POLAR BEAR DENNING SURVEY ALONG STORKERSON PENINSULA, STEFANSSON AND KILIAN ISLANDS, N.W.T.

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ABSTRACT

A polar bear denning survey along Storkerson Peninsula, Stefansson Island, and Kilian Island was made from snowmachines between 01 and 22 April 1983. Poor weather conditions hampered search efforts throughout the survey. Three dens were located and one of these was probably a maternity den. The dens were located within a relatively small area along the northeastern coast of Storkerson Peninsula. Seven bears were observed, including a group of four bears south of Kilian Island. Track observations of family groups with cubs of the year (n=5) suggest the presence of additional maternity denning areas in Hadley Bay and in the vicinity of Kilian and Stefansson islands.

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INTRODUCTION

In 1977, the Gateshead Island region in the Central Arctic was defined as an important denning area for polar bear (Ursus maritimus) after nine dens were found within a relatively small area (Spencer and Schweinsburg 1979). Another survey of the same area in 1982 (Williams and Jingfors 1983) confirmed the consistent use by denning polar bears and established Gateshead Island as the highest density denning area known from the Canadian Arctic Archipelago. Previously, only scattered den sites have been reported for most of the Arctic Archipelago where widespread and abundant denning habitat is available along the extensive coastlines (Stirling et al. 1978).

Little information is available on polar bear distribution or denning habitat along M'Clintock Channel, north of Gateshead Island. Potential maternity denning areas have been suggested for nearby Hadley Bay and the north coast of Stefansson Island based on track observations of family groups with cubs of the year (Schweinsburg et al. 1981). However, actual den sites were never recorded.

A denning survey on snowmobiles was initiated in April 1983 to determine if polar bear denning areas occur along the west coast of M'Clintock Channel and on Stefansson and Kilian Islands.

METHODS

We used four snowmobiles to travel along the coastline to intercept polar bear tracks heading out onto the sea ice from denning sites. As weather and travelling conditions permitted, one team of two snowmobiles travelled about 1 km inland from the coast while the second team travelled offshore, near the coastline. We also concentrated search efforts along major river banks or prominent hills close to the coast that provided snowdrifts for denning. We used a speedometer on one of the snowmobiles to estimate distance travelled.

Dens were found by searching for mounds of excavated snow ("porches" - Harington 1968) that were visible in the mostly flat terrain either with binoculars or the naked eye. Once a den was located, a 2-m steel rod ("Kautit") was used to probe the den. Characteristics of the den (aspect, bear signs, extent of icing) were recorded after the den had been excavated.

Observations of other wildlife, primarily muskoxen and caribou, were made along the travelling route. We recorded weather conditions (temperature, wind speed and direction) every day, prior to travelling.

RESULTS

We left Cambridge Bay on 01 April and returned on 22 April after travelling 1755 km. The areas searched included the northeastern coast of Victoria Island (Storkerson Peninsula), the northern coast of Stefansson Island, Kilian Island and parts of Hadley Bay (Fig. 1).

Weather during this survey was mostly poor with frequent storms and reduced visibility. Ground visibility was good only during 12 of 22 days (Appendix A). Blowing snow or flat light often obscured or obliterated signs of polar bears along parts of the survey route. Below, the survey route is broken down into distinct sections and each section, or area, is discussed separately.

Northeastern Victoria Island (Storkerson Peninsula)

We reached the coast, by Denmark Bay, on 02 April (Fig. 2). The coastline in this area, and as far north as Cape Stang, is flat and featureless. The outline of the coast was at times difficult to follow due to a maze of low-lying gravel bars and raised beach ridges.

The only signs of polar bears south of Cape Stang were the tracks of an adult female with two cubs of the year on the ice about 400 m from the coastline. (Fig. 2) The tracks were heading due south. Since there had been no major storms in over 2 weeks, it was impossible to age the tracks. Another set of adult tracks was seen near our fuel cache at Cape Stang.

Following a storm on 06 April, an adult male bear was seen near camp in the morning. Tracks showed the bear had visited camp during the night and

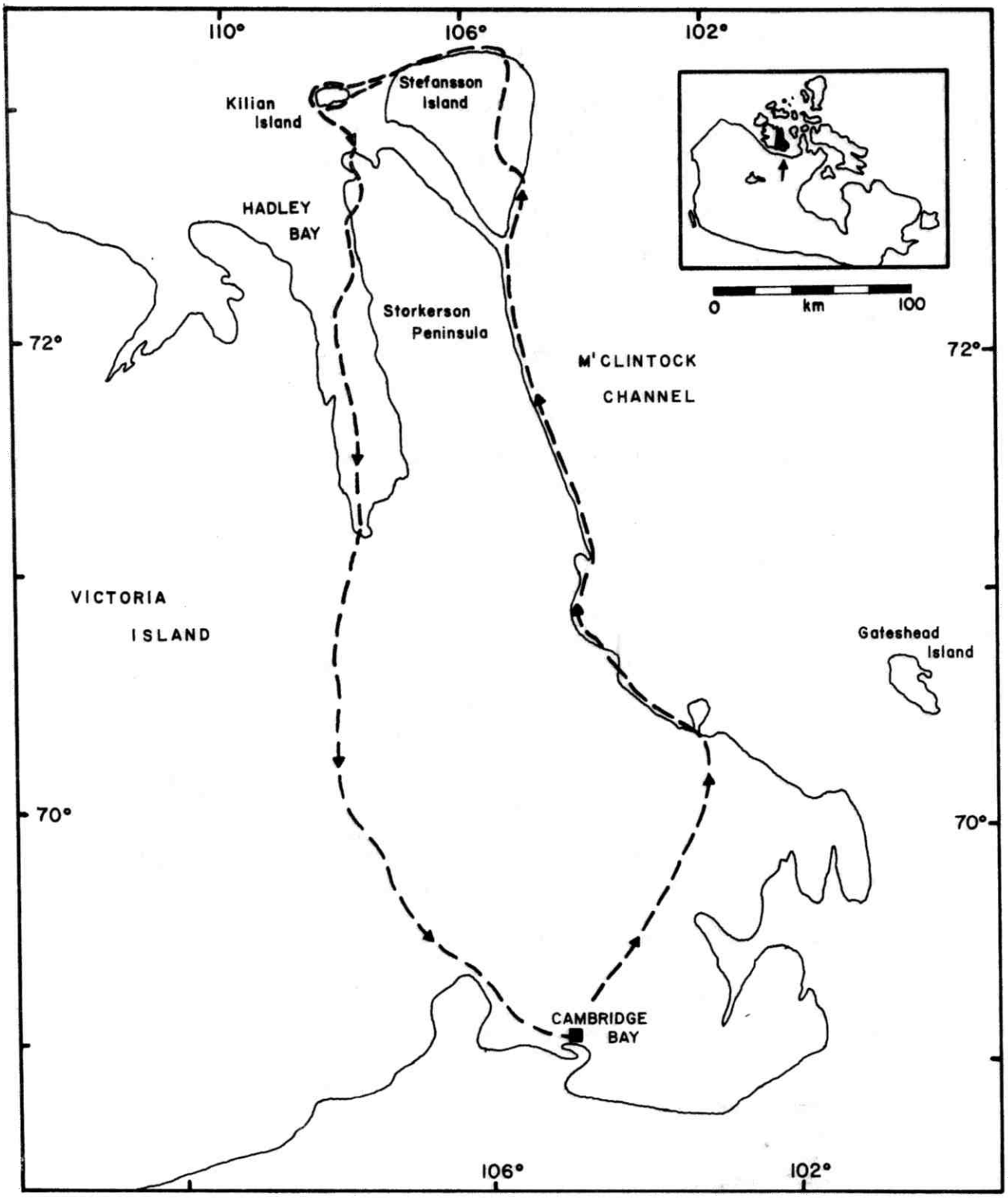

Figure 1. Travel route during polar bear denning survey, April 1983.

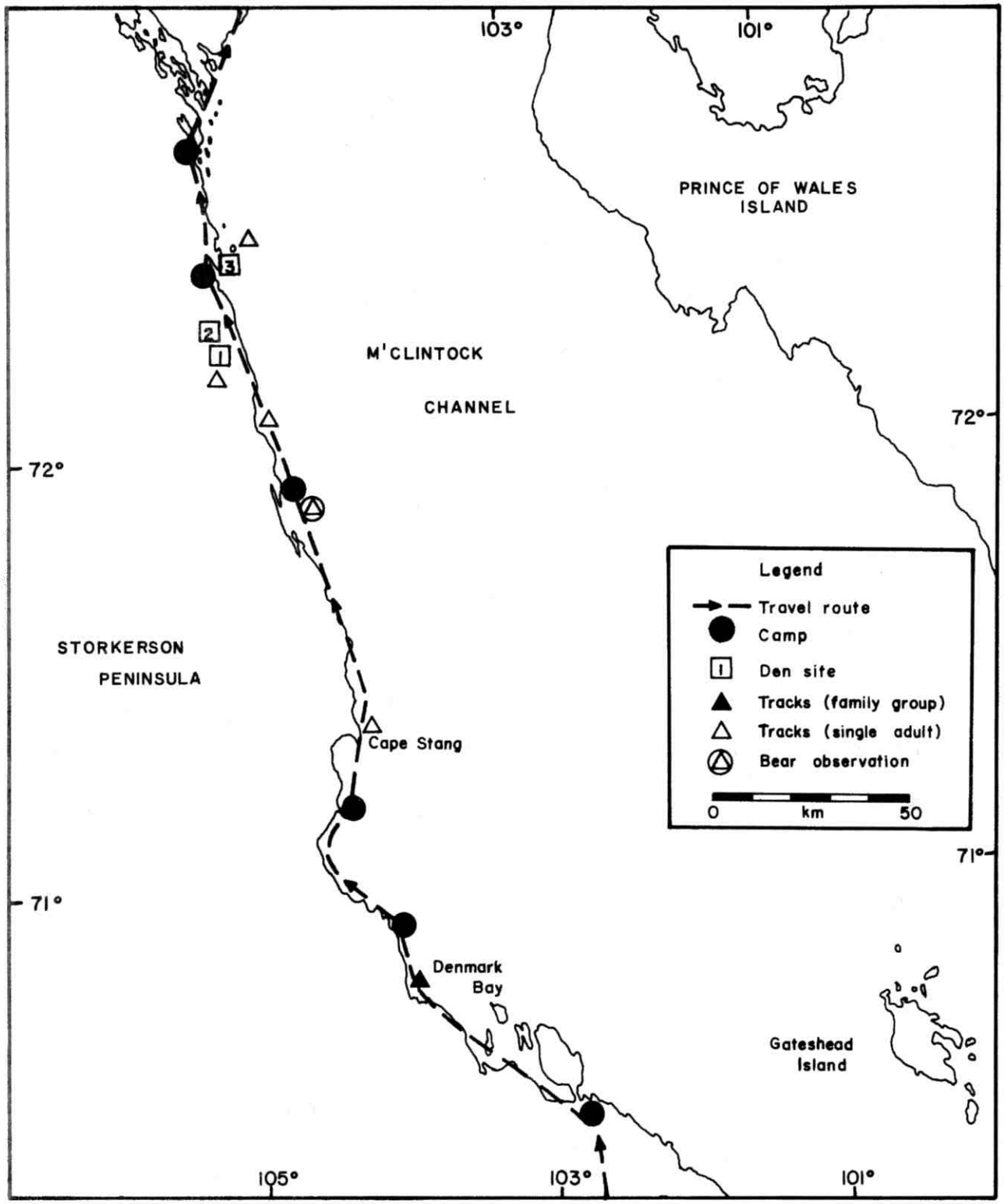

Figure 2. Travel route and observations of polar bears along northeastern Victoria Island, April 1983. Den site characteristics are described in Appendix 2.

left with some caribou meat; no other damage was done.

While travelling north on 07 April, we noted two sets of tracks from adult bears. One set was seen along the coast and another further inland where signs of digging were also observed. On closer examination of this latter area, we found two temporary bear dens (Fig. 2, Appendix B). The dens were located about 500 m apart in a relatively hilly area along an unnamed river. The openings were drifted in with old snow and the dens appeared to have been abandoned for some time.

Later that night, we surveyed a small island 3 km off the coast (Fig. 2). The island was rugged and windblown with little or no vegetation, large boulders and high ice pressure ridges along the north and east side. We saw four sets of tracks from adult bears: one set on the island and three sets along frozen leads near the island. There were no signs of digging or dens on the island, probably because there was not enough snow for denning.

On our return to camp, we checked some raised beach ridges along a peninsula (Fig. 2). There were fresh (1-2 days old) tracks of at least two adult bears in an area where we also found scattered bones of a muskox. Examination of a femur showed red, icy bone marrow suggesting that the muskox had been in poor physical condition. We could not determine if the muskox had died naturally or if it had been killed by bears.

About 25 m from the muskox bones, we found a freshly excavated den (Appendix B). Heavy icing suggested the den had been occupied for a long time. We believe the den could have been a maternity den although we only saw one set of tracks that appeared to be from a cub of the year (Appendix B). The strong winds with blowing snow during the preceding days could have obliterated most signs of young bears after the den had been abandoned.

Stefansson and Kilian Islands

On 09 April, we reached Goldsmith Channel, between Storkerson Peninsula and Stefansson Island (Fig. 3). The channel is situated along the prevailing wind direction (NW/SE) and most of the islands in the channel were either blown free or covered with extremely hard-packed snow. We found no signs of polar bears in the channel and it seems unlikely that this area is used for denning. We continued along the southeastern shore of Stefansson Island and then followed a major river drainage, inland, to the next fuel cache (Fig. 3).

On 10 April, we came upon the north shore of Stefansson Island in blowing snow and a stiff breeze. After setting up camp, we found two sets of adult bear tracks near a pressure ridge (Fig. 3). The multiyear ice along the northern coast of the island was rough with large chunks (10-15 m high) pushed up along the shore. The only other sign of bears along the northern coast was a set of adult tracks by an old hydrographic camp (Fig. 3). There were no bear signs along several of the major river drainages although the river banks could have provided suitable denning habitat.

On 12 April, we were camped on the ice, west of Stefansson Island. We set out to survey Kilian Island in poor weather (blowing snow, limited visibility; Appendix A). During the 30-km trip to the island, we found 11 different sets of tracks: 7 from adult bears (unknown sex) and 2 from adult females accompanied by cubs of the year (Fig. 3). Most of the tracks parallelled pressure ridges and with no prevalent direction to suggest any certain movement of bears in the area. We arrived on Kilian Island in near-zero visibility and with a 60-70 kmph wind. We tried to search for dens on the leeward side of terraces and rock piles but found no further signs of bears.

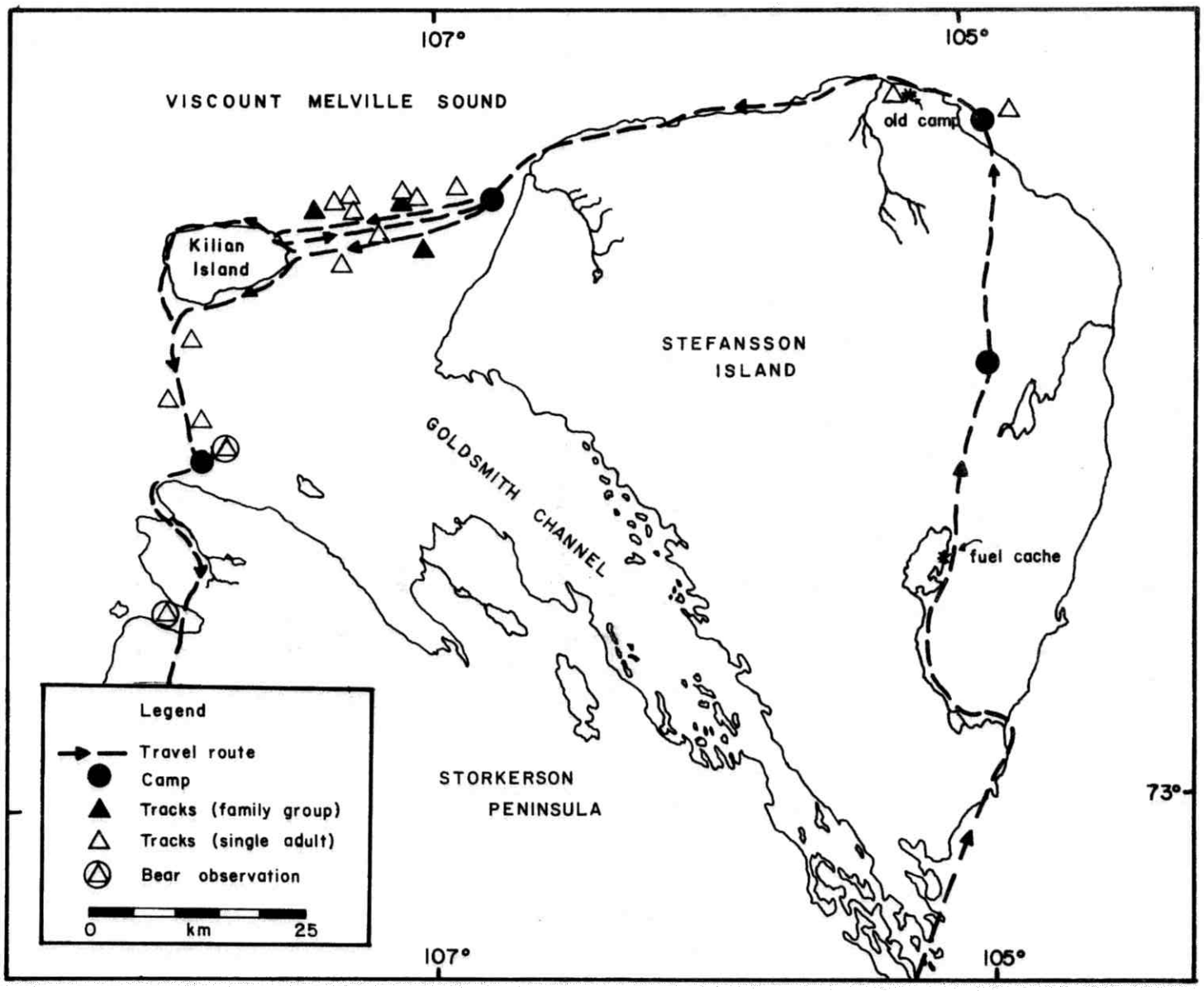

Figure 3. Travel route and observations of polar bears around Stefansson and Kilian Islands, April 1983.

On the following day (13 April), the weather cleared and we made another attempt to survey Kilian Island. On our way there, we found four sets of tracks: one adult bear (unknown sex) and one adult female accompanied by two 2-year-old cubs. We had not seen the latter tracks before. Upon arrival, we split up into two teams, each surveying half of the island. Kilian Island consists of raised marine beach ridges of gravel with a maximum elevation of 150 m at the east end. The north and west sides of the island were either windblown or had extremely hard-packed snow as a result of the predominating northwesterly winds. Snow on other parts of the island was softer and suitable areas for denning occurred along the leeward side of ridges and hills. However, we found no polar bear signs. We did find one set of adult bear tracks on the ice, about 1.5 km south of Kilian Island.

We left Kilian Island in a southerly direction across stretches of rough ice and frequent pressure ridges. However, there were also areas of smooth, first year ice in this area. We recorded two sets of adult bear tracks on the way to Storkerson Peninsula (Fig. 3). About 2 km north of the peninsula, we observed four bears: one adult male and a family group of one adult female accompanied by two 2-year-old cubs. The bears were all close to an extensive pressure ridge and probably in an area of good seal hunting.

Hadley Bay

On 14 April, we started travelling along the northwestern shore of Storkerson Peninsula (Fig. 4). We searched for den sites along the banks of a major river drainage but found no signs of bears. Further south, we observed one adult female bear accompanied by a 1-year-old cub on the ice of a large

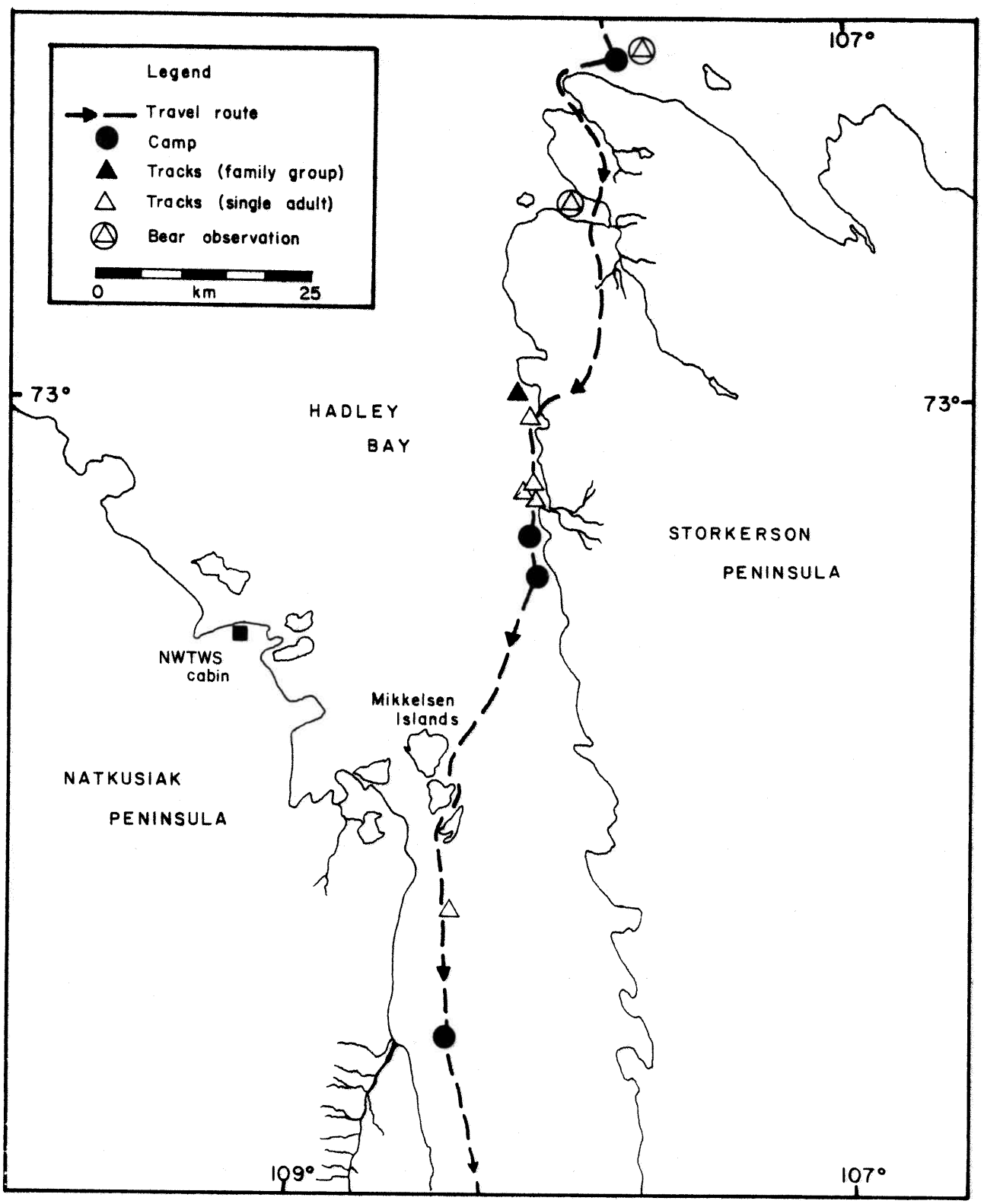

Figure 4. Travel route and observations of polar bears in the Hadley Bay area, April 1983.

bay (Fig. 4).

Since the ice along most of the eastern shore of Hadley Bay was too rough to travel, we continued the next 30 km overland (Fig. 4). As we returned to the coast, we came to an area of spectacular scenery with steep bluffs, deep river gorges and large chunks of ice along the shore. At the ice edge, we found the tracks of an adult female accompanied by two cubs of the year. As we hugged the shoreline, we came upon a set of truly large bear tracks (about 25 cm wide and 35 cm long). Although the tracks were old and the edges not well-defined, the bear was probably an unusually large male.

In a bay about 10 km further south, we found an area where several different bears appeared to have been feeding on seals. Seal remains, bear scats, urine stains and signs of digging were spread over a 400 m^2 area surrounding a pressure ridge. In addition to the bear tracks, there were at least four sets of fox tracks in this area.

A 3-day storm with winds exceeding 75 kmph kept us weathered in along the east shore of Hadley Bay (Fig. 4). It took us another full day to get through the rough, hummocky ice and to reach the center of the bay, towards Mikkelsen Islands, where ice conditions were smoother. The islands are characterized by steep cliffs that are visible from a long distance. It was in this area that we started encountering soft snow (15-20 cm) on top of older, hard-packed snow. We were forced to travel single-file or occasionally double-up to be able to pull the komatiks through the snow. This limited our ability to search for dens and we only recorded wildlife signs along our direct travelling route.

About 10 km south of Mikkelsen Islands, we found a set of large, adult bear tracks. This was the last sign of polar bears we saw in Hadley Bay as we continued south towards the next fuel cache (Fig. 4). The soft, deep snow

continued to the end of Hadley Bay and extended as far as Washburn Lake, 180 km to the south.

DISCUSSION

The primary objective of this survey was to identify important polar bear denning areas. While only three actual den sites were found, we believe there are several, potentially important denning areas along the coastlines of northeastern Victoria Island and Stefansson Island. The often inclement weather conditions during the survey hampered our search efforts and we probably missed many signs of polar bears, including den sites. However, our track observations of family groups with cubs of the year between 5-15 April (n=5 observations) suggest there were maternity denning areas along the travelling route. Previous reports indicate that family groups are still close to their den sites at this time. Kiliaan et al. (1978) found that peak emergence of females with newborn cubs from their dens occurred between 01 and 15 April in the Jones Sound area of northern Devon Island. Three of 10 maternity dens found on Gateshead Island, about 300 km southeast of Stefansson Island, were still occupied at the time of the survey (05-14 April) (Williams and Jingfors 1983).

Northeastern Victoria Island

There is little previous information on polar bear distribution along the

northeastern coast of Victoria Island (Storkerson Peninsula) or in the north end of M'Clintock Channel. Hunters from Cambridge Bay have not travelled in this area during recent years but concentrate their polar bear hunting around Gateshead Island and in Hadley Bay. During their capture efforts along the east coast of Victoria Island, Schweinsburg et al. (1981) tagged only one bear, near Cape Stang; most bears were captured around Gateshead Island. Based on hunter kill returns and capture-recapture data, the authors suggested different sub-populations, and little exchange, of bears between the Hadley Bay and M'Clintock Channel areas.

The scarcity of polar bear signs along most of the coastal plain of northeastern Victoria Island may, in part, be due to the lack of relief and, thus, suitable denning sites. The consolidated, multi-year pack ice along most of the shoreline of M'Clintock Channel probably limited the abundance of seals. Stirling et al. (1981) found lower ringed seal densities in areas of old ice, e.g. western Viscount Melville Sound. As we surveyed more elevated areas, south of Goldsmith Channel, we also found more bear signs (Fig. 2). The two temporary dens were both in a hilly area. The third (maternity den?) was near an island with a relative abundance of bear tracks where we also found stretches of first-year ice with frozen-over leads.

Stefansson and Kilian Islands

Similar to Hadley Bay, this area has been suggested as a denning area based on observations and captures of females with cubs of the year (Schweinsburg et al. 1981). While we found no actual dens, the abundance of bear tracks, including family groups, observed between Stefansson and Kilian

Islands points to the importance of this general area to polar bears in the spring. Ice conditions were similar to those described by Stirling et al. (1981) in 1980 with mostly multi-year ice along the north coast of Stefansson Island and areas of first-year ice between the two islands. We also found stretches of new ice south of Kilian Island.

Given the relative abundance of polar bear tracks near Kilian Island and what appeared to be suitable denning sites on parts of the island, we were surprised to find no signs of denning. It is possible that our arrival at the island was too late (12-13 April) and that the frequent storms had obliterated any signs of an early emergence by females with newborn cubs. It is also possible that there was not enough snow on the island at the time of denning (Oct.-Nov.). The large areas of first-year ice around the island seem to suggest a relatively late fall and delayed accumulation of snow. While the extensive coastlines of the Arctic Archipelago provide an abundance of potential denning areas, the particular snow and ice conditions in any one year will likely influence the selection of specific areas for denning.

Hadley Bay

Between 1973-75, 52 polar bears were captured in Hadley Bay and an average population estimate for the area was calculated at 140 bears (Schweinsburg et al. 1981). The large number of family groups observed in the spring pointed to the use of the area for maternity denning. Additionally, Hadley Bay was also suspected to be used as a summer retreat. Hunters from Cambridge Bay often see females with cubs of the year in the area during spring (April-May). Movements of bears overland between Hadley Bay and

Wynniatt Bay have been observed in the spring, through tracks.

The snow and ice conditions made it difficult for us to efficiently search for maternity dens in Hadley Bay. Our observations of bear tracks merely support what was already suspected, namely that Hadley Bay is used consistently as a denning area. During a muskox survey of Natkusiak Peninsula in August 1983 (Jingfors, in prep.), five bears were observed on the land suggesting that this area is also used as a summer retreat. We saw one adult bear near the old NWT Wildlife Service cabin (72°45'N, 109°15'W). Another adult bear plus a family group including an adult female with two cubs of the year were spotted about 7 km apart, immediately west of Mikkelsen Islands.

The lone adult bear, near Mikkelsen Islands, was observed about 500 m from a herd of five muskoxen that were in a defence formation as our plane (Helio Courier) passed overhead. The terrain at the site was quite rugged and it is possible that the muskoxen were unaware of the bear (and vice versa) and that their reaction was in response to the aircraft rather than the bear. However, Natkusiak Peninsula has a concentration of muskoxen (an estimate of 1300 was calculated from the August survey) and encounters with polar bears seem inevitable in this area. Predation by polar bears on muskoxen has not been well-documented. In 1978, I observed two interspecific encounters in Polar Bear Pass on Bathurst Island. After the bear became aware of the muskoxen, it continued moving, in both cases, without attempting to charge the muskoxen. The muskox bone we observed near the den site on Storkerson Peninsula (Fig. 2) was probably scavenged. Until further observations are available, we do not believe that polar bears habitually prey on muskoxen.

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Appendix A. Weather Conditions and Extent of Travel During Polar Bear Denning Survey Along Storkerson Peninsula, Stefansson Island, and Kilian Island, 1983.

Date		Weather Conditions*			Distance(km)
		Temp. (°C)	Wind speed (kmph) and direction	Visibility	
April	01	-32	30 NE	clear	100
	02	-34	calm	clear	110
	03	-29	20 SE	clear	85
	04	-26	45 N	<1 km	30
	05	-35	8 N	clear	100
	06	-30	50 NE	<0.5 km	0
	07	-34	25 NW	<1.0 km	80
	08	-32	32 NW	<1.0 km	50
	09	-30	5 W	clear	115
	10	-27	48 NW	<0.5 km	30
	11	-24	16 W	clear	90
	12	-25	35 W	<0.5 km	60
	13	-25	calm	clear	110
	14	-25	calm	clear	105
	15-17	-20	60-80 SW	totally obscured	0
	18	-25	8 variable	clear	70
	19	-15	calm	white-out	80
	20	-18	12 NW	clear	140
	21	-15	5 N	clear	190
	22	-14	8 N	clear	210
	Mean:	-26°C	24 kmph	Total:	1,755 km

*Recorded in the morning (9-10 a.m.)

Appendix B. Characteristics of Polar Bear Den Sites, Storkerson Peninsula, 1983. The Numbers Refer to Figure 2.

Number	Type of Den	Comments
1	Temporary	Den located on west side of hill about 1 km from coast. Little icing on walls and ceiling (ceiling about 0.75 m below surface). No tracks around den which appeared to have been abandoned for some time.
2	Temporary	Located about 500 m from previous den along south side of a river bank. Larger den with at least 2 chambers about 1.0 m below surface of snow. Little icing inside and no tracks around den.
3	Maternity(?)	Den located on east side of gravel ridge along the coast. Opening covered with new snow. Large den with 3 chambers and heavy icing inside den. Tracks and claw marks from an adult bear near den. One set of smaller (1-2 cm long) claw marks by den opening (cub of the year?). Fresh tracks of at least 2 adult bears, and signs of digging and "sleeping" (hollows in the snow) found about 25 m from den site. Also found one femur (red, icy marrow) from a young muskox in this area.