SURVEYS OF THE BREEDING BIRDS OF THE TWIN ISLANDS, JAMES BAY
28 June 2022 – 4 July 2022

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Introduction

This document is a summary report on the participation of the Canadian Wildlife Service from Environment and Climate Change Canada (hereafter: CWS) in ornithological surveys carried out on the Twin Islands (James Bay, Nunavut) in the summer of 2022. The project is a result of a funding request from the CWS (Québec Region) to the Eeyou Marine Region Wildlife Board Research Fund. The Cree Trappers' Association (CTA) also contributed to the project.

There is very little recent information on the birds that breed on the Twin Islands. The only comprehensive ornithological study conducted on these islands was in 1973 (Manning, 1981). The main objective of the 2022 surveys was to collect breeding evidence indices for the northern component of the Québec Breeding Bird Atlas, whose study area includes the Eeyou and Nunavik Marine Regions (see Robert et al., 2019: 4). The survey also aimed to document the presence of bird species at risk.

Study Area

The Twin Islands, which include North Twin and South Twin, are uninhabited islands located in central James Bay, Nunavut (Fig. 1). South Twin Island is the closest to the coast and is about 65 km from the airport of Wemindji. According to Manning (1981): "North Twin rises to about 60 m and has an area of 150 km^2 of which about 35 km^2 are occupied by lakes. South Twin is lower and a little more than half the size. Both islands are composed of unconsolidated sand and gravel and have similar vegetation. There are areas of marshland, tussock tundra, sand dunes, and gravel ridges. Dwarf Birch covers about 20 km^2 of North Twin and grows up to 1 m high. In sheltered places, willows grow up to 3 m high. There are widely scattered White Spruce up to 6 m high and on North Twin Island one group of about 20." South Twin has fewer trees and more mossy tundra than North Twin. Some 11 km of open water separates the two islands.

Figure 1. Study area. Walter and Spencer Islands are shown because we also collected data on these islands in 2022.

The Twin Islands are of ornithological interest as they are home to some bird species that usually nest much further north. This is because lakes and tundra vegetation cover them almost entirely, and such large areas of arctic environments exist nowhere else at such low latitudes in Canada or North America.

The Twin Islands are a BirdLife International Important Bird Area (NU034). This classification is based on the work of Manning (1981), especially the number of Canada Geese and Semipalmated Plovers he found there in 1973.

Field Team and Workflow

The field team (Fig. 2) consisted of Michel Robert (MR) and Hilde Marie Johansen (HMJ), biologists from the CWS (Québec Region); George Natawapineskum (GN), Local Officer from the Cree Trappers' Association and Eeyou Marine Region; and Cody Mark (CM), a resident from Wemindji. George and Cody acted as bear keepers and ornithological trainees.

Figure 2. From left to right: Hilde Marie Johansen, George Natawapineskum, Cody Mark, Michel Robert

Fieldwork took place from June 28th to July 4th, 2022. We travelled by helicopter, using an ASTAR 350 B2 (C-GPBY) from Heli-Express. The pilot was Yann Delage. Our base camp was in Wemindji, where Michel and Hilde Marie arrived from Chibougamau[1] on June 28th in the late morning. We started our bird surveys in the afternoon of June 28th and continued every day up to and including July 3rd. Michel and Hilde Marie left Wemindji on the morning of July 4th to return to Quebec City. While in Wemindji, we refuelled locally from drums of Jet-A that we had delivered from LG2. Overall, we allowed 24.4 hours of flight time to the project (Table 1), including 6.1 hours to get to Wemindji and travel back to Quebec City.

[1] We started the project from Chibougamau because Michel completed a fieldwork mission there on 27 June 2022, with the same helicopter and pilot associated with the Twin Islands project.

Table 1. Hours of flight and daily activities[2].

Date	Flight hours	Activities	Participants
June 28th	5.5	Flight from Chibougamau to Wemindji (2.4 h). Bird surveys in the afternoon (South and North Twin Is.).	MR, HMJ, CM
June 29th	5.7	Bird surveys (South and North Twin + Walter Is.)	MR, HMJ, GN, CM
June 30th	2.7	Bird surveys (South and North Twin Is.)	MR, HMJ, GN, CM
July 1st	2.1	Bird surveys (South and North Twin Is.)	MR, HMJ, GN, CM
July 2nd	2.0	Bird surveys (South and North Twin Is.)	MR, HMJ, GN, CM
July 3rd	2.7	Bird surveys (South and North Twin + Spencer Is.)	MR, HMJ, GN, CM
July 4th	3.7	Flight from Wemindji to Quebec City	MR, HMJ

Surveys' Methodology and Data Entering

We collected data according to Québec Breeding Bird Atlas methodology (see Robert et al., 2019: 9). In short, this means exploring various habitats and trying to find breeding evidence indices[3] for as many bird species as possible in 10 km x 10 km survey squares, which are basic data collection units in the atlas (Fig. 3).

Figure 3. Québec Breeding Bird Atlas 10 km x 10 km survey squares in the study area.

[2] We provide Google Earth (kmz) files of our daily movements by helicopter along with this report.

[3] Breeding evidence indices are behaviours that help to prove that a species is breeding in a survey square (e.g., bird agitated behaviour, pair in a suitable breeding habitat, or bird carrying nesting material). They are divided into three levels of certainty: possible, probable, and confirmed. See Robert et al. (2019: 10) for more details.

We conducted bird surveys using two methods: 1) by flying over survey squares by helicopter, as several bird species (e.g., loons and waterfowl) can be identified from the air; and 2) by conducting linear transects, on the ground. The first method has the advantage of allowing a complete coverage of all survey squares in the study area, whereas the second method allows us to find species that are difficult or impossible to detect or identify from the air. We also installed recorders (Song Meter Mini, from Wildlife Acoustics) to obtain data for another CWS project, namely the Boreal Bird Monitoring Project (BBMP)[4].

We always noted our observations at the 10 km x 10 km survey square scale, but we also noted the exact positions (using GPS) of the most interesting observations, including those of bird species at risk.

We recorded observations made from the helicopter in a field notebook. As Michel was the one sitting in the front seat (to the left of the pilot), he usually spotted the birds first so Hilde Marie, sitting in the back seat behind the pilot, was the one taking the notes (i.e., survey square number, bird species, breeding evidence indice, GPS waypoint number, etc.). Most of the observations made on the ground were in areas where we decided to land after having judged, from the air, that the habitats found there were of ornithological interest. We also visited on the ground particular areas or habitats mentioned by Manning (1981). In all cases, we recorded our ground observations using the NatureCounts mobile app[5].

We entered all our observations into the Québec Breeding Bird Atlas database, via NatureCounts[6]: either directly via the mobile app (each day, we submitted our observation lists when we had access to the Internet, in Wemindji) or via the web entry interface (we compiled and entered our observations from the helicopter once back in Quebec City). We have also transferred all our observations (bird checklists) to eBird, which allowed us to add photos and recordings.

Results

Overall, we collected 636 breeding evidence indices for 68 bird species in 38 atlas survey squares. Several of the surveys squares in which we collected data were along the James Bay coast, on the mainland around Wemindji and along our helicopter route from Chibougamau.

We found 59 bird species[7] in the 11 survey squares encompassing the islands of the study area (Fig. 3). Table 2 lists the best breeding evidence obtained for all species we observed in each of these 11 survey squares.[8] The two squares with the most land area are the ones where we found the most species: 48 in 17UNV60 (North Twin) and 38 in 17UNU78 (South Twin).

Overall, we produced 49 eBird checklists as part of our surveys on the islands of the study area, of which 32 (that total 39.1 hours of observation) are from linear, transects ground surveys. You will find detailed information on each of these checklists (including an Internet link to open each of them) in the Excel file that accompanies this report.

[4] We deployed two recorders for about 24 hours at three different sites in the only BBMP sampling unit located in the Twin Islands area. The BBMP sampling unit was included in 17UNV60 survey square on North Twin Island.

[5] Birds Canada has developed the NatureCounts mobile app, which allows participants in various monitoring programs (including Breeding Bird Atlases) to enter their observations directly in the field using their Android or iOS devices. Importantly, the NatureCounts mobile app allows setting up automated checklist sharing to eBird.

[6] NatureCounts is the interactive data portal for Birds Canada's National Data Centre. There are hundreds of datasets available in NatureCounts, including the Breeding Bird Atlases conducted in Canada.

[7] This total includes two species that were only detected by the recorders deployed for the BBMP: the Alder Flycatcher and Greater Yellowlegs.

[8] A more detailed version of Table 2 (including definitions of breeding evidence indices codes) is included in the Excel file that accompanies this report.

Table 2. Bird species[9] surveyed on the North Twin[10], South Twin, Walter, and Spencer Islands in 2022.

Bird Species	Breeding Bird Atlas Survey Squares											Frequency of occurrence
	South Twin			North Twin					Walter	Spencer		
	17UNU78	17UNU79	17UNU88	17UNU69	17UNV60	17UNV61	17UNV70	17UNV71	17UNV80	17UNV82	17UNV83	
Canada Goose	FY	FY	FY	H	FY	FY	FY	FY	H	H	H	**100%**
Herring Gull	FY	AE	AE	AE	FY	AE		H	H	NU	P	**91%**
Red-throated Loon	P	P	NE	P	AE	H	H		P	P	P	**91%**
American Pipit	P	S	NE		NE	H	S		P	A	S	**82%**
Horned Lark	P	CF	P		NE	S	H		S	P	S	**82%**
Savannah Sparrow	M	S	S		CF	S	S		S	S	D	**82%**
American Black Duck	FY	H	H	H	P	H	H				X	**73%**
Lesser Scaup	P	P	P	P	P	P	H			H		**73%**
Long-tailed Duck	P	H	P		P	H	P		P		H	**73%**
Northern Pintail	P	P	H		P	H	P	P	H			**73%**
Semipalmated Plover	FY	H	H		DD		DD		H	H	H	**73%**
Willow Ptarmigan	H	H	H	H	A	S	P	H				**73%**
Red-necked Phalarope	P	H	H	H	FY		P		P			**64%**
Semipalmated Sandpiper	S	A	A		DD		A		S		H	**64%**
American Tree Sparrow	S	S	S		CF	S	S					**55%**
White-crowned Sparrow	S	S	S		A	A	H					**55%**
White-winged Scoter	P		P	P	P	P	P					**55%**
Yellow Warbler	S	S	S		P	S	S					**55%**
Arctic Tern	H			H	NE			NE	NE			**45%**
Common Merganser	X				P	X		X	H			**45%**
Green-winged Teal	P	P			P	H	H					**45%**
Least Sandpiper	DD	S	FY		FY		H					**45%**
Pacific Loon	H	P	NE		FY						S	**45%**
Black Scoter	X	X				X			H			**36%**
Common Eider	H	H			FY	H						**36%**
Common Loon		H	P		P					X		**36%**
Common Raven	H	P			NY			H				**36%**
Common Redpoll		H			H	H	H					**36%**
Lapland Longspur	S		S		A		H					**36%**
Mallard	H				A	H			H			**36%**
White-throated Sparrow	S	S	S		A							**36%**
Common Goldeneye	H				H						X	**27%**
Dunlin					NE				H		H	**27%**
Fox Sparrow	S		S		A							**27%**
Great Black-backed Gull	P				NE			H				**27%**
Lincoln's Sparrow	S				A		S					**27%**
Northern Harrier					H	H	H					**27%**
American Robin					CF	H						**18%**
Bald Eagle					X		X					**18%**
Black Guillemot								NE		H		**18%**
Northern Shoveler		H							P			**18%**
Swamp Sparrow	S				CF							**18%**
Tundra Swan	H				FY							**18%**
White-winged Crossbill	X									X		**18%**
Alder Flycatcher					S							**9%**
Common Nighthawk					H							**9%**
Greater Yellowlegs					H							**9%**
Gyrfalcon			H									**9%**
Killdeer					P							**9%**
Parasitic Jaeger								X				**9%**
Peregrine Falcon								H				**9%**
Purple Sandpiper	FY											**9%**
Red-breasted Merganser					H							**9%**
Ring-necked Duck										X		**9%**
Rough-legged Hawk			H									**9%**
Surf Scoter					P							**9%**
Wilson's Snipe					S							**9%**
Wilson's Warbler					A							**9%**
Yellow-rumped Warbler	S											**9%**
Number of bird species	**38**	**27**	**26**	**9**	**48**	**23**	**24**	**11**	**17**	**12**	**13**	

[9] Bird species are classified according to 1) their frequency of occurrence in the 11 atlas survey squares of the study area, then 2) in alphabetical order (for a given frequency of occurrence).

[10] In addition to the species listed in this table, we detected the call of a Rusty Blackbird (more likely) or Brewer's Blackbird (less likely, but not impossible) on one of the recordings obtained in 17UNV60 survey square on North Twin Island. We are unable to determine with certainty which species it is, however.

We found breeding evidence indices extending the known breeding range for several species: Tundra Swan (breeding confirmed on North Twin, but probably breeds on South Twin also), Long-tailed Duck (probably breeds on all four islands), Dunlin (breeding confirmed on North Twin, but also found on Walter and Spencer Islands), Purple Sandpiper (breeding confirmed on South Twin), Semipalmated Sandpiper (breeding confirmed on North Twin, but also probably breeds at least on South Twin), Pacific Loon (breeding confirmed on North and South Twins), Lapland Longspur (certainly breeds on North and South Twins), and American Tree Sparrow (breeding confirmed on North Twin, but certainly breeds on South Twin also).

We observed two species at risk during this study: the Common Nighthawk and the Red-necked Phalarope. We luckily made the nighthawk fly away as we were passing over a very dry area of survey square 17UNV61, not far from the north shore of North Twin Island. We landed immediately in the area from which the bird had flown and tried to find the bird, if not a nest, in vain. In contrast, we observed the phalarope in most (64%; 7/11) survey squares and in several locations in the main square (17UNV60) of North Twin, where we confirmed its breeding (Table 2). We did not observe the species in the northern portion of North Twin (17UNV61), but it is still very likely to nest there.

Discussion

Overall, this project went fine and yielded interesting observations, including the very important fact that the Twin Islands are home to several bird species that do not nest anywhere else further south in North America. The vast tundra landscapes found there are simply unique at this latitude and could certainly be the subject of environmental monitoring in the context of climate change. Clearly, the Twin Islands support a remarkable breeding bird community.

Unfortunately, our results also indicate that the status of several bird species breeding on the Twin Islands may have changed over the past half-century. First, shorebirds density appears to be much lower today than in the early 1970s, when Manning (1981) estimated the North Twin population size of the Semipalmated Sandpiper, Semipalmated Plover, Red-necked Phalarope and Least Sandpiper at 2000, 1200, 1000 and 500 individuals, respectively. These shorebirds are the species we also found in greatest numbers during this project, and even if our results do not allow estimating the size of their populations, it is likely that they may have fallen by at least 50 to 75%. For example, we counted only about 50 Red-necked Phalaropes in total, even though we were careful to fly over North and South Twins habitats likely to support the species (which is one of the easiest shorebirds to identify from the air), so it seems unlikely that North Twin now supports more than 25% of its former population. In addition, we observed the Dunlin, Purple Sandpiper, Wilson's Snipe and Killdeer on very few occasions (i.e., 1 or 2 times), whereas Manning (1981) estimated their respective populations at 150, 100, 30 and 25 individuals on North Twin only. We also searched for Short-billed Dowitcher in vain, including where Manning (1981) had confirmed the species' nesting. Our observations remain somewhat anecdotal but are consistent with studies showing that many North American shorebird populations are in significant decline (Hope et al., 2019).

In contrast, some passerines are probably more common today than in the early 1970s. This is the case for the Yellow Warbler, which has proven to be the most common warbler during this study. This may also be the case for the Fox Sparrow, Lincoln's Sparrow, and White-throated Sparrow.

Other differences worth noting here between our results and those of Manning (1981) concern the King Eider, which we did not observe, and the Pacific Loon, which was the most common loon after the Red-throated Loon during our surveys.

In any case, one must remain cautious when comparing the results obtained during this study with the information published by Manning (1981). This author, along with his colleague Brenda Carter, did ornithological work on the Twin Islands in 1970, 1972, and 1973, and stayed there from May 7th to July 29th in 1973. In comparison, we visited the Twin Islands six days in 2022, for only a few hours each day. Being able to count the birds by flying over the whole territory in a helicopter represents an advantage compared to the technical means Manning and Carter enjoyed at the time. On the other hand, there is a huge difference between being able to conduct ground surveys for almost three months and allocating 40 hours in less than a week to such surveys.

Concluding Remarks

We were lucky to be able to fly every day and complete our surveys in such a short time, especially as the weather conditions were not always favourable: winds were often strong and when they were not, we sometimes could not fly or work because of foggy conditions. The most difficult conditions occurred from June 30th to July 2nd. We were also lucky that the presence of Polar Bears did not interfere with our work. The collaboration with George and Cody also went very well.

Surveys conducted from the helicopter allowed us to identify the larger birds easily, like swans, ducks, loons, gulls, terns, and raptors. However, it was more difficult to conduct ground surveys due to the windy conditions and the low density of songbirds and shorebirds. We spent nearly 40 hours on the ground looking for breeding evidence indices, but still, most of our eBird lists have few species. It would likely take a lot more time to get a good idea of the relative density of passerines and shorebirds on the Twin Islands.

The main problem with conducting bird surveys using a helicopter is that we must pay a minimum number of flight hours per day, even if we do not use them. This is why we could not allocate more days to our surveys, and why we could not devote long hours each day to conduct ground surveys. The situation becomes even more problematic when the weather conditions are not favourable to ground surveys.

It is important to recall we did consider the possibility of camping on North Twin and survey birds without any helicopter; we discussed this with various local stakeholders (i.e., EMRWB employees, CTA, tallymen, and Wiinipaakw Tours). However, the many logistical problems and dangers associated with camping there (because of polar bears) made it safer and less risky to stay in Wemindji and travel to the islands daily by helicopter.

Overall, we were able to get the most out of this study given the time and resources we had available.

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