Annual Report No. 2: 1972

Project Number: 6259 (Western Arctic)

Title: Ecology of the Polar Bear in the Western Canadian Arctic

Investigator: Ian Stirling

INTRODUCTION

The background to this study, the materials and methods involved, and a summary of results to the end of 1971 were given in earlier reports (Stirling, 1971a and 1972).

Briefly however, the object of this study is to obtain data on population parameters, movements, distribution, abundance, and denning areas of polar bears in the Western Canadian Arctic, on which to base the development of a rational management plan. In addition, research is planned to gain insight into the relationship between the polar bears, their main prey species (ringed and bearded seals), and variations in sea ice conditions.

The clients for this study are defined as the Governments of the Northwest Territories and the Yukon, and the Canadian Wildlife Service. However, in the broader sense, the client is the whole conservation movement since the polar bear has become, to many of them, symbolic of endangered species.

The possibility of Canada entering into international agreements with respect to polar bears also necessitates that we have good data on populations shared between countries, such as that of the Beaufort Sea.

RESULTS AND DISCUSSION

THE BIOLOGY OF POLAR BEARS

Distribution and abundance of bears in the spring

There were some interesting differences in the distribution and abundance of polar bears in the Western Canadian Arctic between the springs of 1971 and 1972.

Table 1 gives the number of polar bears and tracks recorded in various areas of potential pack ice habitat traversed by helicopter in March to May, 1972, in the same format as these data were presented for 1971 (Stirling, 1971b). Table 2 is a gross comparison of the 1971 and 1972 results. In 1971 38% more miles were travelled per bear seen although the distances travelled per track seen were the same. Forty one per cent more bears were tagged in 1972 than in 1971.

It is interesting to compare the distribution of polar bears between the two years. In both years bears were fairly abundant along the leads north of, but parallel to, the mainland coast from Herschel Island to Bailey Island. The major differences in concentrations noticed were off the west coast of Banks Island and the northern portion of Amundsen Gulf.

In the former area five bears were tagged and no maternity dens located in 1971 compared to 16 bears tagged and 3 active maternity dens located in 1972.

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In early April of 1971 there were no open leads in the sea ice for over one hundred miles west of Banks Island. Few tracks were seen and it appeared the bears had simply gone elsewhere to locate better

Similarly, in 1970-71, the Eskimos of Sachs Harbour killed only seven bears of their quota of 18 compared to 18/18 in 1971-72. Thus it is clear there were fewer bears on the west coast of Banks Island last year than this year.

conditions for hunting seals. In 1972, there was a major lead, up to two miles wide in places, running south from McClure Strait down the west coast of Banks Island about 50 miles offshore, to within 10 miles of Bailey Island, before swinging west along the mainland coast into Alaska. Seals were abundant around the lead as were bear tracks and bears. The presence of the lead apparently was the reason there were more bears present in the spring off the west coast of Banks Island. I still have to examine the ice maps for 1970 to try to see if there was anything that might explain the absence of bears in that area during the fall.

In 1971 no bears were seen in the northern portion of Amundsen Gulf compared to nine seen and five tagged in 1972. There were no leads in the sea ice of this area in either year. In this area, all the bears I observed in 1972 were either females with cubs or females travelling alone. It is possible that the apparent paucity of bears denning or just hunting on the west coast of Banks Island in the fall of 1970 affected northern Amundsen Gulf as well, if bears occurring there originate from the Beaufort Sea. Bears seemed more abundant in both areas during the period of my search in 1972. The Eskimos of Holman Island shot their quota of twelve bears in both years.

Distribution and Abundance of bears in the summer

So far little is known of this aspect. Through the late spring and early summer polar bears are often sighted in the open pack ice north of the mainland coast as it melts and breaks up. As Amundsen Gulf becomes ice-free and the edge of the pack in the Beaufort Sea recedes to the north, the bears apparently go north with it for few

bears are sighted on the mainland coast or even on Banks Island during the open water period. Thus far we have no data on summer distribution and abundance.

Distribution and abundance of bears in the autumn

In the autumn the pack ice of the Beaufort Sea moves south toward the mainland. Apparently polar bears are present at the southern edge of the floes because they appear near Banks Island and the mainland as soon as either the ice arrives or the intervening area freezes. Alternately, as documented last fall (Stirling, 1971a), if the wind blows the sea ice out again, the bears depart with it. Such behaviour is most likely related to better hunting conditions in the moving ice than along the land-fast ice or edge of land itself.

In addition to passive movements with the drifting ice, there is also a distinct southward movement of bears which extends many miles out onto the newly formed thin young sea ice that forms south of the pack. The Eskimos of Sachs Harbour utilize knowledge of this fact when the pack moves south by simply going out to the tip of Cape Kellett and waiting for bears to pass by.

From 23 to 28 October I worked over the sea ice off the west coast of Banks Island from Norway Island to about 90 miles south of Cape Kellett. During this period the direction of travel of 51 sets of tracks were determined (family groups were considered as one unit because each adult female presumably determined the direction of travel of her cubs). Eighty-six per cent (44/51) of these tracks were headed south. Table 3 details the locations of sightings of bears and tracks in the Western Arctic in October.

Because of the paucity of data in the fall of 1971, no comparative comments on distribution and abundance can be made.

Resighting of Tagged Polar Bears

Table 4 summarizes recorded movements of tagged bears in the Western Canadian Arctic.

Thus far, three polar bears tagged in Alaska have been recovered in Canada, confirming that interjurisdictional movements occur. All were recovered near Herschel Island and all were tagged near Point Barrow.

Five of my tagged bears have been resighted. An adult female and her two-year-old male cub were tagged together at Herschel Island in October, 1970 and shot, still together, near Cape Parry in April, 1972. A third tagged bear was shot near Cape Parry but unfortunately the Eskimo lost the tag and one unidentified tagged bear was reported disturbing the DEW line site at Nicholson Point. An adult male tagged 25 miles south of Sachs Harbour in April, 1971, was recaptured 36 miles north east of Cape Bathurst in April, 1972. In November, 1972, a tagged bear was reported disturbing the DEW line station at Nicholson but its identity is still unknown.

Thus far recapture data are insufficient to elucidate a great deal about movements or the possible discreteness of populations.

Research underway in Hudson Bay and the Eastern High Arctic has tended to suggest the presence of a number of quite discrete populations. I suspect this may be related to the presence of land masses (i.e. islands or enclosed bays) which restrict large scale movement of pack ice. Thus the polar bears do not have to move great distances to remain in good feeding areas.

The situation in the Beaufort Sea is quite different during the summer, the southern boundary of the pack ice recedes north up to two to three hundred miles and may be fifty to one hundred miles west of Banks Island. In addition, there is a strong (and well documented) clockwise circulation of the ice pack south along the coasts of Prince Patrick and Banks Islands, west across the mainland coasts of Western N.W.T., Yukon, and Alaska, and north through the Chukchee Sea and east again through the Arctic Basin. Hence, it is possible that the movements and distribution of bears in that region may be greatly affected and, as a result, the population may be less discrete. With the exception of one adult male, all the bears had moved straight-line distances in excess of 300 miles between the time of original tagging and the last reported observation. Although nothing is known of the activity of these bears during the period between observations, it is evident there is a potential for extensive annual movements.

Up until 1971, Alaska had tagged 283 polar bears but made only 35 resightings from nine months to four years later (Lentfer, 1972). Lentfer felt these returns indicated that bears tagged near Point Barrow returned to that area. In my view, that conclusion is far from certain.

It is relevant to ask why so few tagged bears have been resighted by ourselves or shot by hunters. There are three possible solutions:

a) Tag loss is so high that few bears retain them when recovered and thus pass unrecognized.

b) Local discrete populations are so large that the probability of recovering marked individuals is low.

c) The bears marked belong to a single widely dispersed and possibly highly mobile population so that the probability of recovering individually marked animals is low.

I personally feel the first explanation is unlikely and that the answer lies somewhere between the latter two.

Denning Areas and Productivity

Harington, 1964, summarized information available up to that date on maternity denning on Banks Island. From that report, plus information gathered since, it appears that the south, west and north coasts of Banks Island still comprise the only known maternity denning area of significance in the Western Canadian Arctic. Occasional dens have been recorded from points such as Cape Baring on the west coast of Victoria Island and Nuvorak Point, Pullen Island, and Herschel Island along the mainland coast. From March to May of 1971 and 1972 I saw several females with cubs along the mainland coast but none of these were cubs of the year, compared to the coast of Banks Island where cubs of the year are sighted annually. This further suggests that maternity denning along the mainland coast is not a regular occurrence.

Productivity is even more difficult to determine. The only easy way to locate a den is to sight the exit hole in late March or early April. Alternately, the tracks of the female and her cubs may be found in the snow when they depart for the sea. However, wind can destroy these clues within hours so that a high potential for error is involved in trying to determine productivity by locating tracks or den sites from the air.

In addition, there can be a great deal of annual variation. In

the spring of 1970, strong easterly winds in early April blew the pack ice away from the west coast of Banks Island creating a wide shore lead. Adult females leaving dens with young cubs were temporarily stopped at the edge of the water. Reliable Eskimos travelling along the coast between Sachs Harbour and Storkerson Bay reported seeing five females (with cubs) per day and although the exact number seen is uncertain, it was probably between 20 and 30. In 1971 I saw no dens or tracks of females with cubs along the west coast and none were reported to me. In 1972 I saw 3 dens, 2 additional females with cubs away on the sea ice, and a sixth female with two cubs was reported to me by an Eskimo trapper.

At present I am not prepared to attempt to estimate productivity. Additional experience may permit an approximation of the productivity of Banks Island in the future.

THE BIOLOGY OF SEALS IN RELATION TO THE POLAR BEARS

In attempting to study the ecology of the polar bear in depth it is particularly important to consider related aspects of the biology of their prey species, the ringed and bearded seals.

Aspects which will be examined during the course of this project are:

a) the age structure of seals killed by polar bears (on a seasonal basis if possible).

b) seasonal distribution and movements of seals in the Beaufort Sea and Amundsen Gulf in relation to the movements and distribution of polar bears.

c) hunting efficienty of polar bears in various ice habitats.

d) hunting behaviour of adult polar bears and the learning of such behaviour by young bears.

e) the caloric value of whole seals and their component parts in relation to the caloric requirements of polar bears.

Much of this work is being done on a cooperative basis. All the data on polar bear predation and specimens collected by the C.W.S. and N.W.T. polar bear projects are received and collated by me. Age determinations are done by Dr. T. G. Smith of the Arctic Unit of the Fisheries Research Board of Canada at Ste. Anne de Bellevue, Quebec.

Dr. Smith is engaged in a detailed study of the population dynamics of the ringed seal in Amundsen Gulf, the results of which will be directly applicable to the polar bear project. He has been extremely cooperative about making these data available as required.

In cooperation with Dr. Smith, I am conducting a study of the distribution and abundance of ringed seal birth lairs in the pack ice in Amundsen Gulf. In conjunction with this survey we are also doing a study of the structure of birth lairs and non-birth lairs, which may be constructed by ringed and bearded seals. From this we hope to learn to differentiate between the lairs used by each species after a polar bear has broken into them.

Physiological work is being done under contract. The initial bomb calorimetry of whole seals was done at U. B. C. and research on the metablolic physiology of polar bears is now underway with the University of Guelph. Most of the funds for the latter are being provided by Eastern Region.

Age Structure of Seals Killed by Polar Bears

Whenever possible, lower jaws and nails from the foreflippers are collected from all seals found killed by polar bears for age determination. When jaws or claws are not available, parts of the thoracic vertebrae, pelvic or pectoral girdles, or other bones are collected so that at least a relative age group such as sub-adult or adult may be established.

The data from all the specimens collected in 1971 and 1972 have not yet been assimilated. Greater clarification of the original data on some specimens is still required.

One general observation can be made, however, and that is that most of the seals killed during the spring are young animals (2 years of age or less). On the surface this would suggest ~~they~~ polar bears are preying more on younger and possibly less experienced ~~animals~~ seals, thus giving the impression that the younger age classes are absorbing the bulk of the predation. However, almost all our specimens have been collected in the spring when the ringed and bearded seals are in reproductive condition and a great deal of intraspecific agonistic behaviour is taking place. I know from my experience with other pagophilic phocids that one result of sub-ice agonistic behaviour is that sub-dominant animals are often excluded to the surface of the sea ice. I have found Weddell seals, for example, that I was literally unable to frighten back into the nearest exit/entrance hole in the sea ice because of their fear of a dominant animal below the surface. In the past couple of years we have found sub-adult animals, often in good condition "frozen out" of the water. (I have found the same thing with sub-adult Weddell seals). I don't believe a seal stays

On the surface of the ice while its passage back to the water (and therefore its food supply as well) freezes over unless there is a more dominant seal below keeping him out. Examination of the live sub-adult ringed seals I have found has shown they have many cuts on the chest, belly, and axilla which are characteristic of phocid sub-ice intraspecific agonistic behaviour. This spring I also found a fat sub-adult bearded seal (est. wt. about 250 lbs.) beside an open breathing hole. She was more afraid to go down that hole than she was of the helicopter landing beside her! I examined (and tagged) this animal and found she had similar cuts from fighting. The tentative conclusion I draw from all this is that sub-ice intraspecific behaviour of the seals themselves is causing a greater proportion of younger less dominant animals to be excluded from the water and makes them more vulnerable to predation in the spring period. This hypothesis is of course easily tested if we can obtain an adequate number of specimens from seals killed by bears in the summer and autumn.

Distribution and Movements of Seals

Some of this work is being done in cooperation with Dr. Smith. He is doing a number of aerial surveys and ~~branching~~ branding studies which are not yet completed.

I have been using sub-ice recording with a hyrdrophone and tape recorder to determine the presence or absence of seals. Some but not all vocalizations can be identified at a species-specific level. With experience and the use of a Sound Spectrograph I hope to improve the accuracy of species identification. In future we plan experiments to attempt to correlate numbers of vocalizations with numbers of seals present.

Hopefully, a greater understanding of the distribution and abundance of seals under the sea ice will aid our understudy of bear movements.

Hunting Efficiency of Polar Bears

As yet we do not have quantitative data on the efficiency of bears hunting seals in the open pack, along the edges of large leads, or along shore-fast ice. Some data have been obtained but ~~as yet~~ they are insufficient for detailed analysis.

However, during April in particular, polar bears in some areas specialize in digging out ringed seal birth lairs. In this circumstance, the tracks and remains often provide quantitative data.

In 1971 we saw, from the air, 25 lairs that had been broken into by polar bears. Of these the bear had been successful 5 times.

The largest number of opened lairs seen were in the northern part of Amundsen Gulf and the southern end of Prince of Wales Strait. Thus, in 1972, I decided to study this area in more detail to gain data on two subjects: the polar bears' hunting efficiency in this situation and the distribution and abundance of ringed seal birth lairs in the gulf.

Most birth lairs are located in pressure ridges and the bears follow them for miles, apparently on the leeward side, locating the lairs by smell. Hearing may also be involved in some circumstances.

Table 5 summarizes the observations of hunting success of digging out birth lairs. Of 265 recorded attempts a seal of some sort was obtained on 25 (9.5%) occasions. Fifty-two percent (13/25) were newborn ringed seal pups.

Table 6 summarizes hunting data of 3 single bears (included in

Table 5). From these few data it is apparent that bears may follow a single pressure ridge for several miles and that the success rate may vary greatly.

To generalize on the distribution of seal lairs, they appeared most abundant near the south end of Prince of Wales Strait and progressively less so further south. This is probably a response to the fact that the probability of successfully weaning a pup prior to break up of the ice decreases in the less stable ice to the south. I plan another detailed survey of this area in April, 1973.

Caloric Requirements of Polar Bears

Physiological research into the metabolic requirements of polar bears is now beginning in the Churchill area. A student from Guelph University (Robin Best) is studying this aspect for a Ph.D. under the direction of Dr. Nils Øritsland. Most of the C.W.S. funding for this project is coming from Eastern Region. From the management point of view, we wish to be able to determine the size of a seal population that would be required to support a polar bear population of a known size.

However, it is not sufficient simply to say one bear requires so many seals per unit of time because, more often than not, only the hide and blubber are eaten. Usually only females with cubs sometimes eat the meat as well. The remainder may be scavenged by foxes.

It has always been assumed that in April, polar bears receive considerable sustenance from the whitecoat ringed seal pups they dig out of the birth lairs. Certainly, from examining the area described in the previous section, it is evident that polar bears do dig out a large number of birth lairs. However, we have found several ringed seal pups

uneaten by the bears. In any case, it has always seemed to me that digging out birth lairs for whitecoat pups was a calorically non-profit business. I began to suspect that what the bears were really after was a chance at the adult female if it was a birth lair, or sub-adult/adult seals of both species if not. A skilled Eskimo seal hunter informed me that when a lair is broken into, the female escapes immediately into the water, but often makes a brief return to peer into the lair at her pup, at which time she may be shot or harpooned. Sometimes an Eskimo may stimulate the female's return by dangling the pup in the water on a cord. I suspect that for the polar bear also, it is not capturing the pup that makes digging out lairs profitable but the less frequent capture of the adult.

This aspect is scheduled for further study in greater depth.

Polar Bear Hunting Behaviour

There are no quantitative data anywhere on this subject.

I plan to have a thorough search made of the historic literature on this subject for background material.

In 1973 I plan to try a pilot study of polar bear hunting behaviour. In late August when breakout occurs in Lancaster Sound, ice remains in Maxwell and Radstock bays. Apparently several bears then congregate and hunt in these bays making it theoretically possible to observe several bears at once from a vantage point on the cliffs. I would like to spend a few weeks actually observing the hunting behaviour of free-roaming bears to gain data on methods, success rate, and learning of such behaviour by the cubs. At present this study is still in the planning stage.

SEA ICE - POLAR BEAR RELATIONSHIPS

Data are still being accumulated on this subject. No discussion further than the brief comments made in last year's report are justified at this stage.

CONTRACT WORK

a) Ringed Seal - Polar Bear Observations on Banks Island

From 10 June to 10 September, 1972, Mr. Douglas Larsen collected jaws and ovaries from ringed seals killed by Eskimo hunters at Sachs Harbour. The object of this study was to obtain data on the age, structure and reproductive status of the ringed seal population preyed upon by polar bears on the west coast of Banks Island. Analysis of the specimens is being done at the Arctic Biological Station of the Fisheries Research Board of Canada at Ste. Anne de Bellevue, Quebec.

In addition, Larsen conducted three coastal aerial surveys of seals and bears during the summer and recorded all relevant observations made by other people in the area.

Three monthly reports from this contract are on file.

b) Bomb Calorimetry of Ringed Seals

During the months of June, July, and August, 1972, 13 ringed seals (newborn pups, yearlings, and adults) were macerated and bomb calorimetry performed to determine the energy values of the seals as a whole and of their component parts. This work was done by Miss Janet Rothwell at U. B. C. under the direction of Dr. E. H. McEwan. Although she was unable to complete all the determinations by the end of the summer, Dr. McEwan's staff completed them.

The results of this study will be particularly valuable.

The final report is on file.

c) Trapping Polar Bears at Herschel Island

From 16 October to 28 November, 1972, Mr. Douglas Larsen was under contract to trap polar bears at Herschel Island. At first there was no sea ice near Herschel so he came to Banks Island for two weeks where I was able to give him additional training in the immobilization and tagging of bears.

The remainder of the time he lived at Herschel. Three bears were shot there by Eskimos. Larsen collected specimens from these bears and examined them for parasites. Fewer bears came to Herschel during October and November, 1972, than did during the same period in the last two years. I attribute this in part to the bears being deterred from coming in by the great amount of activity by aircraft, land vehicles, and the construction of a Twin Otter strip. Larsen also documented this additional activity.

His final report is on file.

REPORTS CITED

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Stirling, I. 1971a. Ecology of the polar bear
in the Western Canadian Arctic.
First Annual Report, Project M4-2-2
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Stirling, 1971b. Report on polar bear studies
in the Western Arctic, March to May,
1971. (Unpublished typed MS). 18 pp.

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Ecology of the polar bear in the
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(Unpublished typed MS). 11 pp.

Table 1. Number of Polar Bears and Tracks Recorded in Various Areas of Potential Pack Ice Habitat Traversed by Helicopter in March to May, 1972.

Date (1972)	Location	Approximate no. miles of potential habitat traversed	No. bears seen ( ) = no. tagged	No. of tracks recorded fresh	old
28 March	N. Atkinson Pt.	165	1 (1)	1	3
29 March	Hooper Is.	200	5 (4)	3	2
30 March	Hooper Is.	200	0	7	0
1 April	Herschel - Komakuk	310	5 (3)	8	8
2 April	Herschel - Komakuk	165	3 (1)	4	9
4 April	Bailey Is. - Sachs H.	130	0	8	14
5 April	S.W. of Sachs H.	150	2 (2)	2	15
6 April	DeSalis Bay to Sachs H.	205	0	3	7
	Sachs - Norway Is.	250	7 (3)	3	5
7 April	W. Cape Kellett	90	2 (2)	11	9
9 April	Sachs - Bernard Is.	120	0	0	0
	North end Banks Is.	25	0	1	3
10 April	North end Banks Is.	50	0	0	4
	N.W. corner Banks Is.	145	1 (1)	10	7
11 April	Gore Is. to Sachs H.	320	6 (5)	22	33
12 April	W. of Cape Kellett	85	1 (1)	6	4
13 April	W. of Cape Kellett	90	0	0	12
15 April	Gore Is. - Sachs Return	330	2 (2)	2	26
17 April	DeSalis Bay - Holman	95	0	4	10
	W. of Horizon Is.	120	0	9	3
18 April	Holman - Ramsay Is.	200	0	0	12
19 April	W. of Holman	255	0	2	16
20 April	Holman - Ramsay Is.	245	7 (4)	4	10
21 April	Holman - Ramsay Is.	200	1 (1)	6	14
23 April	Holman - Cape Baring	155	0	1	5
24 April	Holman - Cape Parry	240	1 (1)	0	1
26 April	Bailey Is. - Cape Parry	250	5 (3)	8	42
27 April	Cape Parry - Bailey Sachs H.	365	1 (1)	18	27
28 April	Cape Parry - Tuk	170	7 (7)	10	39
1 May	Tuk - Pelly Is.	110	3 (3)	3	1
		5435	60 (45)	156	341

Table 6. Hunting success of three single polar bears digging out seal lairs in the snow.

Date (1972)	Location	Miles Travelled	No. Attempts	No. Successes
18 April	N. W. of Ramsay Is.	25	29	4
18 April	W. N.W. of Cape Ptarmigan	5	13	4
19 April	S. E. of A. Milne Pt.	.5	6	1
Total		30.5	48	9

Table 5. Summary of hunting success of polar bears digging out seal lairs in the snow.

No. lairs dug out		265	
No. Kills:	newborn ringed seals	13	
	adult ringed seals	2	(1 female & 1 male)
	sub-adult ringed seals	5	
	sub-adult bearded seals	1	
	species unidentified	4	
		25	

Table 4. Summary of the movements of Tagged Polar Bears in the Western Canadian Arctic

Bear No.	Original Tagging		Recapture		Comments
	Date	Location	Date	Location	
A 1029	9 Mar./70	24 mi. N. Barrow			with Ad ♀ and ♀ sib
			3 Nov./72	Herschel Is.	shot by Eskimo
A 1038	23 Mar./70	19 mi. N. Barrow			with Ad ♂
			29 Mar./70	45 mi. N. Barrow	alone
			8 April/70	10 mi. E. Barter Is.	alone
			2 April/72	50 mi. N. Herschel Is.	2 1 1/3 yr. cubs (died of drug)
A 1051	16 April/68	N. Barrow			new cub with ♀ and sib
			8 April/72	N.E. Barter Is.	1 1/3 yr., with ♀ and sib
			13 Oct./72	9 mi. N. Kay Pt.	alone
X 713	13 Oct./68	Herschel Is.			with ♀ X 714
			April/72	Cape Parry	shot, still with X 714
X 714	13 Oct./68	Herschel Is.			with ♂ 2 yr. X 713
			April/72	Cape Parry	shot, still with X 713
X 696	25 May/71	70 mi. N. Warren Pt.			
			13 April/72	90 mi. N. Flaxman Pt.	killed
X 615	5 April/71	25 mi. S. Sachs H.	7 April/71	35 mi. S. Sachs H.	
			26 April/72	36 mi. N.E. Cape Bathurst	

Table 3. Number of Polar Bears and Tracks Recorded in Various Areas of Potential Pack Ice Habitat Traversed by Helicopter in October - November, 1972.

Date (1972)	Location	Approximate no. miles of potential habitat traversed	No. bears seen ( ) = no. tagged	No. tracks recorded	
				fresh	old
23 Oct.	Cape Parry - Sachs H.	160	0	0	2
	Sachs H. - Worth Pt.	15	3 (3)	4	1
24 Oct.	Sachs H. - Sea Otter H.	140	3 (3)	10	12
	Sachs H. - to west	75	0	0	3
25 Oct.	Sachs H. - Norway Is.	235	3 (3)	2	3
26 Oct.	Sachs H. - Sea Otter Is.	130	3 (3)	5	7
27 Oct.	Sachs H. - Worth Pt.	100	3 (3)	3	0
28 Oct.	Sachs H. - Cape Dalhousie	140	7	36	0
29 Oct.	N. of Herschel Is.	80	1 (1)	2	10
30 Oct.	N. of Komakuk Beach	120	1 (1)	4	32
31 Oct.	N. of Herschel Is.	90	0	4	8
		ref. 1,285	24 (17)	70	76
				146	
		58.5 mi./bear 8.8 mi./track			

Table 2. Comparison of 1971 and 1972 observations of polar bears and tracks recorded in various areas of potential sea ice habitat in the Western Canadian Arctic. (* does not include a female with two cubs tagged at an inland den site bringing the 1971 total to 32)

Year	Miles travelled over ice habitat	No. bears seen, ( ) = no. tagged	Miles travelled/ bear seen	No. tracks seen	Miles travelled/ track seen
1971	4480	36 (29*)	124.0	408	11.0
1972	5435	60 (45)	90.5	497	10.9

APPENDIX

Publications Arising From the Project

Jonkel, C. and I. Stirling. 1972. Polar Bear Research in Canada, 1970 - 71. Proc. 3rd Meeting of Polar Bear Specialists, organized by IUCN at Morges, Switzerland. (in press)

Stirling, I. and C. Jonkel. 1972. Polar Bear: Symbol of the Wild. Outdoor Life, 150:82-85, 114, 116, 118, 120.

Stirling, I. and C. Jonkel. 1972. The Great White Bears. Nature Canada, 1:15-18.

Stirling, I. and A. Macpherson. 1972. Polar Bear Management Changes in Canada. Proc. 3rd Meeting of Polar Bear Specialists, organized by IUCN at Morges, Switzerland. (in press)

Papers and Talks Delivered

"Polar Bear Research in the Western Canadian Arctic"

- similar talk delivered to:

1) Community at Holman, N.W.T. January, 1972.
2) Arctic Station, Fisheries Res. Bd. Canada, Ste. Anne de Bellevue, Quebec. February, 1972.
3) Community of Sachs Harbour, April, 1972.
4) Staff of Cape Parry DEW line station, April, 1972.

"Some Considerations of Polar Bear Research and Management in The Western Canadian Arctic, in Relation to Bears in National Parks."

- to conference on Bear Management in National Parks sponsored by National Parks Branch in Jasper, November, 1972.