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POLAR BEARS

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Polar Bear Specialist Group
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The International Union for Conservation of Nature and Natural Resources (IUCN) is an independent international body, formed in 1948, which has its headquarters in Morges, Switzerland. It is a Union of sovereign states, government agencies and non-governmental organizations concerned with the initiation and promotion of scientifically-based action that will ensure perpetuation of the living world -- man's natural environment -- and the natural resources on which all living things depend, not only for their intrinsic cultural or scientific values but also for the long-term economic and social welfare of mankind.

This objective can be achieved through active conservation programmes for the wise use of natural resources based on scientific principles. IUCN believes that its aims can be achieved most effectively by international effort in cooperation with other international agencies, such as Unesco and FAO.

The World Wildlife Fund (WWF) is an international charitable organization dedicated to saving the world's wildlife and wild places, carrying out the wide variety of programmes and actions that this entails. WWF was established in 1961 under Swiss law, with headquarters also in Morges.

Since 1961, IUCN has enjoyed a symbiotic relationship with its sister organization, the World Wildlife Fund, with which it works closely throughout the world on projects of mutual interest. IUCN and WWF now jointly operate the various projects originated by, or submitted to them.

The projects cover a very wide range from environmental policy and planning, environmental law, education, ecological studies and surveys, to the establishment and management of areas as national parks and reserves and emergency programmes for the safeguarding of animal and plant species threatened with extinction as well as support for certain key international conservation bodies.

WWF fund-raising and publicity activities are mainly carried out by National Appeals in a number of countries, and its international governing body is made up of prominent personalities in many fields.

THIRD WORKING MEETING OF POLAR BEAR SPECIALISTS

C O N T E N T S

Dr. Christian Vibe of Denmark presented a paper on fluctuations in numbers of polar bears hunted in Greenland. As the paper is part of a greater work on climatic fluctuations in the Arctic and as more research is needed, the paper is not ready for publication.

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in the
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S U M M A R Y O F T H E M E E T I N G

Welcome and Introductory Address

Dr. Gerardo Budowski, Director-General of IUCN, welcomed delegates to the third meeting of the Polar Bear Specialist Group (Paper no. 1). He stated that considerable progress had been made in the collection of data on the polar bear's biology and ecology since the Group's formation in 1968. The Group's meetings had focused attention on the need for more effective management of this important arctic resource and the IUCN noted, with satisfaction, the new legislation that had been effected to this end during the past two years in certain nations with arctic territories. Dr. Budowski referred to new developments within IUCN during this period, including the establishment of closer links with the World Wildlife Fund. He looked forward to close collaboration in the future between the Polar Bear Group and the various Commissions and Groups within the Union that were concerned directly and indirectly with the study and conservation of the Arctic's natural resources.

Election of Chairman and Rapporteurs and other Introductory Business

Dr. John Tener was elected unanimously as Chairman of the meeting. Dr. Colin Holloway was elected rapporteur and Dr. Alexandre Kistchinski was elected to assist him.

It was agreed that a report on the meeting, together with the working papers and other relevant documents, should be published as an IUCN Supplementary Paper, subject to the same provisos as were applied to the publication on the previous meeting (see IUCN Supplementary Paper no. 20).

Consideration of a press release on the meeting was deferred until the last day, when it was agreed that a release should be prepared and distributed (Paper no. 9).

Miss Warland sought the Group's approval for the admission to the meeting, as observers, of certain members of IUCN and WWF staff who would be concerned with subsequent action on decisions reached. It was agreed that the request should be granted, but that observers could be excluded from any part of the discussions at the Chairman's

discretion, as reflected by the wishes of the members. One vote was recorded against this motion. The subject of admission of observers from outside the IUCN/WWF organizations was raised later in the course of the meeting. It was decided that applications would be considered individually on their merits. It was agreed that, at some future date, the Group would need to decide precisely on what basis selections would be made.

Research Progess Reports by Countries, 1970-71

Progress reports on polar bear research in the five Arctic nations during this period were submitted and reviewed (ref. Papers 2, 3, 4, 6, and 8). The resulting discussion elicited some additional information and led to certain tentative conclusions.

Doubts were expressed over the reliability of polar bear census figures derived from counts from fast, high-flying aircraft over sea ice. Denning surveys undertaken from aircraft appear to be reliable, but it was desirable to check them by surveys on the ground. It was unfortunate that the work on infra-red scanning devices for polar bear censuses had been suspended because of lack of funds as this technique was considered to have high potential for detailed aerial counts in bear concentration areas.

Considerable interest was shown in the polar bear population estimates for the Chukchi/Beaufort Sea area (4925 animals) based on a life table constructed from harvest data, and for the Svalbard region (1500-2000 animals) based on observation from ships under optimum weather conditions. Differing opinions were expressed about the validity of applying a male survival curve to the female segment of the population and the likely period of heaviest juvenile mortality, but it was agreed that the construction of life tables was a very valuable means of providing new population estimates for the polar bear and should be pursued in countries in which harvest data were available.

The Canadian, Danish and Soviet delegates gave further details of denning sites within their regions, and possible explanations for th marked clumping of den site distribution was discussed. Evidence from Greenland suggested that denning conditions were marginal in Arctic areas where the mean air temperature for February was warmer than minus 15-20°C, and that denning in these conditions often resulted in the collapse of the den and loss of the cubs. It might explain the comparatively low density of dens in Svalbard. A discussion on the possible causes of natural mortality among cubs from

damage to dens by warm temperatures or high winds, food shortage, cannibalism, desertion and human disturbance was inconclusive; additional data on these topics were required.

A total of some 850 polar bears have now been marked. The majority of marked bears recovered to date in Alaska, Canada and Norway had been found in the general vicinity in which they had been marked. It was agreed, however, that the home ranges of polar bears were vast and these preliminary data did not exclude the possibility of long distance, seasonal migrations in some regions. It was felt that if reductions in permissible harvests continued, returns from kills would obviously diminish and that there was a need for new tags that would be visible on living animals when viewed from the air. The Committee on Tagging agreed to re-examine this problem. Reports on telemetry methods of tracking bear movements in Alaska and Canada were favourable and, whilst technical problems still needed to be solved, extension of the use of this technique was considered to be highly desirable.

Dr. Vibe presented further information on climatic fluctuations and changes in polar bear and seal harvests during past decades in Greenland. It was recommended that the possible influence of socio-economic factors on these correlations should be examined in detail. It was also suggested that climatic fluctuations might affect bear distribution rather than absolute numbers, although if they prevented pregnant females from moving to denning sites, for example, then populations might well be depressed.

Other topics that were discussed included morphometric studies (work is continuing in many arctic regions), compilation of sex and age structure (from marked bears in Alaska and, for age structure only, from the examination of skulls and teeth in Norway), production in denning areas (detailed studies are in progress in Canada and the USSR), parasitological examinations (principally in Alaska and USSR) and preliminary analyses of pesticide residues in bears (Alaska and Canada). Physiological studies on polar bears had been undertaken in north America by Nils Oritsland, and a behavioural study on polar bears on islands in the James Bay area was nearing completion. Mr. Lentfer gave details of preliminary studies on bear feeding habits on moving pack ice in spring, and Dr. Jonkel reported on the results of a post-graduate comparative study of bear feeding in mainland and island populations in Hudson Bay, which would be published in the near future.

Conservation Progress Reports by Countries 1970-71

Delegates from each country reported on conservation progress since the last Group meeting (ref. Papers 2, 5, 7 and 8). A number of significant steps to reduce exploitation of the polar bear had been taken by the five Arctic nations during the 1970-71 period. Some additional information was provided in the discussion.

The Norwegian delegates recommended that the study and protection of the polar bear's habitat should receive increasing attention from the Group, as an essential complement to control of exploitation. Oil exploration claims had been made in the Svalbard region and drilling was due to commence on Edgeoya Island in the Spring of 1972. It was considered that the situation called for detailed surveys with a view to the implementation of a comprehensive land use programme, but that the ramifications of the Svalbard Treaty would hamper any quick solution to the problems that these developments raised. In the meantime, provisional regulations to guard against environmental damage had been introduced. Furthermore, the establishment of three National Parks and some reserves will be recommended. In this connection, all possible support was promised by the Group for the proposal that Kong Karls Land should be accorded permanent reserve status.

In response to questions, the Soviet delegates stated that development and mineral exploitation posed no serious threat at present to the main polar bear areas in the Russian Arctic. Rumours of plans for the construction of a large harbour on Wrangel Island were quite unfounded. The Government was actively pursuing a policy of preserving the quality of rivers that drained into the Arctic ocean.

There had been a relatively substantial drop in the estimated total polar bear harvest, from approximately 1300 in 1969/70, to 900 in 1970/71. The reduction was largely attributable to the sharp decline in polar bear kills in the Svalbard region, resulting from the new hunting restrictions and particularly unfavourable ice conditions during the 1970/71 hunting season, and also to the smaller number of hunting permits issued in Alaska.

Illegal hunting was not considered to be a serious problem in most regions. In Alaska, however, the demand for polar bear pelts was high (up to $2,000 might be paid for a skin on the black market). The numbers of animals poached were unknown, but current losses would almost certainly be reduced if approval were given to the recommendations from the Alaska Department of Fish and Game that the use of aircraft in polar bear hunting and all sales of skins be

ended in 1972. These recommendations will be considered by the Alaska Board of Sport, Fish and Game in the near future, and Mr. Lentfer agreed to inform the Group of the outcome.

Identification of Problems of Current International Concern

This item was added to the provisional agenda at the request of Dr. Macpherson, who asked if the Group proposed to apply itself to resolving problems of international concern in the study and management of the polar bear. If this were the intention, he requested that current problems in this field be identified and that proposals be made on the manner in which they might be resolved.

It was agreed that these problems fell within the terms of reference of the Group, which, by virtue of its international character and ecological expertise, was well qualified to pursue them. The data collected so far, principally through national efforts, had begun to reveal problems in which international cooperation was essential and the time was right to identify these needs and to explore the means by which they could be satisfied. It was stressed that expansion of international research and management should not be made at the expense of national endeavours. The ultimate objective was an international management scheme for the polar bear, based on sound scientific information.

Five major problems of current concern were identified and discussed. Some of these problems were discussed under items (5) and (6) of the agenda, but all relevant information is included here for easy reference.

Identification of population discreteness in the polar bear continued to be a major problem in the Group's programme and in the formulation of management plans. In some regions of the Arctic, notably the Chukchi/Beaufort Seas and the North Atlantic, these problems could not be resolved without international effort. It was agreed that IUCN be requested to forward a resolution on this subject (Paper 10.2) to the governments concerned. On the same theme, it was also agreed to request IUCN to write to each of the five Arctic nations to request them to expand and intensify their national tagging programmes. It was considered that work in the Chukchi/Beaufort Seas and North Atlantic might ultimately require joint efforts in international waters and involve the formation of an international Polar Bear Task Force. It was agreed that the Group must be ready to formulate specific programmes re-defining the objects and methods of these operations. Tagging and den surveys by conventional and new

techniques would probably constitute the main thrusts, but the statement from Dr. Uspenski that very large scale tagging on Wrangel Island would almost certainly prove impossible, led to consideration of methods of massive short-term marking with dyes that would be visible on the living animal, from "set-guns" or by precision spraying from the air. Cubs as well as mother bears might be tagged at den sites. The use of assessments of production of denning sites, to see if it were possible to account for the bears known to exist in these regions, was suggested as an alternative to large scale den surveys on multi-year-old ice packs.

There was world concern over the status of the polar bear and many responsible organizations and individuals looked to the Polar Bear Group for information and assurances of better management. To satisfy this need for reliable information, it was agreed that the Group would provide the data for a short publication that would summarize progress made to date and identify current problems and gaps in knowledge. The document would consist of: (1) a short introductory statement on the background to the problem and work of the Group; (2) the main progress report including: (a) a statement on the total world population, (b) productivity, (c) migration patterns and discreteness of populations, (d) impact of man through bear harvests, (e) environmental problems, (f) summary of management accomplishments to date and (g) international agreement on research and conservation; and (3) a summary of gaps in knowledge and future research needs. The report would be accompanied by maps to show main denning sites, limits of occurrence and known migration routes. Photographs would be included as appropriate. Questionnaires on this subject were circulated to Group members for completion and return to Miss Warland by the end of the month. It was agreed that IUCN be requested to compile and publish the report.

Another facet of this problem was the need for good documentary films on polar bear management achievements and problems that could be used for large scale public education. Several films which might suit this purpose were already available within the Group. Miss Warland agreed to contact the WWF film library to ascertain their requirements and to transmit the response to Group members so that action to circulate the films could be taken.

It was recommended that the Group should consider a comprehensive analysis of the possible effects of Arctic development on polar bear stocks, to include consideration of ice movement, biodegradation of oil in Arctic waters, food chains etc., with the object of providing guidance on approaches to development with the minimum disruption of the polar bears' environment. The recommendation was accepted in principle but it was felt that in the forseeable future, Group action should be largely confined to assessment of polar bear populations and habitats, with special reference to their vulnerability to industrial action, together with continuing literature reviews of data on these problems derived from other sources.

The need for an international scheme of identification seals for polar bear skins, to promote control of trade and hunting, was discussed. It was agreed that the Group should not press for an absolute ban on the polar bear skin trade. It was important to the long term future of the bear that it retain its immediate economic value and a total ban would cut off the legitimate trade of Eskimos and Greenlanders, for whom polar bear hunting was an essential part of their culture. Certain practical problems in the implementation of such a scheme could be avoided if each seal was accompanied by appropriate documentation and if processing of skins was confined to the country of origin. Some delegates felt that a scheme of this type should only be pursued if poaching became a serious problem. It was agreed to keep the matter under surveillance but, in the meantime, it was hoped that some jurisdictions would examine the feasibility of introducing national schemes.

Planning and Coordination of Research and Management Programmes 1972-73

Discussion under this item was devoted primarily to matters requiring coordination and cooperation in planning for research and management programmes. To some degree, it was a continuation of the previous agenda item with greater accent on the expansion of continuing programmes.

An early report was requested from the sub-committee appointed to examine the problem of improving the visibility and longevity of tags for marking bears (Dr. Jonkel, Mr. Lentfer and Dr. Uspenski). It was hoped that if individual members were to develop promising new methods of marking in the future, they would circulate details and sample materials to other members of the Group at the earliest opportunity.

It was agreed to initiate an international programme of parasitological studies. Samples of infected muscle tissue of polar bears from all parts of their range would be sent to Dr. Ozeretzkovskaia of the Institute of Medical Parasitology, Moscow, for examination under standard conditions. The aim was to provide pathological data on the polar bear and, if possible, confirmatory evidence of population discreteness. Dr. Ozeretzkovskaia will be requested to send detailed instructions in the immediate future to all Group members on the type of material required and methods of collection, preservation and dispatch.

It was also agreed to initiate a similar programme to determine pesticide and PCB residues in polar bears in representative parts of the total range of the species. Subcutaneous fat samples will be collected from six adult female bears from each of the following regions: North Alaska, West Alaska, Hudson Bay, Foxe Basin, Baffin Bay, Barrow Strait, Beaufort Sea, Greenland Sea, Barents Sea, Central Soviet Arctic, and Wrangel Island. The principal investigator, Dr. G. Bowes (Canada), will send a schedule, instructions and materials, as needed, to all collaborating members of the Group by March 1st. Material, accompanied, if possible, by a tooth for aging, should date from 1971/72 and should be sent to Dr. Bowes by May 30th. A report, incorporating all analyses, will be provided to Group members by September 1st 1972.

The identification of the main feeding concentration areas of the polar bear was an important, but hitherto largely neglected, objective in the Group's programme. The ringed seal was considered to be the main food item of the polar bear and it was agreed to formulate a resolution calling for the study and conservation of important ringed seal areas by the circumpolar nations (Paper 10.4), as an essential component of a survey and protection programme for bear concentration areas. An additional component was the collection of basic data on bear feeding habits and it was also agreed that the initiation of studies on this topic would be very desirable.

It was suggested that the mapping of polar bear denning sites, migration routes and areas of occurrence required for the progress report (see Agenda item 5) might be extended to include feeding and general concentration areas. It was agreed that each Group member would undertake this task for his own national area and that the results would be sent to the Group Chairman for his decision as to whether or not sufficient information was available for publication of the maps to take place immediately, or if it should be delayed until further data were available.

Mr. Brooks expressed the hope that the Group would not lose sight of the continuing need for calculation of basic biological parameters from harvest data, productivity of denning areas and other, by now, routine surveys. He drew attention to the specific needs for data on age of sexual maturity in females (which might be obtained from tagged animals), survival rates in early life (from sizes of litters observed out of dens and before juveniles leave the family group), irregular breeding cycles (from occurrence of females without litters), and indices indicating trends in populations, such as changes in age composition and detection of sustained yield levels (from harvest data).

In general terms, national research efforts in 1972-72 will consist of the continuation and expansion, where possible, of existing programmes, with special emphasis on further marking and recapture, denning surveys and telemetry. Mr. Larsen requested the Soviet scientists to supply him with blood samples from their region of the Arctic, to complete his circumpolar set of samples for electrophoretic analysis. It was hoped that Dr. Manning's morphometric work in collaboration with the USSR and Norway could be completed in the near future. Dr. Jonkel expressed his willingness to cooperate with Dr. Vibe on studies of population discreteness in the Baffin Bay/Davis Strait region, and the possibilities of Mr. Lentfer cooperating with Dr. Stirling in the Banks Island/Beaufort Sea were discussed briefly.

The Group noted with some concern that the delegates of Denmark and Norway had no assured source of adequate funding for their polar bear research programmes for the 1972-73 period. It was agreed that a resolution be drafted (Paper 10.3) to request IUCN to urge the governments concerned to maintain and expand their polar bear research programmes as essential components of the international effort on this problem.

International Convention on the Polar Bear

Mr. Frank Nicholls, Deputy Director-General of IUCN, reviewed the history of the draft convention before the meeting and explained its intentions. It was appreciated that most delegates were not empowered to speak for their governments on this draft and, to avoid any possible embarassment, he proffered a formal invitation to the members of the Group to express a collective opinion on the draft convention, in their capacity as professionals engaged in research in this field and as an advisory committee to IUCN.

The meeting recognized the work of IUCN on this problem and congratulated it on the preparation of a very useful draft. The consensus of opinion was that IUCN should take a long term view of the convention since the procedures involved in bringing it into effect would take time; experience with other conventions indicated that it would be realistic to think in terms of five or ten years before a convention could be achieved. During this period it was hoped that further scientific data would be accumulated as a basis for sound and reliable international management action.

It was decided that rather than attempt to give guidance to IUCN on the precise terms in which the present draft should be elaborated, the meeting should lay down general principles which should be taken into account in the preparation of a further draft.

The following basic principles were agreed:

(1) The polar bear is both a national and an international resource that is to say, there are national and international component to polar bear management, depending on the character of the bears in question and their geographical location.

(2) Further research is required specifically to meet management needs of the polar bear, and each of the Arctic nations involved has a responsibility to conduct this research.

(3) Cooperation in national as well as international programmes is very important. Management of the polar bear resource requires strong national scientific programmes, cooperatively engendered and performed in a coordinated fashion and, in addition, international programmes in such areas as the high seas, where very close cooperation, amounting to single direction, may be needed for effective study and management of the polar bear.

(4) The results of national and international research should be made available to the IUCN's Polar Bear Group for discussion integration and programme planning for the purposes of constructing a circumpolar management model.

(5) In the absence of adequate management, polar bears can cause problems for man; human activities in economic development polar regions can cause direct conflict between man and bear

(6) In the development of management schemes for the polar bear special recognition should be given to the sociological economic and cultural needs of local people.

(7) The presence of intra-jurisdictional interests within certain countries will require special attention in the formulation of a convention on this subject.

IUCN was requested to prepare a further draft that would take account of these principles and to circulate it to the members of the Polar Bear Group. This arrangement would enable them to consult the appropriate authorities in their countries and obtain direction as to how they should comment.

A resolution was passed (Paper 10.6) requesting IUCN to call a special meeting of the Group at Banff on September 8th 1972 to discuss measures for improved conservation of the polar bear. This meeting would also enable delegates to take part in other meetings, connected with the IUCN's General Assembly and Technical Meeting, on polar animals and the management of polar lands.

On the understanding that the implementation of a convention on the conservation of the polar bear would take some years, the Group considered a draft protocol, submitted by the Soviet delegates, to provide in the interim for further protective measures for the polar bear.

A number of amendments to the draft protocol were discussed and agreed upon; it was recommended that some of the basic principles referred to above be incorporated in the preamble.

It was agreed that the basic tenets of the draft protocol be incorporated in a resolution to the nations concerned and to urge them to take early appropriate action (Paper 10.1).

In the meantime, IUCN was requested to prepare a new draft protocol, based on this resolution, and to circulate it to Group members, as soon as possible, for comment (Paper 10.5).

Future Activities and Organization of the Polar Bear Group

Mr. Thor Larsen was elected unanimously as Chairman of the Polar Bear Group for 1972-73. Dr. Tener paid tribute to the work of the retiring chairman, Dr. Andrew Macpherson.

Cooperation with other IUCN Committees

The group within the IUCN whose subject was most closely related to the Polar Bear Group was the Committee on Circumpolar Lands of the Union's Commission on Ecology. The Polar Bear Group recorded its hope that the Ecology Commission would activate this Committee, and its willingness to cooperate with the Committee when this action had been taken.

The need for closer liaison with the Survival Service Commission's Seal Group would be kept under close surveillance.

Vote of Thanks

The Chairman, in closing the meeting, extended the delegates' sincere thanks to the IUCN and its staff for the organization, hospitality and other arrangements which had contributed in no small part to the success of the meeting.

Mr. Larsen, on behalf of the delegates, thanked Dr. Tener for his excellent chairmanship of the meeting and submitted a resolution to the IUCN recommending that Dr. Tener be invited to chair the Group's next meeting (Paper 10.7). The resolution received unanimous approval.

Footnote

In concluding this account of the proceedings of the Third Meeting of the Polar Bear Specialist Group, the opportunity is taken of placing on record IUCN's grateful thanks for the generous financial support accorded by the New York Zoological Society and by the American Conservation Association through the Conservation Foundation.

A G E N D A

Polar Bear Specialist Group

Third meeting held in the Conference Room, Hotel du Mont Blanc
Morges, Switzerland, on 7 - 10 February, 1972.

1. Welcome and introductory address by the Director-General, IUCN.

2. Election of Chairman and Rapporteurs.

3. Research progress reports by countries: 1970-1971.

4. Conservation progress reports by countries: 1970-1971.

5. Planning and coordination of management and research programmes: 1972-1973.

6. International Convention on the Conservation of the Polar Bear.

7. Future activities and organization of the Polar Bear Group, including election of new Chairman for the period 1972-1973.

8. Cooperation with other IUCN Committees and with polar research groups, committees and institutes.

Paper No 1

O P E N I N G A D D R E S S

by

Gerardo Budowski
Director General of IUCN

On behalf of IUCN, I have great pleasure in welcoming you to this meeting and wishing it all the success it deserves. The last meeting of the Polar Bear Group took place just eight weeks before I officially took over in IUCN, and I hope that in the next few days you may have a chance to visit our Headquarters and find out for yourselves some of the changes that have taken place in the last two years.

Progress has, of course, also been made in your own Group and I am certain that you must be gratified by the steady flow of research results that are building up an increasingly accurate picture of polar bear movements, major denning areas, physiology and taxonomy, as well as many other aspects of the polar bear's biology and ecology.

From our side we are also gratified with the obvious concern of all the Governments that for the third time have delegated you as scientists and official representatives. This continuity is in itself a major indication of interest. Moreover, your Governments also have taken considerable steps towards improving the management and conservation of polar bear stocks, based on your research and the exchange of information that has taken place over the years and is continually increasing. We believe that the polar bear meetings are in great part responsible for this awareness and the search for better solutions.

Coming to the achievements of individual countries, we are pleased to report that Norway has introduced regulations on polar bear hunting and has prohibited the use of set guns and aircraft. In Canada, the research has indicated the discreteness of its polar bear populations and this country has therefore oriented and concentrated its research and management into eight polar bear zones. In part of one of these zones (Newfoundland and Labrador) the taking of polar bears has been prohibited indefinitely; in others a certain take is allowed, based on careful assessment of populations.

We have also witnessed the introduction of stricter quotas for trophy-hunting by Alaska and we look forward to the complete ban next year on polar bear hunting from aircraft. In the Soviet Union, prohibition to hunt or otherwise exploit polar bears has been successfully enforced.

You have achieved a great deal in a relatively short time and I hope that the next few days will provide us with the basis for further successful action.

The Polar Bear Group, as you well know, is only part of a larger machinery within IUCN which has been greatly strengthened over the last two years and which is now running at a fast tempo. All of IUCN's six Commissions are now centred in Morges, each one with an Executive Officer, and there will be a chance to meet some of them tomorrow night. I hope that during this meeting you will give some consideration as to how the activities of your Group can be linked to those of some other Commissions -- or other Groups within such Commissions -- such as, for instance, one dealing with circumpolar lands, within the Commission on Ecology. Another of our specialist groups deals with seals and we are presently preparing an international conference on this subject to be held later this year in Canada. At this very moment, an IUCN observer is attending the Antarctic Sealing Conference in London.

On the wider horizon, IUCN has moved in several fields of which I will only give a few, but which I believe have some relevance to your activities. Jointly with the Conservation Foundation of the United States, and particularly through the efforts of our Senior Ecologist, Dr. Raymond Dasmann, we hope to publish very soon a book entitled "Ecological Principles for Economic Development" which we expect to be distributed to the participants of the Stockholm Conference. I do not need to convince you about the important need to incorporate ecological principles at the early stages of any planning, although unfortunately this is often overlooked.

IUCN has also recently been involved in many different activities connected with the drafting of international conventions to be submitted to intergovernmental bodies for their eventual approval. Examples of those conventions deal with islands for science, wetlands, world heritage, and the trade and traffic in threatened and depleting species.

A very important change of the past two years has been the considerable strengthening of our ties with the World Wildlife Fund. Almost all of our projects in the field are now done jointly and "joint programming" is an extremely important part of our day-to day activities.

I should not let this occasion pass without mentioning two of our very important conferences to take place this summer; our 11th General Assembly and Technical Meetings to be held in mid-September in Banff, Canada, with the general theme "Conservation for Development". This is of course the phrase we would like to be shared by conservationists throughout the world, a tool for the right kind of development. The other conference is the Second World Conference on National Parks, to be held in Yellowstone and Grand Teton on the occasion of the centennial of the first National Park of the world, Yellowstone. This Conference is convened jointly by the United States Department of the Interior, the National Parks Centennial Commission of the U.S., and IUCN. It will be held immediately following the Banff conference, during the second half of September.

But our meeting here has also another very important implication. It has been said the solutions of many problems that involve resources, such as the polar bear, that depend one way or another on the handling of such resources by different countries, are bound to face insurmountable difficulties because of the touchy aspects of national sovereignty. I refuse to share this view and I believe that through conversations and common-sense these difficulties can be overcome.

Through the experience gathered in preceding polar bear meetings, it can be visualised that even governmental representatives who are scientists, as you all are, can and actually do reach very important agreements on a subject which clearly touches very delicate points because of the shifting itineraries of polar bears. This demonstration that sensible agreements can be reached is a good example to the rest of the world, which incidentally needs the same type of understanding and positive conclusions for many of its problems. We in IUCN feel proud that we can be instrumental in getting these conclusions and suggestions for implementation under way.

In concluding, I would like to wish all of you every possible success in this meeting, and you can count on us to take every possible step for the most effective follow-up.

Paper No 2

ALASKA POLAR BEAR RESEARCH AND MANAGEMENT, 1970-1971

by

Jack W. Lentfer
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ESTIMATION OF ABUNDANCE, PRODUCTIVITY, AND MORTALITY

Counts and Estimates

We did not attempt to census polar bears in 1970 and 1971. Field work with helicopters and fixed wing light aircraft verified earlier conclusions (Lentfer 1967) that polar bears cannot be accurately enumerated directly from aircraft. We will perhaps attempt to make population estimates based on direct counts if the U.S. Fish and Wildlife Service is able to develop a technique for censusing as part of the research agreement of the 1968 International Polar Bear Meeting (Cooley 1968). We believe that a special technique, such as use of heat sensors to locate animals, will be necessary to make direct counts.

We no longer obtain data from hunting guides on the number of bears they see per unit of time spent flying over the ice. These data obtained through 1969 (Lentfer 1970) were not used to predict total numbers of bears within areas of observation, but, because they were somewhat comparable from year to year, were used as indicators of relative numbers. As regulations relating to hunting with use of aircraft have become more restrictive, pilot-guides have become less cooperative, and data obtained since 1970 are not considered reliable. Some guides have reported more bears than they have actually seen in order to weaken any argument for restriction of hunting with aircraft based on a reduced number of animals in the population.

Sex and Age Structure

Table 1 presents sex and age composition of bears that have been tagged as part of a movements and population study based on mark and recovery. In examining these data, it should be realized that if there were a choice, family groups were tagged rather than single bears. Therefore young animals accompanying females and females with young comprise a greater portion of our sample than of the true population.

Table 1. Location and sex and age composition of polar bears tagged in Alaska, 1967-1971.

	Cub-of-year			Yearling		2-year-old		Sub-adult		Adult		
	M	F	Unk.	M	F	M	F	M	F	M	F	Total
Bering Strait												
1968				1			2			4	3	10
1/ Lisburne												
1968				2	4	3	4	8	7	7	15	50
1969								1	2	4		7
1970				1	5	4	2	1	5	1	8	27
1971				3	3			1		9	6	22
				6	12	7	6	11	14	21	29	106
				18 (17%)		13 (12%)		25 (24%)		50 (47%)		
Barrow												
1967				3	3	4	2	2	4	4	9	31
1968				8	1	3	7	6	11	7	37	80
1969			2		1		4	2	2	2	9	22
1970	2	2	1	4	8	3	3	4	4	5	18	54
1971	3	3		5	4	3	2	1	8	7	16	52
	5	5	3	20	17	13	18	15	29	25	89	239
	13 (5%)			37 (15%)		31 (13%)		44 (18%)		114 (48%)		
Barter Island												
1969				1	1							2
Totals	5	5	3	28	30	20	26	26	43	50	121	357
	13 (4%)			58 (16%)		46 (13%)		69 (19%)		171 (48%)		357

1/ Bears at Lisburne tagged by U. S. Fish and Wildlife Service.

A greater proportion of females and young animals have been tagged at Barrow than at Lisburne, possibly for several reasons. Hunting, which is selective for single animals and is more intensive at Barrow than Lisburne, probably changes population composition more in the Barrow area than in the Lisburne area. The Barrow area, which is further north and may have heavier ice than the Lisburne area, may provide better conditions for sea ice denning, and therefore have a higher percentage of denning females and cubs in the population. Tagging has been conducted later in the season at Barrow than at Lisburne, and cubs have been seen at Barrow only in April after tagging at Lisburne has stopped; if females den in the Lisburne area, they and their cubs may still have been in dens during the tagging period.

Nearly all young remain with their mother until April of their third year when they are approximately 2 years 4 months old. Only two yearlings have been tagged that were not with their mothers. Both were tagged in April in the Barrow hunting area. We do not know if the yearlings separated from their mothers a year earlier than is normal in this area, or if the mothers were killed, possibly illegally by hunters. Only two 2-year-olds have been tagged that were not with their mothers. Both were tagged in April, possibly only recently after family break-up. Eskimos and guides confirm that there are two size classes of young bears older than cubs which accompany their mothers. Young remaining with the mother for more than 2 years differs from Spitzbergen where Lønø (1970) reports that family break-up occurs when yearlings are about 1½ years old. Possibly more abundant food and milder weather in Spitzbergen allow young animals there to develop faster and leave their mothers sooner than off the coast of Alaska.

Composition of the hunter harvest (Tables 4 and 5) does not indicate composition of the population becuase hunters select for single and larger bears. We have data through 1969 (Lentfer 1970) on composition of bears seen but not harvested by hunting guides. We no longer obtain this type of data because some guides started giving false information as hunting regulations became more restrictive.

Reproduction

We will examine female reproductive tracts from bears killed by hunters to attempt to determine ovulation and conception rates. This method has limitations because females accompanied by young through 2 years of age are protected. We therefore are not able to obtain specimens from a large segment of the female population.

Tables 1 lists the percentages of cubs, yearlings, and 2-year-olds tagged. The true percentage of cubs in the population may be higher because much of the tagging has been done when cubs were in dens. The difference in the percentages of yearlings (16 percent) and 2-year olds (13 percent) suggests the extent of mortality during the second year. The difference in litter sizes (Table 2) between yearlings and 2-year-olds annually increase the adult and sub-adult population by 17 percent. This figure is greater than actually occurs however, because, as has been pointed out, tagging effort is somewhat selective for females and young.

Table 2. Average litter sizes of polar bears tagged in Alaska, 1967-1971.

	Cubs	Yearlings	2-year-olds	Total
No. of litters	9	31	24	64
No. of Young	13	53	35	101
Average Litter Size	1.44	1.71	1.46	1.58

Production at Denning Areas

We have started to study in more detail than before the extent of polar bear denning along the Alaska coast. Interviews with coastal Eskimos indicate that a limited amount of denning occurs along the coast from the Point Hope area to the Canadian border. Bears are reported to den on small offshore islands, on shorefast ice, and inland along river banks, probably in greater numbers than previously believed. We continue to see cubs on sea ice north of Barrow shortly after they have emerged from winter dens. Some are far enough north of the Alaska coast that we believe they were not born on land and assume they were born on heavy pack ice which occurs in this area.

Estimation of Hunting and Natural Mortality

Annual hunting mortality in recent years has ranged from 200 to 400. Details will be presented in the section on harvest statistics. We have no measure of natural mortality. We can speculate that moving sea ice provides a less stable platform for denning than land, and that mortality in sea ice dens is greater than in dens on land.

MOVEMENTS AND POPULATION DISCRETENESS

Capturing, Marking, and Radio-tracking

The major effort to determine discreteness of populations of polar bears off the Alaska coast has been a movements study based on a mark and recovery program. Lentfer (1968; 1969) describes immobilizing and marking techniques. The Alaska Department of Fish and Game and U.S. Fish and Wildlife Service have tagged 357 polar bears off the Alaska coast through 1971 (Fig. 1).

Recoveries 9 months or longer after tagging are considered significant from a long term movements standpoint. Thirty-five such recoveries of 283 animals tagged through 1970 have been made through 1971. Animals that have been tagged and then recovered in the Barrow area appear most frequently in the recovery data. Quantitative comparisons of the rate of recovery in different areas cannot be made, however, when recapture and hunter harvest data are combined, because recovery effort by class of bear is not uniform from area to area. Females with young and young are sought by tagging-recapture teams, but not by hunters, and are therefore recovered at higher rates in areas where tagging and recapture effort is high as compared to areas where tagging and recapture effort is low.

A comparison can be made of only bears killed by hunters which shows the percentages of tagged bears from each tagging area as they appear in the harvest of each major hunting area. In making this comparison, sexes are separated because hunter selectivity for sex of bear varies from area to area. Through 1971, 26 tagged bears had been killed by hunters 9 months or longer after they had been tagged (Figs. 2 and 3). No tagged bears have been reported in the approximately 60-bear-per-year harvest from settlements in western Canada. Ian Sterling, western Arctic polar bear biologist for the Canadian Wildlife Service, feels reasonably certain that any polar bear with ear tags that might have been harvested in northwestern Canada would have been reported (pers. comm.).

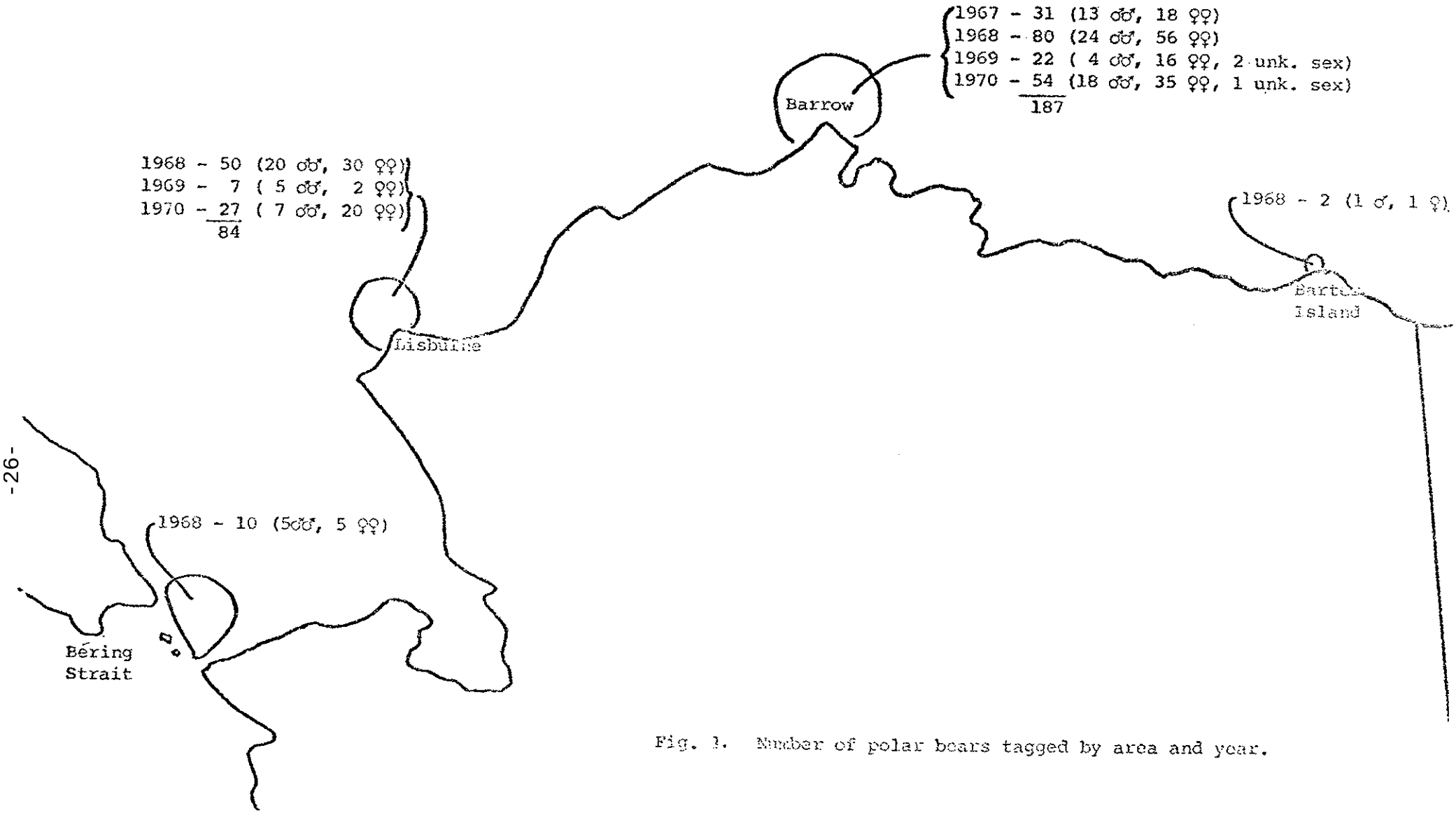

Fig. 1. Number of polar bears tagged by area and year.

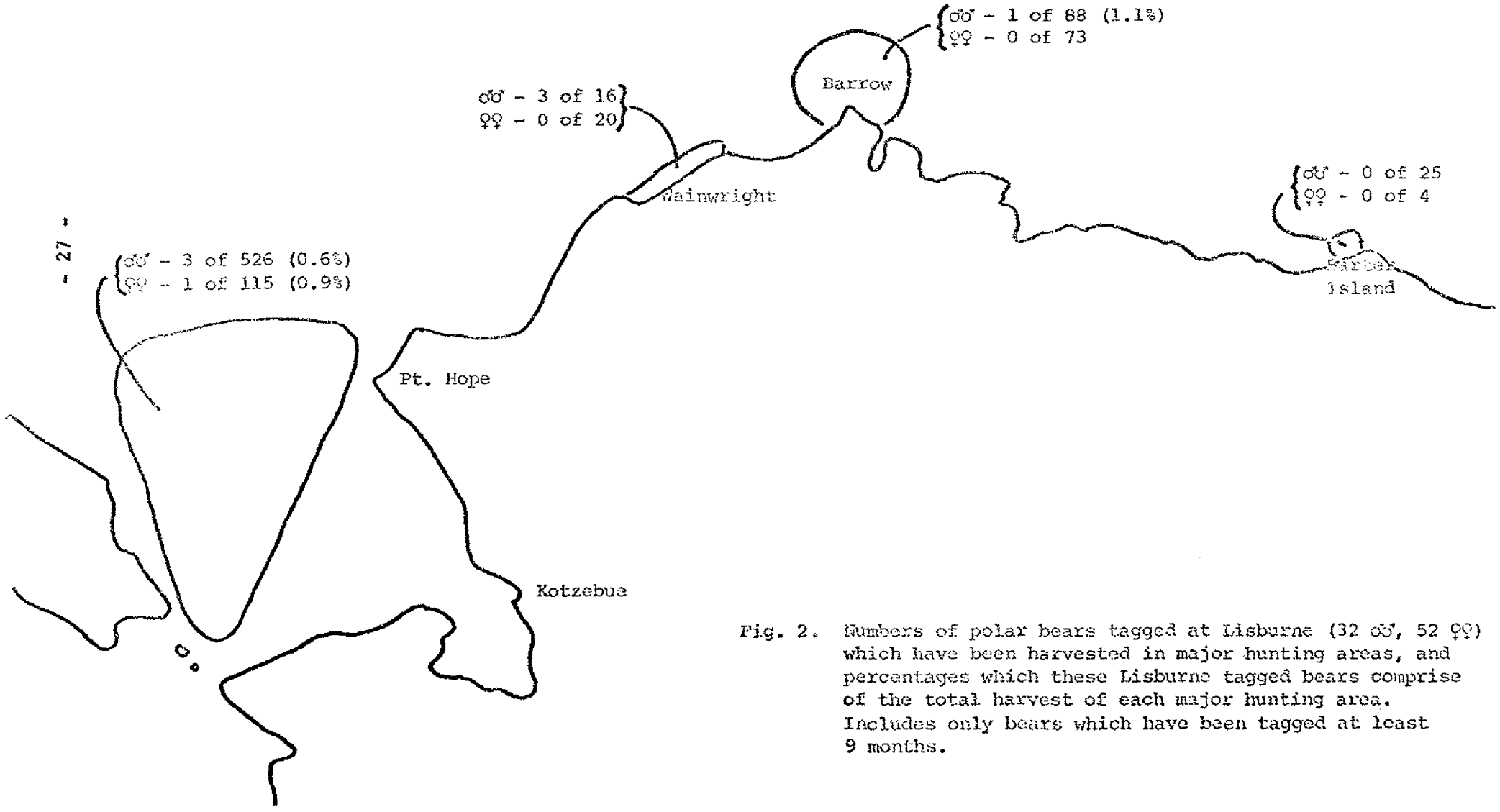

Fig. 2. Numbers of polar bears tagged at Lisburne (32 ♂♂, 52 ♀♀) which have been harvested in major hunting areas, and percentages which these Lisburne tagged bears comprise of the total harvest of each major hunting area. Includes only bears which have been tagged at least 9 months.

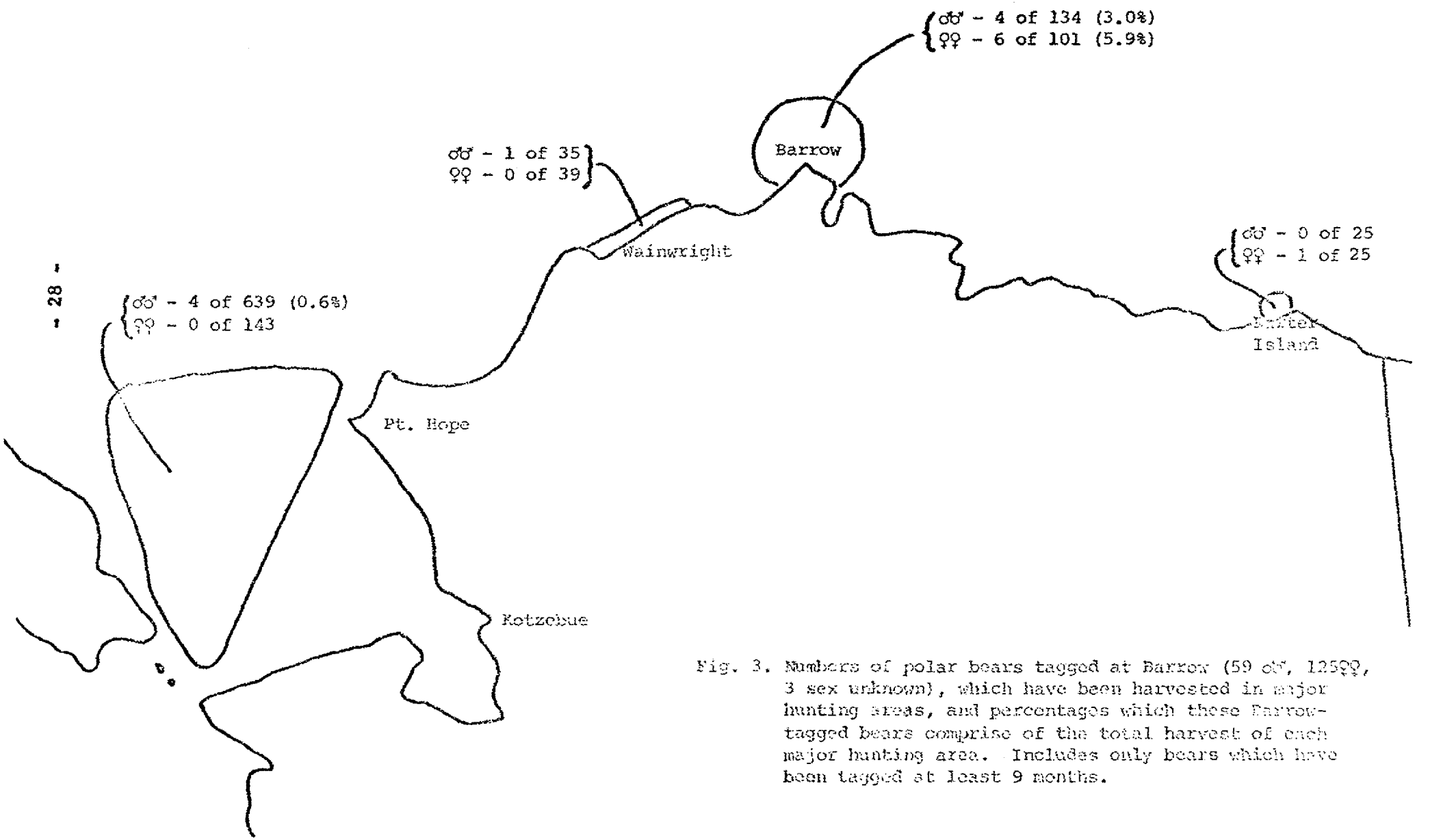

Fig. 3. Numbers of polar bears tagged at Barrow (59 ♂♂, 125♀♀, 3 sex unknown), which have been harvested in major hunting areas, and percentages which these Barrow-tagged bears comprise of the total harvest of each major hunting area. Includes only bears which have been tagged at least 9 months.

The numbers of recoveries is so low that data must be interpreted with caution. However, it appears that bears tagged at Cape Lisburne may be harvested on the coast between Point Lay and Franklin Point at a significantly higher rate than elsewhere. It also appears that bears of both sexes tagged at Barrow are harvested 9 months to 4 years after tagging at a significantly higher rate in the Barrow area than in the Chukchi Sea, which is the other major hunting area (0.6 percent of the males and none of the females harvested in the Chukchi Sea were tagged at Barrow; 3 percent of the males and 6 percent of the females in the Barrow harvest were tagged at Barrow). More females than males are recovered in the same location where tagged or, conversely, males tend to range over greater distances than females.

The data then suggest that bears to the west of Alaska and bears to the north of Alaska form partially discrete populations with only a limited amount of movement between them. A line extending northwest from Point Lay has been chosen as a rather arbitrary dividing line.

Effectiveness of the various marking devices has been evaluated (Table 3.).

For 43 marked bears which have been shot by hunters or recaptured, 39 could be identified either by one or both ear tags and/or a lip tatoo; 4 could not be identified.

For 35 nylon tags which were retained, 15 (43 percent) were intact, 19 (54 percent) were broken but present, and one was missing. For the broken tags, more than half still had a number present which permitted identification. Metal tags were retained in about 75 percent of the cases and were lost in about 25 percent of the cases. Where metal tags were not present, the ear was split and healed. It appears that metal tags do not come unclinched but are lost by working to the edge of the ear. More than half of the ears which retained metal tags were infected and draining from the tagging site. Metal perhaps causes cold damage to tissue of the ear; nylon does not. After several recoveries where metal tags had been lost or ears were infected, a type of nylon tag was used in place of the metal tag.

For 20 bears which were examined for a lip tatoo 9 to 48 months after a tattoo had been applied, 12 had a tattoo which was legible. A lip tattoo was the only marker which identified one bear recaptured 36 months after tagging.

Table 3. Condition of markers on tagged polar bears recaptured or killed by hunters through 1971. 1/

Tagging to Recovery Time in Months	Less than 2	9-13	21-25	36	48	Total 9-48
No. of Recoveries	4	20	6	8	1	35
Nylon Tag						
Intact	4	11	4			15
Broken-No. present		8	1	1	1	11
Broken-No. gone		1	1	6		8
Missing				1		1
Metal Tag						
Present w/out infection	4	3	1			4
Present with infection		5	2	4	1	12
Present - Ear condition not recorded		6	2	3		11
Missing		6	1	1		8
Collars						
Retained	2	5		1		6
Missing	1	3	1	2		6
Not collared	1	12	5	4	1	22
Lip Tattoo						
Legible	3	10		2		12
Illegible	1	5		2	1	8
Not tattooed		3	5	2		10
Not checked		2	1	2		5

1/ Does not include four hunter-killed bears which each had only a broken nylon tag and could not be identified.

Six of 12 bears recovered 9 to 36 months after having had nylon neck collars attached still had the collars.

Nylon ear tags are the best long term marking device used to date. They are subject to breakage, however, and we will continue to tattoo animals so as to have another identifying marker. We are now having a teflon ear tag developed which we believe will be better than nylon. Penny and Sladen (1966) report that teflon tags are excellent for marking penguins.

Radio transmitter collars were also used to obtain movement information in 1970 and 1971. Transmitter collars supplied by Sensory Systems Laboratory, Tucson, Arizona, were tested on a captive bear and applied to bears in the wild. Collars of 2½ inch wide machine belting each had a low profile antenna in a package positioned above the neck, and transmitters and batteries in another package positioned on the underside of the neck. Components were imbedded in dielectric foam with an outer covering of fiberglass. Some collars had nickel-cadmium batteries operational for only 90 days and at temperatures down to -60°F. Other collars had mercury batteries with a calculated life of more than 2 years and operational down only to freezing temperatures. Mercury batteries were positioned next to the neck and covered with insulating foam; they received enough heat from the bear to provide power when ambient temperatures were as low as -30°F. All collars transmitted a pulsed omnidirectional signal approximately once each second on a VHF frequency of 148.5 megahertz. Pulse rates of each transmitter varied slightly to provide identification. Collars were attached around the necks of bears by overlapping the ends of the belting and fastening with hog rings.

Receivers were portable, battery-powered, narrow band (4 kilohertz) high gain circuits optimized to receive and detect transmitter pulses of about 13 milliseconds in length. Two receiving antennas were used. A commercial three phase element yagi (Hygain Model 23) was used for long term unidirectional detection, and a dual one-half wave antenna was used for shorter range detection of null bearing by interferometry. Radio tracking was from aircraft. When a Cessna 180 or 185 was used, a long range antenna was mounted on one wing strut and a short range antenna on the other wing strut. When a Naval Arctic Research Laboratory R4D (DC-3) was used for tracking, only a long range antenna was used, mounted so that it projected from the nose of the plane.

The frequency of collar transmitters was VHF line of sight. Range increased as the elevation of the receiver increased, and the procedure for attempting to pick up signals from instrumented bears was to fly a predetermined course at the highest elevation allowed by weather conditions, aircraft capability, and comfort of passengers.

This was usually between 8,000 and 12,000 feet. A 360 degree turn was made approximately every 25 miles to attempt to pick up signals to the side of the line of flight. The long range tracking antenna was used until a signal was heard. The short range antenna, which gave a more precise hearing, was then used to home in on the signal. The receiver was constructed so that both the pilot and an observer could listen to signals at the same time, and it was possible for the pilot to fly the plane toward the signal with very little direction from the observer.

Radio collars applied to five bears north of Barrow provided information on movements in March, April, and May 1970. Movements were random and were within 50 miles of the tagging site during March and April. Two bears moved approximately 100 miles from their tagging site in May, one to the northwest and one to the east. Lentfer (1971) gives details on radio-tracking.

Although some movement data were obtained, radio collars supplied by Sensory Systems Laboratory are not considered satisfactory. Before collars were applied to bears, signals could be detected from the desired range of 100 miles. Range was reduced to approximately 30 miles after transmitters supplied in 1970 were fastened to bears. Transmitters supplied in 1971 had been modified so that signals were received from instrumented animals from a maximum range of 55 miles. This range was not consistent however. Signal strength apparently depended to a certain extent on an animal's posture. Cold temperatures and perhaps changes in batteries caused pulse rates to change so that it was not possible to maintain identity of individual animals from the signal alone. One radio collar was recovered after a year from a bear killed by a hunter. An external plate was gone, apparently corroded away or so weakened by corrosion that the bear could remove it. An external wire connecting the antenna and transmitter was also gone.

Some bears removed collars by forcing them forward over the head even though collars had been applied quite tightly. The greatest circumference of the head is not much greater than the circumference of the neck of some bears, and this could be a problem with any type of collar. We are now experimenting with a radio-harness on a captive bear.

A program to track polar bears from a satellite appears to be inactive. The National Aeronautics and Space Administration is not encouraging the development of animal tracking from satellites and is requiring that almost complete reliability be demonstrated before allowing testing with a satellite.

Taxonomy

We have obtained hide and skull measurements from bears taken by hunters which show that animals taken west of Alaska are larger than those taken north of Alaska. This might indicate taxonomic differences. This is confirmed by T.H. Manning (1971) who, by statistical comparison of measurements of polar bear skulls from Spitzbergen, Greenland, Canada and Alaska, shows that skulls from bears to the west of Alaska are significantly larger than skulls from bears to the north of Alaska. The differences in skull measurements between the two areas are greater for males than for females. We have collected, cleaned and stored about 350 skulls as part of a cooperative study (Cooley 1968) whereby T.H. Manning of Canada and F.B. Tchernavsky of Russia will make morphometric comparisons of skulls from different parts of the polar basin. We have also collected blood serum samples so that Thor Larsen can make electrophoretic comparisons with polar bear serum from other locations.

Movements related to Sea Ice Movements and Climatic Changes

Relationships between polar bears and sea ice were studied, with emphasis on possible effects of sea ice movements and climatic changes on polar bear distribution and movements off the Alaska coast (Lentfer 1972). Information was obtained from Eskimo hunters, snow-machine trips along the coast, aerial surveys made shortly after freeze-up in the fall and bear tagging flights. Ice movements could tend to isolate most bears to the west of Alaska from most bears to the north of Alaska, but, at the same time, provide for a limited amount of mixing of animals from the two areas. Long term warming and cooling trends occur in the Arctic and probably affect polar bear distribution and numbers. Climatic trends should be considered when assessing bear distribution and population data on a long term basis.

OTHER FUNDAMENTAL TOPICS OF ECOLOGY AND ADAPTATION

Food

Work with a helicopter on the sea ice in late April and May 1971 provided information on ringed seal denning and seal den predation by bears. There is a significant amount of ringed seal denning and pupping on moving, heavy pack ice north of Barrow. This is in contrast to other areas where nearly all pupping has been reported on

shore fast ice (McLaren 1958; Burns 1970). Seal dens on the pack ice north of Barrow occurred most commonly in pressure ridges and were covered with hard packed snow or ice and hard packed snow which bears had to dig through at considerable effort. Bears obtained seal pups from only about 10 percent of the dens they dug into.

Examination of polar bear stomach contents and scats, and observation made incidental to tagging, indicate that bears on sea ice feed almost exclusively on ringed and bearded seals. Bears on the beach in the winter feed also on carrion, mainly walrus, seal and whale.

Behavior and Physiology

Nil Øritsland of the Universities of Oslo and Guelph continued his thermoregulatory studies on polar bears by implanting temperature transmitters in a bear which was brought in from the ice and held at Barrow in April 1971 (Øritsland and Lentfer 1971). Data were obtained at different activity levels and a range of ambient temperatures. Monitoring on closed circuit television allowed activities and animal temperatures to be related. An AGA thermovision scanner provided temperature readings and pictures showing temperatures on the surface of the bear.

A.K. Fisher of the University of Iowa expanded his long term studies of the respiration rates of tissues of Arctic animals to include polar bear. He accompanied hunting parties from Barrow to obtain tissue specimens, and measured respiration rates with a Gilson respirometer. Results will be reported elsewhere.

Diseases and Parasites

The U.S. Department of Agriculture has examined masseter muscle samples from 308 bears killed by hunters from 1967 through 1971 for presence of Trichinella. Trichinella larvae were present in 60.4 percent of 187 males and in 50.6 percent of 89 females. The number of larvae per gram in positive samples ranged from 0.4 to 69.4.

We have had body fat and brain tissue from 42 polar bears analyzed by a commercial laboratory for chlorinated hydrocarbons. In all cases, levels were higher in fat than in brain tissue. Polychlorinated biphenyls (PCBs), long lasting contaminants in the environment, were present in all samples. The average amount of PCBs in fat samples of 23 bears was 15.0 ppm; the range was 1.1 to 29.4ppm. DDT and DDT

Table 4. 1970 known polar bear harvest by Alaska based hunters. Data are catagorized on the basis of area type of hunter, and sex of bear.

MGMT. 1/ AREA	NONRESIDENT			RESIDENT-WHITE			RESIDENT-NATIVE			TOTAL						
	M	F	Sex Unk.	M	F	Sex Unk.	M	F	Sex Unk.	M	F	Sex Unk.	All Bears	% of Total Kill	% Male	% Non-Res.
West	143	25	6	38	17	3	3	3	-	185	44	9	238	75	81	73
North	24	19	-	14	11	-	5	4	1	43	34	1	78	25	56	55
Sub Total	167	44	6	52	28	3	8	7	1	228	78	10	316	100	72	69
Percent	79	21		65	35		53	47		72	25	3				
Total	217 (69%)			83 (26%)			16 (5%)									

1/ West management area is south and west of a line extending northwest from Point Lay; North management area is north and east of this line.

Table 5. 1971 known polar bear harvest by Alaska based hunters. Data are catagorized on the basis of area, type of hunter, and sex of bear.

MGMT. 1/ AREA	NONRESIDENT			RESIDENT-WHITE			RESIDENT-NATIVE			TOTAL						
	M	F	Sex Unk.	M	F	Sex Unk	M	F	Sex Unk.	M	F	Sex Unk	All Bears	% of Total Kill	% Male	% Non-Res.
West	61	10	1	50	21	-	2	-	-	113	31	1	145	71	78	50
North	5	-	1	13	14	-	12	12	1	30	26	2	58	29	54	10
Sub Total	66	10	2	63	35	-	14	12	1	143	57	3	203	100	70	38
Percent	87	13		64	26		54	46		71	28	1				
Total	78 (38%)			98 (48%)			27 (13%)									

1/ West management area is south and west of a line extending northwest from Point Lay; North management area is north and east of this line.

metabolites (DDE and DDD) were also detected in all samples which were tested. With the method of analysis used, PCBs interferred with determination of DDT and DDT metabolite levels so that values which were obtained must be considered estimates. The estimated mean level of DDT and DDT metabolites in fat samples from 23 bears was 0.7 ppm; range was 0.1 to 1.1 ppm.

HUNTING RESTRICTIONS

Hunting restrictions in 1970 were similar to those of the preceding 3 years. The open season for trophy hunting extended from February 1 through April 30. The bag limit was one bear provided a bear had not been taken during the preceding 3 regulatory years. A permit was required prior to hunting. There was no limit on the number of permits issued except that imposed by a cut-off date of March 1 for permit application. Hunters who were not residents of Alaska were required to hire guides. Guides were limited to guiding six hunters and participating in six additional hunts. Residents were allowed to take bears at any time without a permit and without limit for food, provided aircraft were not used. Cubs (bears not yet 2 years old) and females with cubs were protected. Hides and skulls had to be presented to a Department representative within 30 days from the date of kill for examination, sealing, and removal of a tooth for age determination. The only skins which could be sold were those from bears taken without the aid of aircraft.

Because it appeared that hunting pressure would continue to increase in future years and because it was not possible to enforce the regulation limiting each guide to twelve hunts, the Board of Fish and Game on the recommendation of the Department of Fish and Game, modified the permit system so that a limited number of permits (300) were issued for trophy hunting in 1971. Two management areas were established with a quota of 210 permits for the West area (west and south of a line extending northwest from Point Lay) and a quota of 90 permits for the North area (north and east of a line extending northwest from Point Lay). The 621 applicants to receive permits were chosen by drawing, with applications from State residents and non-residents placed together for the drawing.

Also in 1971, the unlimited bag for residents who hunt from the ground and utilize bears for food was reduced to three. The primary purpose for ground hunting by residents has changed from a desire to obtain meat to a desire to obtain skins for sale. Three bears are judged to be an adequate bag limit because of the reduced importance of polar bears as a subsistence item.

The Department of Fish and Game is now recommending that the use of aircraft not be allowed for hunting polar bears after 1972. It is hoped that the quality of hunting and associated esthetic considerations can be upgraded by a change to hunting from the ground. It is also desired to stop the potential for overharvest which exists because of a market for unsealed hides and the difficulties of controlling activities of airborne hunters on the high seas and their smuggling of hides out of the State. The potential for overharvest would be greatly reduced if the valid excuse of guiding with aircraft could not be used as a cover for illegal taking of bears. It is also desired to stop the strong public opinion against the use of aircraft for hunting which could perhaps completely stop all hunting for polar bears along Alaska's coast. Polar bears are a renewable resource, a certain number of which can be harvested without jeopardizing populations. Controlled hunting from the ground would furnish high-quality recreation which is judged to be a desirable method of resource utilization.

The Department is also recommending that the sale of skins of bears taken from the ground not be allowed after 1972 on the basis that bears should be managed for high quality recreation and not as an item of commerce. This would also prevent bears from being taken illegally with the use of aircraft and then sold under the guise of having been taken from the ground.

FORMATION OF RESERVES

Reserves have not been established or proposed because there are no areas in Alaska where bears regularly come ashore in great numbers to feed or den.

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Paper No 3.

POLAR BEAR INVESTIGATIONS IN ALASKA

by

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Estimation of Abundance, Productivity and Mortality

Despite various regulatory measures imposed during recent years to control or restrict the number of polar bears taken by Alaskan hunters, annual harvests have continued to be large in relation to abundance estimates given by Tovey and Scott (1957) and Uspenski (1968 and earlier). This situation continues to cause much concern among conservationists, both in and out of government. Determining bear movements and the relationship between regional stocks or populations necessarily has received top priority in our research activities, but sufficient progress in this area has been made to justify fresh attention to the subject of bear abundance.

Methods thus far considered as being useful in yielding estimates of bear abundance include recording the number of square miles of ice scanned per bear sighted by Alaskan hunters flying over the Chukchi and Beaufort Seas. Such information was extended by Tovey and Scott to yield estimates of the number of bears adjacent to Alaska as well as around the polar basin. Thor Larsen has mentioned the frequency of bears sighted from the crow's nest of a research vessel as having possible usefulness in estimating the number of bears on the pack ice in the region of Svalbard. S.M. Uspenski has recommended the identification of maternal denning areas and enumeration of female bears frequenting them as a basis for calculating population size. Lentfer and his co-workers (Lentfer et. al., 1967) attempted the direct counting of bears from a survey aircraft flying predetermined patterns over the ice pack, but concluded that the method was impractical because an unknown proportion of the animals along the flight path were not seen. Brooks (1970) tested airborne infra-red scanning equipment as a means of detecting all bears along a flight path, with the idea of applying the technique to aerial surveys. (The results of the tests are summarized elsewhere in this report.) Jonkel (1969) reports that direct counts of bears along the coasts of Hudson Bay and James Bay have been made annually for several years. While each of the above cited methods has merit, the information provided is either local in nature or too fragmentary to yield estimates of bear abundance over a large region.

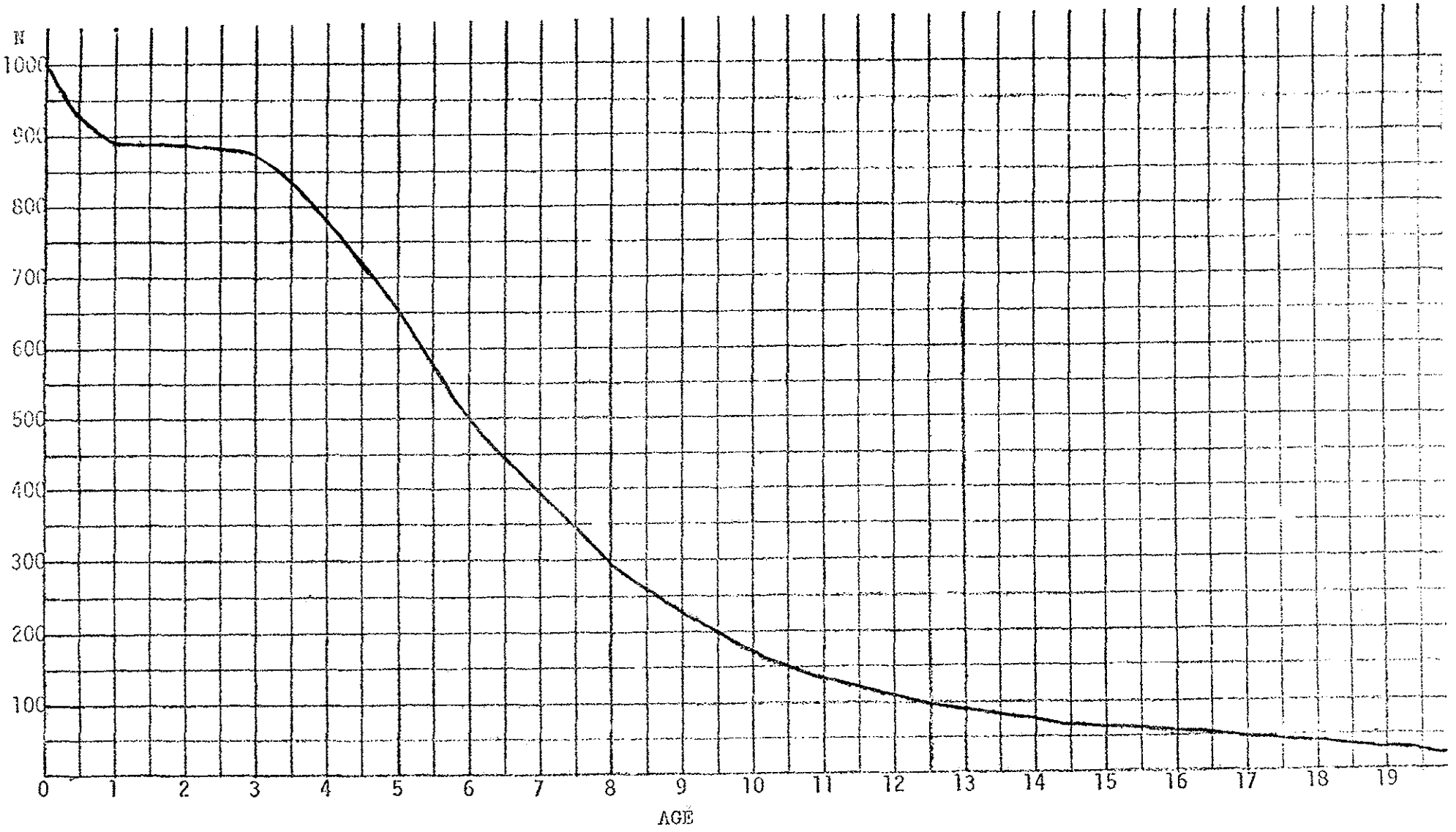
The analysis of harvest data is still another method of estimating the size of a population from which the harvest is taken. The procedures employed for such analyses are selected in accordance with the kinds and amounts of data available coupled with known or presumed life history characteristics of the species. Sufficient information has been recorded about the bears taken by Alaskan hunters over a period of more than two decades to justify an immediate effort to employ them as a means of deriving an estimate of bear abundance in the Chukchi and Beaufort Seas. While specific confidence limits cannot be attributed to the results, they may nevertheless approach reality closer than previous estimates. In any case, an important product of such an exercise will be the identification of weaknesses in our present array of data which will perhaps prompt change or refinement in our information collecting activities.

The theory behind this analysis of harvest data simply presumes that fairly intense exploitation will alter the bear population. Because we know that many more males than females have been taken, an important measure of change in the population would be the difference in age structure between the male and female segments. This difference cannot be established directly, but the information available permits estimates of the relative abundance of adult males to adult females. The analysis also must establish the number of male bears, over and above female bears, counted in long term harvest records, that can be credited with causing a specified population change. The essential elements involved in this analysis are the sex ratios and size of the annual harvests of bears for a period spanning ecological longevity, and the age composition of male bears taken during the period of 1966 to 1970. In addition, assumptions concerning the status and reproductive performance of the female segment of the population are necessary. No use is made of age composition data from the 1971 harvest or from 356 bears live-captured adjacent to Alaska for movement studies because they were not yet available to me. Inclusion of these additional data in future analyses may require modification of procedures or assumptions and should enhance the validity of the results.

I have employed age class information from 697 male bears harvested from 1966 to 1970 to construct a simplified life table and survival curve. Data relating to the age composition of the bear harvests taken in the Chukchi Sea and Beaufort Sea were pooled because their similarity indicated they could have been drawn from the same population, and because movement studies reveal a distributional overlap between regions. The act of combining these data does not deny the possibility of separate populations, but merely recognizes that if they exist, they are similar in age structure. Age data from females are

Life Table based on 697 polar bears of known age harvested in the Chukchi and Beaufort Seas, 1966-1970.

x	d'x	dx	lx	$\frac{lx+(lx+1)}{2}$	Lx	Mean Remaining Life Expectancy
0	86	111	1,000	6,820	944	6.82
1	2	3	889	5,876	887	
2	12	15	886	4,989	878	
3	72	92	871	4,111	825	
4	95	122	779	3,286	718	
5	125	160	657	2,568	577	
6	80	102	497	1,991	446	
7	80	102	395	1,545	344	
8	51	65	293	1,201	260	
9	49	63	228	941	197	
10	25	32	165	744	149	
11	18	23	133	595	121	
12	16	20	110	474	100	
13	11	14	90	374	83	
14	9	11	76	291	70	
15	9	11	65	221	59	
16	8	10	54	162	49	
17	8	10	44	113	39	
18	7	9	34	74	30	
19	7	9	25	44	20	
20	5	6	16	24	13	
21	4	5	10	11	7	
22	3	4	5	4	3	
23	1	1	1		5	
24			0			



Survival curve based on 697 male bears harvested by Alaskan hunters, 1966-1970.

not considered because of the extreme bias in harvesting resulting from regulations which protect females accompanied by cubs, and from the absence of those females that are in maternal dens during the late winter hunting season. A minor degree of bias exists in the male harvest data, but it is confined to two adjacent age classes (3 and 4 year olds) and should not seriously prejudice the analysis.

The data available for construction of the life table and survival curve distinguished annual age classes through 8 years, but combined the 9 and 10 year classes in one group and all older animals in another group. Therefore, the survival curve for these older age classes was extended to approximate a distribution that is typical of vertebrate populations while exactly accounting for the appropriate number of animals in the area under the curve. Year class representation beyond 8 years was then extracted from this survival curve distribution and entered in the life table. This procedure dampened irregularities that might have been present due to chance error in sampling numerically small older age classes. The mortality or d'x value for the zero age class in the life table was derived from an apparent decline in litter size from 1.8 cubs in the maternal den to 1.6 cubs in their second year of life. These litter sizes represent averages obtained from many published sources as well as numerous observations of the older cub litters in the Chukchi and Beaufort Seas.

The life table population, which is thought to be representative of the existing male population, may now be examined to determine how or to what extent it reflects the impact of harvesting. One test that may be used is to consider the life table population to be composed of females rather than males, and see if it could sustain itself. To remain stationary, the sexually mature animals must produce an annual increment of 1,000 cubs. Cub production can be estimated only if the fertility rate of adult females is known. Probably we have handled enough sows with cubs during our tagging activities to determine minimum female breeding age with good accuracy, although that information is not available at this writing. Most evidence from the literature suggests that initial breeding of females at five years of age with the first litter coming when the female reaches six years. It is known with some confidence that most adult females produce about 1.8 cubs every third year, yielding a potential fertility rate of 0.6 cubs per year. Obviously, the realized fertility rate is lower, for some litters are aborted or lost at or shortly after birth and some females do not breed regularly. The frequency of adult females not accompanied by cubs that have been encountered during tagging activities and that enter the hunter harvest confirm that realized fertility must fall short of the potential. If one estimates, rather optimistically, that 80% of all

adult females (at least 5 years old) breed and subsequently produce viable cubs, then the fertility rate would be 0.48 cubs per year per female. With a 1:1 sex ratio of cubs, this production becomes 0.24 female cubs per year. Should we now apply this fertility rate directly to the adult bears (2241) in the life table population, we find an annual increment of only 538 cubs, or about 46 percent below the 1,000 necessary to maintain the population. That such a population, if composed of females, would decline is also indicated by the mean remaining life expectancy of cubs (6.82 years) which shows that the average female would not live long enough to raise a litter to an independent age.

At this point in developing an estimate of bear numbers, it is necessary to make an important assumption that requires justification. The assumption is that the female segment of the stocks is stable. There are three main lines of evidence to support this view: (1) no significant change can be noted in the average age of females harvested over the course of several years; (2) no decrease in the apparent abundance of females with cubs has been reported by guides and hunters who are interviewed regularly; and (3) the actual harvest of female bears is small, amounting to only about one-fourth of the total harvest.

The principal difference between the life table population and a stable female population would be that the latter contains more adults in a number sufficient to raise the annual cub increment from 538 to 1,000. Up to the third year of life, male and female numbers should be identical, and ecological longevity also appears similar. Beyond the third year, the numbers of males versus females in each age class become increasingly different. The difference in representation of adults in the two populations can be attributed to the harvest of more males than females during the time span (23 years) covered by the life table. Reasonably accurate harvest data, including sex ratios, are available which allow calculation to the number of males harvested over and above females. It will be realized, however, that this crude data cannot be applied directly to account for change in the male population. Refinements in the data are necessary for several reasons. First, the older cohorts have relatively less impact on the age structure of the existing population. For example, only bears five years old or less in 1948 could have survived to 1966 to influence the life table population. Of these, only cubs entering the population in 1948 would have survived until 1970 and exerted full influence in the life table. Therefore, extraneous or ineffective age classes in the long term harvest record must be removed. Second, and in a somewhat similar way, recent harvests of bears which are too young to enter the adult category during the period of 1966-70, while vital to the construction of the life table, could

not influence the adult segment of the existing population. Harvests of animals under 5 years old in 1970, and those under 4 years old in 1969, etc., must be discarded. Third, it will be recognized that all of the bears harvested by man held tickets in a natural mortality lottery. If they had not been harvested, some of the bears would have been removed from the population through natural mortality, leaving only that portion of the harvest that otherwise would have survived to enter the present living population as being responsible for existing differences between male and female segments. It is possible to draw an estimate of natural mortality from the survival curve. Thus, of all bears of harvestable age (1 year and older) that might have survived to enter the present population, approximately 62 percent died of natural causes. The same degree of threat would apply to the animals that were harvested and corrections can be applied accordingly.

Having made the computations suggested above, the results are summarized as follows:

Total bears killed 1948-1970	4,457
Number that could now exist as adults	3,242
Number of males	2,349
Number of females	893
Males harvested in excess of females	1,456
Natural mortality correction (62%)	900
Number of males that would be in living population if they had not been harvested	556

With reference again to the life table population as compared to a stationary female population, the refined value of 556 male bears harvested can be credited with causing a decrease of about 46 percent in the number of adult males as compared to females. The following calculations will therefore yield a population estimate. It should be noted, however, that the percentage or number of subadult females in the population cannot be derived from a life table or survival curve. It is necessary to assume that an equal number of subadult males and females would exist, except for the actual number of subadult males known to have been taken in excess of subadult females.

Adult females (556 males harvested = 46%)	1,209
Adult males (Adult females minus 556)	653
Subadult males (69.4 % of total males, from life table)	1,481
Subadult females (Subadult meales + 101 known harvest)	1,582
Total Population	4,925

It is not possible to objectively assign a level of confidence to the above population estimate. Error could have been introduced in a number of ways including (1) the harvest not being a representative sample of the population; (2) the age determination technique not being precise; (3) the female segment of the population increasing or decreasing slightly rather than being stationary; (4) different stocks of bears being included; (5) the natural mortality estimate not being accurate; (6) the true realized fertility rate differing from that entered in the calculations, etc. If errors in data and assumptions are of small magnitude they would not greatly disturb the results. To some extent, they may also cancel each other. However, the natural mortality and fertility rates are extremely potent variables that must be established as accurately as possible. Fortunately, a means is probably now readily available for verifying or refining the realized fertility rate estimate. Thus, the number of females with cubs versus the adult females without cubs encountered during tagging activities in March and early April would indicate the extent of deviation from the potential fertility rate. Furthermore, as mentioned previously, the minimum breeding age of females can probably be determined by reference to the age of females with cubs. Some of these could be expected to involve first litters.

Still another type of information of much importance could be derived from measuring with statistical methods the significance of differences in the age composition of harvests taken from year to year. A simple comparison of mean ages is not sufficient to establish the validity of differences.

Further observations on the population estimate reveal that of 4,925 bears thought to exist, about 403 would be parturient females with as many as 725 cubs in maternal dens. Thus, the portion of the population on the ice pack in the winter would number 3,797 and be contagiously distributed over roughly 125,000 square miles of habitat. Because one and two year old cubs remain with their mothers in one family group, the number of square miles per single bear or family group would be about 50. We do observe a much greater density of bears than this in most areas that are hunted, but there are undoubtedly large areas where the density is lower. If the 1,209 adult females have a fertility rate of 0.48 cubs per year, they would produce 580 cubs annually. Of these, 290 should be males. Considering natural mortality and harvest of about 200 males annually by Alaskan hunters, it is evident that the male segment would decline as seems to be occurring from the decreasing average age of male bears entering the harvest. An apparent risk at this time is that continued harvests of the size taken in recent years will depress the size of male bears available to the point that they are indistinguishable from females. Should this happen, an increase in the female harvest will occur. In a dramatic way, this event took place on Kodiak Island where brown bears were too heavily exploited several years ago (Troyer, viva voce).

New Census Technique

A new technique for detecting and recording the presence of polar bears on the ice pack was tested in April, 1970. An imaging infrared scanner mounted in a single engine aircraft was able to successfully register polar bears and their recent tracks, at least under the condition that prevailed when the tests were conducted. A description of the equipment, the tests performed and the results are to be included in an I.U.C.N. publication (Bears - their biology and management." IUCN publications new series No. 23. 1972).

Further development of this technique has not been undertaken because of fund limitations. At this time, the practical application of airborne infra-red scanning to polar bear censusing cannot be judged. It seems probable that the non-random and constantly changing distribution of bears as well as the enormous size of their range would render large scale surveys difficult and excessively expensive. Surveys of smaller areas, where bears are known to concentrate, might be designed to give valuable minimum estimates of abundance.

Denning

In mid-March, 1970, a female accompanied by two small cubs was seen on heavy, multi-year ice about 50 miles northwest of Cape Lisburne. On the same day, tracks of a second sow with little cubs were observed about thirty miles farther west. Because an open lead varying in width from one to fifty miles had persisted near the coast for at least three weeks prior to the above observations, it is unlikely that the litters were born on shore ice. Guides report that females with little cubs are very rare in the southern Chukchi Sea; such family groups may be seen once in four or five seasons of hunting.

Annual ice formed in the Chukchi Sea is not suitable for the denning of pregnant females in November. Some permanent pack ice, however, would provide adequate protection. In late winter of each year since 1968, islands of old heavy pack ice have reached the latitude of Cape Lisburne and this may account for the occasional sighting of females with very young cubs.

Determination of Mobility and the Degree of Confluence of Populations across National Boundaries

The Bureau of Sport Fisheries and Wildlife has continued its program of marking live bears in the Chukchi Sea west and north of Cape Lisburne. The methods employed are identical to those described by Lentfer (1969). Since 1968, 109 bears have been handled including two recaptures. All data and tooth specimens have been provided to the Alaska Department of Fish and Game for combining with those collected by that agency. Information regarding these bears and the recovery of tags is incorporated in the material presented by Jack Lentfer (Appendix II).

Management

A recently enacted federal law (P.L. 92-159, 92nd Congress, H.R. 5060) prohibits any U.S. national from using an aircraft to harass wildlife. We interpret this act to apply to activities in international waters and it may therefore stimulate a change in traditional polar bear hunting methods. Official interpretation of this legislation by the Bureau has not been completed, so policy regarding enforcement remains undecided.

Paper No 4

POLAR BEAR RESEARCH IN CANADA, 1970-1971

by

Charles Jonkel and Ian Stirling
Canadian Wildlife Service

Much of our progress through 1970-1971 has again been reported in a series of published papers (Jonkel 1970, 1970A, 1971, Jonkel and Miller 1970, Manning 1971 and Jonkel et al. 1972). Other papers on our radiotelemetry work and on the effects of aircraft on bears are still in manuscript form.

Current and Planned Research

During 1970 and 1971 we marked an additional 175 polar bears in Canada (Table 1), bringing the total now marked in cooperation with the wildlife agencies of the provinces and territories to 296. In Hudson and James Bays our emphasis has been on obtaining recaptures of marked bears, and we now have 249 recoveries of marked animals including some recaptured more than once, but in only 96 cases had a full season or year lapsed. In almost all cases the bears were recaptured or sighted within 200 km of the original capture site, although an adult male had moved 450 km in Hudson Bay, and a young male recaptured on the Yukon coast had moved about 800 km from where it had been tagged two years earlier off the Alaskan coast. Bears at Cape Churchill moved onto the sea ice about November 16 in 1970 a and November 22 in 1971 (Compared with November 27 in 1968 and November 14 in 1969). Twenty-four bears considered dangerous because of their proximity to people at Churchill were air-lifted approximately 290 km to the southeast down the Hudson Bay coast, and three of these had returned to the Churchill area within two weeks.

Our future capturing program will be directed to obtaining recaptures of bears marked in James Bay, the High Arctic, and the Western Arctic. Marking of new bears will be undertaken by the N.W.T. Game Management Division during 1972 in the central Arctic east and north of Cambridge Bay. Marking studies will be extended to the Foxe Basin area during 1973.

Time and Place Marked	First Capture	Marked Bears		
		Recaptured	Observed	Killed
Before 1970	121	40	58	7
1970-1971				
Hudson and James bays	104	79	49	15
Western Arctic	34	1	-	-
High Arctic	37	-	-	-
Total	296	120	107	22

Table 1. Numbers of polar bears marked in Canada through 1971, and the numbers of marked animals recaptured, observed or killed.

Our denning studies are well underway. A cooperative study with the Manitoba Department of Mines, Resources, and Environment Management on the Cape Churchill summer and maternity denning area is nearing completion (Jonkel et al. 1972). We have mapped perhaps 70% of the denning area and have calculated its productivity for two consecutive years. We plan physiological and further behavioural work in this denning area, and Manitoba will continue mapping the extent of the area. We completed preliminary studies of the Devon Island denning area in 1971 and will attempt to calculate the productivity of this area in 1972 and 1973 in cooperation with the N.W.T. Game Management Division. Preliminary plans for similar cooperative work along the Ontario coast of Hudson Bay and in Ungava Bay have been made for 1973 and 1974. The location of additional denning areas is being routinely recorded during our population studies.

Russell (1971) completed his study of polar bear food habits. The study quantified the summer and autumn food habits of polar bears in the Hudson and James bay areas, and attempted to compare the food habits of bears spending the summer-autumn period on islands to those of bears spending summer and autumn on the mainland. Although significant differences were found, the sampling technique for mainland animals was apparently biased, as evidenced by concurrent population studies which showed that the mainland bears segregate by sex and age during the period they are ashore. The main food of island bears was found to be sea birds, whereas the mainland bears fed primarily on land and marine vegetation. Further studies of the summer food

habits of High Arctic bears are being continued, and data on hunting behaviour are being recorded routinely. Studies of ringed seal (Phoca hispida Schreber) vocalizations and the auditory acuity of polar bears have just been initiated by Drs. I. Stirling and N. Øritsland.

A study of the behaviour of polar bears on North Twin Island in James Bay is nearing completion. B. Knudsen has studied these bears for three summers, in 1971 spending July through December on the island. Weather and ice conditions hampered his work during 1971, but his behavioural work will be continued in the Cape Churchill denning area and along the south coast of Devon Island. Studies of summer denning behaviour, social aggregations of bears on the Manitoba coast, and breeding and hunting behaviour of High Arctic bears are all planned for 1972 and 1973.

Our collecting of skeletal material from regions where specimens were not available in the past is continuing. We are also striving annually to obtain adequate skeletal samples from the eight different management zones now recognized in Canada. We have 336 unprocessed skulls and sets of long bones on hand, and laboratory analysis of the specimens for age and sex classification is in progress. The studies partially completed by Manning (1971) indicate statistically significant skeletal differences in polar bear stocks across the Nearctic and Palearctic from the Bering Sea to Svalbard (Spitsbergen), indicating real differences between populations. During 1972 and 1973, he will examine the additional specimens we now have available, and perhaps extend his examination to include the entire range of the species. Areas from where he needs data are: Hudson Bay, Bering Sea and the Soviet Arctic.

We have recently increased our studies of pesticide residues in polar bear and ringed seal tissues. Indications are that residues are higher and present more potentially serious problems than previously reported by Jonkel (1970). Quantitative data from five regions of the Canadian Arctic should be available by late 1972. In particular, we are checking fat, liver and muscle samples from polar bears; and fat, liver and hide tissues from ringed seals. These studies are being done in cooperation with the CWS Pesticides Section, and in 1972-1973 will be extended to various species in the food chain of polar bears and ringed seals.

Provincial and Territorial officials have requested CWS to prepare a contingency plan for polar bear survival in case of massive oil spills in any portion of polar bear range in Canada. Suspension of polar bear hunting seasons in the various jurisdictions and the possibility of feeding residual populations of bears in the event of an oil spill will be studied during 1972-1973. At present we are assembling data on ocean currents and the centres of polar bear populations, but as yet have little to report.

It has become increasingly apparent that in order to understand polar bear ecology (and thereby polar bear management) we must continue our behavioural studies and undertake physiological studies relating to our ecological work. In particular, we are planning studies to determine: 1) whether polar bear stocks and the stages of the annual sexual cycle of individual bears can be determined on the basis of chemical and physical properties of polar bear blood; 2) how energy resources balance the thermoregulatory requirements and how this balance relates to survival and summer denning; 3) the total caloric input from seals available in particular areas (based on kcal/seal and population estimates of seals) and the caloric content of different portions of ringed seal bodies; and 4) the microsensory perception of polar bears. These studies are being planned in co-operation with the University of Guelph, Guelph, Ontario,aand the Manitoba Department of Mines, Resources, and Environmental Management.

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Paper No 5

POLAR BEAR MANAGEMENT CHANGES IN CANADA

by

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Canadian Wildlife Service

Since the 1970 meeting a number of changes in polar bear management have been implemented which reflect both the greater quantity of scientific data available and the increasing awareness in Canada of the need for conserving polar bears. Table 1 summarizes regulations in effect in all jurisdictions up to 31 December 1971.

As of 30 December 1970, the Government of Newfoundland-Labrador banned all hunting of polar bears within its jurisdiction. Persons in Newfoundland possessing polar bear hides must provide proof of import. From the small amount of data available it appeared the polar bear population on the Labrador coast was in danger of extinction. Apparently this was a unique population that once fed on spawning salmon as do the grizzlies of the west coast of B.C. and Alaska. The main problem in this area, however, was not the native community which took only four or five bears a year, but the sealing vessels and freighters passing through the area. The problem of the killing of bears on the high seals is still not resolved.

Some progress has been made on the problem of marking hides. The Northwest Territories was the first to provide a metal seal for marking hides and this system is now also used by the Yukon Territory and Ontario. The Yukon now allows native families resident on their portion of the arctic coast, or with a tradition of hunting there, to take two polar bears per family per year. A limit on the total that may be taken has not yet been set, but it is expected this will be done fairly soon, and in close consultation with the Northwest Territories authorities. Ontario has classed the polar bear as a fur bearing species and has instituted a tag system using a seal very similar to those of the Yukon and the N.W.T. Pelts in Ontario are now marketed for the Indians by the Provincial Government at the North Bay Fur Auction. Quebec and Manitoba are currently studying the question of instituting a tag system. CWS is trying to coordinate and encourage legislation in all provinces and territories making it illegal to possess or to process any untanned and untagged polar bear hide.

Table 1. Summary of regulations covering polar bear management in Canada as of 31 December, 1971.

CATEGORY	JURISDICTION					
	MANITOBA	NFLD./LAB.	N.W.T.	ONTARIO	QUEBEC	YUKON
Hunting season	- closed	- closed	- 1 October to 31 May	- none	- none	- 1 October to 31 May
Who can hunt	- protection only	- protection only	- native Eskimos - non-residents with special license	- killing legal for protection only	- Eskimos only	- Yukon resident Eskimo families or those with a tradition of hunting on the Yukon coast
Quota	- nil	- nil	- quota by settlement - 1972 limit equals 422	- "permissable kill" - no quota		- 2 bears/family - no total quota set
Females and cubs protected	- yes	- yes	- yes	- yes	- no	- yes
Bears in dens protected	- yes	- yes	- yes	- yes	- no	- no
Proof of origin of untanned bear	- uncertain	- verbal proof	- sealcum hide or export permit from area of origin	- seal on hide - proof of origin required on imported hides	- seal on hide	- seal on hide

Table 1. (continued)

CATEGORY	JURISDICTION					
	MANITOBA	NFLD./LAB.	N.W.T.	ONTARIO	QUEBEC	YUKON
Export permit required and cost	- not applicable	- required - no cost	- required - $1.00	- none	- none	- required - $5.00
Scientific Licenses	- discretion of Minister	- discretion of Minister	- at discretion of Superintendent of Game	- discretion of Minister	- discretion of Minister	- at discretion of Commissioner
Selling of hide by hunter	- cannot be sold	-	- none	- must be sealed by Dept. staff - sale at North Bay Fur Sales rec.		- permit required from Director of Game

The quota of bears killed in N.W.T. increased from 386 in 1968 to 422 in 1970. The known number of bears killed and captured in Canada is given in Table 2. Research is continuing on productivity, age structure, sex ratios, and growth rates in the respective zones to ensure that the harvest is maintained within the ability of the bears to reproduce themselves. In general, such results as are available from these studies indicate that populations are well maintained at present, except perhaps for those of eastern Hudson Strait and the Labrador, where a decline has become apparent, and where hunting on the high seas and interjuriddictional management problems are not as yet fully resolved.

	Year			
	1968-69	1969-70	1970-71	1971-72
Bears Killed				
N.W.T.	386	313	392	*
Manitoba	7	7	10	7
Ontario	10	?	11	18
Quebec	?	?	?	?
Yukon	0	0	0	4
Newfoundland	4	3	3	0
Sub-total	407	323	416	-
Bears Captured				
N.W.T.	0	0	2	2
Manitoba	0	1	0	1
Ontario	0	0	0	0
Quebec	0	0	0	0
Yukon	0	0	0	0
Newfoundland	0	0	0	0
Sub-total	0	1	2	3
Total	407	324	418	-

Table 2. Known numbers of polar bears killed or captured in Canada from 1968-69 to 1971-72 (*N.W.T. Kill figures are unavailable until late June of each year. The quota for 1971-72 however is 422 and this figure will probably approximate the total.)

Limited sport hunting of polar bears by non-resident hunters in two settlements in the N.W.T. was permitted in 1969-70 and 1970-71. It has increased from six in two settlements in 1969-70 to 16 hunters in four settlements in 1971-72. The conditions under which the hunt must be conducted are strictly controlled to ensure a high quality of sportsmanship. An Eskimo guide is required, and all hunting must be done on foot or with the aid of a dog team. All motorized vehicles and aircraft are prohibited. The increased revenue gained benefits the settlement as a whole except for approximately $500 which goes to the guide. The number of bears taken comes out of the quota for Eskimos of the settlement so that the total bears killed in a particular area or within the N.W.T. is not increased.

Sport hunting of polar bears is not presently being considered in any of the provinces.

The Federal-Provincial Administrative Committee on polar bears is now formed and has met twice at the Federal-Provincial Wildlife Conference to discuss the recommendations of its Technical Committee. The Administrative Committee then advises the Federal and Provincial Governments on matters pertaining to polar bear management.

The Administrative Committee has recognized the need for coordinated management of polar bears by provinces and territories and has looked with favour on a plan for a zoning pattern which cuts across jurisdictional boundaries presented to it by the Technical Committee. It has not yet, however, accepted the judgements of the Technical Committee on zone harvests as these judgements in a number of cases lack a scientific data base.

At the request of the hunters themselves, the N.W.T. enacted a closed season for polar bears from 1 June to 30 September. This was to prevent bears being taken during the summer when the hides were of poorer quality.

Killing of cubs is illegal in N.W.T. and Yukon Territory but some confusion has arisen on the definition of a cub. Two and one-half year old cubs still accompanying adult females are being taken and enforcement of this aspect is difficult. Few bears under six feet in pelt size are taken. Bears in the N.W.T. are not allowed to be killed when in dens.

The N.W.T. has increased the number of game officers in outlying settlements which has greatly improved communication to native hunters about polar bear management regulations.

The recent extension of Canadian territorial waters to twelve miles means that Greenlanders are no longer able to hunt polar bears while passing through Canadian fishing zones as these now have the status of territorial waters. Greenland Eskimos will be permitted to hunt seals for dog food while passing through Canadian territory en route to traditional hunting grounds in international waters.

The management zones remain the same at present. It appears likely that Zone A (Hudson Bay south of 60°N and James Bay) will be sub-divided because tagging studies now indicate there are at least two sub-populations in that region.

Paper No 6

POLAR BEAR RESEARCH IN NORWAY

by

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Since the last meeting in the Polar Bear Specialist Group, Norwegian polar bear research progress has been presented in several publications. Polar bear conservation and management problems have also been discussed in various journals of popular science, monthly magazines, etc. (see References).

There have been no expeditions for polar bear research to Svalbard since 1969. But polar bear skulls and biological specimens have been collected from the last set gun catches on Hopen and Edgeöya in 1969/70. Polar bear observations have been made by the Norwegian Polar Institute summer expeditions. In addition, we had the opportunity to participate in a few days aerial survey over the northern Spitsbergen area in May 1970, in an effort to count bears and locate denning signs. Effort has mainly been spent in studying the material collected, and on polar bear conservation and management problems related to the rapidly developing oil exploitation in Svalbard. Mr. Nils Oritsland, who is in charge of the Norwegian physiological polar bear investigations, is at present working at Guelph University, Canada, for a period of about three years. While in North America, Mr. Oritsland is coordinating his activities with the Canadian Wildlife Service and the Alaska Department of Fish and Game.

Current Research

Attempts have been made to estimate the number of polar bears present in the Svalbard area. Data collected on aerial surveys over the eastern Svalbard pack ice in 1966 and 1967 and from the expedition vessels in the same general region in 1967 and 1968, have been evaluated and compared. Air counting success was shown to vary with weather and ice conditions. Airplane speed and altitude were the most important limiting factors for absolute counts. Observation distance, weather conditions, observers experience and degree of color sense affected the ship counts. Ship counts were considered more reliable than airplane counts, but both methods are inaccurate. An evaluation of the counts made from ships under optimal conditions

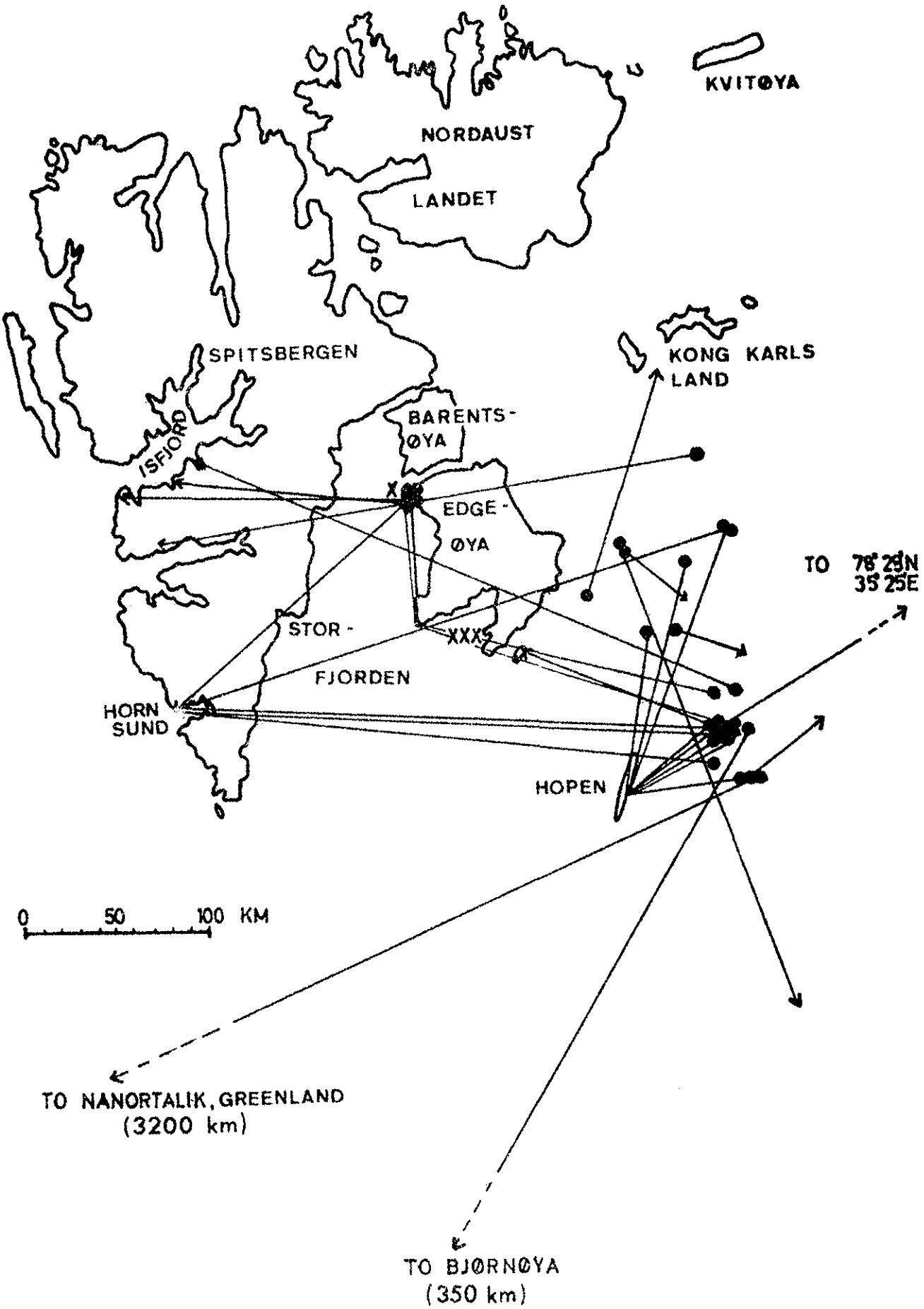
only, suggested that the total number of polar bears in the Svalbard area was between 1500 and 2000 in the late sixties. Comparison between air and ship counts showed a great discrepancy between the two counting methods. Absolute air counts of polar bears must be considered very unreliable. Previous world wide estimates of polar bears are also unreliable, because of the lack of evaluation of the methods used, and because a census by one method in one particular area, cannot be used in a world wide estimate. Merely by summarizing the various national counts, which still must be considered inaccurate, one reachs the conclusion that the world's total polar bear population is probably closer to 20 000 animals, than to the lower figures often suggested.

Skulls from the 1969/70 polar bear catch on Hopen, Halvmaneöya and Tjuvfjorden - the last set gun catch on Svalbard - have been measured and studied. In addition we have representative samples from the set gun catches in Svalbard from 1964 to 1970, with about 500 skulls measured and aged. Teeth have been pulled on about two thirds of the samples, and sectioned at the Norwegian State Game Research Institute. They are currently read for analysis of age structure in the set gun catches, and later for population studies by discriminant analysis. A polar bear male, marked as a half year young in 1967, was killed by a trophy hunter the summer of 1971. The skull has been made available for our collections. Tooth cementum layer counts on this 4½ year specimen, confirms that only one dark and one light band is deposited each year. The first premolars in the lower jaw seem to be the best tooth for sectioning and age determinations, according to the methods we use.

Since 1969, polar bears have not been marked in Svalbard. Of the 103 bears marked up to 1969, there are reports about 36 recoveries and observations, distributed as follows:

Year	Observation	Recapture	Kill
1967			2
1968		1	8
1969	1		6
1970	1		16
1971			2

All bears have been recovered in Svalbard, except one (Fig. 1). The very high recovery rate of marked bears - in 1970 it was almost 20 percent - confirm the previous assumption of a heavy harvest pressure on the polar bear in the Svalbard area in recent years.


KVITØYA
NORDAUST
LANDET
SPITSBERGEN
KONG KARLS
LAND
BARENTS-
ØYA
ISFJORD
EDGE-
ØYA
TO 78° 29N
35° 25E
STOR-
FJORDEN
HORN
SUND
HOPEN
0 50 100 KM
TO NANORTALIK, GREENLAND
(3200 km)
TO BJØRNØYA
(350 km)

Additional electrophoresis of serum samples from Alaskan polar bears confirm the previously found genetic difference between polar bears from Alaska and Svalbard. It has not been possible to show any genetic difference between the Alaska south and Alaska north polar bear populations in the serum electrophoresis patterns. Samples from the Canadian Arctic are now being processed.

Planning and Coordination of Management and Research Programmes, 1972-73

This spring, we hope to finish the serological work on the polar bear blood samples now available. There is, however, additional need for samples from the U.S.S.R. and from Greenland. About 200 polar bear skulls from the western Soviet Arctic are at the collections of the U.S.S.R. Academy of Science Zoological Institute in Leningrad and at the Museum of Zoology in Moscow, and have been made available for studies by the kind permission of the U.S.S.R. Academy of Science and the Department of Agriculture of the U.S.S.R. On the invitation by the last organization, Norwegian and Russian polar bear research and conservation problems will be discussed also.

Polar bear counts in Svalbard, studies of migratory patterns and analysis of harvest data suggest that the polar bears in Svalbard and the western Soviet Arctic probably belong to one common stock. It has been surprising, and rather unexpected, to find relatively few polar bear dens in Svalbard, in spite of considerable effort in certain regions. It is a question if the major denning areas for such a common bear population may be found in the Soviet Arctic, as Russian biologists expect about 150 to 200 polar bears to den in the Frans Josef Land/Novaya Zemlya area. In order to get more information about this problem, a one month field expedition to Svalbard is planned to take place between March 25 and April 30 this spring. The expedition will use two small fixed wing aircrafts with ski (Cessna 185) and search for dens in the eastern and northeastern Svalbard area. The planned work has also become increasingly urgent, because of the buildup around the oil exploitation and development in the archipelago. For further information, see Application for a World Wildlife Fund Grant, no. 826/1971.

As pointed out by the Polar Bear Specialist Group at its meeting in 1970, oil development and other activities in the Arctic may now threaten the polar bear more than hunting. The hunting of polar bears is now diminishing in many parts of the Arctic, as in the Svalbard area. We cannot therefore expect much information from marked bears in that region in the future - as already indicated by the few recoveries in 1971. But information about polar bear eco-

logy will also be required in the future, although data have to be collected by other methods. Polar bear surveys, counts and observations must be performed at regular intervals. Because already existing information suggests connections between polar bears in East Greenland, Svalbard and the western Soviet Arctic, polar bear surveys should be performed bilaterally or internationally. With the experience gained from the comparative ship and air counts we reccommend that surveys are performed from ships in that part of the Arctic, eventually with a helicopter on board. This logistic framework opens possibilities for other investigations and sampling techniques to be included whenever required.

We do not yet know much about the polar bear's migratory patterns and territoriality nor about the discreteness of the polar bear populations in the Svalbard area. We do not know to what degree polar bear females return to the same locality to dig their dens. Another problem which is worth much attention is Dr. Vibe's theory about the changing drift ice conditions in the Arctic Ocean which again may affect the polar bear migratory patterns and population discreteness changes. This problem may best be studied by internationally coordinated telemetry investigations.

It is worth mentioning, that the Norwegian section of the program MAB (Man and the Biosphere) has expressed their interest in the possibility of an internationally coordinated project on the polar bear.

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Paper No 7

HARVEST AND MANAGEMENT OF THE POLAR BEAR IN NORWAY, 1969-1971

by

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Changes in Regulations relating to Polar Bear Management

Various positive changes in regulations relating to the management of the polar bear have been implemented since the 2nd Working Meeting in February 1970.

1. The proposal for new hunting regulations for polar bear (presented to the Norwegian authorities in 1968) were put into force as from 1 September 1970 (beginning of the hunting season 1970/71) according to an Order in Council of 26 June 1970.

   In accordance with these regulations, a fixed number of hunting permits are submitted each hunting season. The complete text of the regulations is attached (Annex I) and was also published in the Newsletter No 2 of this Working Group in June, 1971.

2. The increasing interests for oil claims in Svalbard, focused in 1970/71 on the sedimentary rocks of Kong Karls Land. On this group of islands, and its territorial waters, a total protection of the polar bear was put into force in 1939. However, as mentioned in previous reports to this group, this protection covered only the species and not its habitat. In this situation, and as a preliminary measure, the Government decided on 23 April 1971, by Order in Council, to establish Kong Karls Land as a nature reserve for 3 years. During this period, proposals for a permanent reserve will be considered. The (preliminary) relatively strict regulations for the reserve, are attached (Annex II).

3. In September 1971, the Government decided to ban polar bear safari hunting in Svalbard from the next season (starting in June/July 1972).

   The intention was primarily to reduce the present hunting pressure on the species. This hunting activity has also been subject to much criticism from the public during recent years. From a scientific point of view, however, it should be added that the organized hunting safaris offered the best possibility for sample collections,

etc., from polar bears. In accordance with this ban, the responsible department (Department of Agriculture) reduced the total number of hunting permits from 200 to 170 for this season.

In recent years 1-4 ships have been involved in this hunting activity during the summer months. During the 1960's an average of 35 polar bears have been taken each year from safari ships (12-14% of the annual Norwegian harvest).

4. Caused by the plans for oil drilling (Texaco and Petrofina) on Edgeøya in 1972, a set of provisional regulations to control interference with the environment were worked out by the Norwegian authorities in early 1971.

The regulations ("Provisional regulations to control interference with nature in Svalbard and Jan Mayen") were put into force by Order in Council on 28 May 1971. They apply to all technical activities which may cause damage to fauna and flora and the environment in general. These regulations are at present of special importance on Edgeøya, where drilling operations will take place this spring.

A copy of the regulations is attached (Annex III).

Reserves

1. As previously mentioned, temporary regulations for the preservation of Kong Karls Land and its territorial waters as a nature reserve, were issued in April 1971.
Kong Karls Land consists of 3 larger (Svenskøya, Kongsøya and Abeløya) and some smaller islands, covering an area of 330 sq. kms.
Land mammals are restricted to polar bear and arctic fox. A small herd of Svalbard reindeer also occurred up to the end of the 19th century. In recent years, some observations of single individuals on Svenskøya indicate that a restoration may take place.
From its discovery in the beginning of the 19th centruy, Kong Karls Land has been known as a denning area for polar bears. In the season 1909-1910, 6 men killed 90 adult polar bears and took 32 cubs alive on Kong Karls Land. This indicates at least 20 dens on the islands at that time. The present number of dens is probably not very high. However, these islands are at present the only known "consentrated" denning area in the Svalbard archipelago. Their importance as denning area will be further studied during the planned air surveys in spring 1972.
The bird fauna is restricted to a few (22) species, of which only 10 have been found breeding. A total of 15 seabird colonies (Rissa tridactyla, Larus hyperboreus, Pagophila eburnea and Cepphus grylle) are located on Svenskøya and Kongsøya.

During the summer of 1971 Norsk Polarinstitutt continued its biological survey (started in 1969) of Kong Karls Land. This time, helicopters also were used for the purpose. Further biological data (mainly on polar bear denning and seal concentrations) from these isolated islands, will hopefully also be collected during the air surveys this spring.

The biological material from Kong Karls Land collected during the recent years, will (probably this year) be presented in a special report.

2. In January 1971, a proposal for protection of Barentsøya and Edeøya as a wildlife reserve, was prepared at Norsk Polarinstitutt. This proposal was presented to the Interministry Advisory Board for Polar Affairs by the Working Group on Wildlife Management and Conservation in Svalbard.
At present, there is no final decision on this proposal, due to the considerable interests for oil exploration on these islands. Barentsøya and Edgeøya cover a total land area of respectively 1300 sq.kms and 5130 sq.kms. Only smaller parts (approximately 380 sq.kms on Barentsøya and 1500 sq.kms on Edgeøya) are regarded as biologically productive. Polar bears are probably denning regularly on both islands, and do occur in considerable number along the south-eastern coasts of Edgeøya during the winter. The population of Svalbard reindeer on the islands is estimated at about 2000 individuals, approximately 50% of the total Svalbard herd. This population is partly isolated in an (up to 1970) undisturbed area, free of predators, and is, from an ecological point of view, of great interest.

Hunting Activities

Season 1969/70. Hunting activities for polar bear during the season 1969/70 were influenced by the announced revision of the hunting regulations. Because these regulations were announced, but not put into force before the start of the season, the total hunting effort increased abnormally. Some problems also occurred regarding the hunting statistics, as the authorities were not in all cases adequately informed. The official total for this season was 469 bears. Based on personal information, however, the figures below (Table 1) probably approximate to the real figure for this season.

Table 1. Norwegian polar bear harvest 1969/70

Sealers all areas	Trappers Svalvard	Weather stat.crew	Tourist hunters	Other resid.&exped.	TOTAL HARVEST
46	272	105	41	51	515

Season 1970/71. As previously mentioned, new regulations for polar bear hunting were issued in June 1970 and put into force on Septem er 1st of the same year.

For the first hunting season (originally the season 1968/69) the Working Group for Wildlife Management and Conservation in Svalbard had proposed 275 hunting permits. This was, however, increased to 300 permits by the Department of Agriculture for the first season when the new regulations were put into force:

Residents, miners etc. Svalbard	60 permits
Trappers, Svalbard	100 permits
Weather station crew, Svalbard	40 permits
Sealers, safari hunters	100 permits
Total	300 permits

The 100 permits issued for sealers and safari hunters were administered by the Department of Agriculture. The rest were the responsibility of the Sysselmann (Governor) of Svalbard.

The new regulations lead to a marked decrease in the total kill. (In part, however, the low total figure is probably also due to unfavourable weather conditions, lack of sea ice and perhaps the high number killed during the previous season.)

According to the present (January 1972) information the figure is as follows for the season 1970/71 (Table 2):

Table 2. Norwegian polar bear harvest 1970/71

Sealers all areas	Trappers Svalbard	Weather stat.crew	Tourist hunters	Other resid.&exped.	TOTAL HARVEST
32	21	19	32	12	116

Season 1971/72. For the season 1971/72, Norsk Polarinstitutt recommended the Department of Agriculture to issue a maximum of 150 hunting permits (compared with the 300 issued in 1970/71). This recommendation was based on:

a) The abnormally high kill in the season 1969/70
b) The results of cand.real. T. Larsen's studies, indicating a maximum total population of 1500-2000 individuals in the Svalbard area.

c) The recommendation of IUCN to the responsible governments to reduce the polar bear harvest.
d) The negative effects which may result from the increased oil exploration activities in the eastern parts of the archipelago.

In the final decission, the Department of Agriculture issued 200 permits for the season 1971/72. However, in September 1971, the Government decided to ban polar bear safari hunting. Accordingly, the total number of permits for this season was reduced to 170:

Residents, Svalbard	140 permits
Sealers	30 permits
Safari hunters	30 permits
Proposed total	200 permits
- Reduction due to ban of safari hunting	30 permits
Total	170 permits issued

Final Remarks

In the period of 26 years, 1945-1970, a total of 8432 polar bears were killed by Norwegian hunters (an average of 324.3 per year). The full regulation of the Norwegian harvest from 1971, represents in more than one way a step forward in the efforts for better conservation and management of the species. In the first season in which the new regulations were applied (1970/71) the annual harvest decreased to the lowest recorded in the whole period (1945-1971) (Table 3). The harvest of 116 polar bears in 1971 corresponds to 0.4 bears per issued permit in this season.
On the basis of the same relation between issued permits and killed bears in 1971/72. a total harvest reduced to about 65-70 polar bears or less is a probable result for this season. However, at a time when increasing technical activities in the Arctic face the polar bear population with new and quite different problems, continued effort to decrease the hunting pressure further, should be considered only as one rational and necessary step in the management and safe conservation of the species. Increasing attention should also be given to protection of the most important parts of its environment. In the light of the increasing activities in Svalbard, caused by better communications, oil exploration, tourism and expedition activities, this would preferably include establishment of reserves, national parks and other protective zones.

The established reserve on Kong Karls Land, the proposal for a wildlife reserve on Edgeøya and Barentsøya, and the present preparation of plans for 3 national parks in Svalbard, should be mentioned in this connection.
In the future work on these matters, the polar bear should, however, preferably not be considered only as a unique and isolated object worth protection. It seems more and more important to widen the scope and see the polar bear as a part of the Arctic ecosystems. Conservation of these biological systems should accordingly be the ultimate aim for all conservation effort in this region.

Table 3. Norwegian bear harvest, 1945-1971*

Year	Sealers all areas	Trappers exped. E. Greenl.	Trappers Svalbard	Weather stat.crew Svalbard	Tourist hunters Svalbard	Other resid. & exped.	TOTAL HARVEST
1945	195	-	-	-	-	-	195
46	371	-	5	27	-	2	405
47	195	15	280	25	-	9	524
48	197	5	194	45	-	3	444
49	218	10	14	51	-	10	303
50	499	14	-	21	-	2	536
51	269	10	55	32	-	8	374
52	88	5	2	32	19	7	153
53	290	6	-	42	8	3	349
54	147	10	-	22	34	3	216
55	295	8	72	22	30	47	474
56	240	17	7	45	31	9	349
57	250	4	1	18	31	9	313
58	83	-	1	29	32	36	181
59	128	4	123	45	24	12	336
60	11	-	57	70	24	23	185
61	42	-	9	52	23	11	137
62	42	-	11	85	39	19	196
63	127	-	62	86	32	7	314
64	147	-	152	79	56	3	437
65	9	-	273	120	28	5	435
66	3	-	23	96	45	18	185
67	9	-	102	86	38	28	263
68	3	-	120	68	38	38	267
69	8	-	123	133	33	49	346
70	46	-	272	105	41	51	515
71	32	-	21	19	32	12	116
Total 1945 -71	3944	108	1979	1455	638	424	8548

* Based on official Norwegian statistics, other published data (1945-70) and personal communications and inquiries.

Annex I

INSTRUCTIONS CONCERNING POLAR BEAR HUNTING
stipulated by Order in Council of 26 June 1970

1. These instructions apply to Svalbard and Jan Mayen with adjacent territorial waters and to the hunting and taking of polar bear by Norwegian citizens, inhabitants of the realm or by Norwegian companies and other units outside Norwegian territory.

2. Hunting or taking of polar bears must not take place without special permission from the Ministry of Agriculture or any person authorized by the Ministry.

   On Kong Karls Land with adjacent territorial waters the polar bear is to be preserved the whole year until the Ministry of Agriculture decides otherwise.

   For permission as mentioned in the first item, the Ministry of Agriculture may fix a fee, which may differ for the various groups of hunters.

3. The use of any weapon except a rifle of 6.5 mm caliber or over and an expanding projectile of a minimum energy of 200 kgm at a range of 100 m is not permitted in polar bear hunting.

   Aircraft must not be employed in polar bear hunting.

   Polar bear cubs and female polar bears accompanied by cub(s) must not be hunted, injured or killed.

   Polar bears must not be taken alive.

   Use of trapping gear in connection with polar bears is prohibited. This also applies to set gun and poison and muscle-paralysing injections.

4. Hunting of polar bear is to be practised in such a way as not to cause unnecessary suffering to the animals.

   Beyond what is necessary as part of legal hunting, it is prohibited to hunt or injure polar bears by employing motor vessels, or in any other way.

   Anyone who injures a polar bear is obliged to do what he can to put the animal to death as quickly as possible.

5. The Ministry of Agriculture or any person the Ministry authorizes may give permission to kill or take polar bear for scientific or other specific ends without regard to the contents of these Instructions. Further conditions or restrictions may be attached to the dispensations given with reference to this paragraph.

6. The Ministry of Agriculture may stipulate explicit directions concerning polar bear hunting, including restrictions on timing and territory of the hunting, time allowed for applying for hunting permission and the information required in the application, and the obligation to report the result of the hunting and to submit such a report within a stipulated time as a condition for obtaining a new permit.

   The Ministry may lay down further regulations concerning control of the hunting, including marking, tallying and landing of the skin or other parts of killed animals, and prohibition of the offering for sale, disposing of, buying or receiving a polar bear skin which is not marked in a prescribed manner.

7. Any person who intentionally or inadvertently contravenes regulations stipulated by, or supported by, these Instructions will be liable to the penalties imposed by Section 3 of the law of March 22, 1957, concerning the taking of polar bears, or eventually by the penal law.

   An illegally killed or taken polar bear or the value of it is forfeit to the State. This also applies to polar bears killed for humanitarian reasons or in an emergency.

8. These Instructions are in force with effect from September 1, 1970. Simultaneously the following provisions are repealed: Clause II, section 2 and Clause VIII, sections 2 and 3, of the regulations enacted on August 26, 1955, by Order in Council of the reigning Crown Prince, concerning hunting, capture and preservation in Svalbard; Clause IV, sections 2 and 3, of the regulations of August 26, 1955, concerning hunting, capture and preservation in Jan Mayen; the Order in Council of the reigning Crown Prince of June 13, 1957, concerning prohibition of the taking of polar bears alive; the Royal letter of March 5, 1965, concerning sport hunting of polar bear; and the Royal letter of June 2, 1967, concerning prohibition of the use of motor-vehicles and aircraft in hunting polar bear.

Annex II

TEMPORARY REGULATIONS FOR THE PRESERVATION (PROVISIONALLY FOR NOT MORE THAN 3 YEARS) OF KONG KARLS LAND WITH ADJACENT TERRITORIAL WATERS AS A NATURAL RESERVE, RESOLVED BY ORDER IN COUNCIL OF 23 APRIL 1971

1. The territory shall be protected against all forms of technical interference such as road building, the erection of buildings and plant of any kind or other activity which involves interference with terrain and disturbance of the natural environment. The building of necessary housing for wardens shall, however, be permitted.

2. Fauna shall be protected all the year and must not be unnecessarily disturbed. It is forbidden to introduce species or breeds which are not indigenous to the area in question.

3. Dogs may not be brought ashore.

4. Flora shall be protected against all damage not resulting from ordinary traffic.

5. The use of wheeled vehicles and landing of aircraft is prohibited except by special permission of the district governor. This ban, however, shall not apply to the activities of wardens, police or ambulance-drivers.

   With such exceptions as are mentioned in the first paragraph, the Ministry of Municipal Affairs and Labour may prohibit all traffic for all the year or for part of the year when this is deemed necessary in order to preserve flora or fauna or geological deposits.

6. The emptying of refuse and spreading or discarding of substances and articles which may be directly or indirectly detrimental to the fauna and flora of the islands are prohibited.

7. The Ministry of Municipal Affairs and Labour is empowered to grant dispensation from the above regulations, upon application, for the purpose of scientific research or for other special activities whose purpose is not contrary to the purpose of the protection.

8. Any person who wilfully or negligently infringes these regulations or provisions made in pursuance of these regulations, is liable to fines, pursuant to the Criminal Justice Act, Art. 339 No. 2.

9. These regulations come into force immediately.

Annex III

PROVISIONAL REGULATIONS TO CONTROL INTERFERENCE WITH NATURE IN SVALBARD AND JAN MAYEN, ISSUED BY ROYAL DECREE OF 28th MAY 1971.

(Issued pursuant to No. 4 of Act of 17th July 1925 No 11 concerning Svalbard, cf. the Svalbard Treaty of 9th February 1920 article 2, second paragraph, and No. 2 of the Act of 27th February 1930 No. 2 concerning Jan Mayen).

- 1 -

These regulations apply to economic activities or other measures which may cause changes in the landscape or other natural environment of Svalbard and Jan Mayen with adjacent territorial waters, including e.g. mining operations which involve the driving of mine-shafts and test operations, oil drilling and oilwell production, industrial activities, hotel operation, use of land for transportation purposes, for tank storage purposes and for large, freely located fuel dumps, and buildings in connection with such activities. Acts which come under the provisions of the preceding paragraph will hereinafter be called activities.

- 2 -

Plans for such activities or for the enlargement of existing activities require the approval of the Ministry before they are implemented. Such plans shall as a rule be submitted to the Ministry not later than one year before the contemplated date for their realization. The applicant is obliged to furnish the necessary information regarding the activities, such as the location of the place of work, the nature of the work which will be performed, the size of the labour force, the organization for the supply of water and victuals, the sewage and discharge system, the removal or placing of earth masses, roads and piers and other transport facilities etc. The applicant shall simultaneously furnish information on the effect which the planned measures will presumably have on the natural conditions. The Ministry may require additional information and maps, and may order the applicant to pay the costs of a study of the harmful effects which may presumably arise in connection with the activities.

- 3 -

The Ministry may, as a condition for granting approval or subsequently, issue instructions for modification of the plans and for special measures aimed at minimizing or counteracting any harmful effects of the activities on the landscape or other natural environment, and may require that inspectors appointed by the Ministry be transported to the area of operation.

The Ministry may issue special rules for certain kinds of work.

Wherever the planned activities will affect areas that are of value to the natural sciences, the Ministry may require the planned activities to be postponed pending scientific investigations and order the applicant to pay the costs thereof, to a reasonable extent. A fianl date for such investigations shall be stipulated.

The Ministry may completely prohibit activities which may harm large areas or distinctive geological, botanical and zoological elements and antiquities or cultural and historical relics, or which may cause extensive pollution of the soil, water or air.

- 4 -

All persons shall be considerate and careful in their dealing with the natural environment. Steps shall be taken to ensure that traffic or activities do not cause any considerable alteration or considerable pollution of the soil and the sub-soil, air, lakes and rivers or adjacent marine areas and do not cause any considerable or unnecessary harm to vegetable or animal life.
The Ministry may limit the area in which the persons connected with the activities may drive motorised vehicles or land aircraft, and may issue rules for the traffic in connection with and round the area of the activities.

The person responsible for the activities is obliged to ensure that everybody who performs work in connection with said activities is informed of the provisions and instructions applying thereto.

- 5 -

When the activities cease, all installations on the surface, all refuse, etc., shall be removed from the area, which shall as far as possible be restored to its original appearance.

If this provision has been disregarded, the Ministry may order special measures to be carried out by a stipulated date. If such order is disregarded, the Ministry may arrange for removal, etc., and recover the costs from the person who is responsible for the activities.

The Ministry may require security to be deposited for the coverage of such costs.

- 6 -

In Svalbard, the Governor will supervise the execution of these regulations. In Jan Mayen, such supervision will be conducted by the Ministry's appointee.

The Governor or appointee may in each separate case order or request special measures for the purpose of enforcing these regulations. In the event of any serious or repeated violation thereof, he may stop the activities. In such case he shall promptly notify the Ministry thereof.

The Ministry may engage inspectors to assist the Governor or appointee in conducting the supervision. The costs of the inspection may be recovered from the person who is responsible for the activities. The Ministry may issue further rules regarding supervision. The provisions of the Administration Act Chapter VI regarding appeal and review will similarly apply to any decision made pursuant to this No. 6, subject to such modifications as the Ministry may provide.

- 7 -

The Ministry may in special cases exempt from provisions issued in or pursuant to these regulations.

The Ministry may wholly or partially exempt certain specifically delimited areas or certain kinds of activities from provisions issued in or pursuant to these regulations. The Ministry decides

with binding effect whether any measure or any activities come under No. 1 above, whether the conditions of No 3 above for prohibiting or postponing the measure or activities have been satisfied, and whether the provisions of No. 5, first paragraph, above have been observed.

- 8 -

Officials with supervisory authority under these regulations shall have unrestricted access to the area of the activities, including buildings and other facilities.

Subject to the limitations resulting from their functions under these regulations, officials with supervisory authority shall maintain secrecy in matters which come to their knowledge in their official capacity, as regards technical installations and processes and operational or business matters which it is of competitive importance to keep secret on account of the person whom the information concerns.

- 9 -

The Ministry may withdraw approval of the measure or activities if

a) provisions issued in or pursuant to these regulations are repeatedly or continuously infringed,

b) a requirement of a security deposit as mentioned in No. 5, third paragraph above is disregarded,

c) officials with supervisory authority are obstructed or denied access to the area of the activities.

When approval is withdrawn, the activities shall cease immediately or by a date stipulated by the Ministry, see also No. 5, first and second paragraphs, above.

- 10 -

Infringement of provisions issued in or pursuant to these regulations will be punished according to No. 339 No 2 of the Criminal Code.

- 11 -

These regulations enter into force immediately and remain in force until 31st December 1974.

Paper No 8

POLAR BEAR RESEARCH AND CONSERVATION MEASURES IN THE USSR, 1970-1971.

by

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As in previous years, the research programme "Polar bear and its conservation in the Soviet Arctic" is worked out by the Central Laboratory on Nature Conservation, U.S.S.R. Ministry of Agriculture (under the guidance of S.M. Uspenski). The Laboratory also co-ordinates research and practical measures, concerning polar bear conservation, carried out in the U.S.S.R. by other institutions and departments.

In 1970-1971, the main attention in polar bear research in the U.S.S.R. was paid to counting maternity dens, studying of the female bear's winter ecology, and tagging.

Counts of maternity dens were made in 1970 (March 24 - April 10) on Wrangel Island. In the course of previous studies, some peculiarities and shortcomings of censusing dens during ground surveys by dog team and/or tracked vehicle were discovered (Uspenski and Kistchinski 1970). In the spring of 1970, we obtained additional evidence that our conclusions were true. Our pattern of census accepted in 1970 included: (1) total (on foot) survey of areas where the density of dens was highest (for example, Drem-Head mountains); and (2) aerial survey of the rest of the territory where dens are regularly made. Aerial survey was carried out on April 10, on a sunny day with excellent visibility, from an AN-2 light aircraft, at a height of 100 m and a speed of 150 km per hour. Under these conditions, all the opened dens, tracks of females and cubs which had left dens recently, as well as bear families themselves could easily be recognized. Results of counts are presented in Table 1. In the view of the fact that some females denned in areas not surveyed, and some dens (which were left early in March) were blocked with snow up to the flight time, we assume that total numbers of breeding females on the Wrangel Island in 1969/70 was 180-200. Data are now in press (Uspenski and Kistchinski 1972).

Table 1. Number of polar bear dens in the different parts of Wrangel Island (March - April, 1970).

Territory	Number of dens found	Total numbers of breeding females estimated
Drum-Head mountains	42	45
Byezymyannye mountains (north-western part)	4	10 - 20
Tundrovaya Mt. and environs	6	6
Kitovaya Mt. and environs	10	12 - 15
East Plateau (northern part)	19	35 - 40
East Plateau (eastern part)	23	40 - 45
Hawaii Hills	4	4
Area near Rodgers Bay	4	4
Mountains in the middle reaches of the Red Flag River	6	10
Total	118	165 - 190

We propose that such counts should be performed once in five years. Aerial surveys are to be made twice in spring - at the end of March and at the beginning of April; and ground surveys of areas of highest density during the intervening period.

Aerial counts over vast areas. We continue to receive data on polar bear observations during aerial ice surveys (which are annually made by the Main Board of the Hydrometeorological Survey of the U.S.S.R.). However, taking into consideration the technical conditions of these flights, we do not expect to achieve any essential progress in comparison with the data already published (Uspenski and Shilnikov 1969).

Breeding ecology studies. We continued to study ecology of the breeding stock on the Wrangel Island - mainly in the Drem-Head mountains where the density of dens was extremely high (although it was lower than in 1969). In the course of the sufficiently complete ground surveys, there were found, in the spring of 1970 - 43 dens, and in the spring of 1971 - 23 dens. Observations concerning distribution and structure of dens, on the whole support the evidence obtained in 1969 (Uspenski and Kistchinski 1970). Now all data are in press (Uspenski and Kistchinski 1972; Kistchinski and Uspenski 1973). Several points are to be mentioned.

As in 1969, there was found to be a great unevenness in the distribution of dens. In the spring of 1970, in one case, six dens were even made within an area of 300 sq. meters. Denning places in winters 1968/69, 1969/70, and 1970/71 did not coincide. In the first winter (1968/69), the majority of females, especially in the Drem-Head mountains, denned on the south-eastern and eastern slopes which in the spring of 1969 were rather poor in snow. In the spring of 1970, dens were mainly found on the north-eastern and eastern slopes where the snowdrifts were the thickest, and in the spring of 1971 - on the northern and western slopes, which also were the richest in snow that winter.

In the autumns of 1970 and 1971, observations were made on the den making and bedding of females (Belikov, in press). The amount of data is not large but in all the cases the female bear excavated, in a snowdrift newly formed after autumn snowstorms, a den approximately of the same structure as it is found in spring.* Entranceways from these dens were 1.5 - 4 m long, and the roof was 40-50 cm thick. The entranceways were partially blocked with snow.

It was found that the female, before the choosing of final place for den, makes several trial excavations which are abandoned afterwards. In one case, female bear made a temporary hole and spent there several days; after this, she settled in a new, definitive den.

* This agrees with the conclusions of C.R. Harington (1968).

We believe that the distribution of dens is chiefly determined by the autumn conditions of new snow-accumulation; however, using of unthawed snowdrifts of the previous year cannot be completely excluded. During the winter, winds and storms redistribute snow; thus, up to the time of den leaving, dens can sometimes be found on the slopes poor in snow at that time. In the spring of 1970, we saw "semi-open" and "open" dens; snow from their roofs was blown away by the winds, and the bear family simply lay in a snow pit. In these cases, the departure of bears to the sea ice is probably hastened.

In the autumn of 1971, females came to the est of the Wrangel Island in the first half of October and in the middle of November; during these periods, the ice edge and a large amount of drifting ice were near the shore. In the second half of October and at the beginning of November, the sea near the western coasts of the island was clear, and female bears did not arrive. Similar evidence was presented by Harington (1968) and Lønø (1970).

In 1970, the first female was met with out of the den on March 7. A mass "breaking" of dens occurred on March 20-25; the last families leaving dens were seen on April 10. In 1971, the majority of dens were abandoned by March 25.

In 1970, mean litter size was 1.68 (11 females had 1 cub each, 19 females - 2 cubs each, and 1 female - 3 cubs). In 1971, mean litter size was 1.82 (9 litters with 2 cubs, 2 with 1 cub each). Thus, in winters 1969/70 and 1970/71, 300-360 cubs were produced annually on the Wrangel Island.

Cubs found at the time of leaving dens weighed 4.5 - 12 kg. Perhaps time of den breaking does not correlete exactly with the age of cubs but, to the same extent, is determined by external conditions. The smallest cubs were found in the dens which were "open" (see Table 1) or had a thin roof.

In 1970 (as in 1969) we found the remnants of a cub eaten by female in a den.

Polar bear tagging. In 1970-1971, tagging of polar bear females in maternity dens was continued on Wrangel Island. The immobilizing and tagging technique was essentially the same as developed in 1969 (Uspenski and Kistchinski 1970); Sernylan was the only drug used. In 1970, we accepted as a best dosage 250 mg of Sernylan for a female of normal weight, i.e. 1.2 - 1.8 mg/kg - slightly smaller than in

1969 (Table 2). We used Sernylan (2.5 ml of standard 10% water solution) in the mixture with the same quantity of ethyl alcohol, loaded into a 5 ml syringe. Such a mixture does not freeze at -20 -30°C. If necessary we added supplemtntary dosages (50 mg). In 1971, good results were only obtained when dosages of 400-600 mg of Sernylan were used (probably to be explained by the quality of this batch of the drug). A mixture of Sernylan with ethyl alcohol in ratio greater than 1: 1 sometimes froze below -20°C, and, therefore, was not convenient. When using small dosages of Sernylan, salivation and convulsions were slight, and some animals did not suffer at all.

Bears were tagged by steel and plastic ear tags and by the red dye, as in 1969. "Flags" of polyvinyl-chloride were not used because they did not hold well in the ear. Results of our work in 1969-1970 are in press (Kistchinski and Uspenski 1972).

In the spring of 1970, 7 female bears and 1 cub were tagged, and in the spring of 1971 - 8 females and 1 cub (Table 3). Due to the inaccessibility of Wrangel Island, both in 1970 and in 1971, the most convenient time for tagging was not fully utilized. We believe that if field work could be carried out throughout the whole period of den leaving, it would be possible to tag in the Drem-Head mountains 30-40 females per spring.

Up to the present, we have had no recoveries of tagged bears.

Parasitological studies on polar bear are continued at the Institute of Medical Parasitology of the U.S.S.R. Ministry of Health (N.N. Ozeretskovskaya and E.V. Pereverseva). The main efforts are directed to the study of the role of polar bear in the circulation of the trichinellosis invasion in the Arctic. All the bears studied were strongly invaded by Trichinella spiralis, but were free of other ecto- and endoparasites. Coprological samples did not contain helminths except for one instance of Anisoconidae (Nematode) larvae. Parasitological studies confirm some specificity of the "arctic" strains of Trichinella spiralis.

Morphological studies are continued at the Institute of Evolutionary Morphology and Ecology of Animals, U.S.S.R. Academy of Sciences (under the guidance of Prof. V.E. Sokolov). Samples taken on Wrangel Island (cerebrum, eyes, uterus and ovaries, thyroids, adrenals, intestinal tissues, heart and skeletal muscles, bone and fat tissues, tongue, kidney, liver, spleen, skin, blood) are processed. A part of these data is ready for publication.

Table 2. Results of immobilizing female polar bears by Sernylan (Wrangel Island, 1970-1971).

Date	Weight kg (approx)	Dosage of drug		Time from injection to immobilization, min.	Duration of immobilization, hrs.
		mg	mg/kg		
March 24, 1970	170	300	1.76	8	5
March 24, 1970*	180	250+	1.39+	8	
March 25, 1970	220	250	1.14	13	1+
March 25, 1970	150	250	1.67	21**	1.5
March 26, 1970	300	250	0.83	8	
March 26, 1970*	130	250+	1.92+	5	0.7+
April 6, 1970	150	300	2.00	5	7+
March 25, 1971	200	500	2.50		1
March 26, 1971	300	300	1.00	was not fully immobilized	
March 26, 1971	180	500	2.78		
March 27, 1971	180	280	1.56		
March 28, 1971	150	700	4.67		2
March 29, 1971	150	450	3.00		
March 30, 1971	200	500	2.50	40	
March 30, 1971	200	500	2.50		

* Before the main injection (250 mg), this female had received a small dosage (not exactly known because of an unsuccessful shot), which had failed to immobilize her.

** Female was not fully immobilized at all; restricted mobility of head and neck was observed all the time.

Table 3. Results of polar bear tagging (Wrangel Island, 1970-1971).

Date	Age, sex	Numbers of steel ear tags	Numbers of plastic ear tags	Number dyed
March 24, 1970	Ad.female	761, 763	761, 763	761
March 24, 1970	Ad.female	764, 766	764, 766	766
March 25, 1970	Ad.female	776, 777	776, 777	77
March 25, 1970	Ad.female	779, 779	779, 779	7
March 26, 1970	Ad.female	788	788	88
March 26, 1970	Ad.female	787, 785	787, 785	85
April 6, 1970	cub	772	-	72
March 25, 1971	Ad.female	751, 752	751, 752	-
March 26, 1971	Ad.female	791	791	-
March 26, 1971	Ad.female	753	753	-
March 27, 1971	Ad.female	792, 793	792, 793	-
March 28, 1971	Ad.female	754, 755	754, 755	754
March 29, 1971	Ad.female	756, 757	756, 757	-
March 30, 1971	Ad.female	758, 759	758, 759	-
March 30, 1971	Ad.female	799, 800	799, 800	-
March 30, 1971	cub	797	797	-

Progress in conservation measures. In 1970-1971, polar bear hunting in the U.S.S.R. was prohibited as before. In 1970, on Wrangel Island, by special permission, 13 cubs were taken alive for zoos; in 1971 - 17. Catching is being carried out under control of specialists with the obligatory rule to preserve the life of females.

On March 1970, new hunting regulations were passed in the Magadan Region. By these regulations, several especially protected areas were established within the Wrangel Island Republican Reserve. Areas with the highest density of dens (Drem-Head mountains, Hawaii Hills and East Plateau) are included in these especially protected areas; people are not allowed to stay in the area and all economic activities except for checking reindeer herds are prohibited. Among other regulations, the penalty for illegal killing of a polar bear in the Magadan Region has now been increased to 700 roubles.

As in previous years, people of the northern regions of the U.S.S.R. are being widely informed about the prohibition of polar bear hunting, by means of the press, radio, TV, special noticeboards, etc.

Polar bear research plans for 1972-1973. In the U.S.S.R. it is planned:

- to continue and to enlarge polar bear tagging on Wrangel Island,
- to complete studies on the winter ecology of the breeding part of the population,
- to improve tagging techniques (with the use of experimental animals),
- to continue collecting information on the distribution, numbers, population dynamics and ecology of polar bears from correspondents of Central Laboratory on Nature Conservation, staff of weather stations, trappers etc., as well as from the data of aerial ice surveys.
- to prepare for publication a book of collected papers on the "Ecology and Morphology of the Polar Bear in the Soviet Arctic".

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Paper No 9

P R E S S R E L E A S E

Scientists ask for ban on hunting of polar bears in international waters

Further measures for the conservation of polar bears and recommendations for international cooperation in polar bear management and research were agreed upon at an international meeting at Morges, Switzerland, which concluded Thursday.

Recommendations were made and a protocol drafted covering a ban on hunting of polar bears on the high seas from 1973 onward, except in continuation of the traditional rights of local peoples dependent on this resource.

Further recommendations were made on protection of denning and feeding areas and the management of polar bear populations within national territories.

General principles affecting a possible eventual international convention on the conservation of polar bears were also approved.

The above decisions came at the conclusion of the third biennial meeting of scientists from Canada, Denmark, Norway, the Soviet Union and the United States. The meeting was sponsored by the International Union for Conservation of Nature and Natural Resources (IUCN), which has responsibility for collating scientific research data on the white bears.

In four days of discussions, the experts reviewed research work of the past two years and conservation action in their individual countries, then laid plans for their international research programme for 1972-73.

The 1970-71 research brought out new data supporting earlier evidence of the discreteness of polar bear populations in the Hudson Bay region of Canada. Recoveries of tagged or marked bears pointed to a distinct boundary between the northern and southern bear populations, and additional data now suggest that the southern area can be further subdivided into three relatively distinct groups.

The ring seal appears to be the principal food of polar bears throughout the arctic icepack. However, a comparison of food habits of mainland and island polar bears in Hudson Bay in summer and autumn by a Canadian research student has shown that the main food of island bears during this period was sea birds; during the same period mainland bears ate large quantities of land and marine vegetation. Details of this study are to be published in the near future.

The group reported good progress had been made in denning surveys and calculation of productivity at denning sites. Further progress has been made in development of census techniques, and methods of estimating populations. No estimate of the total bear population was made by the meeting, but bears in some regions were reported as abundant and in certain regions as needing greater protection.

An estimated total of 900 bears was killed in the entire circumpolar region during 1970-71. This compares with 1300 estimated for the previous year.

Considerable progress on conservation action was reported.

In Greenland a Commission on Conservation Law is due to report soon, and there are strong hopes that a new National Park in North East Greenland will be declared which would protect the main polar bear denning areas in Greenland.

In Canada, polar bears have been protected totally in Newfoundland and along the Labrador coast. A number of provinces how have a system of sealing or identifying polar bear pelts to prevent illegal traffic.

New hunting regulations were introduced on September 1, 1970 in Svalbard (Spitzbergen) and Jan Mayen Island. Kong Karls Land has been given temporary reserve status, and all polar bear sport hunting from ships in the Svalbard region ended last year.

In Alaska, hunting permits for trophies were reduced to 300 in 1971; the unlimited bag for residents who hunt from the ground and use bears for food was reduced to three per hunter. The use of aircraft for hunting polar bears may be banned after 1972.

Total prohibition of polar bear hunting throughout the Soviet Union arctic continued, and more stringent protection for denning areas has been introduced in certain parts of Siberia.

It was recognized that the gradual reduction in polar bear harvests would reduce the recoveries of marked bears in certain regions, and that this situation demanded the design of new forms of tags that would be visible on live animals.

Cooperative international programmes were adopted for the examination of parasite loads and pesticide and PCB residues in bears, using standard techniques at special centres. The parasitic work will be handled in the Soviet Union, while the pesticides work will centre in Canada.

The group recognized the current world interest in the polar bear and in its effective management. To satisfy the need for reliable information, it proposes shortly to prepare a publication on current knowledge of the biology, status and conservation of the bears, including maps of known denning areas, foraging grounds, migration routes and occurrence. The publication would also serve to further identify gaps in present information.

Mr. Thor Larsen of Norway was unanimously elected chairman of the group for the next two year period. He succeeds Dr. Andrew Macpherson of Canada.

Proceedings and working papers of the meeting will be published as an IUCN Supplementary Paper.

11 February 1972.

Paper No 10

IUCN THIRD POLAR BEAR SPECIALISTS' MEETING - MORGES 7-10 FEBRUARY 1972

R E S O L U T I O N S

Resolution 1: Protection of polar bears on the high seas

The IUCN Polar Bear Group:

Recognizing that the polar bear is a significant resource of the Arctic region, the management of which has both national and international implications;

Knowing that the polar bear is of vital importance to the economic, social and cultural well-being of local peoples in the Arctic region;

Being aware that present polar bear numbers and population densities in most parts of the Arctic region are below the optimum level and that the species is under threat of disappearance in some areas;

Being convinced that the polar bear requires additional protection if the resource is to be conserved and populations permitted to build up to optimum levels;

Considering that effective management of this resource can be achieved only by a coordinated international effort;

Recommends to IUCN that it strongly urge all nations concerned:

(1) To take appropriate action to prohibit, from 1973 onwards, hunting of polar bears on the high seas including the area of the circumpolar pack ice, except where such hunting is carried out as a continuation of the traditional rights of local people who depend on this resources; and

(2) To protect, within their own territories, polar bear denning and feeding areas and to manage their own separate polar bear populations in consultation with other nations sharing these populations.

Resolution 2: Tagging programmes with particular reference to the North Atlantic and Chukchi and Beaufort Seas.

The IUCN Polar Bear Group:

Having reviewed the results of research concerned with elucidating the regional and circumpolar nature of the polar bear;

Recognizing the progress made, particularly in characterizing regional populations, estimating the numbers of bears in local areas, locating some areas of importance to denning, and assessing the types and incidence of disease and parasites;

Being aware however that, despite these advances in the understanding of polar bear populations and ecology, several problems of extreme importance remain unresolved;

Realizing in particular that fundamental knowledge about polar bear stocks ranging in the Chukchi Sea and the Beaufort Sea, which are of common interest ot Canada, the USSR and the USA, is insufficient to provide a basis for effective conservation action;

Realizing also that the available information about polar bears ranging in the Barents Sea and the Greenland Sea, which are of common interest to Denmark, Norway and the USSR, is inadequate especially in regard to numbers, movements and place of origin;

Being convinced also that action must be taken to locate important denning areas, both on land and sea ice, to which these stocks of bears are related;

Recognizing that whilst elements of such investigations are of principal importance to one country and may accordingly be handled on a national basis, other elements are of international scope and demand international cooperation for resolution;

Recommends to IUCN that it request all nations concerned:

(1) To expand significantly scientific programmes for studying polar bear populations probably shared by two or more countries, particularly tagging and survey programmes in the Barents Sea and the Greenland Sea (Denmark, Norway and the USSR), and the Chukchi and Beaufort Seas (Canada, USSR and the USA);

and

(2) to study denning areas and denning habits of polar bears in the North Atlantic (Denmark, Norway and the USSR) and on the coastal areas of the Chukchi and Beaufort Seas, (Canada, the USSR and the USA).

Resolution 3: Programmes in Denmark and Norway

The IUCN Polar Bear Group:

Recognizing the vital importance of the research on the polar bear being undertaken by Denmark and Norway in Greenland and in Svalbard to the development of effective management and conservation measures;

Knowing that these two countries may share polar bear populations with Canada and the USSR and that more information on these populations is required, especially data on migration, productivity and total numbers of bears;

Realizing the urgency of securing data on these important topics because of the rapid increase in development and exploitation of the Danish and Norwegian Arctic and the resulting impact on polar bear conservation and management;

Considering the already demonstrated advantages of a co-ordinated international effort in achieving better management and conservation of the polar bear throughout the Arctic;

Considering also the views expressed at the current meeting on the importance to Canada, the USSR and the USA of the Danish and Norwegian work in resolving conservation problems in the Arctic common to all five nations;

Recommends to IUCN that it strongly urges Denmark and Norway to take all possible action to continue and increase polar bear research, particularly that related to management and conservation, within their Arctic territories.

Resolution 4: Seal protection and research

The IUCN Polar Bear Group:

Recognizing that the ringed seal is the main food item of polar bears throughout their circumpolar range, and therefore that ringed seal productivity and availability is of direct importance to polar bear welfare;

Recognizing also that the protection of polar bear feeding grounds is as important to polar bear management as is the protection and preservation of discrete polar bear populations;

Realizing that the available data on ringed seal distribution and productivity are inadequate;

Recommends to IUCN that it request member nations to initiate and support studies and action programmes concerning the management and protection of ringed seals and the areas in which they congregate.

Resolution 5: Convention and protocol on polar bears

The IUCN Polar Bear Group:

Being convinced that an international convention will be required to provide a formal framework for cooperation between Arctic nations in regard to conservation of polar bears;

Welcoming the first draft of a Convention on Conservation of Polar Bears prepared by IUCN;

Having now enunciated general principles affecting the conservation of polar bears which should form the basis of such a convention;

Realizing the delays inevitably involved in concluding a convention;

Believing that international action is needed urgently to implement specific recommendations of the Group on management of polar bears;

Recommends to IUCN:

(1) That IUCN prepare a new draft of the proposed Convention based on the principles affecting polar bear conservation enunciated by the Group and circulate it to the Group for comment;

(2) That IUCN prepare a draft protocol based on Resolution 1 of the 3rd meeting of the Group and circulate it to the Group for comment;

(3) That IUCN, after amending the draft protocol as required in the light of comments from the Group, invite all nations concerned to adhere formally to the protocol.

Resolution 6: Meeting at Banff

The IUCN Polar Bear Group:

Being informed of the various topics affecting the ecology and management of natural resources in the Arctic that will be discussed at the IUCN 11th General Assembly and associated technical meetings;

Considering the importance also of early follow-up on several aspects of international coordination of polar bear research and management arising from the current meeting of the Group;

Recommend to IUCN that it consider convening a special meeting of the Group at Banff on 8 September 1972, immediately before the other IUCN meetings at Banff.

Resolution 7: Chairmanship of next meeting of the Group

The IUCN Polar Bear Group:

Recognizing that the Group has made considerable progress in connexion with research, management and conservation of the polar bear;

Realizing that any multi-national committee labours under serious political and linguistic restrictions;

Being convinced that the Chairmanship of any such committee is an essential element in contributing to the success of that committee;

Commends the IUCN for inviting Dr. John Tener to chair the Group's three sessions;

Recommends to IUCN that Dr. Tener be invited to chair the Group's next session.