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**AERIAL SURVEYS OF MIGRATORY BIRDS AND MAMMALS NEAR
THE QUEEN MAUD GULF AND CORONATION GULF COASTS, AUGUST 1994**

by
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ABSTRACT

Aerial surveys of the Queen Maud Gulf and Coronation Gulf coasts in the Central Arctic were done from August 18 - 24 , 1994 to determine relative numbers of animals in the regions, and to identify areas important to wildlife that could be negatively affected by mineral exploration and oil spills. White geese (Snow and Ross' Geese) were the most abundant type of goose and the majority were in the southern Queen Maud Gulf. Canada Geese were seen in both Queen Maud Gulf and Coronation Gulf. Brant were most abundant in eastern Queen Maud Gulf and western Coronation Gulf. Gulls and low numbers of Tundra Swans were found throughout both regions. The smaller less visible bird species (e.g. ducks, shorebirds) were likely present, but few were detected due to the survey method used and often poor weather conditions encountered. Muskox were commonly seen but few other mammals were observed. Several areas where exploration activity might significantly affect geese and swans were identified: the Cape Hearne area, Kent Peninsula, southern King William Island, the Queen Maud Gulf Bird Sanctuary and Adelaide Peninsula, Jenny Lind Island, and the Royal Geographic Society Islands. Areas that may meet the criterion of Alexander et al. (1991) for key habitat site status are the Cape Hearne area, Kent Peninsula, southern King William Island, and Adelaide Peninsula.

RÉSUMÉ

Une campagne de recensement aérien a été effectuée sur le littoral du golfe Queen Maud et du golfe Coronation entre les 18 et 24 août 1994. L'objet de cette campagne était de dénombrer les animaux vivant dans ces régions et de déterminer les habitats critiques susceptibles d'être perturbés par des travaux d'exploration minière et des déversements de pétrole. L'oie blanche (oie des neiges et oie de Ross) était le type d'oie le plus abondant, particulièrement dans le secteur sud du golfe Queen Maud. Des bernaches du Canada ont été observées dans le golfe Queen Maud et le golfe Coronation. La bernache cravant était particulièrement abondante dans le secteur est du golfe Queen Maud et dans le secteur ouest du golfe Coronation. Des mouettes et un petit nombre de cygnes siffleurs ont été observés dans les deux régions. Des espèces de moindre taille, moins visibles, (canards, oiseaux de rivage, etc.) étaient également présentes mais très peu on pu être détectées en raison de la méthode de recensement utilisée et du mauvais temps. Le boeuf musqué semblait commun, mais très peu d'autres animaux terrestres ont été observés. On a déterminé plusieurs endroits où les colonies d'oies et de cygnes pourraient être perturbées par d'éventuelles activités d'exploration: le secteur du cap Hearne, la péninsule Kent, l'île King William, le refuge d'oiseaux du golfe Queen Maud, la péninsule Adelaide, l'île Jenny Lind et les îles Royal Geographic Society. Les secteurs qui pourraient correspondre aux critères d'Alexander et al. (1991) en matière d'habitat critique sont le secteur du cap Hearne, la péninsule Kent, le sud de l'île King William et la péninsule Adelaide.

ACKNOWLEDGMENTS

I am grateful to the following people and organizations for their contribution to the project. Dave Tilden of the Environmental Protection Service and AXYS Environmental Consulting supported the project. R. Doug Campbell of Range and Bearing Environmental Resource Mapping Corporation provided maps and assistance during the surveys, Canawest Aviation provided the airplane and pilot, and Jim Hines and Myra Wiebe-Robertson of the Canadian Wildlife Service reviewed and edited the manuscript.

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1.0 INTRODUCTION

As mineral and oil exploration continues to increase in the Arctic, the threat of accidents such as oil spills also increases. Knowledge of areas important to wildlife is critical in order to minimize the effect of exploration activities on wildlife and to protect wildlife from oil spills. Recent mineral exploration in Queen Maud Gulf and Coronation Gulf in the Central Arctic prompted concern about the sensitivity of the regions to these activities. Two areas of special importance to migratory birds already have been identified in the regions: Jenny Lind Island and the Queen Maud Gulf Bird Sanctuary (QMGBS) (Alexander et al. 1991). However, more information is needed on the overall wildlife diversity and abundance in the regions, especially on migratory bird distributions during late summer (Bromley and Stenhouse 1994).

Aerial surveys of the coasts in Queen Maud Gulf and Coronation Gulf were done in August 1994. The objectives of the surveys were to estimate relative numbers of animals in the regions, and to identify important wildlife areas that could be negatively affected by exploration activities and oil spills.

2.0 STUDY AREA

The study area includes most of the coastline (4 268 km) in Queen Maud Gulf and Coronation Gulf (Figures 1 and 2). It lies on the border of the Northern Arctic and the Southern Arctic Ecozones (Wiken 1986) and is characterized by a variety of geological and vegetative features. The surface geology differs greatly from areas of low relief marine deposits and raised beaches to areas of 150 m limestone cliffs. Vegetation varies from shrub-herb-heath low Arctic tundra to herb-lichen high Arctic tundra (Wiken 1986). Descriptions of the regions and additional references can be found in Bostock (1970) and Wiken (1986).

3.0 METHODS

Wildlife surveys were done at the same time as geological information on the sensitivity of the coastline to oil spills was collected by AXYS Environmental Consulting (for the Environmental Protection Service). Because the primary objective of the flights was to collect geological information and secondarily to identify areas important to wildlife, rigorous wildlife aerial survey protocol could not be followed.

The total distance surveyed was 4 268 km. Prior to the surveys, the coastline was divided into 136 sections based on geological features detected from air photos. I referenced the location of observations during the surveys using these section numbers and prominent landmarks.

The surveys were done on August 18-24, 1994. The total number of survey hours was 22 hours, with an average of 3.1 hours/day plus travelling time to survey areas. Surveys were flown in a twin-engine Piper Navajo airplane that travelled at 200 to 300 km/hr at an altitude of approximately 170 m during the surveys. The airplane was flown parallel to the coast at a distance of approximately 170 m from shore, with the coastline generally on the left side of the airplane.

The weather conditions were generally unfavourable for wildlife observations, with low overcast skies, rain and winds ranging from 10 - 50 km/hr. Air speed, turbulence, moderate rainfall and fog did not greatly affect the geological surveys, so surveys were sometimes flown during poor conditions for wildlife observations.

I sat in the right rear of the airplane facing a large window in the left side door and identified species and numbers of individuals seen. Observations were recorded onto a hand-held tape recorder. I used 8×23 binoculars to identify some species and estimate the number of birds in large flocks.

Many groups of birds are difficult to identify to the species level during aerial surveys. Therefore, some of the dark-coloured geese (Canada Geese (*Branta canadensis*), Greater White-fronted Geese (*Anser albifrons*) or Black Brant (*Branta bernicla*)) were classified only as "dark geese". Snow Geese (*Chen caerulescens*) and Ross' Geese (*Chen rossii*) cannot be reliably distinguished during aerial surveys so I classified them as "white geese". It was extremely difficult to identify ducks to the species level during the surveys because of the high altitude and fast speed of the airplane, therefore all sightings of ducks were grouped in one category.

An attempt to view a constant transect width, required to make density calculations, was abandoned for two reasons. First, in order to follow the coastline closely the airplane was banked at 15°, which partly obliterated my view of the coastline. Second, because I was not able to sit directly by the observation window, a blind spot existed directly below me and extended to a point approximately 180 m outward from the airplane. Nevertheless, I was able to compare different coastlines by calculating the number of birds/km based on the number of individuals seen along a coastline and the length of that transect.

4.0 RESULTS

4.1 White Geese (Snow and Ross' Geese)

White geese were the most abundant species group (Table 1). The majority of white geese were in South Queen Maud, with over 1 000 individuals seen on the Adelaide Peninsula and approximately 1 000 individuals seen within the QMGBS (Figure 3). Several hundred white geese were seen further north on the southern part of King William Island and approximately 200 individuals were seen on Jenny Lind Island. Lower numbers of white geese were seen north and east of Cambridge Bay. Almost all white geese were in groups of 10 to 200.

4.2 Canada Geese

The total number of Canada Geese was high compared to other dark-coloured species of geese seen during the surveys (Table 1). Several hundred Canada Geese were seen in the Cape Hearne area and the Kent Peninsula, areas where no white geese were seen. Over 150 Canada Geese were seen on the coasts in both southern Queen Maud Gulf and the southern part of King William Island (Figure 4), although the numbers of Canada Geese seen were not nearly as high in these areas as white geese. Canada Geese were generally in groups of about 50, but 5 groups had over 100 birds.

4.3 Brant

The total number of Brant seen was high, almost 900 individuals, but not as high as the numbers of white geese or Canada Geese (Table 1). However, Brant are difficult to distinguish and some were probably included in the dark geese category. King William Island, western Coronation Gulf, and the Royal Geographic Society Island had the highest concentrations of Brant, 200 or more individuals seen in each area (Figure 5). Brant were generally in groups of 60 - 70, but 2 groups had over 100 birds.

4.4 Greater White-fronted Geese

No Greater White-fronted Geese were identified during the surveys. I probably saw Greater White-fronted Geese but included them in the dark geese category.

4.5 Dark Geese (Unidentified Canada Geese, Greater White-fronted Geese or Brant)

Almost 700 geese were identified only as dark geese. I saw concentrations of dark geese west of Cambridge Bay, on southern King William Island, on Melbourne Island, and in the Cape Hearne area (Table 1 and Figure 6).

4.6 Ducks

The greatest numbers of ducks seen, over 100 individuals, were in the QMGBS (Table 1) and some were identified as male eiders (*Somateria* spp.). Most ducks were in groups of approximately 12.

4.7 Tundra Swans

Low numbers of Tundra Swans (*Cygnus columbianus*) were seen throughout most of the study area (Table 1 and Figure 7). Largest numbers of swans were seen in the north Coronation Gulf. Most birds were in groups of 4 or less.

4.8 Gulls and Terns

Several hundred gulls were seen during the surveys. Gulls were seen throughout the study area, with high concentrations west of Cambridge Bay and in the Coppermine area (Figure 8). Most of the large gulls were probably either Glaucous Gulls (*Larus hyperboreus*) or possibly Thayer's Gulls (*Larus thayeri*). The only sighting of Arctic Terns (*Sterna paradisaea*) was a group of approximately 100 near the northern tip of the Royal Geographic Society Islands.

4.9 Muskox

Almost 300 muskox (*Ovibos moschatus*) were seen on Victoria Island (Figure 9). I saw 43 muskox in the QMGBS and an additional 23 muskox on Melbourne Island. Although not during the formal surveys, two muskox were also seen on Jenny Lind Island during an additional flight over the island.

4.10 Caribou

Only five caribou (*Rangifer tarandus*) were seen during the surveys. All five caribou were on the coast in the northwestern part of Coronation Gulf (Figure 9).

4.11 Other Species

Approximately 250 medium-sized shorebirds were seen near the Berens Islands and 45 seabirds (family Alcidae) in Bathurst Inlet. Six raptors, two loons, and one wolf were also seen during the surveys.

5.0 DISCUSSION

Although geese and swans were found in most of the coastal areas surveyed, specific areas in Queen Maud Gulf and Coronation Gulf had higher concentrations of these birds. Many Canada Geese, Brant and dark geese were seen in the Cape Hearne area. Likewise, Bromley and Stenhouse (1994) noted high numbers of Canada Geese there. Both Kent Peninsula and southern King William Island had high numbers of white geese, Canada Geese and Tundra Swans. Bromley and Stenhouse (1994) also observed similar or higher numbers of these birds in the two areas. The coastal regions east of the QMGBS had high numbers of white geese. This part of the Adelaide Peninsula may be as heavily used by geese in late summer as the coastal parts of the QMGBS. Jenny Lind Island and the southeastern coasts of Victoria Island also had high numbers of white geese. Tundra Swans were seen along most of the southern coast of Victoria Island. Exploration activity in any of these areas could have a significant negative impact on geese and swans. Geese and swans were using the fresh water habitat near the coasts rather than the marine habitat so it is uncertain what affect an oil spill would have on these species.

Many Brant were seen on the Royal Geographic Society Islands and the only observation of Arctic Terns was there. Exploration activity near or on these islands could have a significant negative impact on Brant and terns. Terns eat fish from the ocean, thus an oil spill in this area could have devastating effects on the terns.

Gulls were found throughout the study area. High concentrations near Cambridge Bay and Coppermine were probably correlated with increased human activity in these areas, so it is uncertain how exploration activities might impact gulls. Nevertheless, gulls probably would be affected by an oil spill during the late summer in these areas.

Few ducks were seen during the surveys, so it is unclear where ducks tend to concentrate during the late summer. Due to the cloudy and rainy weather conditions, the high flight altitude of the airplane and generally dark plumage of ducks, I probably saw only a small proportion of the ducks actually present. Similarly, although some groups of shorebirds and seabirds were seen, their small size and dark coloration made it difficult to detect them during the surveys. Therefore, it is not possible to determine from the surveys the specific areas where exploration activity or an oil spill during late summer might affect these birds the most.

Muskox were seen mainly on Victoria Island, yet the sightings of muskox south of the island are significant. McCormick and Poston (1986) made the first documented observation of muskox on Jenny Lind Island and speculated that they may breed there. The observation of muskox on the island during the flights lends more evidence that a resident population may occur. In contrast to muskox, few caribou were seen during the surveys implying that the regions during the late summer are relatively unimportant for caribou.

Based on the surveys of Queen Maud Gulf and Coronation Gulf coastlines, several areas were identified where exploration activities during the late summer could have a significant negative impact on geese and swans:

- The Cape Hearne area
- Kent Peninsula
- Southern King William Island
- Queen Maud Gulf Bird Sanctuary and Adelaide Peninsula
- Jenny Lind Island
- Southern and eastern Victoria Island
- Royal Geographic Society Islands

The following areas, after further investigation, might meet the criteria for Key Habitat designation (Alexander et al. 1991). Three of the areas are already recommended by Bromley and Stenhouse (1994) for special designation.

- The Cape Hearne area
(nominated for Key Habitat Site designation by Bromley and Stenhouse 1994)
- Kent Peninsula
(nominated for Key Habitat Site designation by Bromley and Stenhouse 1994)
- Southern King William Island
(recommended for further study by Bromley and Stenhouse 1994)
- Adelaide Peninsula

More rigorous survey work is recommended to better quantify the late summer distributions of migratory birds in the regions and to determine which areas contain critical habitat for wildlife.

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Table 1. Number of individuals and number of birds/km for waterfowl seen during aerial surveys of coasts in the Queen Maud Gulf and Coronation Gulf, August 18 - 24, 1994. Refer to figure 2 for transect locations.

Transect	Number of Individuals (Number of Birds/km)						
	White Geese ^a	Canada Geese	Brant	Dark Geese ^b	Total Geese	Ducks	Swans
Admiralty Island	0 (0.0)	0 (0.0)	14 (0.18)	0 (0.0)	14 (0.18)	0 (0.0)	2 (0.02)
North Queen Maud	347 (0.93)	30 (0.08)	91 (0.24)	0 (0.0)	468 (1.26)	9 (0.02)	8 (0.02)
Jenny Lind Island	188 (1.77)	0 (0.0)	0 (0.0)	0 (0.0)	188 (1.77)	1 (0.01)	0 (0.0)
Cambridge Bay	0 (0.0)	0 (0.0)	50 (0.61)	0 (0.0)	50 (0.61)	0 (0.0)	0 (0.0)
North Coronation Gulf	21 (0.04)	75 (0.13)	35 (0.06)	242 (0.42)	373 (0.65)	8 (0.01)	58 (0.10)
South Coronation Gulf	0 (0.0)	458 (0.81)	213 (0.38)	67 (0.12)	738 (1.31)	65 (0.12)	16 (0.03)
∞ Bathurst Inlet	4 (0.01)	0 (0.0)	0 (0.0)	0 (0.0)	4 (0.01)	0 (0.0)	4 (0.01)
Kent Peninsula	0 (0.0)	347 (1.49)	0 (0.0)	62 (0.26)	409 (1.74)	0 (0.0)	0 (0.0)
Melbourne Island	21 (0.19)	0 (0.0)	0 (0.0)	66 (0.61)	87 (0.80)	0 (0.0)	2 (0.02)
South Queen Maud	2294 (2.62)	207 (0.24)	15 (0.02)	77 (0.09)	2593 (2.96)	104 (0.12)	39 (0.04)
King William Island	741 (1.65)	146 (0.32)	254 (0.57)	175 (0.39)	1316 (2.93)	56 (0.12)	16 (0.04)
Royal Geographic Society Islands	6 (0.03)	50 (0.27)	200 (1.08)	0 (0.0)	256 (1.38)	3 (0.02)	4 (0.02)
Total	3622 (0.85)	1313 (0.31)	872 (0.20)	689 (0.16)	6496 (1.52)	246 (0.06)	149 (0.03)

a- includes Ross' and Snow Geese

b- unidentified Canada Geese, Greater White-fronted Geese and Brant

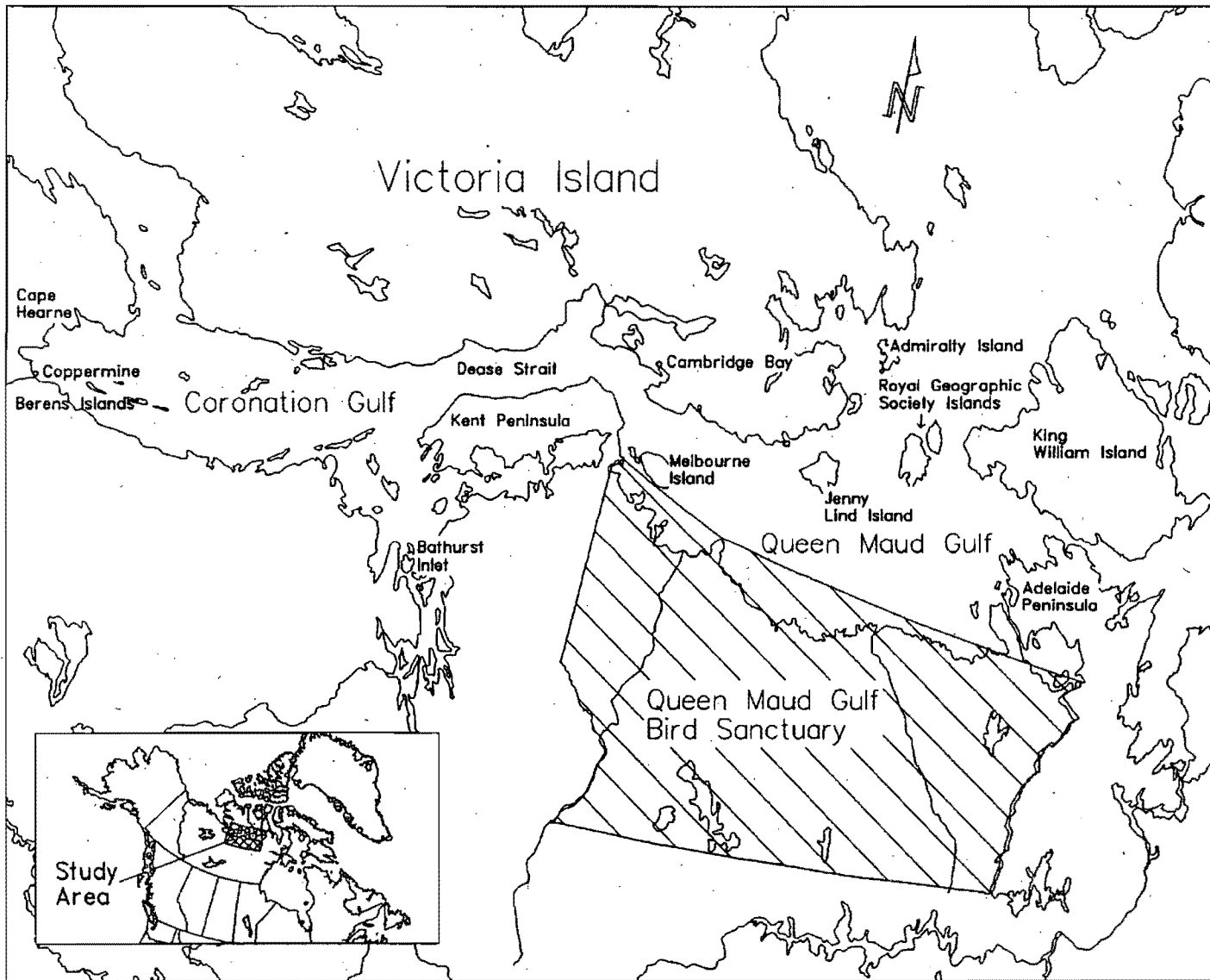


Figure 1. The Queen Maud Gulf and Coronation Gulf regions.

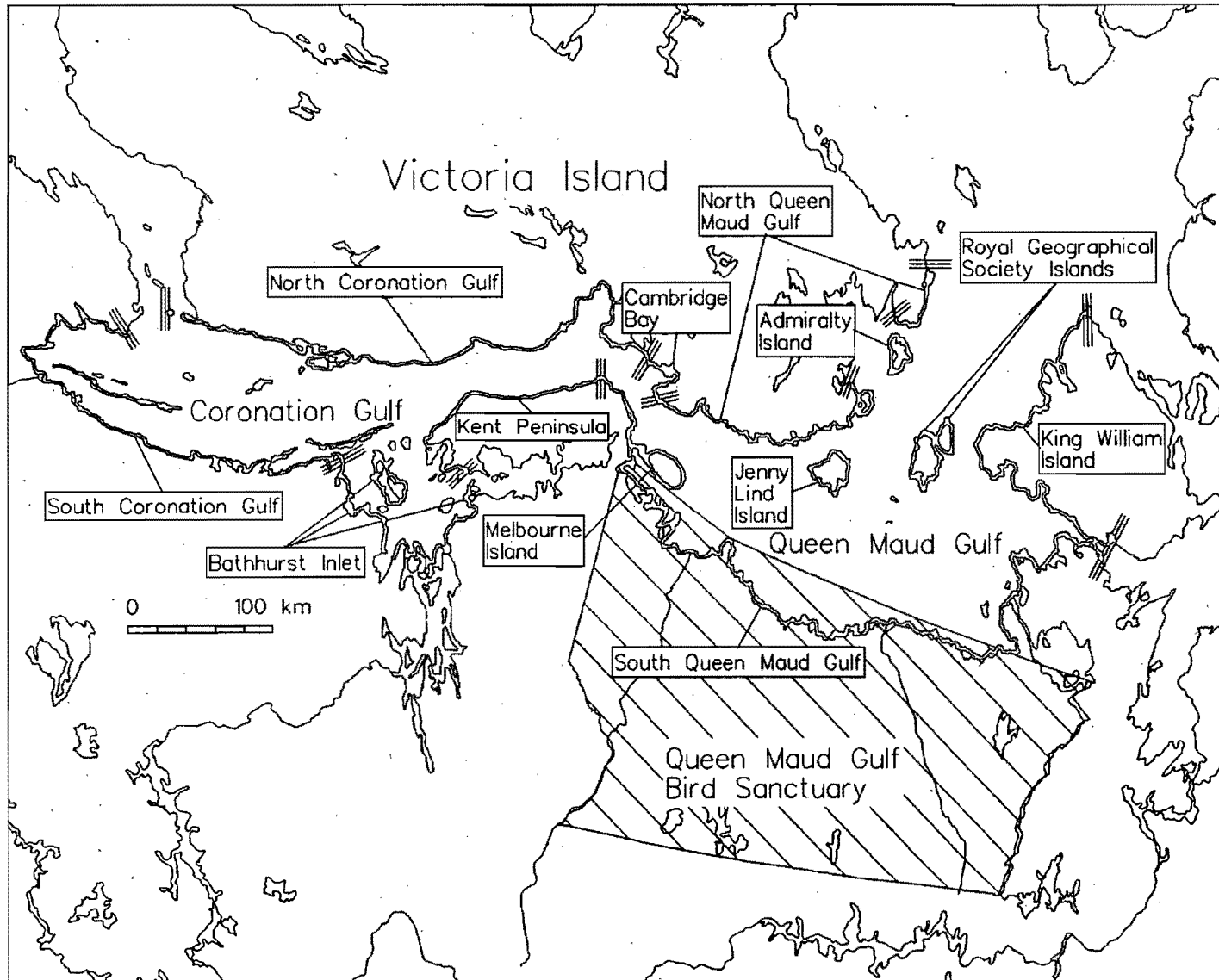


Figure 2. Flight path of wildlife surveys along the coasts of Queen Maud Gulf and Coronation Gulf, August 18 -24, 1994. Transects are indicated by thick dark lines and transect names are in boxes. Division points between different transects are indicated by three thin lines (///) placed perpendicular to the transect line.

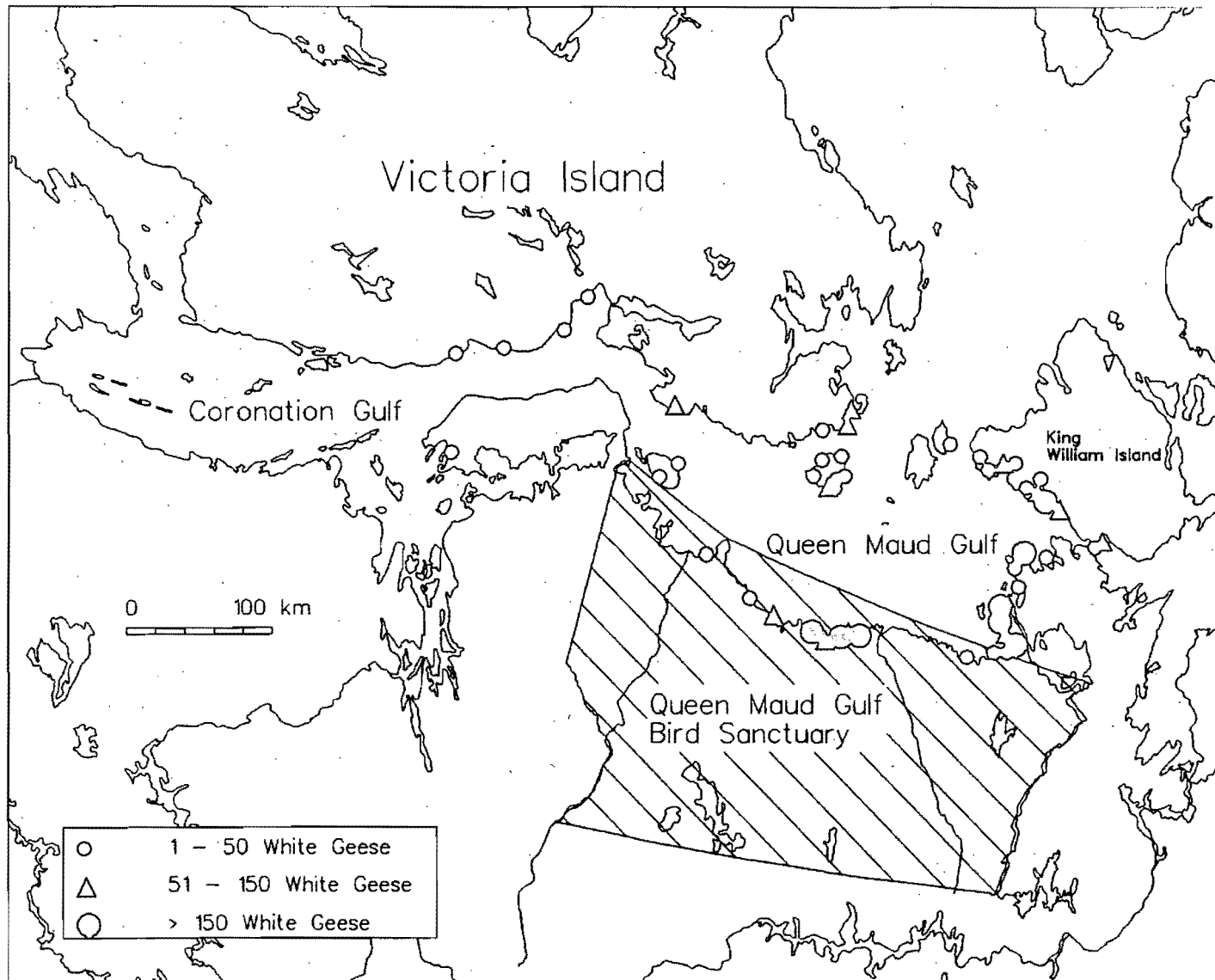


Figure 3. The distribution of white geese (Snow and Ross' Geese) during aerial surveys, August 18 -24, 1994.

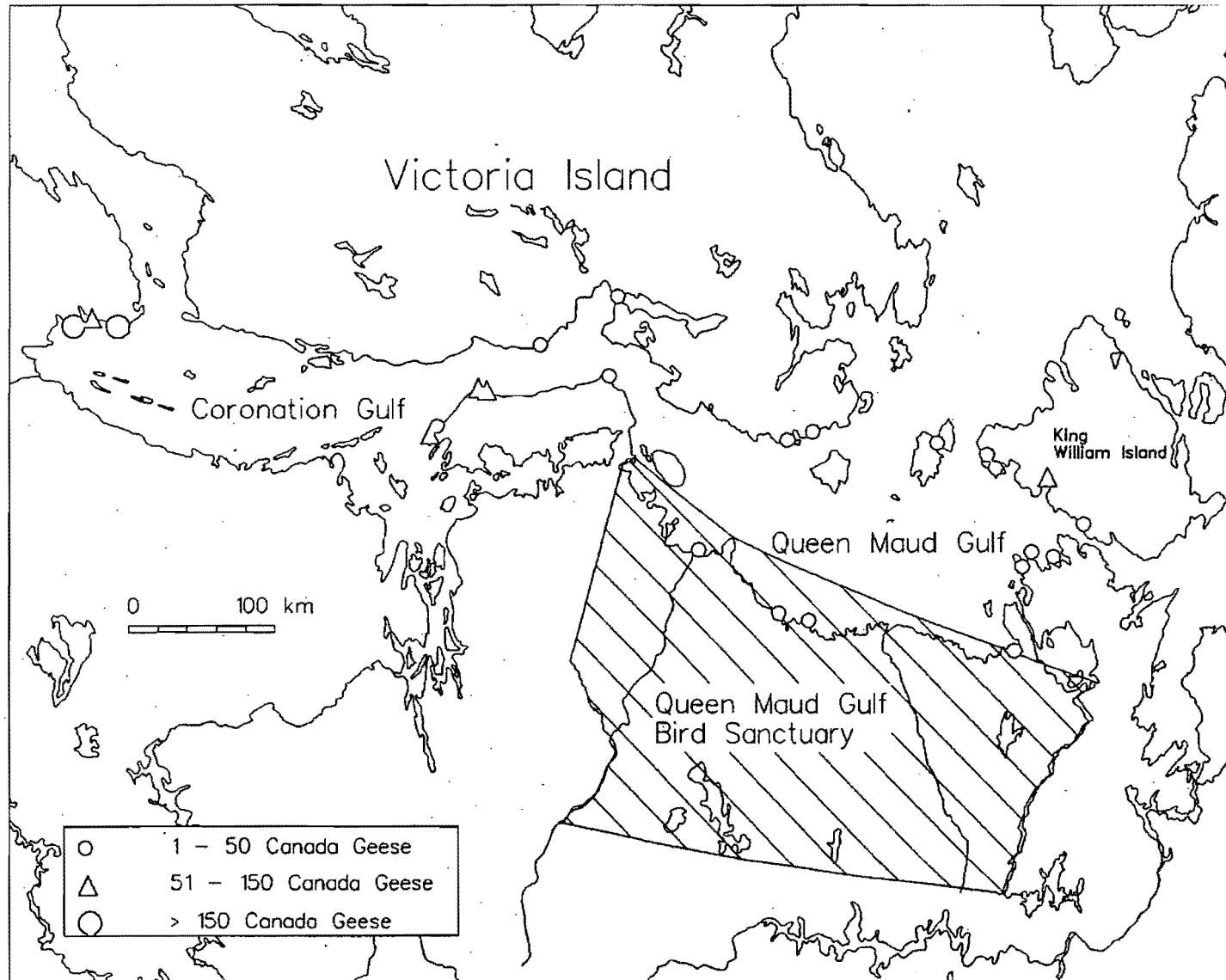


Figure 4. The distribution of Canada Geese during aerial surveys, August 18 -24, 1994.

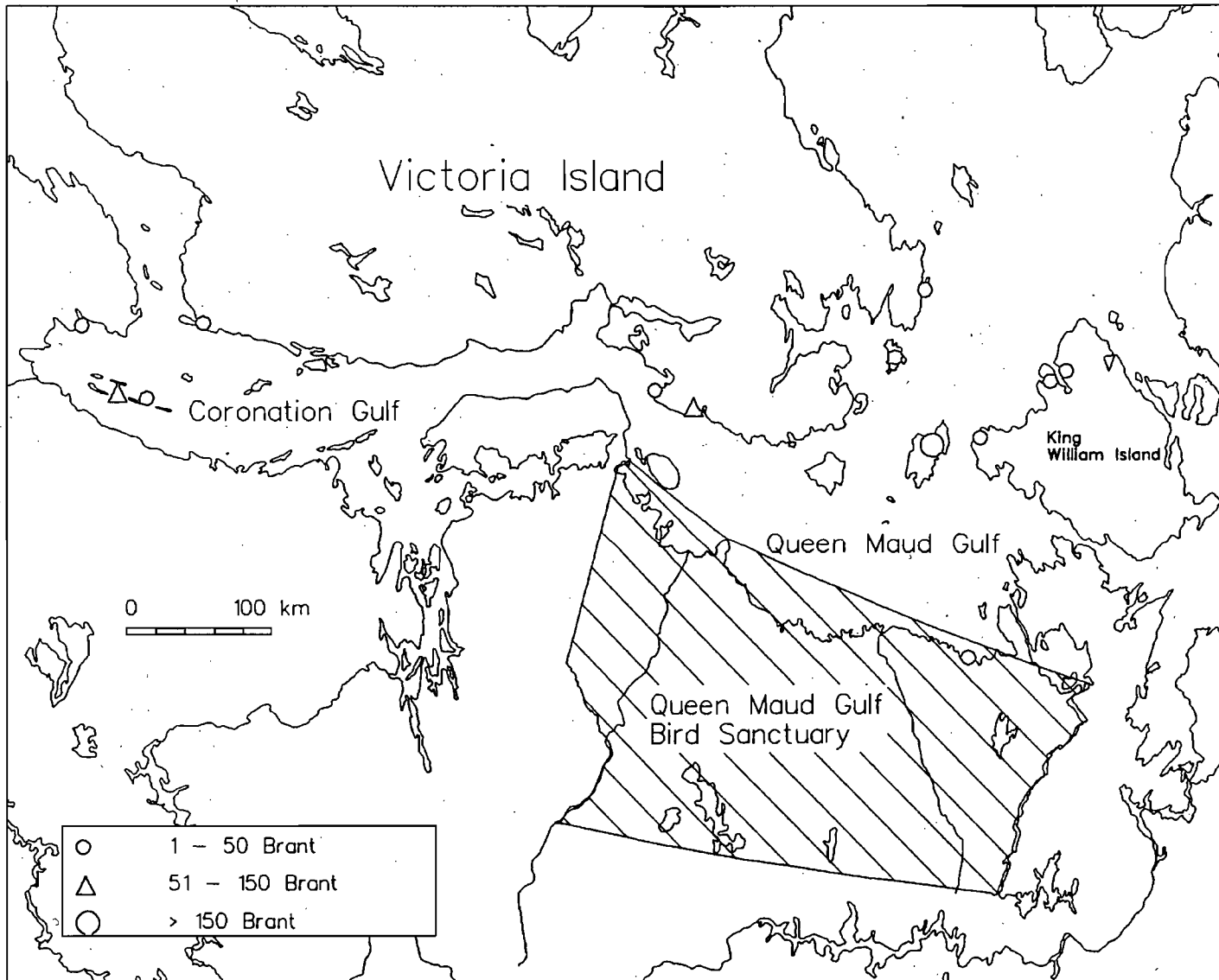


Figure 5. The distribution of Brant during aerial surveys, August 18 -24, 1994.

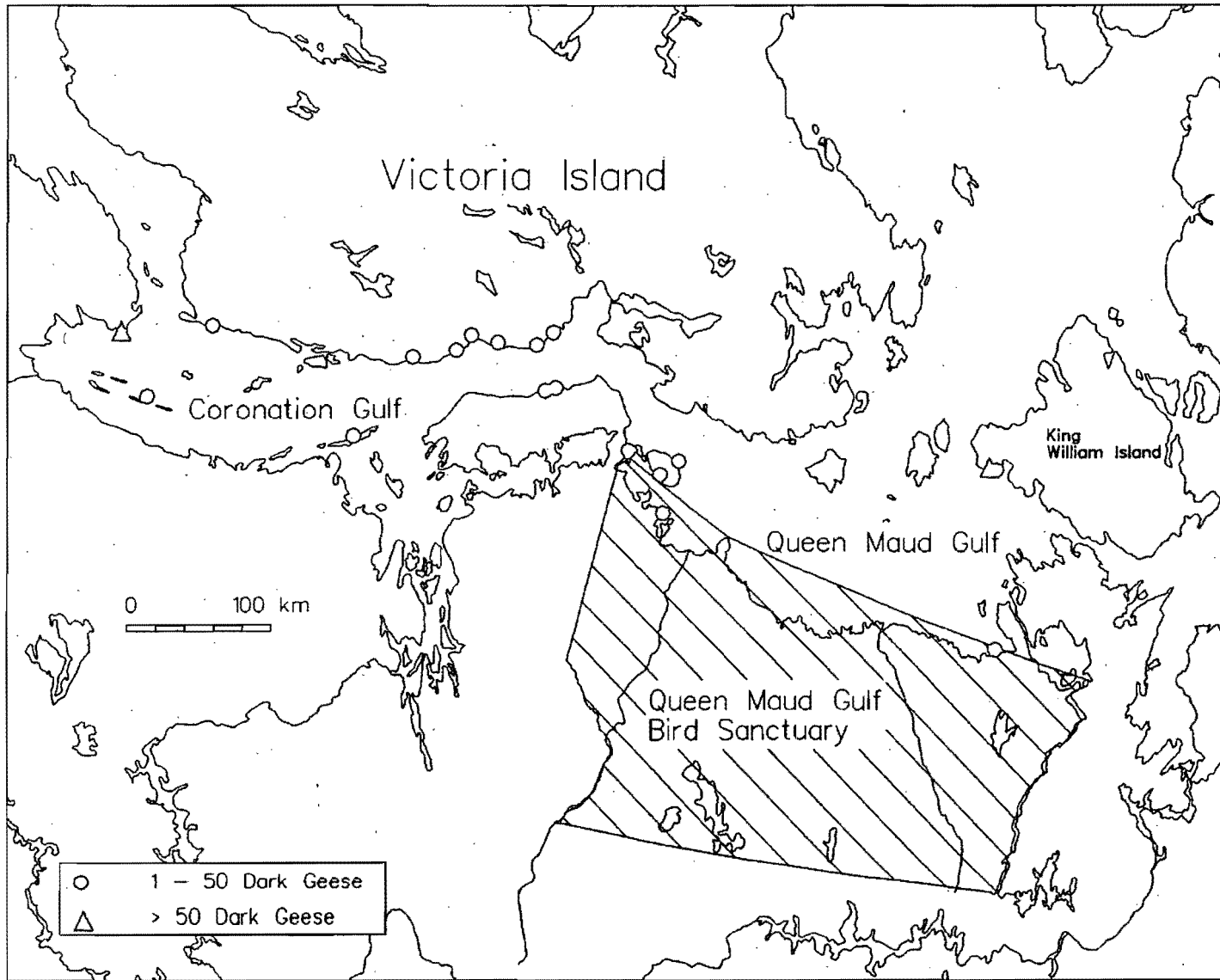


Figure 6. The distribution of dark geese (unidentified Canada Geese, Greater White-fronted Geese and Brant) during aerial surveys, August 18 -24, 1994.

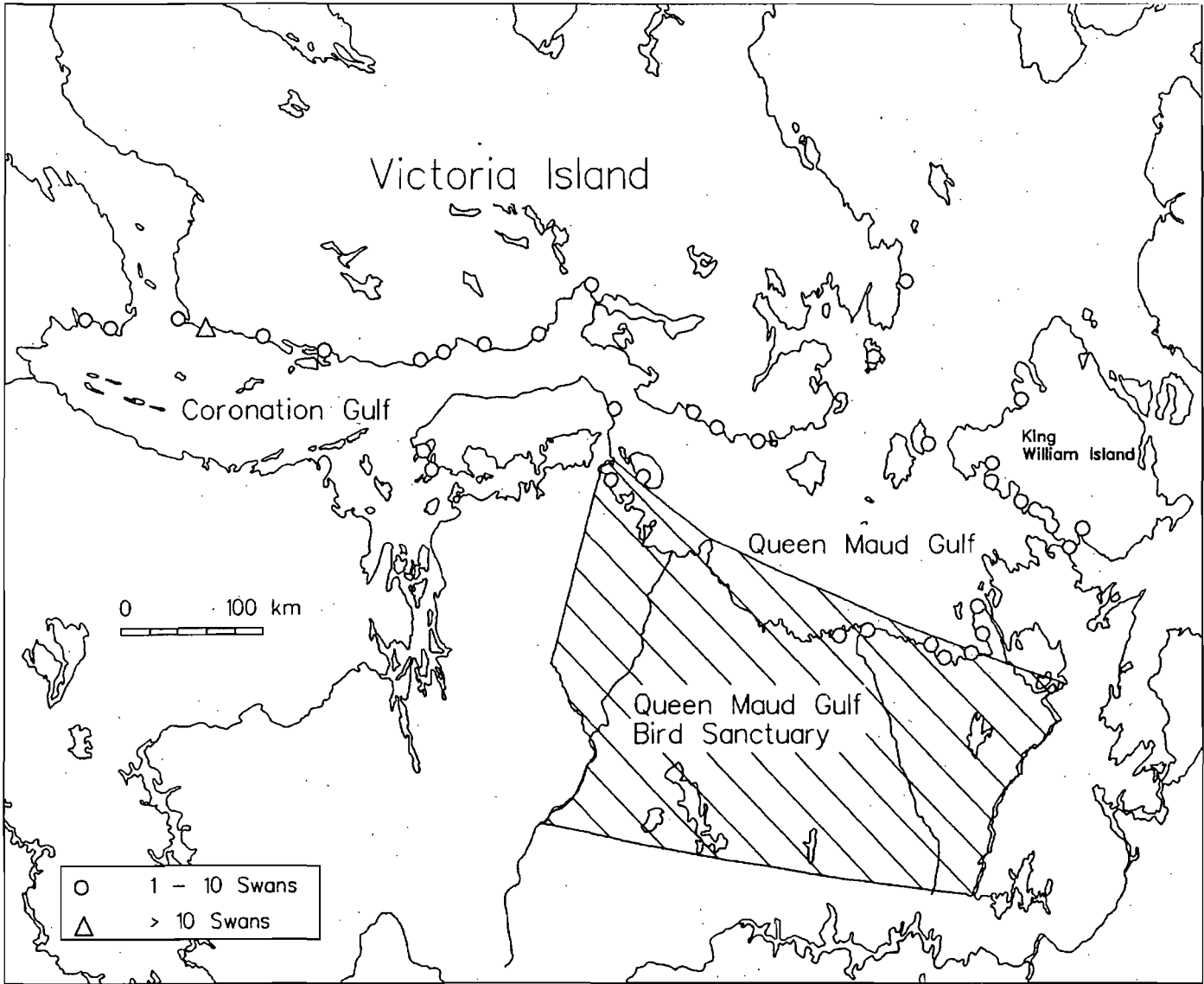


Figure 7. The distribution of Tundra Swans during aerial surveys, August 18 -24, 1994.

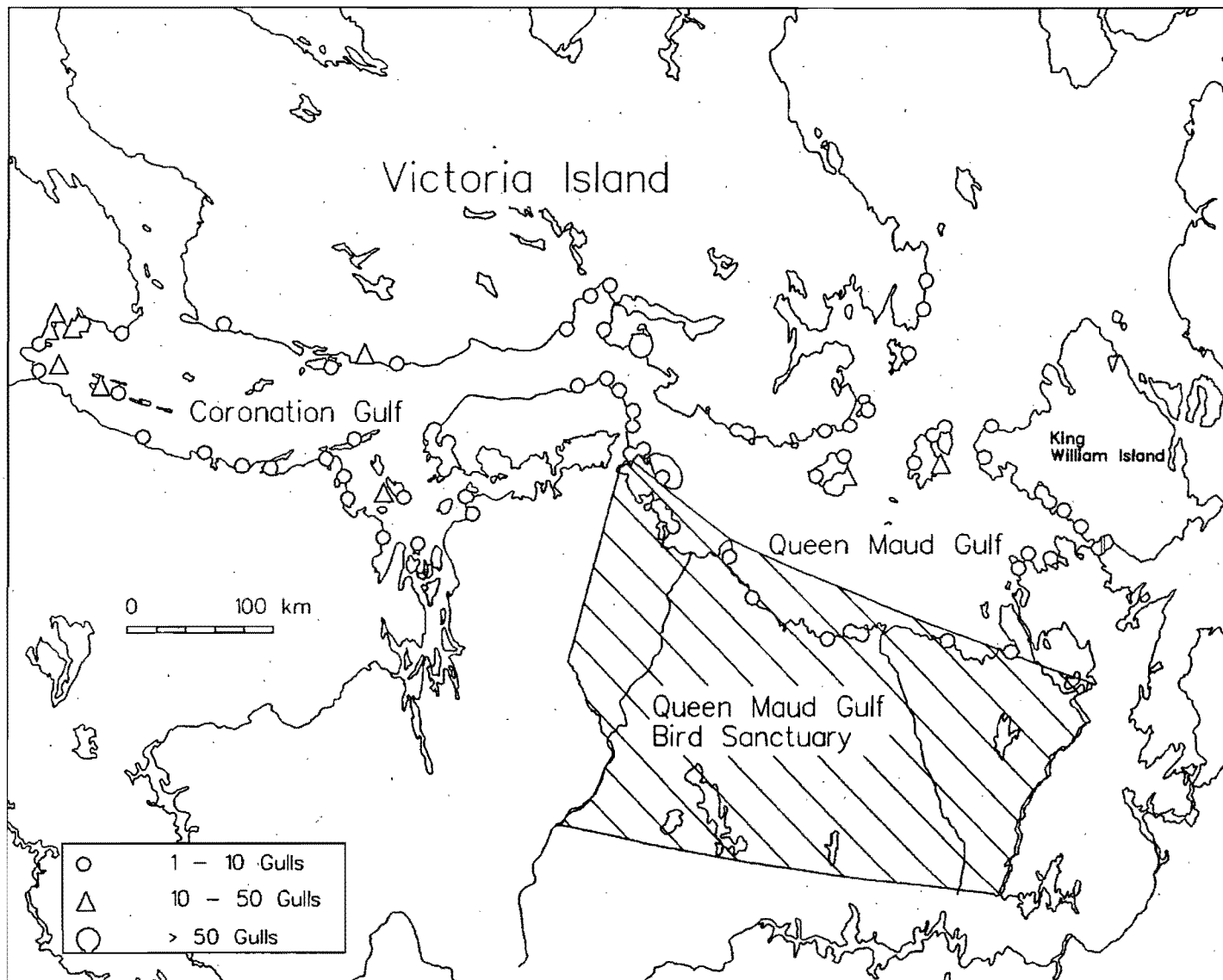


Figure 8. The distribution of gulls during aerial surveys, August 18 -24, 1994.

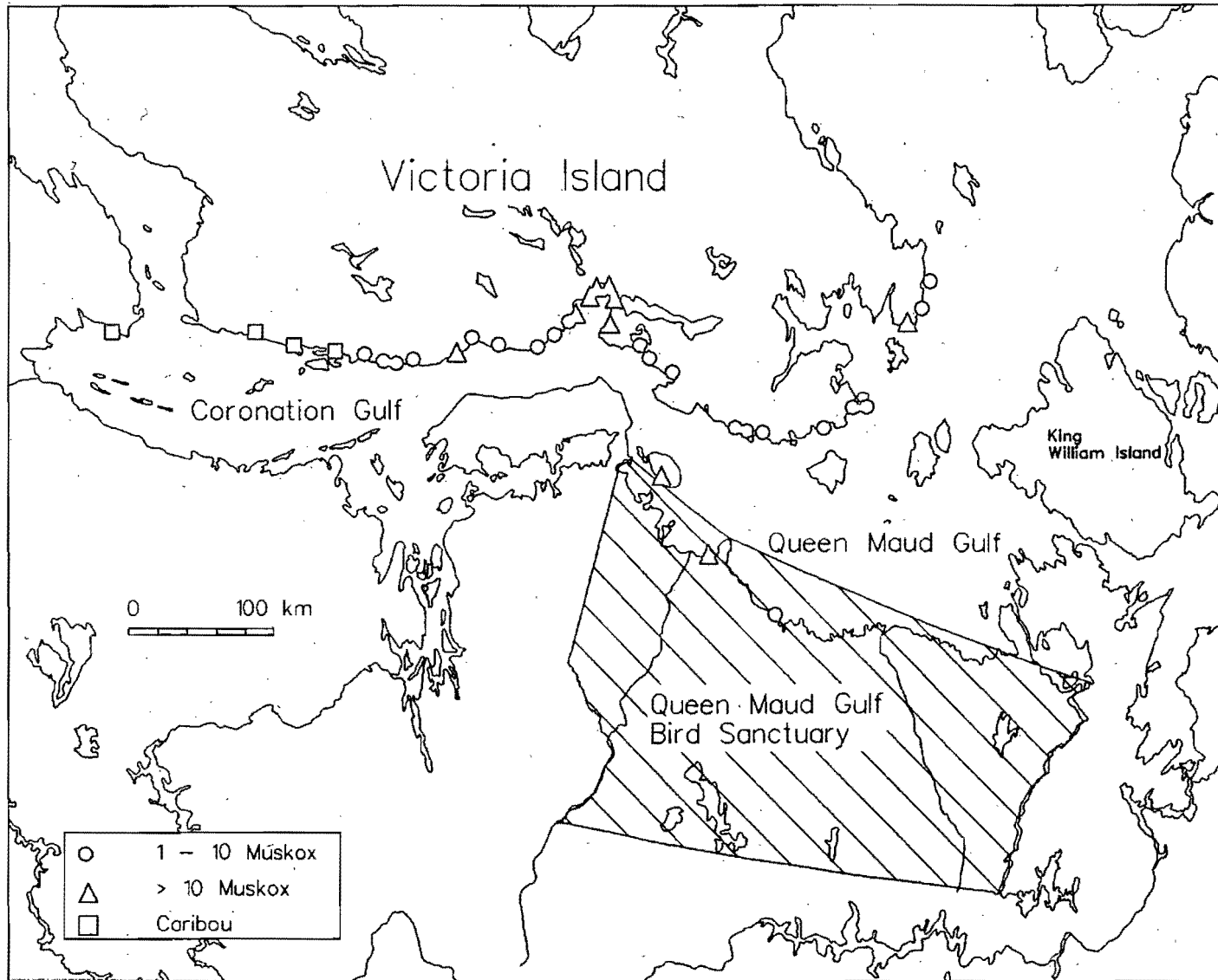


Figure 9. The distribution of muskox and caribou during aerial surveys, August 18 -24, 1994.