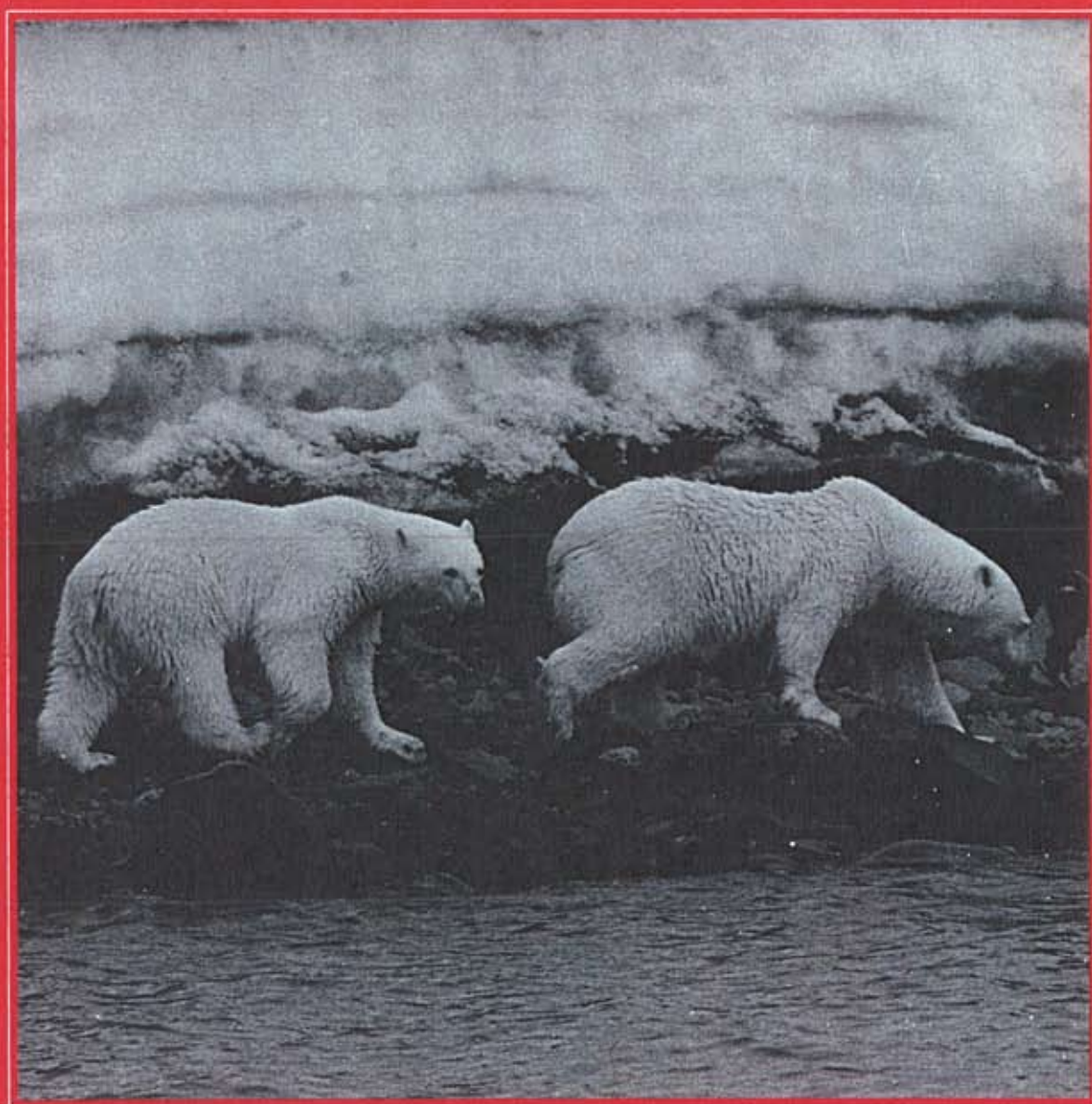

Polar Bears

Proceedings of the
Eighth Working Meeting of the
IUCN/SSC Polar Bear
Specialist Group

January 1981



P O L A R B E A R S

Proceedings of the Eighth Working Meeting
of the IUCN/SSC Polar Bear Specialist Group

Held at the Ministry of Environment
Oslo, Norway

15-19 January 1981

International Union for Conservation of Nature and Natural Resources
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1985

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EIGHTH WORKING MEETING OF POLAR BEAR SPECIALISTS

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INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND NATURAL RESOURCES

S P E C I E S S U R V I V A L C O M M I S S I O N

POLAR BEAR SPECIALIST GROUP

Eighth Meeting

15-19 January 1981

Room 214, Ministry of Environment

Myntgaten 2, Oslo, Norway

REVISED AGENDA

1. Welcome and Introductory Remarks - Mr. Erik Lykke
Mr. Richard G. Fort
2. Remarks of Convenor - Dr. John S. Tener
3. Confirmation of Participants
4. Selection of Rapporteurs
5. Appointment of Resolutions Committee
6. Adoption of Agenda
7. Research Progress Reports by Country
8. Conservation Progress Reports by Country
9. Matters Arising from Minutes of Previous Meetings
10. Status of Polar Bear Populations by Country
11. Drafting of Conclusions and Resolutions
12. Future Plans and Other Business
13. Election of Group Chairman for 1981-83
14. Adoption of Conclusions and Resolutions
15. Adjournment

SUMMARY OF THE MEETING

1. Welcome and Introductory Remarks

The assembled parties were welcomed to Norway at 9:30 on 15 January 1981, by Mr. Erik Lykke, Director General, Ministry of Environment.

Mr. Lykke gave his personal support as well as that of his Government to the close advisory relationship the Polar Bear Specialist Group has to the Signatory Parties of the Agreement on the Conservation of Polar Bears, and encouraged continuation and enrichment of that relationship.

Mr. Richard Fort, Division Head, Ministry of Environment, followed by outlining arrangements that had been made for secretarial and stenographic assistance during the meeting. He also announced that the Norwegian Government would host a dinner for the group on 20 January at the Hotel Bristol.

2. Remarks of Convenor

The Polar Bear Specialist Group (PBSG) meeting was officially convened by John Tener at 10:00. He briefly reviewed the history of the group, noting that it is comprised only of people actively involved in polar bear research and management. He also emphasized the value of the group in assisting all of the polar bear nations to develop worthwhile research and management plans.

Thor Larsen suggested that the members have been in the business long enough that the group should be able to provide a consensus statement concerning polar bear management considerations. Such a statement should incorporate the state of current knowledge about polar bear population dynamics and emphasize how that knowledge must be used to formulate world-wide management strategies (See Statement 2).

3. Confirmation of Participants

The group welcomed and approved the participation of new members and invited guests. (See pp. 5 and 6).

4. Selection of Rapporteurs

Steve Amstrup, Robert Scott and Peter Schei were appointed Rapporteurs for the meeting.

5. Appointment of Resolutions Committee

Jack Lentfer, Savva Uspenski, and Thor Larsen were appointed to the Resolutions Committee for this session.

6. Adoption of Agenda

Two comments were made concerning the proposed Agenda:

1. Thor Larsen's suggestion should be considered under Conclusions as an item treating "Fundamental Principles of Polar Bear Management and Ecology".
2. The subject of satellite telemetry should be considered under Future Plans.

The Agenda was adopted unanimously after a motion by Ian Stirling, seconded by Jack Lentfer.

John Tener announced that former group member Dr. Alexander A. Kistchshinski had died recently. It was agreed that John should draft a letter of condolence to Dr. Kistchshinski's widow from the PBSG.

7. Research Progress Reports by Country

A. DENMARK:

The details of recent Danish progress are covered in several documents included in this volume. Christian Vibe covered highlights, including a discussion of the Danish involvement in recent satellite telemetry activities. Notable was that one presumably pregnant female bear was marked east of Greenland at approximately 82°N latitude and killed the following winter in east central Greenland. Little

information is available but the question is raised whether the bear went to that area to den or for other reasons. Other evidence also tends to support the theory of a general southern drift of bears along the east coast.

Dr. Vibe also mentioned that some evidence suggests the Thule area shares bears with Canada, creating a potential international management problem.

Past research has involved tagging, and Dr. Vibe emphasized that their 200 kr. cash reward seemed to assure reporting of most tagged bears killed.

B. NORWAY:

Thor Larsen distributed four papers reporting on recent Norwegian research. Since these papers were being published in other media, they are included as Abstracts only in this volume. Subjects covered include behaviour with cubs in the denning area, denning habits in the Svalbard area, satellite radio tracking, and Svalbard bear population data.

Since the implementation of protective measures in 1970, Norway has been trying to monitor the polar bear population by use of den surveys. The estimate of 120-135 dens in the Svalbard Archipelago suggests approximately 1000 bears in the area. One area had a density of 12 dens/km² which is the highest denning density known. Why so many concentrate on Kong Karls Land, and whether, as the population size continues to increase, denning will spread to other (now unused) areas, are two pressing questions.

There are several indications that the polar bear population is increasing in Svalbard, Franz Josef Land, and adjacent ice areas. However, population estimation and delineation is difficult.

Recent studies suggest that perhaps as many as 50 per cent of females lose their cubs before they reach the age of one year. Explanations of that phenomenon and how it relates to the trend of increasing population would be interesting.

Mr. Larsen also reviewed the fates of four satellite-collared bears instrumented between Svalbard and Greenland. Two of them, captured at about 82°N latitude, moved south. Two bears caught at about 84°N moved eastward toward Franz Josef Land. Although the data are scanty, they raise the question of a possible population segregation between 82° and 84°N latitude. Unfortunately, the tracking period was prohibitively short for a good assessment of the movement patterns of these bears to be made.

C. CANADA:

Canadian polar bear research was summarized in a report included in this volume. Ian Stirling provided the following highlights of the report:

With the recent unavailability of Phencylidine HCL, Canadian researchers have turned to a combination of Xylazine and Ketamine HCL for immobilizing bears. Because the drug can only be mixed in low concentrations, large amounts may be required for adult males. They often require more than one dart.

Results of recent studies suggest that the implications of petroleum pollution in arctic marine environments are serious. Bears ingest oil during normal grooming activities resulting in gastro-intestinal distress and possible death. Their ability to thermo-regulate is also seriously reduced. Three reports on these studies are currently in preparation.

The potential impact of petroleum contamination in the high arctic is magnified by a recent proposal to ship oil from the Beaufort Sea through the Northwest Passage.

Research on polar bear behaviour is continuing in the Radstock Bay area, and a new study of female reproductive biology is being initiated on western Hudson's Bay. Emphasis will include examinations of fidelity to previous denning areas, and analysis of reproductive tracts collected from bears killed on Southampton Island.

Behavioural research, and studies of bear detection and deterrent systems, will be continued, as bear-human conflicts seem likely only to increase. A workshop in Yellowknife, N.W.T. considered computer modelling from mark-recapture data. A report by Mitchell Taylor on this work appears on p. 17 of this Summary Record.

Dr. Stirling's report on the significance of polynyas to marine systems should be published in a few months.

Dr. Stirling suggested the group ought to evaluate what approaches (other than mark and capture) are possible to improve the accuracy of population estimates.

D. UNITED STATES:

Steve Amstrup summarized a report included in this volume. Some highlights of the report:

1. 15 polar bears were captured near Pt. Barrow in 1979 and 40 in 1980.
2. The small number captured in 1979 was the result of diverting efforts into the cooperative satellite telemetry programme which will be discussed later.
3. Conventional radio collars were attached to 17 female polar bears in 1980. Twelve of those were relocated at intervals for a short time after marking but could not be relocated later.
4. Due to unavailability of Phencylidine Hydrochloride, M-99 has been evaluated as a polar bear immobilizing agent.
5. Future research emphasis will include a more spatially dispersed tagging programme, conventional radiotelemetry, and denning studies.

E. USSR:

Recent Soviet Research was reviewed in a paper included in this volume. Savva Uspenski summarized the report as follows: Most Soviet research has been oriented around den ecology. There are two areas where major efforts have been made:

1. Wrangel Island and adjacent coast of Siberia;
2. Franz Josef Land and surroundings.

The Wrangel Island work started in 1969 and ended in 1978 when a national reserve was established there. During that period, over 100 bears were marked; so far, none has been recovered.

Intensive studies began on Franz Josef Land in 1979. An interesting observation resulting from that work is that several dens were found to contain males and non-pregnant females, but the significance of that is still unclear.

Based on analysis of heavy metals in bone tissue, Soviet bears have been divided into three sub-populations:

1. Franz Joseph Land
2. Chuckchi Sea
3. Laptev Sea

Thor Larsen noted that he has available translations of a whole series of articles by Dr. Uspenski and other Soviet scientists.

8. Conservation Progress Reports by Country

A. DENMARK:

Since the last meeting, Greenland has established a new national park in Melville Bay. It is described in a document in this volume.

As of 1 January 1980, all conservation problems have been taken over by Greenland with the assumption of Home Rule. However, the polar bear regulations will remain unchanged. (Regulations included in this volume, see p. 51). All motorized forms of transportation are

prohibited. Greenlanders can sell skins of polar bears taken, but the number is usually small. In 1979 they sold 13 and in 1980 they sold 38 at the Copenhagen marketplace. The average price was 7000kr while the highest was 14,000 kr.

B. NORWAY:

Norway has established two nature reserves in the Svalbard area, protecting about 90 per cent of the bear denning area according to Peter Schei. Polar bears have been totally protected since 1973, with the only kill occurring for reasons of human safety. Only 17 bears have been killed since 1976, but problem interactions and bears killed are expected to increase.

C. UNITED STATES:

Steve Amstrup summarized Alaskan polar bear management. The Marine Mammal Protection Act prohibits all persons except native Indians, Aleuts, and Eskimos from killing polar bears. However, there are no restrictions on the native take of polar bears if they are used for subsistence purposes.

Harvest data reveal that the take of polar bears in Alaska has declined markedly since 1972. Of some concern is the observation that the female component of the harvest may have increased over the same period.

Of special concern in Alaska are the probable negative impacts of greatly expanded human activity in the Arctic. Exploration for and development of petroleum reserves are expected to expand at increasing rates, in the Alaskan Arctic. Pollution, disruption, and alteration of critical habitats seems unavoidable.

Jack Lentfer also provided a report on Alaskan polar bear management, included in this volume. He highlighted the effects of recent State Court decisions and various regulations. His report also summarized harvest statistics, and he predicted the 1980 kill might be similar to the 1978 figures and, therefore, higher than 1979. Hides taken can no longer be sold, except as native-manufactured articles, so there is less incentive to hunt, and there is no significant amount of killing by non-natives. There seem to be no detectable changes or trends in the bear population generally.

D. CANADA:

Ian Stirling distributed a summary of recent Canadian bear management measures included in this volume. Quotas on take have been increasing in some areas, and are likely to be approaching the sustainable harvest. The total quota for 1981 is 604. Most settlements are abiding by their quotas but many are applying pressure to increase them. It appears that Canadian polar bears probably number as many as 15,000 - 20,000 at the present time, but estimates are not precise. Sale of skins of legally killed bears is permitted and about 650 are sold each year, mostly within Canada, but some are exported. Prices range from \$500 to \$3000. Norm Simmons described the legal issuance of non-resident hunting permits within local quotas in the Northwest Territories, providing the guiding is done by natives using traditional means.

Some habitat protection has been achieved by four small parks established in Lancaster Sound. Parks are also proposed on Banks Island, Ellesmere Island and in Penny Strait. Dr. Simmons suggested the group consider developing a Resolution promoting research on human-bear interactions.

E. USSR:

Savva Uspenski reviewed Soviet conservation measures. Killing polar bears has been prohibited since 1956, and an Act passed in 1979 resulted in entry of the polar bear into the Red Data Book of the U.S.S.R. At present only a very limited take of cubs for zoos is allowed.

Confrontations between bears and humans are becoming more frequent as bear numbers increase and they become more daring. However, no bears have been killed since 1978.

Dr. Uspenski emphasized that some conservationists in the U.S.S.R. fear a backlash against the Soviet prohibition on taking polar bears may result from the high kill in other areas of the world. He also stated that many in the U.S.S.R. fear that other nations, not party to the agreement, are taking bears, and suggested that IUCN look into traffic in polar bear products.

9. Minutes of Previous Meetings

At the last meeting of the Polar Bear Specialist Group, a request had been made to IUCN to indicate their position on experiments with endangered species. IUCN responded that they had not yet established a position. Ian Stirling reiterated his feeling that they should. It was suggested the draft of such a Position Statement could appropriately be developed by the Polar Bear Group.

Ian Stirling moved that the minutes of the last two meetings be accepted as presented. Jack Lentfer seconded the motion and it passed unanimously.

10. Status of Polar Bear Populations by Country

See Table I of Special Statement 2 (p. 39) for a summary of population status estimates by country.

A. GENERAL

Mitch Taylor of the University of Minnesota reported on some of the recent mathematical modelling work he and Kathline Zinnel have been doing for polar bear populations. First, he briefly discussed some of the assumptions and other inputs that drive the model. Then he outlined his ideas and made predictions about Alaskan and Canadian polar bear populations. Points covered included:

1. The procedure computes population size from summer to summer.
2. Age Class 6 is the single most important age class from the standpoint of its reproductive contribution.
3. Mating success is defined as the percentage of available females having cubs. Since most females not bred one year will breed the next, changes in the mating success do not change the population growth rate very much.
4. Estimated Population Growth Rate derived from Canadian and Alaskan data is 1.021.
5. At equilibrium, 57 per cent of litters produced must produce two cubs. In most populations 80 per cent of litters contain two cubs. However, it takes large changes in this parameter to alter the population growth rate significantly.
6. An important characteristic of polar bears is longevity. Like all "k-selected" populations, changes in survivorship of bears can radically affect population growth rate.
7. Realistically, there are no density-dependent limitations on any polar bear populations at current levels (i.e. they are all reproducing as fast as they can).

Taylor then produced a preliminary estimate suggesting dramatic declines in Alaskan polar bear populations since 1970, and, using the same procedure he used for Alaskan data, estimated the Canadian population to be only 7876. Ian Stirling gave his best guess for Canada's polar bear population size as between 15,000 and 20,000.

A lengthy discussion of population indicators ensued, during which the following points and criticisms were made:

1. The results presented are preliminary, sensitive to certain unknown factors and could be erroneous.
2. The concentration of most of the marking in few localities at the same season each year prohibits conclusions about seasonal fidelity of bears to particular areas. Yet such fidelity would have profound effects on outcomes of any estimate based upon mark and recapture data.
3. Data collection in several areas does not strictly follow guidelines offered by the authors of the procedure. For example, the recommended annual sample size is around 100, but in most areas, fewer than 100 bears were caught annually and the number caught varied greatly between years.
4. In order to use the procedure described by Mr. Taylor, one must assume a survival rate for members of the population. As he pointed out, the other parameters of polar bear population dynamics make them sensitive to changes in survival. The model, too, is sensitive to changes in the assumed survival rate, and it is not clear that Alaskan data are adequate to allow an accurate estimate of that critical parameter.

5. Mr. Taylor's estimates of trends and size in Alaskan polar bear populations seem inconsistent with other available indicators, including observations of people collecting data.
6. Jack Lentfer maintained that population indicators other than Mr. Taylor's recent analysis should be included. Long term sustained harvest, "catch" per unit effort of biologists, the number of human-bear interactions, and the total hunter kill and its sex ratio indicated a different trend from that suggested by Mr. Taylor in the draft report.
7. Skip Ladd discussed several of his specific concerns about Taylor's presentation:
 - (a) Based on the graphs presented, the Alaskan polar bear population has declined by about 75 per cent since 1970. This doesn't appear to be reasonable in view of the decrease in harvest since enactment of the Marine Mammal Protection Act (1972) and other indications. Also, the results of the modelling analysis which indicates a significant decline are very recent and preliminary and really haven't been through rigorous critical review, yet the estimates were presented as being the only and final estimates available for Alaskan stocks. In contrast, estimates provided until now by other scientists indicate that populations in Alaska ranged from 5000 to 10,000 with no discernible trend. There were even some indications that the population was increasing slightly. In view of the newness of the Taylor analysis, the lack of rigorous review it has received, and the conflict with previous estimates, he did not think it appropriate to use the Taylor results as the sole population estimate and trend for Alaskan stocks.

- (b) The document implies that the world population as a whole may be declining, based on the analysis of the Chukchi-Beaufort data. This conclusion does not appear to be warranted.
- (c) There does not seem to be strong evidence that non-hunted populations are serving as reservoirs for hunted populations. Thor Larsen replied that there is sufficient evidence.
- (d) The paper does not specify harvest levels and trends in the various areas. If it is going to comment on harvest as the major factor in indicated declines, harvest data should be presented to add perspective.
8. Steve Amstrup suggested that the derivation of the 1.5 - 2.0% sustainable harvest figure merits scrutiny. This figure was based upon Mitch Taylor's calculated survival rate of 0.88. However, that rate, which was based upon Alaskan and Canadian data already includes human-induced mortalities at their current rate. Therefore, to take a known annual kill of, say, 700 for Canada and use the 1.5% figure to work back to a "needed" population is "double dipping" on the harvest. That 700 has already been included in the 0.88, so the sustainable yield is in fact 1.5 - 2.0% of the population plus the component of the recognized 12% annual mortality accounted for by current human activities.
9. Above all else, one thing was very clear: the data currently available are inadequate to answer many of the questions critical to an evaluation of the procedure presented as work in progress by Mitch Taylor. More research into the issues addressed above is certainly necessary.

From the discussion several concluding points and recommendations were made.

John Tener suggested that the Taylor analysis be identified as new and unverified. Also, that it be recognized as a red flag warning of the need for closer attention of researchers and managers to the status of polar bear populations.

Thor Larsen stated that, population estimates aside, it should be possible to agree and state that the population dynamics of polar bears require a prudent approach to human-induced mortality; e.g. if bears are harvested, the harvest must be very small in relation to the total population in order to be within the sustainable yield.

Mr. Taylor interjected that his work emphasizes that depletion due to excessive harvest is a slow process and that there is time to make more refined assessments before a final decision about population status is made.

Norm Simmons concluded that the discussions conveyed at least two important messages:

- (1) Increases in Canadian quotas cannot be considered at this time.
- (2) Further research to fill the gaps in our knowledge of polar bear populations is badly needed.

Steve Amstrup considered that the discussion demonstrated there are many unknowns about polar bears: population size, distribution, and growth rate, to name a few. However, it is known that, relatively, the sustainable loss of males from a polar bear population is greater than the sustainable loss of females from the same population. It is also known that a few simple, straight-forward management procedures can effect substantial protection for female polar bears. Recognizing the lack of consensus and poor understanding of many polar bear subject areas, and also the desire to recommend actions that will benefit polar bears, it seems only reasonable that the document emphasize the need for, and value of, taking measures to protect females.

Steve Amstrup also suggested several changes in approach which would have resulted in equal emphasis being applied to environmental degradation and harvest as potential decimating factors for polar bear populations. Discussion resulted in a compromise on this issue since it did not seem desirable to dilute the statements on harvest effects.

In summary, Taylor's presentation and conclusions about declining polar bear populations were preliminary, tentative and require extensive peer review and verification. (See Annex I, page 143, for a later Memorandum on this point from Mr. Taylor.) Nevertheless the points raised were serious enough to warrant recommending caution to jurisdictions presently hunting polar bears and a stepped up modelling and research effort.

B. DENMARK:

Christian Vibe discussed how Greenland has been divided into six regions, and reviewed population and movement data and harvest estimates (see Papers). Polar bear populations in each region seem somewhat different. For example, Areas 2 and 3 seem to have small, local populations but Areas 3 and 4 seem to receive migrants from other areas, including the Polar Basin.

C. NORWAY:

Thor Larsen reminded the group that a Paper written by Jack Lentfer on polar bears in the interior Arctic Basin may be useful in this discussion. Larsen estimates a total of about 2000 bears between Franz Josef Land and Svalbard, and reports that there are very few bears seen north of 82°N. Most are relatively close to shore.

Savva Uspenski suggested there are two systems of ice circulation, one counter clockwise north of Alaska and Canada, and another clockwise north of USSR and Norway and south along Greenland. He believes these systems are accompanied by two main polar bear populations, each with sub-populations.

D. SUMMARY STATEMENT

The above discussion was a prelude to the adoption of the Statement on "The Status and Analysis of Polar Bear Populations, a Review and Recommendations".

This item was intended as a response to Item 5 in the draft Agenda for the Meeting of the Signatories of the Agreement on the Conservation of Polar Bears which was convening in Oslo, 20 - 22 January, 1981, immediately following the specialist group meeting. (See Annex 2 for the Summary and Conclusions of the Meeting of the Parties).

On several occasions during the final hours of the PBSG meeting, Savva Uspenski expressed his feeling that the IUCN/SSC Specialist Group, as a group of voluntarily cooperating scientists is independent of the Signatory Parties in an international legal sense and therefore, should not construe its conclusions as formal recommendations to the parties.

Thor Larsen pointed out that Section 6 of the "Explanatory Statements" (See Annex 3) about the final Agreement states clearly that the PBSG does function partly to help the Signatories. Most group participants concurred, so discussion continued on a draft Statement that had been prepared overnight by Ian Stirling and Mitch Taylor.

Norm Simmons suggested that care must be taken so that statements do not seem to reflect principally uncertainty, or lack of consensus in critical areas. He further maintained that what is said should be strengthened to the extent possible, and that it be strongly recommended that further research is needed to fill the gaps in knowledge.

Ultimately, Steve Amstrup, Mitch Taylor, Jack Lentfer and Skip Ladd reached agreement on the Alaskan sections of the Statement in a text that subsequently was approved by the entire group (Special Statement 2, p. 34).

11. Drafting of Conclusions and Resolutions

Earlier, Savva Uspenski had suggested that the group consider two Resolutions:

One, requesting IUCN examine the international trade in polar bear hides, perhaps in collaboration with CITES. Another, taking a stand on the continued high kill of polar bears world wide.

Skipp Ladd suggested some relativity be added to Dr. Uspenski's second suggestion, recognizing that the total world kill is down significantly from what it had been before the Polar Bear Agreement.

Mr. Ladd also emphasized we must be careful to look closely at new information such as that presented by Mitch Taylor. Right or wrong, its political as well as biological ramifications may be great. As a group of professionals, we must be on secure footing before attempting to take a solid stand.

Further discussion of Dr. Uspenski's suggestions was deferred until later. (See Section 14).

12. Future Plans and Other Business

A. Satellite Tracking:

Mitch Taylor is writing up the report on satellite telemetry to date, having taken it over from Doug DeMaster. Mitch Taylor highlighted parts of his report.

1. Transmitters were attached by harnesses designed to drop off within one year.
2. Behavioural studies suggest harnesses may cause some behavioural differences but they were not considered harmful.
3. A number of equipment and logistical problems limited information gathered in the study of the effect of harvests on the behaviour of polar bears.

Jack Lentfer stated that the problems with the Nimbus system should have been foreseen and that the French Argos system would be better. He also emphasized the utility of conventional radiotelemetry.

Thor Larsen raised the issue of continued satellite work. "It is expensive; therefore, if it is worthwhile we should join forces for our mutual benefit and for the benefit of bear research. ... Let us discuss avenues of cooperation."

Ian Stirling suggested that workable satellite technologies could be very helpful in a number of problem areas but some questions need to be answered first, which satellite system to use being the most basic. It should also be recognized that much development and testing work still needs to be done.

Dr. Stirling agreed that a proposed post-Doctoral position supported cooperatively by interested parties could be coordinated through his office in Edmonton to facilitate further work on telemetry and population modelling. He also proposed that the Resolutions Committee consider Resolutions recognizing the values of satellite telemetry and mathematical modelling.

B. Problem Bears (Human-Bear Interactions):

Ian Stirling emphasized how little is known about solving problem interactions between humans and bears. Emphasis to date has been on detection and deterrent systems. It was recognized that we also need additional knowledge on the biological basis of bear problems, i.e. a profile of problem bears. One approach might be to study the behaviour patterns of "problem bears" at Churchill. Ray Schweinsburg (not present at the meeting) will get a biologist on contract to study deterrents within six months. All the available information on this subject should be pooled to make best use of past work and experience.

Norm Simmons noted that human-bear interactions are a serious problem with international implications and that the problem is sure to get worse as man's intrusion into the Arctic increases.

C. Baffin Bay:

Christian Vibe emphasized the necessity to continue research in the Baffin Bay area. The Danes are very concerned about the potential problems that may result from the ship traffic related to proposed petroleum development in the Canadian High Arctic and Beaufort Sea.

D. Population:

Savva Uspenski, reiterated two suggestions from his report in this volume.

1. Future work should emphasize:
 - a. world wide population estimation; and
 - b. population dynamics
2. Therefore, a synchronous population survey should be coordinated during 1983-84 and at five-year intervals thereafter.

The group questioned the utility of aerial surveys, and various alternative means were discussed.

13. Election of New Group Chairman

According to the established tradition of rotation, it was Canada's turn. Jack Lentfer moved that Ian Stirling be elected the new Chairman. Thor Larsen seconded and the motion passed unanimously.

14. Adoption of Conclusions and Resolutions

A. Future Role of the Group:

Savva Uspenski expressed his pleasure with the current workshop format and the relationship to IUCN. He didn't feel any changes were needed. The group should pay special attention to size and dynamics of populations.

Thor Larsen suggested that the group should change the format of meetings, concentrating more on particular problems than on simple reporting of progress.

Ian Stirling suggested that a special session follow each 2 - 3 day regular session. There, workshops etc., could examine particular problem areas or subjects of special interest.

Savva Uspenski suggested such a format would have to be flexible, and that there definitely should be the standard Agenda as in the past, with special topics handled in separate sessions.

Thor Larsen suggested that the next meeting be held jointly with the Bear Biology Association meeting in Arizona in 1983. Savva Uspenski commented that was a decision for the new Chairman to ponder, and for further communication within the group.

Bob Scott stated IUCN would like to have some expression from the group concerning its present operating format. John Tener offered to draft a Paper expressing the consensus of the group on this. (See Special Statement I, p. 33).

B. Conservation Status of Ecosystems and Need for Information Exchange

This item refers back to Resolution 2 of the last meeting (See 7th Meeting notes p. 25).

Ian Stirling felt the PBSG has been so successful partly because of its small size and limited scope of concern. More realistic than a permanent group for Arctic ecosystems might be a forum for calling together specialists in any particular area of concern. "Arctic Ecosystems" is necessarily too broad to be effectively discussed by any one group of workable size.

Savva Uspenski supported the current arrangement of PBSG and suggested it was not really its mission to discuss broader subjects. The PBSG has been very effective, so why change it?

Bob Scott mentioned that IUCN would like to suggest to the Signatory Parties of the Agreement that the PBSG has been very effective and that some similar forum for information exchange on other Arctic matters should be considered. The Group took no further action on this issue.

D. Other Resolutions:

The following Resolutions were discussed and accepted. (See Resolutions, Page 29):

1. Population estimates
2. Modelling of polar bear population data
3. Polar bear-human interactions
4. Development and use of telemetry techniques
5. Polar bears and the marine ecosystem of Baffin Bay
6. Expression of thanks

15. Adjournment

The meeting adjourned in the afternoon of Monday, 19 January, after having used Sunday as a free day.

RESOLUTIONS

Resolution 1: Population estimates

The IUCN Polar Bear Specialist Group,
recognizing that population estimates for most subpopulations of polar bears are imprecise; and
recognizing that the quality of data and methods of estimating subpopulation sizes from the data vary from area to area; and
recognizing that better estimates of polar bear numbers throughout their range are needed to develop management programs and to provide protective measures as hunting and disturbance related to increased human activity occur throughout the Arctic;
therefore urges that signatory nations to the Agreement on the Conservation of Polar Bears place high priority on obtaining and exchanging information which will increase reliability of estimates of sizes of subpopulations, and which, through coordinated international cooperation, will provide continuing world population estimates.

Resolution 2: Modelling of polar bear population data

The IUCN Polar Bear Specialist Group,
recognizing that impending changes in human activities and associated changes in Arctic environments and overharvesting may severely impact polar bear populations in the near future; and
recognizing that detailed information on polar bear population size, composition and dynamics will be essential to formulation of proper management responses to such impacts; and

recognizing that mathematical modelling of polar bear population data can be an important aid in estimating population size and understanding population dynamics;

therefore urges nations signatory to the Agreement on the Conservation of Polar Bears to individually and cooperatively continue development and refinement of mathematical techniques describing the sizes and dynamics of polar bear populations.

Resolution 3: Polar bear - human interactions

The IUCN Polar Bear Specialist Group,

recognizing that interactions between polar bears and humans can result in loss of human life, destruction of bears, and loss of property; and

recognizing that polar bear mortalities resulting from interactions with man can adversely affect bear management strategies and direct public opinion away from the need to conserve polar bears; and recognizing that such interactions are likely to increase because of increased human activity in the Arctic;

therefore resolves that all signatory nations to the Agreement on the Conservation of Polar Bears should make immediate use of all available information in order to minimize interactions between polar bears and humans and urges those nations to conduct cooperative investigations aimed at minimizing polar bear - human interactions in the future.

Resolution 4: Development and use of telemetry techniques

The IUCN Polar Bear Specialist Group,
recognizing that conventional and satellite telemetry are effective techniques to study ecology of polar bears;
and
recognizing that existing systems of attaching transmitters to polar bears are not sufficiently reliable;
and
recognizing that existing technology for satellite tracking needs significant improvement;
therefore urges use of conventional and satellite telemetry to study polar bears and cooperative efforts to improve telemetry techniques.

Resolution 5: Polar bears and the marine ecosystem of Baffin Bay

The IUCN Polar Bear Specialist Group,
noting that the marine mammals and birds of Baffin Bay are vital to the maintenance of the traditional way of life of the Inuit of the adjacent coasts of west Greenland and Canada; and
noting that little is known about the biology of the polar bears of that region in particular and of the marine ecosystem in general; and
noting that large scale year round shipping operations which include icebreaking through the winter as required and planned for the transport of hydrocarbons through the region,

therefore calls attention to the fact that this ecosystem is potentially vulnerable to significant disruption and pollution from such activity; and recommends that joint studies be undertaken by Canada, Denmark and Greenland upon the polar bears and their ecosystem in Baffin Bay, with a view toward the identification and protection of critical habitat prior to disturbance and establishment of baseline values against which the potential effects of disturbance could be evaluated so that recommendations can be made to minimize detrimental effects.

Resolution 6: Expression of thanks

The IUCN Polar Bear Specialist Group,
noting the fine organization, warm hospitality, and excellent facilities at their eighth meeting in Oslo, which contributed greatly to the success of the meeting;
therefore wish to thank the Norwegian Ministry of the Environment, the Norwegian Polar Institute, and the IUCN for planning for and hosting the meeting and providing facilities; and also wish to thank Dr. John Tener for his skillful chairing of the meeting.

SPECIAL STATEMENTS

1. STATEMENT ON RESEARCH AND THE FUTURE ROLE OF THE POLAR BEAR SPECIALIST GROUP

The Polar Bear Specialist Group of the IUCN met to exchange research and management information. Topics covered in the discussion included the results of the coordinated international satellite tracking program; population estimates for subpopulations of polar bears around the polar basin; results of maternity denning surveys; analyses of population dynamics and population modelling; shipboard survey of polar bears in the Barents Sea; population ecology studies in the Canadian Arctic in Lancaster Sound, southeastern Baffin Island and the Labrador coast; the importance of the polar bear marine ecosystem to polar bear populations; and, potential detrimental effects on polar bears of increased conflicts between polar bears and humans and increased offshore industrial activities.

The Polar Bear Specialist Group of the IUCN has concluded after careful consideration that its meetings have proven most valuable in furthering the protection and management of polar bear populations through information exchange, coordination of research, development of new methods and techniques of study and better understanding of polar bear biology and ecology. It is generally satisfied with the present format of the meeting but may introduce other mechanisms for improving understanding of polar bears, such as developing workshops and symposia.

2. THE STATUS AND ANALYSIS OF POLAR BEAR POPULATIONS; A REVIEW AND RECOMMENDATIONS

Studies of the size and dynamics of polar bear sub-populations have been carried out in several areas of the Arctic in recent years. During this period, there has been considerable variability in the methods used, the durations of studies, and the methods of analysis. For several large and significant areas, there are no estimates available to date.

While recognizing the limitations on the data, the Polar Bear Specialist Group felt it would be useful to summarize the information available (Table 1) and make some comments on subsequent analyses based on these data. Approximately 900 polar bears will be harvested in 1981.

Several varying population estimates and trend indicators, based on long-term North American information, are available for the Chukchi and Beaufort Seas. The estimates range from a report of an increasing population to a more recent analysis indicating a decline. If the decline is real, the most likely explanation is overharvest, or possibly disturbance resulting from increased human activities. Comprehensive evaluation of population trends and estimates for the Beaufort-Chukchi area is urgently required for resolution of this disparity.

Recent analyses using a mathematical model indicate that sustained yield may be less than 2 % of the total population. Canadian harvest levels in some areas may exceed 5 %. In case of a harvest, the number of bears that could be harvested from a population is variable depending on the age and sex composition of the bears in both the total population and the harvest. These calculations point out the urgency of continued work on population estimates and modelling of polar bear populations. Due to these most recent findings, no increases in quotas should be considered. Furthermore, these results emphasize the immediate necessity for continued research to verify this conclusion.

Although more difficult to evaluate than harvest in the future, serious losses of animals and declines in productivity may result from environmental degradation. Such losses are likely to increase as man's intrusion into arctic environments accelerate in decades to come.

Non-harvested portions of some populations appear to serve as reservoirs for replenishing subpopulations that have been or may now be declining. The impact of harvesting immigrant animals should be evaluated. Recovery time for depleted populations is very slow (i.e. decades) because of the slow intrinsic rate of increase of polar bear populations. Similarly, it appears from the modelling done to date, that polar bear populations will probably decline more slowly than can be readily detected because the effect of the annual loss from overharvesting, or environmental degradation, from a pristine popu-

lation is relatively small. The decline in the population suddenly becomes much more apparent as the losses from overharvest or other causes begins to represent a progressively larger proportion of the total population.

Further research into methods of analysis and modeling of polar bear populations require the following information immediately to reduce the chance of overharvesting:

- a) populations estimates;
- b) delineation of the geographical boundaries of the population;
- c) establish the degree of immigration and emigration from the population;
- d) evaluate the bias in the sex and age composition of the harvest; and,
- e) estimates of population size, survivorship and reproductive parameters.

Other major conservation points include: identification and protection of critical denning and feeding areas from disturbance or destruction; and protection of the marine ecosystem as a whole from the detrimental effects of human industrial activities.

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Table 1. Summary of estimates on a regional basis. See attached maps for delineation of geographical areas (Figures 1 & 2)

AREA	BASIS OF ESTIMATE	SOURCE	ESTIMATE
Barents and Greenland Sea, Svalbard and Franz Josef Land, Novaya Zemlya	Ship Survey	Larsen <u>et al.</u> Unpublished data	4779 - 5750
a) *Svalbard & Drift Ice between 5°W and 60°E from ice edge to 82°N	Ship Survey	Larsen (1981) (unpublished)	ca. 2000
b) *East Greenland Drift Ice and Polar Basin	Subjectives, based on obser- ved harvest	Vibe (1981) (pers. com.)	at least (2000 - 3000)

* These estimates are included in line 1 of the table.

AREA	BASIS OF ESTIMATE	SOURCE	ESTIMATE
Central East Greenland (resident)	mark-recapture	Vibe (1976 a & b) Ericksen (1976)	approximately 100
NE Greenland (resident)	aerial surveys	Vibe (personal communication)	approximately 100
Ellesmere Island, Jones Sound and Thule area (resident)	Subjective estimate based on sustained harvest	Vibe (verbal communication)	at least 300
Canadian arctic			
Zone A ^I & A ^{II}	Approximated by Taylor from estimate of cub production (200/yr)	Jonkel et al. (1976) Stirling et al. (1977)	1750
Zone A ^{III}	recalculated from mark-recapture data by Taylor & Zinnel	Jonkel et al. (1976)	308
Zone B Labrador Coast Ungava Bay	mark-recapture none	Stirling and Kiliaan (1980)	75 (60-90)
Zone C	none		

AREA	BASIS OF ESTIMATE	SOURCE	ESTIMATES
Zone D			
southern	mark-recapture	Stirling et al. (1980)	700
northern	none	-	-
Zone E	mark-recapture	Schweinsburg et al. (1980a)	1100
Zone F	mark-recapture	Schweinsburg et al. (1980b)	2008
Zone G	none	-	-
Zone H	mark-recapture	DeMaster et al. (1980)	1800
Alaskan North Slope	Computer simulation of harvest figures	Lentfer (1976)	2500
Alaskan North Slope	mark-recapture	Taylor, unpubl. (1981)	1200
Chukchi Sea	Computer simulation of harvest figures	Lentfer (1976)	7000
Chukchi Sea	Mark recapture	Taylor, unpubl. (1981)	2500
Soviet Union	Aerial Survey	Uspenski & Shilnikov (1969)	1800 - 3600

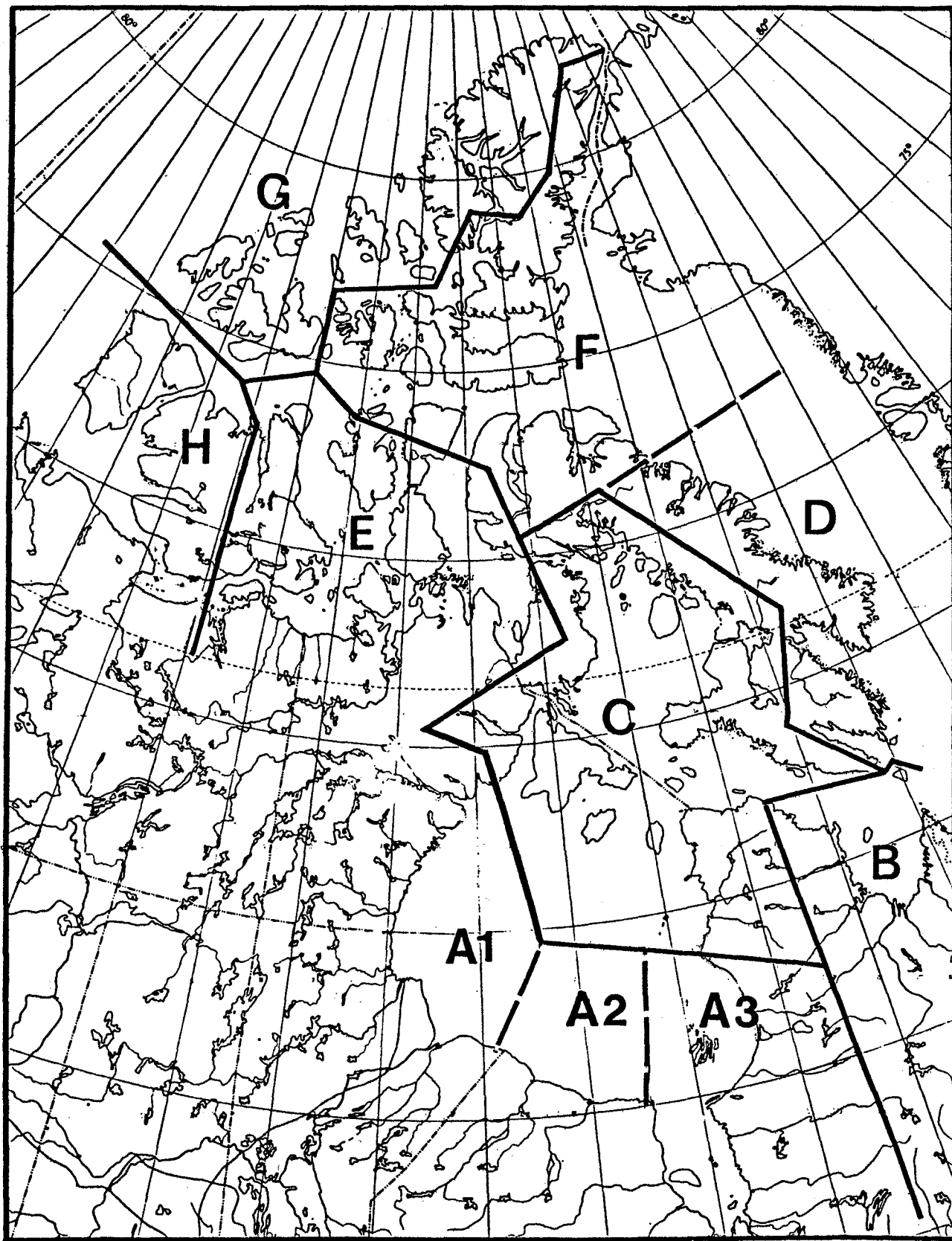


Fig. 1. Current polar bear management zones in Arctic Canada.

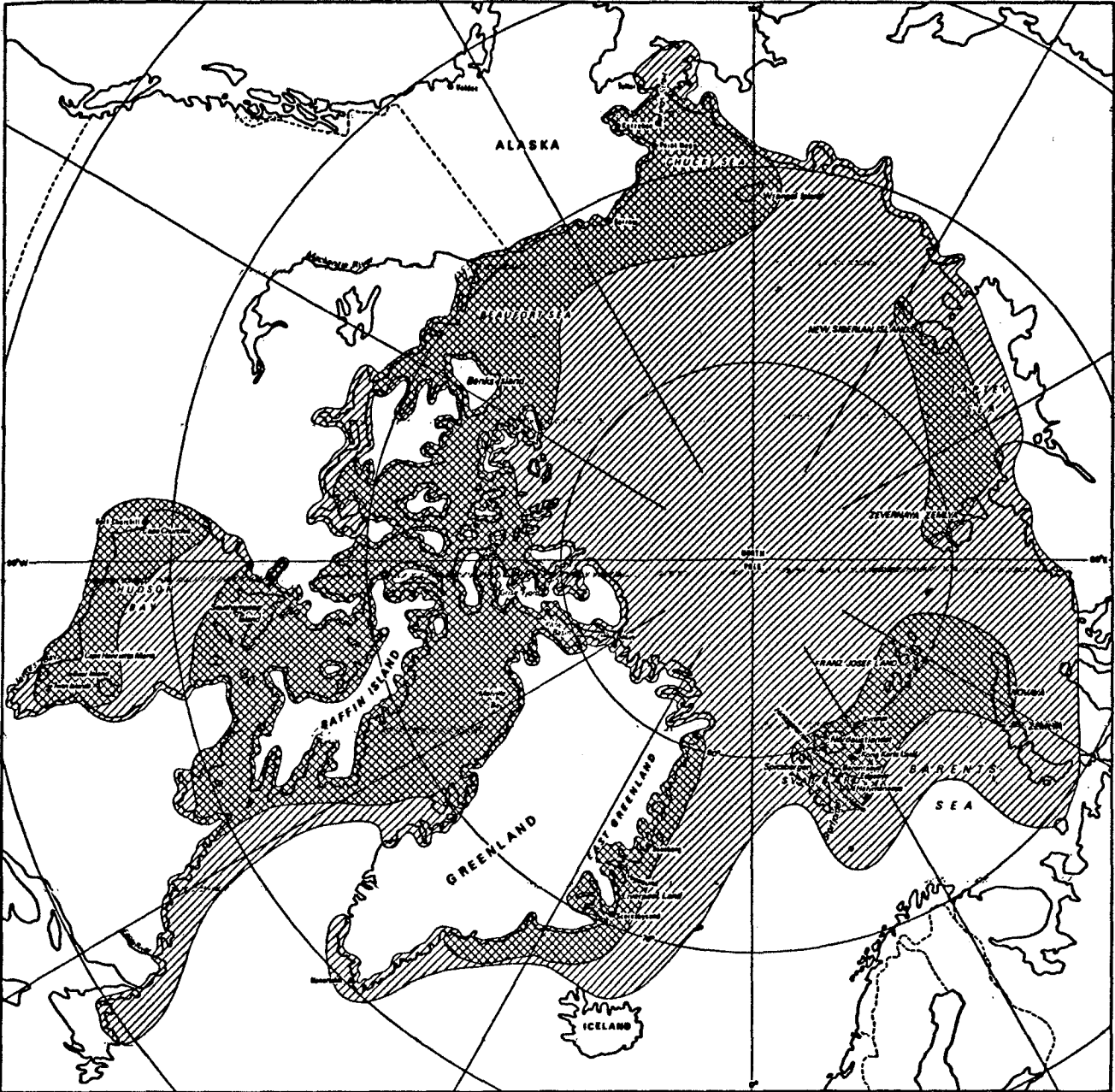


Fig. 2. The circumpolar area.

Polar Bear Specialists
Eight Meeting
Paper No. 1

MISCELLANEOUS INFORMATION RELATING TO POLAR BEARS IN GREENLAND

Submitted by: Christian Vibe

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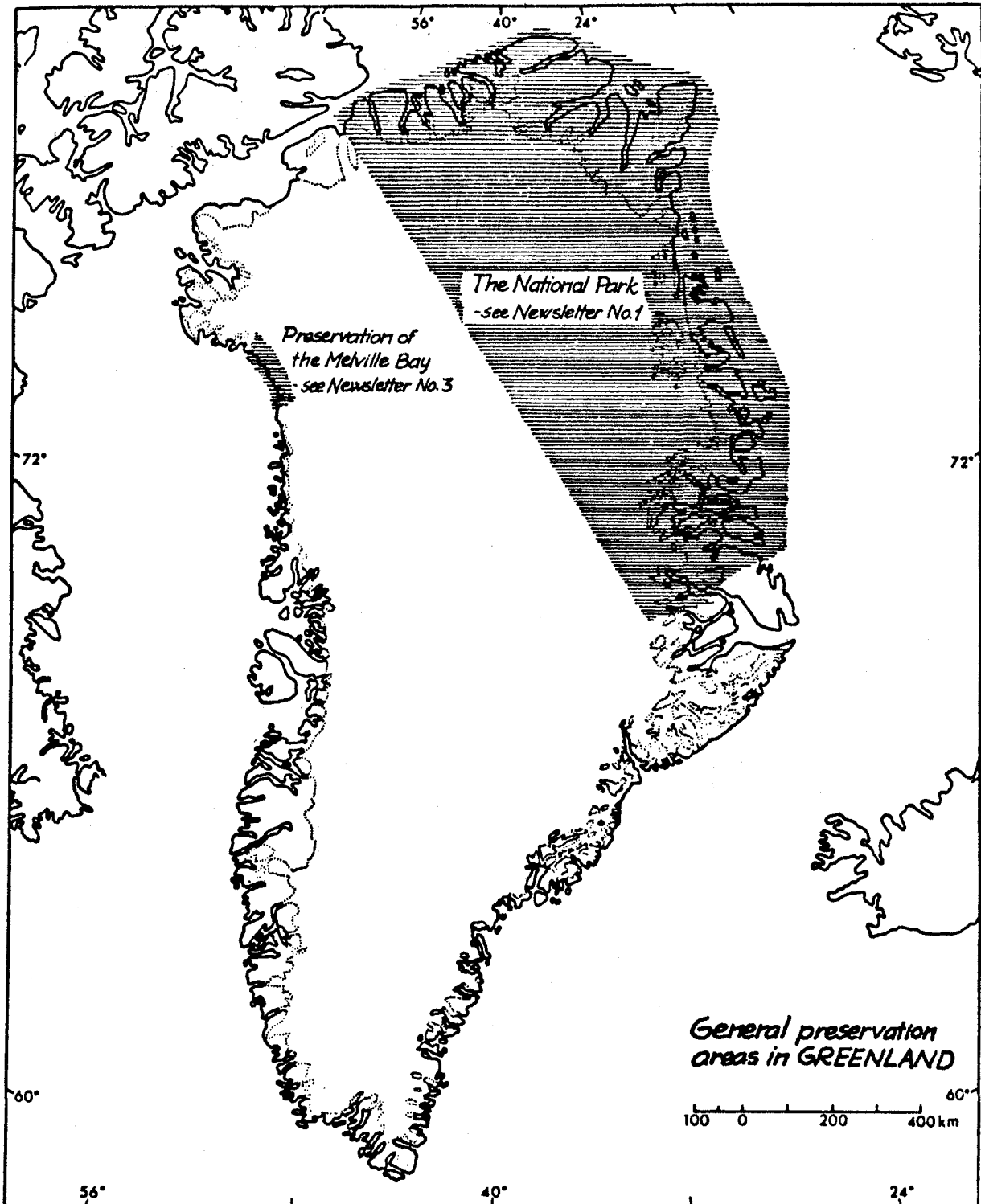
- Newsletter No. 3 extract: Preservation of the Melville Bay
- Map: Traveling bears in the Polar Sea near Greenland
- Polar Bear Hunting Statistics, Greenland
- Order No. 596, 5 December, 1979: Order on Preservation of Polar Bears in Greenland
- Executive Order, 25 June, 1976: On the National Park in Northern and Eastern Greenland.

Preservation of the Melville Bay

In NEWSLETTER No. 1 details were given about the largest national park in the world, the National Park in Northeast Greenland.

In June, 1980, another large area - albeit rather small in comparison with the National Park - has come under general preservation, i.e. the Melville Bay in Northwest Greenland.

For the guidance of our readers we publish in the following an unauthorized translation of the Rigsombudsmand's Order on Preservation of the Melville Bay.



Preservation of the Melville Bay

Order from the High Commissioner in Greenland (Rigsombudsmanden)

Pursuant to section 15 (1), cf. section 10, in Act No. 266 of 22th May 1974, the Greenland Preservation Act, I have decided to order the following preservation:

Section 1.

Melville Bay shall be preserved as a nature reserve.

Section 2.

The preserved area comprises the sea, islands, coastal regions, and the nunataks between Tugtulipaluk (Kap Lewis), 75°34' northern latitude, 58°23' western longitude, and Kap Melville (Navdlortup Nua), 76°03' northern latitude and 64°05' western longitude. The eastern and northern boundaries are constituted by the 1500 m contour line on the ice cap, beginning respectively due north-east and due north of the points mentioned. The southern boundary consists of a line between Kap Lewis and the southernmost point of the Sabine Islands (Satut). The western boundary consists of a line from the western point of the Sabine Islands to the western point of Thom Island (Qapiarfigssalik) and further to the western point of Bryan Island (Apusavik) and further to Kap Melville. Hereinafter, the boundary here described is called "Preservations Boundary I".

Section 3.

Subsection 1. In the nature reserve all sealing, whaling, fishing, hunting and shooting, collecting of bird's eggs, traffic and further flights at low heights (less than 500 m) are prohibited.

Subsection 2. The municipalities of Thule and Upernavik may permit the local sealers etc. to continue their traditional sealing etc. in defined boundary areas of the nature reserve. Such permissions (name and settlement of sealers etc.) shall be reported to the other municipality concerned and to the High Commissioner. The provisions laid down here shall be in force for a period of six years, after which time a continuation or amendment, if any, shall be taken up for discussion between the Thule and Upernavik municipalities.

Subsection 3. The area thus permitted to be used by the local sealers etc. for their activities is situated between Preservation Boundary I and Preservation Boundary II.

Subsection 4. Preservation Boundary II consists of a line which starts in the south where the reserve boundary intersects 59° western longitude, passing from there towards north west to the south-western coast of Store Welhaven Island (Nugssup K'ekertarssua), further towards north west to the southern point of Kloft Island (61° western longitude and 76° northern latitude), from there towards west to the southern point of Leven Island, further towards west to the eastern side of Store Skene Island, and from there in a straight line along the eastern side of Sundt Island to the 1500 m contour line on the ice cap.

Subsection 5. Inside Preservation Boundary II, the preservation is unconditional for everybody as provided in subsection 1. It is, however, permitted to track wounded polar bears inside Preservation Boundary II if it is verifiable that the wounding shot was fired outside the boundary mentioned.

Subsection 6. Any crossing of Preservation Boundary II during the tracking of polar bear shall immediately be reported to the police and the municipal council in the municipality at which the hunters arrive.

Section 4.

Subsection 1. Traditional sledge journeys between Upernavik and Thule municipalities shall be routed outside Preservation Boundary II. During the journeys, the necessary sealing is permitted.

Preservation of the Melville Bay (contd.)

Subsection 2. Sledge journeys of a sportmanlike or touristy character across Melville Bay can only be made with permission of the Ministry for Greenland. On such journeys, no hunting or shooting is permitted and, if possible, the route must be kept outside Preservation Boundary I. Any crossing of that boundary shall immediately be told the police in the municipality of arrival, and a report will be made.

Section 5.

All navigations in Melville Bay not comprised by section 3, subsection 2, shall take place outside Preservation Boundary I, and no landings are permitted in the preserved areas.

Section 6.

Subsection 1. The Minister for Greenland may permit scientific expeditions in the reserve. On such expeditions, shooting, hunting and the catching of animals and birds for any purpose than that of authorized banding and marking, the collection of eggs and environmental damage of a lasting character are prohibited. All equipment brought into the area shall be taken out again when the expedition has been concluded.

Subsection 2. In the same manner, the Minister for Greenland may grant exploration permissions and exclusive concessions within the preserved area and can, in this connection, grant the necessary exemptions, if any, from the above-mentioned provisions.

Subsection 3. Any permission and the relevant conditions in respect of any stay in the nature reserve shall be submitted for comments to the local councils of Thule and Upernavik.

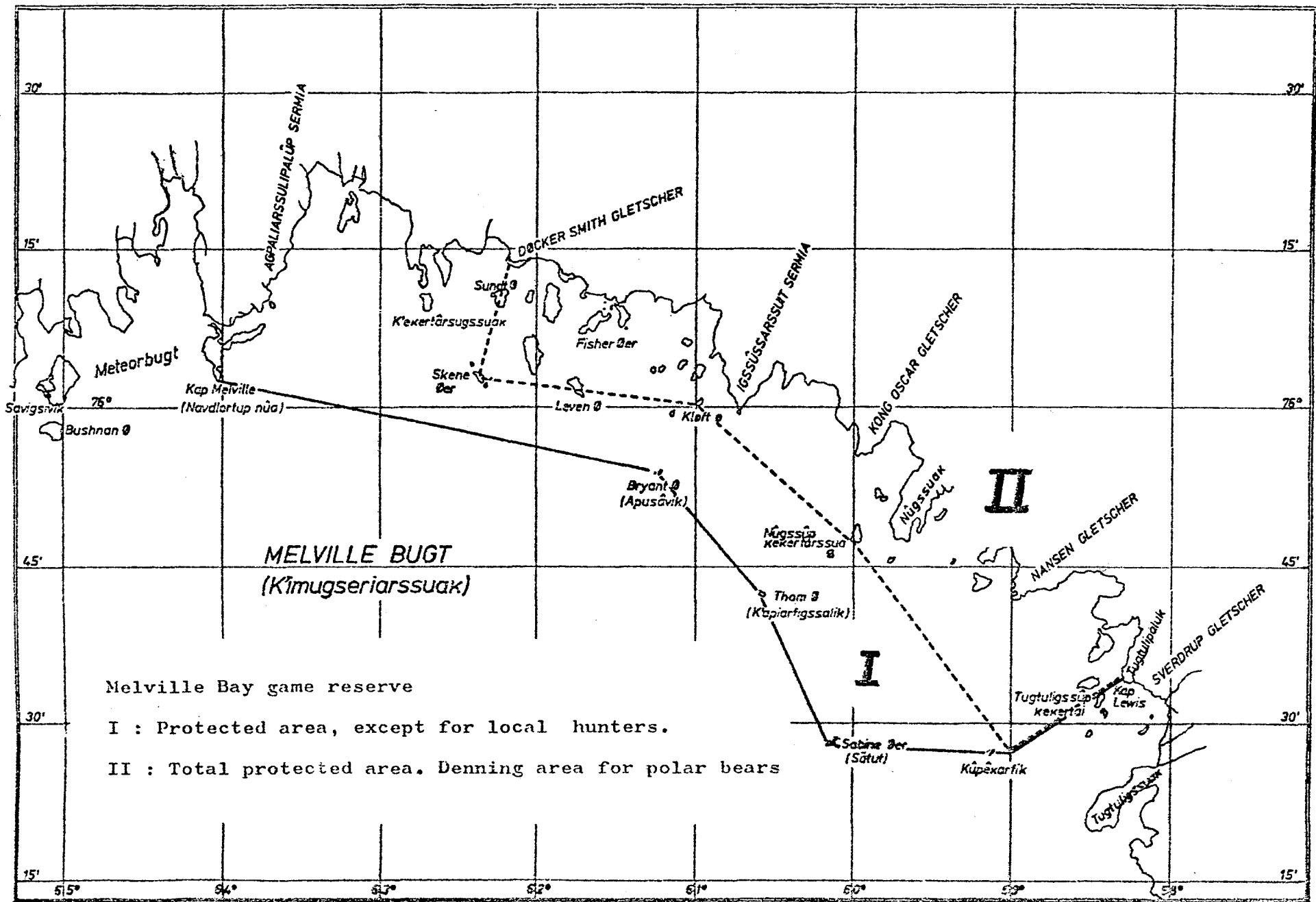
Section 7.

Any infringement of above-mentioned regulations may result in the levying of a fine. Further, any catch etc., the tackle used, and the means of transport may be confiscated under the provisions of the Criminal Law for Greenland.

THE HIGH COMMISSIONER IN GREENLAND

Godthåb, 27th June, 1980

(signed) T. Hede Pedersen.

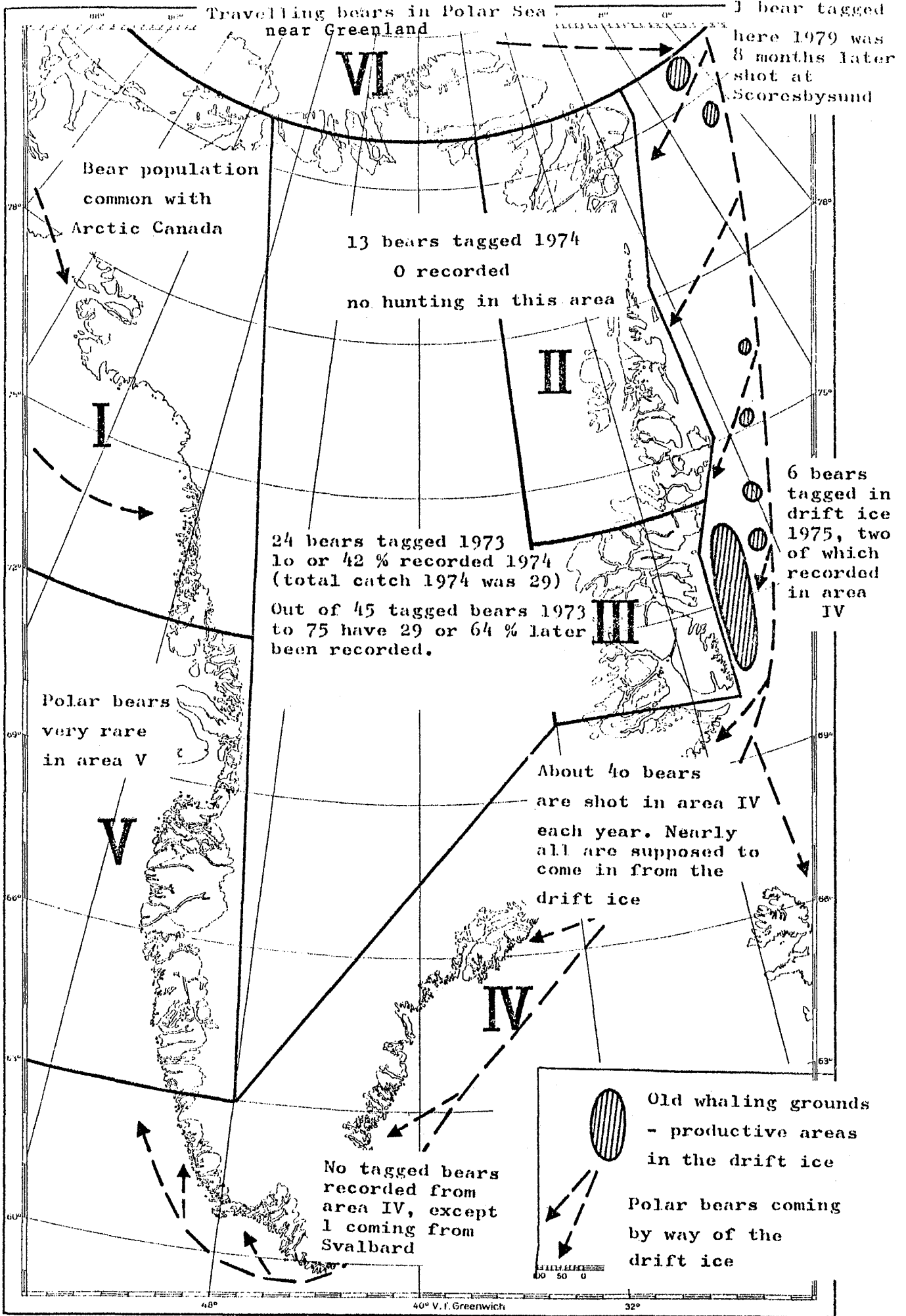


MELVILLE BUGT
(K'īmugseriarssuak)

Melville Bay game reserve

I : Protected area, except for local hunters.

II : Total protected area. Denning area for polar bears



Polar Bear Hunting Statistics, Greenland
(True figures are probably slightly higher)

	N.W. Green- land	S.W. Green- land	Ang- mags- salik	Sco- resby- sund	East Greenl. weather & police stations	Thule	Total for Greenl.	Average per Year
1955	6	2	31	21	20?	25?	105	:
1956	2	1	26	54	20?	25?	128	:
1957	4	1	42	23	20?	15?	110	:
1958	12	1	29	61	20?	25?	148	:
1959	5	17	86	18	20?	25?	171	:
1960	7	8	28	23	20?	35?	121	:
1961	9	4	25	19	20?	35?	112	: 129
1962	14	0	8	15	20?	30?	87	:
1963	8	2	21	15	20?	40?	106	:
1964	2	4	27	15	20?	40?	108	:
1965	4	8	55	35	20?	60??	182	:
1966	6	2	45	25	20?	18	116	:
1967	1	5	70	31	20?	23	150	:
1968	2	9	52	62	20?	15?	160	:
<hr/>								
1969	3	12	56	31	20?	20?	142	:
1970	4	16	44	45	20?	15?	144	:
1971	3	11	40	39	15?	15?	123	:
1972	1	13	47	69	20?	20?	170	:
1973	3	1	37	40	15?	15?	111	:
1974	2	11	53	36	15?	20?	137	: 115
1975	4	1	30	26	0	15	76	:
1976	14	2	34	64	0	20?	134	:
1977	5	1	36	40	1	15?	97	:
1978	17	1	28	22	1	20?	89	:
1979	10	0	5	12	1	15?	43	:

It has been impossible to get exact figures from Thule. The hunters here use to hunt only to supply themselves with skins for trousers. When they have got, what they need, they use to stop hunting.

At the weather and police stations polar bear hunting is now prohibited, except in self-defence.

Order on Preservation of Polar Bears in Greenland

In pursuance of § 4, subsection 1, of Act No. 413 of June 13, 1973 for Greenland concerning professional fishing, sealing and hunting, the following provisions have been laid down:

§ 1. Hunting of the polar bear (*Ursus maritimus*) must only be undertaken by persons permanently residing in Greenland who are closely attached to the Greenland community and who are in possession of a licence issued by the local council in the district in which they live, permitting sealing and hunting as their chief or incidental occupation.

Subsection 2. Polar bear hunting must, however, not be undertaken by any person who is conveyed by, or is acting as paid attendant of, persons not fulfilling the conditions mentioned in subsection 1 above.

§ 2. Polar bear cubs up to 1 years of age and she-bears with such cubs are preserved the whole year round.

Subsection 2. Other polar bears are preserved from July 1 till August 31.

§ 3. Aeroplanes, helicopters, and motor-driven means of transport on the ground, including snow-scooters, must not be used for hunting polar bears or for transportation to, and from, the hunting ground.

Subsection 2. The use of poison, foot-traps, snares or spring guns is prohibited.

§ 4. It is prohibited to keep polar bears in captivity or to export polar bears from Greenland without permission from the Minister for Greenland.

§ 5. It is prohibited to buy, or accept, meat and skins and other parts of polar bears illegally killed.

§ 6. Any person violating the above-mentioned provisions may be liable to a fine and, further, the meat, skin, and other parts of any polar bears illegally killed or bought will be confiscated. In case of any violation of the provisions contained in § 3, the means of transportation and the implements illegally used may be confiscated.

Subsection 2. In case of violations of the provisions contained in §§ 1-3, not only the individual hunter shall be held responsible but also the owner of the boat, sledge or other equipment that has been used for hunting provided that he has taken part in the hunting expedition or he has been aware of the intention to use the equipment in question for such illegal hunting.

§ 7. For scientific or other purposes, the Minister for Greenland may grant exemption from the provisions contained in this Order.

§ 8. This Order will become effective on January 1, 1975.

Subsection 2. As of the same date, § 8 and § 16, subsection 2, of Order No. 218 of July 31, 1956 concerning game preservation in North-eastern Greenland are repealed. ¹⁾

The Ministry for Greenland,
December 5, 1974.

Holger Hansen/

K. Budde Lund

1) Promulgation Order concerning Greenland, main section 16, group 13, serial No. 10.

Executive Order on the National Park in Northern
and Eastern Greenland

In pursuance of § 20(2) of Act No. 266 of 25th May, 1974, The Conservation (Nature and Ancient Relics) Act for Greenland, the following rules and regulations are hereby laid down:

Part I

General Rules

§ 1. The National Park has been established for the purpose of preserving the natural state of the territory, securing at the same time the possibility of scientific research and admission for the general public. Endeavours shall be made to secure the best possible protection of landscape, flora, fauna, and ancient relics.

Part II

Regulations governing public access to the National Park etc.

§ 2. Mammals and birds, their lairs and nests must not be disturbed and eggs must not be removed. New species, including domestic animals, must not be introduced.

Subsection 2. The Ministry for Greenland may grant permission to mark birds and mammals.

§ 3. Without a view to reselling, visitors are permitted to collect plants, pick berries, and gather insects and other lower animals and minerals. Plants with roots must not be removed without special permission from the Ministry for Greenland. New species must not be introduced.

§ 4. Angling with rod or jig is permitted. The catching of fish by the use of any other gear and methods is prohibited

§ 5. Driftwood and other earth-found material deriving from plants or animals, including crania and skeletal parts, must not be removed from the finding places without special permission from the Ministry for Greenland.

M.f.G.j.nr. 1780-06.

§ 6. Shotguns, saloon rifles, spring guns, and traps of any description must not be taken into, and not be found in, the National Park. Other arms, including rifles with telescopic sight, can only be taken in or possessed if permission from the chief of police is obtained in each individual case.

The provision contained in the second period above shall not apply to persons carrying on a traditional trade, cf. § 15.

§ 7. Outside the established stations, motor-driven vehicles, including snow scooters, must only be used on ice or firm snow.

Part III

Regulations on protection of fresh-water resources

§ 8. The course of the streams must not be shifted.

Subsection 2. Lakes and ponds or parts thereof must not be filled up. Shores and banks must not be damaged, and the water level must not be altered:

Subsection 3. Waste products and poisonous substances of any kind must not be led into fresh-water lakes and rivers etc.

Part IV

Regulations on archaeological localities and finds

§ 9. Ancient relics and finds of historical or culture-historical interest are protected under Part I of the Conservation (Nature and Ancient Relics) Act for Greenland. Further, the following special rules shall apply in the National Park:

- a. In the National Park the protection shall comprise cairns and inscriptions on cairns irrespective of their age.
- b. In situ relics and the surrounding ground, cf. § 1(2) of the Act, within a distance of 100 metres from such relics, must not be interfered with. Any activity on the areas thus delimited, such as removal of stones, the landing of aeroplanes, and the collecting of objects, such as antiquities, bones and wood, is prohibited. This provision shall, however, not apply to the surroundings of the cairns mentioned under a.

- c. As further examples of in situ relics, cf. § 1 (1) of the Act may be mentioned ruins of dwellings visible as stone and peat houses or preserved as stone rings, banks of gravel, slabs of stone, isolated hearths, and storerooms and stone pavings of all kinds.

Part V

Various Regulations

§ 10. It is forbidden to leave behind any refuse or waste products on land, in lakes, in the sea or on ice on lakes, on the sea, or on glaciers. Refuse or waste products shall be brought back to the regular stations or ships with a view to destruction or re-exportation thereof.

Subsection 2. No camp must be pitched on the natural breeding, feeding or resting places or migratory routes of any animals.

Subsection 3. Animals must not be disturbed or teased. If an animal is killed on the plea of self-defence, its skin and skull shall be carefully dressed and be sent to the Ministry for Greenland together with a report on the event, such report to be referred to the chief of police for evaluation. The value of the skin shall go to the Greenland provincial treasury.

§ 11. Aircraft flights over land and sea ice at a height of less than 500 metres shall be subject to prior permission from the Ministry for Greenland. Any landing of aircraft, disembarkation from vessels, and dropping of supplies are forbidden without permission from the Ministry for Greenland.

§ 12. New stations and huts or other structures must not be established without permission from the Ministry for Greenland.

Part VI

Access and Control Measures

- § 13. The National Park shall be accessible to
- a. Residents of the municipalities of Thule and Scoresbysund who are, at the same time, closely connected with the Greenland society;

- b. persons executing inspection and other tasks for the public authorities, and
- c. persons employed in station areas.

Subsection 2. For all other persons than those mentioned in subsection 1, a-c, permission from the Ministry for Greenland is required, cf. §§ 15 and 17.

§ 14. The persons mentioned in § 13 (1a) shall have the right to carry on a traditional trade within the boundaries of the National Park provided that they are able to prove that hunting and fishing constitute their principal trade or the source of extra income for them. Certificates constituting such proof are issued by the council of the municipality where they reside.

Subsection 2. Traditional trade shall mean hunting and shooting on the sea ice and at sea, dog sledges, kayaks, and motor boats being used; such hunting trips must start from, and return to, the municipality where the hunters live. No such hunter must take up permanent residence in the said area or seek support from regular stations or expeditions, and he must not be a salaried attendant to, or be transported by, any person not fulfilling the conditions mentioned in § 13(1a).

§ 15. Any application for admission to the National Park under § 13(2) shall contain information about the purpose and area of operations, a list of the participants, the contemplated duration of the stay, and such other information as the Ministry for Greenland may see fit to require.

Besides, the provisions contained in §§ 2 and 4, subsections 1-4 and 6, of the Executive Order of 22nd February, 1967, issued by the Ministry for Greenland concerning travels to, and in, Greenland shall apply.

§ 16. The National Park shall be administered by the Ministry for Greenland in co-operation with a comprehensive Nature Conservancy Council for Greenland.

§ 17. In respect of activities under prospecting licences, exploration and exploitation concessions for mineral resources, the Ministry for Greenland will, after having heard the opinion of the Nature Conservancy Council mentioned in § 16, work out special regulations relative to the individual licences or concessions. In the same manner, regulations are worked out in respect of The Geological Survey of Greenland and any other scientific activities approved by the Ministry to take place in the National Park.

§ 18. The Ministry for Greenland will work out detailed regulations governing the inspection and control service in the National Park and the operation of station areas.

§ 19. Any infringement of the provisions contained in this Executive Order may involve a caution or a fine.

Part VII

Coming into Force

§ 20. This Executive Order shall come into force on 1st August, 1976.

THE MINISTRY FOR GREENLAND,

25th June, 1976.

Jørgen Peder Hansen

/ Jørgen Reventlow

AGE DETERMINATION IN POLAR BEARS CAPTURED
AND MARKED IN NORTH EAST GREENLAND 1973-75

by Helen Grue

INTRODUCTION

With the aim of assessing age by means of cementum incremental lines, a first premolar tooth was extracted in 45 subadult and adult polar bears captured and marked in North East Greenland 1973-75 on three Danish polar bear expeditions, lead by Dr. Christian Vibe with participation of the veterinaries Bjarne Clausen, Erik Eriksen and Lehn Jensen.

When recaptured by the marking team in 1975, 2 males and 1 female marked in 1973, had one more tooth extracted. Based on the teeth from these 3 animals it was possible to confirm that cementum incremental lines are produced annually in polar bears in Greenland.

Preparation of tooth sections from bears captured in 1973 and 1974 was carried out at the Norwegian Polar Research Institute, Oslo, and of teeth collected in 1975 at the Institute of Comparative Anatomy, Copenhagen, where all the sections were examined and interpreted. Slightly different preparation techniques have been used, but all teeth have been decalcified, cut longitudinally, and sections have been stained and mounted according to standard histological methods. The method used in Copenhagen is described by Grue & Jensen (1973).

RESULTS

Due to frequent appearance of accessory lines it was necessary to compare several sections from each tooth before the number of primary lines could be

assessed. Teeth of 5 animals were rejected for age determination, 3 because the tip of the tooth was missing, and 2 because the cementum layer had been damaged.

In the three animals where teeth were extracted twice, with a two year interval, the last extracted tooth showed two primary lines more than the first one (7, 6, 6 and 5, 4, 4, respectively). This indicates the existence of a synchrony between cementum deposition and seasons of the year, basically resulting in one primary line per year.

For correct age determination, knowledge of the time of year when primary lines are formed, is an important prerequisite. Even though lack of material from the major part of the year prevented an exact assessment of the period, the available material collected in April, May and August indicates that spring and summer are the seasons when primary lines are formed in polar bears in North East Greenland. Further, with January 1st as designated date of birth, it was assessed that the first primary line will appear when the bear is approximately 15-19 months old. Based on this information the age in years of the 40 polar bears was determined and the result is listed in Table 1. Compared with the cementum pattern in 50 other species of wildliving mammals, the pattern in the polar bear is judged to be the most difficult to interpret (Grue & Jensen 1979). This is not restricted to polar bears from North East Greenland but includes also bears from Svalbard and is mainly due to occurrence of numerous accessory lines.

Accessory lines occurring in such large numbers was not observed in any other of the investigated wildliving mammals from the palearctic region. It was, however, in some cases found that the cementum pattern may vary intraspecifically. Thus it would be of interest to establish whether frequent appearance of accessory lines is restricted to polar bears in N.E. Greenland

and Svalbard which might be related to external conditions specific for the two areas or whether this pattern is specific for the species as such.

Cementum structures are also used for age determination in polar bears in Canada (Stirling et al. 1975 and 1977), but no information on readability or occurrence of accessory lines have been given.

Table 1

Age distribution of 40 polar bears captured and
marked in North East Greenland 1973-75

<u>Age In Years</u>	<u>Number of Animals</u>			<u>Number of Animals</u>			<u>Total</u>		
	1973	1974	1975	1973	1974	1975	Total		
2-3	1	1	1			1	3	1	4
3-4			2	1			2	1	3
4-5					2	1		3	3
5-6	2*	2		2*	2		4	4	8
6-7	3*	1	1	2	2	1	5	5	10
7-8			1*		3	1*	1	4	5
8-9			1*				1		1
9-10		1		1		1	1	2	3
10-11				1	1			2	2
11-12	1			1			1	1	2
12-13		1					1		1
13-14		1					1		1
Total	7	7	6	8	10	5	20	23	43*

Notes: * and * age of one of these animals was also determined by means of a tooth extracted in 1975

* including 2 teeth from each of the three animals indicated by dots

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- Stirling, I., D. Andriashek, P. Latour & W. Calvert 1975. The Distribution and Abundance of Polar Bears in the Eastern Beaufort Sea. Beaufort Sea Technical Report No. 2.
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Polar Bear Specialists
Eighth Meeting
Paper No. 3
(Abstract only)

DISTRIBUTION, NUMBERS AND POPULATION CHARACTERISTICS
OF POLAR BEARS IN SVALBARD

by

Thor Larsen, Norsk Polarinstitut, Oslo, Norway

(Complete Paper submitted to
Journal of Wildlife Management)

Abstract

Revised population estimates of polar bears (*Ursus maritimus*) based on ship surveys, Lincoln index estimates and multiple mark and recapture estimates show that the polar bear population in the Svalbard area probably declined to around 1000 animals around 1970. The 1969/70 catch removed 515 animals from the population. Ship surveys in 1980 indicate an increase in the population after 10 years total protection. Summer and winter observations in the Svalbard area shows that average litter size drop from 1.72 in early spring, to 1.51 in summer, to 1.34 in yearlings, where it remains stable (1.33 in two year olds). More than 50% of the females loose their litter during the cubs first year of life. Relative density figures show that bears are almost five times more abundant south of 80° north latitude than further north in summer. As the ice retreats north, available habitat will decrease, as reflected in the density figure of 4.6 bears per 100 sq. km. as observed along the ice edge during YMER 80. The summer population of bears in the Svalbard area and in the ice between Svalbard and Frans Josef Land was estimated to appozimately 2000 bears in 1980. An estimated population of 1000 to 2000 bears could not have survived an annual average take of more than 300 bears. This study confirms Russian observations that Svalbard, Frans Josef Land and Novaya Zemlya and adjacent ice covered areas is the range of one common population.

Polar Bear Specialists
Eighth Meeting
Paper No. 4
(Abstract only)

DENNING HABITS OF POLAR BEARS IN THE SVALBARD AREA

by

Thor Larsen, Norsk Polarinstitutt, Oslo, Norway

(Complete Paper submitted to
Journal of Wildlife Management)

DENNING HABITS OF POLAR BEARS IN THE SVALBARD AREA

Abstract

After the polar bear (*Ursus maritimus*) was partially protected in Svalbard in 1970, and all hunt prohibited in 1973, efforts have been made to monitor the bear population through den counts in key areas. Den surveys in 1972 and other information show that probably 90% of the polar bear maternity dens can be found on Kong Karls Land and on Nord-austlandet. Kong Karls Land is by far the most important denning area. Between 120 and 135 polar bear dens can be found in Svalbard each year, of which 80 to 85 on Kong Karls Land. There the average den density per square km suitable denning area increased from 0.4 in 1972 to 0.9 in 1980. In the Bogen area on Kongsøya there were 12.5 dens per square km in 1979. Assuming that females with small cubs form 13.4% of the population in the summer, the denning females are recruited from an adult/juvenile bear population of 896 to 1007 bears. 78 to 88 cubs enter the population when they are in their third year of life. The previous annual average take of more than 300 bears could not have been sustained unless there was a significant immigration of bears from outside areas.

SATELLITE RADIO-TRACKING OF POLAR BEARS BETWEEN SVALBARD AND GREENLAND

by

Thor LARSEN 1)
Charles JONKEL 2)
Christian VIBE 3)

Abstract

Some scientists have regarded the Arctic Ocean and the Greenland Sea as barriers which prevent a significant migration of polar bears (Ursus maritimus) between Svalbard and Greenland. Others have claimed that bears from the Eurasian Basin drift with the ice south along the East Greenland coast. A pilot aerial survey program in 1977 revealed that polar bear tracks were rather abundant from Svalbard to Northeast Greenland south of 81° north latitude; the same general track distribution was observed in spring 1979. Between late April and early May, 4 polar bears were instrumented with satellite radio-collars, in the drift ice between 81° north latitude and 84° north latitude, and 0° west longitude and 7° west longitude. After one month, two bears had moved eastwards to Svalbard and Frans Josef Land. One remained in the same general area, and one moved south. In periods, some of the instrumented bears must have moved more than 40 km per day. Compared with ice draft data from the same area, there must be a strong element of active migration in the bears movements, often against the general ice drift current. There is probably a closer connection between the polar bears from Svalbard and East Greenland than previously assumed.

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BEHAVIOR OF POLAR BEARS WITH CUBS OF THE YEAR IN THE DENNING AREA

by

Jørn Thomassen 1)

Rasmus Hansson 2)

Abstract

Basic behavioral studies were made on female polar bears (Ursus maritimus) with cubs of the year in the denning area on Kongsøya, Svalbard during spring 1978 and 1979. The animals were observed in the time from maternity den breaking till the groups leave the area in mean 14 days later. The observation range was 200-1300 m. Approx. 3500 female bear hours and 6100 cub bear hours were recorded on 25 groups during the two years of study. Average litter size in the denning area was 1.96. Information was mainly collected on record sheets, by continuous descriptions on tape, photography and filming. The information obtained are primarily used for the quantification of data and analysis of activity patterns, while record sheets together with other data sources provide the basis for the descriptive part. Apparently the bears held no home range, but they seemed to be out of dens alternatively. No aggressive confrontations were observed, and also no sign of dominance were recorded. One or both animals would withdraw when catching sight of the other. Further nothing seemed to prevent groups from entering and staying in dens recently left by other groups. The main activity of the females in the den area was searchwalking around with the cubs in order to find food. The females were not observed eating anything but grass, mosses and faeces. The activities of the cubs consisted mainly of a combination of various types of plays, and this developed from small investigation activity close to the female, to wild fighting in a distance of approx. 100 m at the end of the period. The cubs suckled one to several times per day. In spite of the difficulties in distinguishing the cubs from another in a litter, there have been no observations indicating one cub dominating the other in this life stage.

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RESEARCH ON POLAR BEARS IN CANADA 1978-80

Ian Stirling¹, R.E. Schweinsburg², G.B. Kolenosky³,
I. Juniper⁴, R.J. Robertson⁵, S. Luttich⁶, and W. Calvert

INTRODUCTION

Most polar bear research in Canada continues to be carried out by federal, provincial, and territorial governments. This situation has arisen largely because of the cost involved, but also because of the management responsibilities of those governments. Some research, such as the physiological studies at Churchill, is carried out by universities with private funding. Such projects are coordinated with government research through bilateral discussions and the Federal-Provincial Polar Bear Technical Committee, but are not included in this report.

A wide variety of both coordinated and independent research projects, several of which are continuing, were conducted during 1978-80. This report summarizes the cooperative studies, and the studies conducted by individual jurisdictions, and lists reports completed between 1978 and 1980.

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COOPERATIVE STUDIES

Computer data base management and modelling

Data continue to be entered into the computer as they are collected, edited, and corrected. Data for Zones A (Hudson Bay), B, C, and D (Foxe Basin, Labrador and south Baffin) and H (Western Arctic) have been fairly well cleaned. Complete bound books enclosing the computer printout for these zones have been sent to Game Officers and Superintendents in the regions and to the head office in Yellowknife. Editing of the data for Zones E and F (Central and High Arctic) continues. Report Generator and SPSS packages are being used to produce tables for reports. Data entry, editing and formatting programs have been written. Further work is planned on programs to produce frequently used tables and calculations and to aid in plotting locations on maps.

A modelling workshop was held in January 1980 at the University of British Columbia, with a follow-up meeting in Yellowknife in June 1980. Using models of both the Western Arctic and High Arctic populations, the populations were stressed with a heavy harvest to examine the possibility of using sex ratio and age distribution as indicators of overharvest. In the initial trials, neither parameter was sensitive, apparently because the population seemed to respond to the harvest evenly over all sex and age classes. The effects of protecting pregnant females and family groups, and of fluctuating food supplies were also studied.

Research on new immobilizing drugs

Since Sernylan (phencyclidine HCl) became unavailable, ketamine and Rompun (xylazine) have been used in combination. Some difficulties

were encountered when high doses were needed for large bears. Freeze-dried powders of both drugs are now available, allowing high concentrations to be used.

The NWTWS, with Dr. J.C. Haigh (University of Saskatchewan) have been experimenting with ketamine, Rompun, and carfentanil in various combinations.

Effects of oil on thermal regulation of polar bears

In the event of a major oil spill, we must assume polar bears will contact oil. We need to know how that contact will harm bears in order to develop contingency plans to save oiled bears or to make decisions on the cost of deploying contingency safeguards in relation to their expected value to polar bear populations. Oil could affect polar bears by fouling the fur, thus affecting thermoregulation through loss of insulation, and by causing internal toxic effects after absorption through the skin or ingestion. Studies were designed to give us a basic understanding of whether, and to some extent how, oil affects polar bears.

The Department of Indian and Northern Affairs contracted Dr. Nils Øritsland (University of Oslo) to conduct physiological research on bears, including the bears' ability to regulate body temperature after the hair is fouled with oil. The original proposal was modified so that the bears were oiled by swimming in tanks of seawater with oil on the surface, rather than by spraying with oil, and the best methods of cleaning the bears were also studied. Urine, fecal and blood samples were taken throughout, and the heart rate was monitored. All research was conducted in accordance with the guidelines of the Canada Council for Animal Care.

A report on these studies is being prepared by Drs. E. Broughton and R. Englehardt. When this report is available, it will be submitted to the Polar Bear Technical Committee as a basis for development of a contingency plan in the event of an arctic oil spill. Two questions remain unanswered by these studies: we do not know whether wild polar bears will enter water covered with oil or eat oiled food items.

SINGLE AGENCY RESEARCH

Canadian Wildlife Service (CWS)

Behavioral and ecological interrelationships of polar bears

Research at Cape Churchill, Manitoba, on activity budgets and ritualized interactions between polar bears forced to spend the summer and fall on land has been completed as part of an M.Sc. thesis by Paul Latour. The results of the research have been reported in two papers (Latour 1981a and b).

Behavior observations in the High Arctic continued at a low level in 1980, after being suspended in 1979. The data on habitat utilization, hunting efficiency, effect of harassment, man/bear conflicts, movements, and time budgets have facilitated a deeper understanding of the management and impact assessment studies. Data are also collected and collated in other projects on the influence on polar bears of seasonal and annual changes in ice conditions, seal distribution and abundance.

In spring 1980, research continued on the ecological interrelationships of polar bears in the High Arctic. A preliminary paper on the biological importance of polynyas was published (Stirling,

1980) and new field work and data collection on polar bears and seals around polynya areas was conducted out of Resolute, but no analyses of these data have yet been done. An aerial survey of seals hauled out on the ice in polynya and non-polynya areas in the High Arctic was conducted in June-July 1980 and the report will be completed in January 1981. This survey is expected to be repeated in 1981.

An overview of available biological data on polynyas is scheduled for publication as a CWS Occasional Paper in 1981. Chapters on the following subject areas are planned:

- geographical aspects, location, annual variability, etc. by M. Smith and B. Rigby, Geography Department, Carleton University;
- biological and physical oceanography by M. Dunbar, McGill University;
- polar bears and marine mammals by I. Stirling, H. Cleator and T. Smith, CWS, Edmonton and Arctic Biological Station;
- sea birds by D.N. Nettleship and R.G.B. Brown, CWS, Dartmouth;
- sea ducks by R. Prach and H. Boyd, CWS, Edmonton and Ottawa;
- editing by I. Stirling and H. Cleator, CWS, Edmonton.

Polar bear ecology in the eastern Beaufort Sea

Monitoring of the Western Arctic polar bear population continued in 1978 and 1979. Both polar bear and seal populations appear to have recovered from the marked decline in 1974-1975 (Stirling et al. 1979, 1980). A critical point is that numbers of both groups of animals are increasing faster than would be possible from reproduction alone. This indicates that large-scale movements of some portions of the bear and seal populations may be occurring in compensation for earlier losses. Clarification of this aspect is vital to our assessment of recovery

times, etc. of bear and seal populations as the result of a possible oil well blowout. Unpublished data from colleagues in Alaska appears to confirm what we have found in the Beaufort Sea. A report on seal distribution and numbers is expected to be completed in 1981.

Southern Baffin Island, northern Quebec, and northern Labrador

This research has now been completed. An interim report (Stirling et al. 1979) on the whole area, and final reports on northern Labrador (Stirling and Kiliaan 1980) and southeastern Baffin (Stirling et al. 1980) have been completed. The following summary is based on the abstracts of those reports.

During spring 1976-79, 37 polar bears were captured and individually tagged in northern Labrador. Most were found along the interface between the coastal landfast ice and the drifting pack ice, especially around the mouths of bays. The mark and recapture data indicated a low population (60-90 bears) in the area. Fifty to 80% fewer polar bears and tracks were seen per 100 km of potential habitat surveyed than were recorded in other areas of the Arctic. This also indicates a smaller population.

At least some of the polar bears present on the Labrador coast in the spring travel great distances at other times of the year. Journeys were recorded between northern Labrador and both southeastern Baffin Island and northern Hudson Bay. These movements may be seasonal in nature and influenced by sea currents which carry the pack ice on which polar bears sometimes hunt. The number of polar bears that spend the whole year in northern Labrador is unknown.

No evidence of maternity denning was found and the reproductive rates of females captured in northern Labrador were lower than in other areas of the Arctic.

The polar bears in northern Labrador are on the southern edge of their range. Consequently, small environmental changes may have a greater effect on the distribution, numbers, and reproductive parameters there than in other areas of the Arctic. The polar bears found in Labrador are part of a population that is shared with and harvested by Inuit from both the NWT and Quebec. In addition, offshore drilling, with its attendant potential for environmental damage, is now taking place and more activity is projected in Davis Strait and the Labrador Sea. Evolving management practices will have to accommodate all these factors.

During 1974-79, 231 polar bears were captured and tagged in the area of southeastern Baffin Island. Subsequently, 41 recaptures were made of 36 bears. An additional 13 tagged bears were reported killed by Inuk hunters. In general, densities of polar bears and their tracks sighted for each 100 km of sea ice habitat were higher than had been recorded in other areas of the Arctic. However, that appeared to reflect a lesser amount of preferred habitat rather than a greater number of bears. Polar bears in that area travel onto the land much more during late winter and early spring than they do in other areas of the Arctic.

Polar bears along the southeastern coast of Baffin Island show a high degree of fidelity to their winter and spring feeding areas. In only 23% (8/35) of the independent movements recorded did bears move between the two main population centres on the Cumberland and Hall peninsulas. The data suggested that, within the study area, some bears moved south with the ice during winter and then north in spring. The extent to which polar bears within the study area utilize the offshore pack ice remains unknown.

The most important maternity denning areas, in descending order of importance, were around the seaward tips of the Cumberland, Hall, and Meta Incognita peninsulas. The mean litter size recorded during this study was 1.82 ± 0.079 and most females mated for the first time at four years of age. The mean breeding interval, calculated from six females with known minimum intervals between litters, was 3.5 years.

Sex-specific mortality rates calculated from samples over several different ranges of ages were in excess of 20%. These may be too high because of unknown biases in the data but they are still greater than the 12-14% range calculated from polar bear populations in the Western, Central, and High Arctic areas.

Based on mark and recapture data, the population of polar bears in southeastern Baffin Island was estimated to be 700-900. The estimates of population size and age-specific reproductive parameters indicate that 75-90 cubs are born each spring.

Reproductive biology of female polar bears in western Hudson Bay

Throughout the Arctic, extensive exploration and development activities are either underway or expected to begin in the foreseeable future. Many of these projects involve the potential for extensive disturbance of maternity denning areas of polar bears as a result of such activities as pipeline construction, road building, and the establishment of logistic support installations.

In most areas of the Arctic in which polar bears have been studied, the geographic scale and logistic costs have been too large to facilitate studying the fidelity of female polar bears to their maternity denning areas. Consequently, we have had no factual data base from which to

argue that greater consideration and protection should be given to maternity denning areas.

For three consecutive spring seasons, starting in 1980, a large sample of adult female polar bears will be captured and tagged with their newborn cubs as they are leaving the denning area south of Churchill. Twenty-one family groups of polar bears were tagged in the maternity denning area in March 1980. Measurements are taken and specimens collected for age determination. If a large enough sample is captured each year, we should be able to clearly determine the following parameters:

- fidelity to the denning area and possibly to specific areas within it;
- whether the normal reproductive cycle of females is 2 or 3 years long;
- age of first reproduction; and
- longevity of females.

In order to make recommendations on safe levels at which polar bears populations can sustain continued harvesting by Inuit hunters, accurate data are required on the age at which females first reproduce and on their litter size, breeding interval, and longevity. Population models are now being developed in which these data can be utilized to the maximum benefit of the species. In most areas of the Northwest Territories, the Inuk Hunters and Trappers Associations understood and accepted the changes recommended from modelling done to date. However, on the Keewatin coast of northwestern Hudson Bay, and on Southampton Island, most polar bear hunting had traditionally taken place during the fall when the bears were on the land. Inuit of the Keewatin settlements from Eskimo Point north to Repulse Bay argue that the female polar bears they kill along the coast are not pregnant. They maintain that pregnant females have already gone inland to den by October. The Inuit may or

may not be correct but there are no data available with which to clear up the point. If the Inuk hunters are wrong, they may be harvesting the bears in the way most detrimental to the population.

A Ph.D. student, Malcolm Ramsay, began his field research in Hudson Bay in early October 1980. Reproductive specimens and lower jaws (for age determination) have been collected from polar bears killed by Inuk hunters on Southampton Island and the Keewatin coast of Hudson Bay. The Wildlife Service of the Northwest Territories is assisting in the collection of specimens. Analysis of these specimens in the laboratory will enable us

- to determine if female polar bears being killed in the fall are pregnant;
- to corroborate conclusions on the age of first reproduction, breeding interval, and the longevity drawn from the mark and recapture studies in the maternity denning area; and
- to provide completely new insight into the extent and possible significance of intrauterine mortality, missed pregnancies, and reproductive senility.

Northwest Territories Wildlife Service (NWTWS)

Polar bear studies in Lancaster Sound and Baffin Bay

This was a continuation of previous studies designed to assess the possible impact on polar bears and their habitat of exploratory drilling for petrochemicals in eastern Lancaster Sound. During a three-year study which has now been completed, 311 bears were captured, 73 were recaptured and 81 were resighted. Those data confirmed the earlier conclusion of Stirling et al. (1978) and Kiliaan et al. (1978) that bears of Lancaster Sound belong to the same subpopulation as those of Prince Regent Inlet, Barrow Strait, Wellington Channel, and Jones Sound (Zone F). The eastern

limits of the population remain unclear, although some marked bears have been returned from Clyde on northeast Baffin Island, and a few from Greenland.

During the late winter months, polar bears in Lancaster Sound were concentrated along both shorelines and along the floe edge across the mouth of Lancaster Sound. More bears were found along the south coast of Devon Island than elsewhere. This trend was evident in all three years of the study although localized differences in distribution and concentration probably resulted from varying ice conditions. No bears were captured on the offshore floe ice, although numerous tracks came and went over the floe edge. Consulting biologists on fixed-wing surveys saw polar bears as far as 250 km offshore in Baffin Bay.

Bears marked and recaptured during late winter in successive years showed fidelity to general areas where they were originally captured. Females moved an average of 198 ± 96 km and males 167 ± 92 km from their place of original capture.

During the summer, polar bears were found on landfast ice in deep bays or on land. Land areas where bears were seen or were suspected to occur are the south and east coasts of Devon Island, the perimeter and coastal mountain areas of Bylot Island, and the west, north and northeast coasts of Baffin Island. As breakup continued, some polar bears moved west with the ice edge and then returned during the winter. Others remained in the area at summer retreats.

Maternity denning appeared to be widespread at low density, probably because of the wide availability of denning habitat. Newborn cubs were seen during April at Radstock Bay, Croker Bay, Cape York, and Bylot Island.

Estimates of population size for Lancaster Sound and of all Zone F were 1031 ± 236 and 1647 ± 290 respectively in 1979 and 673 ± 116 for Lancaster Sound in 1980.

The litter size of captured bears in Lancaster Sound and in all Zone F was 1.56 and 1.6 cubs/litter respectively. A small proportion of females in Lancaster Sound bred for the first time at 3 years, but most first conceived when 4 years old. For all of Zone F the probability that a female would have a cub that year was 0.210. The number of cubs/female/year was 0.226. The survival rate for the polar bears of Lancaster Sound was 0.885.

Money from the sale of polar bear hides yielded \$60 000 to \$138 000 to the people of the area for the last four hunting seasons.

Implications of oil development in Lancaster Sound: Exploratory hydrocarbon wells have been proposed for the area where Lancaster Sound joins Baffin Bay. As well, the Arctic Pilot Project proposes to ship liquefied natural gas by ice-breaking tanker through Barrow Strait and Lancaster Sound. If this is successful, there is every likelihood that the mode will be extended to include transport of oil. The development of an oil field in Lancaster Sound and the transport of oil through the Northwest Passage will probably lead to an oil spill.

If an oil spill occurs near the mouth of Lancaster Sound, oil will likely travel into Lancaster Sound and along the northeast coast of Baffin Island. The distance it penetrates into Lancaster Sound will depend on the season, winds, and prevailing ice conditions.

Polar bears would probably contact oil along open water or leads. In late winter and spring, depending on ice conditions, this would occur along the south coast of Devon Island, the north and northeast coasts of

Bylot and Baffin Islands and the mid-Lancaster Sound floe edge. In summer, bears would contact oil along the coastal areas of Devon, Bylot and Baffin Islands. We do not have data for fall and early winter, but we assume that the bear distribution is similar to that of late winter.

Bears probably move east offshore from Lancaster Sound into Baffin Bay, and our study suggests that there is also a westward movement which may be determined by the patterns and rate of annual ice breakup in Lancaster Sound. This could mean that many bears, except those that stay at Lancaster Sound retreats, would be out of the area if a mid-summer oil spill occurred. They would, of course, return to Lancaster Sound as the ice reformed.

This study showed that numbers of polar bears may vary widely from year to year in Lancaster Sound. This variation is probably related to ice distribution as well as the abundance and distribution of the bears' main food source, ringed seals. We cannot predict environmental conditions that cause large-scale movements of polar bears. Therefore, to determine if a population has fluctuated naturally or as a result of industrial disturbance, it should be monitored in the same years as oil drilling takes place. This could be particularly important if a short-term change in population coincided with an oil spill.

With the exception of Baffin Bay and northeast Baffin Island, there is probably enough information now to assess long-term population changes which may result from an environmental disaster such as an oil spill. However, more work is required to strengthen the present data base. For example, productivity appears to be low compared to other areas, though this may be because of small sample size. On the other hand, the population estimate of 1000 bears for Lancaster Sound seems

high for such a small area. We do not know if the bear population of 1979 was unusually high, but if our estimates are correct, Lancaster Sound is one of the most densely populated areas known. The population structure approximates that of other bear populations, but small sample sizes have produced gaps, particularly among the youngest and oldest age groups.

Unless an oil spill or blowout occurs, it is unlikely that drilling one exploratory well would have much impact on polar bears. However, longer-term development must be considered. A major oil field development with all its associated facilities and activities would greatly affect polar bears in the area and lead to declines in numbers. Onshore bases established in areas of high polar bear concentrations will result in man/bear conflicts which inevitably lead to dead bears. Historically, this has caused brown and black bears to decline in number or to be extirpated in a large part of North America.

It is not known if polar bears will avoid spilled oil or refuse to eat oiled food items. It must be assumed, therefore, that contact with spilled oil will prove harmful. A major oil spill would likely lead to the disruption of food chains. The sudden depletion of polar bear food stocks in Lancaster Sound would cause starvation as well as an increase in the number of hungry bears which might create problems in camps and villages.

Depending on how far west oil spread and assuming the worst case of complete elimination of the polar bear population in Lancaster Sound, it is evident from this study that only a portion of the Zone F population will be affected. We speculate that polar bears from the unaffected portion would repopulate Lancaster Sound, probably within decades.

However, this would occur only if the ecosystem returns to its pre-spill state and if hunting throughout Zone F were curtailed to maintain breeding stock.

Polar bear population estimate for Foxe Basin - northern Hudson Bay

Because the present system of quota assessment through capturing and marking individual bears over a number of years is expensive, time consuming, and subject to public relations problems, a system to use marker darts and a helicopter to mark samples of polar bears with different dyes was proposed.

Observations of marked and unmarked bears would be subjected to a Jolly-Seber analysis to obtain a population estimate. Using mortality and reproductive rates from other areas, quota assessments for the settlements in the area would then be attempted. If the system worked, time and money would be saved and public relations problems should be reduced. Certain types of information that can only be obtained by capturing bears would be unavailable (e.g. subpopulation limits, movements, reproductive and mortality rates). However, the advantages of quickly assessing the quotas and the possible savings in time and money would offset these disadvantages.

This system was tried in Foxe Basin in 1979, but was unsuccessful. Only 8 bears were found and marked with the marker dart. None of these was resighted so the durability of the mark was unknown. No further work was done in Foxe Basin in 1980, and none has been planned in the near future.

Summer polar bear tagging on Mansel Island

The population size and range of polar bears in the area of northeast Hudson Bay and Southampton Island, Hudson Strait, are largely unknown. The islands of western Hudson Strait serve as polar bear summer retreats and are accessible for population surveys and suitable for summer tagging programs.

The area has been shown (Juniper, DRF, Quebec, pers. comm.) to be a polar bear summer retreat with a summer population of approximately 30 animals. Quebec Inuit hunt polar bears in the area during late autumn and winter but no records of kill data are kept.

This investigation had two objectives: to estimate the size of the polar bear population of Mansel Island during the summer of 1978, and to tag bears to obtain information on movements and determine to which population the polar bears of Mansel Island belong.

Transects were flown in a Canadian Coastguard helicopter in August 1978. Thirteen lone bears, two of which had been previously tagged, were counted on the western half of the island. After being immobilized with phencyclidine HCl, six bears were marked with tags. No family groups were observed either during the transect census or during tagging flights. The summer population was estimated at 25-30 individual bears.

The results of the census confirmed Juniper's earlier estimate of the summer population on Mansel Island, but the complete absence of family groups differed markedly from what Juniper found. The ice in Hudson Strait was unusually heavy in 1978, with dense pack remaining well into August. It is possible that females with cubs remained on the ice for most of the summer. One female with two yearling cubs was observed on pack ice near Digges Islands, northern Quebec, just before the survey.

The recapture of one of the tagged bears on the Labrador coast, 1000 km to the east, in March 1979 would suggest the Mansel Island summer polar bear population is a part of the group whose range extends through Hudson Strait and down the Labrador coast. However, more tag returns are required from the area between Mansel Island and the Labrador coast before this can be confirmed. At present, Quebec Inuit hunt these bears within NWT boundaries, but are not required by either the Quebec or NWT governments to report any tag returns.

Polar bear deterrent studies

Man/bear conflicts increase in frequency every year as more people travel in remote bear range. Bears destroy camps, raid meat caches, and have injured and killed several people in recent years. Furthermore, numerous bears have been killed in conflict situations. Every year, the NWTWS receives requests from mining companies, scientists, government travellers, native hunters, and tourists for information on how to avoid conflicts with bears. In polar bear management, the problem of man/bear conflicts is second only to population evaluation and ecological relationships.

Recently, most agencies responsible for bear management agree that developing bear deterrents is a priority item. However, few have found the combination of funds, manpower, and expertise needed to pursue this difficult question.

This is a continuing project to test deterrent and detection devices to protect camps and humans. Ideas for deterrents include high voltage-low amperage electric fences, biologically significant sounds, and noxious chemicals. Detection devices include trip or proximity wires and radar and electric eyes that detect the presence of intruders.

Observations of bears attracted to food are made both with the deterrent in place or turned on, and without the deterrent. Comparison of the data gives an estimate of the efficacy of the deterrent. Ideas with promise will be improved and/or more rigorously tested under arctic conditions.

Preliminary studies have been encouraging and several methods of detecting and deterring bears have either worked or shown enough preliminary success to warrant further development and research. All systems were quantitatively tested with a scientific control.

-trip wire detection fence: This consists of an electric fence which is disconnected by an intruding bear. Upon disconnection an alarm is set off and/or a deterrent is activated. With some modification this system should prove 100 % effective for detection.

-electrical field detection fence: This consists of a wire which detects a bear by changing the capacitance and hence the electrical charge on the wire. This sets off an alarm or a deterrent is activated. This system is not recommended for practical applications because of its high sensitivity to transient conditions, which leads to a correspondingly high level of false alarms. Tuning these transient signals out results in a low level of sensitivity and a high probability that a bear will pass the system undetected.

-high voltage-low amperage shocking fence: This consists of an electrically charged fence. A bear receives a high voltage - low amperage shock upon contact. Preliminary tests were about 80% successful in deterring polar bears from a bait station. If the bear was obviously shocked, there was a strong avoidance reaction. However, the fur of the neck and shoulders was such a good insulator that bears were not always shocked.

Design modifications to ensure that the intruder is always shocked have not yet been developed. This technique appears promising enough to continue research and development.

Laser detection was tried, but was adversely affected by clouds and wind and became unfocussed. Preliminary results indicate that acoustic, chemical or physical deterrents may repel a bear temporarily, but long-term aversions to a location may only be achieved by the presentation of painful or very frightening stimuli. In summary, we do not have a way to deter a determined bear in arctic conditions.

Further work has been proposed on the following topics:

- behavioral research (incorporating that which has already been done);
- prevention of food-rewarded conditioning;
- baiting bears away from residential areas (e.g. Churchill);
- protection of people in open terrain; and
- conditioning bears to avoid human contact.

Monitoring of pollutant levels in polar bear tissues

Little progress has been made on this project due to lack of funds, manpower, and agreement on what is needed as a baseline and what has already been collected. Meanwhile, development of the Arctic, particularly in the Beaufort Sea, is forging ahead.

Ground denning surveys

Most of the areas in the Keewatin and Baffin regions have been covered as effectively as it is possible to do with this method. Future ground denning activities will focus on the Central Arctic and Inuvik Regions.

Population dynamics and sustainable yield

Settlement quotas for the hunting of polar bears in Canada have gradually increased in the NWT from an initial total of 375 in 1967 to 604 in 1980, as a result of several factors: research results supported increases in Zones A,H,E, and F; political pressure from Inuit in areas where no research data were available led to special, retractable increases; and concentration of the kill on males while protecting pregnant females and family groups allowed further increases. With the NWT kill of 600 and with the provinces killing between 70 and 150 bears annually, the Canadian harvest now approaches or exceeds two-thirds of the world's annual harvest of polar bears.

There is increasing political pressure to continue to increase polar bear quotas. Part of this pressure comes from an increasing Inuit population, but most comes from shifts in northern political awareness. Since October 1980, requests to increase polar bear quotas by a total of 65 have been received from 6 settlements. If this trend continues, quota increase requests are expected to exceed 100 bears within the next 12 months. Frequently, these quota requests spread within a Region from settlement to settlement and, if granted, the chances of overhunting within a particular polar bear population are greatly increased. Another aspect of this same trend is the request for separate additional quotas for Outpost Camps outside the settlements. This request has been submitted to the Legislative Assembly of the NWT and, if approved in policy, could double or triple existing quotas.

The number of problem bears killed in Outpost Camps, industrial installations, scientific camps and hunting camps seems to increase each year as more and more people move into polar bear habitat. This form of

mortality will only increase as the Arctic is developed and Outpost Camps proliferate.

We need to know how much more the quotas can be increased without causing populations to decline. We have the following population estimates: Zones A1 and A2 - 1000; Zone A3 - 230; Zone B - 75(60-90); southern Zone D - 700; Zone E - 1100; Zone F - 1700; Zone H - 1500; Zones C,G, and northern Zone D - no estimate, but a logical one based on habitat would be 1500 in each area. This gives an estimated total population of 11 000 polar bears in the NWT.

Simulation modelling has shown that polar bear populations will sustain a harvest somewhere between 2 and 5% annually without declining or increasing. Assuming that a maximum harvest rate of 5% is sustainable, then no more than 550 bears per year should be killed. Since 600 polar bears are now taken on quota and 25-50 are killed as problem bears, the estimated sustainable harvest level is near or exceeded. It is possible that our estimates of the polar bear populations are low. However, these are the best estimates we have to date, and they indicate that further quota increases may well cause populations to decline.

Future research

An overall research and management plan for the NWT is nearing completion and should be available by the summer of 1981. It states the goals and objectives of the Wildlife Service in relation to polar bears, what is known about polar bears (up to 1980), and what needs to be done to achieve the goals and objectives.

Briefly, mark-recapture studies need to be continued in the areas in which population range and abundance are poorly defined (northeast

Baffin Island, Foxe Basin and Hudson Strait, and possibly northern Hudson Bay). Using this information as a baseline, indices to determine population trends need to be developed. If this is successful, further mark-recapture work will be necessary only to check on declining populations, or to re-establish a baseline that has become too old to be of use. For instance, the early Hudson Bay work is now almost 20 years old.

Ontario

Aerial surveys to monitor numbers and distribution of polar bears along the northern coast of Ontario have been conducted annually since 1963. Objectives of the surveys were to provide an index of annual abundance and to determine preferred areas of summer sanctuary. Continuing requests for an increased harvest by native peoples and proposed changes in management policies make it imperative that at least a minimum surveillance be maintained.

The 1979 fall survey was conducted on 30-31 August. The total of 172 sighted between Hook Point, James Bay and Anabusko Island, Manitoba was the highest total recorded since inception of the surveys. The total of 158 for Ontario was exceeded only in 1967 when 168 bears were counted. Areas of concentration were similar to previous years, but bears were more grouped than usual. Of the 85 bears sighted east of Winisk, only one occurred west of 83°00'. Another rather unusual concentration of 15 large and medium sized bears occupied a series of coastal ridges about 51 km west of Winisk. A total of 31 were grouped in the vicinity of the Pen Islands. Groupings may be related to patterns of ice breakup and retention in Hudson Bay.

Although the overall tally was high, young bears (cubs and yearlings) constituted less than 10% of the total. This could indicate reduced productivity in 1979, be a reflection of the poor correlation previously observed between fall and spring surveys, or indicate geographical segregation of age and sex classes at that time. Since the spring survey was not conducted in 1979, data were not available for comparison. Based on previous spring aerial surveys, estimated annual cub production for Ontario from 1974 to 1978 was 71.

During the fall 1980 survey, a record number of bears was sighted in Ontario (173). A helicopter survey was conducted two weeks later from the border to Anabusko Island in Manitoba. Five bears were sighted, the second lowest number seen in that area in 18 years. Young bears comprised 16% of the total. The large number of females with young and greater than usual number of bears (17) on Akimiski Island suggest the population is in a healthy state.

The high counts in recent years have not resulted in consistent new concentration areas or in a more dispersed distribution. Rather, as observed in 1979, numbers at usual concentration areas tend to be greater. For example, 26 bears were observed on Bear Island. This in itself is not unusual; however, 13 animals were in a dense cluster, seemingly almost touching each other as the aircraft passed over the island.

The continuation of annual spring surveys of maternity denning was not felt to be necessary because of the apparent stability of the population along the northern coast. Future surveys will be conducted for 2 consecutive years at 5-year intervals. The consecutive surveys were suggested to allow for annual variations in numbers and weather

conditions. They are scheduled to resume in 1983. Fall survey flights and collection of specimens from Indian hunters will continue.

Quebec

In conjunction with a study of the Inuk harvest of polar bears, visits were made to several communities along the coast in order to explain polar bear research and management on a national and international basis. A positive response has been given by the communities involved.

An oversnow survey for bears and dens in the Cape Smith area resulted in no sightings of polar bears at all and only one set of old tracks being seen. A survey farther inland is planned for spring 1981.

Manitoba

Four surveys were conducted in August and September 1979 in the Churchill and Port Nelson areas extending along the coast to the NWT and the Ontario borders. A total of 300 bears, including 3 family groups with 2 cubs each were sighted. Twenty-five bears were tagged in conjunction with the bear control program at Churchill, including 7 recaptures.

There were 3 surveys in fall 1980, between the NWT border and Port Nelson. A total of 303 bears were sighted, including 5 family groups with one cub each and 2 with 2 cubs each. Three bears were tagged, including 2 recaptured bears, and personnel at Churchill assisted with research being carried out in the area by other groups.

Newfoundland, Yukon Territory

No independent research projects were begun in these areas, but personnel assisted in ongoing cooperative studies in 1979.

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POLAR BEAR MANAGEMENT CHANGES IN CANADA 1978-80

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Since the January 1979 meeting of the IUCN Polar Bear Specialists Group, there have been several changes in the management of polar bears in Canada. The regulations covering polar bear management in Canada as of 31 December 1980 are summarized in Table 1 and Appendix 1. Changes made prior to 31 December 1978 are outlined in management reports prepared for previous IUCN meetings.

The Federal-Provincial Technical and Administrative Committees for Polar Bear Research and Management, representing the four provinces (Manitoba, Newfoundland, Ontario, and Quebec), the two territories (Northwest Territories and the Yukon Territory) and the Federal Government continued to meet annually to discuss research results and to make management recommendations. Research programs arising from these meetings are outlined by Stirling et al. in these proceedings.

The polar bear quotas by jurisdiction are based on recommendations by the Federal-Provincial Committees. The quotas and numbers of polar bears killed in 1978-79 and 1979-80 are summarized and recommended quotas for 1980-81 are also given (Table 2). In June 1978 the Polar Bear Administrative Committee approved a change in the boundary between Zones A1 and C to north of Chesterfield Inlet to include Daly Bay. Figure 1 shows the present boundaries of the management zones in Canada.

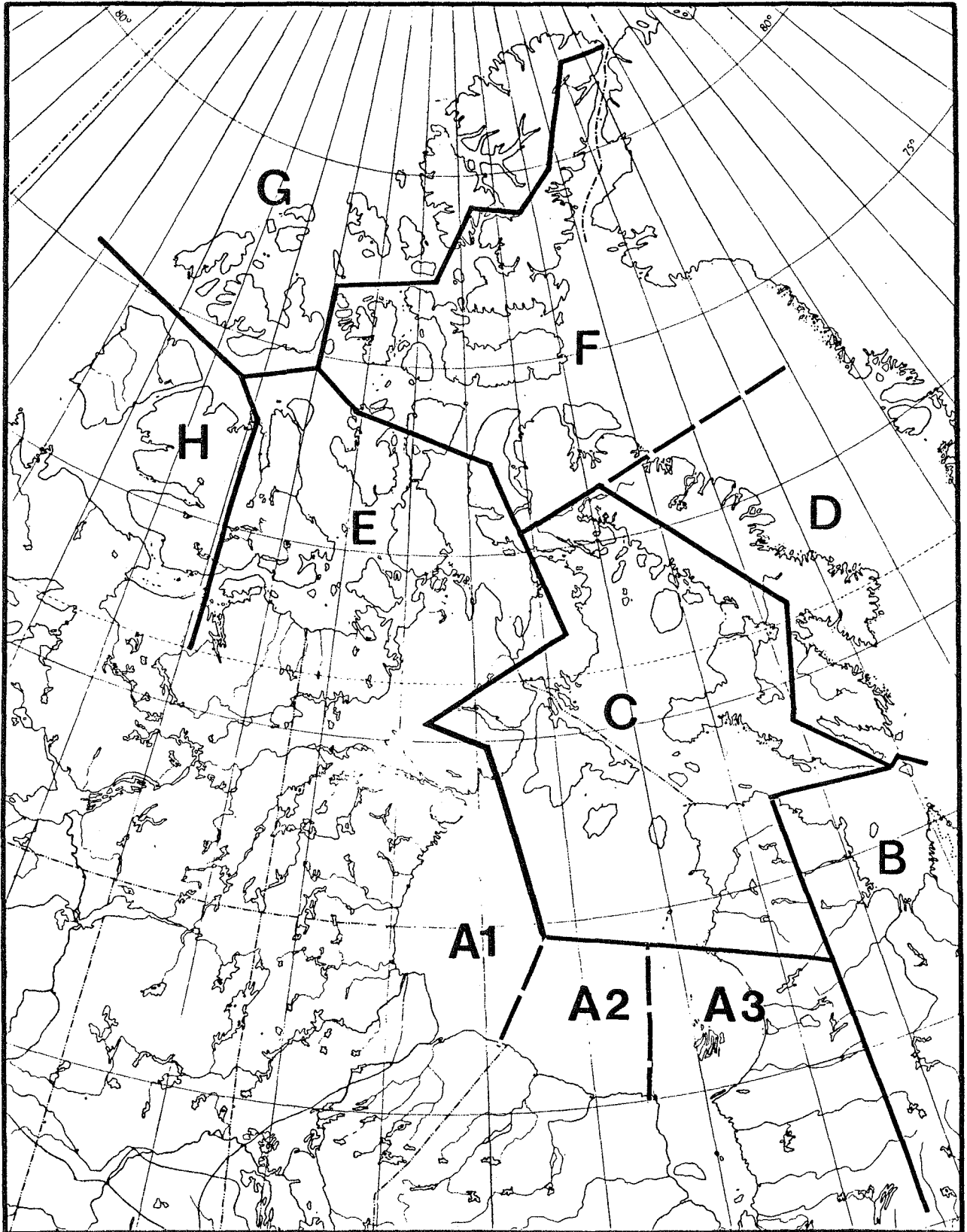


Fig. 1. Current polar bear management zones.

Table 1. Summary of regulations covering polar bear management in Canada as of 31 December 1980.

Category	Jurisdiction					
	MANITOBA	NFLD.	N.W.T.	ONTARIO	QUEBEC	YUKON
Hunting season	-closed	-none at present -reopening under consideration	-1 Oct.-31 May in Keewatin, Foxe Basin and Grise Fd; 15 Nov. to 31 May for 12 tags in Repulse; 1 Dec.-31 May all others;	-none	-1 Oct. to 31 May	-1 Oct. to 31 May
Who can hunt	-natives of coastal region for own use, but sale of hide prohibited	-residents only	-residents and non-residents with Wildlife Certificate if HTA provides necessary tag	-protection only -permissible kill by native Indians -need a licence	-Inuit and Indians	-Inuit only by special permit
Quota	-maximum of 35 annually (not exercised at present)	-4 possible but not yet allocated	-quota by settlement -1980-81 limit equals 604	-permissible kill of 30 (by restricting sales over 30)	-quota by zone -total quota equals 46	-total quota equals 6
Females and cubs protected	-no	-yes	-cubs and females with cubs under 1.5 m in length, prior to being stretched and dried or 1.8 m after being stretched and dried	-no	-yes	-yes

Table 1. Continued.

Category	Jurisdiction					
	MANITOBA	NFLD.	N.W.T.	ONTARIO	QUEBEC	YUKON
Bears in den protected	-no	-yes	-yes	-no, but dens are	-yes	-no
Proof of origin of untanned bear	-seal proposed	-verbal proof (no seal implemented to date)	-seal on hide and export permit if origin outside or if leaving NWT	-seal on hide -proof of origin required on imported hides	-seal on hide	-seal on hide -kill monitored by export permit
Export permit required and cost(out of province or territory of origin)	-nil	-required -\$5.00	-required -\$1.00	-required -no cost	-required -no cost	-required -\$5.00
Export permit out of Canada		-required for all polar bears or parts thereof exported out of Canada -obtained from Province or Territory in which port of export				
Scientific Licences	-discretion of Minister	-discretion of minister	-discretion of Superintendent of Fish and Wildlife Service	-discretion of deputy	-discretion of Minister	-discretion of Director

Table 1. Continued.

Category	Jurisdiction					
	MANITOBA	NFLD.	N.W.T.	ONTARIO	QUEBEC	YUKON
Selling of hide by hunter	-prohibited -skins of nuisance bears sold by Manitoba Gov't. through sealed tender	-allowed if legally obtained	-yes -must be sealed	-must be sealed by Dept. staff	-\$5.00 Royalty fee -must be sealed	-permit required from Director of Wildlife
Basis Regulation	-Wildlife Act 1970	-Wildlife Act 1971 -classified as big game	-Wildlife Ordinance and Regulations; 1960 Order-in-Council (Endangered Species)	-Fish and Game Act 1970	-Wildlife Conservation Act 1969 -Order-in-Council 2401-75	-Game ordinance 1958 as amended
Fur Dealer authority	-Wildlife Act Licences \$10 restricted \$25 general \$25 travelling	-Wildlife Act Licence for each store \$2.50, travelling \$2.50	-Fur Dealers Licence \$10.00, Travelling Fur Dealers Licence \$100.00	-Fish and Game Act -Licence \$10.00	-\$50.00 licence (one location) -\$100.00 licence (ambulent)	-Game ordinance Resident - \$25.00 Non-resident -\$30.00
Taxidermy	-Wildlife Act licence \$5.00	-legislation in preparation legal if obtained legally elsewhere	- Taxidermist Licence \$25.00	-Fish and Game Act		-Game Ordinance

Table 1. Continued.

Category	Jurisdiction					
	MANITOBA	NFLD.	N.W.T.	ONTARIO	QUEBEC	YUKON
Tanner's authority	-licence \$10.00	-no legislation at present	Tanners Licence \$25.00	-Fish and Game Act (fee currently under review)	-\$50.00 tanner's licence	-nil
Live Animals Capture	-Ministerial permit	-illegal unless authorized by permit from Minister for scientific purposes	-licence to capture live wildlife \$5.00 -licence to export live wildlife \$3000.00	-Ministerial authority	-Ministerial permit	-Scientific licence
Export	-Ministerial	-illegal	-Wildlife Export Permit	-Ministerial authority	-Ministerial permit	-Special permit

Table 2. Quotas and known numbers of polar bears killed in Canada, 1978 - 1980

	NWT	Ontario	Manitoba	Nfld	Quebec	Yukon	Norway	Total
1978-79 ¹								
Suggested quota	590	30 ⁺	35	4	*	6	5 ^{**}	670
No. bears killed	581 ^a	13	14	0	59	0	0	667
No. bears captured and held in zoos	0	0	1	0	3	0	0	4
1979-80								
Suggested quota	585	30	35	4	*	6	5	665
No. bears killed	587 ^b	18	8 ^c	0	52	0	0	665
No. bears captured and held in zoos	0	0	3	0	0	0	0	3
1980-81								
Suggested quota	604	30	35	4	*	6	5	680

¹ Management year extends from 1 July to 30 June the following year

⁺ Permissible kill

* The allowable kill has not yet been set

** Allowed to Norway for protection of life under the Agreement on the Conservation of Polar Bears (1973)

^a Includes 23 problem bears, bears killed in self-defence, or from drug-overdoses

^b Includes 51 problem bears or bears killed illegally, and 3 handling deaths

^c Includes 7 problem-kills

Northwest Territories (NWT)

There have been several changes in management of polar bears in the NWT during the last two years. A new Wildlife Ordinance came into effect 1 July 1979. The main changes were a 1 December opening date for the regular quota kills in most of the communities, and an increase in the legal hunting length of bears (see Table 1), in order to protect pregnant females and younger cubs respectively. Changes in the conditions affecting quotas in each community are summarized in Appendix 1.

After studies were completed in Zones A1, E, F, and H, it appeared that the allowable kill could be higher than the present quota. Research on a computerized population model and behaviour studies of wild undisturbed polar bears indicated that higher harvests could be taken from a population if the season did not open until 1 January (therefore protecting pregnant females along the coast in the autumn) and by affording maximum protection to family groups. Thus, in areas in which the available data appear to warrant it, increases in the existing quota on an experimental basis were suggested. The increases had to be cautious, however, because no one knows at what harvest level the bears become overhunted. To ensure that the increase was identified as separate from the regular quota, the tags were coloured red. Red tag quotas were to be retractable if subsequent information showed the polar bears were being overharvested. Other safeguards were built into the red tag system to further ensure that overharvesting would not occur:

- a) emphasis was placed on non-productive segments of the population through hunter education and delaying the red tag season until 1 January when pregnant females were denning;
- b) jaw return from all harvested bears was mandatory in order to monitor the kill and detect if bears were being overharvested.

In some areas, red tags were allocated to different geographical areas in order to spread out the effect of the harvest over a greater portion of the available population. The regulations governing the issuing of red tags varied between settlements to some extent depending on their individual hunting patterns.

Red tag quotas were introduced into four zones (A1, E, F, and H) in 1978-79, affecting seventeen communities. This system was well received the first year throughout the Arctic when the opening date was 1 October for regular tags and 1 January for red tags. The hunters liked the system and response to jaw return was almost 90 per cent (an unprecedented amount of cooperation).

Unfortunately, a complicating factor was introduced with the new Wildlife Ordinance which delayed the opening date of the season to 1 December to protect pregnant females. The 1 December opening date was a separate management idea and was initiated many years ago, although it did not reach fruition until the new Ordinance. Delaying the season was supported by research and modelling - if productive females are protected, then more bears can be taken without harming the population. In some areas where research had not been completed, some red tag quota increases were issued as a stop-gap response to political pressure, and were given to individual Hunters and Trappers Associations (HTA) on the understanding that they would delay their hunting season.

The fact that all three programs (red tags, delayed opening dates across the NWT, and individual agreements with HTA's) occurred at about the same time, and each contained aspects of the others, has confused the fact that they were three separate management thrusts based upon two different concepts: (1) retracting red tags in the case of overhunting, and (2) delaying

opening seasons to protect pregnant females, hence allowing a larger harvest. The original opening date, 1 January, was changed to 1 December to coincide with the regular season opening date and to simplify regulations. Since most females are denned at that time, there was no management reason not to open all seasons on 1 December. However, this is another complicating factor not understood by all. Some problems were apparently caused by a misunderstanding of the purpose of red tags when their function was explained at the community level. These problems are being resolved through a more active program of explaining the red tag system in the communities.

In the 1979-80 season, nine Keewatin (Zone A1) communities argued against the 1 January opening date for the kill, since they felt all the pregnant female polar bears which are meant to be protected by the delayed season would stay in the denning area near Churchill, and that only subadults and adult males would migrate up the coast. It has been agreed to by the NWT government that these communities (and Grise Fiord, which also protested) be allowed to keep the 1 October opening date. It was also recommended that the total of 12 red tags to these communities be removed to protect the polar bear population and in fairness to the other communities that have a delayed opening date and increased quota. The 10 red tags for the Keewatin communities were returned for the 1980-81 season, although the opening date is still 1 October.

For the 1979-80 season, a red tag quota of 4 with a 1 January opening date was recommended for Wager Bay (Zone C), in response to political pressure. For the 1980-81 season, the Hadley Bay quota (Zone E) was increased by 4 red tags, to a total of 8, and 12 of the Repulse Bay quota of 20 can be taken after 15 November; the remainder cannot be taken until 1 December.

The NWT also will increase the quota of 20 polar bears at Sanikiluaq (Zone A3) by 5 red tags to a total of 25. The community wanted 10 but the

NWT Wildlife Service felt that an increase of 5 red tags was adequate. The available data suggest the population is in the mid-hundreds and increasing the quota could be dangerous. Some immigration of polar bears might occur from western Hudson Bay, but it would be risky to count on this because the size of the kill there could increase in the future, thus precluding any surplus which might emigrate. This decision was not reviewed by the Technical Committee.

Special Licence (sport) hunts: The sport-hunt in the NWT continued in 1979 and 1980 with a limited number of hunts (Table 3). Under the 1968 NWT Game Ordinance, these Inuk-guided sport-hunts, using traditional hunting methods, have been allowed since January 1970. Tags used for the sport-hunt must be allotted from the settlement quotas. Tags allocated to unsuccessful sport-hunters cannot be used later by Inuk hunters. The time period during which sport-hunting can be carried out has been lengthened from 1 March-30 April to 1 February-31 May. Approximately half of the sport-hunters are from the U.S. The rest have come from Belgium, Austria, Germany, Japan, and Mexico.

Table 3. The number of polar bear sport-hunters by settlement in the NWT, 1979 and 1980. Numbers in brackets are successful hunters.

Settlement	1979	1980
Frobisher Bay (Allen Island)	-	4(1)
Holman	4(3)	6(4)

Since 1977-78, the NWT government has not organized the sport-hunts. Instead, private firms now arrange bookings and expediting for these hunts.

At present, these firms are not routinely required to provide statistical information, reports, or biological specimens from the polar bears killed. In 1979 and 1980, the cost per hunt was \$6000 for Holman and \$10 500 for Allen Island, which did not include the hunter's travel expenses to Yellowknife and Frobisher Bay respectively. The increased cost of the sport-hunts apparently has resulted from changes designed to improve the quality of the hunts: The Inuk guides are given special training and a first aid course, and cold-weather clothing of caribou skins is made to size for use during the hunt.

In recent years, the number of applicants for the sport-hunt has been greater than the number of tags made available for such hunts by the settlements. This situation has arisen for a number of reasons. Because of the ubiquitous use of snowmobiles, there are few trained and conditioned sled dogs and few experienced dog handlers. According to the Canadian Declaration attached to the Agreement on the Conservation of Polar Bears (1973), dog teams are an integral part of the sport-hunt. Consequently, sport-hunts are not licensed unless suitable dogs are available in the settlements requesting the permission. Also, many hunters are unwilling to give up their polar bear tags in exchange for the sport-hunting fee, and the relatively high prices paid for polar bear hides may discourage hunters from wishing to commit a substantial portion of time to this activity in advance.

Manitoba

In 1979, there was an approximate 20% increase, to 107, in reports of problem bears. There were 7 problem kills, 3 bears captured, and 1 bear flown to Seal River. Permits for conducting research have been made more rigorous, with detailed immobilization and surgical protocol report forms.

Newfoundland

There are no immediate plans to reopen the polar bear season. Although there is no intent of taking a harvest, Newfoundland will retain their quota of four for problem bears.

Ontario

Management policies remained unchanged, but those regarding specific harvest quotas and sale of sealed hides are currently under review.

Quebec

The relationship between the number of polar bears killed on the Quebec coast and the sustainable yield for that population is not known. In 1970, Newfoundland closed the season for polar bears in northern Labrador because of the possibility of these bears being a discrete and endangered subspecies. The traditional Inuk pattern of hunting in northern Quebec was to go out to the offshore islands (which are part of the NWT) in late summer and kill all the bears present. A substantial proportion of the polar bears on the offshore islands are females and family groups, so the harvest was being taken in the way most detrimental to the population. Much progress has now been made toward eliminating this practice. According to Makivik Corporation Research Department sources, 110 bears were harvested in 1973-74 and in 1974-75, and 72 in 1976-77. In more recent years, the reported harvest has been about 30 to 50 bears per year. Recent mark and recapture studies suggest that many of the bears being shot on the northern Quebec coast are being transported on drifting ice through Hudson Strait, sometimes as far as the Labrador coast, northern Hudson Bay and southern Foxe Basin. Some of these bears return in the late spring and may remain on the islands where they are later hunted.

It is even more difficult to assess the extent and effect of the polar bear harvest in northern Quebec because specimens are not returned; nor are ear tags from tagged bears. This latter aspect is particularly important now since there are a substantial number of tagged polar bears along southeast Baffin Island and the Labrador coast and the NWT may initiate a large-scale tagging program in southern Foxe Basin. It would be extremely valuable if tags and jaws were returned for analysis from polar bears harvested in northern Quebec. Ian Juniper of Direction de la recherche faunique visited five communities in 1979-80 and planned to visit the remaining northern Quebec settlements the following winter, explaining polar bear research and management on a national and international basis.

Although the Quebec Inuit do not oppose regulation of the polar bear hunt, they feel the management legislation, which was based on NWT regulations, should be modified. For example, the Quebec Inuit have suggested that the Quebec season open on 1 September because of the danger involved in crossing to the islands later in the year. However, those islands are within the NWT, which is proposing a delay in opening to provide greater protection of pregnant females.

During a revision in 1980 of game laws, the polar bear regulations were found to be in conflict with the James Bay and Northern Quebec Agreement and so were repealed (Decret 3188-8; 8 Oct. 1980). This action was legally necessary, but the regulations will be reinstated following negotiations.

Meanwhile, research by the Native Harvest Research Committee to establish the present levels of harvest is underway and scheduled to be completed by 1981. The tags for polar bear hides are issued directly to the community councils and they are responsible for collecting data on the kill. At the end of the seven-year harvest study, the present level of harvesting

of polar bears shall be determined. Based on that, a guaranteed level of harvest of polar bears will be negotiated between the Ministère du Loisir, de la Chasse et de la Pêche and the Quebec Inuit. Following this procedure, a quota similar to those existing elsewhere in Canada shall be arrived at, in consideration of all pertinent data available at that time and with the participation of all concerned parties, including the Inuit. At the same time, Newfoundland may reopen a polar bear hunting season in Labrador, and the NWT settlements on southwest Baffin Island, in southern Foxe Basin, and northern Hudson Bay are all clamouring for increases in quotas. These bears will all be coming out of the same population so it is extremely important that all parties begin to discuss an eventual agreement on sharing of quotas.

Several points of concern were noted by members of the Polar Bear Administrative Committee: using the Inuit harvest record as the basis for determining the quota would appear to encourage hunters to kill as many animals as possible; other jurisdictions should be involved in determining the final numbers because this is a shared population; if a certain number is guaranteed, it may make reducing quotas more difficult even if biological data might indicate this is warranted; although seals are now required before hides can be marketed, fewer sealed hides are being tanned than are being reported by the hunters; and, the final discussion of populations and quotas will be done with the aid of very little real biological information about that population.

Yukon

The quota of six was not used in 1979-80. In 1980-81, the NWT government is controlling distribution of the tags.

Federal

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973) has now been in effect since July 1975. Polar bears are included in Appendix II to the Convention ('all species which although not necessarily now threatened with extinction may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with their survival'). Since July 1975, the Federal Government, through the issue of permits, has maintained a permanent record of all polar bears, hides, or any other products legally exported or imported. Data for 1975-77 were included in the management report prepared for the previous IUCN meeting. The 1978 and 1979 data are summarized in Table 4. Most of the exported hides (58%) were destined for Japan.

Table 4. Number of polar bears and polar bear hides legally exported from Canada, 1 January 1978 to 31 December 1979 (from Heppes and McLean 1979 and 1980).

	1978	1979	Total
Live polar bears ⁺	0	11	11
Polar bear hides [*]	304	187	491
Total	304	198	502

⁺mainly zoo use

^{*}some hides with skulls

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APPENDIX I

NWT Settlement Quotas and Conditions 1 July 1979

The respective numbers of polar bears that may be killed in any one year period commencing on 1st July and, where applicable, the conditions attaching to the hunting, shall be in accordance with the following conditions:

Wildlife Management Unit	Settlement	Quota	Conditions
B	Arctic Bay	12	-the Superintendent may increase the quotas as between the Hunters' and Trappers' Associations in Arctic Bay or Pond Inlet, or, in aggregate, both, by 8, all of which must be taken in Prince Regent Inlet, south of Cape York and north of Cape Kater, on the joint recommendation by both of such Associations, and the lower jaw of each bear must be given to an officer.
B	Broughton Island	22	-all of which must be taken after 1st December and the lower jaw of which minimum must be given to an officer.
B	Cambridge Bay	15	-at least 5 must be taken after 1st December and the lower jaw of which minimum must be given to an officer.
B	Cape Dorset	10	
I	Chesterfield Inlet	8	-the Superintendent may increase the quotas as between the Associations in Chesterfield Inlet, Rankin Inlet, Whale Cove or Eskimo Point, or in aggregate, any 2 or more of them, by 10, on the joint recommendation by all of such Associations, and the lower jaw of each bear must be given to an officer.
B	Clyde River	45	-all of which must be taken after 1st December and the lower jaw of which minimum must be given to an officer.
B	Coppermine	6	-at least 4 must be taken after 1st December and the lower jaw of which minimum must be given to an officer
J	Coral Harbour	65	

J	Eskimo Point	15	-see conditions for Chesterfield Inlet.
B	Frobisher Bay	18	-8 of which must be taken north of 62°30'N and west of 65°10'W.
B	Gjoa Haven	14	-at least 5 must be taken after 1st December and the lower jaw of which minimum must be given to an officer.
A	Grise Fiord	33	-at least 6 of which must be taken from Norwegian Bay and a further 2 of which must be taken after 1st December and from Norwegian Bay.
I	Hall Beach	7	
B	Hadley Bay	8	-at least 4 must be taken after 1st Dec.
B	Holman Island	20	-at least 4 must be taken after 1st December and the lower jaw of which minimum must be given to an officer.
I	Igloolik	18	
B	Lake Harbour	13	
A	Melville Island	12	
B	Pangnirtung	14	
C	Paulatuk	17	-at least 4 must be taken after 1st December and the lower jaw of which minimum must be given to an officer.
I	Pelly Bay	15	-at least 5 must be taken after 1st December and the lower jaw of which minimum must be given to an officer.
B	Pond Inlet	15	-all of which must be taken after 1st December. Also see conditions for Arctic Bay.
J	Rankin Inlet	10	-see conditions for Chesterfield Inlet.
I	Repulse Bay	20	-12 of which may be taken after 15th November and the remainder after 1st Dec.
A	Resolute Bay	38	-at least 4 of which must be taken after 1st December and at least 2 of which minimum must be taken in Cresswell Bay south of Fury Point and the lower jaw of which minimum must be given to an officer.

B	Sachs Harbour	22	-at least 4 must be taken north of $73^{\circ}00'N$ and after 1st December and the lower jaw of which minimum must be given to an officer.
J	Sanikiluaq	25	-at least 5 must be taken after 1st Dec.
B	Spence Bay	27	-at least 5 must be taken after 1st December and the lower jaw of which minimum must be given to an officer.
C	Tuktoyaktuk	26	-at least 4 must be taken west of $135^{\circ}00'W$ and after 1st December and the lower jaw of which minimum must be given to an officer.
J	Whale Cove	12	-see conditions for Chesterfield Inlet.

Progress Report - USA

Research on Alaskan Polar Bears in 1979 and 1980

In 1979 the U.S. Fish and Wildlife Service continued its program of mark and recapture. From 31 March to 4 May field crews working at Point Barrow, Alaska, captured and marked a total of 15 polar bears (Table I). The small number was due to very poor ice conditions off the coast of Alaska, making tracking and capturing difficult. Four of the bears were recaptures from previous years. In addition, as part of a multi-national program (Canada, U.S., Norway) satellite transmitters were attached to 3 adult female polar bears in the hopes of tracking them to their dens the following winter. However, due to mechanical and operational difficulties, very little information was acquired in the Alaskan sector of the project.

In 1980 a total of 41 bears were captured and marked at Point Barrow, Alaska (Table I). The program began on 12 March 1980 and ended 10 April. Of the 41 bears, 24 were adults, 8 were 2-year olds, and 9 were yearlings. Eleven of the adults were recaptures from previous years, including one from Canada. Radio (local RF) collars were put on 17 adult females.

Since Sernalyn TM is not presently available for use as an immobilizing agent, an alternate drug, M99, was tested. M99 was used to immobilize 10 of the 41 bears and Sernalyn was used on the remaining bears. In all cases where M99 was used the antidote M50-50 was used to revive the bears after processing. We feel that M99 is a suitable replacement for Sernalyn as an immobilizing drug.

Baiting was attempted to concentrate bear and, therefore, reduce search efforts. Three stations, baited with seal blubber, were set up on the ice north of Point Barrow. Due to poor weather and shifting ice only two of the stations were relocated the following day, both undisturbed, and none thereafter. The efficacy of baiting as an aid to polar bear capture cannot presently be assessed.

The University of Minnesota group, supported by U.S. Fish and Wildlife Service grants, accomplished the following: the satellite telemetry program which began in 1979 was completed. No radios were recovered, although 2 animals which carried satellite transmitters were recaptured. One animal was recaptured in Canada and the other was killed by an east Greenland hunter. Neither of these animals showed any signs of permanent injury from the collar or harness. A report of all results from the satellite program is forthcoming.

Conventional transmitters were attached to 17 females in the vicinity of Point Barrow, Alaska during 1980. After 5 failures, the proper technique and materials were used to attach the last 12 radio collars. Eight of these twelve females were successfully relocated multiple times; 3 were not relocated, indicating the instrumented bear probably moved out of the area searched; and 1 radio was found on the ice at the site of instrumentation. A follow-up summer survey to relocate radioed animals found only the radio lost on the ice.

A cooperative telemetry study with the Canadian Wildlife Service (CWS) polar bear program in the Cape Churchill area was successful in locating 4 denning females and only 1 transmitter was lost out of 11 attached to female bears. CWS personnel were shown state-of-the-art techniques in collar materials and attachment technique.

The polar bear population model was refined to allow sex and age structured harvest regimes. Preliminary assessment of world population numbers was begun with the cooperation of the C.W.S., N.W.T., Norsk Polar Institute, and Zoological Museum of Copenhagen polar bear specialists. The current best estimate of the total Alaskan polar bear population is about 6,000 males and females. These estimates require information on annual and seasonal movements to interpret and correct.

Table I. Summary of polar bears that were captured and marked by the U.S. Fish and Wildlife Service, Point Barrow, Alaska 1979-1980

Year	Total Captured	No. of Recaptured	Number of:				
			Adult Male	Adult Female	2-Year Olds	Yearlings	Cubs of Year
1979	15	4	9	5	1	-	-
1980	41	11	7	17	8	9	-

Research Planned

Determining population status with greater confidence, delimiting denning areas and determining the significance of near-shore and on-shore denning to the Alaskan polar bear population are research objectives given high priority in planned studies. Mark-recapture methods will be used along the west coast of Alaska for a period of 3-5 years to supplement the data available from the north coast. A variety of methods will be used to locate and determine the importance of denning areas. Initially the area east of the Canning River will be studied most intensively.

Management - 1979 and 1980

Unless the population is officially declared to be depleted, the harvest of polar bears by Alaskan Natives (Eskimos, Indians and Aleuts) who dwell on the coast of the North Pacific and Arctic Oceans is not restricted in amount if the bears are taken for purposes of subsistence (food, clothing, shelter and the like) or for the making and selling of authentic Native handicrafts and clothing. The only restriction is that taking must be done in a non-wasteful manner. Taking by others is presently prohibited except for scientific and public display purposes and these uses are strictly regulated. Until 1972, when the Federal government assumed management responsibility for polar bears, the State of Alaska carried out a mandatory program for hunters to report polar bear kills. Subsequent to 1972 the State carried out a voluntary reporting program. The Alaska Department of Fish and Game has provided estimates of 29 and 27 polar bears taken in 1979 and 1980, respectively. The 1980 figure included only those bears taken during the period January through April 4, 1980. It is known that some bears were taken after this time and in the fall of 1980, but the total numbers are unknown at this time. These estimates were based on voluntary reports from subsistence hunters and knowledge of State field personnel working in the area. Comparable estimated numbers for previous years are as follows (data, provided by Alaska Department of Fish and Game, are on a calendar year basis):

<u>Year</u>	<u>Polar Bears Harvested In Alaska (% Male)</u>	<u>Year</u>	<u>Polar Bears Harvested In Alaska (% Male)</u>
1961	148 (73)	1970	335 (72)
1962	199 (69)	1971	214 (70)
1963	187 (79)	1972	239 (80)
1964	255 (77)	1973*	36 (50)
1965	298 (76)	1974	48 (64)
1966	405 (74)	1975	146 (58)
1967	223 (80)	1976	167 (47)
1968	324 (74)	1977	114 (51)
1969	288 (72)	1978	59 (--)

* Moratorium on sport hunting for polar bears went into effect, and continues to the present time.

The U.S. Fish and Wildlife Service began collecting harvest data in May and June of 1980 in four Native villages in the northern Bering Sea region in conjunction with a walrus harvest monitoring program. The approach used was to ask local Native hunters to volunteer information on numbers harvested.

Management Planned

Management activities in 1981 and beyond will emphasize collecting reliable information on the harvest of polar bears, including data on numbers, age and sex, reproductive status and location of bears harvested. The planned approach is to reinstitute a mandatory reporting and sealing program whereby any bear harvested would have to be reported to government authorities and the hides would be sealed. Regulations to implement the program are expected to be in place by the fall of 1981. If a mandatory program cannot legally be implemented, then an intensive voluntary harvest data collection program will be carried out in villages which are known to take polar bears. In either case, government biologists and possibly law enforcement agents will be responsible for making frequent visits to or reside in the villages for short periods to collect the data. Local village residents may be hired to assist in collecting the data.

An effort is planned for 1981 to begin developing a comprehensive polar bear management plan for the stocks associated with Alaska. The plan will address objectives, problems, management strategies and future research needs.

Special Topic - Potential Changes in Polar Bear Habitat

Human activities associated with exploration and extraction of oil and gas is a significant factor affecting the quality of polar bear habitat. Both survival and productivity of the polar bear population are likely to decline over a period of the next two or more decades. The actual overall effect on polar bear populations is not known but it is likely that denning females will be displaced from historic denning areas and that the denning period will be disrupted; both of these factors may reduce production and/or survival. Also, oil spills which appear to be inevitable will increase mortality directly through soiling of polar bears or indirectly by poisoning through the food chain. Plans to speed the energy production activities announced in mid-1980 will result in significant activities throughout the Alaskan range of polar bears by 1985. This will include off-shore as well as on-shore exploration and possibly production.

Degradation of polar bear habitat and population impacts will certainly be reduced as a result of legislation such as the National Environmental Policy Act, Coastal Zone Management Act, Marine Mammal Protection Act, and the Polar Bear Agreement, however, to be realistic, we can expect that local effects may be severe and because polar bears are highly mobile these effects may extend to a significant portion of the Alaska polar bear population.

Information useful in predicting or assessing impacts of development on polar bears include: spatial and temporal relationships of bears and important habitats (particularly denning areas) to development sites; sensitivity levels of bears during different phases of their life cycles to various kinds of disturbances, effects of pollutants on bears and their food chain and the ability and willingness of bears to respond in a constructive manner to disturbances that do occur. Prevention of oil spills and other polluting activities is best addressed, at least theoretically, in engineering circles. Once a spill has occurred, managers can do little to mitigate its damage. However, restrictions on the timing and spacing of developments, if based upon good information, should minimize alterations of normal bear behavior.

Oil and gas exploration is currently underway in the Beaufort Sea and the western half of Alaska's North Slope, and production is underway in the Prudhoe Bay region. Exploratory work was authorized in late 1980 on the North Slope portion of the Arctic National Wildlife Refuge in northeastern Alaska which encompasses the mid-Beaufort coastal plain. Known denning habitat occurs throughout the coastal area of the Beaufort. Oil and gas exploration and development is required to adhere to guidelines designed to help reduce impacts on fish and wildlife resources and the environment. With an acceleration of energy development, however, it will be difficult to prevent all adverse impacts on polar bears in Alaska's arctic regions.

Report to IUCN Polar Bear Specialist Group
Jack W. Lentfer
Alaska Department of Fish and Game
January 1981

The Marine Mammal Protection Act of 1972 transferred management authority for certain marine mammals, including polar bears, from the State of Alaska to the Federal government. Shortly after the Marine Mammal Act was passed, the State of Alaska requested waiver of the moratorium on taking and return of management authority for certain species, including polar bears, as provided for in the Act if certain conditions were met. The proposed State management program would provide for subsistence and recreational hunting, both to be done from the ground only. Female bears with young and bears in dens would receive complete protection, and there would be quotas by areas and bag limits for all hunters. After a review period of six years, the Federal government approved Alaska's request for return of management, but with stipulations that were unsuitable to the State. The Federal government and the State could probably resolve differences relating to stipulations so that management could be returned. However, the Native exemption in the Marine Mammal Act is an over-riding consideration. The Native exemption allows Alaskan Eskimos, Aleuts, and Indians to take marine mammals without restriction provided taking is not done in a wasteful manner. The only restriction of Native take of a species that may occur is after the species has been declared depleted. From a biological standpoint, polar bears cannot be declared depleted. A court ruling (People of Togiak vs. United States of America, Civil Action No. 77-0264, 1979) states that the Native exemption cannot be waived. Therefore, Natives cannot be regulated with other users as part of a management program. The constitution of the State of Alaska prohibits preferential management of resources for a single ethnic group, and the State therefore cannot accept management under present interpretation of the Act. One alternative is to change the Native exemption by amending the Act.

With loss of management authority, the State could no longer justify extensive research and management programs, and therefore greatly curtailed polar bear activities. However, in order to provide some continuity and to have knowledge of the single greatest mortality factor, the State continued to monitor hunter harvest. The hide sealing program was continued but the percentage of bears sealed became smaller each year as more hunters realized sealing was no longer mandatory. Biologists in coastal villages estimated the number of bears taken and not sealed, which, together with bears recorded on sealing documents, gave yearly estimates of total kill. These are given in Table 1, along with comparative figures since 1925.

The State has also remained involved with polar bears by providing and recommending for habitat protection relative to oil and gas exploration and development on and adjacent to Alaska's north coast. The Alaska Department of Fish and Game has identified polar bear denning and potential

denning areas along the coast and inland for 25 miles and has stipulations included in road and seismic permits that roads and seismic lines will avoid these areas as much as possible. All seismic and drilling activity is prohibited within one mile of Cross Island, a known polar bear denning area, during periods of snow cover.

The State has also taken measures to protect ringed seals, the principal food of polar bears. Seismic operations are not allowed on ice beyond the 3-fathom water depth after 20 March to protect ringed seals in pupping dens.

For activities on State lands, stipulations are made a part of permits through the State permitting process. For Federal lands, stipulations go from the Alaska Department of Fish and Game to the U.S. Fish and Wildlife Service, which then transmits them to whichever Federal agency issues the permit for the specific area in question.

The State has consistently opposed the sale of oil leases in the Beaufort Sea offshore from a series of barrier islands extending from the Colville Delta eastward to the western edge of the Arctic Wildlife Range on the basis that present technology does not provide for drilling in this area in an environmentally sound manner. Polar bears, ringed seals, and the food chain supporting them are of major concern. Nevertheless, the Federal government is proceeding with plans for leasing in this area.

Table 1. Alaska polar bear kill figures, 1925-1979

<u>Year</u>	<u>West Area</u>		<u>North Area</u>		<u>West & North Areas</u>	
	<u>Total</u>	<u>Females</u>	<u>Total</u>	<u>Females</u>	<u>Total</u>	<u>Females</u>
1925-53					117(Ave)	
1954					100	
1955					128	
1956					135	
1957					206	
1958					128	
1959					250	
1960					162	
1961	111	29	37	11	148	40
1962	142	38	57	22	199	60
1963	137	21	50	17	187	38
1964	189	34	66	25	255	59
1965	202	40	96	28	298	68
1966	257	50	148	50	405	100
1967	131	16	92	30	223	46
1968	209	33	115	46	324	79
1969	201	40	87	34	288	74
1970	240	45	95	43	335	88
1971	146	31	68	29	214	60
1972	174	26	65	17	239	43

<u>Year</u>	<u>West Area</u>		<u>North Area</u>		<u>West & North Areas</u>	
	<u>Total</u>	<u>Females</u>	<u>Total</u>	<u>Females</u>	<u>Total</u>	<u>Females</u>
1973	13	6	23	11	36	17
1974	29	10	19	7	48	17
1975	108	50	38	16	146	66
1976	140	61	27	12	167	73
1977	80	39	34	17	114	56
1978	32	17	27	5	59	22
1979	15	6	14	5	29	11

Sources

- 1925-56 Annual reports of the Alaska Game Commission.
- 1957 Tovey, P., and R. Scott. 1957. A preliminary report on the status of polar bears in Alaska. Presented at Alaska Science Conference.
- 1958 Scott, R., K. Kenyon, J. Buckley, and S. Olson. 1959. Status and management of the polar bear and Pacific walrus. Trans. North America Wildlife Conference 24:366-373.
- 1959 Alaska Department of Fish and Game files.
- 1961-72 Alaska Department of Fish and Game sealing records.
- 1972-79 Alaska Department of Fish and Game sealing records and estimates of unsealed hides.

Polar Bear Specialists
Eighth Meeting
Paper No. 11

POLAR BEAR RESEARCH AND CONSERVATION
IN THE USSR
1979-1980

Report at the 8th Meeting of the Polar Bear
Working Group of IUCN

Dr. S.M. Uspenski, S.E. Belikov

(All-Union Research Institute on Nature Conservation and
Reserves, USSR Ministry of Agriculture)

During the period under review the leading agency that carried out the research on the polar bear in the USSR, and also coordinated this research, was the All-Union Research Institute on Nature Conservation and Reserves of the USSR Ministry of Agriculture (it was organized in 1978 on the base of the Central Laboratory on Nature Conservation of the USSR Ministry of Agriculture). A number of other institutes of the USSR Academy of Sciences (the State Committee on Hydrometeorology and Monitoring under the USSR Council of Ministers, the Main Administration of Hunting Management and Reserves under the RSFSR Council of Ministers) took part in the research and conservation activities.

Polar Bear Ecological Studies

In 1979 field research in Wrangel Island was resumed and conducted in cooperation with the staff of the state preserve that was established here.

The aim of the research was as follows:

- evaluation of the absolute number of the maternity dens of the polar bears in Wrangel Island;
- effectuation of the total count of the dens on the model plot of Wrangel Island in Drem-Head Mountains;
- immobilization and tagging of the females and cubs in maternity dens;
- continuation of the winter ecology research and studies of the behaviour of different groups of the polar bears in this region;
- rendering assistance to the preserve in polar bear research.

Evaluation of the Absolute Number of the Maternity Dens in Wrangel Island in 1978/79

Because of the unfavourable weather conditions it was impossible to carry out total aerial counts of the dens as had been done in previous years. To solve the problem, results of the terrestrial counts of the dens on the model plot in Drem-Head Mountains were used. The total number of the dens counted was equal to 264 (it is the average value, while the credibility level is equal to 0.90).

Total Count of the Dens on the Model Plot

The total count of the dens made it possible to evaluate the corrective coefficient to the data of the den aerial counts and thus calculate the total number of the dens on the whole island. Besides this it gives an idea of the dynamics of the number of the dens in the region under study.

The Drem-Head Mountains (the north-west of the island) served as a model plot; the area about 25 sq. km. This area is characterized by a very high density of the dens. Since 1969 stationary research by the expedition of the All-Union Research Institute on Nature Conservation and Preserves of the USSR Ministry of Agriculture has been conducted here.

Search of the dens was done almost every day from the 6th of March till the 15th of April and covered practically the whole period of their opening and leaving by the bear families.

In 1979, 30 dens, of which 22 dens are maternity ones and 4 dens are temporary ones, were discovered and mapped (the dens being located in Drem-Head Mountains). We failed to establish the type of the 4 dens. It should be noted that the number mapped in 1979 is close to the average number of the dens on the model plot during the ten years of the research (Table 1).

Table 1 The Number of the Dens Discovered

	Year									
	1964	1969	1970	1971	1972	1973	1974	1975	1976	1979
Total	21	52	38	23	20	35	42	63	17	30
Temporary Dens	?	?	?	?	?	2	3	10	4	4

Immobilization and Tagging of the Bears in the Dens

To immobilize and mark females and the cubs in the dens, methods that were developed earlier and tested in Wrangel Island were used. Ten lactating females were immobilized and tagged in 1979 in Drem-Head Mountains. Together with the young the number of the animals tagged amounted to 29 (Table 1).

Opening and Leaving of the Dens, Their Distribution and Structure

The first opened den was discovered on the 16th of March - the last, on the 15th of April. The dens opened steadily due to the settled weather (without blizzards) that set in between March and the first half of April in Drem-Head Mountains.

The leaving of the dens by the bear families began relatively late - after the last 10 days of March - and coincided with the period of the raising of the temperature of the air (from $-30/35^{\circ}\text{C}$ to $-20/25^{\circ}\text{C}$).

What draws attention is an immensely large percent, if compared to the previous years, of the maternity dens having compound structure (only two of the dens studied had simple structure - 1 chamber; the others had many chambers). The reason for that may be thaws that took place twice during the last months before the bear families left the dens. Icing of the walls and the roof of the den probably accounts for the deterioration of the temperature-gas regime in it and made the females resume the digging activity. It is interesting to note that in some dens there were traces of the digging activity of the cubs (these were for example chambers, corridors, niches in the walls, etc. dug by them).

It should be noted that the snow in March-April 1979 was not relatively dense which facilitated the digging activity of the females and cubs.

Ecological and Morphological Characteristics of the Lactating Females and Cubs

In 1979 the females studied either had no hypodermic layer of fat or it was thin. The exceptions were females from two dens whose layers of fat were well formed.

The weight of the cubs in opened dens varied from 6.5 to 11.6 kg. No reliable sexual differences as to the weight of the cubs of this age were established, but on the whole the average weight of the cubs from the opened dens (9.3 kg) in 1979 was one of the lowest for all of the years of the observations.

In 1979 the average size of 20 broods was 1.8; broods with one cub were found 4 times (out of them 3 broods were traced), and broods with two cubs were found 16 times (out of them 7 broods were traced). The average size of the brood in 1979 is near to that for the 9 previous years (1.78 for 172 broods).

Results of the ten year polar bear research in Wrangel Island enable us to draw some conclusions:

1. The number of the dens in any particular area of Wrangel Island directly correlates with ice conditions on the coast in the period of the appearing of the pregnant females on the land and lying in the dens.
2. Comparing the number of the dens on the model plot (Belikov, 1977; data of 1979) and the number of the dens on the whole island (Kischinski, Uspenski, 1973; Chelintsev 1977) one may see that the latter is subject to fluctuations to a lesser degree which reflects most probably the dynamics of the number of the animals in the population.
3. The state of nourishment of the females and cubs during the opening and leaving of the dens may serve as an indicator of the effectiveness of the denning period on the one hand and of the general state of the population on the other. It is not altogether excluded that the low nourishment of the females in Spring 1975, 1976 and 1979 reflects to some extent the general state of the breeding group of the population in the denning period. For this reason it is appropriate in the future to conduct research of the food resources of the ringed seal in Wrangel and Herald Islands.

4. The terms of lying, opening and leaving the dens are determined by the factors of the environment of which the most important are the snow cover, temperature and wind. For each phase of the denning period the combination of these factors is different. One must note that in 1979 the first emergence of females from of the dens began much earlier than the end of the denning period - a month or two earlier. One may judge by the traces that they coincided in time with the thaws that took place in January - February. Most probably these thaws made the females leave the dens temporarily.
5. The distribution of the dens in the mountains and the peculiarities of their structure are closely connected with the character of the formation of the snow cover in winter and with the availability of the remains of the snow of the previous year.
6. The breeding females of the polar bear make the dens both in the snow of the current year and in the remains of the snow of the previous year, mainly on the mountain slopes, but sometimes in the snow deposits on the banks of the rivers and on the sea coast.
7. As a rule the females lie in the dens in mountain areas near the shore of the sea though some dens occur also in the central parts of the island, 25-30 km away from the coast.
8. The behaviour of the breeding females in the denning period may be classified as "indifferent" with regards to the attitude towards each other.
9. The breeding females take good care of the young. The cases of cannibalism observed previously (Kischinski, 1973; Belikov, Kuprijanov, 1977) should be considered exceptions.

10. Observations of the lactating females showed that for some of them the presence of people did not cause disturbance. In some cases the dens were located several hundred metres away from the base of the expedition and the females (including the immobilized ones) were in no haste to leave their shelter. At the same time some other females left the dens soon after they were observed. It is difficult to say if the reason for that was the disturbance factor or simply that it was time to leave the den.
11. The reaction of the pregnant females lying in the den to the disturbance factor differs from one female to another. Some females that dug the den in the snow of the current year (not deep dens) easily left them if troubled by man. In contrast to that, the females denning in the snow that remained from the previous year do not leave their dens no matter how frequently they are visited by man. It is not excluded that in this case the stay of the pregnant female in a shelter as stable the den dug in the remains of the previous year's snow makes her feel safe in spite of disturbance.
12. The number of bears tagged in Wrangel Island exceeded 180, one third of them being breeding females. So far there have been no returns of the tags. The main reasons for that may be as follows:
 - a) the tagging method is imperfect and should be improved
 - b) females tagged in Wrangel Island do not always return here for breeding.

In 1980 the expedition of the All-Union research Institute on Nature Conservation and Reserves of the USSR Ministry of Agriculture conducted field research in Franz Joseph Land (the head of the expedition, S.E. Belikov, scientific adviser: S.M. Uspenski).

The working programme of the expedition was as follows:

- aerial counts of the polar bears and their dens, and also the walruses, seals, and whales in the area of the archipelago (together with the Archangel Hunting Management Unit of the RSFSR Main Hunting Administration);
- terrestrial counts of the dens of the polar bears;
- tagging of the polar bears
- studies of the ecology and behaviour of the polar bears and other mammals.

Aerial Counts of the Polar Bears and their Dens

Aerial counts were conducted on the 31st of March and on the 1st and 21st of April with the help of the airplane IL-14, the speed being 230-250 km per hour and the height of the flight being 100-150 m.

In the course of the aerial counts on the 31st of March and on the 1st of April the coast of all of the big islands (including Victoria Island) was investigated, and also a flight around the archipelago was made. During two days 32 dens were discovered of which 14 were presumable. Several solitary bears and females with cubs born in the current year were noted.

On the 21st of April the flight around Franz Joseph Land was repeated, and also the route as far as 86°N. During the flights around the archipelago only traces of polar bears were noted.

It should be noted that the number of pinnipeds considerably increased (it was noted during the flight around Franz Joseph Land on the 21st of April) due to the fact that the animals were coming from the southern areas and concentrating within the archipelago. By that time the ice conditions around Franz Joseph Land changed - the number of the open sea areas increased. On the contrary the ice to the North of the archipelago was solid and that is why we failed to see any animals or their traces during the flight to 86°N.

Terrestrial Counts of the Dens and Tagging of the Polar Bears

Terrestrial research was done mainly on Greem-Bell Island, partly in Haise Island. Once research was done on Bromidge Island.

On Greem-Bell Island search for the dens was done mainly from the 6th of April till the 1st of May. In that part of the island that was not occupied by the glacier, 15 dens were found and investigated, of which 5 were maternity dens, and 6 were temporary ones. We failed to determine the type of 4 dens. Four dens were occupied by females with cubs. In three litters there were two cubs in each litter; in two litters, one cub in a litter.

It is interesting to note that some dens belonged to solitary bears that, judging by the compression of the snow in the den, spent less time in their shelter than the family groups.

It should be noted also that most of the dens discovered in Franz Joseph Land were located in relatively shallow snow deposits. The density of the snow near the dens was much lower than that on Wrangel Island.

On Haise and Bromidge Islands during the terrestrial investigations no dens were found. The reason for that may be that the research was done relatively late - on the 11-16th of April when all of the dens might have been deserted and covered by snow.

Tagging was done in one of the dens occupied by a bear family. The female was marked with an ear tag N802, and the cubs - the male and the female - N803 and N804 respectively.

The attempts to catch the wandering bears with jumping foot loops were not successful. It is reasonable to do that at the end of the summer - autumn, when, as the questionnaire data testify, polar bears are often seen on the land.

Counts and observations of the polar bears and other marine mammals were also made on board an atomic ice-breaker "Lenin". It was noticed that both the pinnipeds and the polar bears concentrate along the canal in the ice laid by the ice-breaker.

Preliminary Conclusions

1. Franz Joseph Land as shown already by V.Y. Parovschikov and S.M. Uspenski is an important centre of reproduction of the polar bear.
2. The results of the counts show that there are reasons to believe that the islands to the south-west of Haise Island (Nansen Island, Bromidge Island, Pritchett Island, Brady Island and others) and especially Greem-Bell Island are also an area of concentration of the polar bear dens.
3. Most probably, apart from the breeding females, bears of other sex and age groups also den in Franz Joseph Land.
4. Questionnaire data and observations made on board the ice-breaker testify to the fact that Vanderbilag Strait in the archipelago is one of the concentration areas for polar bears and pinnipeds in spring.

Counts on Vast Areas

As in previous years in the period under review, data on the distribution, number, sex and age structure of the animals were gathered. Information was accumulated during the ice reconnaissance flights by the Arctic and Antarctic Research Insitute and with the help of a special questionnaire investigation based primarily on a system of Soviet polar stations. The information received generally indicates a definite growth of the number of polar bears in the basin of Kara Sea. A trend towards less watchfulness of the polar bears towards Man is observed throughout the Soviet Arctic which may be the result of the ban put on the polar bear hunt. At the same time the problem of preventing polar bear attacks on the people grows in significance (the unprovoked cases of the polar bear attacking people has become more frequent lately).

Analysis of the population structure of the species

Analysis of the population structure of the species with the use of the element analysis of the bone tissue initiated in the USSR in 1976

(S.M. Uspenski and A.N. Golovkin) continued in the period under review.

Samples of the bone tissue (skulls) of the polar bears, both from the Soviet Arctic and Canada and Eastern Greenland (in the latter case collections from the Berlin Zoological Museum are used), are studied presently with the use of geochemical methods. Preliminary results indicate that within the Soviet Arctic three distinctly differentiated groupings of animals have been identified that may be viewed as separate populations.

Polar Bear Population Management

As in previous years (since 1956) polar bear catch in the Soviet Arctic in 1979-1980 was totally banned. The exception was the catch of a limited number of cubs to be kept in zoos. The cubs were taken on a planned basis by the expedition. The taking of each cub requires a special permit of the All-Union Institute on Nature Conservation and Reserves of the USSR Ministry of Agriculture, providing that the females remain alive. In the period under review 9 polar bear cubs were taken, of which 8 were in 1979 (4 in Frantz Joseph Land and 4 near the settlement of Amderma) and 1 in 1980 (in Wrangel Island).

The polar bear is included in the USSR Red Data Book (in category B - "rare species"). As in previous years, the human population, especially that of the Northern areas, was informed about the prohibition to take polar bears. The information was conveyed by means of press, radio, TV, etc.

Plans for Research in the Future

For the years 1981-1982 it is planned:

1. To continue field research on the ecology, behaviour, and elaboration of the scientific grounds for the management of the population of polar bears in the area of Franz Joseph Land.
2. To continue research on the analysis of subpopulations within the species with the use of geochemical methods.

3. To continue studies on the population dynamics of the species and the structure of the population over vast areas.

Proposals to the Programme of Joint Research

The aspect of the studies of the polar bear ecology that was studied least of all is the numbers (both of separate populations and the species as a whole) and the dynamics of the population. Without reliable and complete data as to that, it is impossible to work out a general strategy for the management of the stocks of polar bears. This is the most important task of the working group of the polar bear specialists of IUCN.

Proceeding from the above, the Soviet delegation at this meeting proposes that the research on the polar bear in all of the circumpolar countries (USSR, USA, Canada, Denmark and Norway) should be conducted more actively, especially studies of the number of polar bears and their dynamics. It is proposed that:

- in 1981-1982 methods of the counts of the polar bears on vast areas with the use of airplanes (and maybe other modern technical media) should be tested and improved on a national scale.
- At the IX Meeting of the working group (the end of 1982 - beginning of 1983) on the basis of the proposals being mutually acceptable methods of the polar bear counts on vast areas and methods of mathematical treatment of the results of the counts should be worked out.
- in 1983-1984 the first experimental synchronous polar bear count throughout the Arctic (in each circumpolar country by national forces and media) should be made.
- At the next Meeting of the working group (the end of 1984 - beginning of 1985) results of the first experimental synchronous polar bear count throughout the Arctic should be discussed with the purpose of making the methods of the counts more precise.
- In 1985-1986 and in the future every five years synchronous polar bear counts throughout the Arctic (in each of the five circumpolar countries by national forces and media) should be made.

APPENDIX

Results of the Tagging of the Polar Bears in Drem-Head Mountains, Wrangel Island, 1979

<u>Date of the Tagging</u>	<u>Number of the Tags</u>	<u>Number of the Ear Tag</u>	
		Female	Cubs
21.III	2	770	771 772
24.III	14	773	774 775
28.III	13	769	776 778
1.IV	1	779	780 781
3.IV	4	782	783 784
5.IV	17	785	786
8.IV	21	787	788 789
10.IV	22	790	791 792
11.IV	7	793	794 795
13.IV	10	796	797 798

x) Ear tags, diameter 300 mm, red, plastic

MEMORANDUM March 5, 1981

TO: Ian Stirling, Chairman IUCN/SSC Polar Bear Specialist Group
 Steve Amstrup, USFWS Polar Bear Project Leader

FROM: Mitchell Taylor, University of Minnesota

SUBJECT: Analysis of Alaskan polar bear population status

During the Specialist Group meetings I produced a preliminary analysis of mark-recapture data collected from Alaskan polar bear populations over the past 13 years. In essence this analysis made use of a modified Jolly-Seber procedure (DeMaster et al 1980) to calculate population size from the ratio of marked to unmarked animals in the capture period sample. The animal estimates of population size were observed to decrease at a relatively constant rate to a population estimate for 1980 which was about 1/5 my estimate for 1970.

Subsequent discussions with yourself, Jack Lentfer, and Ancel Johnson indicated that capture bias from local fidelity to capture areas was occurring. In addition Sam Harbo pointed out that the survivorship estimates

used in the DeMaster et al (1980) procedure were less than the "observed decline" indicated.

My work since that time has focused on evaluating the effects of capture bias and the assumption of constant survivorship at 0.88 annually. The results of this work are also preliminary, but I believe important enough that they should be noted or included in the final report.

Capture bias towards marked individuals (i.e. marked animals are more likely to be recaptured than unmarked) reduces the population size estimated. The amount of reduction increases rapidly as the proportion of marked animals decreases. You are aware that the proportion of Alaskan polar bears marked is certainly less than 10%. Additionally, as the fraction of polar bears marked diminishes (because of annual recruitment of unmarked cubs and annual loss through mortality of marked animals) the population estimate is decreased. The mark-recapture program has tagged fewer animals during the last four years because of changing research priorities. Thus reduced annual tagging effort coupled with some positive catchability bias could explain both the population trends and the disparity of mark-recapture estimates to previous transect and census estimates.

The effects of annual loss of polar bears by hunting on the survivorship estimates from population age structure are small when the size of the harvest is small relative to the population size. However, when the harvest is large relative to the population size, age structure estimates of survivorship would be affected. The effect of an error in the survivorship estimate is a linear increase (overestimated survivorship) or a linear decrease (underestimated survivorship) of the population size. As you know the survivorship estimate from the Alaskan data (0.88 annual survivorship) is consistent with estimates from other areas and polar bear biology.

My efforts at University of Minnesota have focused on developing a technique for evaluating and correcting for catchability bias. Don Siniff has

identified a procedure which we are currently developing. Don has also made me aware of a wealth of other population estimation procedures that we will employ to examine the effects of relaxing or violating underlying assumptions (such as equal catchability). From this discussion it is apparent that an understanding of movements is crucial to interpreting existing mark-recapture information. I hope the work I am finishing for my thesis requirements can serve as a catalyst to involve Jack, Doug, Steve, Fred and others in a joint effort on this question. The final area of effort has been the use of cohort data to calculate annual survivorship.

My purpose for writing this memo is to identify the analysis I produced in Oslo as preliminary work still in progress. I am certain you and other members of the Specialist Group are aware of that fact. This memo should clarify the point for any interested outside parties that were not present at the meeting.

Thank you,

Mitchell Taylor

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OSLO 20 - 22 JANUARY 1981

SUMMARY AND CONCLUSIONS

1.

A Consultative Meeting of the Contracting Parties to the Agreement on the Conservation of Polar Bears, was convened by Norway as depositary government, in Oslo 20 - 22 January 1981.

Governments of the following countries were represented: Canada, Denmark, Norway, Union of Soviet Socialist Republics, United States of America.

A representative of the International Union for the Conservation of Nature and Natural Resources (IUCN) participated in observer capacity.

A list of participants is attached as Annex I.

The meeting was opened by Mr. Rolf Hansen, Norwegian Minister of Environment. (See Annex II)

Mr. Erik Lykke, Norway, was elected Chairman for the meeting.

The draft agenda was revised and adopted following discussion. (See Annex III)

2.

The Chairman of the IUCN Polar Bear Specialist Group informed the meeting of the conclusions reached at the meeting of the Specialist Group, held in Oslo 15 - 19 January 1981. (See Annex IV)

The meeting of the Contracting Parties took note of the estimates of the polar bear population presented in Annex IV.

3.

In the discussion which followed, the meeting recognised that the establishment of the Agreement had been of decisive importance for the protection of the Polar Bear. The meeting further noted that all five governments had decided to continue the cooperation under the Agreement.

4.

While noting the progress achieved in the development of assessment methods for estimating polar bear populations, the meeting agreed that further efforts in this direction should be given high priority.

5.

The meeting agreed that national efforts should be directed towards identification of important denning and feeding areas, and towards their protection from disturbance or destruction; and protection of the polar bear habitats from the detrimental effects of human activities.

The meeting recognised the desirability of providing adequate protected zones around identified denning areas, where disturbances due to human activities otherwise may occur.

6.

The meeting also recognised that changes in the Arctic environment associated with human activities, and instances of overharvesting of polar bears, may severely impact polar bear populations in the near future.

In face of this situation the meeting agreed that national authorities should continue to direct efforts towards avoiding a reduction of polar bear populations.

7.

The meeting noted that interactions between polar bears and man will increase because of increased human activity in the Arctic, and agreed that investigations for the development of appropriate measures which would minimise polar bear - human interactions in the future should be intensified.

8.

The reports provided to the meeting by the delegations on the implementation of the Agreement and relevant management matters are attached as Annex V.

9.

The Norwegian delegation submitted to the meeting of the Parties for review a proposal for a broader exchange of scientific data relevant to nature conservation problems in the Arctic.

This proposal is attached as Annex VI.

10.

A statement circulated by the representative of the IUCN is attached as Annex VII.

11.

The meeting confirmed the continued validity of the Statement relating to the IUCN Polar Bear Specialist Group, as recorded on page 45 of the Final Act and Summary Record of the Conference to Prepare an Agreement on the Conservation of Polar Bears, held in Oslo 13 to 15 November 1973.

12.

The meeting noted that during the five years that the Agreement on the Conservation of Polar Bears has been in effect, a significant amount of research has been conducted. This research has been reported upon, every two years, to the IUCN through the Polar Bear Specialist Group. In particular, research relevant to the Agreement has been conducted in the following areas, several of which have involved international cooperation: satellite tracking; estimate of the size of subpopulations; maternity denning surveys; shipboard and air surveys of the distribution and abundance of polar bears in the ice; computer modelling of population dynamics; interactions between bears and humans; and, possible detrimental effects on polar bears and their habitats resulting from increased offshore industrial activities.

The need for a continuation and intensification of polar bear research efforts in the participating countries was recognised.

Extract from "Final Act and Summary Record, Conference to Prepare an Agreement on the Conservation of Polar Bears, Oslo, 13 to 15 November, 1973"

Annex D, Para 6

IUCN Polar Bear Specialist Group

The Working Group recognized the important contributions made by the IUCN Polar Bear Specialist Group in providing a forum for the exchange of information and ideas between the five Polar nations on research and conservation of the Polar Bear.

The Working Group requested IUCN to continue the activities of the Polar Bear Specialist Group to provide a means for such consultation and to bring before the participating Governments any findings or recommendations of the Group relating to research and conservation of the polar bears.



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