ARCTIC SHOREBIRDS *in* NORTH AMERICA

A Decade of Monitoring

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CHAPTER EIGHT

Small-scale and Reconnaissance Surveys

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Abstract. This chapter describes small-scale surveys at seven locations in arctic Canada. At Kent Peninsula, the standard double sampling method (Bart et al., chapter 2, this volume) was used to estimate densities and population sizes. Shorebird densities were low except on Melbourne Island. At the northern tip of Ellesmere Island, densities were too low for intensive plots to be practical, and some of the species became extremely cryptic once incubation started. Methods are suggested for dealing with both problems. On Somerset Island, detailed surveys were made at Creswell Bay and estimated densities and population sizes were obtained. On the rest of the island, we lacked a good habitat map and densities were extremely low. We found a few scattered shorebirds but were not able to obtain estimates of density of population size. At Québec, shorebird density was strongly related to elevation. This relationship may provide an important basis for stratification in this region, especially since detailed landcover maps are lacking. On Melville and Prince Patrick Islands, shorebirds were found in the interior of the islands and in almost completely unvegetated areas, indicating that future surveys will need to cover the islands extensively rather than just the wetlands and adjacent bare areas. On Ellesmere and Axel Heiberg Islands, a combination of aerial and ground surveys showed that while species richness was low, areas of Axel Heiberg Island and the Fosheim Peninsula had surprisingly high numbers of breeding shorebirds. Rope drag surveys proved critical in identifying nesting Red Knots. In the Kivalliq region on the west side of Hudson Bay, a combination of aerial and ground surveys documented high diversity and numbers of breeding shorebirds and other species. In addition, large numbers of passage birds were observed on the coast, though the overall importance of this region to spring migrants remains unknown. These surveys demonstrate the value of conducting small-scale reconnaissance surveys in unfamiliar regions prior to beginning the full-scale PRISM surveys to estimate density and population size.

Key Words: aerial surveys, Alert, arctic, Axel Heiberg Island, Canada, Ellesmere Island, Fosheim Peninsula, Kent Peninsula, Kivalliq, Melville Island, monitoring, Northwest Territories, Nunavut, population size, Prince Patrick Island, PRISM, Québec, range maps, reconnaissance, Red Knot, shorebirds, Somerset Island.

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This chapter contains brief reports on surveys of breeding shorebirds at six locations in arctic Canada. Surveys on Kent Peninsula used the standard double sampling method, lasted for two years, and provided estimated densities and population sizes. Methods in the other surveys varied depending on shorebird density and on how large the study area was. In the Québec study area, the standard Arctic PRISM method for rapid surveys was used. In the Alert study area, hybrid methods were developed to deal with an extremely low density of shorebirds. In the other sites, investigators did not confine their surveys to predefined, randomly selected plots. We did not estimate densities or population sizes from the reconnaissance surveys, but the results provided useful new information on distributions and some indication of abundance. These preliminary surveys will also help us design large-scale surveys to estimate density and population size.

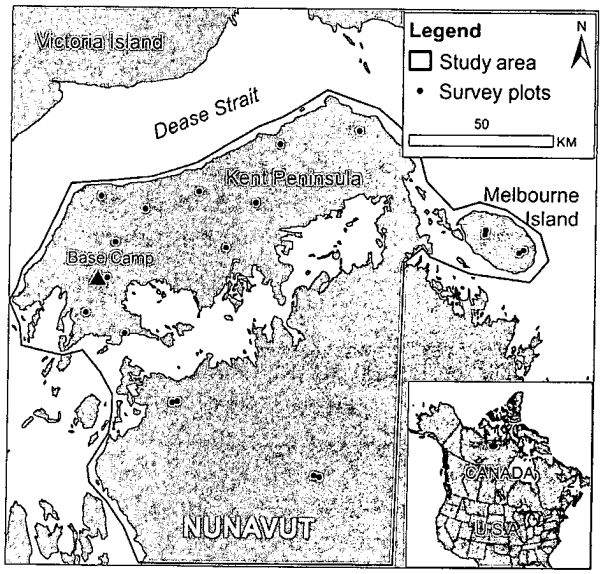


Figure 8.1. Kent Peninsula study area.

KENT PENINSULA

This study area encompassed Kent Peninsula, Melbourne Island, and the adjacent mainland from Bathurst Inlet to the western boundary of the Queen Maud Gulf Migratory Bird Sanctuary (Fig. 8.1). The study area was stratified by the normal three PRISM habitats (wet, moist, upland) and four geographic areas. Rapid surveys using the standard methods (Bart et al., chapter 2, this volume) were made on 52 randomly selected plots during 17–29 June 2001 and 19–29 June 2002. Intensive plots were established in both years but had too few shorebirds to estimate detection rates. We therefore used the Canada-wide detection ratio of 1.27 to adjust results from rapid surveys.

Surveyors recorded 88 shorebirds of 11 species (Table 8.1); 78% of the records were of the five most common species: American Golden-Plover, Dunlin, Semipalmated Sandpiper, Pectoral Sandpiper, and Stilt Sandpiper (for scientific names, see Appendix C). Densities were consistently highest in wetlands and were about equal in moist areas and uplands (Table 8.1).

Although shorebird density was low compared to other mid-arctic sites, we found high densities at Melbourne Island. Only six plots were surveyed, but 33 shorebirds were recorded, and the density of observations was more than twice the density at the rest of the plots. A preliminary analysis of satellite imagery suggested that 15% of Melbourne Island is covered by wetlands, about three times more than in other parts of the study area. An important task for future surveys in the mid-arctic regions will be to identify small but habitat-rich locations like Melbourne Island that have extensive high-quality habitat.

ALERT

This study area (Fig. 8.2) covered 135 km^2 near Alert on the northeast coast of Ellesmere Island. The terrain was mainly frost-shattered rock, gravel, and bare clay with little vegetation. Most "barren" areas had less than 5% vegetation cover; "tundra" areas generally had 5–15% cover (mostly *Dryas*, *Salix*, and *Saxifraga*); and "wetlands," which occurred below persistent snow and ice banks, had up to 85% cover (mostly graminoids and mosses). Snow cover in spring varies between years but is usually extensive until the end of May or early June. Snow-free patches begin to occur in late May and early June, especially on south-facing slopes on higher ground, where wind action results in only a thin layer of snow.

We selected 75 plots (61 in 2001, 14 in 2007) in locations considered to be representative of the area and surveyed them during 10 June–15 July 2001 and 24–29 June 2007. Plot size varied from 1 to 50 ha; 43 covered 5–20 ha. Most

TABLE 8.1

Number recorded, estimated densities, and population sizes (with CVs) of shorebirds in the Kent Peninsula study area.

Species	Number by habitat type			Density (birds/km^2) (CV)			Population size
	Wetlands	Moist areas	Uplands	Wetlands	Moist areas	Uplands	
American Golden-Plover	1	1	9	0.18 (1.13)	0.99 (0.93)	4.13 (0.44)	29,794 (0.38)
Semipalmated Plover	0	0	1	0 (0)	0 (0)	0.43 (0.98)	2,590 (0.99)
Dunlin	8	3	1	9.21 (0.39)	2.97 (0.93)	0.37 (1.01)	23,588 (0.68)
Semipalmated Sandpiper	7	2	4	10.37 (0.63)	1.25 (1.02)	1.75 (0.76)	24,628 (0.67)
Least Sandpiper	0	2	3	0 (0)	1.34 (0.77)	2.29 (0.85)	20,239 (0.65)
White-rumped Sandpiper	1	0	1	1.11 (1.05)	0 (0)	0.27 (1.03)	2,491 (0.77)
Pectoral Sandpiper	15	3	4	16.24 (0.30)	2.22 (0.69)	2.75 (0.49)	39,822 (0.38)
Baird's Sandpiper	2	0	0	2.52 (0.52)	0 (0)	0 (0)	1,971 (0.76)
Stilt Sandpiper	3	0	2	3.47 (0.43)	0 (0)	1.86 (0.68)	13,964 (0.60)
Red-necked Phalarope	9	0	2	3.47 (1.00)	1.25 (1.02)	0 (0)	8,673 (0.84)
Red Phalarope	3	1	0	7.55 (0.65)	0 (0)	0.54 (1.03)	9,143 (0.56)
Total	49	12	27	54.12 (0.27)	10.04 (0.38)	14.40 (0.28)	176,903 (0.27)

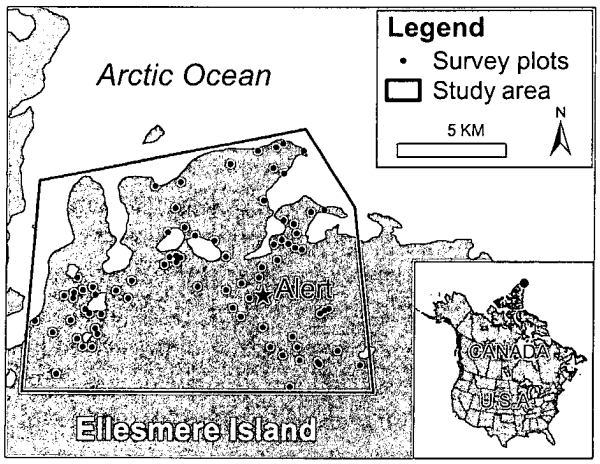


Figure 8.2. Alert study area.

surveys followed the rapid survey method but some involved rope dragging (Bart et al., chapter 2, this volume). We recorded only those birds thought to be nesting in the plot, as was done in Alaska. Due to the low density of shorebirds at this site, estimating detection rates using standard intensive plots was judged not to be practical. Instead, plots were surveyed up to six times, with more surveys on those plots thought to have more birds. The number of plots covered one, two, three, and four or more times were 38, 18, 10, and 9, respectively. Plots covered more than once were estimated to contain 30 territories, of which 25 were found after the first survey. This indicated a detection rate of 0.83 on the first visit, a value very close to the 0.81 obtained in Alaska using similar methods (see McCaffery et al., chapter 3, this volume, and Bart et al., chapter 4, this volume). This result suggests that most nesting birds were located during these surveys, so we have assumed a detection ratio of 1.0 while acknowledging that we lack rigorous proof for this absolute value.

In both years, Ruddy Turnstone, and Red Knot were common (Table 8.2). In 2001, a single Red Phalarope was recorded. In 2007, Red Phalaropes were more common and Baird's Sandpiper was also recorded. Among non-shorebirds, Snow Bunting was by far the most common species, though Long-tailed Jaegers were also regularly noted. Forty-seven of the 75 plots (63%) had bird territories (all species combined); 27 of the 75 plots (36%) contained shorebird territories. Off-plot birds were also recorded in 2007 and, as a result, this doubled the number of non-shorebird species recorded (8 vs. 4 in 2001). The density and population size of all shorebirds was estimated at 10.65/km^2 and 1,434, respectively (Table 8.3). These estimates should be treated with caution due to the lack of a formal plan for selecting plots.

Once incubation began, Red Knot and Sanderling ceased conspicuous activities on their territories, so their nests were difficult to locate. Ruddy Turnstones remained active on their territories and were easier to detect. Rope dragging did reveal nests, but generally did not reveal new nests on plots that had previously been searched. This was because densities were low and territories were initially searched during the territory-establishment period when birds were active. For example, during nine rope surveys of plots previously surveyed at least once, no new nests were discovered. However, later in incubation, and for Red Knot in particular, some nests would have been missed had we not expanded the rope dragging effort. Predation levels were recorded qualitatively as "high" during the 2001 surveys. In 2007, half the nests are known to have failed and some nests had not hatched by the time surveyors departed.

In other parts of the arctic, wet areas are often heavily used by birds. Most species occurring at Alert, however, favored "upland" types of tundra, and in the case of the Red Knot, nesting could occur in extremely barren rocky, almost unvegetated terrain. The only records of shorebirds nesting in "marsh" habitats at Alert were Baird's Sandpiper, which nested in the marsh at Kirk Lake over several years (though this species typically nests in drier habitats elsewhere), and a single Ruddy Turnstone, which nested unsuccessfully in the same marsh in 2002. Red Phalaropes and Red-necked Phalaropes have been recorded at Alert in wet areas in the spring, but no nesting records were recorded.

Although these high-arctic species prefer drier nesting habitats, presumably much of their foraging occurs in nearby wetlands. To determine how close nests were to wetlands, the distance from the nest to the nearest water body or edge of a wetland complex was recorded in 2007. The average distances to water were Sanderling (2 nests): 13.5 m, Ruddy Turnstone (8 nests): 34 m, and Red Knot (2 nests): 217 m. For all nests, the average was 61 m.

TABLE 8.2

Birds recorded on rapid surveys in the Alert study area.

Species	2001	2007	
	On plots	On plots	Off plots
Shorebirds			
Common Ringed Plover	1	0	0
Ruddy Turnstone	14	1	6
Red Knot	15	1	11
Sanderling	7	1	5
Baird's Sandpiper	0	3	1
Red Phalarope	1	1	3
Other species			
Red-throated Loon	0	0	2
Brant	0	0	3
King Eider	1	0	0
Long-tailed Duck	0	0	5
Rock Ptarmigan	2	0	0
Long-tailed Jaeger	6	3	15
Thayer's Gull	0	0	1
Glaucous Gull	0	0	3
Arctic Tern	0	0	7
Snow Bunting	43	9	7

TABLE 8.3

Estimated densities and population sizes of shorebirds in the Alert study area.

Species	Number recorded	Density (birds/km^2)	Population size	CV
Red Knot	23	4.80	647	0.30
Red Phalarope	1	0.21	28	1.03
Ruddy Turnstone	16	3.34	450	0.34
Sanderling	11	2.30	309	0.42
All species	51	10.65	1,434	—

SOMERSET ISLAND

This study area (Fig. 8.3) covered 4,359 km^2 and was divided into the Creswell Bay region 139 km^2 and the remaining area (4,220 km^2). Rapid surveys were conducted during 27 June to 5 July 2001 on 56 plots in Creswell Bay and 47 plots in the remaining area. Plots were searched a single time, in most cases by two observers walking slowly, 25 m apart, along parallel lines that completely covered the plot. We attempted to conduct intensive surveys but arrived too late for them to be effective.

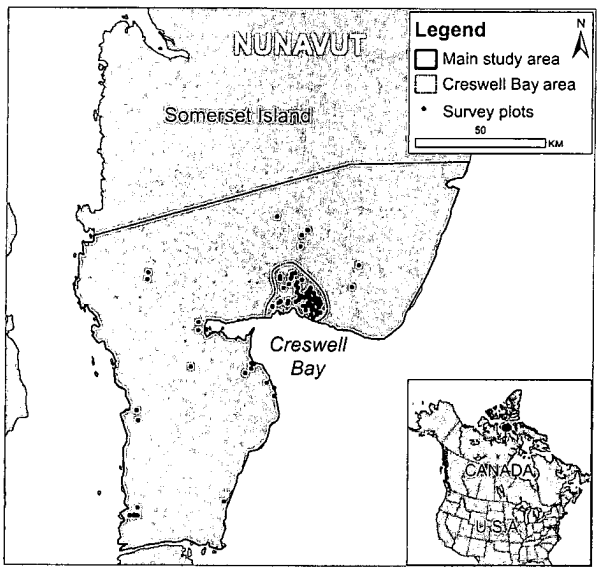


Figure 8.3. Somerset Island study area.

During the surveys at Creswell Bay, we recorded 201 shorebirds of eight species (Table 8.4). About half the birds recorded were Red Phalaropes and a third were White-rumped Sandpipers. All other species were much less common (less than 6%). The density of shorebirds was nearly 50 birds/km^2. The estimated population size was 6,751 shorebirds.

We lacked a useful landcover map for the rest of the study area, and many areas portrayed as wetlands were actually shadows. As a result, the randomly selected areas had virtually no birds. Eventually a decision was made to seek areas that might have suitable habitat and survey them to determine whether any appreciable number of birds occurred in the area. We found 28 indicated pairs of shorebirds, including Baird's Sandpipers (8), Sanderlings (7), Red Phalaropes (6), American Golden-Plovers (2), Black-bellied Plovers (2), White-rumped Sandpipers (2), and Red Knots (1). These data provide distributional information and show that shorebird populations in these areas are sparse but present. They do not provide a good basis for estimating density or population size.

We also recorded 14 species other than shorebirds. The species (and number of indicated pairs) at Creswell Bay were Lapland Longspur (36), King Eider (9), Horned Lark (7), Red-throated Loon (3), Canada Goose (1), Long-tailed Duck (1), and Parasitic Jaeger (1). On the rest of the study area the records were Lapland Longspur (15), Snow Bunting (13), Snow Goose (12), Horned Lark (6), Long-tailed Duck (3), Red-throated Loon (2), Long-tailed Jaeger (1), Pacific Loon (1), Redpoll (1), Snowy Owl (1), and Glaucous Gull (1).

QUÉBEC

This study area (Fig. 8.4) covered 19,003 km^2 on the eastern shore of Hudson Bay, including the village of Puvirnituq (60°00′N, 77°10′W). Rapid surveys were conducted during 9–17 June 2002 on 98 randomly selected 10-ha plots. We used the standard PRISM method for surveys and analyses (see Bart et al., chapter 2, this volume). Two intensive plots were established but no birds were found breeding on them, so the Canada-wide detection ratio (1.27) was used to estimate density. We did not calculate estimated densities of species other than shorebirds.

Semipalmated Sandpiper was by far the most common breeding shorebird, followed by Semipalmated Plover and Wilson's Snipe (Table 8.5). Several other species were abundant including Lapland Longspur, Canada Goose, American Pipit, American Tree Sparrow, and Savannah Sparrow.

Shorebird densities showed a strong inverse relationship with elevation. For example, the mean number of shorebirds/plot (and CV) was 0.77 (0.24) for plots less than 15 m above sea level, but only 0.20 (0.29) for plots greater than 15 m above sea level ($P < 0.01$). Plots at higher elevations were better drained and had fewer wetlands.

Our results suggest that breeding Dunlin were more abundant on the Ungava Peninsula than suggested by Warnock and Gill (1996). Breeding was confirmed for Dunlin (nest-building) and probable for American Golden-Plover (copulation). Although we found only one confirmed breeding record for the Black-bellied Plover, they may be more abundant along coastal segments of rivers on the Ungava Peninsula than reported by Paulson (1995).

MELVILLE AND PRINCE PATRICK ISLANDS

This study area (Fig. 8.5) included Melville (42,149 km^2), Prince Patrick (15,848 km^2), and Eglinton (1,541 km^2) Islands in the western Queen Elizabeth Islands. Prior to the survey, Landsat images and a vegetation map prepared by Edlund (1982) were used to select 77 clusters of three plots each (231 plots). The average plot size was 23 ha, and 80% of the plots were between 9 and 41 ha.

TABLE 8.4

Results of shorebird surveys on Somerset Island, 2001.

Species	Number recorded	Estimated density (birds/km^2)	CV	Estimated population size
Red Phalarope	97	22.32	0.22	3,092
White-rumped Sandpiper	64	15.89	0.22	2,201
American Golden-Plover	12	3.24	0.39	448
Baird's Sandpiper	9	2.51	0.37	348
Black-bellied Plover	6	1.90	0.39	262
Pectoral Sandpiper	6	1.23	0.41	170
Buff-breasted Sandpiper	5	1.03	0.53	142
Ruddy Turnstone	2	0.63	0.72	87
Total	201	48.7		6,751

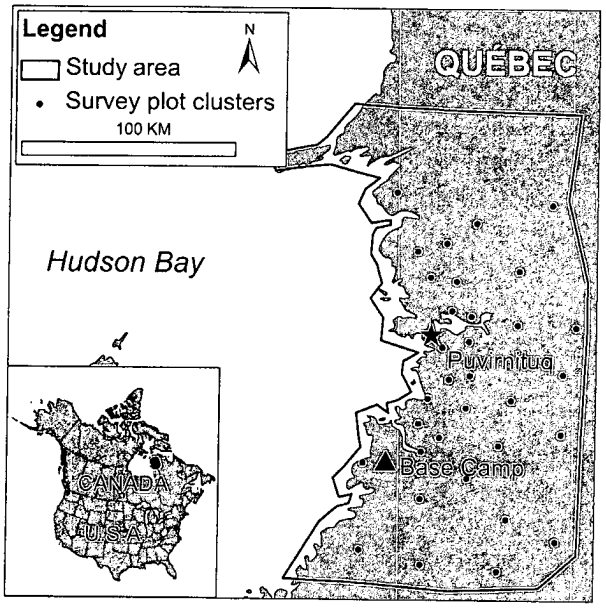


Figure 8.4. Québec study area.

Sites were concentrated in areas we thought likely to have the most birds, but a small sample of sites in the most barren areas was also selected.

Surveys were conducted during 18–29 June, 2007. We visited 208 plots in 64 clusters, including a few plots not in the original sample. When a plot was covered entirely by snow or water, we recorded zero birds for it and selected another nearby area to survey. If a plot was partially covered by snow or water, we adjusted the boundaries and later redrew the plot so that it covered the original plot plus the additional area surveyed. The survey of each plot was conducted by a single observer and lasted 30–45 minutes (longer for a few large plots located near base camps). During surveys we recorded indicated pairs and off-plot birds as usual for PRISM surveys (see Bart et al., chapter 2, this volume).

We recorded 12 shorebird species and 630 "indicated birds" (indicated pairs × 2 + birds seen off-plot), of which 36% were Red Phalarope. Species diversity was high, with ≥15 individuals of nine species recorded. An additional 97 shorebird individuals, most not identified to species, were recorded during helicopter flights.

Prior to our surveys, the avifauna of these two islands was poorly known. The results will be reported in more detail elsewhere, but here we note new information on distribution and abundance.

American Golden-Plover

The BNA range map excludes half of Melville Island and all of Prince Patrick Island, whereas our surveys show that both should be included (Johnson and Connors 1996a).

Ruddy Turnstone

The BNA range map includes all of Melville and the southeastern part of Prince Patrick Islands (Nettleship 2000). Our surveys suggest that the range may be limited to the southeastern quarter of Melville, though a few individuals could certainly occur elsewhere in the study area.

TABLE 8.5

Birds recorded on rapid surveys in the Québec study area.

Species	Number recorded	Estimated pairs	Estimated density (birds/km^2; CV)
Shorebirds			
Black-bellied Plover	1	0	0.00 (0.00)
American Golden-Plover	2	1	0.12 (1.02)
Semipalmated Plover	11	6	0.92 (0.41)
Dunlin	5	3	0.43 (0.59)
Semipalmated Sandpiper	40	23	3.59 (0.26)
Least Sandpiper	5	3	0.44 (0.59)
White-rumped Sandpiper	32	0	0.00 (0.00)
Wilson's Snipe	6	6	0.97 (0.48)
Other species			
Snow Goose	12	0	—
Canada Goose	387	134	—
Northern Pintail	8	7	—
Black Scoter	2	2	—
Long-tailed Duck	15	11	—
Rock Ptarmigan	6	4	—
Herring Gull	4	1	—
Horned Lark	48	46	—
American Pipit	134	107	—
American Tree Sparrow	84	76	—
Savannah Sparrow	70	64	—
White-crowned Sparrow	28	27	—
Lapland Longspur	304	294	—
Snow Bunting	16	7	—
Common Redpoll	5	3	—

Purple Sandpiper

The BNA range map includes eastern Melville Island and has a "?" for the rest of our study area (Payne and Pierce 2002). Our results show that this species is widely distributed throughout the study area and that it may be more common at Prince Patrick than on Melville Island.

Sanderling

The BNA range map shows this species nesting only close to the coast; our results suggest it probably also nests inland on these islands (MacWhirter et al. 2002).

White-Rumped Sandpiper

The BNA range map excludes Prince Patrick Island, whereas our results show that most, if not all, of the island should be included (Parmelee 1992b).

Baird's Sandpiper

The BNA range map includes the entire study area, whereas we found it only on Melville Island

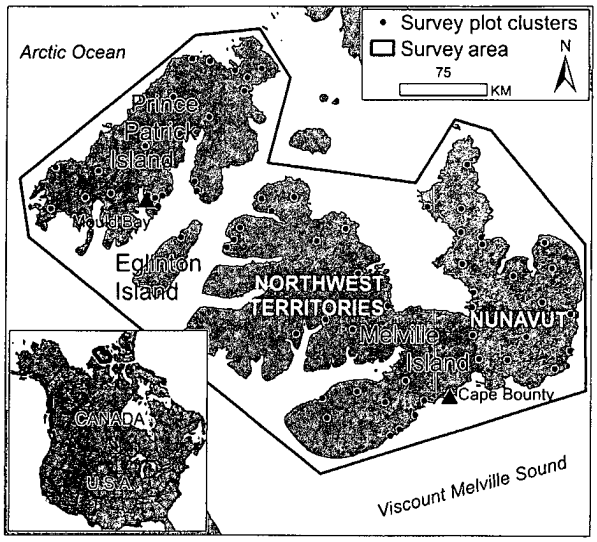


Figure 8.5. Melville and Prince Patrick Islands study area.

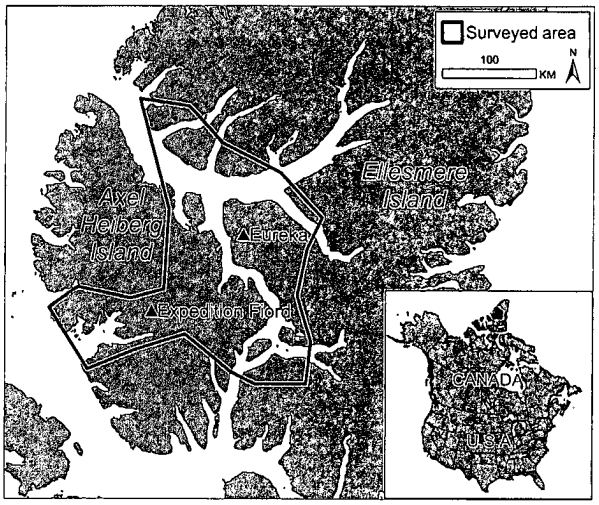


Figure 8.6. Central Ellesmere and Axel Heiberg Islands study area.

(Moskoff and Montgomerie 2002). The species may occur sparsely on Prince Patrick Island.

Pectoral Sandpiper

The BNA range map shows the species only on the eastern side of Melville Island, whereas we found it throughout Melville and at a few locations on Prince Patrick (Holmes and Pitelka 1998).

Buff-Breasted Sandpiper

The BNA range map includes only the southern quarter of Melville (Lanctot and Laredo 1994). We found it at one site in central Melville and, based on habitat and the distribution of other species, we suspect that it occurs more widely across the study area.

Red-Necked Phalarope

The BNA range map excludes all areas north of southern Victoria Island (Rubega et al. 2000). The single bird we recorded may have been due to an overflight or may suggest that a small population breed farther in our study area.

Red Phalarope

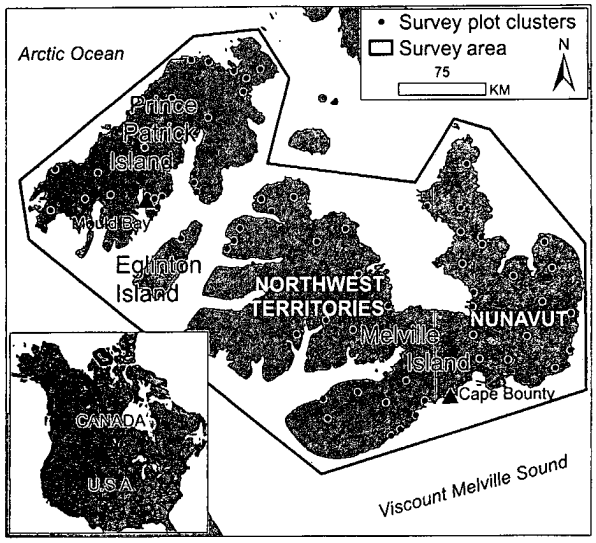
The BNA range map excludes Prince Patrick Island, whereas we found it breeding in the southern quarter of the island (Tracy et al. 2002).

The mean number of shorebirds per plot in different habitats showed that the highest numbers were in wetlands and vegetated uplands but that substantial numbers occurred in unvegetated soil and even rock (either bedrock or gravel). Some of these plots were far from highly vegetated areas. Shorebirds may thus be quite widely distributed across the study area.

CENTRAL ELLESMERE AND AXEL HEIBERG ISLANDS

This study area (Fig. 8.6) covered 44,000 km^2 on central Ellesmere and Axel Heiberg Islands. The survey crew was based at the Polar Shelf facility at Eureka and the research camp at Expedition Fiord from 17 to 26 June 2007. Three types of surveys were conducted: ground-based area searches, rope drags, and aerial transects. The locations of the areas searched and rope drag plots were non-randomly selected, while the general survey locations were selected using a coarse-scale habitat classification and topographic maps. We concentrated our surveys in wetlands. Aerial transects were conducted while flying between plots (Elliott and Smith, chapter 9, this volume).

Plots for area searches (n = 5) covered 4–16 ha and were surveyed by two people, who recorded all birds detected. Rope drag surveys of plots (n = 6) were carried out in wetlands. The surveyors circumnavigated the lake, pond, or wetland complex while spiraling outward from the edge of the wetland or water body. Distances from nests to the edge of the nearest wetland or water body were measured to test the hypothesis that shorebird nests would be found near wetlands. One hundred thirty-five shorebirds were seen during the ground surveys (area search and rope drag plots). We found 17 shorebird nests and recorded 89 indicated pairs of shorebirds (Table 8.6).



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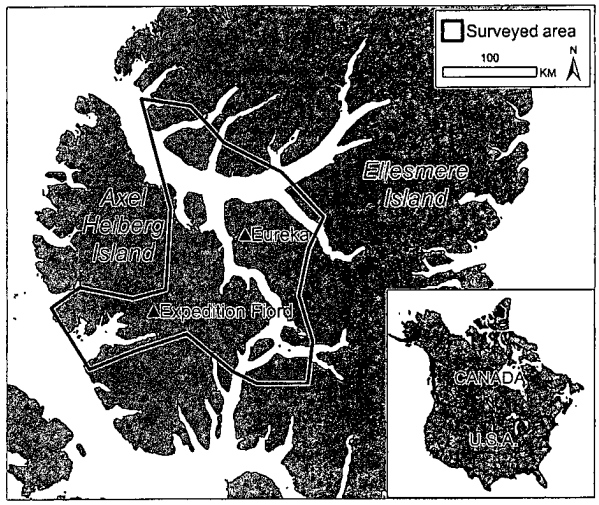

Figure 8.6. Central Ellesmere and Axel Heiberg Islands study area.

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CENTRAL ELLESMERE AND AXEL HEIBERG ISLANDS

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TABLE 8.6

Birds recorded on ground surveys (rapid surveys and rope drags) and aerial surveys in the central Ellesmere and Axel Heiberg Islands area.

	Ground surveys				Aerial surveys		
Species	Nests	Pairs	Singles	Total	Axel Heiberg Island	Ellesmere Island	Total
Shorebirds							
American Golden-Plover	0	0	1	1	1	0	1
Ruddy Turnstone	10	16	16	42	66	58	124
Purple Sandpiper	0	0	0	0	1	2	3
Red Knot	5	2	17	24	69	70	139
Sanderling	0	0	4	4	3	6	9
White-rumped Sandpiper	0	0	0	0	3	5	8
Baird's Sandpiper	1	0	0	1	2	0	2
Red Phalarope	1	11	5	17	20	73	93
Small shorebird	0	0	0	0	357	207	564
Medium shorebird	0	0	0	0	0	11	11
Other species							
Red-throated Loon	0	2	0	2	9	8	17
Snow Goose	0	0	10	10	44	29	73
Brant	0	1	0	1	42	10	52
Canada Goose	0	0	0	0	10	0	10
Common Eider	0	0	0	0	4	0	4
King Eider	0	5	1	6	156	81	237
Long-tailed Duck	0	8	3	11	39	45	84
Unidentified Duck	0	0	0	0	9	5	14

Glaucous Gull	0	0	0	0	4	3	7
Rock Ptarmigan	0	0	1	1	4	2	6
Parasitic Jaeger	0	0	1	1			
Long-tailed Jaeger	1	2	3	6	60	60	120
Arctic Tern	0	0	1	1	16	5	21
Common Raven	0	0	1	1	0	0	0
Lapland Longspur	1	13	28	42	3	6	9
Snow Bunting	0	1	7	1	61	64	125
Hoary Redpoll	0	0	3	42	0	0	0
Unidentified songbird	0	0	0	0	3	3	6

TABLE 8.7

Birds recorded in the Kivalliq region study area.

Species	Aerial surveys	Walkabouts	Total
Shorebirds			
Black-bellied Plover	0	1	1
American Golden-Plover	0	22	22
Semipalmated Plover	22	30	52
Lesser Yellowlegs	3	3	6
Whimbrel	8	10	18
Hudsonian Godwit	0	1	1
Ruddy Turnstone	39	109	148
Red Knot	0	9	9
Sanderling	6	51	57
Dunlin	9	101	110
Pectoral Sandpiper	0	7	7
White-rumped Sandpiper	12	87	99
Baird's Sandpiper	0	9	9
Semipalmated Sandpiper	0	234	234
Least Sandpiper	0	34	34
Stilt Sandpiper	2	55	57
Wilson's Snipe	0	4	4
Red Phalarope	0	24	24
Red-necked Phalarope	47	75	122
Small shorebirds	3,068	—	3,068
Medium shorebirds	218	—	218
Large shorebirds	4	—	4
Other species			
Red-throated Loon	8	5	13
Pacific Loon	16	8	24
Common Loon	0	1	1
Tundra Swan	124	7	131
Canada Goose	1,535	838	2,373
Greater White-fronted Goose	62	57	119
Ross's/Lesser Snow Goose	354	493	847
Mallard	1	0	1
Northern Pintail	442	99	541
Northern Shoveler	6	0	6
Green-winged Teal	54	16	70
Unidentified scaup	23	2	25
Common Eider	76	14	90

TABLE 8.7 (*continued*)

Species	Aerial surveys	Walkabouts	Total
King Eider	16	6	22
Long-tailed Duck	153	101	254
Surf Scoter	4	0	4
Black Scoter	8	0	8
Common Merganser	22	5	27
Red-breasted Merganser	2	6	8
Northern Harrier	2	2	4
Bald Eagle	2	2	4
Merlin	2	0	2
Willow Ptarmigan	189	73	262
Rock Ptarmigan	0	21	21
Sandhill Crane	67	39	106
Long-tailed Jaeger	0	21	21
Parasitic Jaeger	6	11	17
Herring Gull	346	107	453
Glaucous Gull	0	1	1
Arctic Tern	426	12	438
Common Raven	0	4	4
Horned Lark	0	70	70
Gray-cheeked Thrush	0	5	5
American Pipit	1	20	21
Yellow Warbler	0	1	1
Blackpoll Warbler	0	4	4
American Tree Sparrow	0	46	46
Savannah Sparrow	0	328	328
Harris's Sparrow	0	12	12
White-crowned Sparrow	0	26	26
Lapland Longspur	5	599	604
Snow Bunting	24	20	44
Redpoll	0	106	106

All nests were within 500 m of a wetland or water body. The rope drag was extremely effective, especially for Red Knots, which did not flush until the rope touched or passed over them.

Aerial transects (n = 36) were flown 30 m above ground at a speed of 80 km/hr. Observers recorded birds within a 400-m-wide transect, centered on the airplane. The total transect length was 3,500 km. Birds were identified to species where possible or to size category (Table 8.6). The small shorebird category included Baird's Sandpiper, Common Ringed Plover, Red Phalarope, Sanderling, and White-rumped Sandpiper. The medium shorebird category included American Golden-Plover, Black-bellied Plover, Purple Sandpiper, Red Knot, and Ruddy Turnstone. No large shorebird species were found in this region. We recorded 954 shorebirds on the survey, mainly

unidentified small shorebirds, but substantial numbers of Red Knot, Ruddy Turnstone, and Red Phalarope. We also recorded more than 100 each of King Eider, Jaegers, and Snow Buntings. It is interesting to note that more shorebirds were seen on the surveys of Axel Heiberg Island than on Ellesmere Island. Axel Heiberg Island had more "good" wetland habitat than we expected. The density of birds (number/km^2) recorded on the aerial survey was impressive: shorebirds 0.68, geese 0.10, ducks 0.24, and all species 1.24. These results show the utility of aerial surveys for determining distribution of many species, including shorebirds and even a few small landbirds (e.g., Snow Buntings).

KIVALLIQ REGION

This study area (Fig. 8.7) covered 180,000 km^2 on the west coast of Hudson Bay. The survey crew was based in Arviat and Baker Lake from 10 to 28 June 2008. Surveys consisted of ground-based "walkabouts" and aerial transect surveys. The walkabouts were done by two observers walking in opposite directions from the helicopter for approximately 45 minutes. All species detected were recorded (Table 8.7). The aerial surveys were flown at 30 m above the ground at a speed of 80 km/hr with two observers on opposite sides of the helicopter (front left and back right), each recording birds within 200 m of the airplane. Shorebirds that could not be identified to species were classified by size category: Small (Baird's Sandpiper, Dunlin, Least Sandpiper, Red Phalarope, Red-necked Phalarope, Sanderling, Semipalmated Plover, Semipalmated Sandpiper, White-rumped Sandpiper), Medium (American Golden-Plover, Black-bellied Plover, Pectoral Sandpiper, Red Knot, Ruddy Turnstone, Stilt Sandpiper, Wilson's Snipe), and Large (Hudsonian Godwit, Lesser Yellowlegs, Long-billed Dowitcher, and Whimbrel).

The Kivalliq region has high species diversity for both shorebirds (n = 19) and other species (n = 44), as noted in the Northwest Territories–Nunavut Bird Checklist Survey (see Armer et al., chapter 12, this volume). The most common shorebirds recorded were Semipalmated Sandpiper, Ruddy Turnstone, Red-necked Phalarope, and Dunlin. The most common non-shorebirds were Canada Goose, Ross/Snow Goose, Lapland Longspur, Northern Pintail, Arctic Tern, and Herring Gull. We also noted hundreds of mid- and high-arctic–breeding

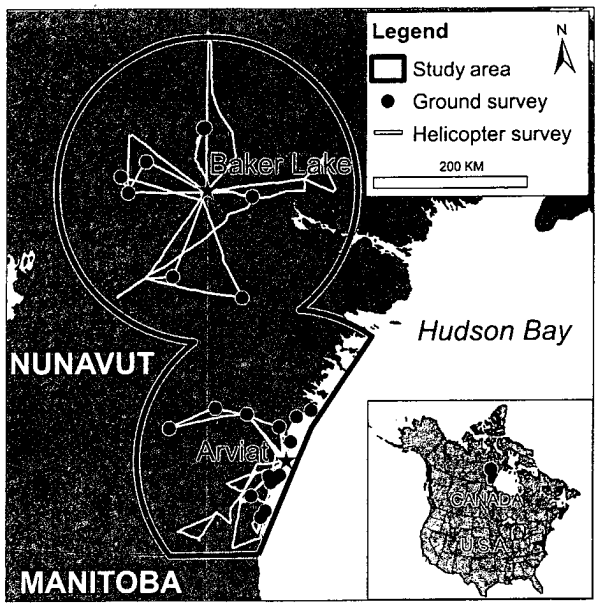

Figure 8.7. Kivalliq Region study area.

shorebirds (e.g., Ruddy Turnstone, Sanderling, White-rumped Sandpiper) feeding on the wrack lines along the western Hudson Bay coast. The importance of this region for northward migration of these species is still unknown.

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