

## 6. MIGRATORY BIRDS

Migratory birds include waterbirds and upland birds. Waterbirds are defined as birds that primarily forage within waterbodies. The Arctic waterbird community is comprised of geese, Tundra Swan, several species of dabbling and diving ducks, gulls, Arctic Tern, four species of loons, and Sandhill Crane. Upland birds are defined as birds that primarily forage and nest in upland areas. The Arctic upland bird community is comprised of songbirds, shorebirds, ptarmigan, and jaegers.

### 6.1 FEIS PREDICTIONS

The predicted residual effects of the Back River Mine on migratory birds as identified in the FEIS included:

- Habitat loss (not significant, low magnitude); and
- Disturbance (not significant, low magnitude).

Mitigation and management measures to reduce the potential for these effects to result in residual effects on migratory birds are discussed in Sections 11 and 12 of the WMMP Plan (B2Gold 2024a).

### 6.2 PRE-CLEARING SURVEYS

Where possible, construction activities are scheduled to occur outside of the Arctic bird breeding season of May 15 and August 15. If avoidance is not possible, then pre-clearing bird nest surveys are conducted as detailed in Section 10.3.1.2 of the WMMP Plan (B2Gold 2024a). Pre-clearing surveys are aimed at identifying active bird nests that are at risk of disturbance from construction activities and thereby trigger appropriate management as described in Section 11.2.2 of the WMMP Plan (B2Gold 2024a).

During 2024, ground clearing was required during the bird breeding season in June and early August; therefore, pre-clearing surveys were completed. Four survey transects were completed prior to ground clearing activities (described below) and no nests were observed.

#### 6.2.1 METHODS

Pre-clearing surveys are conducted prior to construction occurring during the bird breeding season to ensure all nests in the area are located (e.g., in case of new nest construction) and occupancy status is confirmed. Straight line transects stratifying the proposed disturbance area were walked by two observers looking for birds and signs of nesting. For areas with ponds and lakes, transect lines were concentric circles around the waterbody.

Where potential nesting was noted, observers slowly and carefully searched the immediate area for a nest. Observers were vigilant to not disturb the nest or linger too long in the nesting area, as to not disturb the nesting bird. A setback buffer was established around any active nests and potentially active nesting locations identified. Buffer size followed those described in Table 6.2-1, with the nesting location in the centre of the buffer. Follow up surveys of identified nests were completed weekly for all buffered nests to determine when young left the nest. The buffer was removed and the area cleared if the nest stage was determined to be fledged (nest empty, no young in area, no signs of predation), depredated (nest disturbed, egg/nesting fragments), or abandoned.

TABLE 6.2-1 RECOMMENDED NEST BUFFER SIZES

Bird Group	Recommended Buffer Size <sup>1</sup>
Gulls and Terns	300 m
Ducks	150 m
Geese	500 m
Loons, Tundra Swan, and Sandhill Crane	50–100 m
Songbirds	100 m
Shore Birds	100–300 m
Ground-Nesting Raptors	1.5 km <sup>2</sup>

Notes:

<sup>1</sup> If the suggested buffer cannot be implemented for logistical reasons, the Environment Manager will ensure that a minimum buffer of at least 30 m will be enforced, and the reason will be recorded and reported.

<sup>2</sup> If 1.5 km is not feasible, a minimum buffer of 100 m will be set up around the nest site.

General survey information recorded included date, start and end time, start and end location, temperature, wind, and cloud cover. Where potential or active nests were identified, the transect, bird group, species, nest clue, nest stage, nest content (number of eggs or young), nest location, and associated buffer were recorded.

Bird pre-clearing surveys were conducted in accordance with and using the data sheet provided in the Pre-Clearing Nest Surveys for Land Clearing Pre-construction, Construction SOP (B2Gold 2024I), including recommended buffer size and mitigative measures for all identified nests.

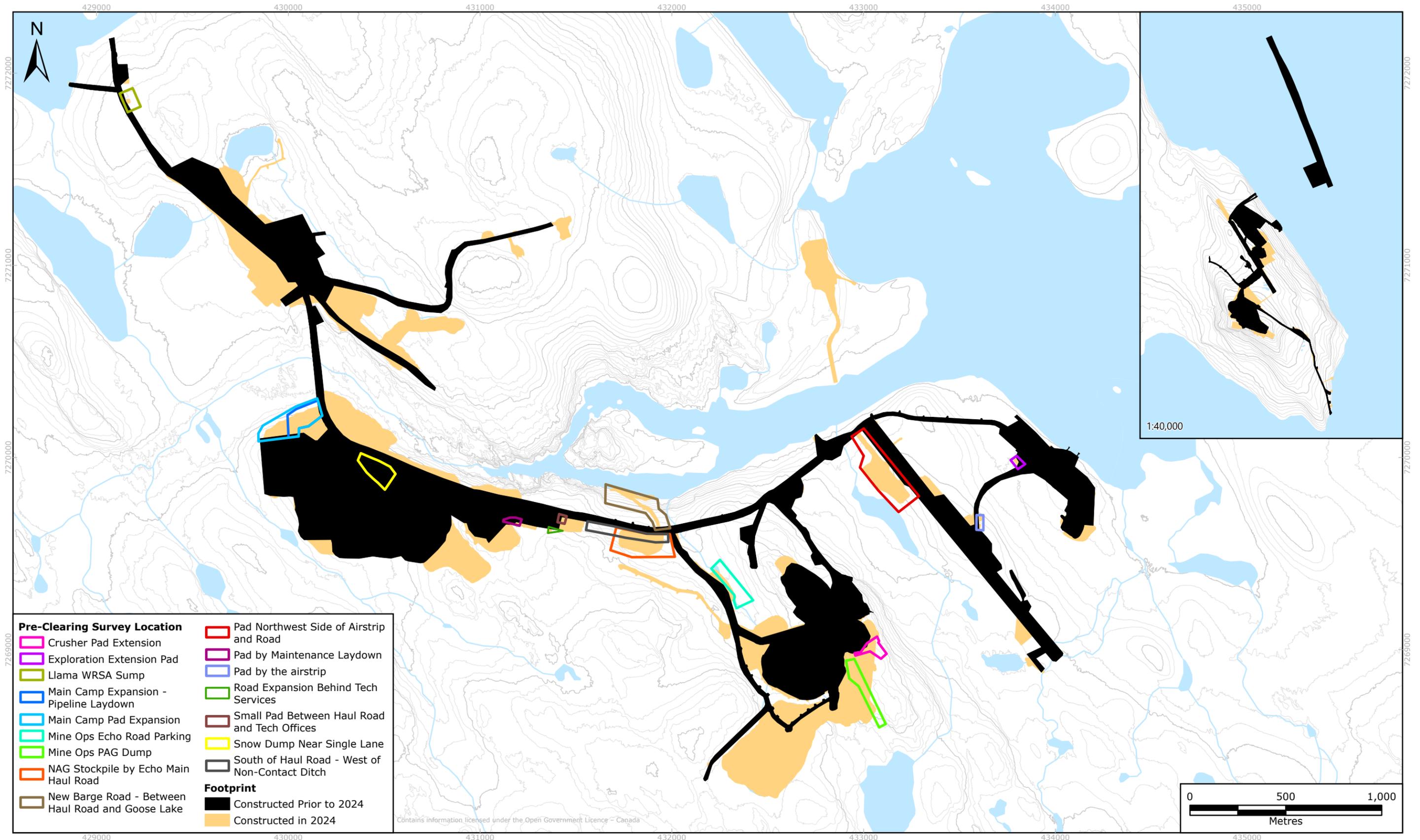
## 6.2.2 RESULTS AND DISCUSSION

During the breeding season, 18 pre-clearing surveys for birds (including raptors and migratory birds) were completed at the Goose site between May 20 and August 10, 2024 (Figure 6.2-1; Table 6.2-2). In all cases, surveys were conducted the same day as, or one day prior to, ground clearing.

One active Willow Ptarmigan nest (*Lagopus lagopus*) was identified during pre-clearing surveys at the Main Camp Pad Expansion on July 1, 2024. A 100 m setback buffer was established around the nest on July 1, 2024, and was decreased to 50 m on July 3, 2024. The nest was monitored until it was deemed inactive on July 5, 2024 (see Section 6.2.2.1).

Pre-clearing surveys were effective at ensuring all nests were located in areas where disturbance was planned during the bird breeding season. One nest was observed, buffered, and monitored as outlined in Section 6.2.2.1. No additional nest or signs of nesting were identified during pre-clearing surveys, and as a result no additional mitigation was required in 2024.

FIGURE 6.2-1 PRE-CLEARING BIRD SURVEY LOCATIONS, 2024



**TABLE 6.2-2 BIRD PRE-CLEARING SURVEYS COMPLETED AT BACK RIVER MINE, MAY 20 TO AUGUST 10, 2024**

<b>Date</b>	<b>Survey Location</b>	<b>Nest Found</b>
May 20	Mine Ops Echo Road Parking	No
May 20	Mine Ops PAG Dump	No
May 23	Crusher Pad Extension	No
June 7	Snow Dump Near Single Lane	No
June 13	Llama WRSA Sump	No
June 18	Exploration Extension Pad	No
July 1	Main Camp Pad Extension	Willow Ptarmigan nest
July 3	Main Camp Expansion—Pipe Laydown	No
July 8	Snow Dump Near Single Lane	No
July 15	South of Hal Road—West of Non-Contact Ditch	No
July 16	New Barge Road—Between Haul Road and Goose Lake	No
July 28	Pad by Maintenance Laydown	No
July 29	NAG Stockpile by Echo Main Haul Road	No
July 30	Pad by Airstrip	No
August 4	Pad Northwest Side of Airstrip and Road	No
August 4	Pad and Road Northwest Side of Airstrip and Road	No
August 10	Small Pad Between Haul Road and Tech Offices	No
August 10	Road Expansion Behind Tech Services	No

Setback buffers were applied to active nests, ranging from 5 m to 100 m. Setback buffers were reduced by direction of a Qualified Professional to ensure buffers remained sufficient to prevent any disturbance to the active nest. Nest buffer distances may be adjusted by Qualified Professionals from the recommended sizes following a risk-based approach that considers multiple factors, including if the nest is established in an active work site, species specific tolerance levels, if the work completed is likely to result in a low-level of disturbance, if the activity required is Project critical, and if the nest is continuously monitored while work is completed. Nest buffers and nests were removed if multiple days of inactivity were reported during monitoring.

During nest monitoring, no stop-work orders were issued and no birds exhibited signs of distress (i.e., did not flush from nest) associated with Mine activities. The fate of the active nests included three nests that successfully fledged, three nests that were predated on, and one fatality due to natural unknown causes (Table 6.2-3). Fledged nests were observed active at all stages (i.e., eggs, nestling, fledgling) and were reported fledged once the nest was empty for multiple days. A juvenile American Robin fatality was recorded below the third-floor powerhouse nest (Table 6.2-3), despite being healthy the previous day. The fatality was due to unknown causes and is believed to be unrelated to construction or predation. No activity near the nest, including presence of adults, was observed following this instance.

TABLE 6.2-3 NEST MONITORING FOR ACTIVE NESTS, JUNE 21 TO AUGUST 9, 2024

General Location	Species	Buffer (m)	Date Checked	Nest Stage	Nest Contents (# eggs/young)
Plant Site	Common Redpoll	8	June 21 and 26	Incubation	5 eggs
			June 27, 28, 29, and 30; and July 2, 4, and 5	Nestling	5 eggs
			July 7	Fledged	0
			July 9	Nest removed	0
New Powerhouse on Third Floor of Steel Beam	American Robin	5–10	July 10, 11, 13, 19, 20, 22, 24, 26, 27, and 29	Incubation	Unknown number of eggs
			July 30	Fatality unknown cause	0
Back of Empty Seacan	American Robin	5–10	July 13, 14, 15, and 19	Nestling	Unknown number of young
			July 20, 22, and 23	Fledged	0
Berm Extension	Willow Ptarmigan	50 <sup>1</sup>	July 1, 3, and 4	Incubation	6 eggs
			July 5	Hatched and left nest	0
North Laydown/ MLA	Mountain Bluebird	30	June 25 and 27; and July 1	Incubation	3 eggs
			July 6	Predated upon	0
North Laydown/ MLA	Common Redpoll	30	June 25 and 27; and July 1	Incubation	Unknown number of eggs
			July 6	Predated upon	0
Behind UG Powerhouse	Common Redpoll	10	August 9 and 10	Nestling	3 young
			August 12	Predated upon	0

Note:

<sup>1</sup> Nest buffer initially 100 m, but decreased to 50 m.

Additional monitoring was implemented for the Mountain Bluebird nest observed at the MLA (Table 6.2-3), as it was noted by construction staff that the trailer the nest was on contained steel that was critical for finishing the construction of fuel tanks. Various discussions with construction, site management, and the Environment Department were held and determined as the nest was located near the trailer hitch and hidden in a secure spot; removal of the steel could be completed without prolonged disturbance to the nest. On July 3, removal of the steel was completed with the Environment Department present, continuously monitoring the nest and with the authority to halt work if distress was observed. The work was completed during warm weather conditions (approximately 7°C) to allow eggs to stay warm when the mother was off the nest. The entire operation took 1 hour, including a 30-minute break. Throughout the process, the mother bird was closely monitored, leaving the nest twice, but returning within 15 minutes each time. The mother was recorded on the nest after completion of work and a 30 m setback buffer was re-established.

## 6.3 WATERBIRD MONITORING IN PONDS

Monitoring of onsite ponds are completed to determine if waterbirds are using the TSF or other onsite ponds as described in Section 11.3.1.1 of the WMMP Plan (B2Gold 2024a). Observations of waterbirds in onsite ponds where the water quality does not meet wildlife water quality guidelines will trigger mitigation to exclude the wildlife from the ponds, as described in Section 11.3.1.1 of the WMMP Plan (B2Gold 2024a). As of 2024, the TSF or other onsite ponds have not been constructed at the Mine. As a result, waterbird monitoring in ponds was not completed in 2024 and is anticipated to begin once onsite ponds are constructed.

## 6.4 WATERBIRD POPULATION MONITORING

Regional monitoring for waterbirds was completed in 2024 to evaluate whether waterbirds may be disturbed or otherwise affected by the Mine, resulting in reduced density or breeding, as described in Section 11.3.2.2 of the WMMP Plan (B2Gold 2024a). Regional monitoring for waterbirds is planned for every 3 years during construction and monitoring. The first survey occurred in 2024 during the second year of construction, with the next regional survey scheduled for 2027. Results indicating fewer waterbirds near the Mine over time will trigger a review of site activities to identify if there are adaptive management actions that can reduce any potential disturbance to waterbirds.

### 6.4.1 METHODS

To monitor waterbird populations, two survey methods were completed during the staging period (spring and fall migration) and during the breeding period: 1) aerial plot surveys, which are a continuation of the baseline methods; and 2) ground surveys at individual waterbodies. These methods were compared qualitatively for their ability to detect change in waterbird distribution.

Waterbirds observed during surveys, but outside of the survey transects (i.e., off-effort), were recorded as incidental sightings and provided in Section 6.7.

#### 6.4.1.1 AERIAL SURVEYS

Aerial waterbird surveys were completed during the spring staging, summer brood, and fall staging periods to monitor for potential changes in waterbird density or breeding due to disturbance from the Mine. Spring staging aerial waterbird surveys were completed twice in 2024; once in mid-May (May 15 and May 16) and a second time a few days later in May (May 20 to May 22), due to most waterbodies still being frozen during the first round of surveys. Therefore, only results from the second survey (May 20 through 22) are included in the analysis. Results from the first survey are provided in Appendices H and I.

Aerial waterbird surveys followed established protocols outlined by the CWS and the USFWS (CWS and USFWS 1987), which are a continuation of the methods used during the baseline surveys. For each survey period, four aerial survey plots were established following the baseline surveys (Rescan 2013b, 2014): a Goose Treatment plot and a Goose Control plot (Rescan 2013b), and a MLA Treatment plot and a MLA Control plot (Rescan 2014). The control plots were established during baseline studies and are located greater than 10 km from the Goose and MLA PDAs.

Each plot consisted of eight linear transects 16 km long and spaced 2 km apart. Aerial surveys were flown by helicopter at speeds of 40 to 100 km/hour and at an altitude of approximately 30 to 50 m. Two observers were present in the helicopter, in addition to the pilot, with one observer also serving as a data recorder. One observer sat next to the pilot on the left side of the aircraft, and the second observer sat behind the pilot on the right side. The observers recorded all waterbirds observed within the survey plot boundaries to species, sex, and age, when possible. Habitat information and coordinates of the observations were also recorded.

As this is the first year of the waterbird population monitoring program, no data analyses can be completed to determine temporal trends in the distribution and productivity of waterbirds between the Treatment and Control plots of the Goose PDA and MLA PDA. However, a qualitative comparison of results between monitoring completed in 2024 with baseline survey results at the Goose plots in 2012 and the MLA plots in 2013 is provided. Data analyses to establish trends in waterbird populations will be completed once multiple years of data have been collected.

#### 6.4.1.2 GROUND SURVEYS

Ground-based waterbird surveys were completed during the spring staging, summer brood, and fall staging periods to monitor for potential changes in waterbird density or breeding due to disturbance from the Mine. To survey wetlands and waterbodies within 5 km of Mine infrastructure, a subset of 24 ground survey sites was established (six sites per waterbird aerial survey plot: Goose Control, Goose Treatment, MLA Control, and MLA Treatment plots). Ground survey sites were selected based on baseline studies and on suitable habitat identified during the initial aerial waterbird surveys during the spring staging period (Section 6.4.1.1). Ground survey sites were established to ensure an equal distribution of sites between Control and Treatment plots, as well as within representative habitat. During the summer brood and fall staging surveys, another four sites were added within the Goose Treatment plot to survey areas within the Energy Centre footprint. The addition of these sites increases the survey effort in the treatment plot compared to the Control plot (Figure 6.4-1 and Figure 6.4-2).

Ground surveys consisted of fixed radius counts of all waterbirds observed on the waterbody within 200 m of the survey point, with a maximum survey time of 20 minutes. Observers recorded all waterbirds observed within the survey boundaries to species, sex, and age, when possible. Habitat information was recorded at each ground survey site.

FIGURE 6.4-1 GOOSE CONTROL AND TREATMENT SURVEY PLOTS WITH WATERBIRD GROUND SURVEY LOCATIONS, 2024

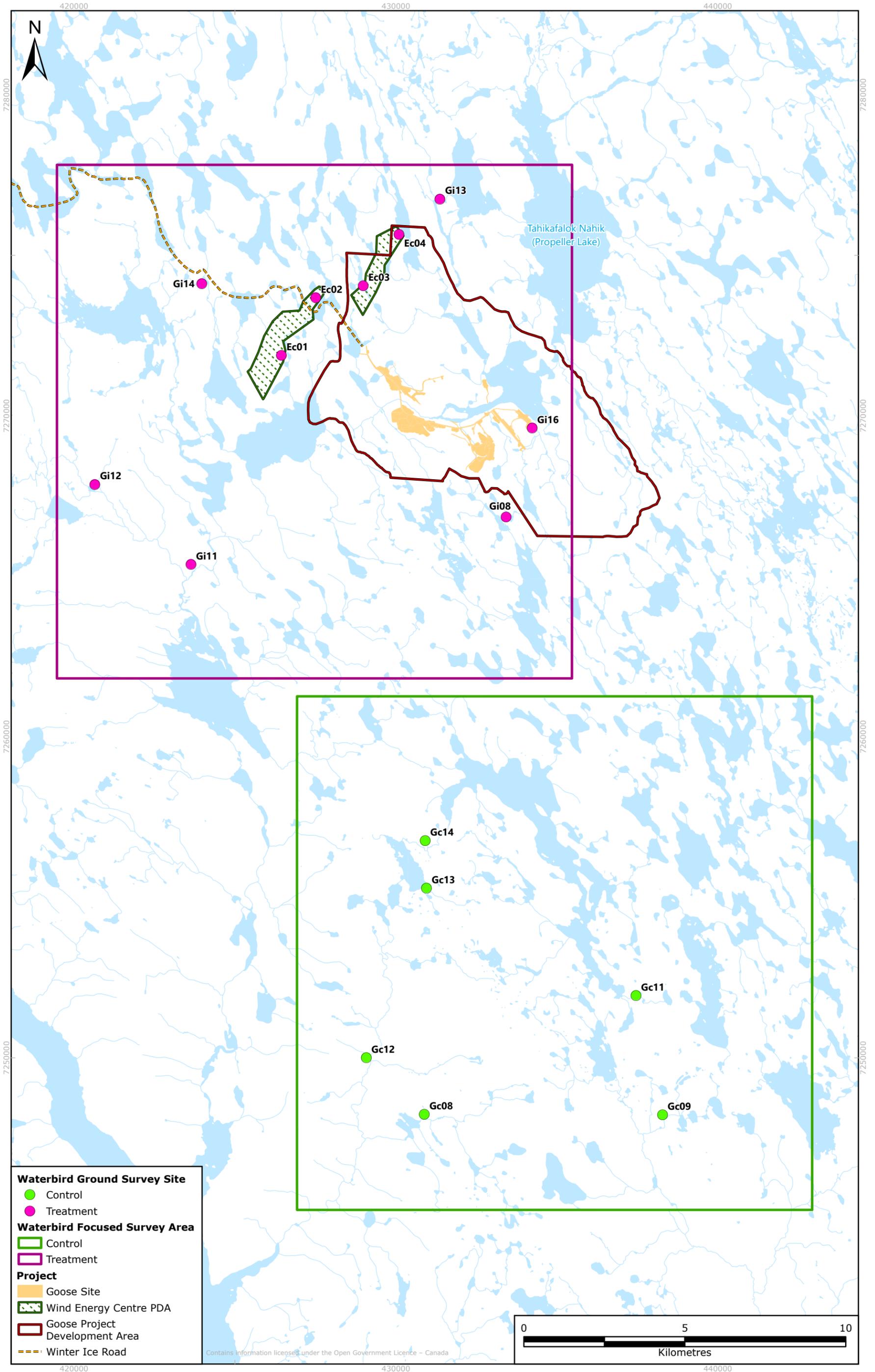
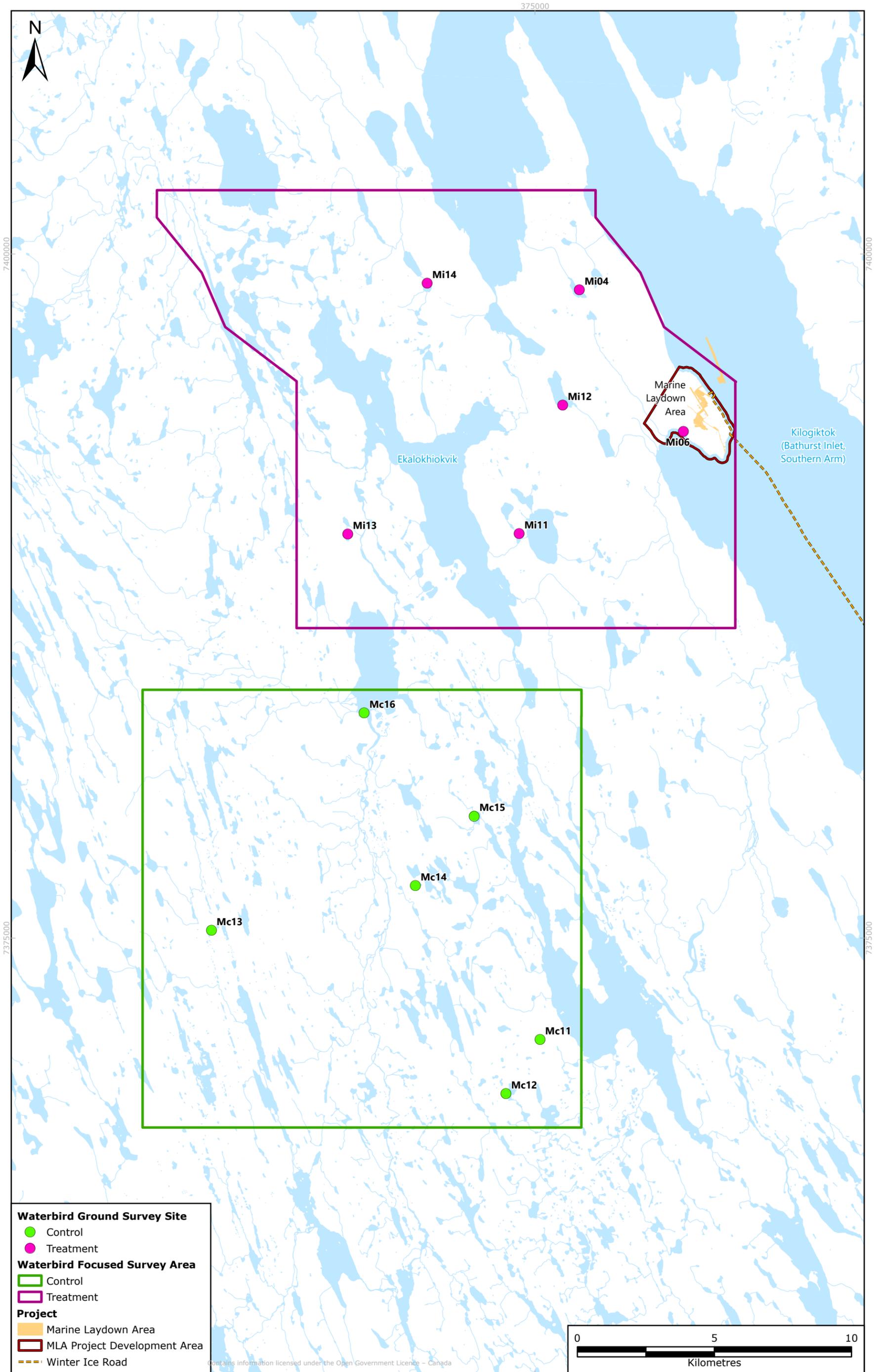


FIGURE 6.4-2 MLA CONTROL AND TREATMENT SURVEY PLOTS WITH WATERBIRD GROUND SURVEY LOCATIONS, 2024



## 6.4.2 RESULTS AND DISCUSSION

### 6.4.2.1 AERIAL SURVEYS

#### Spring Staging

The four aerial survey plots were surveyed between May 20 and 22, 2024 (Figures 6.4-3 and 6.4-4; Appendix J and Appendix K). Survey effort was similar across the four survey plots (between 71 minutes and 89 minutes per plot). During these surveys, 11 waterbird species and 1,587 individuals were observed (Table 6.4-1; Figure 6.4-3 and Figure 6.4-4). No waterbird species of conservation concern were observed during the spring staging surveys. Canada Goose (*Branta canadensis*), Greater White-fronted Goose (*Anser albifrons*), and Snow Goose (*Anser caerulescens*; Table 6.4-1) were the most commonly observed species in 2024. The highest abundance of waterbirds was recorded at the MLA Treatment plot (1,186 individuals; Table 6.4-1; Figure 6.4-5; Photo 6.4-1), while species richness was highest in the Goose Control plot (11 species; Table 6.4-1; Figure 6.4-5). Three waterbodies were identified that supported a high abundance of waterbirds during spring staging: an early spring melt close to the Goose airstrip, where a high number of Snow Geese were observed (Figure 6.4-3), and two waterbodies approximately 4 km from the MLA PDA (both within the MLA Treatment plot; Figure 6.4-4).



Photo 6.4-1 Large group of waterbirds observed during spring staging at a waterbody in the MLA Treatment plot northwest of the MLA PDA, May 2024.

At the two Goose survey plots, there was a total of 478 individuals recorded across 11 species. Within the Goose Treatment plot, there were 166 individuals among six species, compared to 224 observations among 11 species at the Goose Control plot (Table 6.4-1). Snow Goose and Greater White-fronted Goose were the most commonly observed waterbird species across both Goose survey plots.

FIGURE 6.4-3 WATERBIRDS OBSERVED DURING SPRING STAGING AERIAL SURVEYS AT THE GOOSE CONTROL AND TREATMENT PLOTS, MAY 2024

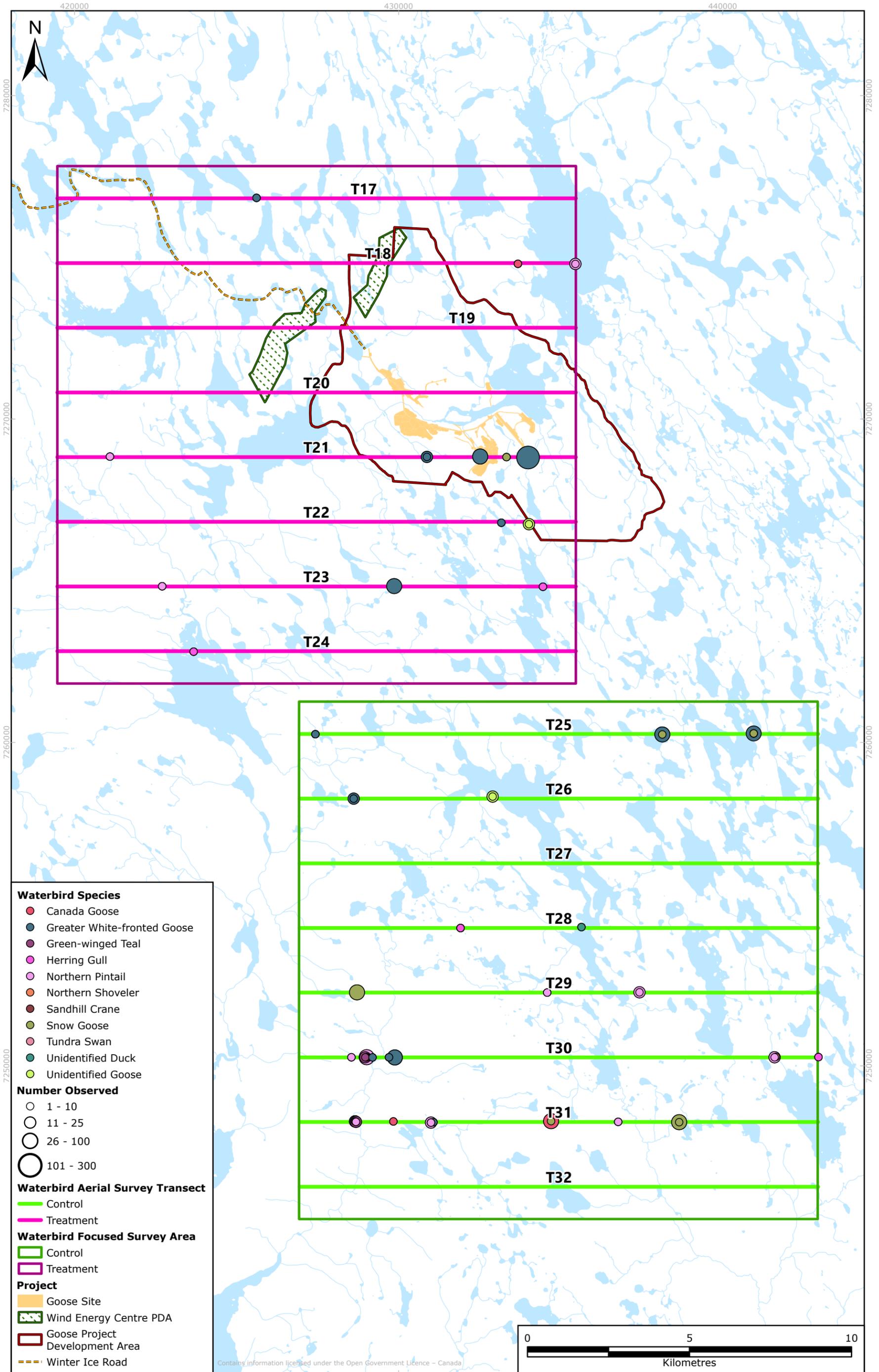


FIGURE 6.4-4 WATERBIRDS OBSERVED DURING SPRING STAGING AERIAL SURVEYS AT THE MLA CONTROL AND TREATMENT PLOTS, MAY 2024

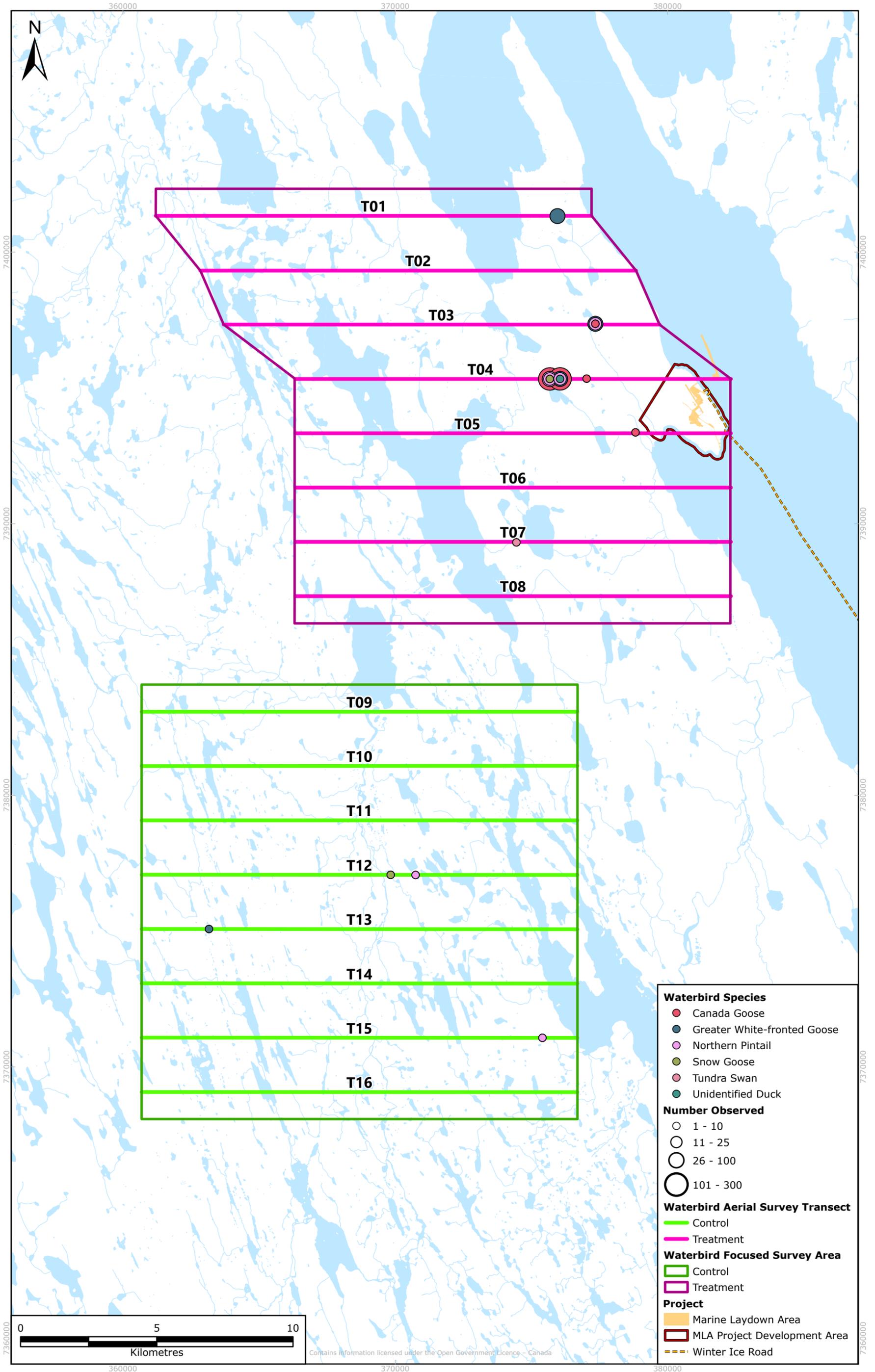


FIGURE 6.4-5 WATERBIRD ABUNDANCE AND SPECIES RICHNESS BY SURVEY PLOT DURING AERIAL SURVEYS, 2024

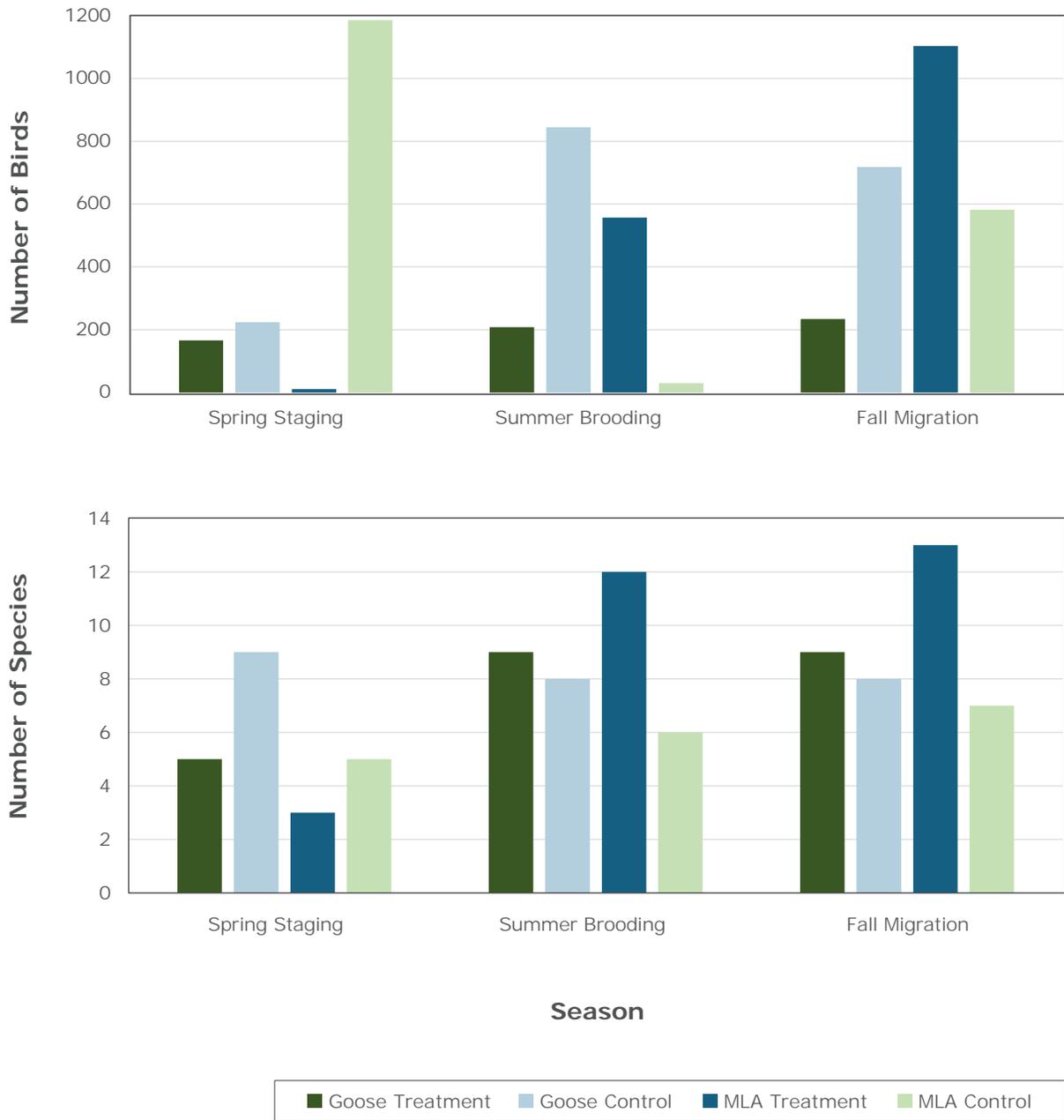


TABLE 6.4-1 SUMMARY OF WATERBIRD AERIAL SURVEYS FOR SPRING STAGING, SUMMER BROOD, AND FALL STAGING, 2024

Species	Spring Staging				Summer Brood				Fall Staging				Total
	Goose Control	Goose Treatment	MLA Control	MLA Treatment	Goose Control	Goose Treatment	MLA Control	MLA Treatment	Goose Control	Goose Treatment	MLA Control	MLA Treatment	
Arctic Tern					21	16							37
Cackling Goose						1		45			9		55
Canada Goose	16	2		466	756	134		99		25	357	175	2,030
Common Loon							1						1
Common Merganser						11		17					28
Glaucous Gull					1							2	3
Greater Scaup					4	11	4	282		22	5	568	896
Greater White-Fronted Goose	97	53	2	391	24				374	97	189	5	1,232
Green-Winged Teal	21						4	8				32	65
Herring Gull	2	2			8	8		2	6	2		7	37
Lesser Scaup												1	1
Long-Tailed Duck					29	5	15	21	3	29	4	20	126
Northern Pintail	32	8	6	88		19		14	27			124	318
Northern Shoveler	2												2
Pacific Loon								2		1		5	8
Red-Breasted Merganser								15	251	38	10	147	461
Sandhill Crane	2				2	3			3				10
Snow Goose	45	97	3	232					15				483
Surf Scoter								30					30
Tundra Swan	1			6			4	22	39	14	6	13	105
White-Winged Scoter												3	3
Yellow-Billed Loon							2			4			6
Unidentified Duck	2			3									5
Unidentified Goose	4	4									2		10
Unidentified Loon										2			2
Unidentified Scaup												1	1
<b>Total</b>	<b>224</b>	<b>166</b>	<b>11</b>	<b>1,186</b>	<b>845</b>	<b>208</b>	<b>30</b>	<b>557</b>	<b>718</b>	<b>234</b>	<b>582</b>	<b>1,103</b>	<b>5,864</b>



At the two MLA survey plots, there was a total of 1,197 individual birds recorded across 11 species. Within the MLA Treatment plot, there were 1,186 individuals among six species, compared to 11 individuals among three species at the MLA Control plot (Table 6.4-1). The most commonly observed species at the MLA were Canada Goose, followed by Greater White-fronted Goose, and Snow Goose across both MLA survey plots.

Results from aerial surveys at the Goose Treatment and Goose Control plots in 2024 were similar to results from baseline surveys in 2012 within the same plots (Rescan 2013b). In 2012, a total of 515 birds (126 within the Goose Treatment plot and 389 within the Goose Control plot) were recorded, and 11 separate species (five species within Goose Treatment plot and eight within Goose Control plot; Rescan 2013b). This is similar to the species abundance and the same species richness recorded in 2024, with 478 individuals and 11 species recorded at Goose (166 birds and six species at the Goose Treatment plot and 244 birds and 11 species at the Goose Control plot). The higher (although only by 37 individuals) number of birds observed during baseline surveys could be attributed to surveys being completed later in the season (May 29). The most abundant species during spring staging at Goose sites was the same in 2012 and 2024, with Greater White-fronted Goose, Canada Goose, and Snow Goose being the most abundance in 2012 (Rescan 2013b), and Greater White-fronted Goose and Snow Goose were the most abundant in 2024.

Baseline spring staging surveys were only completed at the MLA Treatment plot in 2013 (Rescan 2014); therefore, only results from the 2024 MLA Treatment plots are compared to baseline survey results (Rescan 2014). In 2013, a total of 40 birds were recorded and three separate species (Rescan 2014), compared to 2024, when 1,186 birds and six separate species were recorded. The most abundant species at the MLA during baseline spring staging surveys was Greater White-fronted Geese (Rescan 2014). During spring staging survey at the MLA in 2024, the most abundant species were Canada Goose, followed by Greater White-fronted Geese.

## Summer Brood

Aerial surveys for breeding waterbirds were completed between July 16 and 20, 2024 (Figures 6.4-6 and 6.4-7; Appendix J and Appendix K). Survey effort was similar across the four survey plots (between 104 minutes and 131 minutes per plot). Twenty-one waterbird species (1,432 individuals) were observed (Table 6.4-2), including 20 broods belonging to eight species (Table 6.4-2). There were no species of conservation concern recorded during summer brood surveys. Canada Goose and Greater Scaup were the most commonly observed species during brood surveys. The highest abundance of birds was recorded at the Goose Control plot (245 individuals), and the highest species richness was recorded at the MLA Treatment plot (12 species; Table 6.4-1).

At the two Goose plots, there was a total of 1,053 individual birds observed across 11 species. In the Goose Treatment plot, there were 208 individuals across eight species, and the Goose Control plot had 845 individuals and eight species. In the Goose plots, the most abundant species was Canada Goose. Six broods were observed belonging to four different species, including Long-tailed Duck, Northern Pintail, Greater Scaup, and Sandhill Crane (Table 6.4-2; Figure 6.4-6; Appendix I).

FIGURE 6.4-6 WATERBIRDS AND BROODS OBSERVED DURING AERIAL SUMMER BROOD SURVEYS AT THE GOOSE CONTROL AND GOOSE TREATMENT PLOTS, JULY 2024

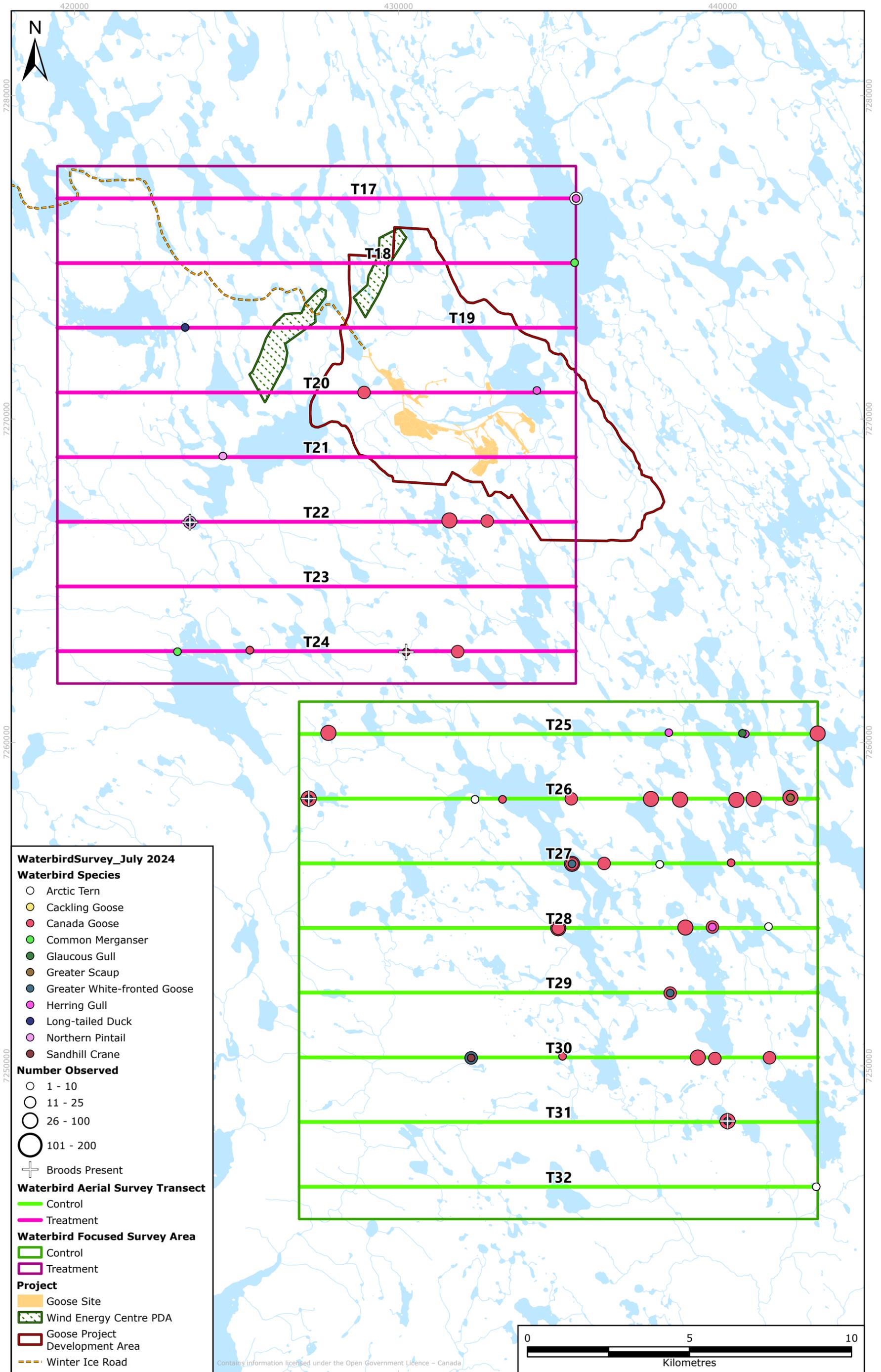
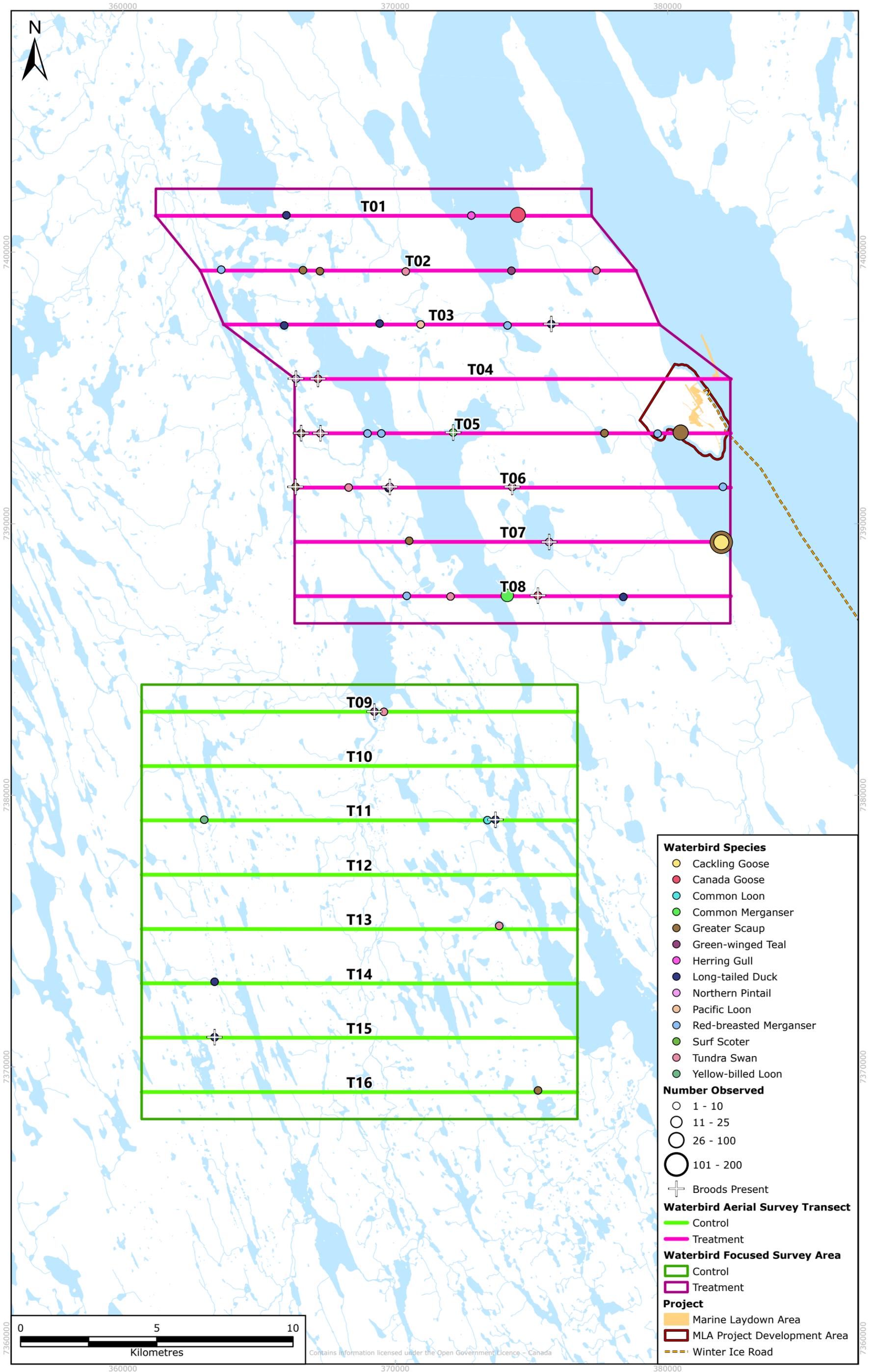


FIGURE 6.4-7 WATERBIRDS AND BROODS OBSERVED DURING AERIAL SUMMER BROOD SURVEYS AT THE MLA CONTROL AND MLA TREATMENT PLOTS, JULY 2024



**TABLE 6.4-2 OBSERVATIONS OF WATERBIRD BROODS DURING THE SUMMER BROOD SURVEYS, 2024**

Species	Brood Size <sup>1</sup>				Total Broods <sup>2</sup>
	Goose Control	Goose Treatment	MLA Control	MLA Treatment	
Canada Goose				3, 2	2
Common Merganser				1	1
Greater Scaup		6		2, 7	3
Green-winged teal			3		1
Long-tailed duck	7, 7	3	7, 4	6	6
Northern pintail		4		5, 3, 3	4
Sandhill Crane		1			1
Tundra Swan				2, 3	2
<b>Total Broods<sup>3</sup></b>	<b>2</b>	<b>4</b>	<b>3</b>	<b>11</b>	<b>20</b>

Notes:

<sup>1</sup> Different broods are separated by a comma.

<sup>2</sup> Total number of broods observed by species.

<sup>3</sup> Total number of broods observed by plot type.

At the two MLA survey plots, 587 individuals across 13 species were recorded. In the MLA Treatment plot, there were 557 individuals and 12 species observed compared to the Control plot that had 30 individuals and six species observed. In the MLA plots, the most abundant species was Greater Scaup. Fourteen broods were observed at the MLA plots, belonging to seven species, including Green-winged Teal, Long-tailed Duck, Canada Goose, Common Merganser, Greater Scaup, Northern Pintail, and Tundra Swan (Table 6.4-2; Figure 6.4-7; Appendix I).

Results from aerial surveys at the Goose Treatment and Control plots in 2024 was compared with results from the same survey plots completed during baseline surveys in 2012 (Rescan 2013b). In 2012, 1,311 individuals were observed (398 within Goose Treatment plot and 915 within Goose Control plot) across 14 separate species (five species at Goose Treatment and 12 species at Goose Control; Rescan 2013b), compared to 1,053 individuals across 11 species in 2024. In both 2012 and 2024, the most abundant species was Canada Goose. The number of broods remained consistent, with six broods observed at Goose in 2024, and seven broods (six of which were Canada Geese) observed in 2012.

Summer brood surveys were only completed at the MLA Treatment plot in 2013 (Rescan 2014); therefore, only results from the 2024 MLA Treatment plot are compared to baseline survey results. In 2013, a total of 95 birds were recorded, across eight separate species (Rescan 2014), compared to 557 birds across 12 species in 2024. The most abundant species group at the MLA during baseline summer brood surveys was diving ducks, followed by geese/swan (Rescan 2014). During summer brood surveys at the MLA in 2024, the most abundant species was Greater Scaup (a diving duck species). The number of broods was higher in 2024, with 14 broods across seven species observed (Table 6.4-2; Appendix I), compared to one brood of a Long-tailed Duck recorded during baseline surveys (Rescan 2014).

A total of 20 broods were observed during summer brood aerial surveys (Table 6.4-2). Broods were observed for the following species (Table 6.4-2): Long-tailed Duck (*Clangula hyemalis*), Green-winged Teal (*Anas carolinensis*), Greater Scaup (*Aythya marila*), Northern Pintail (*Anas acuta*), Canada Goose, Common Merganser (*Mergus merganser*), Tundra Swan (*Cygnus columbianus*), and Sandhill Crane (*Grus canadensis*) were observed during surveys, indicating successful breeding for these species in the RSA (Appendix I; Photo 6.4-2). Broods were observed within all four survey plots, with the MLA Treatment plot having the greatest number of observations (11 broods; Appendix I).



Photo 6.4-2 Female Long-tailed Duck with seven ducklings observed in the Goose Control plot during the summer brood aerial waterbird survey, July 2024.

### Fall Staging

Fall staging aerial surveys were completed at the four survey plots between September 5 and 9, 2024 (Figures 6.4-8 and 6.4-9; Appendix J and Appendix K). Survey effort was similar across the four survey plots (between 96 minutes and 117 minutes per plot). During these surveys, a total of 2,642 individual birds were observed across 22 different species (Table 6.4-1). There were no waterbird species of conservation concern detected. Both the highest abundance and highest species of richness were recorded at the MLA Treatment plot (Table 6.4-1; Figures 6.4-8 and 6.4-9). The most commonly observed species across all four survey areas were Greater White-fronted Goose, followed by Greater Scaup and Canada Goose. There were several water bodies used as fall staging areas by waterbirds throughout all four of the survey plots (Figures 6.4-8 and 6.4-9), which is in contrast to the spring staging survey.

FIGURE 6.4-8 WATERBIRDS OBSERVED DURING FALL STAGING AERIAL SURVEYS AT THE GOOSE CONTROL AND GOOSE TREATMENT PLOTS, SEPTEMBER 2024

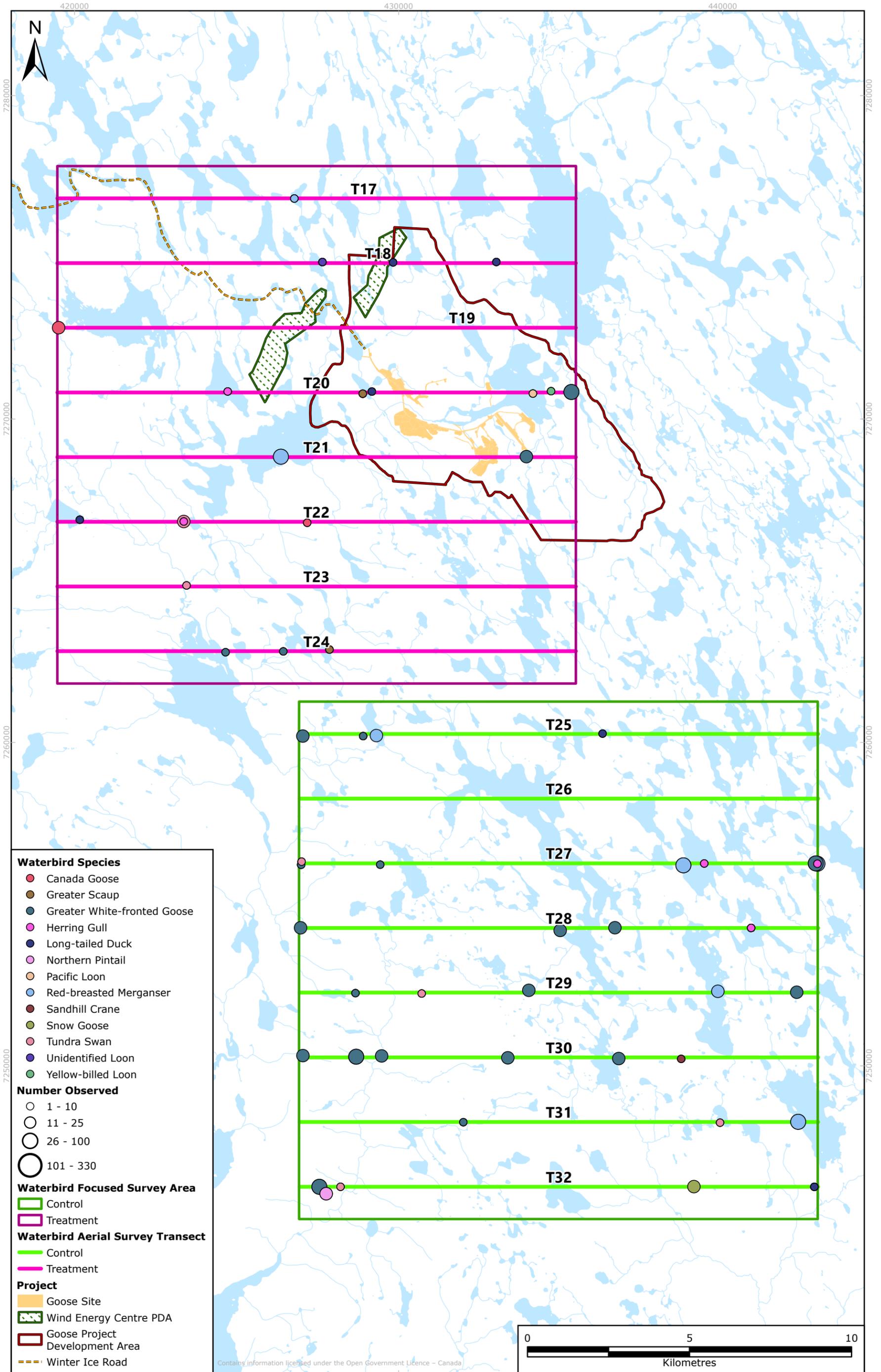
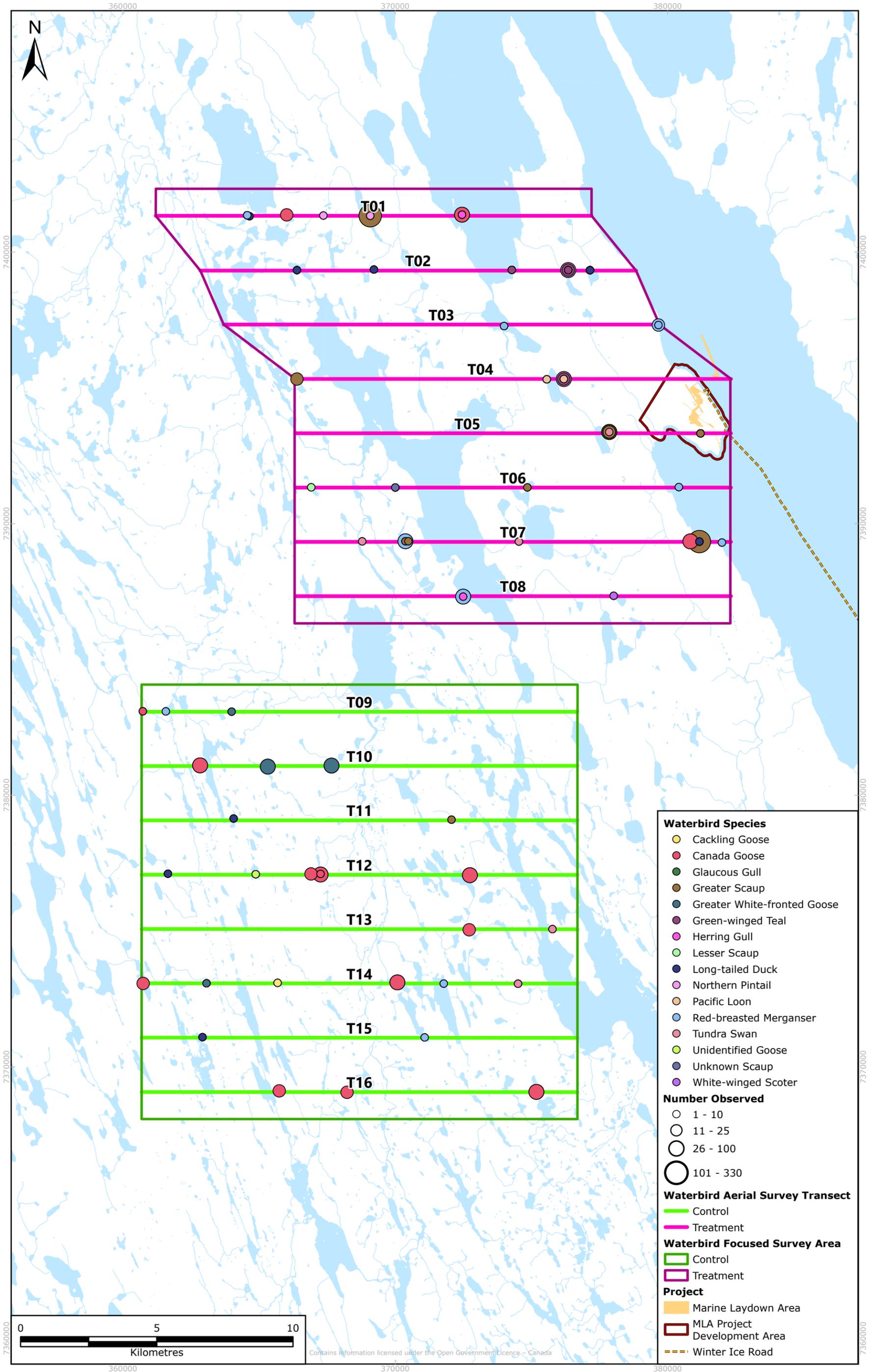


FIGURE 6.4-9 WATERBIRDS OBSERVED DURING FALL STAGING AERIAL SURVEYS AT THE MLA CONTROL AND MLA TREATMENT PLOTS, SEPTEMBER 2024



At the two Goose survey plots, 956 individuals were recorded across 14 species. Within the Goose Treatment plot, there were 234 individuals among 10 species, compared to 718 individuals among eight species at the Goose Control plot. Within the Goose survey plots, the most abundant species was Greater White-fronted Goose, followed by Red-breasted Merganser.

At the two MLA survey plots, 1,685 individual birds were observed across 16 species. Within the MLA Treatment plot, there was 1,103 individuals across 14 species observed, compared to the MLA Control plot where there were 582 individuals across eight species observed. The most commonly observed species at the MLA plots was Greater Scaup, followed by Canada Goose. The MLA Treatment plot had the highest species richness and abundance (Table 6.4-1; Figures 6.4-8 and 6.4-9), which is similar to other seasons (spring staging and summer brood). During fall staging, the MLA Control plot also had relatively high waterbird abundance, with large groups of geese using the tundra throughout the plot.

Results from the 2024 aerial fall staging surveys were compared to results from baseline surveys in 2012 at Goose plots (Rescan 2013b). In 2012, 1,218 individual birds (765 in Goose Treatment Plot, 453 in Goose Control Plot) and 11 species (six species in Goose Treatment Plot, 10 species in Goose Control Plot) were observed (Rescan 2013b), which is similar to the 957 individuals across 14 species recorded in 2024. In 2012, Canada Geese, followed by Long-tailed and Red-breasted Merganser, were the most commonly observed species, while in 2024, the most commonly observed species were Greater White-fronted Goose, followed by Red-breasted Merganser.

Fall staging surveys were only completed at the MLA Treatment plot in 2013 (Rescan 2014); therefore, only results from the 2024 MLA Treatment plots are compared to baseline survey results. In 2013, there were 277 birds recorded across seven species at the MLA (Rescan 2014), compared to 1,103 birds recorded across 14 species in 2024. The larger number of birds observed in 2024 could be attributed to large groups of staging waterbirds observed in Bathurst Inlet south of the MLA PDA in 2024, while in 2013, there were no waterbirds observed at that same location during surveys (Figure 6.4-9).

#### 6.4.2.2 GROUND SURVEYS

##### Spring Staging

Ground surveys were completed once per survey site during spring staging between May 20 to 22, 2024 (Figures 6.4-1 and 6.4-2; Appendix L and Appendix M). Species richness ranged from zero to six species, and abundance ranged from zero to 723 individuals (Table 6.4-3). Similar to the aerial spring staging survey results, the MLA Treatment plot had the highest species richness and highest abundance of birds during spring staging, compared to the other three plots.

At the Goose site, a total of 192 individual birds (150 within the Treatment plots, and 42 in Control plots) among seven species (six species at Treatment plots, four species at Control plots; Table 6.4-3; Figure 6.4-10). The most commonly observed species near Goose were Northern Pintail, followed by Snow Goose and Greater White-fronted Goose (Table 6.4-3).

FIGURE 6.4-10 WATERBIRDS OBSERVED DURING SPRING STAGING GROUND SURVEYS AT THE GOOSE CONTROL AND TREATMENT PLOTS, MAY 2024

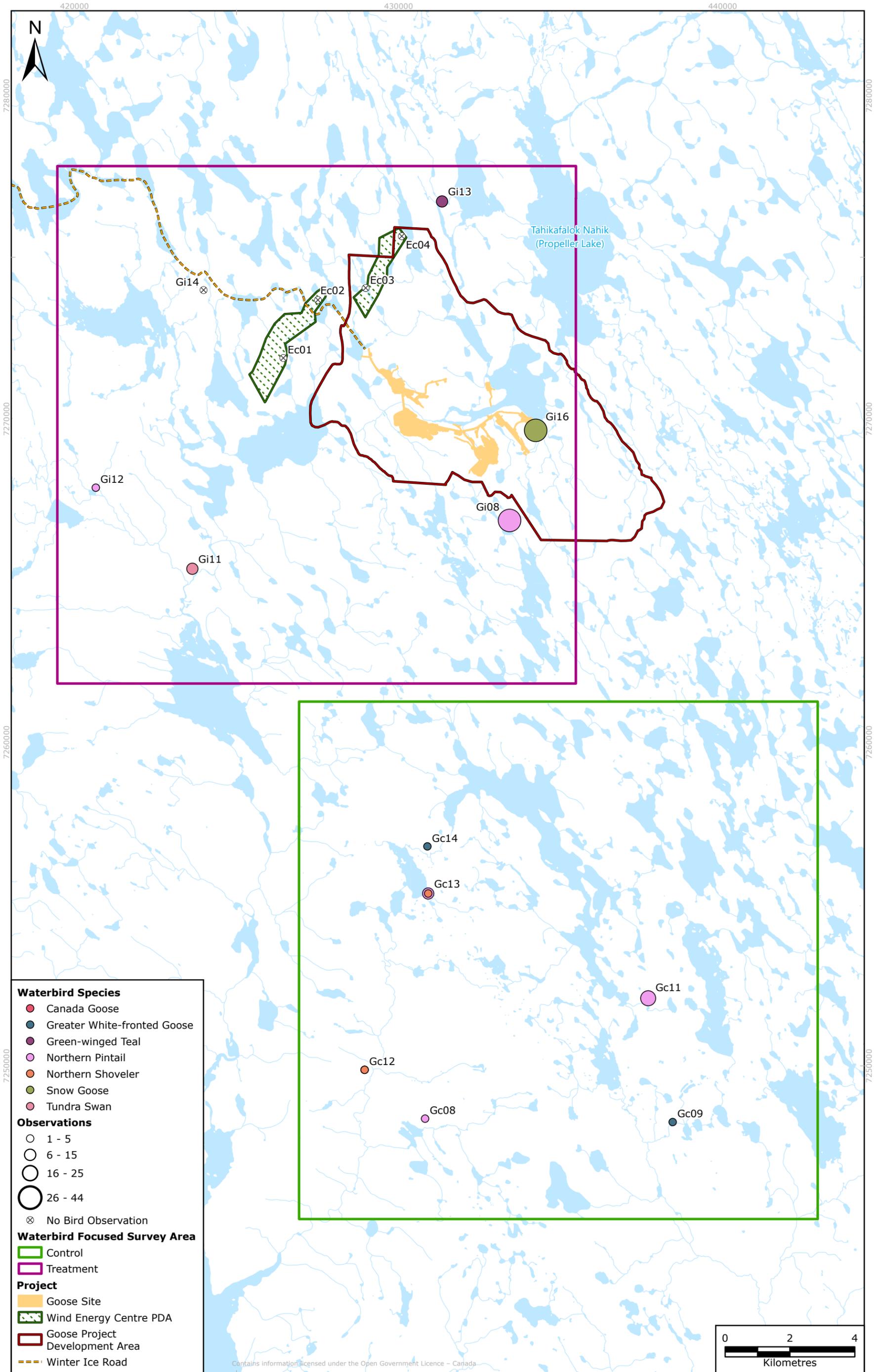


TABLE 6.4-3 WATERBIRD SIGHTINGS DURING SPRING STAGING GROUND SURVEYS, MAY 2024

Species Name	Goose Control						Goose Impact						MLA Control						MLA Impact				Total		
	Gc08	Gc09	Gc11	Gc12	Gc13	Gc14	Gi08	Gi11	Gi12	Gi13	Gi14	Gi16	Mc11	Mc12	Mc13	Mc14	Mc15	Mc16	Mi04	Mi06	Mi11	Mi12		Mi13	Mi14
Canada Goose											17								123	2		417			559
Common Goldeneye																			2						2
Greater Scaup														3											3
Greater White-Fronted Goose		2		4		2		2			23				2			24	284			186			529
Green-Winged Teal					2					6															8
Northern Pintail	2		17	4	6		41		4		2		14	2	2			48	41	2	75				260
Northern Shoveler				2	1																				3
Redhead																						4			4
Snow Goose											44								92			40			176
Tundra Swan								11									9	1				1			22
<b>Total</b>	<b>2</b>	<b>2</b>	<b>17</b>	<b>10</b>	<b>9</b>	<b>2</b>	<b>41</b>	<b>13</b>	<b>4</b>	<b>6</b>	<b>0</b>	<b>86</b>	<b>0</b>	<b>17</b>	<b>4</b>	<b>2</b>	<b>0</b>	<b>33</b>	<b>550</b>	<b>43</b>	<b>2</b>	<b>723</b>	<b>0</b>	<b>0</b>	<b>1,566</b>



At the MLA, a total of 1,374 individual birds (1,318 in Treatment plot and 56 in Control plots) among eight species (seven in Treatment plots, four within Control plots) were recorded (Table 6.4-3; Figure 6.4-11). The most commonly observed species were Canada Goose, due to greater than 400 recorded at a waterbody west of the MLA, followed by Greater White-fronted Goose and Northern Pintail.

Spring staging waterbodies with a high abundance of waterbirds identified during ground surveys were similar to those identified during aerial surveys: Mi12 and Mi04 in the MLA Treatment plot, and Gi16 near the Goose airstrip in the Goose Treatment plot (Table 6.4-3; Figures 6.4-10 and 6.4-11). No waterbird species of conservation concern were observed during the spring staging ground surveys.

### **Summer Brood**

The summer brood ground surveys were completed once per survey site between July 18 to 22, 2024 (Figure 6.4-1 and 6.4-2; Appendix L and Appendix M). Species richness ranged from zero to three, and abundance ranged from zero to 120 individuals (Table 6.4-4). Similar to the spring staging ground surveys, the MLA Treatment plot had the highest species richness and highest waterbird abundance compared to the other three plots. In contrast, the highest abundance of birds during summer brood aerial surveys was recorded at the Goose Control plot. No waterbird species of conservation concern were observed during the summer brood ground surveys.

At the Goose site, a total of 122 individual birds (87 within the Treatment plots, and 35 in Control plots) among eight species (seven at Treatment plots, and four at Control plots; Table 6.4-4; Figure 6.4-12) were recorded. The most commonly observed species in the Goose Treatment and Control Plots were Canada Goose, Cackling Goose, and Long-tailed Duck.

At the MLA site, a total of 168 individual birds (153 within the Treatment plots, and 15 within the Control plot) among nine species (eight at Treatment Plots and two at Control plots; Table 6.4-4; Figure 6.4-13) were recorded. The most commonly observed species in the MLA Treatment and Control Plots were Canada Goose and Greater Scaup (Table 6.4-4). Sites Mi04 and Mi06 in the MLA Impact plot had the highest waterbird abundance (Table 6.4-4). High abundance was observed during aerial summer brood surveys at Mi06, but not at Mi04.

The number of broods observed during the ground surveys was low compared to the aerial summer brood surveys (Section 6.4.2.1), with three broods recorded during ground survey compared to 20 broods during aerial surveys. Broods were recorded for two species during ground surveys: two Greater Scaup broods and one Long-tailed Duck. The observations of Greater Scaup broods were both recorded in Treatment plots, one in the MLA (Mi04) and the other at Goose (Ec03; Appendix M). The Long-tailed Duck brood was also observed in Goose Treatment site Ec03 (Appendix M).

FIGURE 6.4-11 WATERBIRDS OBSERVED DURING SPRING STAGING GROUND SURVEYS AT THE MLA CONTROL AND TREATMENT PLOTS, MAY 2024

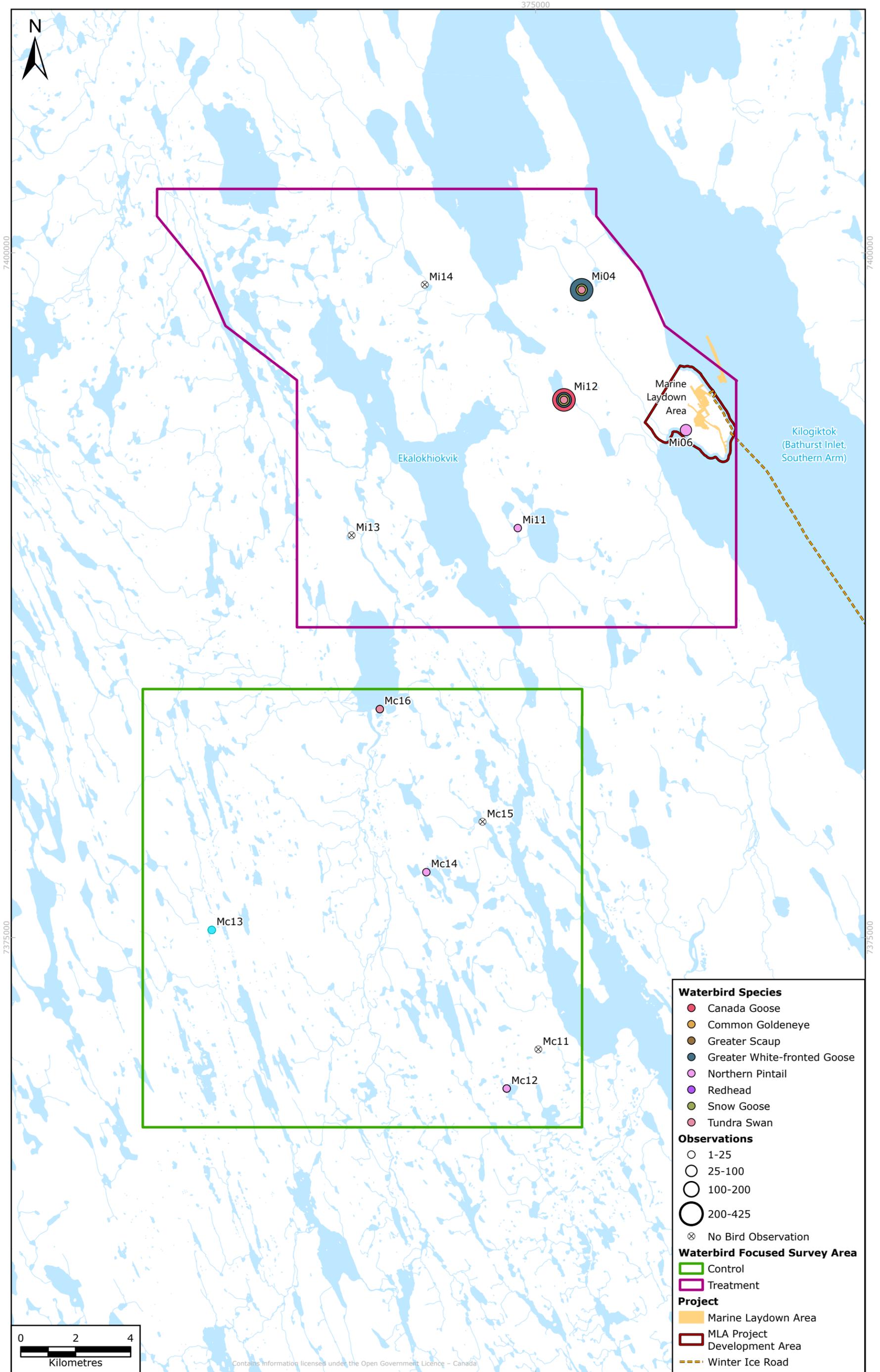


FIGURE 6.4-12 WATERBIRDS OBSERVED DURING SUMMER BROOD GROUND SURVEYS AT THE GOOSE CONTROL AND TREATMENT PLOTS, JULY 2024

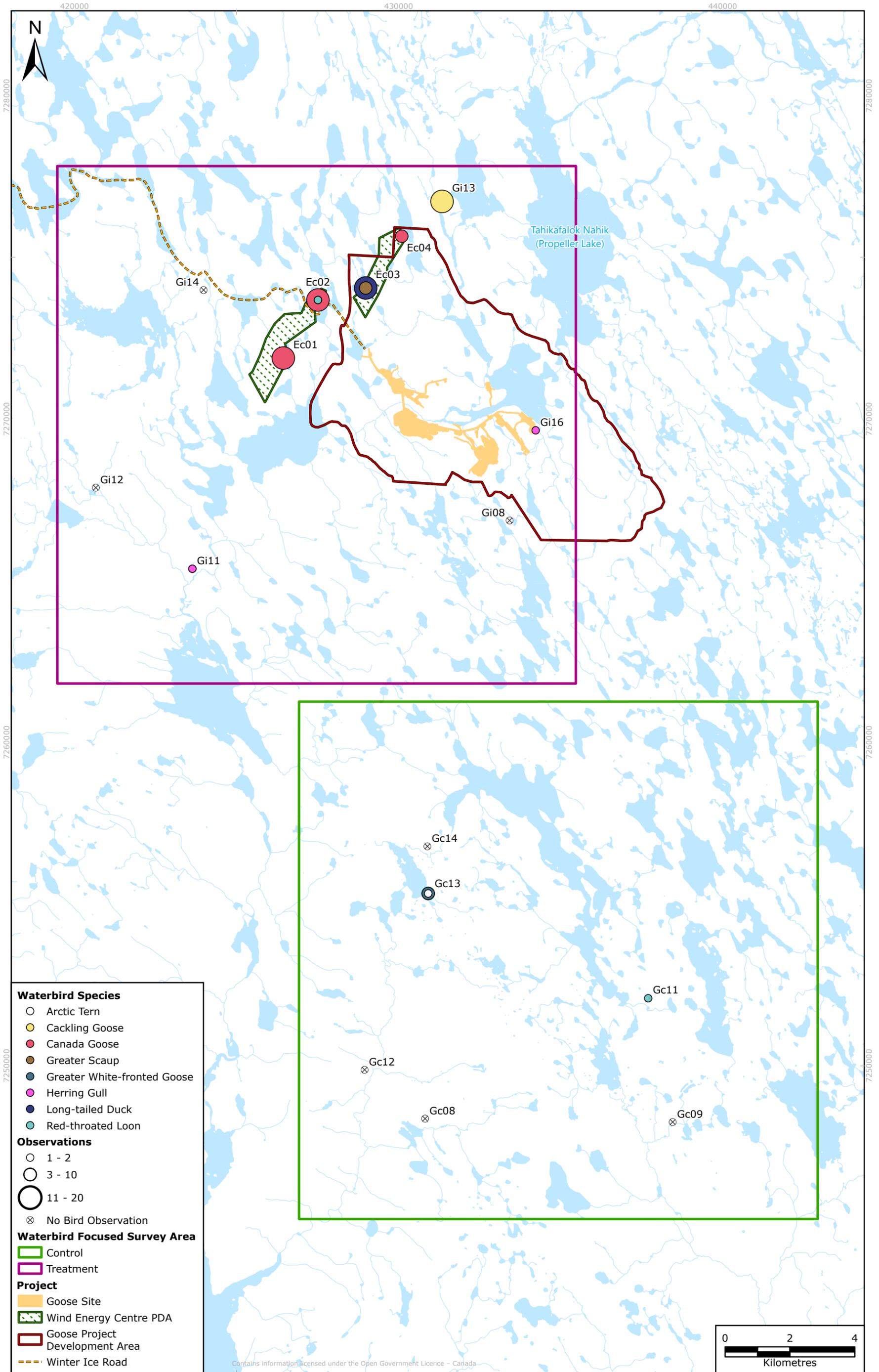


FIGURE 6.4-13 WATERBIRDS OBSERVED DURING SUMMER BROOD GROUND SURVEYS AT THE MLA CONTROL AND TREATMENT PLOTS, JULY 2024

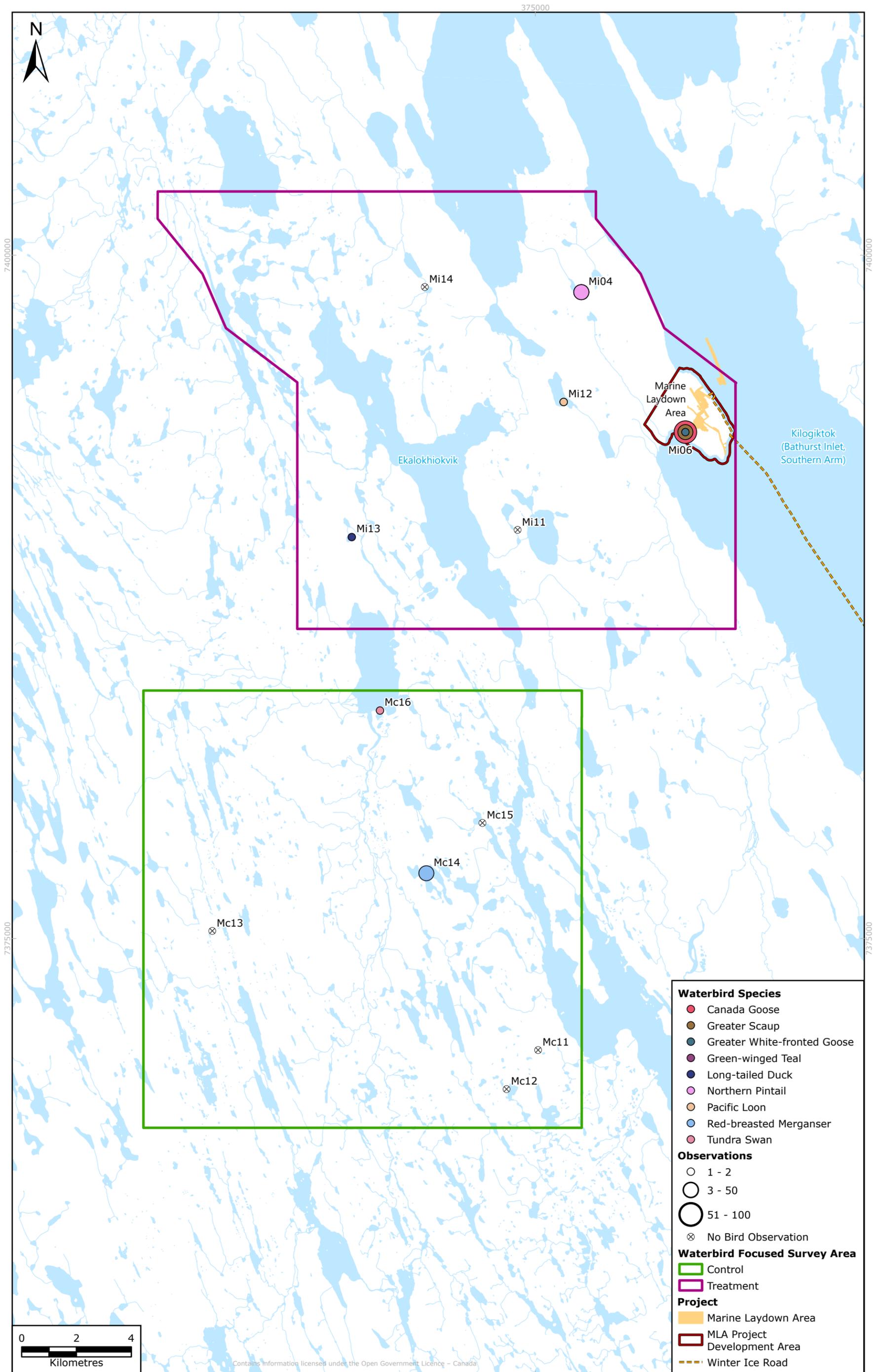


TABLE 6.4-4 SUMMARY OF WATERBIRD SUMMER BROOD GROUND SURVEY RESULTS, JULY 2024

Species Name	Goose Control							Goose Impact							MLA Control						MLA Impact				Total						
	Gc08	Gc09	Gc11	Gc12	Gc13	Gc14	Ec01	Ec02	Ec03	Ec04	Gi08	Gi11	Gi12	Gi13	Gi14	Gi16	Mc11	Mc12	Mc13	Mc14	Mc15	Mc16	Mi04	Mi06		Mi11	Mi12	Mi13	Mi14		
Arctic Tern					2			1																							3
Cackling Goose														18																	18
Canada Goose					6		21	18		5		2																	100	152	
Greater Scaup									7														9	19						35	
Greater White-fronted Goose					5																							1	6		
Green-winged Teal																							13							13	
Herring Gull												2				1														3	
Long-tailed Duck									11																			1	12		
Northern Pintail																							7							7	
Pacific Loon																										1			1		
Red-breasted Merganser																														13	
Red-throated Loon				1				1																						2	
Tundra Swan																												2		4	
<b>Total</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>13</b>	<b>0</b>	<b>21</b>	<b>20</b>	<b>18</b>	<b>5</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>18</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>13</b>	<b>0</b>	<b>2</b>	<b>29</b>	<b>120</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>269</b>		



## Fall Staging

The fall staging ground surveys were completed once per survey site between September 6 to 9, 2024 (Figures 6.4-1 and 6.4-2; Appendix L and Appendix M). Species richness ranged from zero to five, and abundance ranged from zero to 83 individuals (Table 6.4-5). Similar to the aerial fall staging survey results, the MLA Treatment plot had the highest species richness and total waterbird abundance. No waterbird species of conservation concern were observed during the fall staging ground surveys.

At the Goose site, a total of 85 individual birds (37 in the Treatment plot and 48 in the Control plot) among six species (four in the Treatment plot and three in the Control plot; Table 6.4-5; Figure 6.4-14). The most commonly observed species in the Goose plots were the Greater White-fronted Goose, Red-breasted Merganser, and Sandhill Crane.

At the MLA sites, a total of 127 individual birds (102 in the Treatment plot and 25 in the Control Plot) among nine species (eight species in the Treatment Plot and two species in the Control plot; Table 6.4-5; Figure 6.4-15). The most commonly observed species were the Northern Pintail, Green-winged Teal, and Greater White-fronted Goose. Fall staging waterbody with highest abundance of waterbirds identified during fall ground surveys also had high abundance during spring staging and summer brood ground surveys: Mi04 in the MLA Treatment plot (Table 6.4-5; Figure 6.4-15; Photo 6.4-3).



Photo 6.4-3 Northern Pintails observed at site Mi04 during fall staging ground surveys within the MLA Impact plot, September 2024.

FIGURE 6.4-14 WATERBIRDS OBSERVED DURING FALL STAGING GROUND SURVEYS AT THE GOOSE CONTROL AND TREATMENT PLOTS, SEPTEMBER 2024

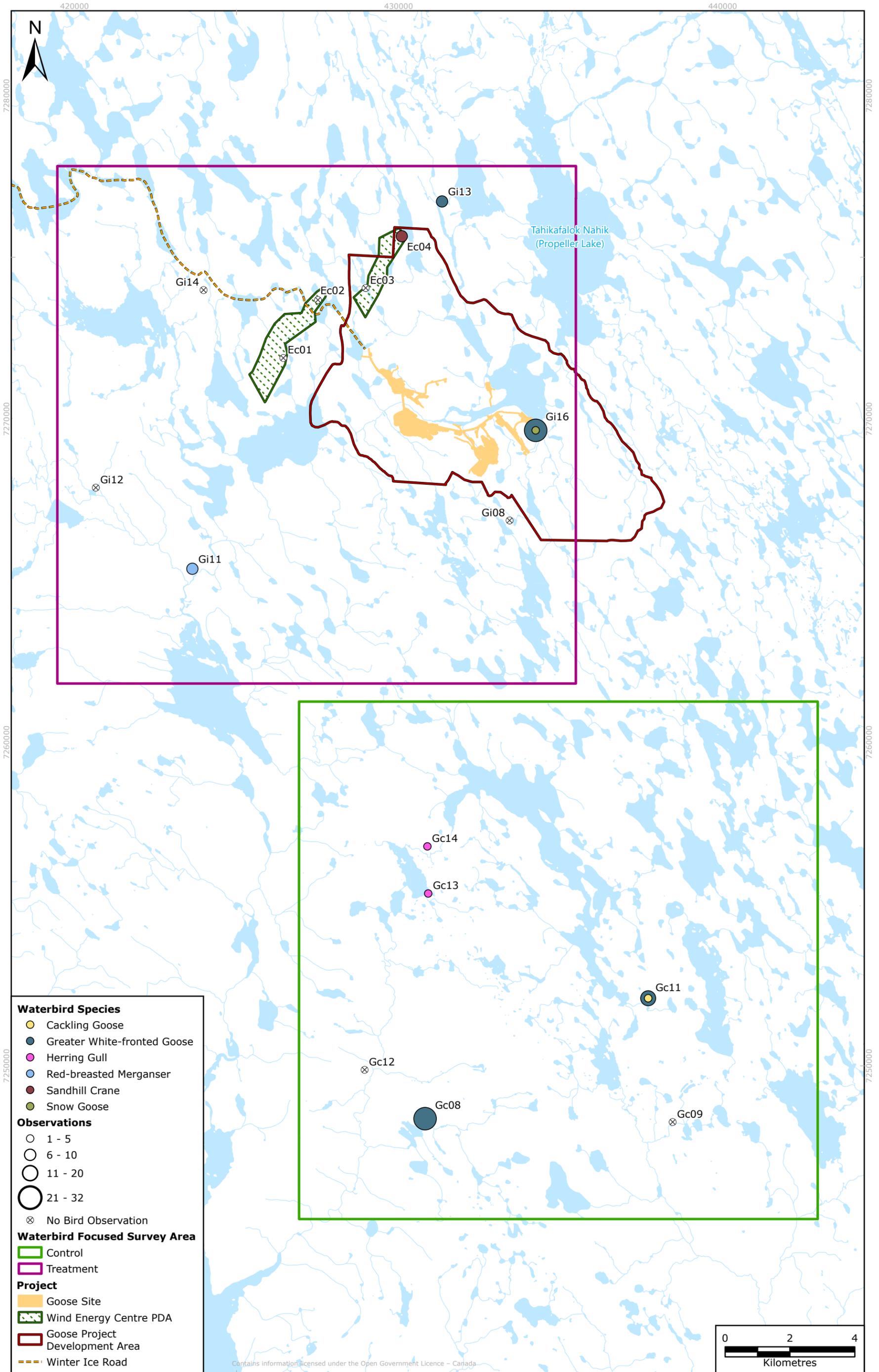


FIGURE 6.4-15 WATERBIRDS OBSERVED DURING FALL STAGING GROUND SURVEYS AT THE MLA CONTROL AND TREATMENT PLOTS, SEPTEMBER 2024

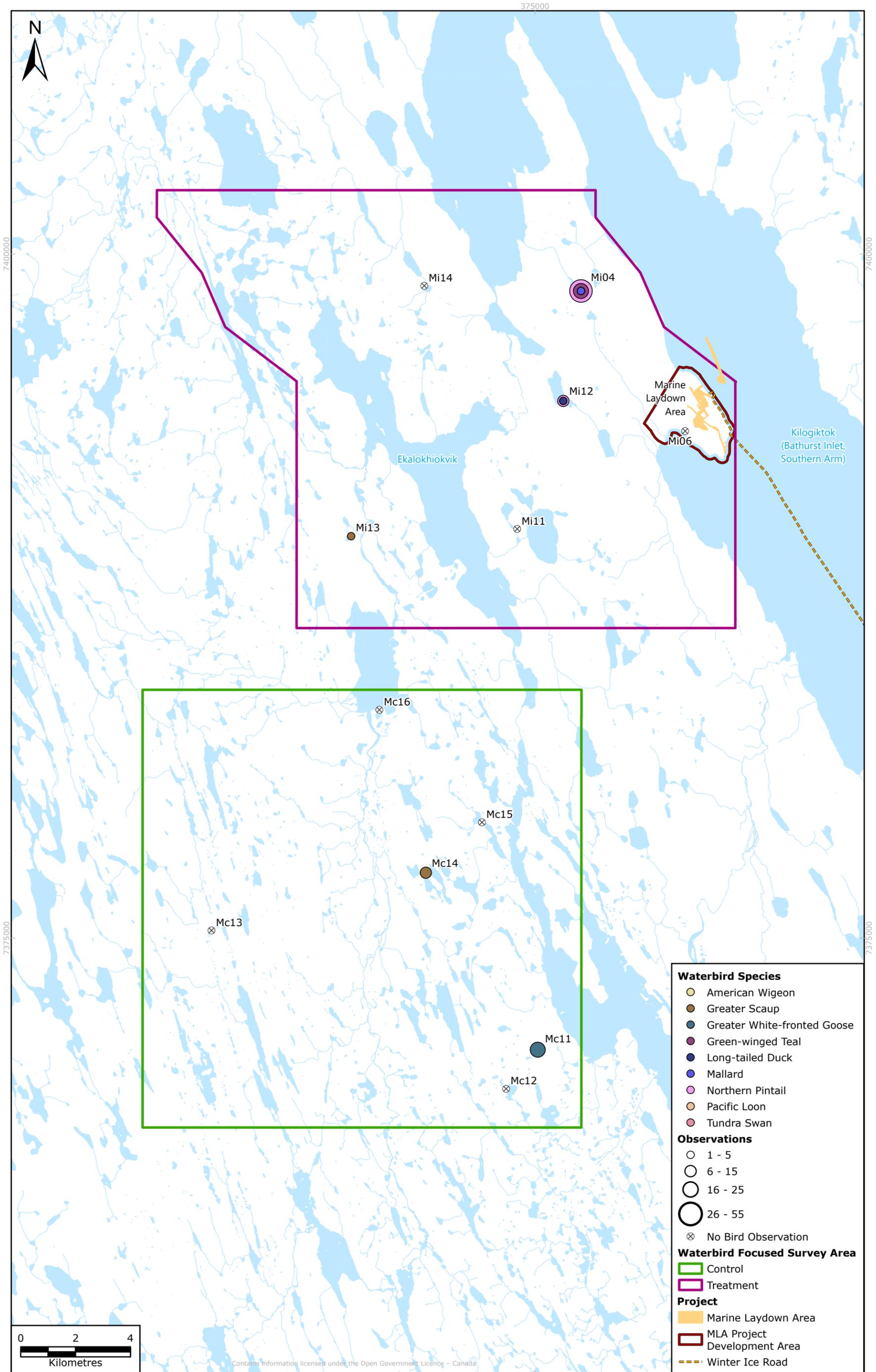


TABLE 6.4-5 SUMMARY OF WATERBIRD FALL STAGING GROUND SURVEY RESULTS, SEPTEMBER 2024

Species	Goose Control						Goose Impact										MLA Control						MLA Impact						Total	
	Gc08	Gc09	Gc11	Gc12	Gc13	Gc14	Ec01	Ec02	Ec03	Ec04	Gi08	Gi11	Gi12	Gi13	Gi14	Gi16	Mc11	Mc12	Mc13	Mc14	Mc15	Mc16	Mi04	Mi06	Mi11	Mi12	Mi13	Mi14		
American Wigeon																							2							2
Cackling Goose			4																											4
Greater Scaup																				7							1			8
Greater White-fronted Goose	21		18										8		32	18														97
Green-winged Teal																							23							23
Herring Gull					4	1																								5
Long-tailed Duck																										1				1
Mallard																							1							1
Northern Pintail																							55			11				66
Pacific Loon																										4				4
Red-breasted Merganser												10																		10
Sandhill Crane															10															10
Snow Goose																5														5
Tundra Swan																							2			2				4
<b>Total</b>	<b>21</b>	<b>0</b>	<b>22</b>	<b>0</b>	<b>4</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>37</b>	<b>18</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>83</b>	<b>0</b>	<b>0</b>	<b>18</b>	<b>1</b>	<b>0</b>	<b>240</b>	



### 6.4.3 COMPARISON OF SURVEY METHODS

The aerial and ground survey methods were compared qualitatively to determine which method will have a greater ability to detect a ZOI for waterbirds (B2Gold 2024a).

For the spring staging surveys, the trend in waterbird abundance and species richness were similar between methods for the MLA plots. However, for the Goose plots, the Control site had higher waterbird abundance during aerial surveys, while the Treatment plot had higher abundance during ground surveys.

During fall staging, the aerial survey method was more effective at detecting waterbird abundance and species richness across the plots compared to the ground survey method. Aerial and ground surveys at specific ponds elicited similar results, such as at ground survey site Mi04, which was identified as supporting a high abundance of waterbirds during both ground surveys and aerial surveys, as well as a similar number of birds being counted. Therefore, aerial surveys allow for greater spatial coverage of the area, while still recording similar numbers of birds as the ground surveys.

During summer brood surveys, both methods resulted in similar trends between the Control and Treatment plots in terms of waterbird abundance and species richness. However, there was a difference between the methods in terms of waterbird productivity (i.e., detection of broods). Using the ground survey method, only three broods were detected, compared to 20 broods observed during aerial surveys, suggesting aerial surveys may be a more valuable method for waterbird surveys at the Back River Mine.

## 6.5 UPLAND BREEDING BIRD POPULATION SURVEYS

Regional monitoring for upland birds was completed to determine if upland birds are avoiding the Mine site, as described in the WMMP Plan (B2Gold 2024a). If results indicate that fewer upland birds occur near the Mine, a review of site activities will be triggered to identify if there are adaptive management actions that can reduce any potential disturbance to upland birds.

To monitor upland bird populations, two survey methods were used:

1. Rapid Program for Regional and International Shorebird Monitoring (PRISM) surveys; and
2. Variable Radius Point Count (VRPC) surveys.

Both survey types are a continuation of the baseline methods implemented in 2007, 2011, 2012, 2013, and 2019 (Gartner Lee Limited 2008; Rescan 2012, 2013b, 2014; ERM 2022).

Data analysis to determine temporal trends in the distribution and productivity of upland birds between the Control and Treatment zones of both the Goose and MLA PDAs will be completed when additional years of data have been collected. As this is the first year of the upland bird population monitoring program, no data analysis can be completed at this time.

## 6.5.1 METHODS

### 6.5.1.1 REGIONAL PRISM MONITORING

In 2024, regional PRISM surveys following the CWS PRISM protocol (CWS 2024) were completed in the Control and Treatment zones of the Goose and MLA PDAs. A total of 50 PRISM surveys were planned to be completed from mid-June to early July to correspond with the upland bird nesting season (B2Gold 2024a). Due to logistical constraints and inclement weather conditions, a total of 30 PRISM surveys were completed, comprised of 24 survey sites in the Goose zones and six survey sites in the MLA zones (Figure 6.5-1 and Figure 6.5-2).

Each PRISM survey site was 300 m by 400 m in size (area of 12 ha) and were selected from historical PRISM survey locations completed during baseline surveys (Rescan 2012, 2013b; ERM 2022). Within the Treatment zones, survey sites were selected based on habitat type and stratified across varying distances from infrastructure. Survey sites in the Control zones were selected randomly to match the habitat types of the survey sites included in the Treatment zones. Habitat characterization was completed at each PRISM survey site to determine secondary habitat features, including general topography, aquatic features, and vegetation cover (Appendix N).

Survey sites were accessed by helicopter, with landing locations located at least 200 m from the plot boundaries to minimize disturbance to birds. Weather variables were recorded at the beginning of each survey, and plot photos were taken from at least one corner of the plot. Habitat cover and characterization were also recorded for each plot. Observers systematically surveyed the plot, starting from one corner and walking in tandem along the north-south transects spaced 25 m apart (CWS 2024).

During PRISM surveys, all birds seen or heard within the plot were recorded and mapped according to species, sex, and age, where possible (Appendix O). Breeding territories within a plot were determined based on behavioural cues (e.g., carrying food or nesting materials, courtship displays, breeding pairs, alarm calling, and distraction displays). All nests observed during PRISM surveys were georeferenced and photographed. Nest details, coordinates, and photographs were recorded for all nests found in the plot. Nest details recorded included the associated species, nest stage, number of eggs/nestlings, flushing distance, nest cover, and nest substrate. Additionally, all non-bird species, or bird species observed outside of the PRISM plot boundaries, were recorded as incidental observations. All birds that flew over the plot without landing were also recorded as incidental observations. Incidental observations are all reported in Section 6.7.

### 6.5.1.2 VARIABLE RADIUS POINT COUNTS

In 2024, regional VRPC surveys were completed during the breeding bird period in June following RIC standards (RIC 1999). Surveys were completed using a 100 m radius as recommended in the VRPC protocol, which is a common technique used to estimate species richness and relative abundance of forest birds (Ralph et al. 1995). One VRPC survey was completed in the south-east corner of each of the PRISM survey plot before PRISM surveys began (Figure 6.5-1 and Figure 6.5-2). Survey site selection of the Goose and MLA Treatment and Control zones is described in the PRISM survey methods (Section 6.5.1.1).

FIGURE 6.5-1 GOOSE SITE PRISM AND VRPC LOCATIONS, 2024

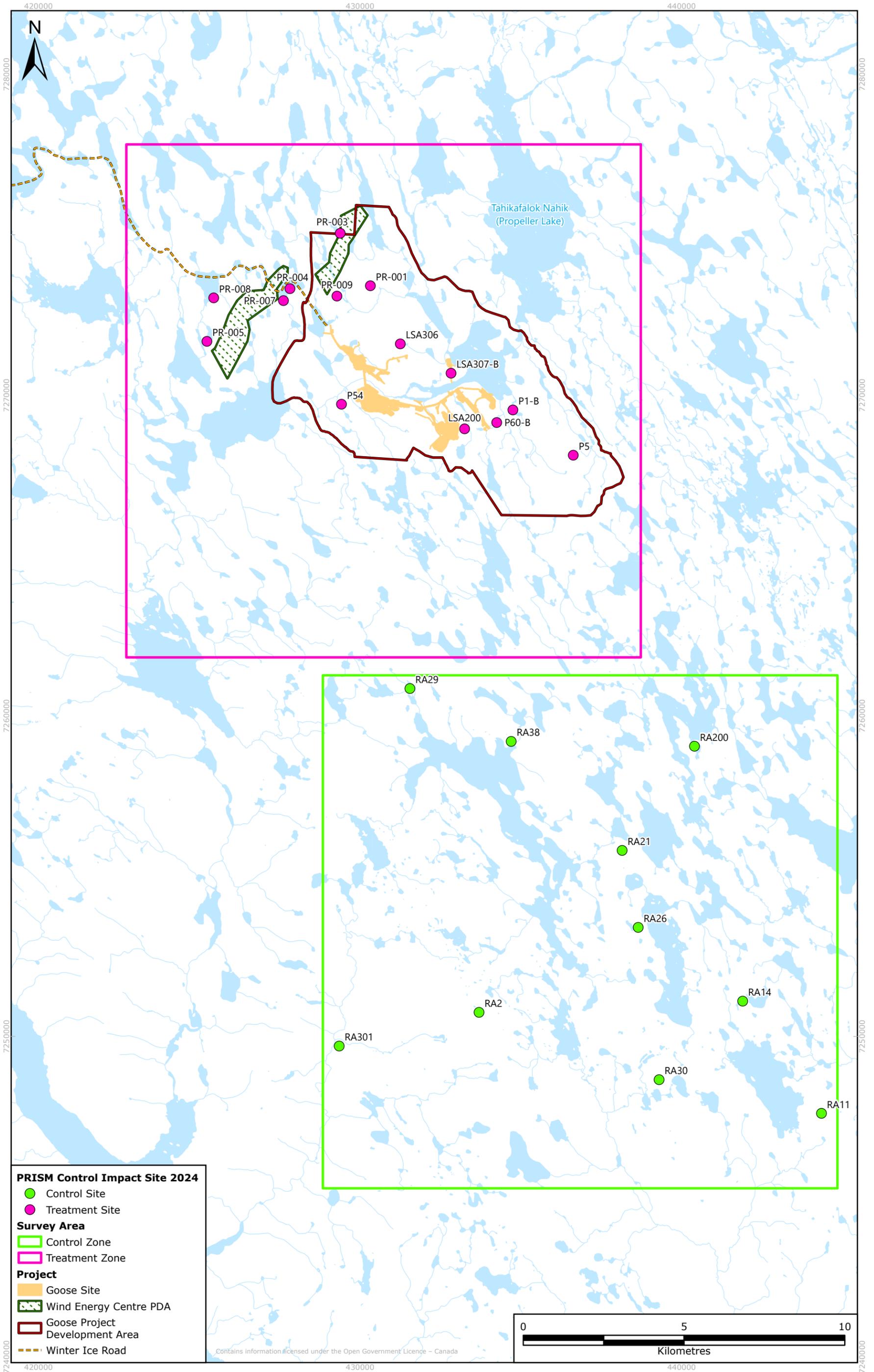
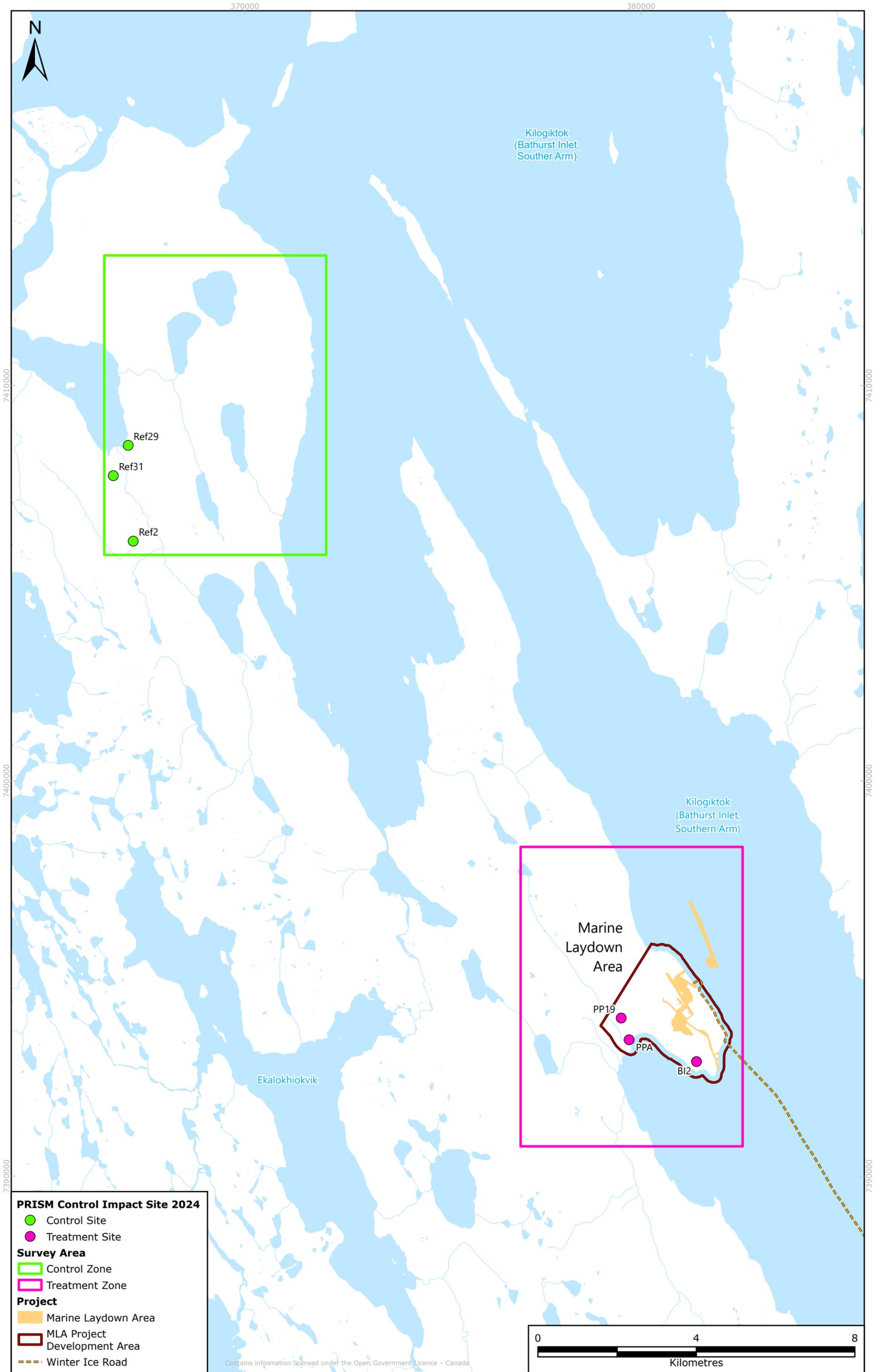


FIGURE 6.5-2 MARINE LAYDOWN AREA PRISM AND VRPC LOCATIONS, 2024



Survey timing varied from RIC standards as the active period for birds in the Arctic differs from forest and grassland birds in southern habitats. General weather, habitat, and vegetation cover data is collected at each site prior to surveying (Appendix N). The VRPC surveys were completed for 5 minutes, during which all bird species seen and heard were recorded (Appendix P). Bird detections were estimated according to distance from the observer and binned into 0 to 50 m and 50 to 100 m distances. Surveys were not completed when wind speeds exceeded approximately 11 km/h (greater than a 2 on the Beaufort scale) or when precipitation exceeded a light, intermittent drizzle. All crews that completed VRPC surveys had at least one qualified observer who was experienced in identifying birds by sight and sound. Detections that occurred before or after the survey were considered as flyovers (referring to individuals that exclusively flew through the survey plot), and are outside of the 100 m distance were recorded as incidental observations (Section 6.7).

Upland bird data was summarized by relative abundance and species richness. Relative abundance is the number of individuals counted, and species richness is the total number of species observed during each survey period. These estimates included only those data collected during VRPC surveys (i.e., no incidental observations).

## 6.5.2 RESULTS AND DISCUSSION

### 6.5.2.1 REGIONAL PRISM MONITORING

A total of 30 PRISM surveys were completed at Goose (10 Control, 14 Treatment) and the MLA (three Control, three Treatment) from June 14 to July 1, 2024 (Appendix N and Appendix O). The PRISM surveys were completed in a variety of upland and lowland tundra habitats with additional aquatic habitat features, such as wetlands, lakes, oceans, rivers, marshes, and ponds noted within select survey sites. A total of 617 individual birds, from 18 unique species, were recorded during 2024 PRISM surveys (Appendix O). A lower total number of birds and unique species were recorded at the MLA zones (Total Birds = 110; Unique Species = 8) than Goose zones (Total Birds = 507; Unique Species = 18), which is due to the lower number of PRISM survey sites completed.

A total of five species of conservation concern were observed during PRISM surveys in 2024, including American Golden-plover (*Pluvialis dominica*), Harris's Sparrow (*Zonotrichia querula*), Hoary Redpoll (*Acanthis hornemanni*), Red-necked Phalarope (*Phalaropus lobatus*), and Semipalmated Sandpiper (*Charadrius semipalmatus*). American Golden-plover, Hoary Redpoll, Red-necked Phalarope, and Semipalmated Sandpiper are all territorially ranked as Vulnerable (CESCC 2022). Harris's Sparrow and Red-necked Phalarope are both assessed as species of Special Concern by COSEWIC and are listed as such on Schedule 1 of SARA (Government of Canada 2025). Further information regarding each federal and territorial status for species of conservation concern is presented in Section 10.

## Goose

Upland bird PRISM surveys were completed between June 14 and June 30, 2024, at a total of 24 survey sites across both Control and Treatment zones in the Goose PDA (Figure 6.5-1 and Figure 6.5-2; Appendix N). The average survey effort for PRISM surveys was 1 hour and 27 minutes per site, with a total survey effort of 34.92 hours to complete all 24 PRISM plots. The weather conditions were generally considered mild, with an average temperature of 7°C and average wind speeds of 12 km/h to 19 km/h (3 on the Beaufort scale; Appendix N).

A total of 507 upland birds (299 at Treatment, 208 at Control) from 18 bird species (15 at Treatment, 14 at Control) were detected during PRISM surveys in the Goose area (Table 6.5-1; Appendix O). More PRISM surveys were completed in the Treatment zone (14) than the Control zone (10); however, the average bird abundance per survey site are relatively the same between the two zones (20.6 in the Treatment zone, 20.9 in the Control zone; Figure 6.5-3). The most commonly observed bird species at both Control and Treatment plots were Lapland Longspur, Savannah Sparrow, and America Tree Sparrow (*Spizelloides arborea*; Table 6.5-1), accounting for approximately 78% of all bird observations.

Approximately 4% of all bird observations were shorebird species. The Semipalmated Sandpiper was the most frequently observed shorebird and is one of five species of conservation concern in Nunavut that were observed during PRISM surveys. The four additional species of conservation concern that were observed include the Red-necked Phalarope, American Golden-plover, Hoary Redpoll, and Harris's Sparrow (Table 6.5-1). Most species of conservation concern were observed in both Control and Treatment zones, except for the Hoary Redpoll, that was only observed in the Treatment zone, and the American Golden-plover, only observed in the Control zone. This is consistent with previous surveys completed during baseline surveys, where American Golden-plover was observed mainly in the Goose Control zone (64% of observations). This difference may be due to differences in microhabitats where the Control zone may be better breeding habitat for American Golden-plovers than the habitat in the Treatment zone.

Species richness varied between two and nine species across all PRISM plots, with an average of approximately five species (Figure 6.5-3 and Figure 6.5-4). Bird abundance varied between four and 40 birds across all plots, with an average of approximately 20 birds per transect (Figure 6.5-3; Table 6.5-1). Control and Treatment zones had similar average species richness (20.9 at the Control Zone and 20.6 at the Treatment zone) and similar average abundance (five for both the Control and Treatment zones; Figure 6.5-3). Control survey site RA-29 had the highest species richness and abundance (Figure 6.5-3 and Figure 6.5-4). This plot, located in lowland habitat, featured both a pond and stream, which together comprised 30% of the plot area. Species observed in the RA-29 included both shorebirds and songbirds, and two species of conservation concern (Red-necked Phalarope and Semipalmated Sandpiper; CESSC 2022; Government of Canada 2025).

Seven nests were observed during surveys at Goose, including four nests belonging to upland bird species, two nests for shorebird species (Semipalmated Sandpiper), and one ptarmigan species (Table 6.5-2). Savannah Sparrow and Semipalmated Sandpiper nests were the most commonly observed (two nest of each species; Photo 6.5-1). The two Semipalmated Sandpiper nests were both observed in Treatment zone survey sites near to each other within 1 km of site infrastructure (Table 6.5-2; Figure 6.5-4).

FIGURE 6.5-3 SPECIES RICHNESS AND BIRD ABUNDANCE AT GOOSE PRISM PLOTS, 2024

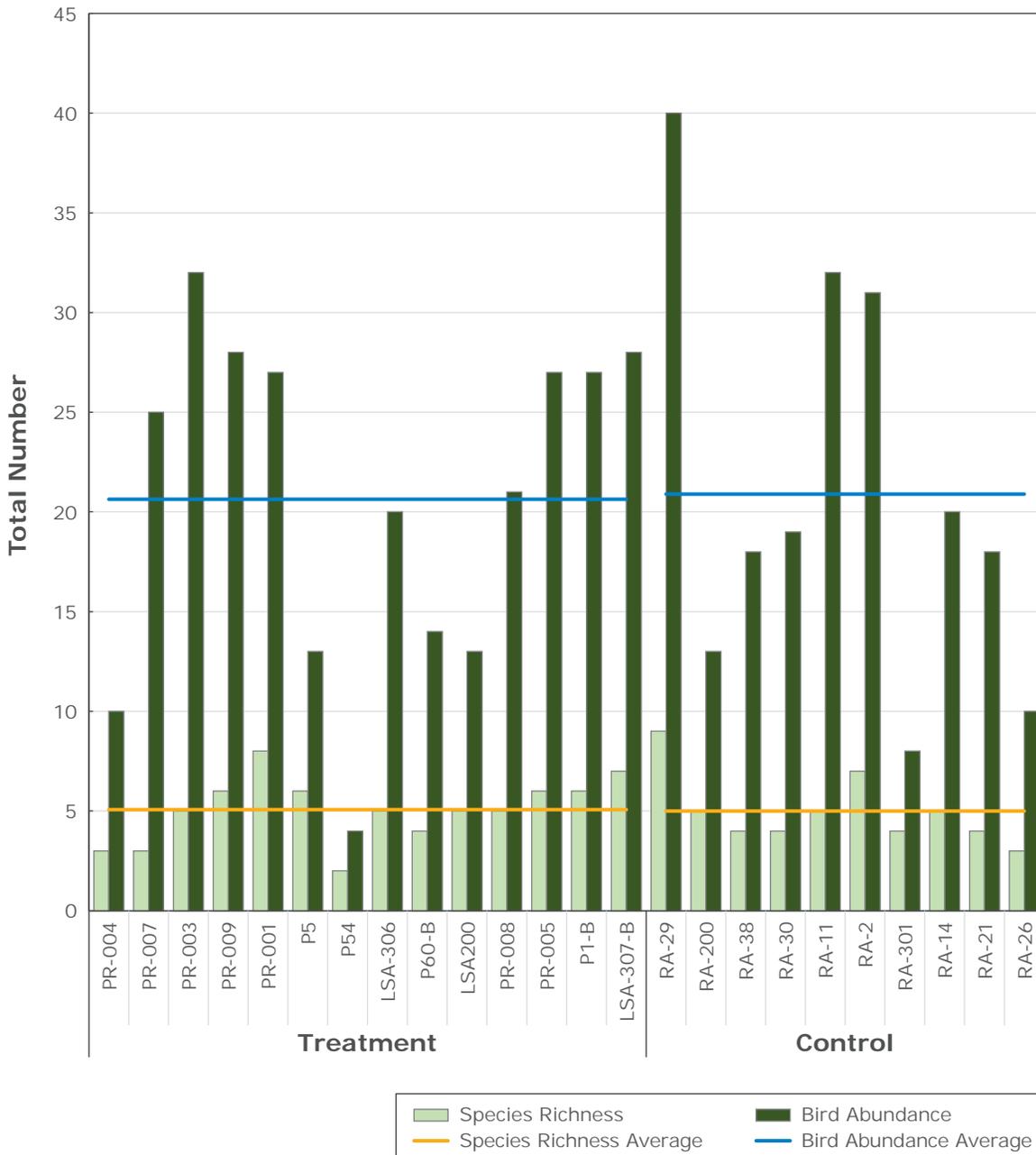


FIGURE 6.5-4 SPECIES RICHNESS RECORDED IN THE GOOSE TREATMENT AND GOOSE CONTROL ZONES DURING PRISM SURVEYS, 2024

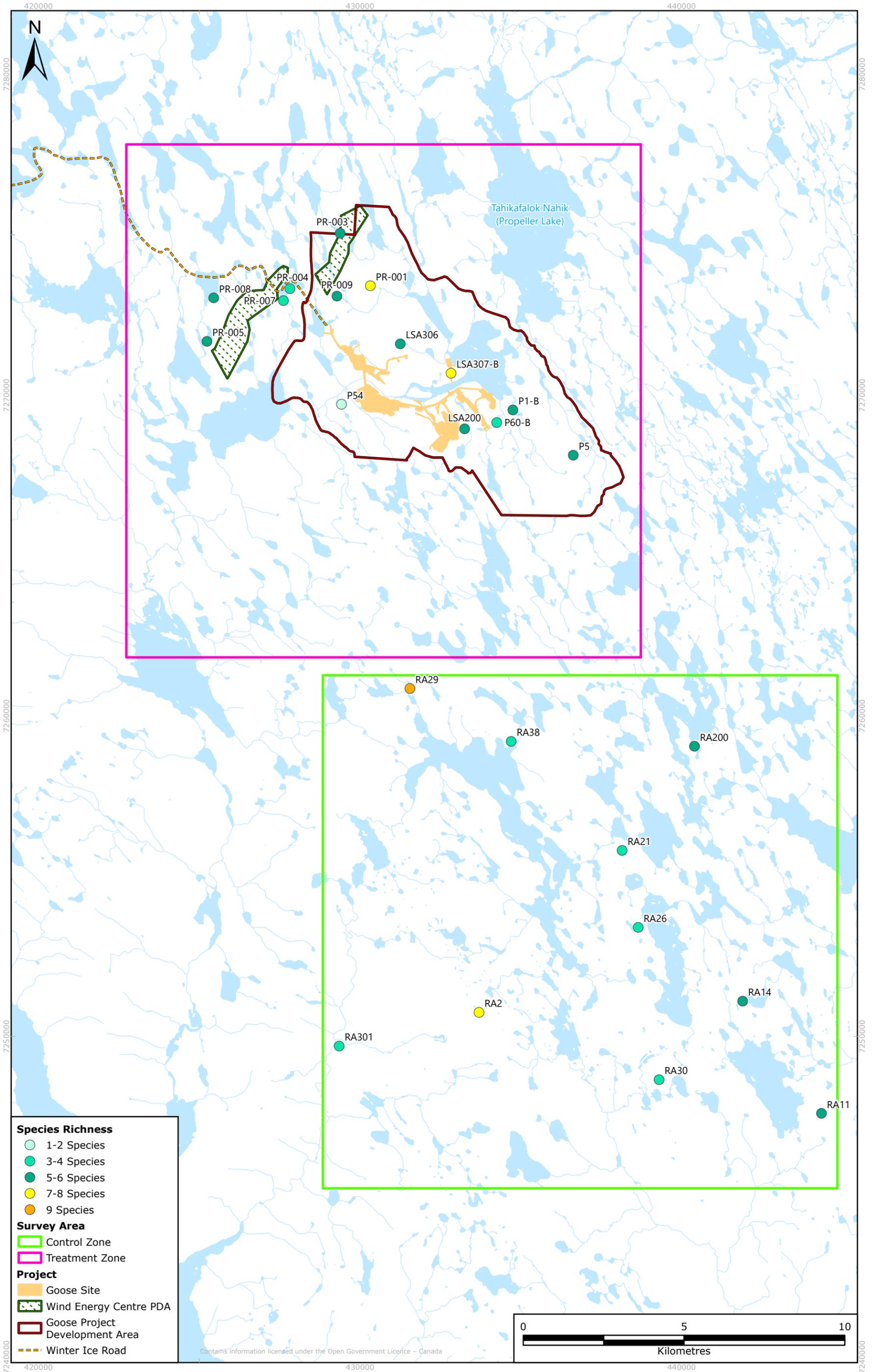


TABLE 6.5-1 UPLAND BREEDING BIRDS OBSERVED IN THE GOOSE ZONES DURING PRISM SURVEYS, 2024

Group	Common Name	Scientific Name	Total Number of Observations											Total <sup>3</sup>		
			Goose Treatment						Goose Control							
			Male	Female	Pairs	Unknown <sup>1</sup>	Young	Total <sup>2</sup>	Male	Female	Pairs	Unknown <sup>1</sup>	Young		Total <sup>2</sup>	
Shorebird	American Golden-plover*	<i>Pluvialis dominica</i>	-	-	-	-	-	-	-	2	1	-	-	-	3	3
	Least Sandpiper	<i>Calidris minutilla</i>	-	-	-	-	-	-	-	-	-	-	3	-	3	3
	Pectoral Sandpiper	<i>Calidris melanotos</i>	-	-	-	-	-	-	-	-	-	-	3	-	3	3
	Red-necked Phalarope*	<i>Phalaropus lobatus</i>	1	-	-	-	-	-	1	2	1	-	-	-	3	4
	Semipalmated Plover	<i>Charadrius semipalmatus</i>	-	-	-	1	-	1	-	-	-	-	-	-	-	1
	Semipalmated Sandpiper*	<i>Calidris pusilla</i>	-	-	2	6	-	10	-	-	-	-	1	-	1	11
Upland Bird	American Pipit	<i>Anthus rubescens</i>	-	-	-	2	-	2	-	-	-	-	-	-	-	2
	American Robin	<i>Turdus migratorius</i>	1	-	-	-	-	1	-	-	-	-	-	-	-	1
	American Tree Sparrow	<i>Spizelloides arborea</i>	14	-	4	5	-	27	9	-	1	4	-	15	42	
	Common Redpoll	<i>Acanthis flammea</i>	-	-	3	5	-	11	-	-	-	5	-	5	16	
	Harris's Sparrow*	<i>Zonotrichia querula</i>	3	-	2	-	-	7	-	-	-	2	-	2	9	
	Hoary Redpoll*	<i>Acanthis hornemanni</i>	1	-	-	2	-	3	-	-	-	-	-	-	3	
	Horned Lark	<i>Eremophila alpestris</i>	8	4	-	4	-	16	-	1	-	-	-	1	17	
	Lapland Longspur	<i>Calcarius lapponicus</i>	75	14	16	5	-	126	44	17	22	2	-	107	233	
	Savannah Sparrow	<i>Passerculus sandwichensis</i>	32	2	8	18	-	68	24	2	2	21	-	51	119	
	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	4	-	1	4	-	10	-	-	-	4	-	4	14	
Ptarmigan	Rock Ptarmigan	<i>Lagopus muta</i>	-	-	-	1	-	1	-	-	-	1	-	1	2	
	Willow Ptarmigan	<i>Lagopus lagopus</i>	12	1	-	2	-	15	5	-	1	2	-	9	24	
<b>Total<sup>2</sup></b>			<b>151</b>	<b>21</b>	<b>36</b>	<b>55</b>	<b>-</b>	<b>299</b>	<b>86</b>	<b>22</b>	<b>26</b>	<b>48</b>	<b>-</b>	<b>208</b>	<b>507</b>	

Notes:  
 \* Indicates a species of conservation concern either federally or in Nunavut.  
<sup>1</sup> Birds are recorded as unknown when the species is not sexually dimorphic and no sex-specific behaviours are observed (e.g., singing).  
<sup>2</sup> The total number of observations is calculated by adding up the number of observations in all preceding columns, including doubling the number in the "Pairs" column, as a pair is two birds.  
<sup>3</sup> The number of eggs or nestlings was not always recorded, as some nests with incubating adults remained undisturbed.

TABLE 6.5-2 SUMMARY OF ALL NESTS OBSERVED IN THE GOOSE ZONES DURING PRISM SURVEYS, 2024

Species Group	Transect ID	Nest ID	Species	Nest in Plot	Nest Stage	Egg Number <sup>1</sup>	Nestling Number <sup>1</sup>
Upland Bird	RA2	RA2_ATSP_N01	American Tree Sparrow	Yes	Incubating	5	0
	RA21	RA21_SAVS_N01	Savannah Sparrow	Yes	Incubating	5	0
	RA38	RA38_LALO_N01	Lapland Longspur	Yes	Incubating	1	0
	RA11	RA11_SAVS_N01	Savannah Sparrow	Yes	Incubating	3	0
Shorebird	P60-B	P60B_SESA_N01	Semipalmated Sandpiper*	Yes	Incubating	-	-
	LSA200	LSA200_SESA_N01	Semipalmated Sandpiper*	Yes	Incubating	3	0
Ptarmigan	RA21	RA21_WIPT_N01	Willow Ptarmigan	Yes	Incubating	-	-

## Notes:

\* Indicates a species of conservation concern either federally or in Nunavut.

- Indicates an unknown number of eggs or nestlings because the adult was incubating and not disturbed.

<sup>1</sup> The number of eggs or nestlings was not always recorded, as some nests with incubating adults remained undisturbed.



Photo 6.5-1 Semipalmated Sandpiper nest with three eggs at site LSA200\_SESA\_N\_01 (left) and Savannah Sparrow nest with five eggs at site RA21\_SAVS\_N\_01 (right).

Overall, results from monitoring in 2024 are similar to baseline surveys completed in 2007, 2011, 2012, and 2019. During baseline surveys, 58 PRISM survey sites were surveyed in the Goose area, including 30 surveys in 2011, 19 surveys in 2012, and nine surveys in 2019 (Rescan 2012, 2013b; ERM 2022). A total of 60 surveys were completed in 2007; however, the survey methods were loosely based on PRISM methods and were not the same methods as those completed in 2011, 2012, 2019, and 2024 (Gartner Lee Limited 2008; Rescan 2012, 2013b; ERM 2022). In 2024, a total of 24 PRISM survey sites, four of which were also surveyed in 2007, nine in 2011, four in 2012, and seven in 2019. Although some of the plot locations were moved (primarily due to footprint development since baseline surveys), a similar geographical area was surveyed, allowing for comparison of results among years.

The number of species detected at the Goose zones in 2024 (18 species) was similar to baseline PRISM survey results in 2007 (18 species), 2011 (16 species), and 2012 (17 species; Gartner Lee Limited 2008; Rescan 2012, 2013b). The most commonly observed species during PRISM surveys in 2007, 2011, and 2012 were the same as 2024; Lapland Longspur and Savannah Sparrow (excluding Hoary Redpoll in 2007 due to species similarity with Common Redpoll). Five species currently listed as conservation concern were also observed during baseline surveys in 2007, 2011, and 2012 in the Goose area (CESCC 2022): American Golden-plover, Hoary Redpoll, Red-necked Phalarope, Harris's Sparrow, and Semipalmated Sandpiper. All five of these species were observed in 2024 during PRISM surveys.

In 2019, nine PRISM sites were completed during baseline surveys specifically for the Energy Centre (ERM 2022), seven of which were re-surveyed in 2024. Three species that are currently of conservation concern were observed in 2019 in the Energy Centre area: Red-necked Phalarope, Harris's Sparrow, and Hoary Redpoll (CESCC 2022). Red-necked Phalarope was not observed in 2024 within the Energy Centre survey sites; however, the other two species of conservation concern were observed in addition to Semipalmated Sandpiper, which was not observed in 2019. Observed bird abundance in 2024 was similar to that of surveys completed in 2019 (172 birds in 2024 and 157 birds in 2019); however, species richness in 2024 was slightly lower than 2019

(18 species in 2024 and 22 species in 2019). Site PR-002, which exhibited the highest species richness in 2019, was not surveyed in 2024, which may have impacted the species richness overall in 2024. The variation in species richness between survey sites indicates that some sites may have specific microhabitats that may be more suitable for a higher variety of bird species. Reasonable difference in species richness and bird abundance can be expected when comparing year to year and longer-term monitoring of the areas will be required to define trends.

### **Marine Laydown Area**

Upland bird PRISM surveys were completed between June 24 and July 1, 2024, at a total of six survey sites, with three in both the Control and Treatment zones at the MLA (Figure 6.5-2; Appendix N). The average survey effort for PRISM surveys was 1 hour and 36 minutes per site, with a total survey effort of 9.68 hours to complete all six PRISM plots. The weather conditions were generally considered mild, with an average temperature of 9°C and average wind speeds of 1 km/h to 5 km/h (1 on the Beaufort scale; Appendix N).

A total of 110 upland birds (51 at Treatment, 59 at Control) from eight bird species (eight at Treatment, six at Control) were detected during PRISM surveys in the MLA area (Table 6.5-3; Appendix O). The average bird abundance per survey site was relatively similar between the two zones (15.6 in the Treatment zone, 19.6 in the Control zone). The most commonly observed bird species at both the Treatment and Control zones at the MLA were Savannah Sparrow, Common Redpoll (*Acanthis flammea*), and White-crowned Sparrow (*Zonotrichia leucophrys*; Table 6.5-3), accounting for 56% of all observations.

Approximately 10% of all bird observations were of shorebird species. The Semipalmated Sandpiper was the most commonly observed shorebird and the only species of conservation concern observed in the MLA area during PRISM surveys (CESCC 2022; Table 6.5-3). The majority of shorebird observations occurred in Treatment site PPA. The lowland habitat of plot PPA included 20% ocean and 5% river, which provided unique shorebird habitat.

Species richness varied between two and seven species across all PRISM plots, with an average of approximately five species (Figure 6.5-5 and Figure 6.5-6). Species abundance varied between eight to 25 birds across all plots, with an average of approximately 17 birds per transect (Figure 6.5-5). Bird abundance was slightly higher in the Control zone (19.7) than the Treatment zone (15.6; Figure 6.5-6). Treatment site PP19 had the lowest species richness and abundance of all MLA survey sites, while the remaining Treatment sites had similar species richness and abundance to the Control zone. In contrast to PP19, Treatment site PPA had the highest species richness and bird abundance (Figure 6.5-5). This plot, located in lowland habitat, featured a river and the ocean, which comprised 25% of the plot area. Species observed in Treatment site PPA included both shorebirds and songbirds, including Semipalmated Sandpiper, a species of concern (CESCC 2022). The high abundance at this site was mainly attributed to one species, Common Redpoll ( $n = 14$ ).

Three upland bird nests were observed in the MLA in 2024, including two Semipalmated Plover nests and one American Tree Sparrow nest (Table 6.5-4). The two Semipalmated Plover nests were observed at site PPA (Photo 6.5-2). The open sand and gravel of the beach near the ocean in the plot is ideal nesting habitat for Semipalmated Plovers (Nguyen et al., 2003).

FIGURE 6.5-5 SPECIES RICHNESS AND BIRD ABUNDANCE AT MARINE LAYDOWN PRISM PLOTS, 2024

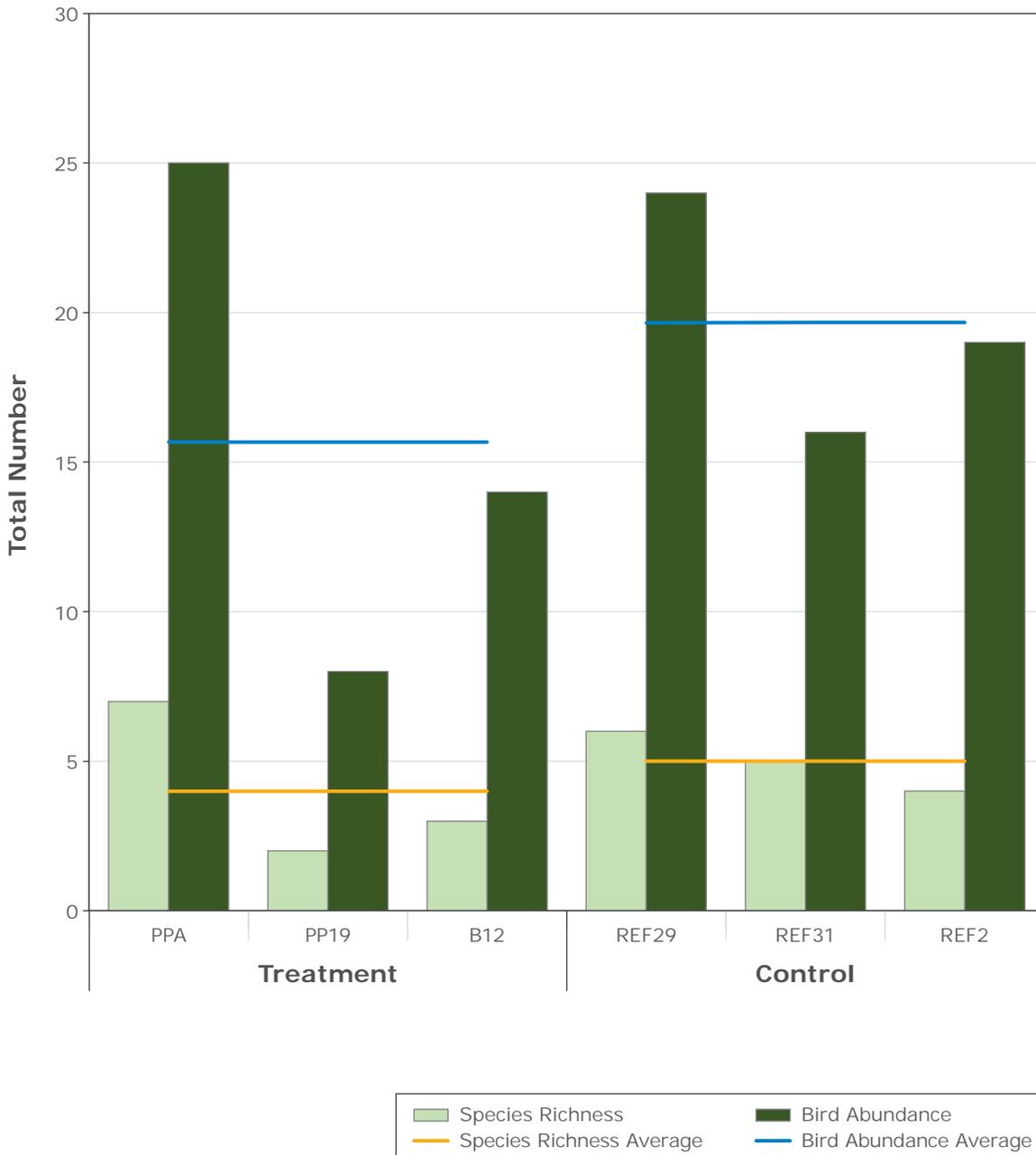


FIGURE 6.5-6 SPECIES RICHNESS RECORDED IN THE MARINE LAYDOWN AREA TREATMENT AND MARINE LAYDOWN AREA CONTROL ZONES DURING PRISM SURVEYS, 2024

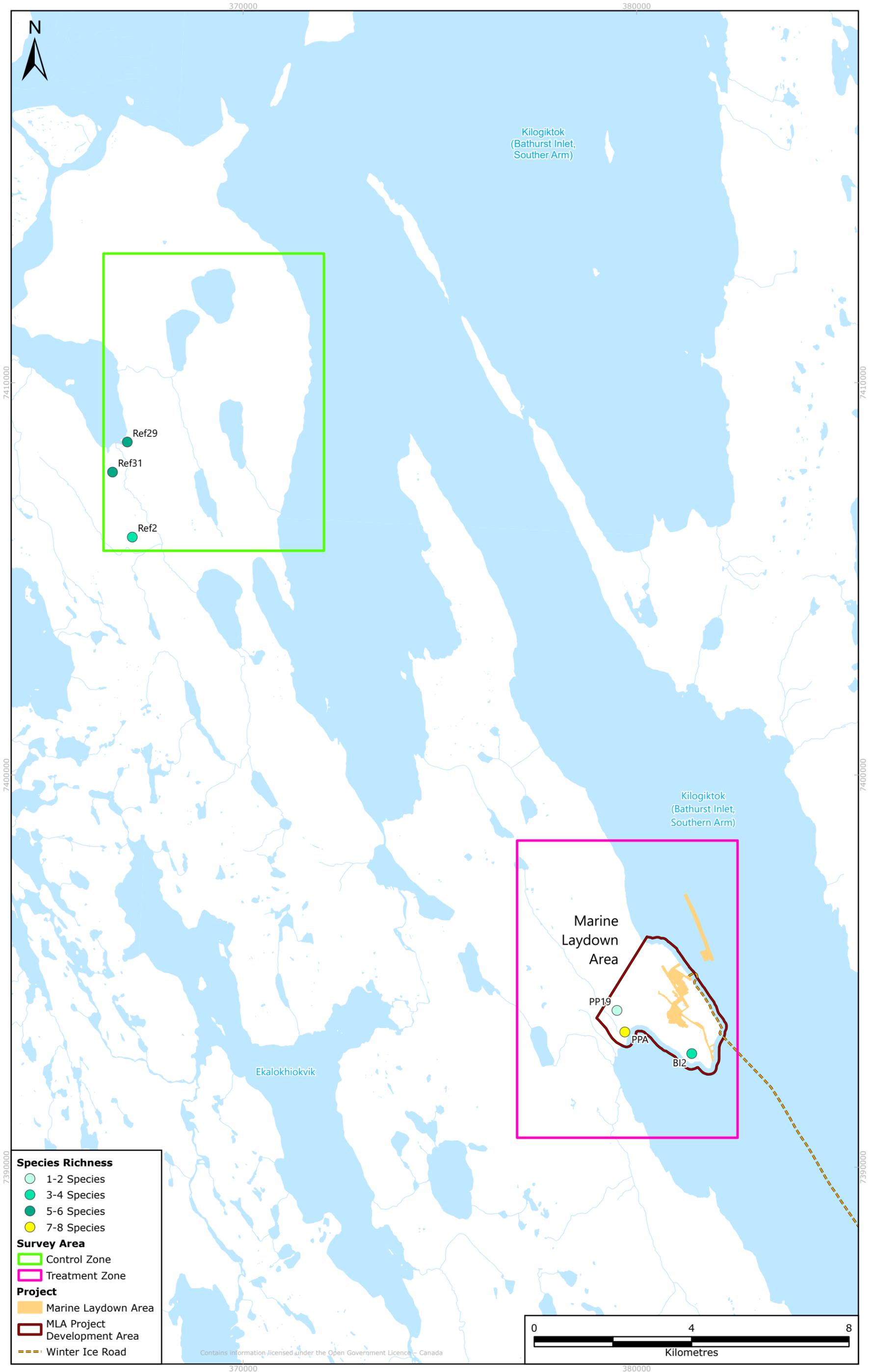


TABLE 6.5-3 UPLAND BREEDING BIRDS OBSERVED IN THE MARINE LAYDOWN AREA DURING PRISM SURVEYS, 2024

Group	Common Name	Scientific Name	Total Number of Observations												Total <sup>3</sup>
			MLA Treatment						MLA Control						
			Male	Female	Pairs	Unknown <sup>1</sup>	Young	Total <sup>2</sup>	Male	Female	Pairs	Unknown <sup>1</sup>	Young	Total <sup>2</sup>	
Shorebird	Semipalmated Plover	<i>Charadrius semipalmatus</i>	-	-	2	1	-	5	-	-	-	-	-	-	5
	Semipalmated Sandpiper*	<i>Calidris pusilla</i>	-	-	-	4	-	4	-	-	1	-	-	2	6
Upland Bird	American Tree Sparrow	<i>Spizelloides arborea</i>	1	-	-	1	-	2	1	-	2	8	-	13	15
	Common Redpoll	<i>Acanthis flammea</i>	-	-	-	14	-	14	1	-	-	6	-	7	21
	Horned Lark	<i>Eremophila alpestris</i>	2	-	2	2	-	8	-	-	-	-	-	-	8
	Lapland Longspur	<i>Calcarius lapponicus</i>	-	1	-	2	-	3	3	3	1	3	-	11	14
	Savannah Sparrow	<i>Passerculus sandwichensis</i>	7	-	-	5	-	12	7	-	-	3	-	10	22
	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	-	-	1	1	-	3	5	-	1	9	-	16	19
<b>Total</b>			<b>10</b>	<b>1</b>	<b>5</b>	<b>30</b>	<b>-</b>	<b>51</b>	<b>17</b>	<b>3</b>	<b>5</b>	<b>29</b>	<b>-</b>	<b>59</b>	<b>110</b>

Notes:  
 \* Indicates a species of conservation concern either federally or in Nunavut.  
<sup>1</sup> Birds are recorded as unknown when the species is not sexually dimorphic and no sex-specific behaviours are observed (e.g., singing).  
<sup>2</sup> The total number of observations is calculated by adding up the number of observations in all preceding columns, including doubling the number in the "Pairs" column, as a pair is two birds.  
<sup>3</sup> The total number of observations of each species in both the Control and Treatment zone by adding the previous two total columns together.

TABLE 6.5-4 NESTS OBSERVED IN THE MARINE LAYDOWN AREA DURING PRISM SURVEYS, 2024

Species Group	Transect ID	Nest ID	Species	Nest in Plot	Nest Stage	Egg Number <sup>1</sup>	Nestling Number <sup>1</sup>
Upland Bird	REF2	Ref2_ATSP_N01	American Tree Sparrow	Yes	Incubating	5	0
Shorebird	PPA	PPA_SEPL_N01	Semipalmated Plover	Yes	Incubating	4	0
	PPA	PPA_SEPL_N02	Semipalmated Plover	Yes	Incubating	4	0

## Notes:

\* Indicates a species of conservation concern either federally or in Nunavut.

- Indicates an unknown number of eggs or nestlings because the adult was incubating and not disturbed.

<sup>1</sup> The number of eggs or nestlings was not always recorded, as some nests with incubating adults remained undisturbed.



Photo 6.5-2 Two Semipalmated Plover nests (PPA\_SEPL\_N\_01 and PPA\_SEPL\_N\_02) located in the MLA Treatment zone at survey site PPA, 2024.

Baseline surveys at the MLA were only completed in 2013. Overall, results from monitoring in 2024 are similar to baseline surveys completed in 2013. A total of eight plots were surveyed during baseline surveys in 2013 (compared to six in 2024), five of which were resurveyed in 2024. The species abundance and species richness in 2024 (110 birds and eight species) was slightly lower than in 2013 (132 birds and 12 species), potentially due to few survey plots in 2024 (six compared to eight). The Savannah Sparrow was the most frequently observed species in both 2013 and 2024. In 2024, six Semipalmated Sandpipers were observed within the MLA Control and Treatment zones, a species of conservation concern in Nunavut (Table 6.5-3; CESSC 2022). No Semipalmated Sandpipers were observed in the MLA in 2013.

#### 6.5.2.2 VARIABLE RADIUS POINT COUNT

A total of 30 VRPC surveys were completed at the Goose (24) and MLA (six) zones between June 14 and June 30, 2024 (Appendix N and Appendix P). The VRPC surveys were primarily completed in tundra habitats, with each survey area comprising at least 50% tundra (Appendix N). A total of 117 birds across 12 unique species were recorded during 2024 VRPC monitoring. A lower total number of birds and unique species were recorded at MLA zones (Total Birds = 26; Unique Species = 7) than Goose zones (Total Birds = 95; Unique Species = 11), due to the lower number of surveys completed. No nests were observed during VRPC surveys. Approximately 97% of the 24 total VRPC surveys were completed in weather conditions that adhere to ECCC standards (ECCC 2023a), with one survey completed at higher than recommended wind conditions due to logistical constraints (Appendix N).

Two species of conservation concern were observed during VRPC surveys in 2024, including Harris's Sparrow and Semipalmated Sandpiper. Semipalmated Sandpiper are territorially ranked as Vulnerable (CESCC 2022) and Harris's Sparrow are assessed as a species of Special Concern by COSEWIC and are listed as such on Schedule 1 of SARA (Government of Canada 2025). Further information regarding each species of conservation concern's federal and territorial status is presented in Section 10.

## Goose

A total of 24 VRPC surveys were completed at Goose (43 in Treatment, 51 in Control) from June 14, 2024, to June 30, 2024 (Appendix N). A total of 94 birds (44 at Treatment, 51 at Control) belonging to 10 species (nine at Treatment, six at Control) were recorded in the Goose zones (Table 6.5-5; Figures 6.5-7 and 6.5-8; Appendix P). The average bird abundance and species richness per survey site was relatively the same between the two zones (3.6 birds and 2.4 species in the Treatment zone compared to 4.4 birds and 2.1 species in the Control zone; Figure 6.5-7) The most commonly observed species were Savannah Sparrow and Lapland Longspur, accounting for approximately 65% of all observations. Harris's Sparrow and Semipalmated Sandpiper were the only species of conservation concern recorded during 2024 surveys (Table 6.5-5). Semipalmated Sandpiper was observed mainly in the Goose Control zones at RA2 (Table 6.5-1 and 6.5-6) and Harris's Sparrow was recorded only once at site P54 in the Treatment zone, where it was the only species observed during the VRPC survey.

Baseline surveys for upland birds completed in the Goose site in 2011, 2012, and 2019 (Rescan 2012, 2013b; ERM 2022) were PRISM surveys, not VRPC surveys, and are therefore not comparable. Survey methods for PRISM surveys were developed to determine breeding bird activity in tundra habitats; in contrast, VRPC methods are specific to grassland and forest bird species. Therefore, PRISM surveys have been historically used over VRPC surveys to accurately assess breeding bird species richness and bird abundance at the mine. Additionally, these two surveys are not directly comparable, as the area covered by the survey types varies. PRISM surveys cover an area of 12 ha, while VRPCs cover an area of 3.14 ha. The smaller search area and less optimized survey methods for tundra habitat are a potential explanation for the lower species richness and abundance observed during VRPC surveys in 2024.

## Marine Laydown Area

Six VRPC surveys (three Treatment and three Control) were completed at MLA site from June 24, 2024, to July 1, 2024 (Appendix N). A total of 26 birds and seven species were recorded at MLA sites, with similar numbers of individuals recorded between the Control (n = 12) and Treatment sites (n = 14; Table 6.5-6; Appendix P). The most commonly observed species were Savannah Sparrow and White-crowned Sparrow. A singled Semipalmated Sandpiper is the only species of conservation concern observed during VRPC surveys in the MLA, observed in the Treatment zone at survey site PPA.

FIGURE 6.5-7 SPECIES RICHNESS AND BIRD ABUNDANCE AT GOOSE VRPC SURVEYS, 2024

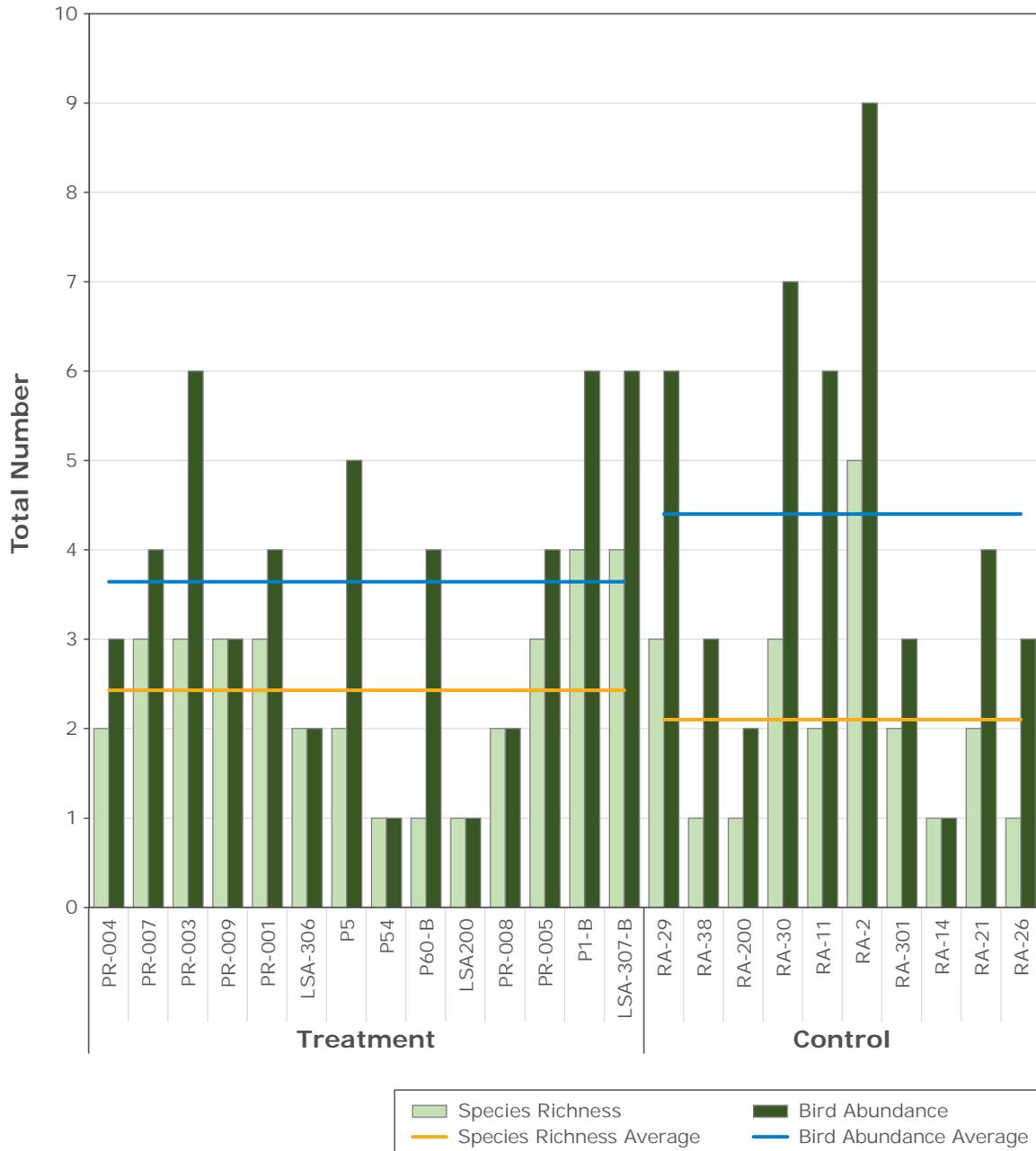


FIGURE 6.5-8 SPECIES RICHNESS RECORDED IN THE GOOSE TREATMENT AND GOOSE CONTROL ZONES DURING VRPC SURVEYS, 2024

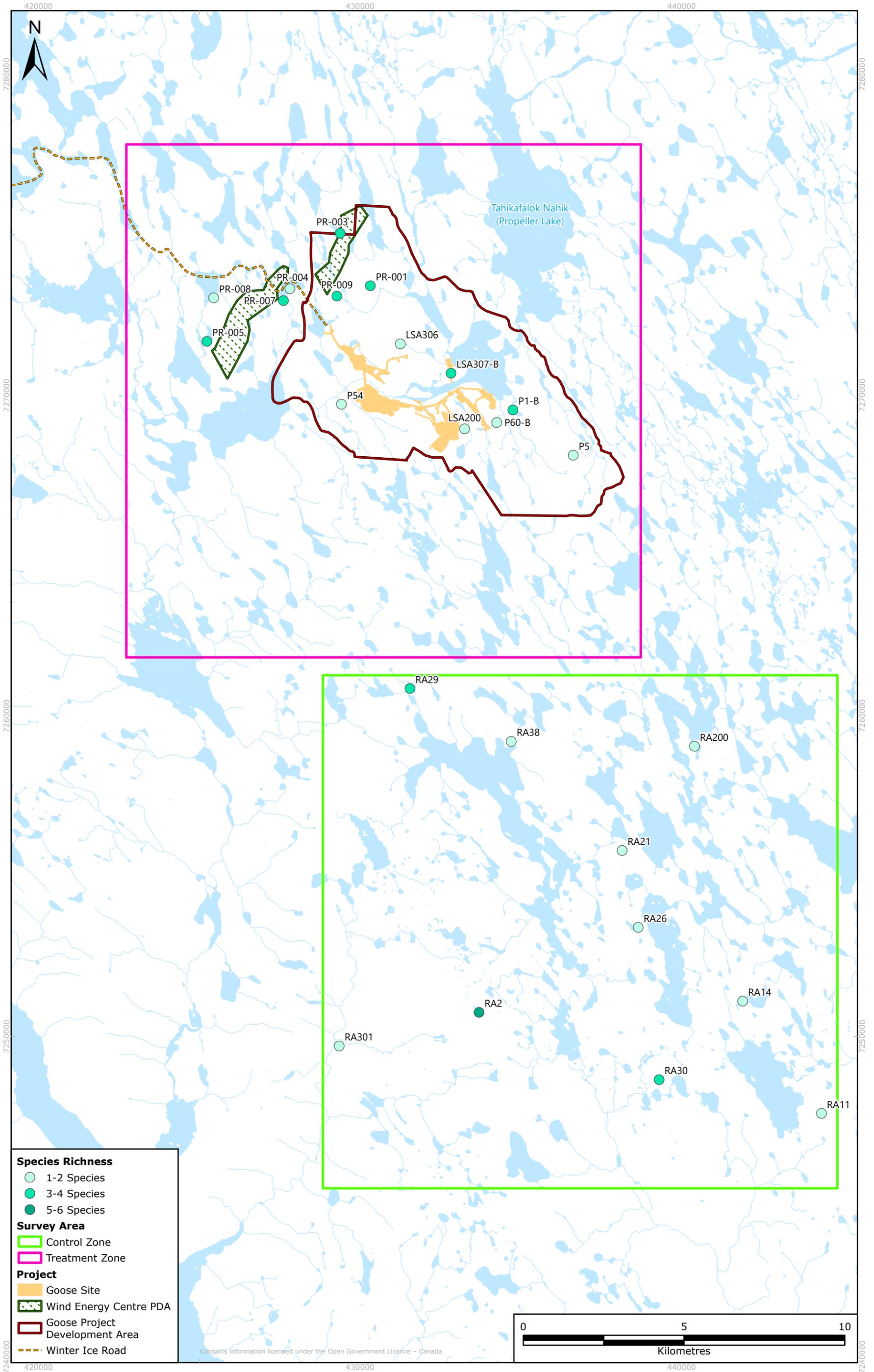


TABLE 6.5-5 UPLAND BIRD SPECIES OBSERVED DURING VARIABLE RADIUS POINT COUNT SURVEYS AT THE GOOSE SITE, 2024

Group	Species Common Name	Scientific Name	Number of Individuals		
			Treatment	Control	Total
Shorebird	Least Sandpiper	<i>Calidris minutilla</i>	0	1	1
	Semipalmated Sandpiper*	<i>Calidris pusilla</i>	1	4	5
Upland Bird	American Tree Sparrow	<i>Spizelloides arborea</i>	5	8	13
	Common Redpoll	<i>Acanthis flammea</i>	4	1	5
	Harris's Sparrow*	<i>Zonotrichia querula</i>	1	0	1
	Horned Lark	<i>Eremophila alpestris</i>	4	0	4
	Lapland Longspur	<i>Calcarius lapponicus</i>	16	14	30
	Savannah Sparrow	<i>Passerculus sandwichensis</i>	16	16	32
	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	2	0	2
Ptarmigan	Willow Ptarmigan	<i>Lagopus lagopus</i>	1	0	1
<b>Total</b>			<b>43</b>	<b>51</b>	<b>94</b>

Note:

\* Indicates a species of conservation concern either federally or in Nunavut.

**TABLE 6.5-6 UPLAND BIRD SPECIES OBSERVED DURING VARIABLE RADIUS POINT COUNT SURVEYS AT THE MARINE LAYDOWN AREA, 2024**

Group	Species Common Name	Scientific Name	Number of Individuals		
			Treatment	Control	Total
Shorebird	Semipalmated Sandpiper*	<i>Calidris pusilla</i>	1	0	1
Upland Bird	American Tree Sparrow	<i>Spizelloides arborea</i>	3	0	3
	Common Redpoll	<i>Acanthis flammea</i>	0	3	3
	Lapland Longspur	<i>Calcarius lapponicus</i>	0	1	1
	Savannah Sparrow	<i>Passerculus sandwichensis</i>	6	3	9
	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	2	5	7
	Yellow Warbler	<i>Setophaga petechia</i>	0	2	2
<b>Total</b>			<b>14</b>	<b>12</b>	<b>26</b>

Note:

\* Indicates a species of conservation concern either federally or in Nunavut.

Species richness at MLA sites was two species per survey, except for survey site REF-31 which had three species (Figure 6.5-9 and Figure 6.5-10). Bird abundance varied between three to five birds, with an average of four birds per survey (Figure 6.5-9). The similar results for species richness and abundance across the Treatment and Control zones suggest that the habitat suitability for breeding birds is relatively similar in both areas.

PRISM surveys were historically the preferred survey type during baseline surveys of the Project site; however, baseline surveys completed in 2013 that focused on the MLA used VRPC surveys in conjunction with PRISM surveys to assess the breeding bird habitat and use in the area (Rescan 2013b). A total of 60 VRPC surveys were completed in the MLA during baseline surveys, with a total of 179 birds of 10 species recorded. None of the VRPC survey sites completed in 2024 were repeats of 2013 VRPC locations, the 2024 sites were chosen based on baseline PRISM survey locations. In 2024, six VRPC surveys were completed in the MLA Control and Treatment zones; however, species richness remained similar to baseline surveys with a total of seven species observed.

Bird abundance varied between 2013 and 2024, likely due to the differences in sample size between the 2 years. The only species of conservation concern that was observed during 2013 baseline surveys that are still considered a species of conservation concern is the American Golden-plover. The American Golden-plover was not observed in 2024 in the MLA Treatment or Control zones.

## 6.6 MARINE BIRD POPULATION SURVEYS—BATHURST INLET

Marine bird monitoring was completed to evaluate potential effects of the Mine on the local population of marine birds, as described in Section 13.3.2.2 of the WMMP Plan (B2Gold 2024a). Marine bird surveys were completed as part of the waterbird surveys completed at the MLA Treatment plot near Bathurst Inlet, described in Section 6.4.

### 6.6.1 METHODS

Marine bird sightings in Bathurst Inlet were recorded at the MLA Treatment aerial survey plot as described in Section 6.4.1.1. Six transects from the MLA Treatment plot (T01, T02, T04 to T07) overlap Bathurst Inlet, and observations from these locations are summarized in this section. Aerial surveys were completed during the spring staging, summer brood, and fall staging periods. Detailed methods for the aerial surveys are described in Section 6.4.1.1.

### 6.6.2 RESULTS AND DISCUSSION

During spring staging survey in 2024, no marine birds were observed, as Bathurst Inlet was still covered in ice (Table 6.6-1). This is similar to results from baseline surveys in 2013 (Rescan 2013), when no marine birds were observed in Bathurst Inlet during spring staging surveys due to ice cover. These results suggest that Bathurst Inlet does not provide spring staging habitat for marine birds as it is not free of ice during the spring staging period.

During the summer brood survey, the small bay south of the MLA PDA supported large groups of diving ducks, including Greater Scaup, Surf Scoters, and Red-breasted Mergansers (Table 6.6-1). These results are similar to baseline surveys in 2013, with greater scaup being the most abundant diving duck present in Bathurst Inlet (Rescan 2013b). No marine bird broods were observed in 2024, or during baseline surveys.

FIGURE 6.5-9 SPECIES RICHNESS AND BIRD ABUNDANCE AT THE MARINE LAYDOWN AREA VRPC SURVEYS, 2024

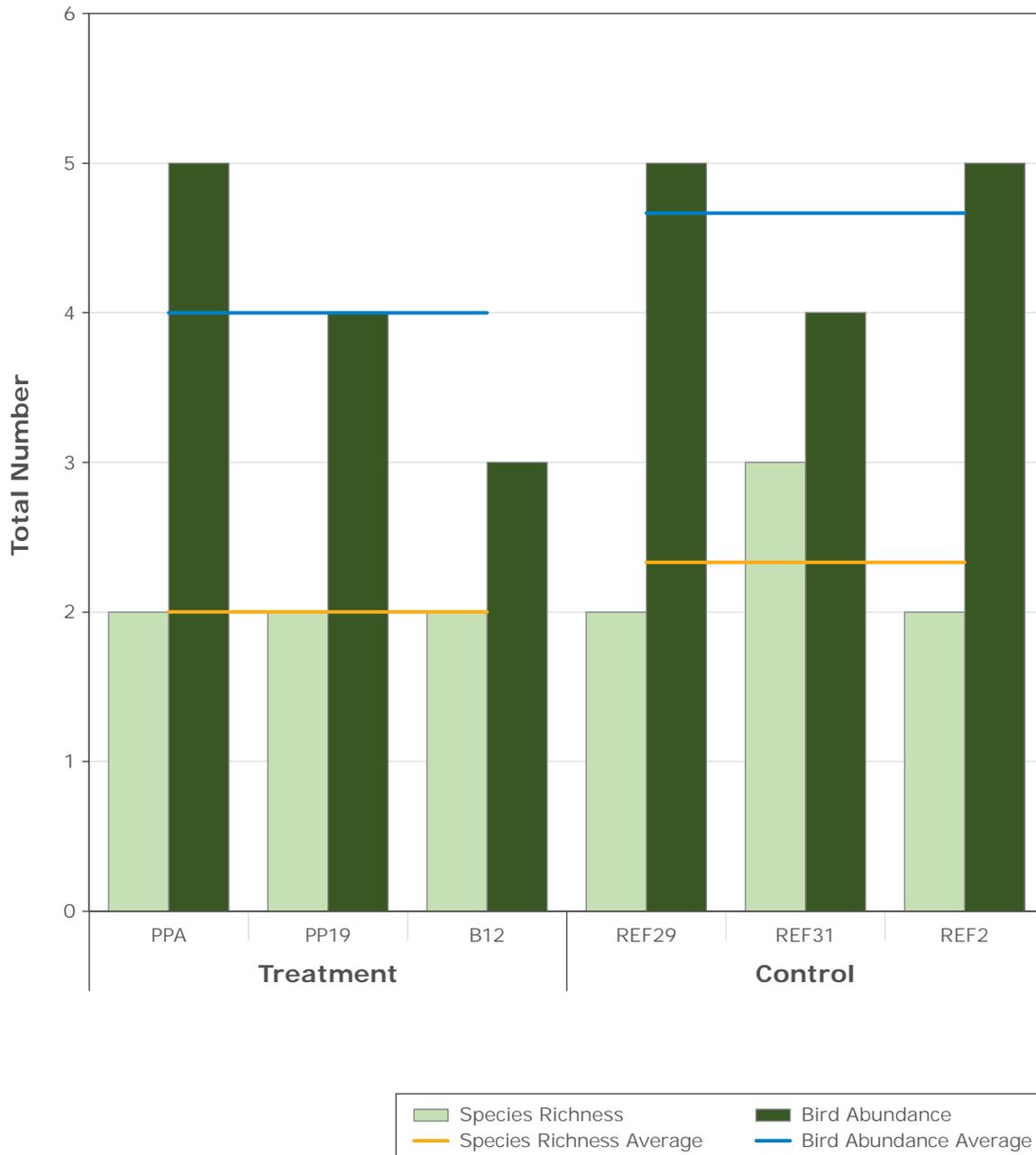


FIGURE 6.5-10 SPECIES RICHNESS RECORDED IN THE MARINE LAYDOWN AREA TREATMENT AND MARINE LAYDOWN CONTROL ZONES DURING VRPC SURVEYS, 2024

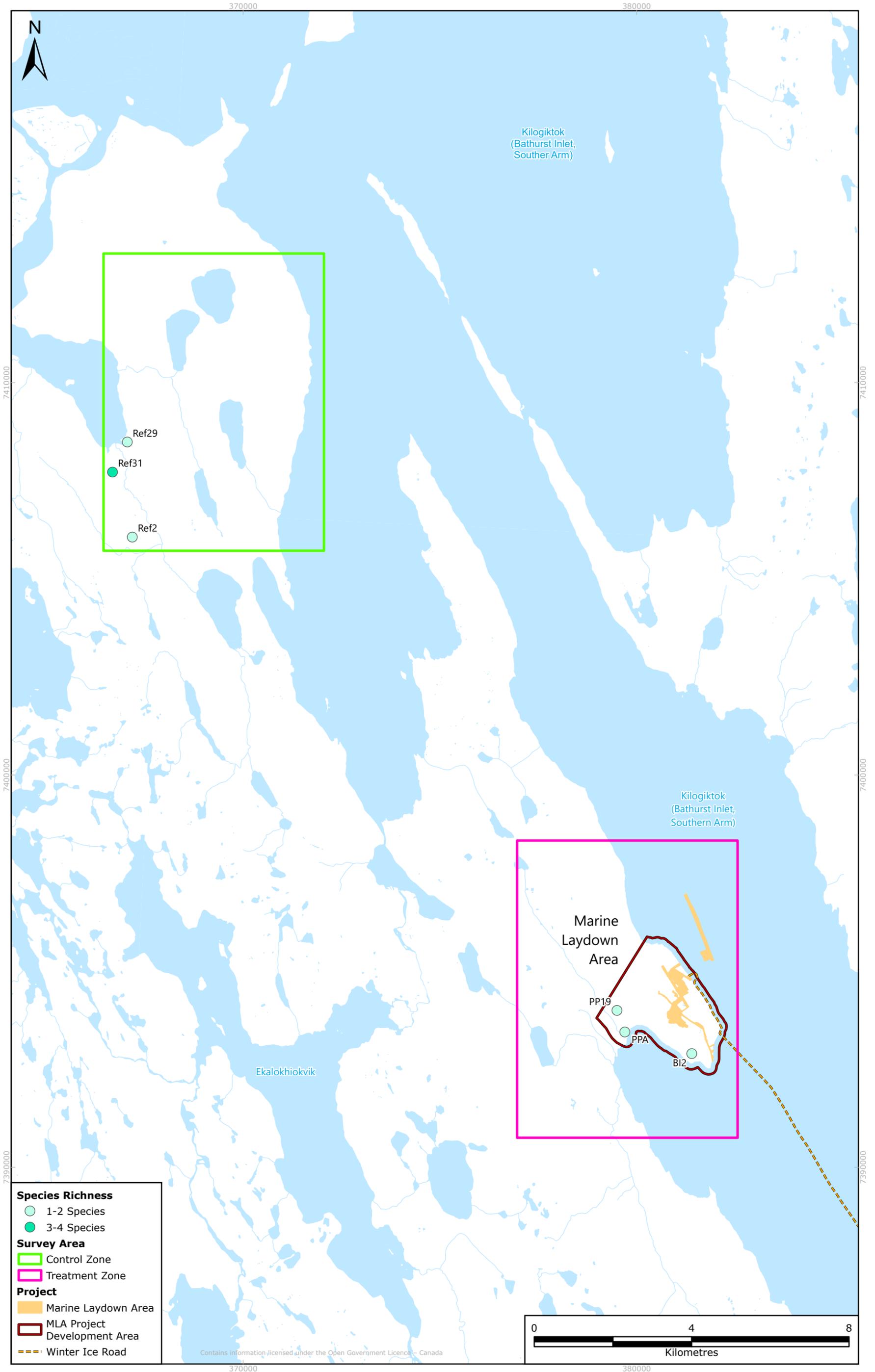


TABLE 6.6-1 MARINE BIRD OBSERVATIONS IN BATHURST INLET, 2024

Species Group	Species	Number of Individuals in Bathurst Inlet		
		Spring Staging	Summer Brood	Fall Staging
Diving Ducks / Seaducks	Greater Scaup	0	237	330
	Long-tailed Duck	0	0	1
	Red-breasted Merganser	0	7	33
	Surf Scoter	0	30	0
<b>Total</b>		<b>0</b>	<b>274</b>	<b>364</b>

During fall staging surveys, the bay south of the MLA PDA continued to support several diving ducks, including Greater Scaup, Long-tailed Duck, and Red-breasted Merganser (Table 6.6-1). The 2024 fall staging survey aligns with the baseline studies, with Greater Scaup being the most abundant diving duck (Rescan 2012, 2013b).

During all surveys in 2024, Greater Scaup, Long-tailed Duck, Red-breasted Merganser, and Surf Scoter were the only species observed in Bathurst Inlet (Table 6.6-1). These results are similar to the baseline studies, with the exception of Common Eider (*Somateria mollissima*), a diving duck species recorded during the 2013 baseline summer brood survey (Rescan 2013b).

## 6.7 INCIDENTAL OBSERVATIONS OF MIGRATORY BIRDS

All personnel are responsible for recording wildlife sightings in the camp's wildlife logs (Appendix I). These logs provide an indication of the wildlife species that occur in proximity to and interact with the Back River Mine infrastructure, as described in Sections 11.3.1.4 and 12.3.1.3 of the WMMP Plan (B2Gold 2024a). Section 3.9 summarizes the number of personnel onsite collecting incidental sightings.

### 6.7.1 METHODS

All personnel at the Back River Mine are expected to report observations of wildlife occurring around or interacting with the Mine to the Environment Department. Incidental observation reports include location (GPS coordinates), date, time, species, number observed, behaviour, and any other descriptive information regarding the sighting.

Incidental observations were recorded in accordance with and using the data sheet provided in the Incidental Wildlife Observations SOP (B2Gold 2024k).

### 6.7.2 RESULTS AND DISCUSSION

In 2024, there were 345 incidental observations of migratory birds, totaling an estimated 1,381 individuals and eight nests (Table 6.7-1; Appendix I). Of the incidental observation events made in 2024, 12 were made by site personnel (totaling an estimated 95 individuals), with 83% of observations made at Goose (n = 10) and 17% made at MLA (n = 2; Figure 6.7-1,

Figure 6.7-2 and Figure 6.7-3). This included seven occasions where site staff observed and reported bird nests, with six nests being deemed active. Details on the buffers established and monitoring completed for all active nests is presented in Section 6.2.3.1. Observations by site staff also include one ptarmigan found deceased by natural predation on the roof of the Goose main camp, which is further discussed in Section 9. The remaining observation events included three observations of groups of Canada Geese ( $n = 69$ ) and one observation of an unknown bird species ( $n = 3$ ). Observations of migratory birds by B2Gold staff (excluding one non-active nest and an additional record where a specific date was not recorded) were made in May ( $n = 1$ ), June ( $n = 3$ ), July ( $n = 3$ ), August ( $n = 2$ ), and September ( $n = 1$ ). The highest number of individuals was recorded in May, which represented 42% of individuals observed (40 individuals) by B2Gold staff, where September had the least number of individuals observed by B2Gold Staff (one individual; 1% of individuals observed).

TABLE 6.7-1 INCIDENTAL OBSERVATIONS OF MIGRATORY BIRDS IN 2024<sup>1</sup>

Species	Scientific Name	Observation Events	Estimated Number of Individuals
American Golden-Plover	<i>Pluvialis dominica</i>	12	23
American Pipit	<i>Anthus rubescens</i>	7	11
American Robin	<i>Turdus migratorius</i>	2	4 <sup>2</sup>
American Tree Sparrow	<i>Spizelloides arborea</i>	3	4
Biard's Sandpiper	<i>Calidris bairdii</i>	1	1
Cackling Goose	<i>Branta hutchinsii</i>	1	1
Canada Goose	<i>Branta canadensis</i>	17	378
Common Redpoll	<i>Acanthis flammea</i>	41	113 <sup>2</sup>
Greater Scaup	<i>Aythya marila</i>	3	39
Greater White-Fronted Goose	<i>Anser albifrons</i>	6	85
Herring Gull	<i>Larus smithsonianus</i>	8	11
Hoary Redpoll	<i>Acanthis hornemanni</i>	1	2
Horned Lark	<i>Eremophila alpestris</i>	4	5
Lapland Longspur	<i>Calcarius lapponicus</i>	43	102
Least Sandpiper	<i>Calidris minutilla</i>	6	8
Long-Tailed Duck	<i>Clangula hyemalis</i>	3	12
Long-Tailed Jaeger	<i>Stercorarius longicaudus</i>	5	7
Mountain Bluebird	<i>Sialia currucoides</i>	1	4 <sup>2</sup>
Northern Pintail	<i>Anas acuta</i>	3	32
Parasitic Jaeger	<i>Stercorarius parasiticus</i>	2	6
Pectoral Sandpiper	<i>Calidris melanotos</i>	3	4

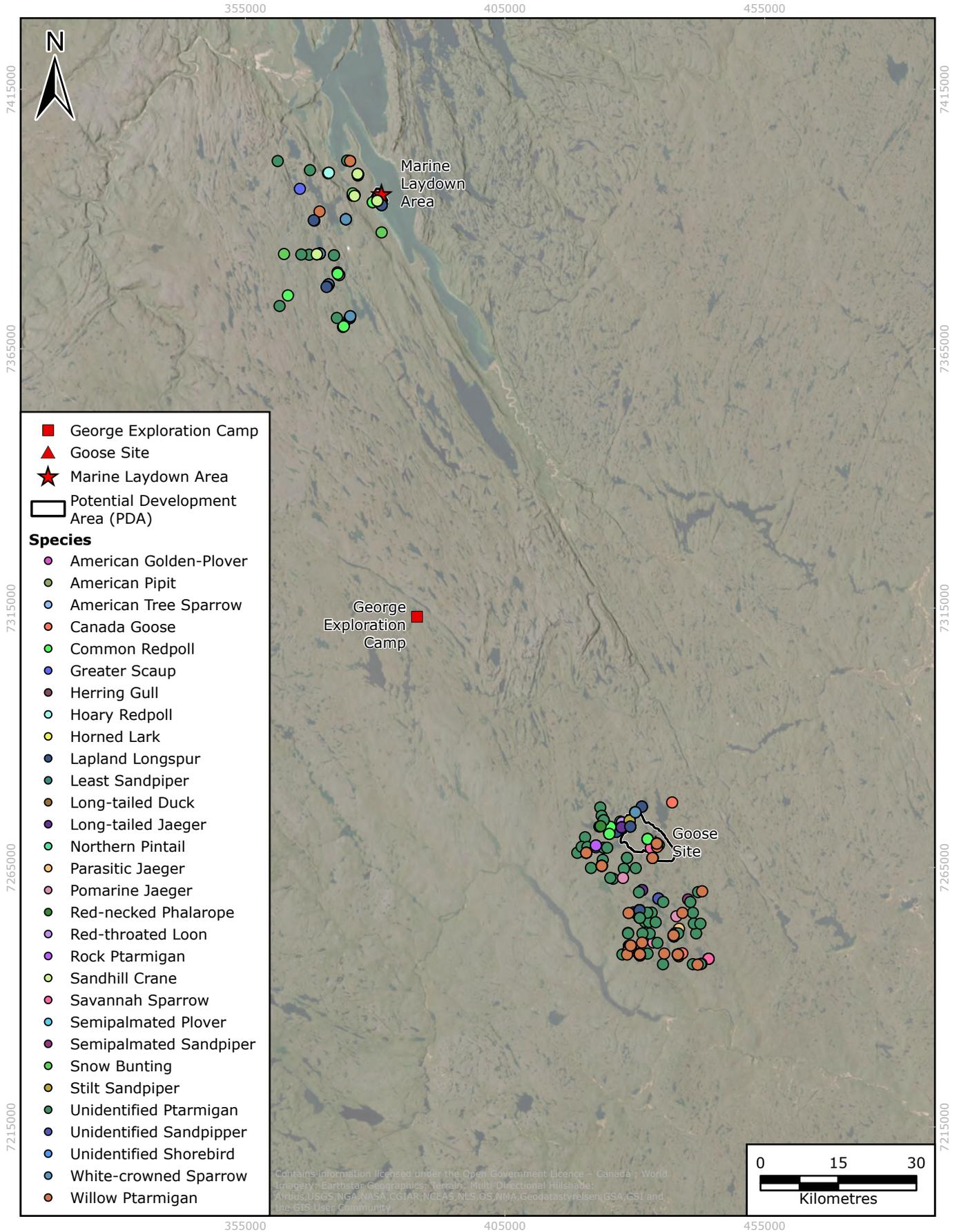
Species	Scientific Name	Observation Events	Estimated Number of Individuals
Pomarine Jaeger	<i>Stercorarius pomarinus</i>	3	3
Red-Breasted Merganser	<i>Calidris melanotos</i>	2	19
Red-Necked Phalarope	<i>Phalaropus lobatus</i>	6	9
Red-Throated Loon	<i>Gavia stellata</i>	2	4
Rock Ptarmigan	<i>Lagopus muta</i>	2	5
Sandhill Crane	<i>Antigone canadensis</i>	7	11
Savannah Sparrow	<i>Passerculus sandwichensis</i>	18	25
Semipalmated Plover	<i>Charadrius semipalmatus</i>	2	2
Semipalmated Sandpiper	<i>Calidris melanotos</i>	3	5
Snow Bunting	<i>Plectrophenax nivalis</i>	4	29
Snow Goose	<i>Anser caerulescens</i>	3	29
Stilt Sandpiper	<i>Calidris himantopus</i>	4	10
Tundra Swan	<i>Cygnus columbianus</i>	7	71
Unidentified Bird	-	2	3 <sup>2</sup>
Unidentified Duck	-	2	2
Unidentified Goose	-	5	79
Unidentified Ptarmigan	<i>Lagopus</i> spp.	59	109
Unidentified Sandpiper	<i>Calidris</i> spp.	1	1
Unidentified Scaup	<i>Aythya</i> spp.	1	1 <sup>2</sup>
Unidentified Shorebird	-	2	9
White-Crowned Sparrow	<i>Zonotrichia leucophrys</i>	11	16
Willow Ptarmigan	<i>Lagopus lagopus</i>	23	82
Yellow-Billed Loon	<i>Gavia adamsii</i>	3	5
<b>Total</b>		<b>344</b>	<b>1,381</b>

## Notes:

<sup>1</sup> Most observations were made by biologists during regional monitoring programs, except for two American Robin observations (four individuals), one Canada Goose observation (40 individuals), three Common Redpoll observations (14 individuals), two unknown geese observations (29 individuals), one Mountain Bluebird observation (four individuals), one unknown ptarmigan observation (one individual), and one unknown bird observation (three individuals), which were made by B2Gold personnel.

<sup>2</sup> Species with nests observed.

FIGURE 6.7-1 INCIDENTAL OBSERVATIONS OF UPLAND BIRDS, 2024



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FIGURE 6.7-2 INCIDENTAL OBSERVATIONS OF WATERBIRDS, 2024

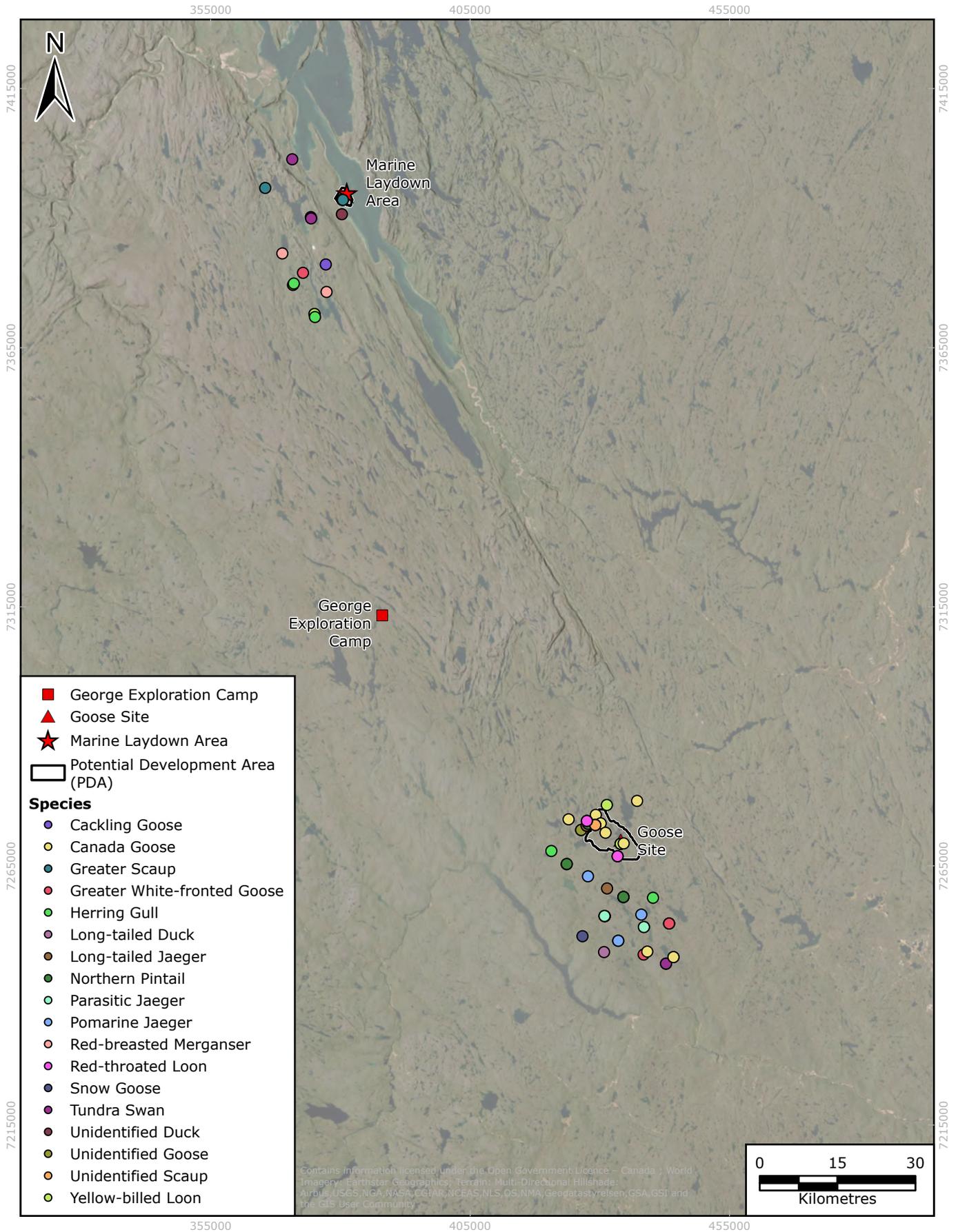
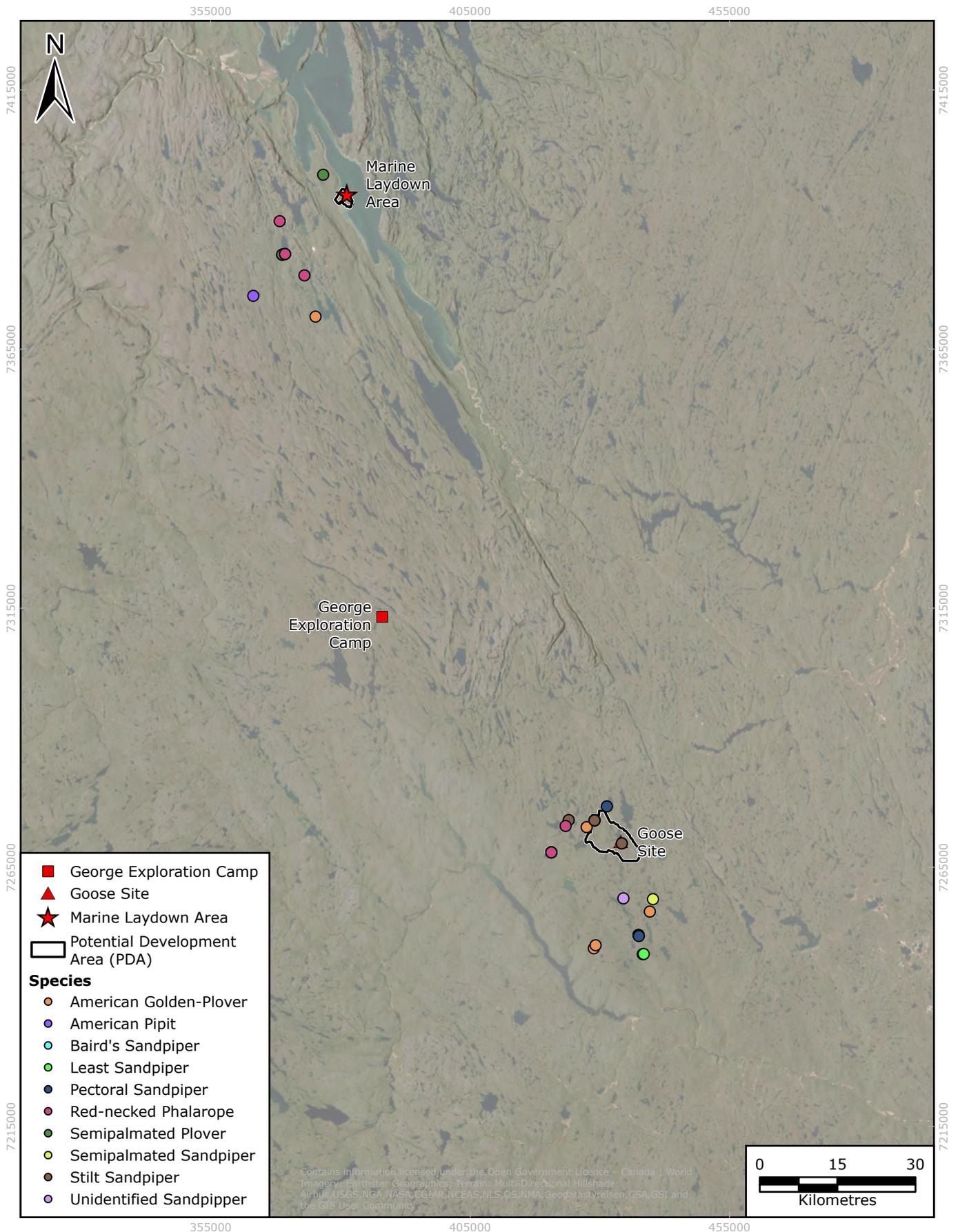


FIGURE 6.7-3 INCIDENTAL OBSERVATIONS OF SHOREBIRDS, 2024



Observations of migratory birds that were made during waterbird and upland bird surveys, but outside of the survey time or outside of the transects are included here. Incidental observations made during wildlife regional monitoring programs accounted for the remaining 333 observation events in 2024. This included an estimated total of 1,286 individuals observed across 45 species and one nest (Table 6.7-1; Appendix I). A nest of an unidentified scaup species with a female on the nest was located within the RSA on June 18 during PRISM surveys at site PR-001 (Appendix O). The nest was located outside of the Goose PDA and follow up monitoring was not required. Observations of migratory birds made by biologists during wildlife regional monitoring programs were made in May during spring migration (n = 135), June during breeding (n = 50), July during breeding (n = 85), and September during fall migration (n = 63). Although September only accounted for 19% of observation events, it had the highest number of individuals recorded (534 of individuals), accounting for 41% of incidentally recorded individuals observed biologists during regional surveys.

In previous years, incidental observations of migratory birds were limited to observations made by site staff. Various regional monitoring programs were completed in 2024 and accounted for 97% of migratory bird incidental observation events. These programs were completed across the RSA at varying distances from the site. As a result, the increased number of migratory birds in 2024 is attributed to these programs and not a reflection of an increase in migratory bird presence around Goose and MLA. The number of observations made by site personnel in 2024 (n = 12) is consistent with 2023 when there were nine observation events accounting for an estimated 250 individual migratory birds.