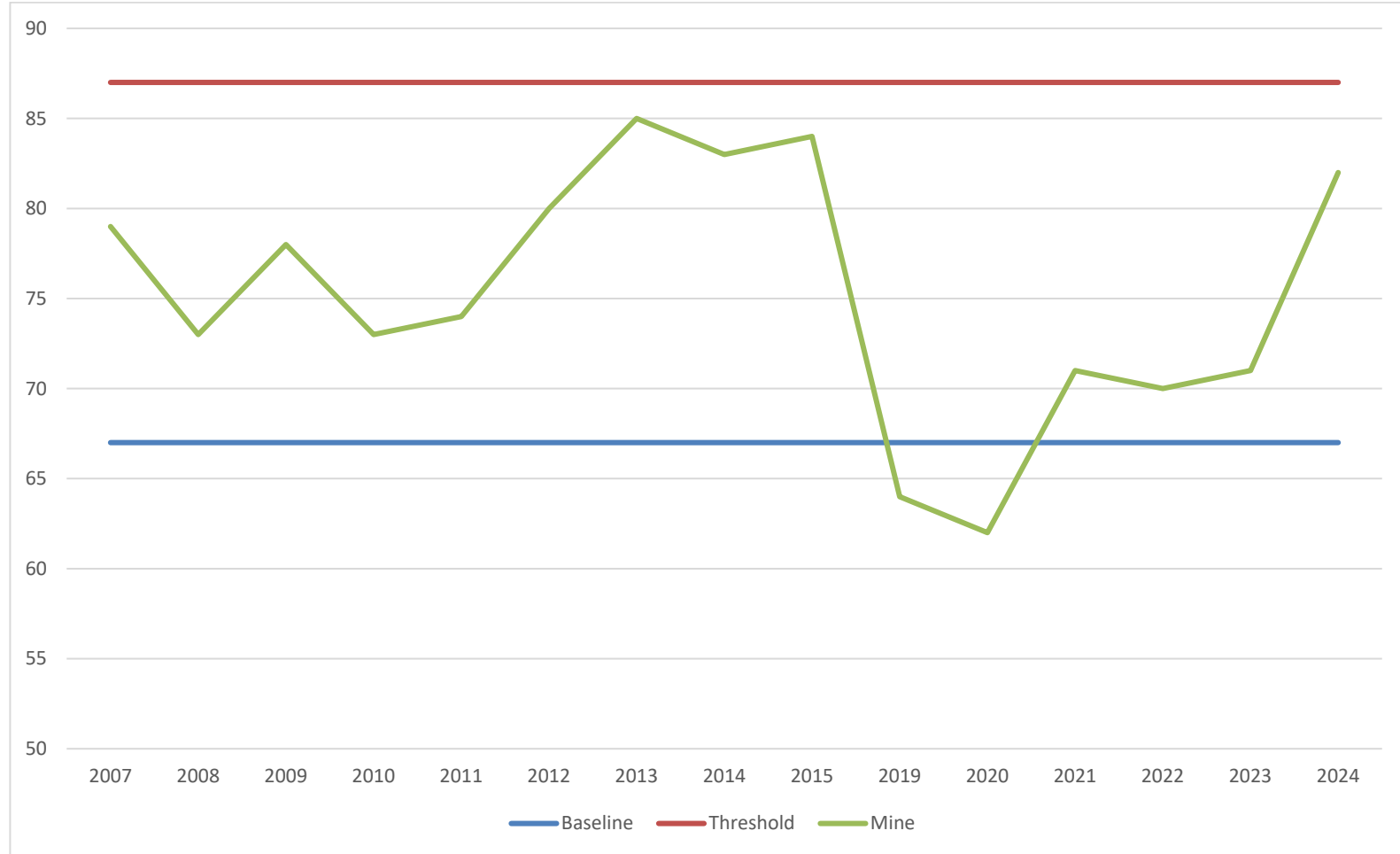


Figure 5.2: Percent of Caribou Harvest within the Meadowbank RSA from 2007 to 2015 (Years 1 to 9), and 2019 to 2024 (Years 10 to 15) Compared to Baseline and Threshold Levels.

Table 5.2: Caribou Harvest Distribution along the WTHR and within the Whale Tail LSA and RSA (1996 to 2001 [NWMB], and 2007 to 2015 and 2019 to 2024 [Baker Lake HHS]).

Study	Annual Harvest within 5 km of WTHR	Annual Harvest within Whale Tail LSA	Annual Harvest within Whale Tail RSA
NWMB 1996 to 2001	0	0	17
Baker Lake HHS 2007	1	1	1
Baker Lake HHS 2008	0	0	15
Baker Lake HHS 2009	1	0	15
Baker Lake HHS 2010	0	0	20
Baker Lake HHS 2011	0	0	103
Baker Lake HHS 2012	0	0	7
Baker Lake HHS 2013	0	0	16
Baker Lake HHS 2014	0	0	17
Baker Lake HHS 2015	0	0	53
Baker Lake HHS 2019	5	5	85
Baker Lake HHS 2020	0	0	12
Baker Lake HHS 2021	3	3	48
Baker Lake HHS 2022	0	0	34
Baker Lake HHS 2023	1	0	74
Baker Lake HHS 2024	0	0	33
Average (2007 to 2023)	0.79	0.64	35.71
Average (2007 to 2024)	0.73	0.60	35.53

5.3 MAGNITUDE OF HUNTING

In 2024, a total of 820 Caribou were reported as being harvested by 64 participants in the Baker Lake HHS, which includes harvests in the Meadowbank and Whale Tail study areas (see **Table 5.3**). The number of participants reporting harvests and the total number of Caribou harvested are the highest since the HHS was initiated. Given that the 64 hunters represent an estimated 18 to 21% of the Baker Lake hunting community (see **Section 5.1**), the total estimated number of Caribou harvested in 2024 in the Baker Lake community ranged from 3,905 to 4,556 animals, which is higher than in 2023 (3,076 to 3,589), lower than in 2022 (i.e., range of 4,256 to 4,788 animals) and higher than historical predictions (NWMB 2004). According to participants, the Caribou herds stayed far away from the commercial meat plant in Rankin Inlet in 2024; therefore, many hunters from Baker Lake filled the gap and sold Caribou to the plant under its quota system. As well, hunters from Rankin Inlet were forced to travel far and wide, including to Baker Lake and even further west (i.e. Shultz Lake) to harvest Caribou in 2024. A few participants expressed concern about this and the increased number of guide outfitters.

Table 5.3: Hunter Caribou Harvest Statistics from the NWMB (2004) Study and Baker Lake HHS (2007 to 2015; 2019 to 2024), which includes the Meadowbank and Whale Tail Areas.

Baker Lake Hunter Harvest Study – Agnico Eagle Mines Ltd.

Year	January	February	March	April	May	June	July	August	September	October	November	December	Yearly Total
2007	0	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
2020	6	14	8	14	12	16	18	95	119	151	88	111	652
2021	29	27	61	16	44	23	20	54	90	54	36	56	513
2022	35	15	33	29	79	14	28	113	113	219	46	42	766
2023	21	31	25	61	78	24	11	37	61	151	53	93	646
2024	85	67	30	22	35	10	9	48	141	202	110	61	820
Total #	347	447	623	561	566	363	301	684	1,212	1,571	637	651	7,963
Average	24.8	29.8	41.5	37.4	37.7	24.2	20.1	45.6	80.8	104.7	42.5	43.4	530.9
% of Total	4.4	5.6	7.8	7.0	7.1	4.6	3.8	8.6	15.2	19.7	8.0	8.2	100.0

Table 5.3: 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	170.0	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

5.4 SEASONAL DISTRIBUTION AND TIMING OF HUNTING

Based on the NWMB (2004) and inclusive Baker Lake HHS results (2007 to 2015; 2019 to 2024), highest Caribou harvests have occurred between August and December, with a second smaller peak between March and May (see **Figure 5.3**). 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 2024 can be found in **Figure 5.4** (i.e., numbers of animals harvested, numbers of participants, and average number of animals harvested by participant by month) and **Figure 5.5** (i.e., Caribou harvest numbers by season and proximity to the access roads).

The seasonal distribution of hunting is illustrated in **Figures 5.6a to 5.6d**, representing the spring, summer, fall, and winter Caribou seasons outlined in the TEMP. In spring 2024, overall Caribou hunting in the Meadowbank RSA was moderate with hunting occurring primarily west of the AWAR from the Hamlet of Baker Lake to the south end of Third Portage Lake around the Km 85 mark (**Figure 5.6a**). Within the Whale Tail RSA, one or two Caribou were harvested at the south end of Third Portage Lake, which is also within the Meadowbank RSA (**Figure 5.6a**).

During the summer, Caribou in the Meadowbank RSA were harvested across a larger area but particularly along the AWAR up to around Km 85 and near the Hamlet of Baker Lake (**Figure 5.6b**). Some harvesting occurred along the Thelon River to Aberdeen Lake, and along the northeastern and southwestern shores of Baker Lake (**Figure 5.6b**). Several Caribou were harvested up to around Km 85 at the south end of the Whale Tail RSA (**Figure 5.6b**).

In the fall, a considerable amount of hunting occurred and was much more concentrated around the Hamlet of Baker Lake, west of Whitehills Lake, along the AWAR up to near Km 85, and around the Prince River (**Figure 5.6c**). A small number of Caribou were reported as being harvested in the southern portion of the Whale Tail RSA in fall 2024 (**Figure 5.6c**).

In winter, Caribou were hunted at high numbers around the Hamlet of Baker Lake, around Whitehills Lake, and on the west side of the AWAR up to Tehek Lake. Some successful hunters travelled further afield by snowmobile (e.g., along the Thelon River to Aberdeen Lake, and near Princess Mary and Pitz lakes) (**Figure 5.6d**). Scattered Caribou harvests were reported in the Whale Tail RSA (**Figure 5.6d**).

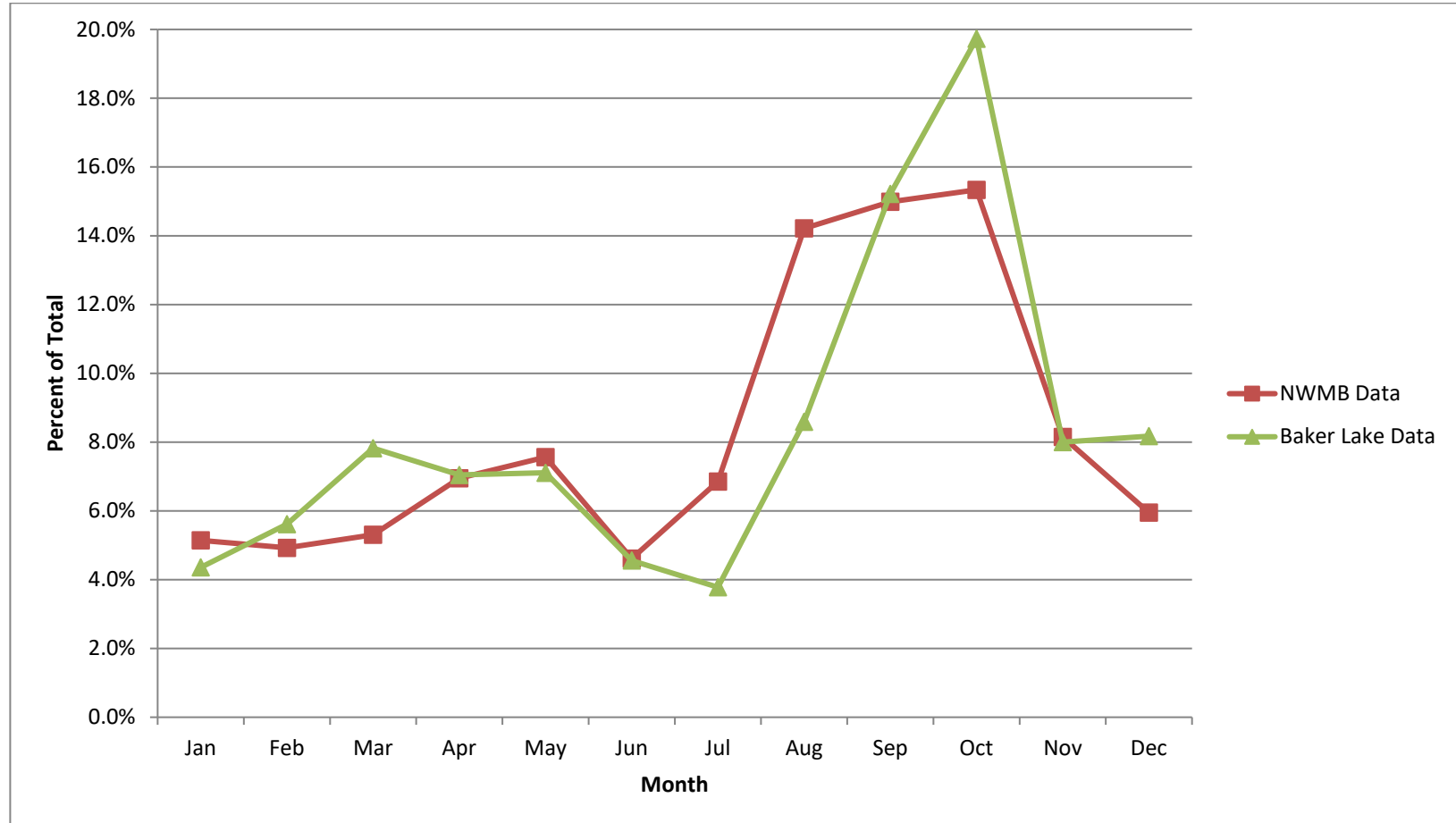


Figure 5.3: Seasonal Trends in Caribou Harvest from the Baker Lake HHS (2007 to 2015; 2019 to 2024) and the NWMB Study (1996 to 2001).

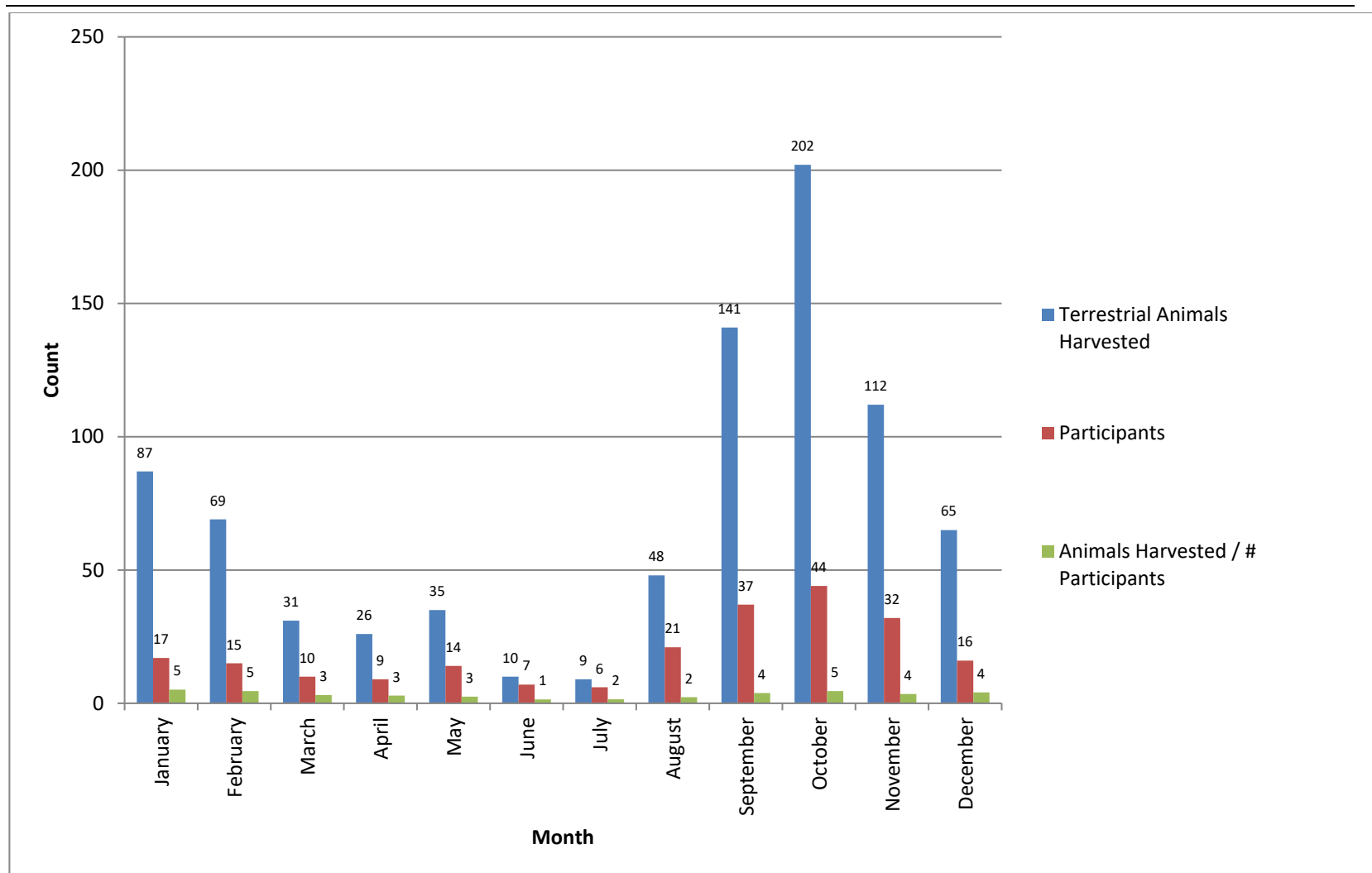


Figure 5.4: Terrestrial Animals Harvested per Month and by Participant in 2024.

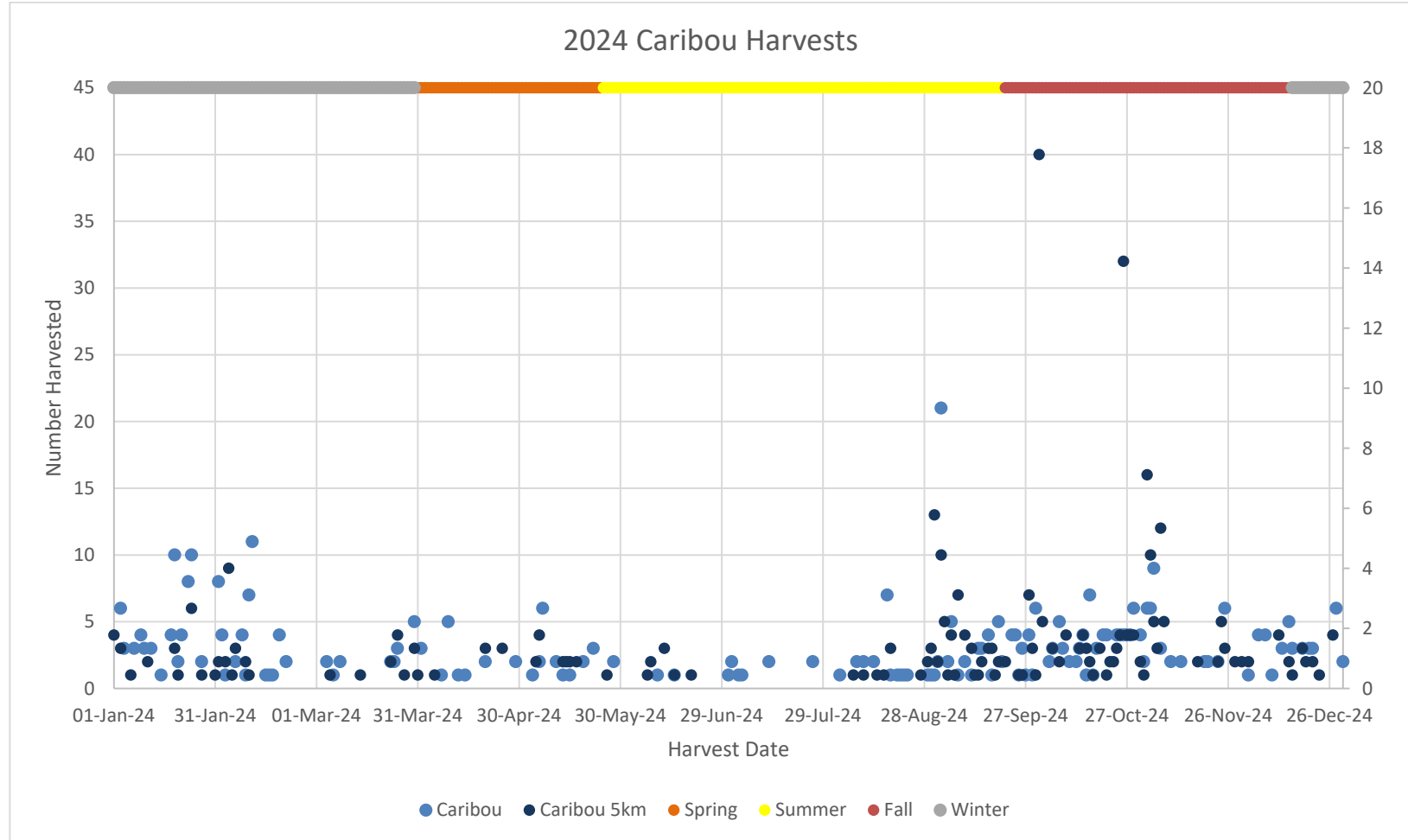





Figure 5.5: Number of Caribou harvested in each Caribou Season and Proximity to Access Roads in 2024.




Figure 5.6a: Total Number of Caribou Harvested in Spring 2024 (Apr 1 - May 25)

Legend

Meadowbank

-  All-Weather Access Road
-  AWAR Local Study Area (LSA)
-  Regional Study Area (RSA)

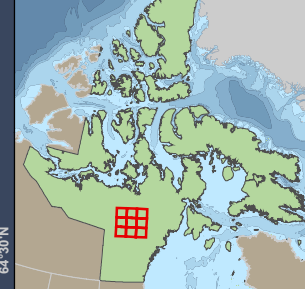
Whale Tail

-  Whale Tail Haul Road
-  Local Study Area (LSA)
-  Regional Study Area (RSA)

Total Caribou Harvested

-  1 - 2
-  3 - 5
-  >5

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.

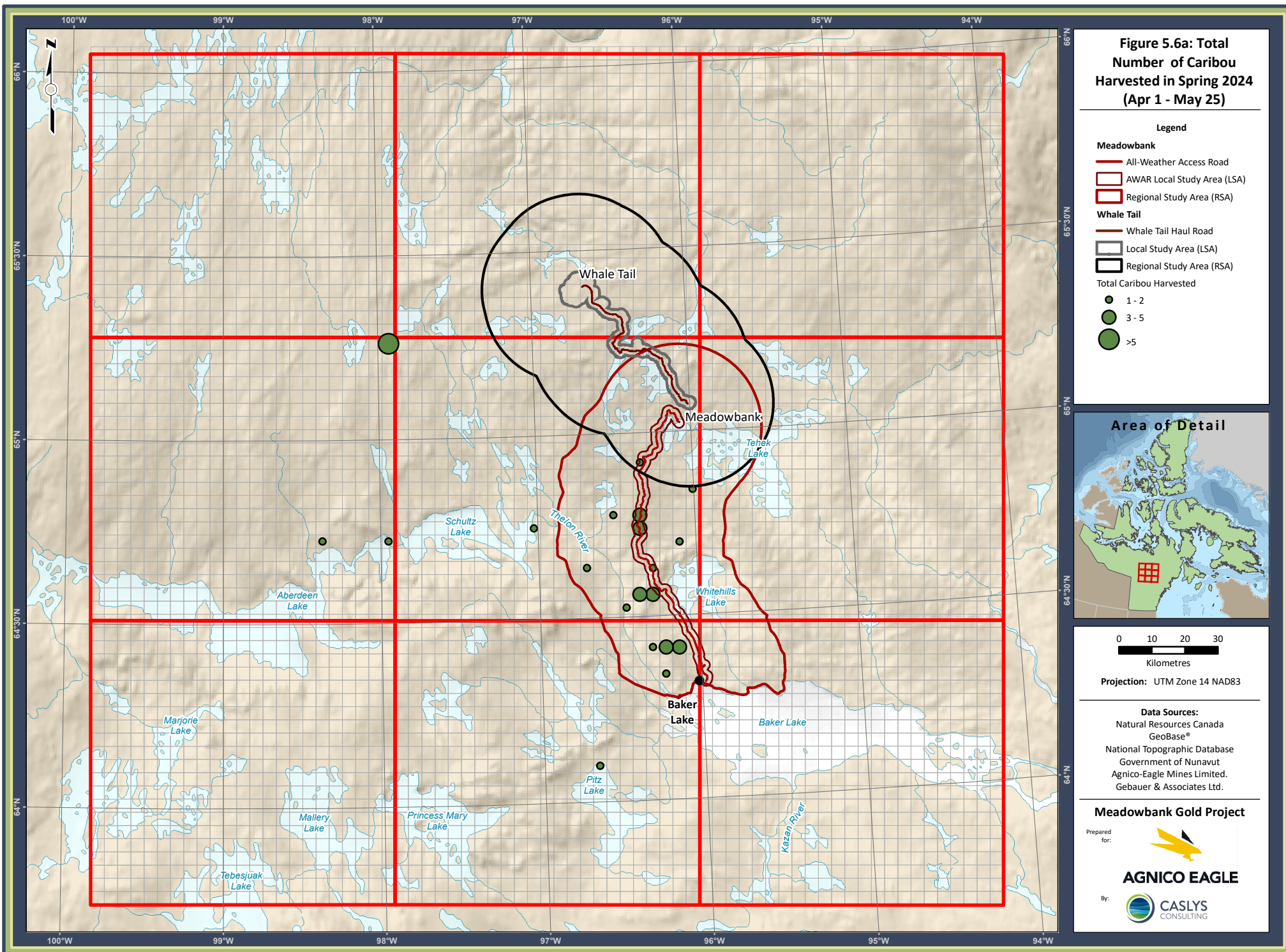
Meadowbank Gold Project

Prepared for:



AGNICO EAGLE

By:



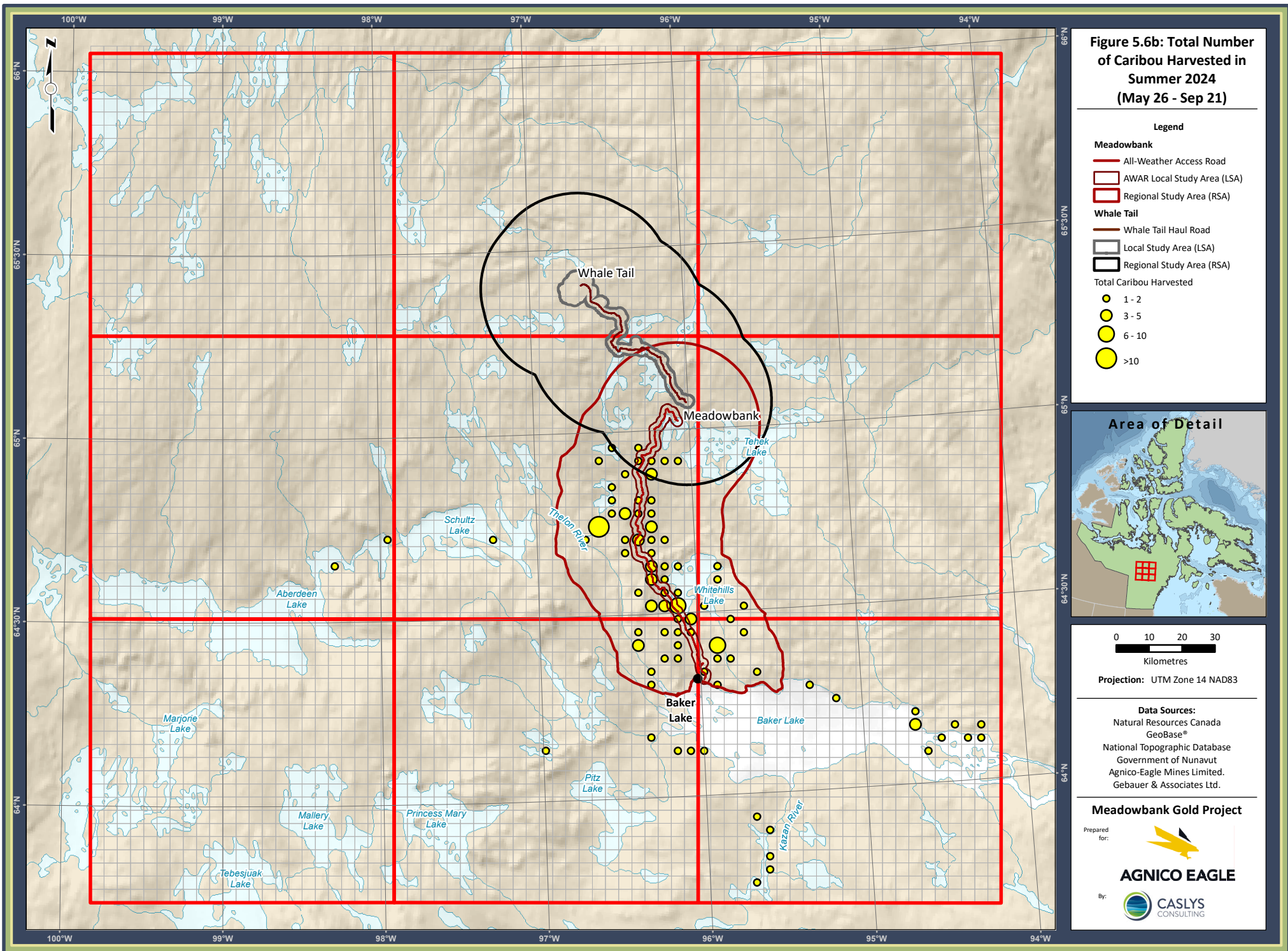


Figure 5.6c: Total Number of Caribou Harvested in Fall 2024 (Sep 22 - Dec 15)

Legend

Meadowbank

- All-Weather Access Road
- ▭ AWAR Local Study Area (LSA)
- ▭ Regional Study Area (RSA)

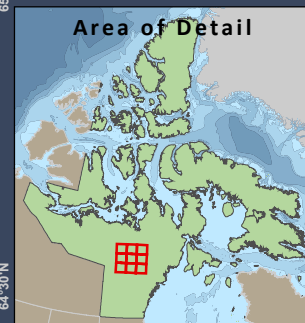
Whale Tail

- Whale Tail Haul Road
- ▭ Local Study Area (LSA)
- ▭ Regional Study Area (RSA)

Total Caribou Harvested

- 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.

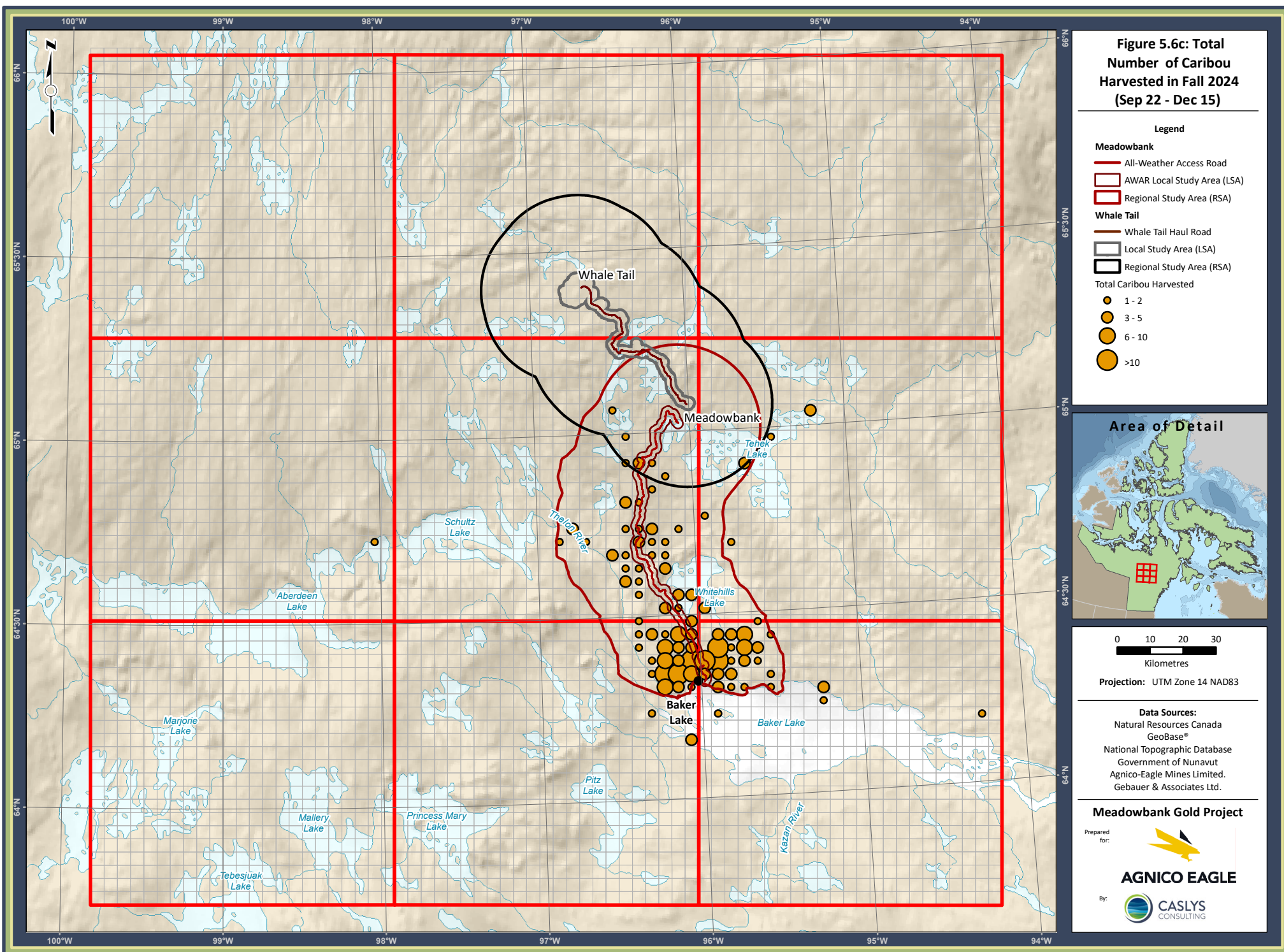
Meadowbank Gold Project

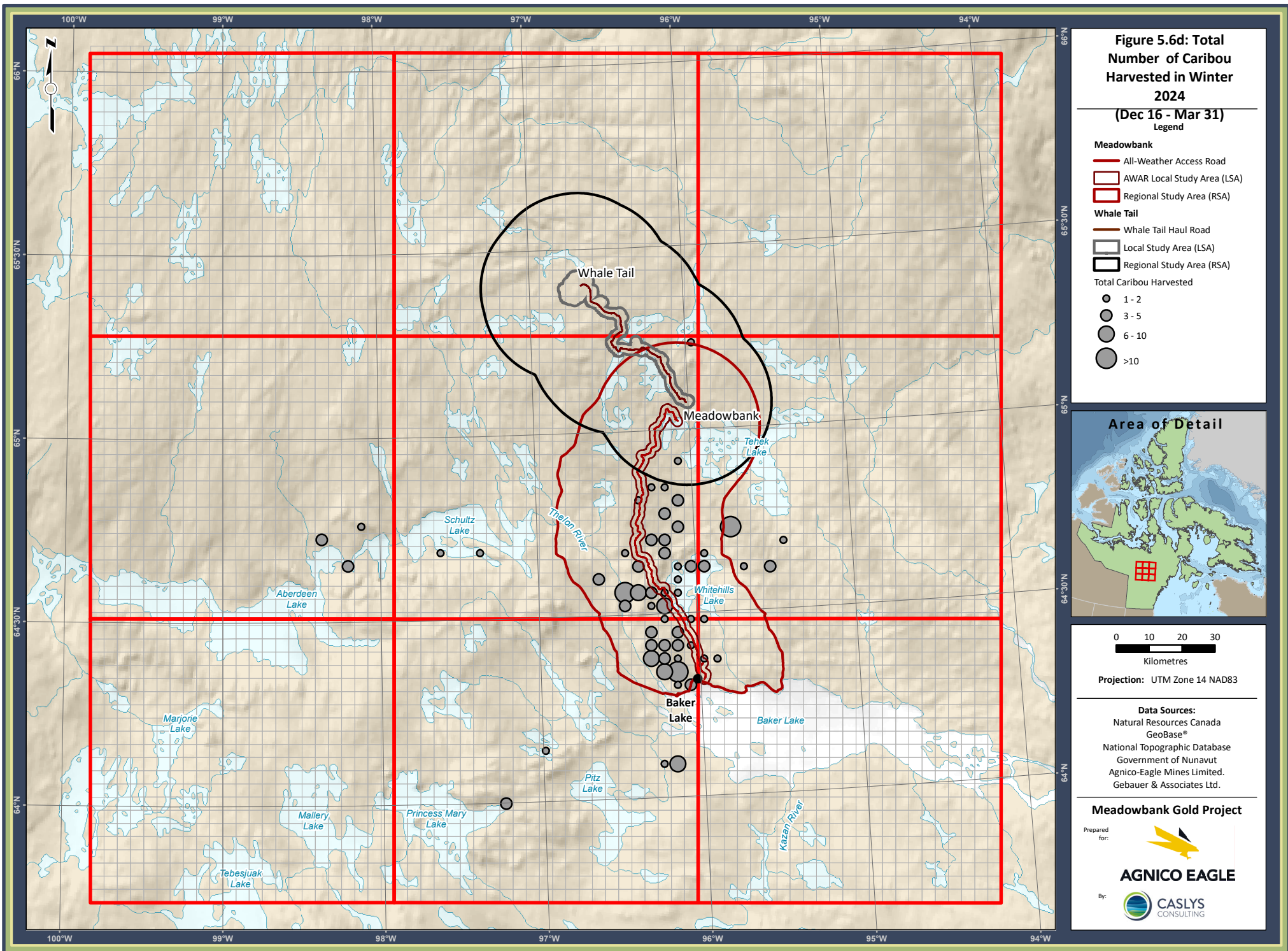
Prepared for:



AGNICO EAGLE

By:



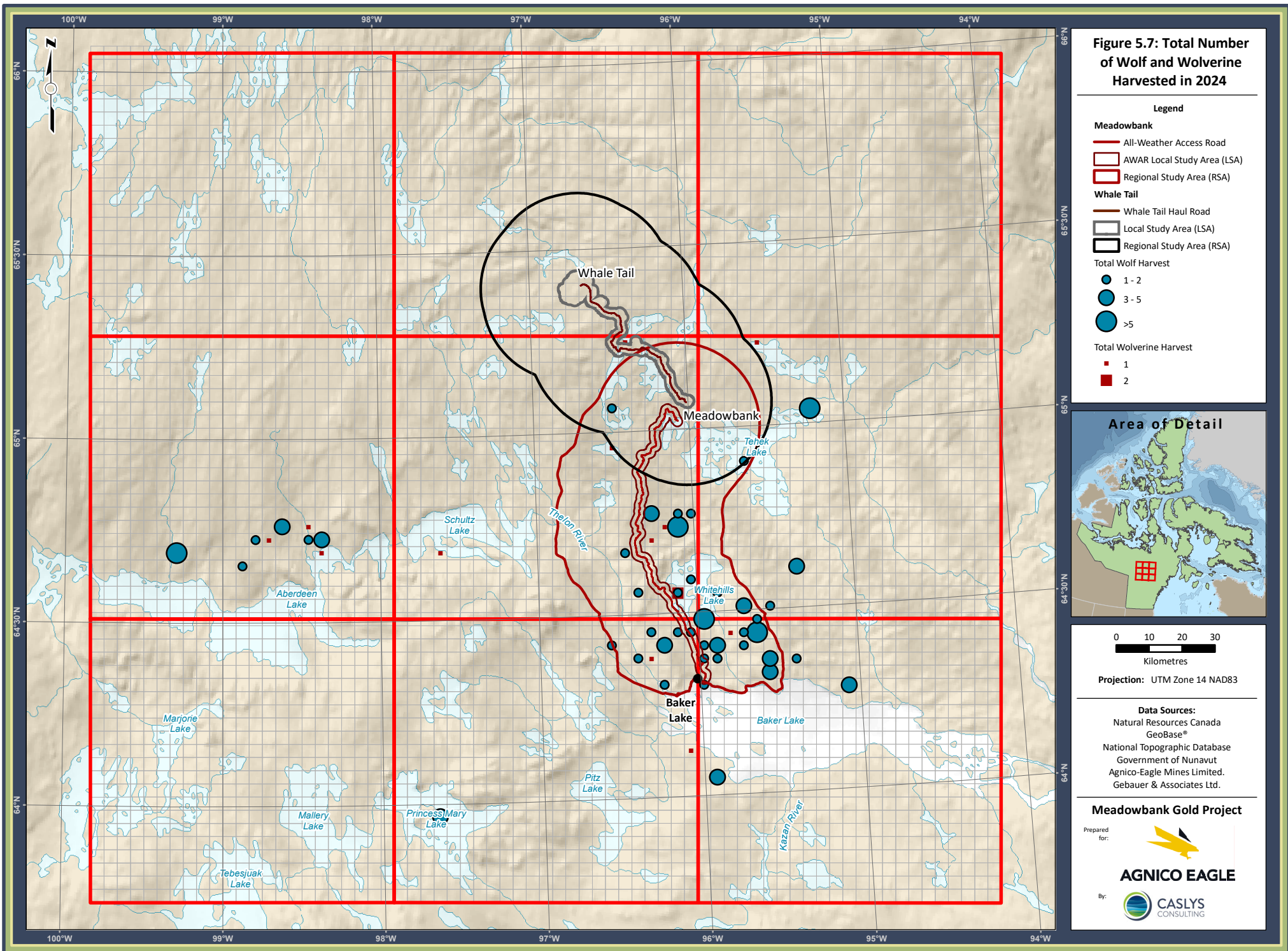


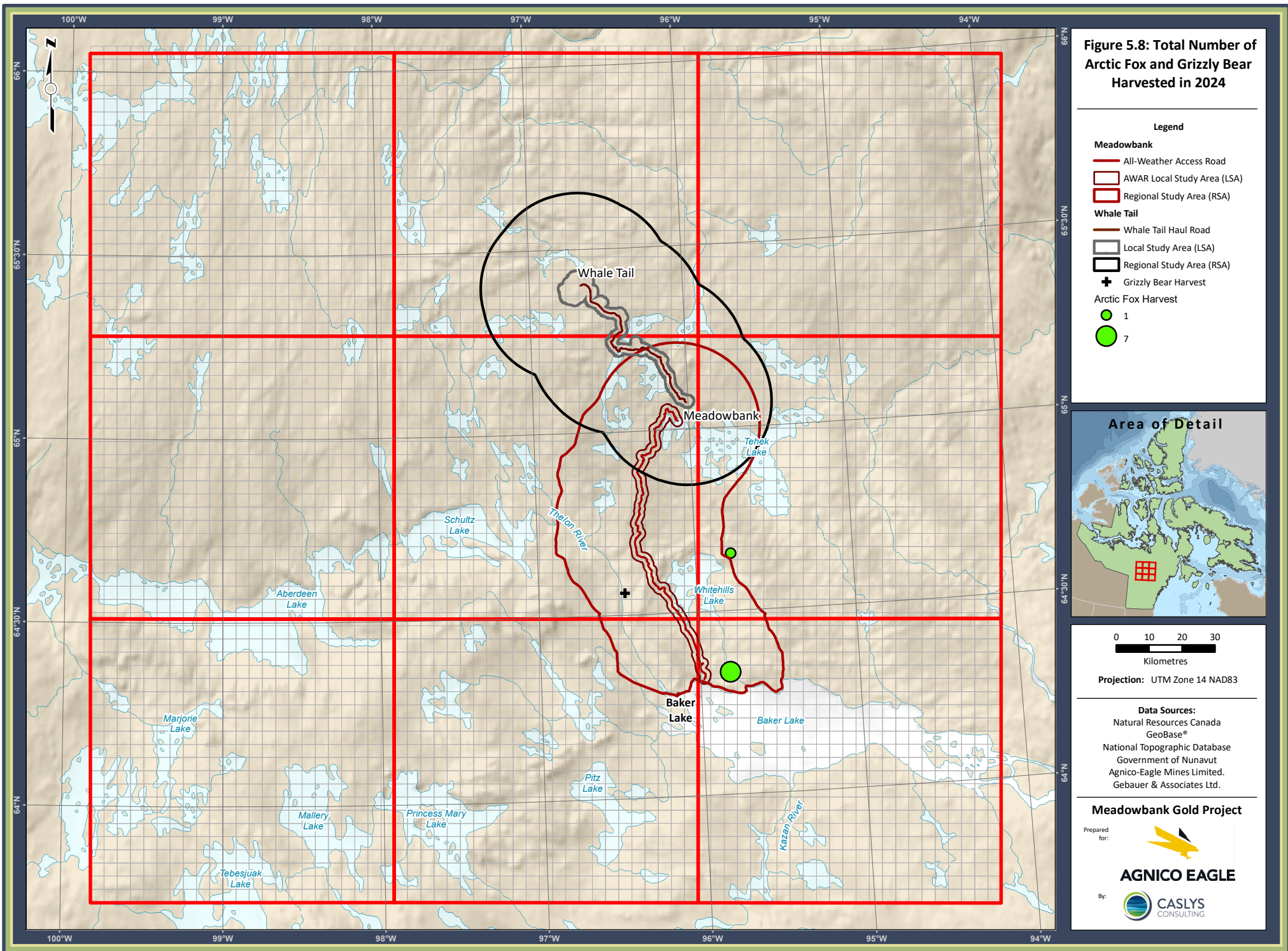
5.5 OTHER WILDLIFE SPECIES

No Muskox was reported as being harvested in 2024, which compares to seven (7) reported Muskox harvests in 2023 and 18 in 2022 (**Table 5.4**). A total of 15 Wolverine were reported in 2024 compared to 18 in 2023 (**Table 5.4**). Wolverine in 2024 was hunted in the Whitehills Lake area, along the Thelon River between Schulz and Aberdeen lakes but especially north of Aberdeen Lake, and at the southwestern end of Baker Lake (see **Figure 5.7**). Wolf harvest in 2024 (143 individuals) was considerably higher than in 2023 (47), 2022 (92), and 2021 (26) (**Table 5.4**). Wolves were primarily harvested close to Baker Lake, in the Whitehills Lake area, and north of Aberdeen Lake (**Figure 5.7**). Wolves were described as ubiquitous directly adjacent to the town of Baker Lake in 2024, with several participants stating that they had observed packs as large as 60 wolves in the area. Eight (8) Arctic Fox were reported as harvested in 2024 compared to none in 2023, 36 in 2022, and five (5) in 2021 (**Table 5.4**). Arctic Fox were primarily trapped or harvested close to Baker Lake (**Figure 5.8**). Other harvested mammal species in 2024 included two (2) Grizzly Bear, one (1) Ermine (*Mustela richardsonii*), one (1) American Marten (*Martes americana*), five (5) Arctic Ground Squirrel (*Urocitellus parryii*), and 10 Arctic Hare (*Lepus arcticus*). One (1) Grizzly Bear was harvested west of Whitehills Lake while the other was harvested outside the study area (**Figure 5.8**).

Table 5.4: Total Number of Terrestrial Mammal Harvests Reported from 2019 to 2024 in the Baker Lake Hunter Harvest Study.

Species	2019	2020	2021	2022	2023	2024
American Marten (<i>Martes americana</i>)				1		1
Arctic Fox (<i>Vulpes lagopus</i>)	83	11	5	36		8
Arctic Ground Squirrel (<i>Urocitellus parryii</i>)		1				5
Arctic Hare (<i>Lepus arcticus</i>)						10
Arctic Wolf (<i>Canis lupus</i>)	72	88	26	92	47	143
Barren-ground Caribou (<i>Rangifer tarandus</i>)	648	652	513	766	646	820
Ermine (<i>Mustela richardsonii</i>)				1		1
Grizzly Bear (<i>Ursus arctos</i>)	1	4	1	2	1	2
Moose (<i>Alces alces</i>)			1			
Muskox (<i>Ovibos moschatus</i>)	4		2	18	7	
Red Fox (<i>Vulpes vulpes</i>)		2	2	1	3	
Wolverine (<i>Gulo gulo</i>)	20	22	20	25	18	15





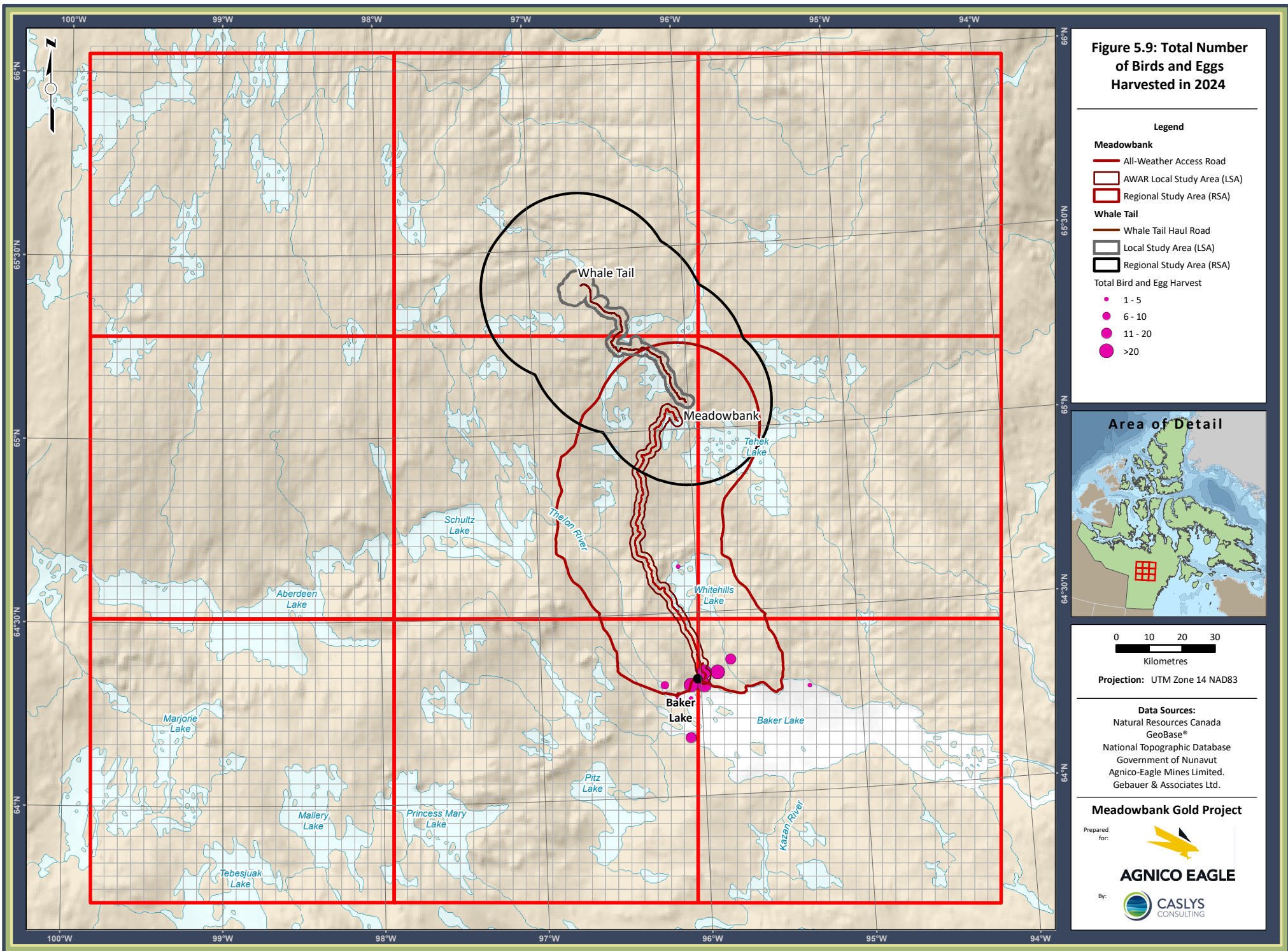
Bird species reported as being harvested in 2024 included ptarmigan sp. (*Lagopus* sp.; 197 individuals – a particularly high number), Canada Goose (*Branta canadensis*; 25), Snow Goose (*Anser caerulescens*; 13), gull species (*Larus* sp.; 10), and Tundra Swan (*Cygnus columbianus*; 2) (**Table 5.5**). **Table 5.5** summarizes bird harvests reported in the HHS from 2019 to 2024.

In 2024, birds were reported as being collected primarily around the Hamlet of Baker Lake (**Figure 5.9**).

Table 5.5: Total Number of Bird Harvests Reported from 2019 to 2024 in the Baker Lake Hunter Harvest Study.

Species	2019	2020	2021	2022	2023	2024
Canada Goose (<i>Branta canadensis</i>)	4	9	22	48	82	25
Goose sp. (<i>Anser</i> sp.)	2	91	2			
Greater White-fronted Goose (<i>Anser albifrons</i>)	1				2	
Gull sp. (<i>Larus</i> sp.)		11		8	2	10
Ptarmigan sp. (<i>Lagopus</i> sp.)	11	7	2	25	48	197
Sandhill Crane (<i>Grus canadensis</i>)				2	1	
Snow Goose (<i>Anser caerulescens</i>)	1	2	2	1	8	13
Tundra Swan (<i>Cygnus columbianus</i>)				3	2	2

For the third year in a row, marine mammals were reported as being harvested. Four (4) Ringed Seal (*Pusa hispida*) were reported as being harvested by Baker Lake hunters, but these were outside the HHS boundaries.



SECTION 6 • 2024 CREEL SURVEY RESULTS

6.1 NUMBER OF FISHERMEN

The number of fishermen reporting successful fishing trips in 2024 was 34, which is higher than the average of 25 fisherman from 2007 to 2015 and 2019 to 2023 (14 years), and slightly higher than the number of fisherman reporting success in 2023 (i.e., 30). The highest number of fisherman reporting success in 2024 were in May and June, which is consistent with seasonal fishing patterns in other years (see **Table 6.1** and **Section 6.4 Magnitude of Fishing**).

Table 6.1: Number of Fisherman in the Baker Lake Area who have Recorded Fishing Success by Year and Month.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2007			4	6	7	1	1		1				20
2008	1	1	2	6	6	6	4	3			2	1	32
2009	2	2	5	10	9	9	9	6	1	8	2	2	65
2010			6	13	18	17	13	4	2	2	3	1	79
2011	1	3	6	15	21	18	9	6	2	9	9	5	104
2012	3	1	1	7	7	18	12	4	3	9	7	3	75
2013			2	5	4	11	9	1		2	1	1	36
2014	2	1	1	4	6	3	4	2		2	2	2	29
2015	1	1	1	2	9	8	6	2		3	4	2	39
2019	1	2	3	12	14	15	7	3	1	1	8	4	71
2020				1	6	9	9	5	1	4	3		38
2021	1		3	3	15	15	3	4	1	1	4		50
2022	2		2	4	16	16	7	2	3	3	2		57
2023				10	13	12	6	7	2	2	5		57
2024	1			2	18	12	6	3		3	4	1	50
Total	15	11	36	100	169	170	105	52	17	49	56	22	802

6.2 COMPOSITION OF CATCH

The most common fish species captured, Lake Trout, represented 51% of the total catch in 2024, which was lower than in the last four years (i.e., 2020 to 2023) (see **Table 6.2**). Lake Trout catch in 2024 (i.e., 356 individuals) was lower than the average of 667 from 2007 to 2015 and 2019 to 2023 (see **Table 6.2**). Arctic Char were caught at lower numbers in 2024 (48 individuals) than the average of 73 from 2007 to 2015 and 2019 to 2023 (see **Table 6.2**). Lake Whitefish were captured in moderate numbers in 2024.

Table 6.2: Total Number of Fish Caught between 2007 and 2015, and 2019 to 2024.

Year	Arctic Char	Arctic Grayling	Lake Trout	Lake Whitefish	Unidentified	Total #	%Char	% Lake Trout
2007	3		210			213	1	99
2008	24		825	192		1,041	2	79
2009	117	1	525	51		694	17	76
2010	103	3	860	326		1,292	8	67
2011	113	1	1,710	460		2,284	5	75
2012	24	1	1,014	471		1,510	2	67
2013	96		490	50		636	15	77
2014	22		353	651		1,026	2	34
2015	41	29	370	1,386		1,826	2	20
2019	89		900	1,573	119	2,681	3	34
2020	75		219	32	2	328	23	67
2021	54	1	481	184	1	721	7	67
2022	202	1	894	147		1,244	16	72
2023	52		490	183	2	727	7	67
Avg # (2007-2023)	73	3	667	408	9	1,159	8	64
2024	48		356	300		704	7	51
Avg # (All Years)	71	2	646	400	8	1,128	8	63
Total #	1,063	37	9,697	6,006	124	16,927		




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 the lower AWAR (see **Figure 6.1**). Some fishing occurred along the Thelon River system and along the northeastern shore of Baker Lake (**Figure 6.1**). As was the case in other years, 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 near the Hamlet of Baker Lake and around Whitehills Lake.




Figure 6.1: Total Number of Fish Harvested in 2024

Legend





Meadowbank

-  All-Weather Access Road
-  AWAR Local Study Area (LSA)
-  Regional Study Area (RSA)

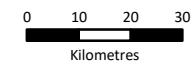
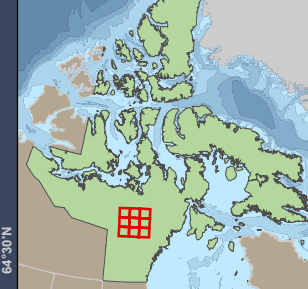
Whale Tail

-  Whale Tail Haul Road
-  Local Study Area (LSA)
-  Regional Study Area (RSA)

Total Fish Harvested

-  1 - 5
-  6 - 15
-  16 - 25
-  >25

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.

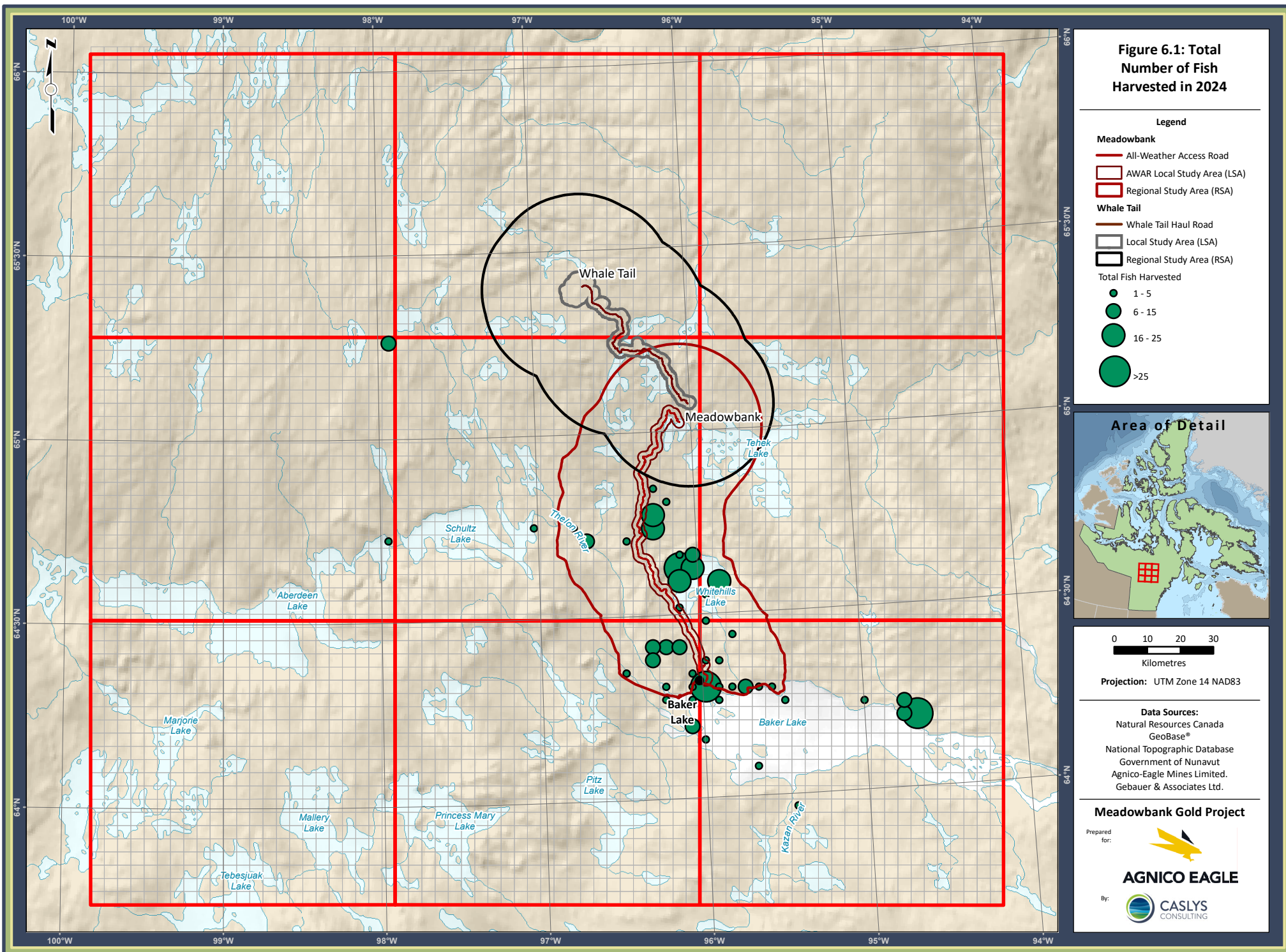
Meadowbank Gold Project

Prepared for:



AGNICO EAGLE

By:



6.4 MAGNITUDE OF FISHING

The average number of fish harvested per fisherman in each month was highest in November with lower averages in the summer months (**Figure 6.2**). In 2024, the most captured fish species, in order of abundance, were Lake Trout, Lake Whitefish, and Arctic Char (see **Table 6.2**). Lower numbers of Lake Trout and Arctic Char were reported as being caught in 2024 compared to 2021 through 2023.

6.5 SEASONAL TIMING OF FISHING

In 2024, fishing periods with the most active fisherman was May and June, which is comparable to other years (see **Table 6.1**). Over all reporting years, the periods with the most fish caught included the summer months (May and June), which reflects the high number of Lake Trout caught by fisherman heading out on the land after ice melt, and November (**Figure 6.3**). This trend can be observed in the trends from 2007 to 2015 and 2019 to 2023 (**Figure 6.3**).

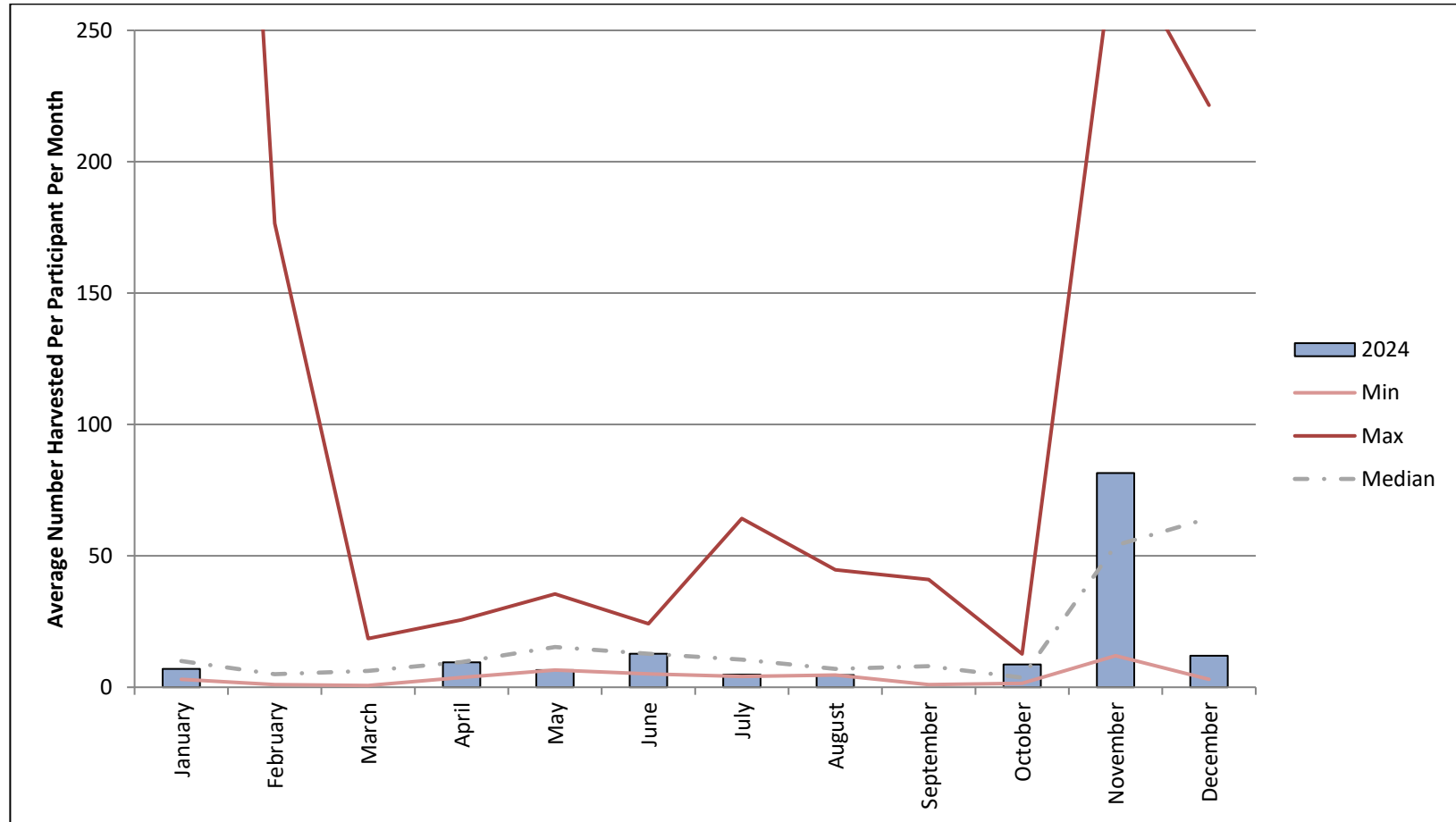


Figure 6.2: Average Number of Fish Caught per Participant in 2024 and the Minimum and Maximum Range from 2007 to 2015 and 2019 to 2023.

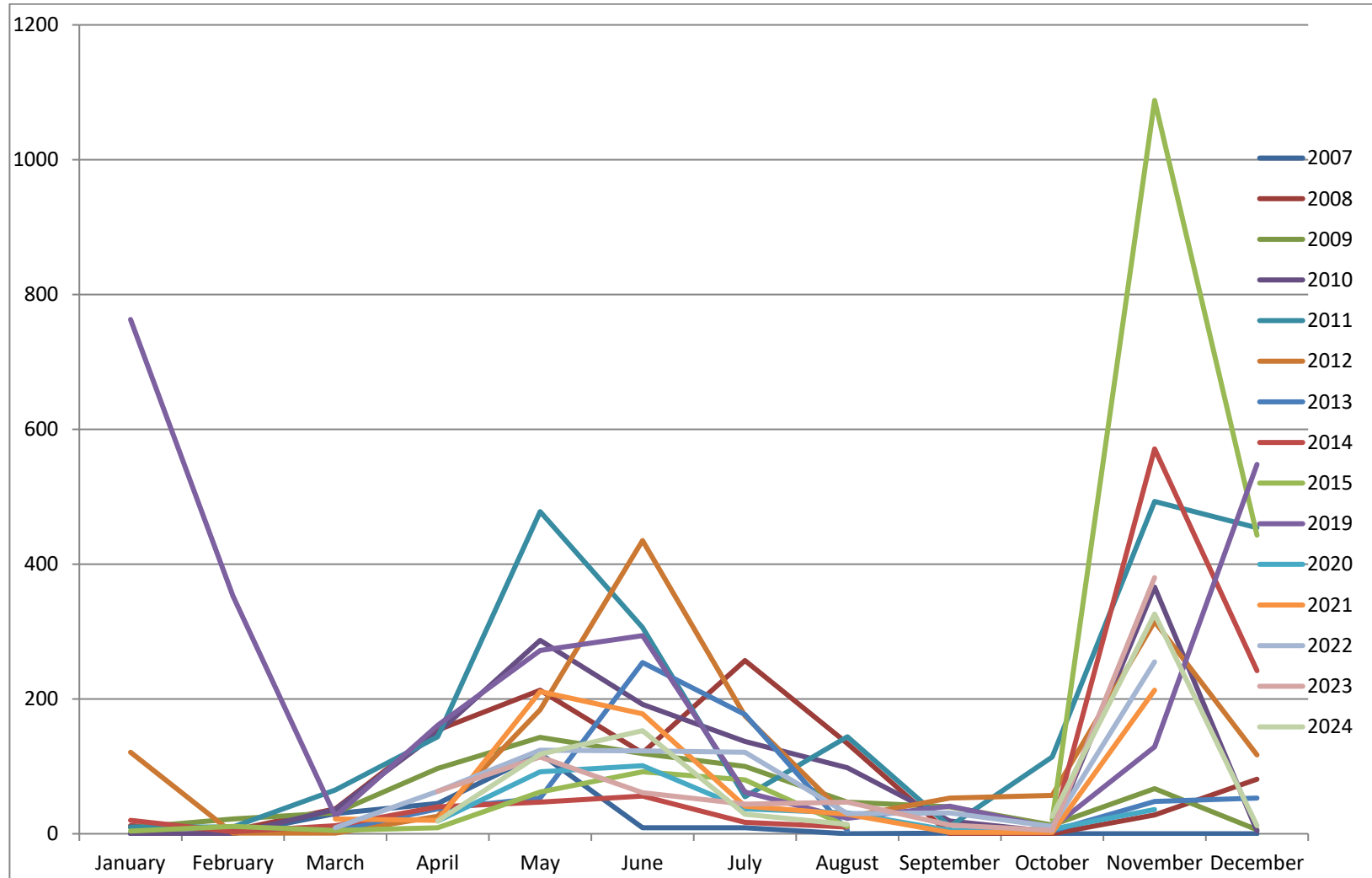


Figure 6.3: Seasonal Trends in Fishing (Number of Fish Caught) in the Baker Lake Area from 2007 to 2015 and 2019 to 2024.

SECTION 7 • ACCURACY OF IMPACT PREDICTIONS

Table 7.1 provides a summary of the impact predictions identified in the original TEMP (Cumberland 2006) and the updated June 2019 version (Agnico Eagle 2019). The 2024 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 2024.

Table 7.1: Accuracy of Impact Predictions – 2024 Baker Lake HHS

Potential Effect	Threshold	RSA (67-87% of Harvest within RSA) 20% Threshold Exceeded (2024)?	Adaptive Management Implemented	Status
Meadowbank All-Weather Access Road (AWAR)				
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 (82% of Caribou harvest in RSA in 2024 compared to NWMB baseline of 67% and average harvest within RSA of 75% since 2007)	Future discussion with HTO and GN representatives required to identify management options	HHS Creel Survey
Whale Tail Haul Road (WTHR)				
Hunting by Baker Lake Residents	No change in harvest	NO (No harvests recorded within 5 km of the WTHR)	None required. Access by hunters is restricted in the growing season and very limited hunting occurs in winter.	HHS Satellite-collaring Program

SECTION 8 • MANAGEMENT RECOMMENDATIONS

The Baker Lake HHS and Creel Survey should be continued on an annual basis to monitor the hunting and fishing patterns of Baker Lake residents, and the potential effects of the Meadowbank Complex Mine. Meetings with participants every four months (3 times/year) in 2025 are particularly important in maintaining contact, building relationships, expanding the study, and collecting good harvest data. Participation rates can be maintained by continuing to use social media platforms such as Facebook and Instagram, expanding connections on these platforms, ensuring that all participants are visited during the three scheduled field visits, and continuing with distribution of the well-received year-end prizes while in the community. In addition, an effort should be made to continue recruiting new, particularly young, hunters for the HHS.

SECTION 9 • LITERATURE CITED

Agnico Eagle Mines Ltd. (AEM) 2019. Meadowbank Division, Terrestrial Ecosystem Management Plan. Version 6, June 2019.

Cumberland Resources Ltd. 2006. Meadowbank Gold Mine Project Terrestrial Ecosystem Management Plan (TEMP). Final Report, December 2006.

IDS, Interdisciplinary Systems. 1978.

NWMB, Nunavut Wildlife Management Board. 2004. The Nunavut Wildlife Harvest Study. Prepared by Priest, H., Harvest Study Coordinator, NWMB and Usher, P. J., P.J. Usher Consulting Services.

APPENDIX A

2024 Hunter Harvest Calendar

[illegible]A photograph showing a person from behind, wearing a dark jacket and a light-colored hat, standing on a grassy hill. They are looking out over a vast, flat landscape under a clear blue sky. The foreground is filled with green grass and some small shrubs. In the distance, there's a low horizon line. The overall scene suggests a remote or wilderness location.

2024

Baker Lake Harvest Study

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Paul Kabloona

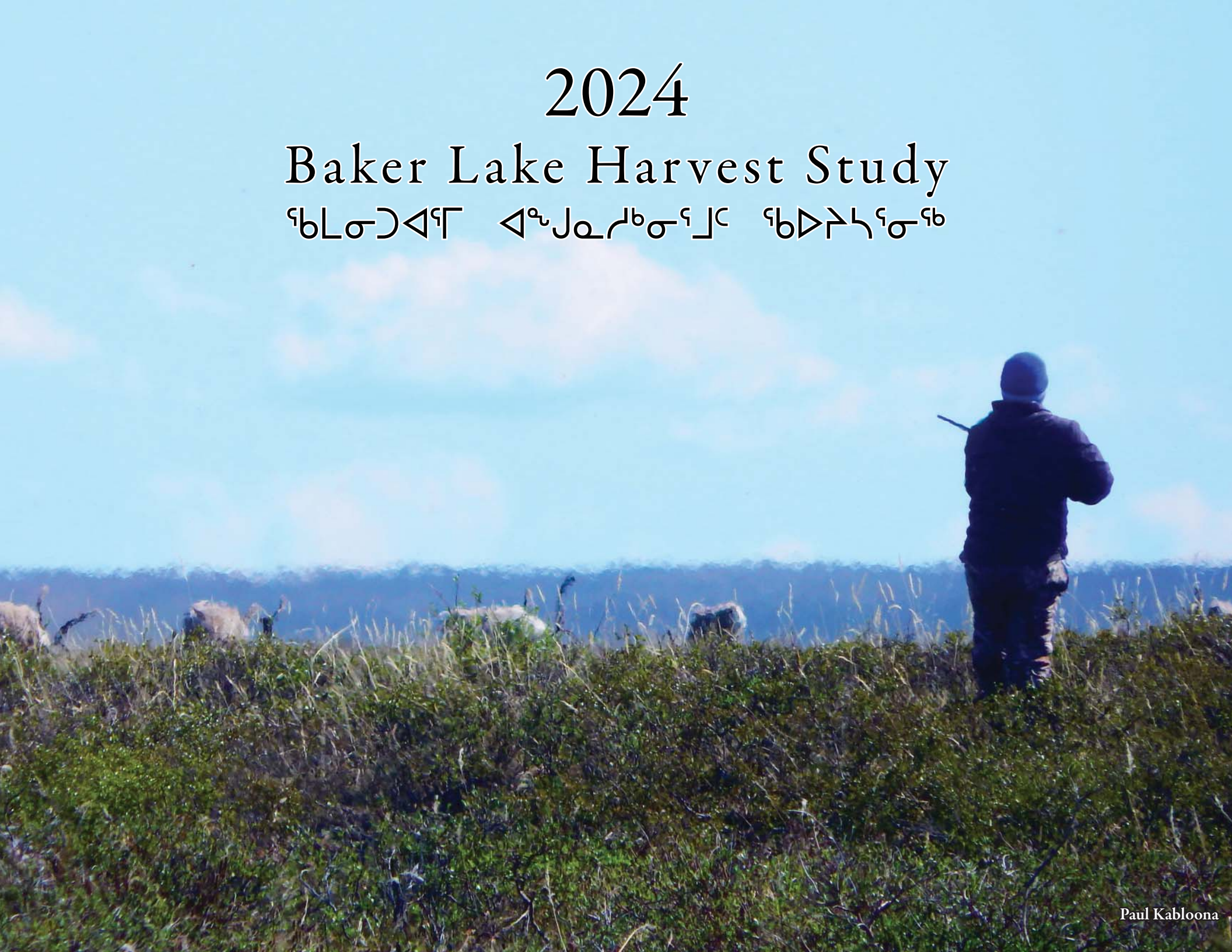
A photograph showing a person from behind, wearing a dark jacket and a light-colored hat, standing on a grassy hill. The person is looking out over a vast, flat landscape under a clear blue sky. In the distance, there are some low hills or mountains. The foreground is filled with green grass and small plants.

2024

Baker Lake Harvest Study

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Paul Kabloona





January | ᑭᓂᑦᑲᓂᑦ 2024

Baker Lake Harvest Study
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February | 2024

Baker Lake Harvest Study
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March | L7 2024

Baker Lake Harvest Study
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April | $\Delta\alpha_C$ 2024

Baker Lake Harvest Study
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May | L Δ 2024

Baker Lake Harvest Study
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Mother's Day						
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June | $\nabla\sigma$ 2024

Baker Lake Harvest Study
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July | $\nabla \subset \Delta$ 2024

Baker Lake Harvest Study

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August | 2024

Baker Lake Harvest Study
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September | ᑭᑎᐱᑦ 2024

Baker Lake Harvest Study
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29	30 National Day for Truth and Reconciliation	<div><div>August 2024</div><table><tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr><tr><td></td><td></td><td></td><td></td><td>1</td><td>2</td><td>3</td></tr><tr><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr><tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td></tr><tr><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td></tr><tr><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td></tr></table><div>October 2024</div><table><tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr><tr><td></td><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td></tr><tr><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td></tr><tr><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td></tr><tr><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td><td></td><td></td></tr></table></div>					S	M	T	W	T	F	S					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	S	M	T	W	T	F	S			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
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October | ᐅᐅᐅᐅᐅ 2024

Baker Lake Harvest Study
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November | 2024

Baker Lake Harvest Study
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December | ൩൧ 2024

Baker Lake Harvest Study
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Wildlife and Fish Species of Interest

Caribou Bull

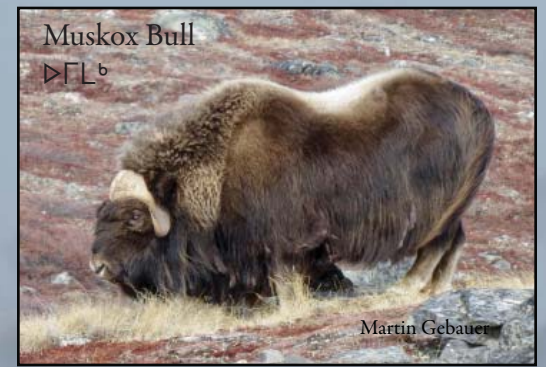
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Lars Qaqqaq

Muskox Bull

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Martin Gebauer

Wolverine

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Jamie Kataluk

Grizzly Bear

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Tom Thomson

Wolf

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Paul Kabloona

Lake Whitefish

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Martin Gebauer

Arctic Char - Male & Female

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Randy Baker

Arctic Grayling

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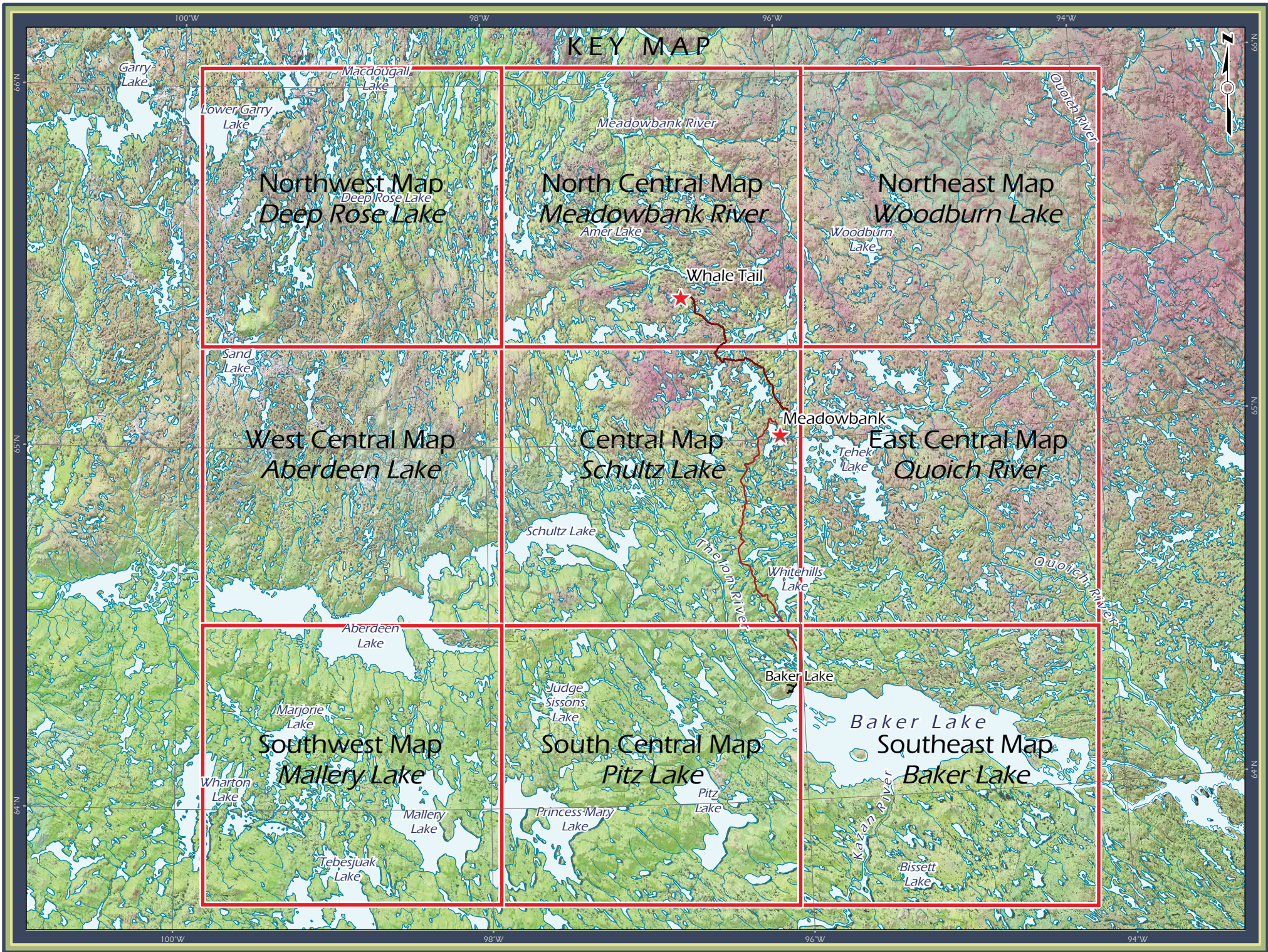
Randy Baker

Lake Trout

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Martin Gebauer



Baker Lake Harvest Study

Northwest Map Deep Rose Lake

Key Map

Deep Rose Lake	Meadowbank River	Woodburn Lake
Aberdeen Lake	Schultz Lake	Quoich River
Mallery Lake	Pitz Lake	Baker Lake

Area of Detail



Projection: UTM Zone 14 NAD83

Data Sources:

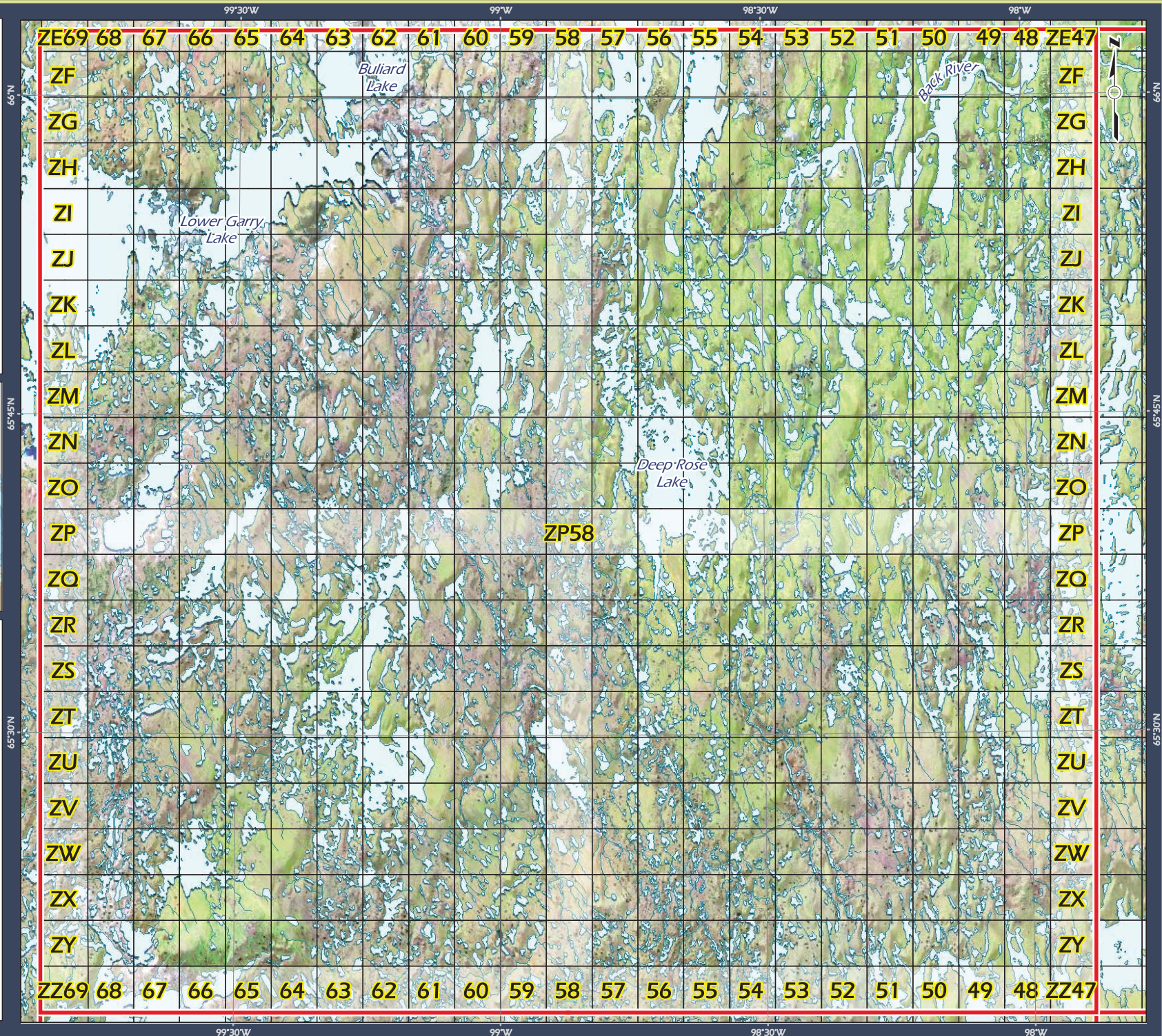
Natural Resources Canada
GeoBase®
National Topographic Database
Government of Nunavut
Agnico-Eagle Mines Inc.
Caslys Consulting Ltd.

Prepared for:



By:

Nunavut ENVIRONMENTAL CONSULTING LTD



Baker Lake Harvest Study

West Central Map Aberdeen Lake

Key Map

Deep Rose Meadowbank Lake	River	Woodburn Lake
Aberdeen Lake	Schultz Lake	Quoich River
Mallery Lake	Pitz Lake	Baker Lake

Area of Detail



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Kilometres

Projection: UTM Zone 14 NAD83

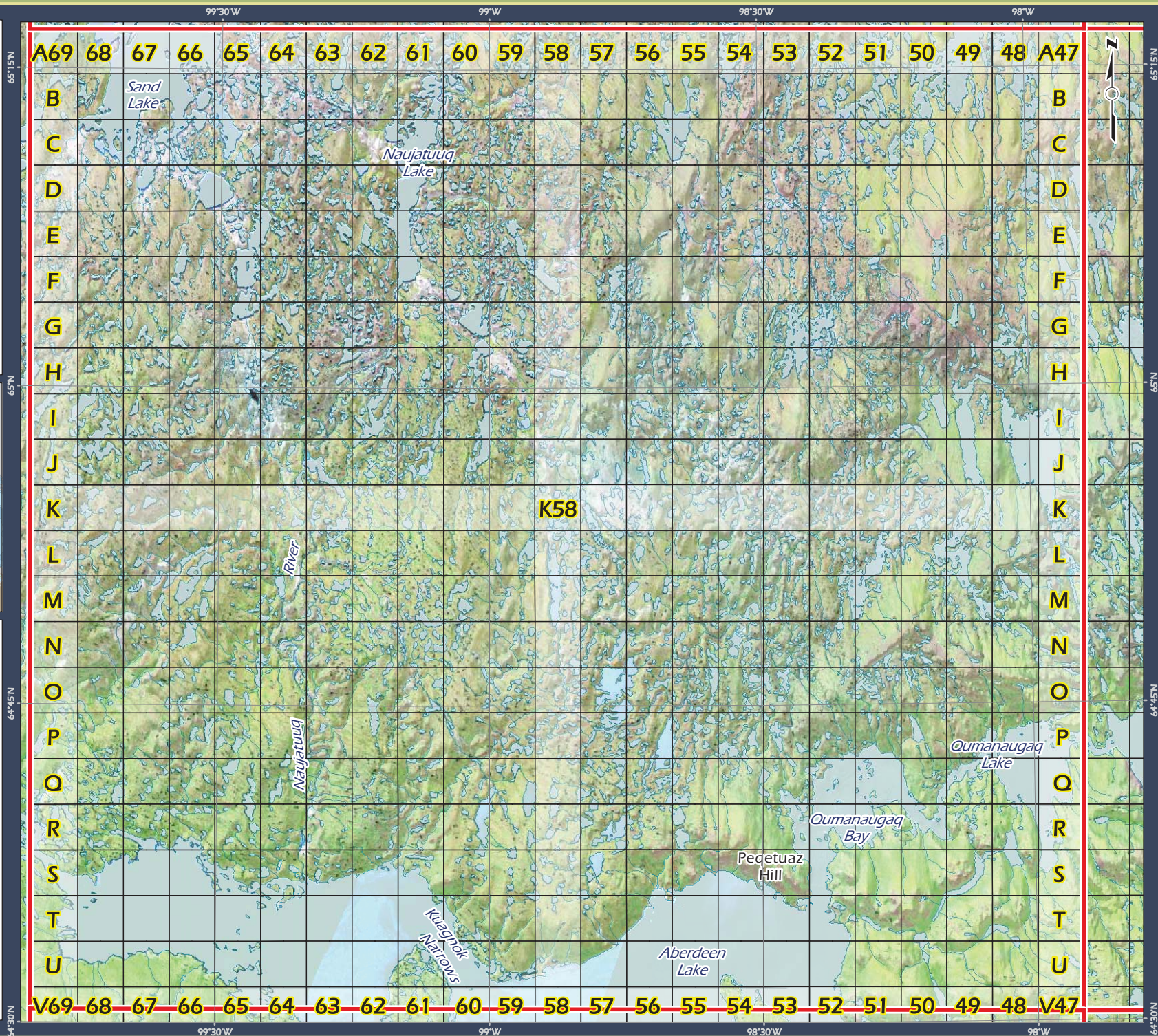
Data Sources:

Natural Resources Canada
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Government of Nunavut
Agnico-Eagle Mines Inc.
Caslys Consulting Ltd.

Prepared for:



By:



Baker Lake Harvest Study

Southwest Map Mallery Lake

Key Map

Deep Rose Lake	Meadowbank River	Woodburn Lake
Aberdeen Lake	Schultz Lake	Quoich River
Mallery Lake	Pitz Lake	Baker Lake

Area of Detail



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Kilometres

Projection: UTM Zone 14 NAD83

Data Sources:

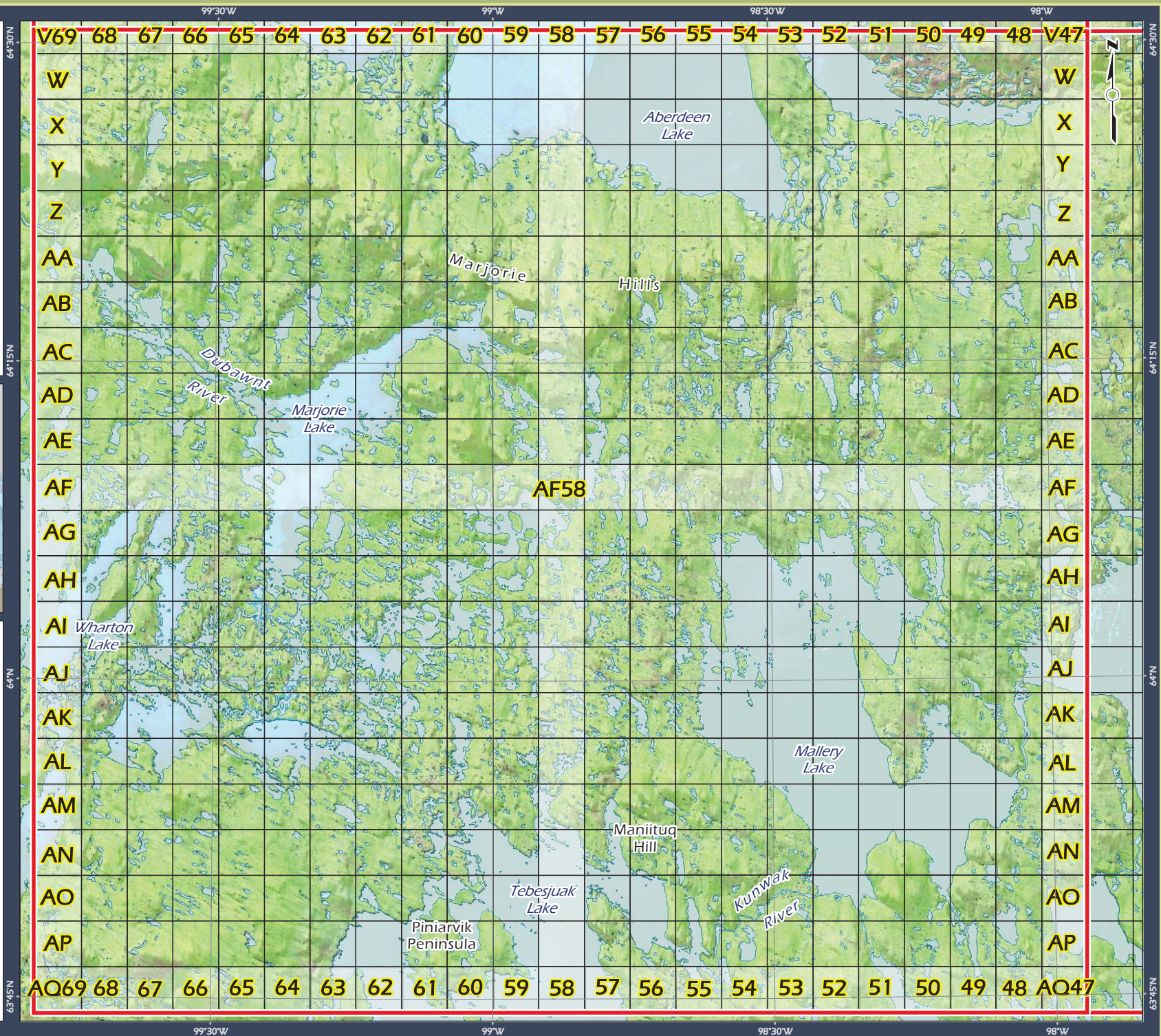
Natural Resources Canada
GeoBase®
National Topographic Database
Government of Nunavut
Agnico-Eagle Mines Inc.
Caslys Consulting Ltd.

Prepared for:



By:

Nunavut ENVIRONMENTAL
CONSULTING LTD



Baker Lake Harvest Study

North Central Map Meadowbank River

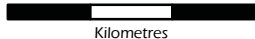
Key Map

Deep Rose Lake	Meadowbank River	Woodburn Lake
Aberdeen Lake	Schultz Lake	Quoich River
Mallery Lake	Pitz Lake	Baker Lake

Area of Detail



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Projection: UTM Zone 14 NAD83

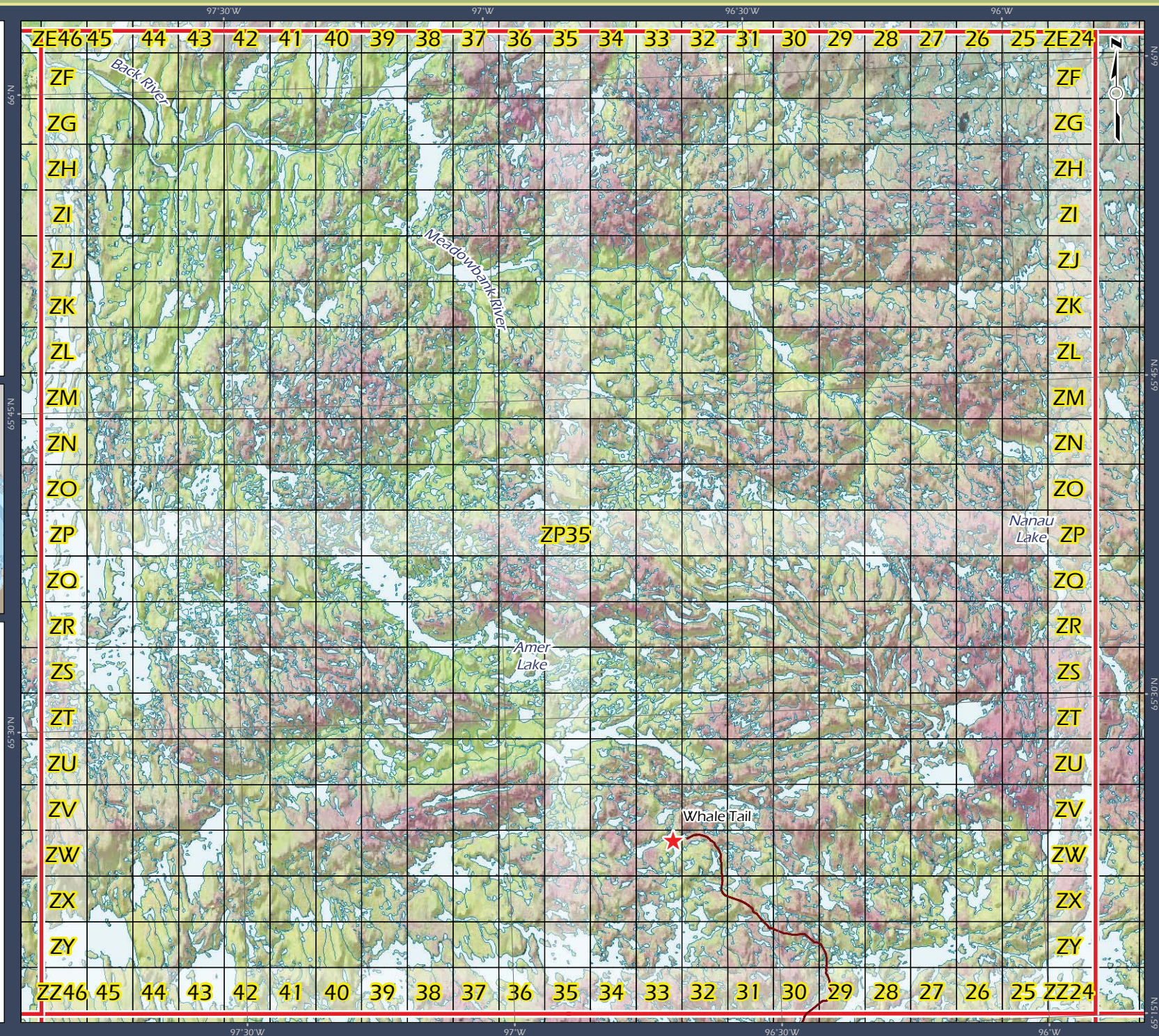
Data Sources:

Natural Resources Canada
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National Topographic Database
Government of Nunavut
Agnico-Eagle Mines Inc.
Caslys Consulting Ltd.

Prepared for:



By:



Baker Lake Harvest Study

Central Map Schultz Lake

Key Map

Deep Rose Lake	Meadowbank River	Woodburn Lake
Aberdeen Lake	Schultz Lake	Quoich River
Mallery Lake	Pitz Lake	Baker Lake

Area of Detail



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Kilometres

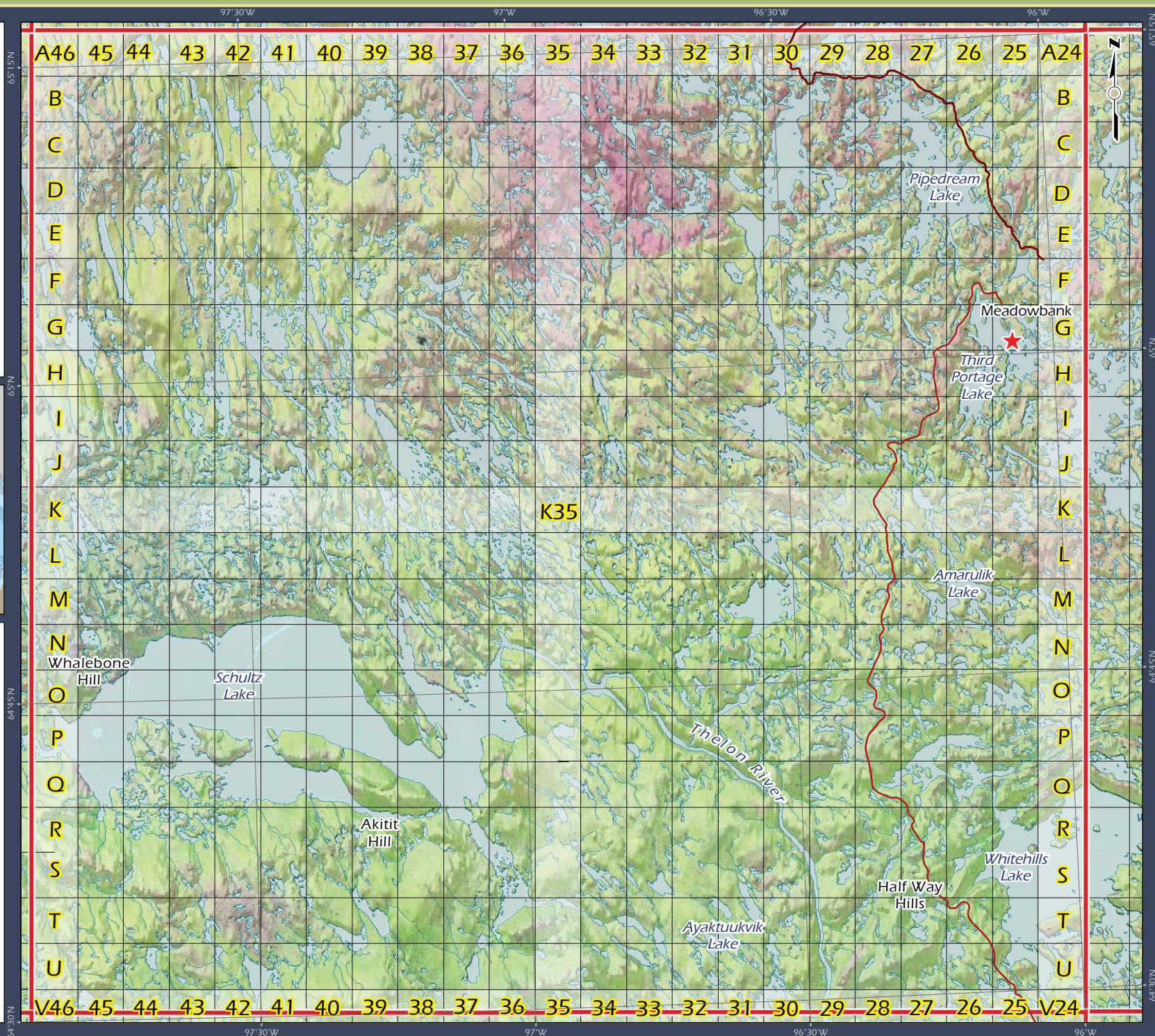
Projection: UTM Zone 14 NAD83

Data Sources:
Natural Resources Canada
GeoBase®
National Topographic Database
Government of Nunavut
Agnico-Eagle Mines Inc.
Caslys Consulting Ltd.

Prepared for:



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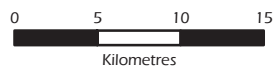


Baker Lake Harvest Study

South Central Map Pitz Lake

Key Map

Deep Rose Lake	Meadowbank River	Woodburn Lake
Aberdeen Lake	Schultz Lake	Quoich River
Mallery Lake	Pitz Lake	Baker Lake



Projection: UTM Zone 14 NAD83

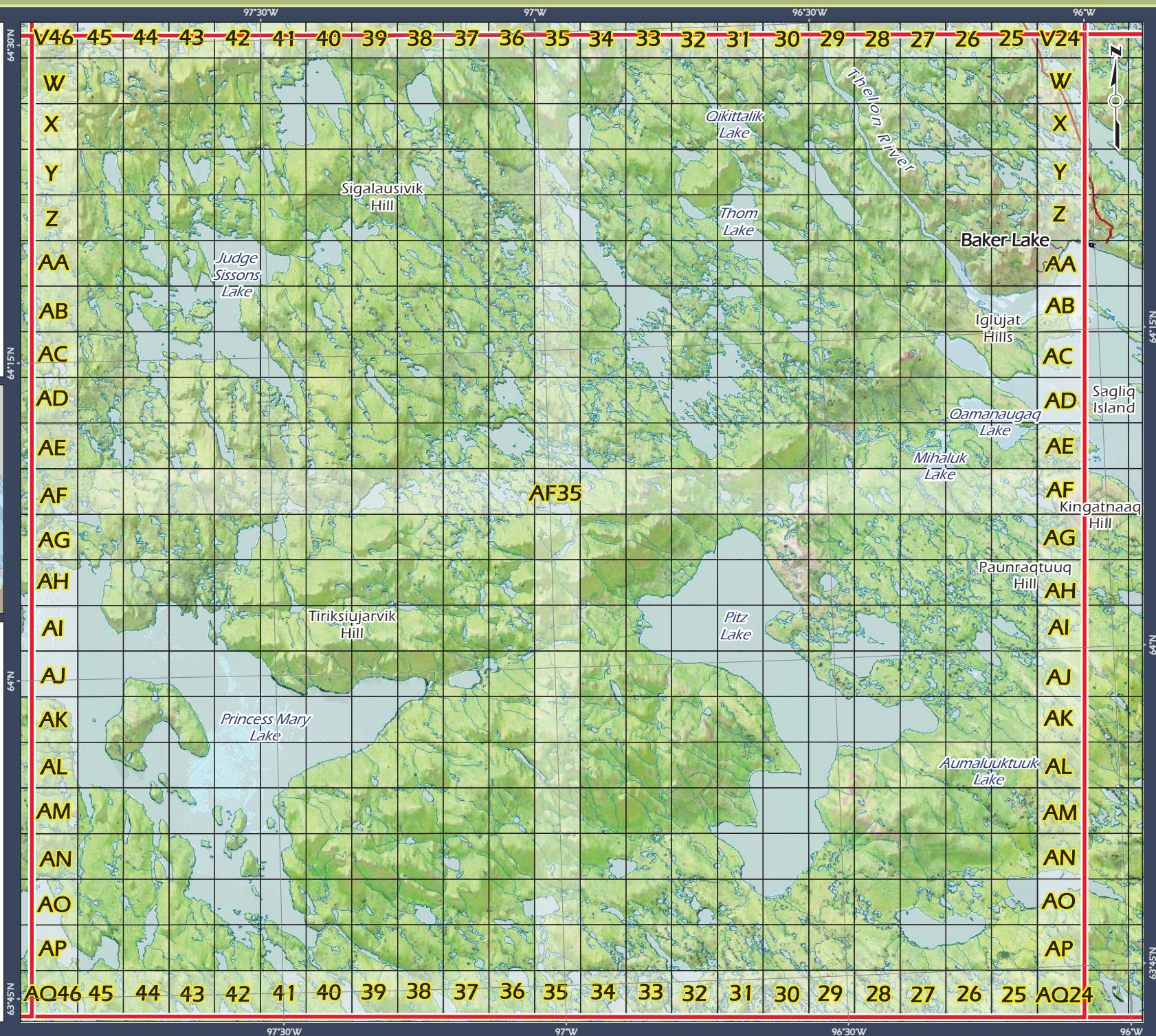
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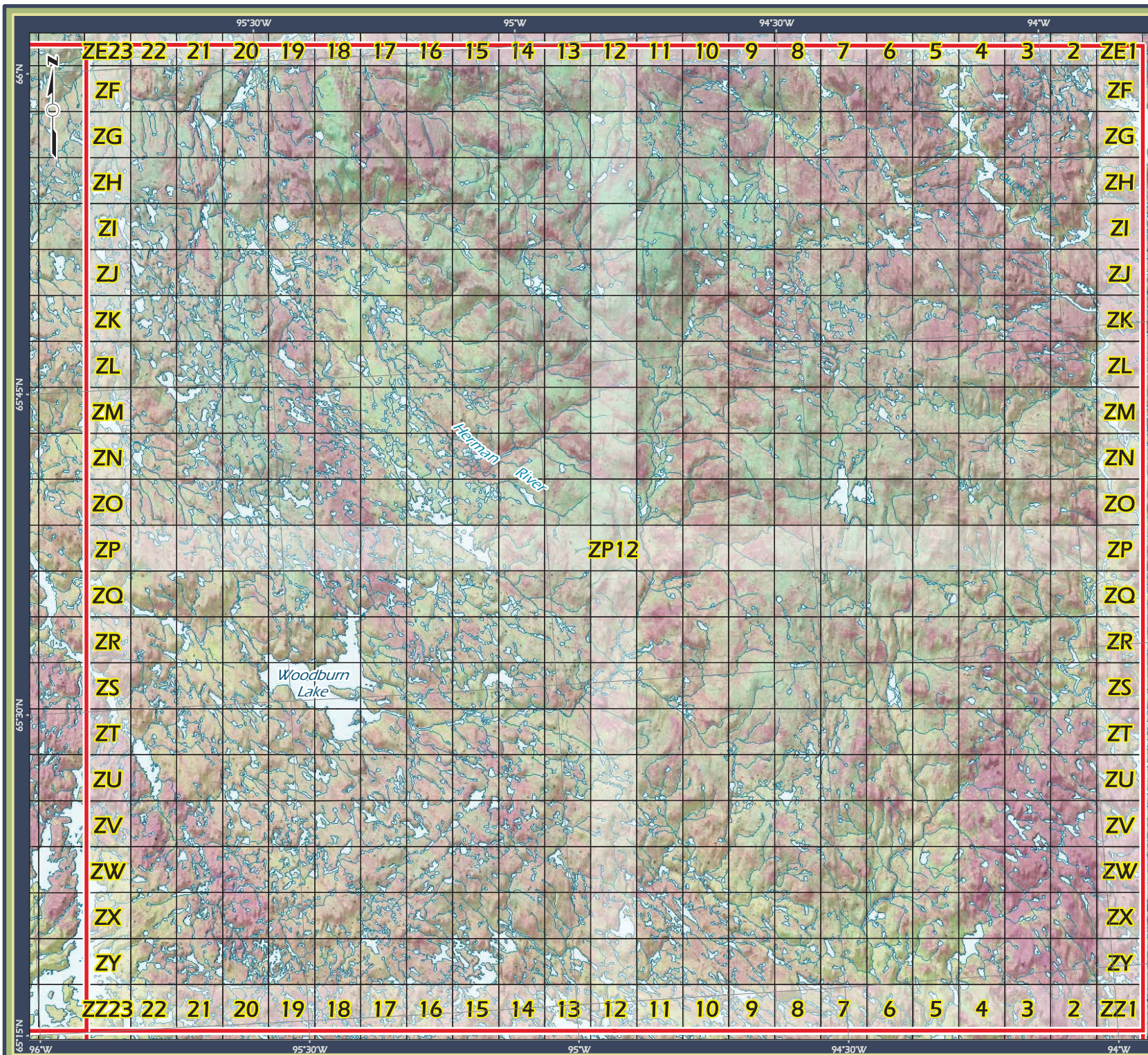
Natural Resources Canada
GeoBase®
National Topographic Database
Government of Nunavut
Agnico-Eagle Mines Inc.
Caslys Consulting Ltd.

Prepared for:



By:





Baker Lake Harvest Study

Northeast Map Woodburn Lake

Key Map

Deep Rose Lake	Meadowbank River	Woodburn Lake
Aberdeen Lake	Schultz Lake	Ouoich River
Mallery Lake	Pitz Lake	Baker Lake

Area of Detail



Projection: UTM Zone 14 NAD83

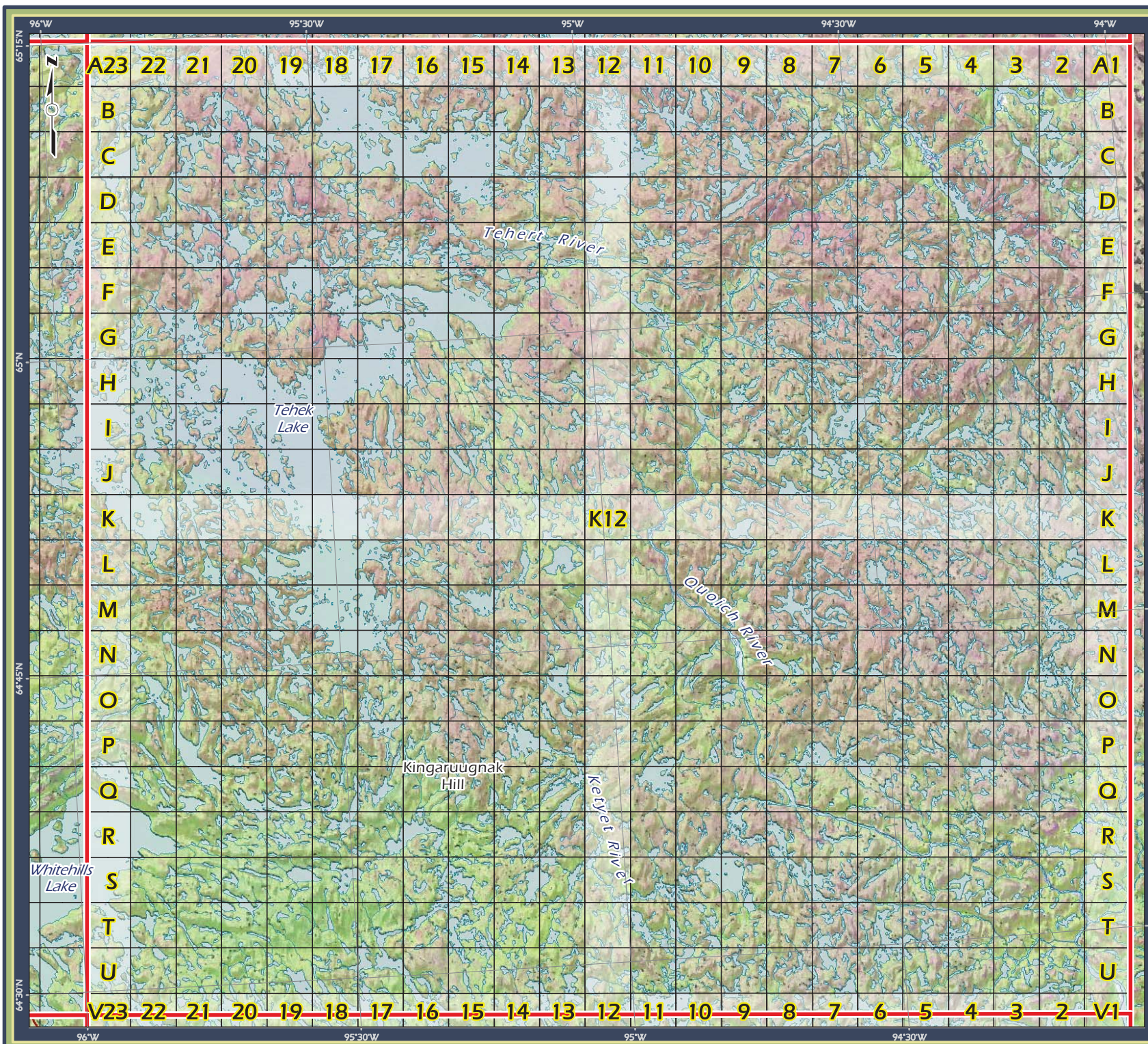
Data Sources:
 Natural Resources Canada
 GeoBase®
 National Topographic Database
 Government of Nunavut
 Agnico-Eagle Mines Inc.
 Caslys Consulting Ltd.

Prepared for:



By:





Baker Lake Harvest Study

East Center Map Quioich River

Key Map

Deep Rose Lake	Meadowbank River	Woodburn Lake
Aberdeen Lake	Schultz Lake	Quioich River
Mallery Lake	Pitz Lake	Baker Lake

Area of Detail



Projection: UTM Zone 14 NAD83

Data Sources:

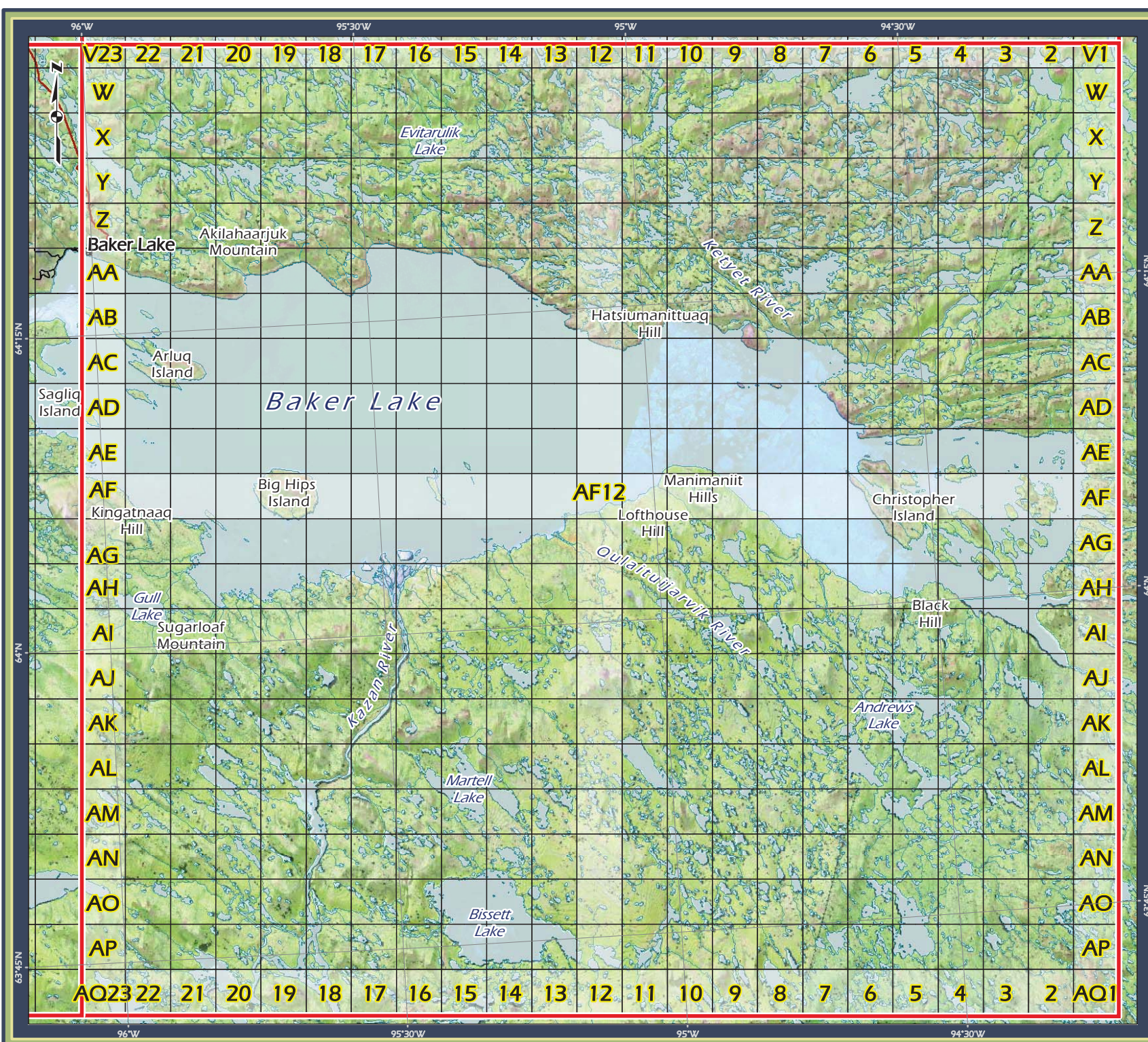
Natural Resources Canada
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Government of Nunavut
Agnico-Eagle Mines Inc.
Caslys Consulting Ltd.

Prepared
for:



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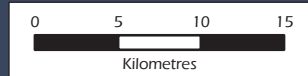
Baker Lake Harvest Study

Southeast Map Baker Lake

Key Map

Deep Rose Lake	Meadowbank River	Woodburn Lake
Aberdeen Lake	Schultz Lake	Ouoch River
Mallery Lake	Pitz Lake	Baker Lake

Area of Detail



Projection: UTM Zone 14 NAD83

Data Sources:
Natural Resources Canada
GeoBase®
National Topographic Database
Government of Nunavut
Agnico-Eagle Mines Inc.
Caslys Consulting Ltd.

Prepared for:



By:



How to Use the Baker Lake Harvest Calendar

Agnico Eagle Mines Ltd., in cooperation with the Baker Lake Hunters and Trappers Organization (HTO), want to understand hunting and fishing patterns by Baker Lake residents. Specifically, we want to understand how the Meadowbank and Whale Tail Gold Project, located north of Baker Lake, might change traditional harvesting patterns. To ensure that traditional hunting and fishing activities are not negatively affected, we have developed this calendar where participants can record harvest information throughout the year.

Near the back of the calendar is a page that shows the animal and fish species that are included in the study. Please write down the species, number, sex, and location of animals or fish that you have harvested on each date on the calendar. When writing down the location, please use the XY coordinate system provided on the nine maps at the back of the calendar.

For example, if you harvested a male caribou on January 16th on Big Hips Island you would write down “1 male caribou, AF19” in the January 16th square of the calendar.

You will also be visited or contacted by the hunter harvest coordinator occasionally throughout the year. The coordinator's job will be much easier if you write down your harvest information in the calendar as soon as possible.

Please return the calendar to the Agnico Eagle office in Baker Lake at the end of the year or give the calendar to the coordinator when he visits in January. Although each participant will receive a gift expressing our thanks, a draw will also be held in January for a number of high quality prizes.

If you have any questions., please contact the Baker Lake Harvest Study Consultant, Dylan White, at 1-266-500-4202 or dsgwhite@gmail.com. You can also contact an HTO member in the community or email Martin Gebauer at martin@gebauerassociates.com.

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Produced By:



AGNICO EAGLE



and



APPENDIX G

Arctic Raptors Report



ARCTIC RAPTORS

Prepared For:
Marie-Pier Marcil
Environmental Project Coordinator
marie-pier.marcil@agnicoeagle.com
Agnico Eagle Mines Limited
Meadowbank Complex
Suite 540
Baker Lake, Nunavut
X0C 0A0

Prepared By:
Arctic Raptors Inc.
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Sherwood Park, Alberta
T8C 1J3

Contact:
Alastair Franke PhD
alastair.franke@ualberta.ca

Background

Broad scale monitoring of raptors in the vicinity of the Meadowbank Mine including the Whale Tail site (Meadowbank Complex) was first initiated in 2015. The purpose of the monitoring program from 2015 through 2019 focused on searching for nesting sites located near to, and far from proposed or existing infrastructure. In 2018, the Government of Nunavut (GN) indicated that monitoring to that point did not have the power to detect and mitigate Project-related effects on raptor nesting success. In addition, the GN argued that the study design did support analysis that would allow detection of project-related nest failures (e.g., by examining nest success as a function of intensity of project-related disturbance). Starting in 2021 (no monitoring was completed in 2020 due pandemic restrictions), Agnico Eagle conducted two broad-scale helicopter surveys per year with the intent of estimating project effects. In addition, Agnico Eagle has conducted regular monitoring of project-related infrastructure considered to be typical of nesting habitat (e.g., road-side quarries).

Monitoring objectives are outlined in the Agnico Eagle Meadowbank Division Terrestrial Ecosystem Management Plan (TEMP; Agnico Eagle Mine 2019). The TEMP outlines requirements for avoiding and managing disturbance to nesting raptors, as follows:

- Develop a nest-specific response plan for identified raptor nests within areas of concern to ensure that nesting success is not affected by development activities
- Follow GN-DoE guidelines for avoiding disturbance to raptor nests
- Active nest monitoring

In addition, the TEMP also outlines the general monitoring approach, as follows:

- Document and map raptor nesting sites (see Project Certificate No. 008 Condition 33)
- Evaluate the success of mitigation to prevent disturbance to raptors or raptor nests
- Estimate project-related disturbance effects
- Develop site-specific management plans for nesting sites within 1.5km of project infrastructure, including minimum “no disturbance” buffers
- In the event of deterrence or removal of a nest, Agnico Eagle must contact the Government of Nunavut (GN) and secure the required permits (see Project Certificate No. 008 Condition 36)

Species Descriptions

Peregrine Falcon (*Falco peregrinus tundrius*)

The Arctic peregrine falcon (Figure 1) is medium- to large-sized falcon. It has a dark hood and face with distinct dark malar stripe, cream to white throat, slate-grey back, barred belly, legs, and tail. Long pointed wings, stocky body. Plumage of immature birds brown rather than grey, and the breast is streaked rather than barred. In adults, the cere and orbital ring are yellow, and bluish in immature birds. Compared with gyrfalcons, the peregrine is smaller and less stocky. In flight, the wings of peregrines appear narrower and more pointed. In peregrine falcons, wing tips extend to bottom of the tail when perched, while in gyrfalcons, wing tips extend two-thirds down the length of tail.

F. p. tundrius breeds mainly north of the treeline from Alaska east throughout northern Canada to Greenland. It breeds throughout the taiga and tundra wherever suitable nesting habitat and sufficient prey are present. In Nunavut, peregrines appear to have their highest densities in the Kivalliq and

Kitikmeot regions. Highest breeding density on record is on the western shores of Hudson Bay in the Kivalliq Region.



Figure 1 Peregrine Falcon (male)

F. p. tundrius is a long-distance migrant, wintering mainly throughout South and Central America, but also in southern United States and Mexico. Northern-breeding American and Arctic peregrines are highly migratory (Yates et al. 1988, Schmutz et al. 1991, Fuller et al. 1998), and although fall migration occurs over a broad geographic range (Fuller et al. 1998), Yates et al. (1988) indicated that “separate and distinct autumn migratory populations pass through the east and Gulf coasts” of the United States.

Peregrine falcons usually nests on cliffs and rocky outcrops, but also nest on hilltops, river canyons, rock scree, and on occasion directly on the ground (Court et al. 1988, Ratcliffe 1993). They prefer nesting in locations close to water in south-facing, rugged terrain. Hunting habitat includes rugged coastline areas and rolling tundra that consists of raised beaches, dry tundra, sedge meadows, wetlands, and lakes that are inhabited by a diversity of breeding songbirds and shorebirds.

Peregrine Falcons do not build a nest but make a depression (called a scrape) in the substrate on a cliff ledge. Scrapes are usually approximately 20 cm in diameter and 4 cm deep. Females usually do the majority of incubation and brooding of small young. Males provision incubating females and provide most of the prey when nestlings are small. Thereafter, females do most of the feeding, beginning to hunt after young are large enough to thermoregulate on their own. Clutch size is typically 3 or 4 eggs in Nunavut. In Rankin Inlet and Igloodik, the median incubation period of the first egg was 36 days and decreased 1 day for each additional egg. The incubation period of the 4th egg (33 days) was similar to what has been reported elsewhere (Burnham 1983).

The Arctic peregrine falcon is a generalist predator with a diverse diet that includes passerines, shorebirds, ducks, gulls, terns, jaegers, black guillemots, and, when available, collared lemmings, brown lemmings, and Arctic ground squirrels. Bradley and Oliphant (1991) indicated that, around Rankin Inlet, small birds (64% of prey items) represented the greatest portion of prey items, followed by microtine rodents (25%), large birds (8%), and Arctic ground squirrels (4%). The most important prey measured by percent biomass were large birds (43%), followed by small birds (25%), microtine rodents (18%), and Arctic ground squirrels (15%).

In Nunavut, the earliest documented arrival for Peregrine Falcons is 10 May at a known breeding site near Rankin Inlet. Although arrival timing varies with spring conditions, most sites are occupied during the 3rd week of May. Median laying date in Rankin Inlet (9 June) is typically earlier than Igloodik (15 June) and northern Baffin Island (16 June). Median date of hatching ranges from 14 July at Rankin Inlet to 18 July on northern Baffin Island and 20 July at Igloodik (Jaffre et al. 2015). Birds depart the breeding grounds from mid-September through early October, arriving on the wintering grounds throughout Central and South America in November.

The peregrine falcon is no longer included on the list of endangered and threatened species in Canada (SARA 2002, as amended); furthermore North American populations including those monitored in Nunavut are considered to be stable (Franke 2016, Franke et al. 2020).

Gyrfalcon (*Falco rusticolus*)

The gyrfalcon (Figure 2) is large with pointed wings, but more rounded and broader than the wings of other falcon species. The tail is relatively long. When perched, wings extend 2/3 down the tail. The body is thick and powerful, particularly in females. Adults have yellow ceres, eye-rings and legs. As in all falcons, the eyes appear black. Three main color morphs occur: black, grey and white. White adults have almost pure white breasts and bellies, with dark wingtips (dipped-in-ink appearance). Grey adults have slate-colored back, with white underparts mottled with gray arrowhead-shaped markings. Dark adults are dark grey overall above and dark-streaked breasts and belly. There is extreme reverse sex dimorphism, with males being approximately 2/3 the size of females (Ferguson-Lees et al. 2001).

Gyrfalcons distribution extends throughout the circumpolar Arctic. Most of the breeding range occurs north of 60°N, but breeding pairs are known to exist as far south as 55°N, mainly along seacoasts in eastern Canada. Many adults remain within the breeding range throughout the year, but some disperse southwards in winter, small numbers reaching the northern United States (Cade 1982, Poole 1987). Immature birds are much more likely to winter to south of breeding range, and females are thought to disperse more widely, with many males remaining relatively close to breeding territories throughout the year.

Ptarmigan are often cited as the most important prey species by biomass, but Arctic ground squirrel and Arctic hare are also important, as well as small mammals (mice and voles) and other birds (ducks, sparrows, buntings). In central Nunavut, Poole and Boag (1988) identified eleven species of birds and five species of mammals among the prey. Birds accounted for three quarters of the diet, and adult rock ptarmigan were the most common. Arctic ground squirrel and arctic hare made up the bulk of mammalian prey.

Males occupy and defend nesting territories as early as the end of January, with females arriving in mid-March. In Nunavut, laying typically begin in the first week of May with most pairs laying by the end of the second week in May. Nestlings typically hatch in mid-June, but hatching can occur throughout June. Nestlings fledge in late July or early August after 7 weeks in the nest. In Nunavut, gyrfalcon usually nest

on cliff ledges, ideally beneath sheltering overhang; sometimes nests in trees or on man-made structures. Nests are generally on rock ledges or abandoned rough-legged hawk or common raven nests. Use of alternate nest sites is not uncommon. Pairs do not necessarily attempt breeding every year, depending on food supply. Typical clutch size is 3-4 eggs (Booms et al. 2008) that are incubated for 34-36 days mostly by the female (ca. 80%). The North American population including Nunavut is considered to be stable (Clum and Cade 1994, Kirk and Hyslop 1998). Although low spring temperatures are associated with later arrival at nesting territories in Nunavut (Poole and Bromley 1988), there was no effect on laying dates. However, (Poole and Bromley 1988) indicated that increased spring precipitation (snow) reduced reproductive success.



Figure 2. Gyrfalcon (female)

Rough-legged Hawk (*Buteo lagopus*)

The rough-legged hawk (Figure 3) is a medium-large bird of prey, with a small beak, predominantly brown in colour and often mottled. Plumage is highly variable with recognized light and dark morphs. Extensive field experience is required to distinguish between males and females, and between adults and juveniles based on plumage alone. A broad chest band is evident in most plumage variations, and in flight, a dark carpal patch is characteristic in light morph individuals. One or more dark terminal bands appear on the tail. The wing tips are long enough to reach or extend past the tail when the animal is perched. Legs are feathered to feet (Ferguson-Lees et al. 2005).

Widespread throughout North America, breeding from the Aleutian Islands, the interior of Alaska, Yukon, northern Mackenzie, and across Nunavut to northern Labrador and Newfoundland and south to Manitoba and southeastern Quebec. In Nunavut, rough-legged hawks are present over most of the territory except for islands without lemmings (Bechard and Swem 2002).

Regularly hovers, or “kites” while facing into the wind scanning for prey. Soars with wings raised in a slight dihedral (V-shape). It is a diurnal raptor that still-hunts from prominent perching structure on both breeding and wintering grounds. Prey is captured on the ground. Courtship involves soaring and calling, with the male engaged in a flight display of repeated undulating stoops rising upward to mid-air stall. It is gregarious on migration, often travelling in flocks, but small groups or individuals are not uncommon.

Breeding pairs prefer rugged terrain areas with steeper slopes in areas associated with vegetation, and were most likely to nest in large, productive valleys surrounded by high-elevation plateaus (Galipeau et al. 2016). It is widely distributed in winter, usually found in open habitat such as prairies, plains, coastal marshes, agricultural fields, and airports (Johnsgard and Johnsgard 1990). More common in wintering areas with short growing seasons and low precipitation, with highest densities in the northern United States, Great Basin area, and the western shortgrass prairies (Bock and Lepthien 1976, Bock et al. 1977).

The rough-legged hawk is a small mammal specialist; thus, its breeding activity is generally associated with local abundance of ground squirrels, voles, or lemmings (Hanski 1991, Potapov 1997). It will prey on birds when small mammals are scarce, particularly juvenile passerines and shorebirds, and will resort to consuming carrion (Watson 1986). Usually reproductively mature at 2 years of age. Stick-nests are built soon after arrival on territory, typically on cliffs, bluffs, or on the ground. Clutch size varies (1-7 eggs), depending on food availability, but 3-5 eggs are usual and laid in May. Incubation 31-33 days, provided almost entirely by the female. Nestling period is 35-40 days, and fledglings remain dependent on adults for another 2 weeks. The male provisions the young and the female feeds the young. Pairs show nest site fidelity, and in locations where ground squirrels are entirely absent, they may forgo breeding or have small broods when lemmings are low (Bechard and Swem 2002). Bechard and Swem (2002) indicated that egg-laying date was associated with spring temperatures and snow-free ledges, but Potapov (1997) reported no effect of snow melting date or spring/summer temperatures on number of nesting pairs.



Figure 3. Rough-legged Hawk (male)

Methods

Field Surveys

Structured surveys were conducted from 2015 – 2017, 2019 and 2021-2024 (Table 1). The focus of these surveys was to search known nesting sites for the presence of cliff-nesting raptors. In addition to the structured surveys, favorable habitat was searched opportunistically when ferrying between known sites, camps, or other mine infrastructure and when raptors or signs of site use (e.g., whitewash, orange-colored lichen, and unused nests) were observed. Sites were considered occupied if one or more adults displayed territorial or reproductive behavior (e.g., vocalization and/or flight behavior associated with defense of breeding territory or presence of nest building, nest, or eggs). Locations with partially-built or unused nests without detection of breeding aged adults were noted as such (e.g., old stick nest; no birds detected). Raptor monitoring in 2024 involved two helicopter surveys (22 May – 26 May, 07 – 10 August), and ground monitoring of potential nesting habitat (natural cliffs, quarries and borrow pits) along the Whale Tail Haul Road (WTHR; Meadowbank to Whale Tail) and All-Weather Access Road (AWAR; Baker Lake to Meadowbank).

Table 1. Broad scale survey effort from 2015-2024 for raptors breeding in the vicinity of the Meadowbank Complex.

Year	2015		2016		2017		2018		2019		2020		2021		2022		2023		2024	
Survey	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Start	28/05	—	18/05	21/07	28/05	—	—	—	13/06	—	—	—	23/05	04/08	28/05	12/08	23/05	09/08	22/05	07/08
End	30/05	—	20/05	23/07	30/05	—	—	—	15/06	—	—	—	30/05	08/08	03/06	17/08	28/05	12/08	26/05	10/08
Hours	12	—	10	10	12	—	—	—	10	—	—	—	12	12	11.7	12.4	10.7	11.4	12.8	12.9

Mapping

Shapefiles for the most recent projection of the combined footprint of the AWAR, WTHR, and project site were read into R using the `readOGR` function in the `rddal` package and converted to a data frame for `ggplot2` using the `fortify` function. The spatial extent for the mapping exercise was set using the `get_map` function in the `ggmap` package. Maps portraying species-specific nesting sites were plotted using `ggmap`.

Data Analysis

Distance to disturbance

Spatial objects (lines and polygons) describing the project footprint were acquired from Agnico Eagle. Euclidean distances from nesting sites to the nearest spatial object were calculated in R (R Development Core Team 2019) using the `sp`, `rgeos`, and `geosphere` packages.

Occupancy

Although estimation of nesting site occupancy can serve as a metric of population status (MacKenzie et al. 2002, 2003), detection of nesting pairs is imperfect, and estimating the proportion of occupied sites without accounting for detection error can lead to underestimation of true occupancy (Kéry and Schmidt 2008). Occupancy modeling estimates parameters that influence occupancy, and simultaneously accounts for imperfect detection (Marsh and Trenham 2008). In any given year, the status of a nesting site is limited to one of only two outcomes: occupied or not occupied. Occupancy modelling estimates the following parameters:

1. initial colonization – the probability that a nesting site is occupied in the first survey year (ψ),
2. colonization – the probability that an unoccupied site becomes occupied between years (ϵ),
3. extinction – the probability that an occupied site becomes unoccupied between years (γ); and,
4. detection – the probability that birds are detected given that the nesting site is occupied (p).

Nesting site survival is estimated as the reciprocal of extinction (i.e., the probability an occupied site remains occupied between years; $1-\gamma$). In addition, environmental covariates can be added to an occupancy model to test whether they influence the above parameters using a logit link function. Multi-year occupancy was calculated in R (R Development Core Team 2019) using the ‘unmarked’ package. When appropriate, data were standardized (e.g., distance to disturbance was standardized by subtracting the mean from each distance value and dividing by the standard deviation), and then formatted specifically for ‘unmarked’ using the *unmarkedMultFrame* function.

Occupancy among years was analyzed separately for peregrine falcons, rough-legged hawks, and gyrfalcons. To do so, the total number of nesting sites was filtered to include only those nesting sites that were occupied at least once between 2015 and 2024 for each species. Model fitting of candidate models (Table 2) was performed using the *colext* function. Akaike Information Criterion (AIC) was used for model selection.

Three candidate models were selected *a priori* to estimate the effect anthropogenic disturbance or time (Table 2) when contrasted against the null model. The aim of this analysis was two-fold: 1) to estimate the proportion of occupied nesting sites annually, and; 2) to estimate the trend in nesting site occupancy from 2015 to 2024. Trend in occupancy was estimated using annual occupancy probabilities to calculate average rate of change (λ) at the population level (MacKenzie et al. 2003) where a value <1 indicates population decline and >1 indicates an increase. Initial occupancy and detection probability were set to constant (i.e., 1) time varying (i.e., year), respectively, for all models. Model structure for extinction and colonization varied according to the test for effects (see Table 2).

Table 2. Candidate models

Model structure	Model #	Tests for effect of:
$\psi(1) + \epsilon(1) + \gamma(1) + p(\text{year})$	m0	Null (contrast to m1 and m2)
$\psi(1) + \epsilon(d2d) + \gamma(d2d) + p(\text{year})$	m1	Distance to disturbance (project infrastructure)
$\psi(1) + \epsilon(\text{year}) + \gamma(\text{year}) + p(\text{year})$	m2	Time (captures effect of missing covariates)

Reproductive success

Over the course of the ten-year period, five surveys were conducted during brood rearing (2016, and 2021–2024). For this report, estimates of reproductive success are reported as the number of young hatched

from a single nesting attempt by a pair of birds, regardless of age at the time they were observed. Because nestling age varied considerably between years and among sites, measures of annual productivity *per se* are expected to be biased high. All nesting sites were assumed to be contained within a unique nesting territory (i.e., no nesting territories were occupied by more than one pair of birds of the same species, regardless of the potential for alternative nesting sites within nesting territories).

Results

Mapping

Among survey years (see Table 1), 163 locations considered to be typical of raptor nesting habitat were surveyed at least once from 2015 – 2017, 2019, and 2021 - 2024. Of the 163 locations surveyed (Figure 4), nesting raptors have been detected at 107 nesting sites (Table 13). Peregrine falcons have been documented at 88 nesting sites, rough-legged hawks at 35 nesting sites and gyrfalcons have been documented at 18 nesting sites.

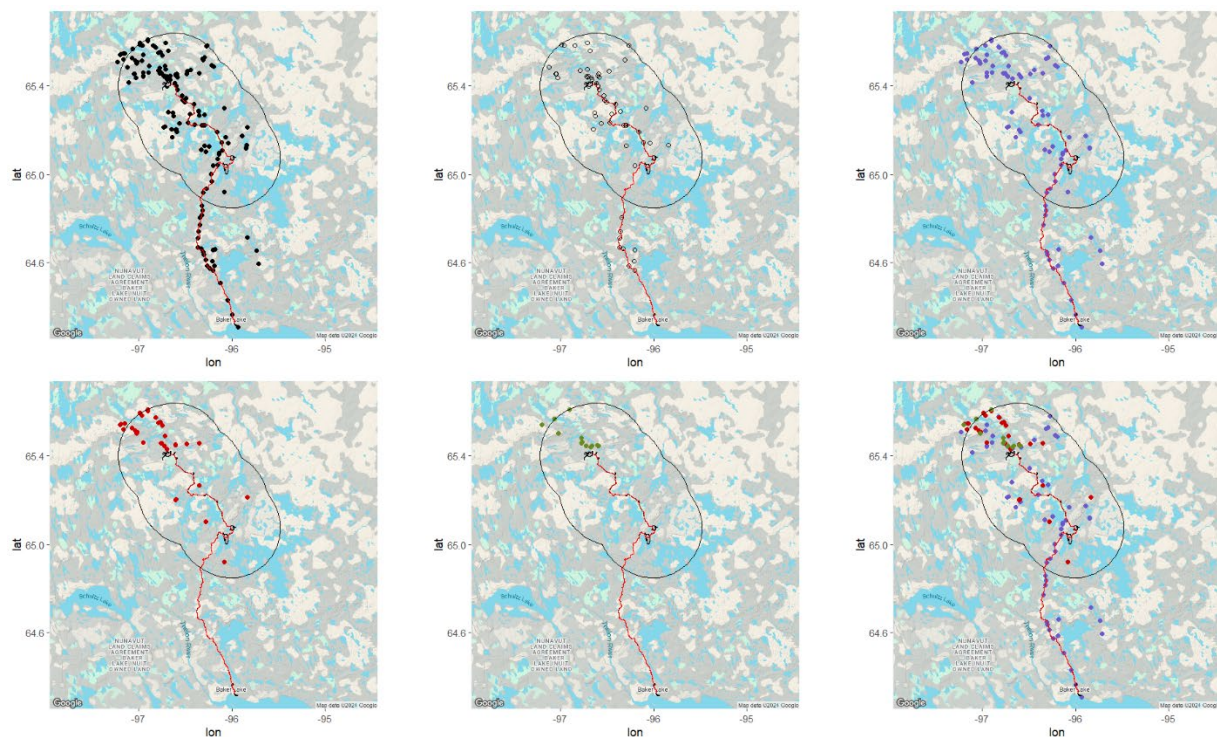


Figure 4. All cliffs surveyed (n=163 top L), cliffs with no record of occupancy (n= 58; top C), PEFA nesting sites (n = 88; top R), RLHA nesting sites (n=35; bottom L), GYRF nesting sites (n=18; bottom C), and all recorded nesting sites combined (bottom R) for the period 2015 – 2024 in the vicinity of the Meadowbank Complex

Distance to Disturbance

Mean distance from known occupied nesting sites to project infrastructure was 8.59 km (SD=8.04 km, range = 0 – 25.42 km). Twenty-two nesting sites fell within 1.5 km of the footprint of AWAR Road, Whale Tail Haul Road, or MBK Complex and are considered candidates for development of a site-specific management plans. Eighteen of the 22 nesting within 1.5 km of the footprint were less than or equal to 600 m from the footprint (500m baseline setback, plus additional 100m setback during the breeding season), identified by the Government of British Columbia (2013) for species with moderate ability to co-

exist with human activity. Twenty-one of the 22 nesting sites within 1.5 km of the footprint have been occupied by peregrine falcons, 17 of which were in rock quarries that were excavated for road building and maintenance, and four were located on natural cliffs. Two rough-legged hawk nesting sites were located within 1.5 km of the project footprint, and were located on natural cliffs. One gyrfalcon nesting site was detected within 600 m of the project footprint in a roadside quarry.

Occupancy

Peregrine Falcons

The minimum and maximum number of nesting sites sampled in any year was 16 (2018) and 88 (2022 and 2024), respectively (Table 3). The minimum and maximum number of breeding pairs detected was 8 (2020) and 41 (2024), respectively (Table 3). The top occupancy model (i.e., m1) included colonization and extinction effects of distance to disturbance, and a year effect for detection (Table 4; see Table 5 for parameter estimates). Delta AIC for the second-ranked model (m0, the null model) compared to m1 was 3.33 (i.e., >2.0), suggesting that effect size associated with distance to disturbance was important (Table 4). In this regard, the relationship between distance to disturbance and the probability that an unoccupied site would become occupied was negative (i.e., unoccupied nesting sites closer to the project footprint had a higher probability of becoming occupied when contrasted with those further from the project; Figure 5). Similarly, occupied nesting sites closer to the project footprint had a lower probability of becoming unoccupied when contrasted with those further away (Figure 5). Using m1, trend in occupancy (Figure 6) was $\lambda = 0.99$ (SE=0.04).

Table 3. Count of peregrine falcon nesting sites sampled, detected, colonized, extinct, static, and common from 2015 – 2024 for birds breeding in the vicinity of the Meadowbank Complex.

year	sampled	detected	colonized	extinct	static	common
2015	65	29	NA	NA	NA	NA
2016	68	32	8	9	44	61
2017	77	31	4	9	55	68
2018	16	9	2	3	11	16
2019	77	28	1	5	10	16
2020	17	8	4	2	11	17
2021	81	25	3	2	12	17
2022	88	36	19	10	52	81
2023	87	32	16	20	51	87
2024	88	41	22	14	51	87

Table 4. Model selection based on AIC score for peregrine falcons

Model structure	Model #	Parameters	AIC score	delta AIC	AICwt	Cumltvwt
-.d2d.d2d.year	m1	15	1228.85	0	0.84	0.84
-.-.-.year	m0	13	1232.18	3.33	0.16	1
-.year.year.year	m2	29	1241.46	12.60	1.5E-03	1

Table 5. Parameter estimates (null model; log odds scale) for peregrine falcon initial occupancy (ψ), colonization (γ) and extinction (ϵ), and a year effect for detection (ρ).

	$\psi(\text{Int})$	$\text{col}(\text{Int})$	$\text{col}(\text{d2d})$	$\text{ext}(\text{Int})$	$\text{ext}(\text{d2d})$	$p(\text{Int})$	$p(2016)$	$p(2017)$	$p(2018)$	$p(2019)$	$p(2020)$	$p(2021)$	$p(2022)$	$p(2023)$	$p(2024)$
estimate	0.38	-1.02	-0.29	-0.72	0.18	0.62	1.04	8.90	1.34	1.52	1.96	-0.45	0.23	-0.89	0.09
SE	0.43	0.15	0.15	0.18	0.15	0.57	0.678	32.26	0.97	1.22	1.24	0.68	0.66	0.63	0.64

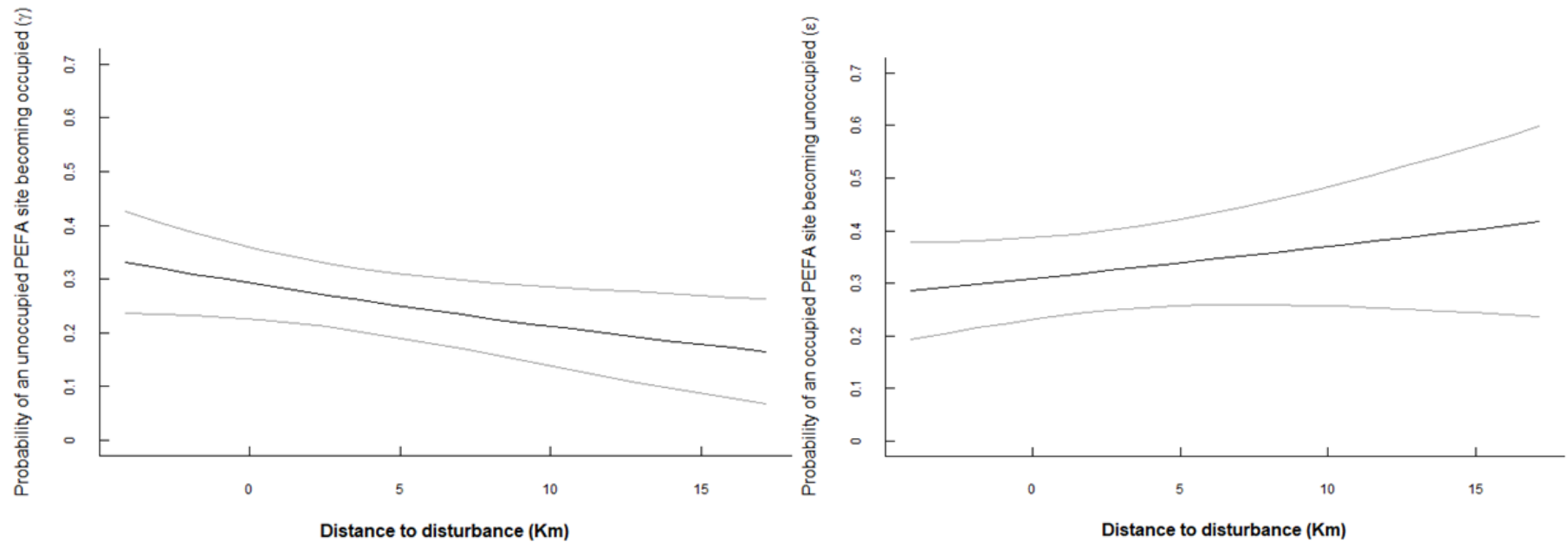


Figure 5. The effect of distance to disturbance on the probability that an unoccupied site would become occupied (L), and the effect of distance to disturbance on the probability that an occupied site would become unoccupied (R)).

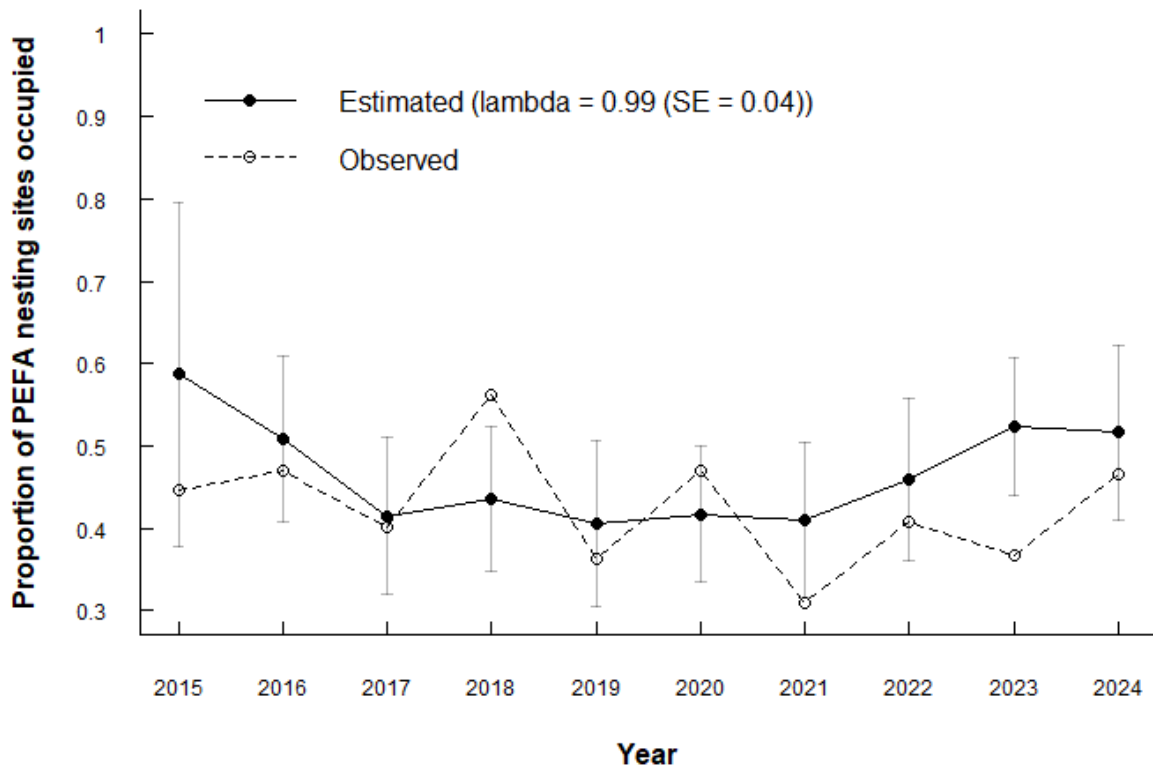


Figure 6. Proportion of PEFA nesting sites occupied from 2015 – 2024 in the vicinity of the Meadowbank Complex. The proportion observed (open circles with dashed lines) are point estimates, and do not account for detection error. The proportion estimated (closed circles with solid lines) accounts for detection error and includes standard error bars. Lambda = 0.99 ± 0.04

Rough-legged Hawks

The null model was ranked first among the candidates for rough-legged hawk occupancy (Table 6; see Table 7 for parameter estimates). Trend in occupancy (Figure 7) calculated as average rate of change at the population level was $\lambda = 1.06$ (SE=0.13), where a value <1 indicates population decline and >1 indicates an increase (MacKenzie et al. 2003).

Table 6. Model selection based on AIC score for rough-legged hawks.

Model structure	Model #	Parameters	AIC score	delta AIC	AICwt	Cumltvwt
-.-.year	m0	13	400.51	0	0.87	0.87
-.d2d.d2d.year	m1	15	404.38	3.86	0.13	1.00
-.year.year.year	m2	29	424.96	24.44	0.00	1.00

Table 7. Parameter estimates (null model; log odds scale) for rough-legged hawk initial occupancy (ψ) colonization (γ) and extinction (ϵ), and a year effect for detection (ρ).

	ψ (Int)	γ (Int)	ϵ (Int)	ρ (Int)	p(2016)	p(2017)	p(2018)	p(2019)	p(2020)	p(2021)	p(2022)	p(2023)	p(2024)
estimate	-0.60	-0.81	-0.54	-0.01	0.77	9.68	0.00	-0.16	0.00	-0.24	-0.36	-1.17	-1.03
SE	1.58	0.36	0.38	2.16	2.06	85.12	100.42	2.39	100.42	2.33	2.35	2.34	2.33

The minimum and maximum number of nesting site sampled in any year was 0 (2018 and 2020) and 35 (2022, 2023 and 2024), respectively (Table 8). The minimum and maximum number of breeding pairs detected was 0 (2018 and 2020) and 16 (2017), respectively (Table 8).

Table 8. Count of rough-legged hawk nesting sites sampled, detected, colonized, extinct, static, and common from 2015 - 2024 for birds breeding in the vicinity of the Meadowbank Complex.

year	sampled	detected	colonized	extinct	static	common
2015	24	4	NA	NA	NA	NA
2016	31	12	5	1	16	22
2017	32	16	6	4	18	28
2018	0	0	0	0	0	0
2019	33	7	0	0	0	0
2020	0	0	0	0	0	0
2021	34	10	0	0	0	0
2022	35	9	5	7	20	32
2023	35	6	3	6	24	33
2024	35	7	4	3	28	35

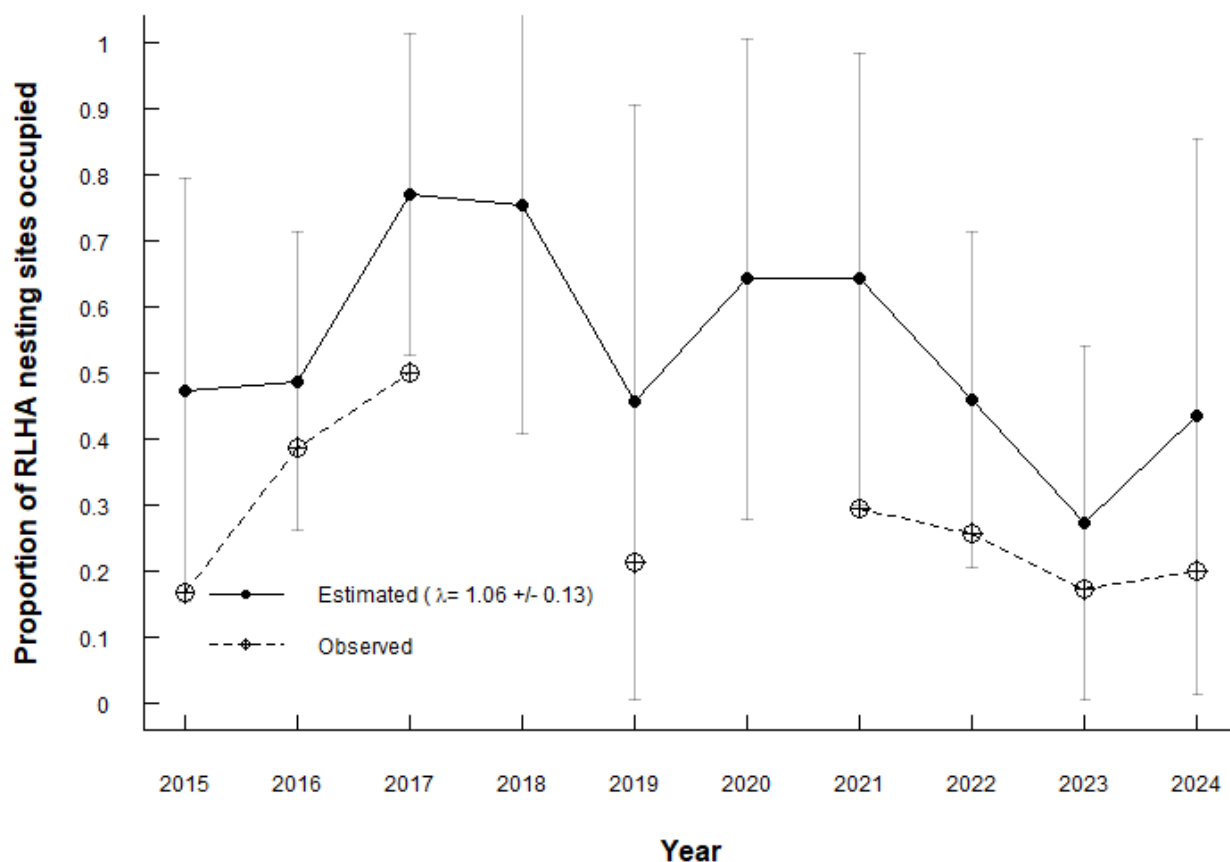


Figure 7. Proportion of RLHA nesting sites occupied from 2015 – 2024 in the vicinity of the Meadowbank Complex. The proportion observed (open circles with dashed lines) are point estimates without error bars, and do not account for detection error. The proportion estimated (closed circles with solid lines) accounts for detection error and includes standard error bars. Lambda = 1.06±0.13

Gyrfalcons

The null model was ranked first among the candidates for gyrfalcon occupancy (Table 9; see Table 10 for parameter estimates). Using the null model, trend in occupancy (Figure 8) calculated as average rate of change at the population level was λ 0.98 (SE=0.07), where a value <1 indicates population decline and >1 indicates an increase (MacKenzie et al. 2003). The minimum and maximum number of nesting site sampled in any year was 1 (2018 and 2020) and 18 (2022, 2023 and 2024), respectively (Table 11). The minimum and maximum number of breeding pairs detected was 0 (2018 and 2020) and 6 (2024), respectively (Table 11).

Table 9. Model selection based on AIC score for gyrfalcons.

Model structure	Model #	Parameters	AIC score	delta AIC	AICwt	Cumltvwt
-.-.year	m0	13	209.20	0.00	0.84	0.84
-.d2d.d2d.year	m1	15	212.57	3.38	0.16	1.00
-.year.year.year	m2	29	229.86	20.66	0.00	1.00

Table 10. Parameter estimates (null model; log odds scale) for gyrfalcon initial occupancy (psi) colonization (gamma) and extinction (epsilon), and a year effect for detection (rho).

	psi(Int)	col(Int)	ext(Int)	p(Int)	p(2016)	p(2017)	p(2018)	p(2019)	p(2020)	p(2021)	p(2022)	p(2023)	p(2024)
estimate	-0.94	-0.69	-0.30	5.45	-6.20	-6.24	-12.43	-6.40	-12.31	-5.83	-6.14	-6.00	-5.88
SE	0.60	0.55	0.73	21.06	21.07	21.08	44.09	21.09	42.61	21.08	21.08	21.07	21.07

Table 11. Count of gyrfalcon nesting sites sampled, detected, colonized, extinct, static, and common from 2015 - 2024 for birds breeding in the vicinity of the Meadowbank Complex.

year	sampled	detected	colonized	extinct	static	common
2015	14	4	NA	NA	NA	NA
2016	16	2	1	3	10	14
2017	15	2	1	1	13	15
2018	1	0	0	0	1	1
2019	16	2	0	0	1	1
2020	1	0	0	0	1	1
2021	17	5	0	0	1	1
2022	18	4	1	3	13	17
2023	18	5	3	2	13	18
2024	18	6	5	4	9	18

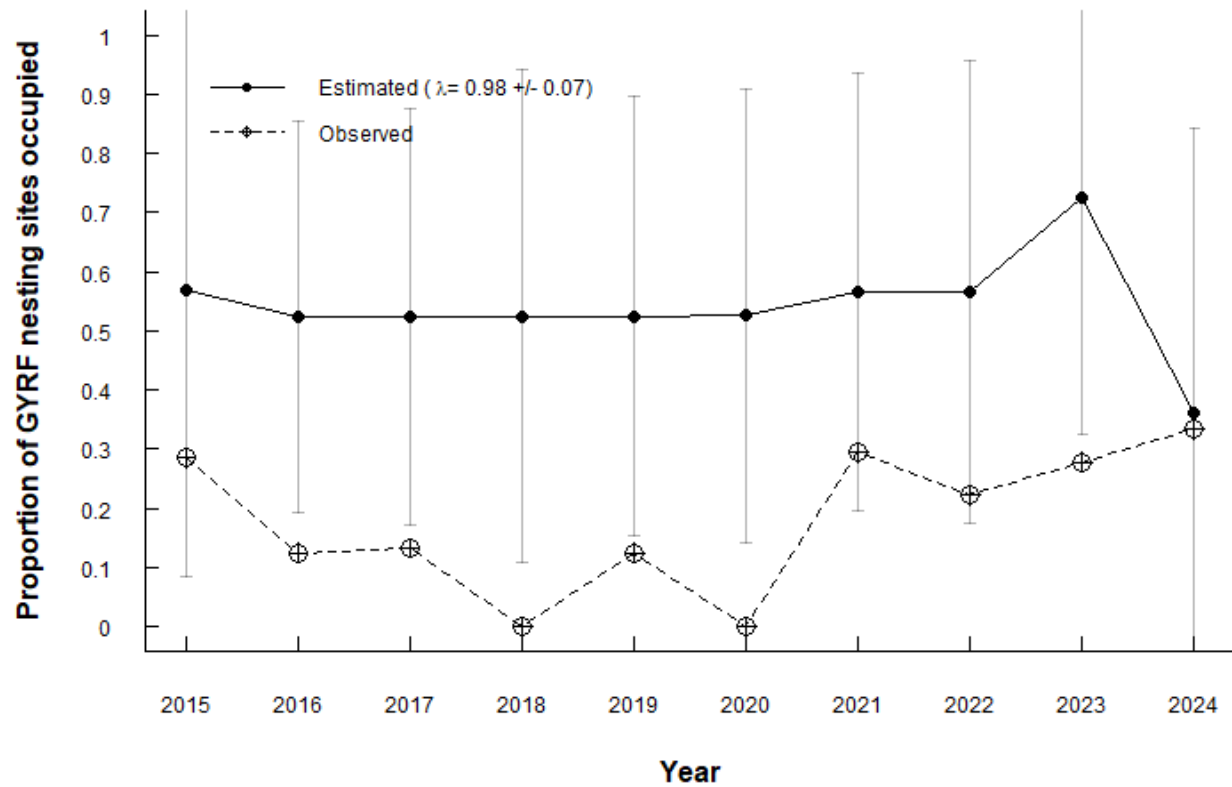


Figure 8. Proportion of GYRF nesting sites occupied from 2015 – 2024 in the vicinity of the Meadowbank Complex. The proportion observed (open circles with dashed lines) are point estimates without error bars, and do not account for detection error. The proportion estimated (closed circles with solid lines) accounts for detection error and includes standard error bars. Lambda = 0.98 ± 0.07

Reproductive Success

Table 12. Estimates of reproductive success for peregrine falcons, rough-legged hawks, and gyrfalcons detected in 2016 and 2021 – 2024 during broad scale surveys in the vicinity of the Meadowbank Complex. Values are reported as number of young hatched from a single nesting attempt, regardless of nestling age at the time they were observed. Because nestling age varied considerably between years and among sites, measures of annual productivity per se are expected to be biased high.

	Peregrine Falcon					Rough-legged Hawk					Gyr Falcon				
Year	2016	2021	2022	2023	2024	2016	2021	2022	2023	2024	2016	2021	2022	2023	2024
Occupied	32	25	32 ¹	30	41	12	10	7	6	7	2	5	4	5	6
Nestlings	9	9	37	9	14	20	11	6	3	5	4	6	0	2	2
Productivity	0.28	0.36	1.16	0.30	0.34	1.67	1.1	0.86	0.50	0.83	2.00*	1.20*	0.00*	0.40*	0.33*

¹ Count of sites at which nestlings were detected, * Gyr Falcon nestlings likely fledged prior to surveys.

Conclusion

This report applies GN-DoE guidelines (Government of British Columbia 2013) to assess potential disturbance to known nesting sites that have been identified over the course of nine survey-years. Agnico Eagle has detected peregrine falcon nesting sites in 17 rock quarries excavated for building and maintenance of the AWAR Road. Gyrfalcons have been detected nesting at one quarry. To date there have been no instances of rough-legged hawks nesting in rock quarries. To date there have been no instances of raptors establishing nests on artificial structures along the Whale Tail Haul Road or Whale Tail site.

Monitoring has focused on searching for, documenting, and mapping nesting sites for three raptor species (peregrine falcons, rough-legged hawks, and gyrfalcons). Study design was limited to single surveys in some years, which limits estimation of detection error. To address this limitation, starting in 2021, the study design was updated to incorporate multiple surveys annually, and took advantage of the distribution of known nesting sites to monitor occupancy as a function of distance to project-related disturbance. This approach addresses the GN comment in the 2018 Annual Report regarding the potential for insufficient power to detect the project-related effects by correcting for inconsistent monitoring within and among seasons. There has been no incident requiring permitting for removal of a nest (Term and Condition 36).

This report meets Term and Condition 33 by documenting and mapping raptor nesting sites (Figure 4, Table 13). There is no evidence for project-related related disturbance effects for peregrine falcons, rough-legged hawk occupancy, and gyrfalcons.

In 2024, pre-season deterrence was conducted at two sites known to harbour raptors for quarries along the AWAR where project-related activity was expected. Despite ongoing in-season and broad scale monitoring there is currently no history of nesting raptors along the WTHR. Where occupied nesting sites were detected, mine-related activity within the quarries was restricted. Nest visits were conducted periodically to conduct egg and nestling counts. Presence of nesting pairs was not made public to minimize disturbance. It is possible that the effect of distance to disturbance for peregrine falcons is related to the quantity of nesting sites that have been established in quarries creating a bias for nesting sites located close to the project footprint. In 2024, additional survey effort was conducted for nesting sites parallel to, and far from the AWAR in an attempt to reduce any potential bias that exists. In 2024, of the 5 peregrine falcon nesting sites where nestlings were detected, only one was located on a natural ledge (i.e., 4 were located in roadside quarries). In addition, 10 of 14 nestlings detected were produced in nests located in roadside quarries. Agnico Eagle will continue monitoring and management of Falcon according to the TEMP. Further update will be discussed with the TAG, as needed.

Table 13. Geographic coordinates (decimal degrees), distance to disturbance (Km) for known nesting sites surveyed between 2015 and 2024. Nesting sites that require management plans are identified.

NSID	Quarry	LAT	LON	PEFA	RLHA	GYRF	minD2D
2	NA	65.1705	-96.0669	1	0	0	2.4
4	NA	65.2687	-96.2974	1	0	0	4.7
5	NA	65.4373	-96.5821	0	1	0	2.9
6	NA	65.4375	-96.5886	1	0	0	2.8
7	NA	65.4425	-96.5963	0	0	1	3.2
9	NA	65.4508	-96.6041	1	1	0	4.1
10	NA	65.447	-96.6058	0	0	0	3.6
11	NA	65.4456	-96.6039	0	1	1	3.5
12	NA	65.4438	-96.5928	0	0	1	3.4
14	NA	65.4419	-96.7278	1	0	0	2.9
16	NA	65.4441	-96.7286	0	1	1	3.1
17	NA	65.4449	-96.7334	1	1	0	3.3
20	NA	65.5107	-96.9705	1	0	0	15.3
21	NA	65.5366	-96.9563	1	0	0	17.1
23	NA	65.547	-96.7894	1	1	0	14.9
24	NA	65.5488	-96.7702	1	1	0	14.9
25	NA	65.5691	-96.82	1	1	0	17.7
26	NA	65.572	-96.8261	1	0	1	18.0
27	NA	65.5984	-96.9029	1	1	0	22.0
28	NA	65.6049	-96.9071	1	1	1	22.7
31	NA	65.1223	-95.8498	1	0	0	7.1
32	NA	65.1177	-95.8505	1	0	0	6.8
34	Q21	65.288	-96.3603	1	0	0	2.3
36	NA	65.5213	-96.3184	1	0	0	18.1
38	NA	65.4844	-96.1955	1	0	0	20.5
39	NA	65.5273	-96.298	1	0	0	19.2
41	NA	65.5754	-96.2762	1	0	0	23.7
42	NA	65.1109	-96.1045	1	0	0	0.5
44	Q19	64.9376	-96.2774	1	0	0	0.0
45	Q18	64.9187	-96.307	1	0	0	0.0
46	NA	65.3424	-96.4942	1	0	0	1.6
49	NA	65.2672	-96.3507	1	1	0	2.7
51	NA	65.0982	-96.1389	1	0	0	2.6
52	NA	65.0708	-96.152	1	0	0	1.7
54	NA	65.1041	-96.2826	1	1	0	0.6
55	NA	65.2811	-96.6848	1	0	0	8.8
58	NA	65.4316	-96.6778	1	0	0	1.5
61	NA	65.1749	-95.8958	1	0	0	9.3
62	NA	65.1287	-96.2463	1	0	0	1.5
63	NA	65.1124	-96.3323	1	0	0	0.6

64	NA	65.1691	-96.6444	1	0	0	10.2
65	NA	65.2056	-96.6023	0	1	0	6.6
66	NA	65.1921	-96.5917	1	0	0	7.1
67	NA	65.2015	-96.6061	1	1	0	7.0
68	NA	65.2164	-96.7209	1	0	0	11.5
69	NA	65.4399	-96.9561	1	0	0	10.4
70	NA	65.4155	-97.1108	1	0	0	17.0
71	NA	65.4791	-96.7799	0	0	1	7.5
73	NA	65.4566	-96.7737	1	0	1	5.1
74	NA	65.4548	-96.7583	1	1	0	4.7
75	NA	65.4552	-96.7645	1	1	0	4.8
76	NA	65.4385	-96.6751	0	0	1	2.3
77	NA	65.4438	-96.6637	0	0	1	2.8
78	NA	65.4527	-96.4856	1	1	0	7.2
79	NA	65.4562	-96.3541	1	1	0	12.8
83	NA	65.5043	-97.2294	1	0	0	24.8
85	NA	65.5011	-97.0226	1	1	1	16.4
86	NA	65.506	-97.02	0	1	0	16.6
87	NA	65.5096	-97.0309	1	1	0	17.3
88	NA	65.5104	-97.0353	1	1	0	17.5
89	NA	65.5229	-97.0726	1	1	0	19.7
90	NA	65.5239	-97.0747	1	0	1	19.8
91	NA	65.4693	-96.4458	1	0	0	9.8
92	NA	65.4903	-96.2212	1	0	0	20.0
93	NA	65.4429	-96.6009	0	0	1	3.2
94	NA	65.4598	-96.9551	1	1	0	11.2
95	NA	65.518	-97.1627	1	1	0	22.8
97	NA	65.578	-96.9643	1	1	0	21.1
99	NA	65.5352	-96.7453	1	1	0	13.2
100	NA	65.4894	-96.717	1	1	0	7.9
104	NA	65.0928	-96.142	1	0	0	3.0
107	NA	65.2139	-96.7367	1	0	0	12.3
108	NA	65.5387	-97.1977	0	1	1	25.4
109	NA	65.5396	-97.1966	1	1	1	25.4
112	NA	65.4418	-96.7152	0	0	0	2.7
117	NA	65.4444	-96.9512	1	0	0	10.3
119	NA	65.58991	-96.9895	0	1	0	22.9
121	NA	65.5451	-97.1639	1	0	0	24.6
122	NA	65.5435	-97.1504	0	1	0	23.9
123	NA	65.4592	-96.8975	1	0	0	8.9
126	NA	65.4299	-96.6958	0	1	0	1.3
127	NA	65.5656	-97.0678	1	0	1	22.9
128	NA	65.4885	-96.8873	1	0	0	10.9
130	Q22	65.0427	-96.157	1	0	0	0.0

131	Q20	64.9706	-96.2202	1	0	0	0.0
132	Q17	64.8592	-96.3248	1	0	0	0.0
133	Q16	64.8384	-96.3178	1	0	0	0.0
134	Q15	64.8166	-96.327	1	0	0	0.0
136	Q13	64.7718	-96.344	1	0	0	0.0
140	Q9	64.6471	-96.309	1	0	0	0.0
141	Q8	64.6341	-96.3019	1	0	0	0.0
142	Q7	64.6092	-96.2829	1	0	1	0.0
144	Q5	64.5703	-96.2423	1	0	0	0.0
146	Q3	64.5038	-96.1266	1	0	0	0.0
147	Q2	64.4244	-96.0506	1	0	0	0.0
148	Q1	64.3576	-96.001	1	0	0	0.0
149	NA	64.2989	-95.9356	1	0	0	0.8
150	NA	64.9208	-96.08	1	1	0	1.8
150	NA	64.6546	-95.7333	1	0	0	11.0
152	NA	64.58264	-96.1892	1	0	0	1.5
154	NA	64.66022	-96.1853	1	0	0	1.5
156	Q21	65.00269	-96.2243	1	0	0	0.0
157	NA	65.46099	-96.7695	0	0	1	5.5
158	NA	65.21485	-95.8341	0	1	0	14.2
160	NA	64.7146	-95.8378	1	0	0	6.1
161	NA	64.591	-95.714	1	0	0	11.8
167	QE30	65.225	-96.401	1	0	0	0.0

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