THE POLAR BEAR IN ALASKA

by the Delegation of the United States

SUMMARY

Population size.—The number of polar bears in areas adjacent to Alaska is unknown. Sows with newborn cubs occur less frequently than would be expected in a typical population. An overharvest of bears adjacent to Alaska is not indicated by studies of biological data from animals killed by hunters.

Distribution.—During winter, bears are found on the sea ice of the Chukchi Sea and Bering Strait south to St. Lawrence Island. As the ice moves northward in spring and summer, bears move with it. Bears do not regularly come ashore in Alaska, and regular denning and foraging places on shore are not known. Bears do not occur on St. Matthew Island as they did during the 1800's, possibly because of changes in ice conditions.

Value.—The main economic value of polar bears has changed during the past 15 years as the harvest has changed. Formerly the main value was as a subsistence item for the Eskimos. Presently the main value is as a source of sport and trophies to hunters and a source of income to Eskimos, guides, and service organizations who supply support to hunters. The 1965 harvest of 292 bears contributed approximately $450,000 to the economy of Alaska.

Hunting methods.—Small aircraft, working in pairs, fly out from shore bases, locate a bear, and land so that hunters may stalk it. Natives hunt on foot or with dog teams in the vicinity of villages. Regulations preclude hunting from boats in summer.

Distribution of harvest by area.—The majority of polar bears are taken north of Bering Strait in the Chukchi Sea from Diomede Islands to Point Hope, and adjacent to Point Barrow. Lesser numbers are taken in contiguous areas. Few are taken south of Bering Strait. Areas of seal abundance are favored by polar bears.

Distribution of harvest by time.—Most bears are harvested in March and April. Hunting is not allowed between April 20 and October 15 except by residents (without the use of aircraft), who may kill bears for food. The harvest by Eskimos is small in winter. The take averaged 117 per year during the 1925–53 period. It has risen since then because of increased hunting pressure, and in 1965 the take was 292 bears.

Distribution of harvest by class of hunter.—Harvest methods have changed during the past 15 to 20 years from one primarily by natives to one by sport hunters. This is the result of the development of more efficient hunting methods by trophy hunters and a lessening dependence of Eskimos on game for subsistence.

Harvest composition.—Sex composition of the harvest for the past 5 years has averaged about 75 percent males. Native hunters are nonselective toward sex of bears hunted, resident white hunters are somewhat selective toward males, and nonresident hunters are highly selective toward males. Hide and skull sizes over the past 5 years have remained fairly constant. Average yearly hide measurements (length plus width) have been between 16.4 and 17.4 feet; average skull measurements (length plus width) have been between 23.8 and 24.9 inches. The lack of a downward trend in size of hides and skulls indicates a large reservoir of adult males—that stocks are not presently being overexploited.

Population characteristics.—Guide and hunter observations recorded during March and April since 1958 indicate an average litter size of 1.86 for cubs of the year (14 observations) and of 1.58 for cubs older than 1 year (363 observations). Observa-

tions of more than 2,300 bears made by hunting guides since 1958 during March and April indicate the following population composition:

	Percent
Cubs of the year	1
Cubs 1 year plus	31
Sows with cubs of year	Trace
Sows with cubs 1 year plus	20
Other bears	47

Most of the relatively few newborn cubs observed on the Alaskan ice pack have been far enough away from shore that it is believed they were born on the ice pack. The large number of cubs older than 1 year that remain with their mother, plus sightings of two sizes of cubs older than cubs-of-the-year, indicates that at least some offspring remain with their mothers for slightly more than 2 years.

Regulations.—Regulations have become more restrictive over the years as hunting pressure has increased. Present regulations allow 1 bear per hunter per year to be taken between October 15 and April 20. Females with young and bears through their second year of life are protected. Since 1961, hunters have been required to show hides to the Game Department for examination and to provide harvest data. Beginning in 1966, hunters will be required to bring skulls to Game Department biologists for examination. If harvest data and life history studies indicate that stocks are being overharvested, regulations will be enacted to limit the harvest within the annual recruitment.

Research.—Present research includes the collection and analysis of harvest data and specimens and a systematic program of recording guide and hunter observations. A much more intensive and extensive research program is required if the polar bear is to be adequately managed in the future.

THE POLAR BEAR IN ALASKA

Introduction

Fortunately, public interest in the conservation of polar bears appears to be keeping pace with the exploitation of these animals, which has, at least in Alaska, increased greatly in recent years. To avoid destruction of the polar bear stocks, it is now clear that harvests must be regulated in accordance with bear productivity. Procedures and mechanics for influencing harvesting activities by humans pose no real problem, but knowing the extent to which restrictions on harvest should be imposed in order to meet, as far as possible, human need or desire to harvest without exceeding sustained yield limits of the bear stocks does present serious and urgent problems. We have in Alaska observed a threefold increase in harvest intensity during the past two decades. Measures have already been taken to control harvests while seeking to gain a better understanding of their effects on the bear stocks.

We decided to confine this presentation mainly to current information and activities relating to polar bears in Alaska with the expectation that delegates from other countries would emphasize information relating to their geographic regions of responsibility. It was decided, furthermore, to omit a recapitulation of the literature which deals with evolution, taxonomy, morphology, physiology, etc., although references to these subjects are cited in the attached bibliography. This approach is dictated by the realization that much reference to polar bears in the literature consists of repeated reviews with very little in the way of new contributions. A thorough synthesis of information already available in the literature would be of great value. We feel, however, that the inadequacies of our present knowledge are apparent and that the pressing current need is for concretely identifying what we know in relation to what we must know if our ultimate objective is to use and still perpetuate the polar bear throughout its range.

Population Size

While estimates of the numbers of polar bears occurring in areas adjacent to Alaska's coasts have been made, all have been based on tenuous assumptions and extrapolation of fragmentary data. Certainly they do not provide a confident basis for guiding management efforts. Two things, however, can be stated.

First, bears observed on the ice pack adjacent to Alaska do not represent a cross-section of a typical population, at least during the season that bears are frequently observed or harvested. Thus, in the Chukchi Sea, sows with newborn cubs are rare in relation to the occurrence of adult bears or sows with yearling or older offspring. Along the Arctic coast of Alaska, the younger cubs are seen more frequently, but certainly not in sufficient abundance to account for the observed recruitment of yearlings.

Second, no decline in the abundance of polar bears adjacent to Alaska has been noted except in the immediate vicinity of certain coastal villages. This is not to say that present levels of harvest can be sustained indefinitely, but rather that if a general decline in the population is being experienced, our methods of observation are too crude to detect it at this point. Methods of attempting to assess population changes are mainly indirect, being based on guide and hunter reports and analyses of harvest data.

Distribution

Bears are common on the sea ice of the Chukchi Sea, excepting Kotzebue Sound, and the Arctic Ocean adjacent to Alaska's Arctic coast. During late winter, they occur, though in much smaller numbers, south of the Bering Strait as far as St. Lawrence Island and rarely beyond. They were once common on St. Matthew Island in the Bering Sea and were even rare visitors to the Pribilof Islands, though they have been absent from these southerly locations in the present century.

During the summer months when the southern extremity of the Arctic ice pack moves northward to or beyond the latitude of Point Barrow, the distribution of polar bears keeps pace. Bears do not come ashore in Alaska with any regularity. At times, when the ice pack moves to the Arctic coast during the summertime and then retreats northward, bears will be stranded ashore for varying periods of time. We are not, however, aware of any common or traditional use of the Alaska mainland by bears for denning or foraging purposes.

It has been speculated that the former occurrence of bears on St. Matthew and Hall Islands indicated a larger population of bears in the last century. It is also possible that oceanographic conditions, particularly the extension and duration of the Arctic ice pack to and beyond the latitude of St. Matthew Island, differed considerably a century ago as compared with the present. A similar contraction of the distribution of Pacific walrus has been observed with the reasons being likewise in question.

Figure 1 depicts the present distribution and relative abundance of polar bears as indicated by harvest data and guide and hunter reports.

Value

The polar bear has always been important in the subsistence economies of many Alaskan Eskimos. Polar bear meat is relished by Eskimos as food. From the advent of whalers in the Alaskan Arctic in the 1850's, prime polar bear skins have also been of economic value. The bears not only provided food and valuable hides that could be sold or bartered, but they were also a significant cultural element in the lives of Eskimos. Ceremonies and dances were related to the harvest of bears, and a man's prestige was enhanced considerably by his success in taking bears. An example of this was related to Brooks by the Reverend Percy Ipalook of the Presbyterian Church at Wales in 1948. One of the native hunters, Bob Tokienna, who was an elder in the church and an unusually successful bear hunter, insisted on doing a polar bear dance and staging a feast in the "Kosgi" after killing a bear. The Reverend Ipalook advised him that the ceremonies were hardly in keeping with his station as a church elder and suggested that he might forego them. Tokienna, who apparently attributed some of his success to these rituals, acknowledged that perhaps the minister had a point but that he, Tokienna, had a large family and couldn't afford to take any chances.

In the late 1940's the hunting of polar bear by use of aircraft began. At first only one or two guides engaged in this type of hunting, but gradually more and more guides acquired the necessary know-how and offered polar bear hunts to sportsmen and trophy hunters. During the past 15 years there has been almost a complete shift from Eskimo hunters utilizing dog teams to white hunters utilizing aircraft. In consequence, there has been considerable change in the economic returns from the bears taken. At the present time, practically no meat is salvaged from the polar bear harvest aside from the relatively few taken by Eskimos. The Eskimos continue to benefit from the polar bear harvest, however, in that they provide many of the

services associated with aircraft hunting in the Arctic. Fleshing of bear hides is done almost exclusively by Eskimo women for which they receive $25 per skin or more. Guide fees range from about $500 to $2,000. Air travel to and from the hunting base, hotel and restaurant charges, special clothing, cameras, guns and personal gear, all contribute to the exchange of money in connection with bear hunting. It would undoubtedly be realistic to say that each polar bear harvested in Alaska at the present time contributes at least $1,500 to the economy of the State in one way or another. If one considered only the bears taken by nonresident hunters who must, in addition to other expenses, purchase a $10 license and a $150 polar bear tag, the value per animal would undoubtedly approach or exceed $2,000. By this manner of reckoning, the 1965 polar bear harvest of approximately 300 bears directly resulted in the expenditure of about $450,000 within the State. Considering that a significant part of this money is expended in relatively small Arctic villages, its importance to the economies of these places is substantial. This economic importance of polar bears at the present time is sufficiently great to become a weighty element in management deliberations. Indications are that the demand for polar bears by sportsmen and trophy hunters will continue to increase with corresponding effects on the economics of polar bear hunting.

Harvest

HUNTING METHODS

Aerial hunting as developed by Alaskan guides and bush pilots allows sportsmen to bag trophy animals with a relatively small expenditure of time. This hunting method characteristically involves the use of two light, ski-equipped aircraft working together for reasons of safety. On long flights, as from Kotzebue to beyond the International Dateline, one aircraft will simply fly cover for the other and perhaps carry extra gasoline. Commonly, however, both aircraft carry gasoline reserves and each may hold a guide and a hunter. The guides typically look for bear tracks on the snow and then judge whether the animal that made the track is of trophy size. If so, and if snow and light conditions are good, the track is followed until the bear is found. This may be within a few miles or in excess of 50 miles. One aircraft will then land as close to the bear as possible and the hunter will stalk it. If an ordinary stalk is impossible, it is commonly reported to us that the cover plane will herd or attempt to herd the bear back within range of the hunter. While many conservationists and sportsmen condemn this type of hunting as not being sportsmanlike or ethical, still some of the most prominent sportsmen in the country have done it and will defend it. Mail received by the Department of Fish and Game indicates a very strong public feeling against aerial hunting, and there is no question that those engaged in it are strongly motivated by either the monetary returns (guides) or the ease with which a rare trophy may be obtained (trophy hunters).

The major bases of aerial hunting operations include the villages of Teller on the Seward Peninsula, Kotzebue, Point Hope, and Barrow. Records compiled during the past 5 years based on guide and hunter reports indicate that the average distance from shore bases at which bears are taken is about 85 miles. Hunters operating from Kotzebue fly the longest distances (average 130 miles), and those from Barrow fly the shortest distances (average 55 miles). Of course, native hunters on foot or with dog teams seldom get more than a few miles off shore.

A few guides have attempted to offer dog team hunts to sportsmen but they have been unsuccessful in developing this type of hunting. The physical exertion and time required are much greater as compared with aircraft hunting, and the trophies taken are usually smaller. Hunting of bears on foot or by dog team as practiced by Eskimos is usually done in association with seal hunting. Bears are shot whenever encountered, and no special hunting techniques, such as trained dogs, are involved.

Some bears are taken nearly every summer by the residents of Barrow while hunting walrus and bearded seals from boats along the edge of the ice pack. While the hides of these bears are of little value, the meat is completely utilized for human food. Sport hunting by boat has not developed because there are regulations specifically designed to prevent it.

DISTRIBUTION OF HARVEST BY AREA

Figure 1 indicates the distribution of the polar bear harvest taken by Alaska-based hunters. To some extent the areas of harvest reflect the distribu-

tion of polar bears. This is particularly true of the area north of Bering Strait where it is evident that bears are concentrated during the principal hunting months of March and April. Hunters from Teller, Kotzebue, and Point Hope all operate in this region. The absence of any significant number of bear kills south of Bering Strait and in Kotzebue Sound reflects scarcity of bears in these areas. But north and east of Point Hope, the harvest distribution probably reflects location of hunting bases rather than concentration of bears.

In the Chukchi Sea and Bering Strait area the abundance of bears is associated with constant fracturing of the ice floes that results in the formation of open water leads. Such areas are favored by seals, which are the sole food of polar bears during the winter season. It seems probable that the availability of seals is an element in promoting the concentration of bears in the southcentral Chukchi Sea just north and northwest of Bering Strait. While little hunting is done between Point Hope and Wainwright, this is in part due to the lack of shore facilities along this coast.

DISTRIBUTION OF HARVEST BY TIME

The major portion of the Alaska polar bear harvest is taken during the months of March and April. During this time daylight hours are increasing rapidly, ice pack formation and southern extension are near maximum, and the availability and quality of bears are optimum.

Furthermore, present regulations prohibit the killing of polar bears between April 20 and October 15 with the exception that residents may take bears without the aid of aircraft for food during the summer period. Actually, fewer than a dozen bears are killed annually during the summertime in an average year. Eskimo hunters do kill bears throughout the winter and have traditionally done so. However, in recent years the harvest by Eskimos has been extremely small (see table 1).

DISTRIBUTION OF HARVEST BY CLASS OF HUNTER

Table 1 illustrates the increasing harvest of polar bears by resident and nonresident trophy hunters in recent years and the sharp decline in harvest by Eskimos. The cause of the recent increase in trophy hunting involves the development and acquistion in large numbers of safe, high performance small aircraft, the increasing ability and experience of guides and bush pilots to hunt successfully with these aircraft, and the great attraction of a polar bear trophy

Table 1.—The Estimated and Known Alaska Polar Bear Harvest According to Hunter Type, 1925–65

[Data sources: 1925–56 annual reports of Alaska Game Commission; 1957 Tovey and Scott, 1957; 1958 Scott et al., 1959; 1959–65 unpublished data in Alaska Department of Fish and Game files]

Year	Nonresident	Resident white	Resident native	Total
1925–53	Few	Very few	Majority	117 (average)
1954	?	?	?	100
1955	?	?	?	128
1956	?	?	?	135
1957	75	53	78	206
1958	69	19	40	128
1959	?	?	53	250
1960	?	?	62	162
1961	70	59	23	152
1962	78	103	16	[1] 201
1963	106	57	22	[1] 189
1964	142	88	23	253
1965 [2]	159	116	17	292

[1] Includes 4 bears for which hunter type is unknown.
[2] Data incomplete.

to affluent sportsmen. The decline in harvest by Eskimos is a result of their being unable to compete with aircraft hunters. The taking of polar bears by Eskimos no longer carries the great and traditional prestige that it formerly did. This significance is lost by witnessing the ease with which white men are able to take bears. Then, too, aircraft activity in the vicinity of villages undoubtedly has a disturbing effect on bear movements, making them less available in accessible close-in hunting areas. In addition, the Eskimos are experiencing a transition in their economies and way of life with a lessening dependence on game resources for subsistence.

COMPOSITION OF HARVEST

The sex composition of polar bears harvested in Alaska during the past 5 years is shown in table 2. It will be noted that Eskimo hunters are apparently nonselective with respect to sex or, in reality, to size. Resident white hunters show a degree of selectivity for larger bears and, therefore, take a greater percentage of males. Nonresident hunters, all of whom are guided, are highly selective, favoring large bears and therefore taking predominantly males. A noteworthy point here is that the larger harvest of polar bears in recent years has not accounted for a proportionately large take of females, and therefore probably has a lesser influence on the reproductive performance of the bear population than one might judge from the total harvest figures.

Table 2.—Sex Composition of Polar Bears Taken by Alaskan Hunters, 1961–65

Year	Nonresident		Resident white		Resident native		All hunters	
	Number	Percent male	Number	Percent male	Number	Percent male	Number	Percent male
1961	70	93	59	57	23	52	152	73
1962	78	85	103	60	16	50	[1] 201	69
1963	106	88	57	68	22	68	[1] 189	79
1964	142	89	88	60	23	69	253	77
1965	159	89	[2] 116	64	17	56	292	78

[1] Includes 4 bears for which hunter type is unknown.
[2] Includes 5 bears collected for scientific purposes.

The size of polar bears taken by various classes of hunters is indicated in table 3. While these data confirm the varying selectivity characteristic of different classes of hunters, we realize that the measurements employed are too coarse to reveal what might be significant changes in the age of bears taken from year to year. This condition results from the fact that bears attain something near their ultimate gross size in from 5 to 7 years, while we are probably harvesting age classes extending through 20 years or more. In the future we will be obtaining tooth specimens from most polar bears harvested, and this will provide a much better indication of changes that may be occurring in the polar bear population through exploitation.

Population Characteristics

LITTER SIZE

A program of systematically querying guides and hunters after flights over the ice has resulted in a compilation of data relating to litter size presented in table 4.

While observations of sows with "cubs of the year" are too few to have real meaning, data relating to the class of "1 year plus" are significant. While it is possible, and even probable (see below), that the "1 year plus" class is composed of both yearlings and 2-year-olds, it is nevertheless indicated that an average of 1.6 cubs per litter survive at least 14 or 15 months after birth.

POPULATION COMPOSITION

Data have also been gathered from guides and hunters relating to their observations of the types of animals observed on hunting flights. This information is presented in table 5. Because these observations mainly were made in March and April when some or most sows with newborn cubs should be out of hibernation, it is apparent that this class of animal is extremely scarce in the areas being hunted. Guides believe that the newborn cubs they do observe are born on the ice pack for they are seen at considerable distances from shore. Furthermore, it is known that denning on the Alaska mainland takes place but rarely.

Table 3.—Average Hide Size (Length Plus Width Plus Flap in Feet) and Average Skull Size (Length Plus Width in Inches) of Polar Bears Harvested by Alaska Hunters, 1961–65

Year	Nonresident		Resident white		Resident native		All hunters	
	Skull	Hide	Skull	Hide	Skull	Hide	Skull	Hide
1961	24.9	17.5	22.7	15.8	21.7	14.6	23.8	16.4
1962	24.8	17.5	22.7	15.6	20.0	15.0	23.8	16.5
1963	25.2	18.1	24.1	16.8	21.5	15.2	24.8	17.4
1964	25.4	18.1	23.7	16.5	.....	15.5	24.9	17.2
1965	25.3	17.6	22.7	15.9	21.2	15.2	24.4	16.8

Table 4.—Number and Size of Polar Bear Litters as Reported by Alaskan Guides During March and April, 1958–65

Year	Sows with 1 cub		Sows with 2 cubs		Sows with 3 cubs		Average litter size	
	Cubs of year	1 year plus	Cubs of year	1 year plus	Cubs of year	1 year plus	Cubs of year	1 year plus
1958	.....	12	.....	22	.....	.....	.....	1.65
1960	.....	39	.....	34	.....	.....	.....	1.47
1961	2	20	3	11	.....	.....	1.60	1.35
1962	1	39	2	43	.....	.....	1.67	1.52
1963	.....	70	2	76	.....	4	2.00	1.56
1964	1	69	1	113	2	1	2.25	1.64
1965	.....	38	.....	71	.....	1	3.00	1.66
Total	4	287	8	370	2	6	1.86	1.58

Table 5.—Population Composition of Polar Bears Observed by Guides off Alaskan Coast During March and April, 1958–65

Year	Sows with cubs of year			Sows with cubs 1 year plus			Other bears			
	1 cub	2 cubs	3 cubs	1 cub	2 cubs	3 cubs	Small	Medium	Large	Undetermined
1958	.....	.....	.....	12	22	.....	26	71	22	.....
1960	.....	.....	.....	39	34	.....	27	95	37	9
1961	2	3	.....	20	11	.....	32	73	25	.....
1962	1	2	.....	39	43	.....	33	113	42	19
1963	.....	2	.....	70	76	4	69	99	51	54
1964	1	1	2	69	113	1	105	207	59	85
1965	.....	.....	.....	38	71	1	51	96	47	34

Composite Summary

Population element	*Number*	*Percent*
Cubs of year	26	1
Cubs 1 year plus	1,045	31
Sows with cubs of year	14	Tr.
Sows with cubs 1 year plus	663	20
Other bears	1,581	47

The composite summary in table 5 reveals a surprisingly large proportion of sows with yearling or older cubs. We believe that the frequent sighting of such animals indicates a true relative abundance, in that hunters will usually bypass the tracks of sows with cubs and hence will not see as many as would be the case with large bear which are tracked from the aircraft. We interpret this relative abundance of sows with older cubs as evidence that cubs frequently remain with the sow for slightly over two years. Further evidence of this extended parental-cub attachment comes from guides and hunters who report two sizes of cubs larger than cubs of the year. In addition, individual sows in estrous have been harvested which were capable of lactating slightly but which were not accompanied by cubs.

Regulations

Table 6 lists regulations and regulation changes relating to the harvesting of polar bears in Alaska (including offshore areas).

After July 1, 1960, all nonresidents were required to hire a registered guide to hunt polar bear provided that residents of the Arctic could serve as guides without possessing a registered-guide license. This mandatory guide requirement has since been rescinded.

Before 1960 the polar bear was classified as a fur-bearing animal in Alaska. In 1960, the Alaska Board of Fish and Game classified it as a big-game animal, although sale or barter of the hides is still permitted.

In 1961 the Alaska Board of Fish and Game required by regulation that the hide of each polar bear taken be sealed by a representative of the Department of Fish and Game. This regulation provided opportunity for interviewing all hunters and for sexing and measuring the bear hides. In 1965 the Alaska Board of Fish and Game further required that the skulls of polar bears accompany the hides until they have been sealed. Opportunity is therefore afforded for accurately measuring the skulls and in most cases obtaining a tooth specimen.

Table 6.—Summary of Alaska Polar Bear Regulations

Period	Closed season	Bag limit
Before 1948..	None.....	None.
1948–49.....	.....do.....	2.
1953–54.....	.....do.....	3.
1955–56.....	.....do.....	Resident—3; nonresident—1.
1957–58.....	.....do.....	1, excepting females accompanied by cubs.
1959–60.....	.....do.....	1, excepting cubs or females accompanied by cubs.
1960–61 [1]....	May 2–Oct. 14....	1, excepting cubs or females accompanied by cubs.[2]
1961–62.....	May 8–Oct. 14....	1 a year, except cubs and females accompanied by cubs.[3]
1962–63.....	May 1–Oct. 14....	Do.
1963–64.....	May 11–Oct. 14...	Do.
1964–65.....	May 11–Oct. 14...	Do.
1965–66.....	Apr. 21–Oct. 14...	Do.

[1] First year of State jurisdiction.
[2] Provided that residents may take polar bear without limit at any time for food.
[3] Provided that residents may take polar bear (except cubs and females accompanied by cubs) without limit at any time for food; polar bears so taken shall not be taken by means or use of aircraft.

The State of Alaska exercises jurisdiction over Alaskan based polar bear hunters when they operate in international waters. Furthermore, through regulations governing possession and transportation within Alaska's territorial limits, this authority extends to nonresidents of the State as well. Other than hunting that may be based in Siberia and Canada, all polar bear harvesting on the seas adjacent to Alaska is done by Alaskan based hunters. While disagreements have occurred among Alaskans regarding the specific nature of regulations, problems of enforcement based on lack of jurisdiction have not arisen.

No polar bear reserves now exist in Alaska, and the rarity of these animals on land seems to preclude the need for them.

Research

The goal of research at this time should be to provide information required as an immediate basis for polar bear management. Because their habitat is intact and relatively undisturbed by man, the principal threat to the animals would seem to be exploitation by man. Thus, determining the influence on the bear stocks of known levels of exploitation is vital. Priority should be given to investigating polar bear abundance throughout its range, discreteness of local populations, and productivity in relation to harvests. Techniques or methods for obtaining such information must be decided upon or developed, with direct methods being favored wherever possible over indirect methods. Beyond satisfying these crucial needs, research should be oriented toward population dynamics, life history, ecology, physiology, and other extremely important, but less urgent, subjects.

CURRENT RESEARCH

In Alaska, research and management activities are integrated. Harvest characteristics are being obtained through a well-established program. Data which are collected for each bear harvested include the size of hide and skull, sex, date and location of kill, and type of hunter.

Guides and hunters report numbers, locations and, when possible, the population component of bears seen.

Reproductive tracts are being collected and will be examined to obtain information on breeding biology and productivity.

Teeth are being collected and will be sectioned to obtain a fairly precise indication of age.

The feasibility of aerial censusing for obtaining a statistically valid population estimate is being explored.

GENERAL RECOMMENDATIONS

1. Research should be broadened geographically to encompass all areas of polar bear occurrence.

2. Each country should be responsible for research within its territorial limits and immediately adjacent international waters, though exchange of scientists on a visiting basis should be encouraged to promote liaison and standardization.

3. Standardized methods and techniques of data gathering should be agreed upon.

4. Assignment of research responsibilities to research agencies or groups within each country should be governed by their material means to execute them, the special scientific skills of individual workers, as well as statutory obligations for resource management or welfare.

5. Accord should be reached between countries as to (*a*) type and magnitude of research to be conducted by each, and (*b*) periodic exchange of information.

SPECIFIC RESEARCH RECOMMENDATIONS

1. Assessment of harvests—Information derived from bear harvests will always be essential to bear management and conservation efforts. It can provide basic data relating to movements, abundance, population dynamics, effects of exploitation, taxonomy, morphology, and other types of studies. Each country should collect at least the following information and specimens from polar bears taken by their nationals:

a. Number, sex, size of bears harvested, and the date and location of each kill.

b. As many skulls as possible, but in any case a tooth specimen and the reproductive organs from each bear harvested.

c. Parasite and tissue specimens that may be pertinent to disease studies.

2. Seasonal distribution and abundance—Each country should, within its means, conduct aerial or other surveys appropriate to conditions for the purpose of establishing seasonal distribution and abundance of bears. In addition, a systematic program of querying hunters or other Arctic residents relative to polar bear observations ought to be inaugurated.

3. Denning studies—Areas of denning should be defined and efforts made to determine the number of bears utilizing them. Attention should be directed toward the extent of maternal denning on the ice pack as well as on land. Such information will be essential to determining the degree to which discreetness of populations may exist as well as giving basis for productivity estimates.

4. Breeding biology and productivity—Specimens and fundamental data relating to reproduction will be acquired as indicated above. Nevertheless, laboratory analysis and careful theoretical interpretation of all related information will be required to gain confident knowledge of potential and realized productivity.

5. Ecology and life history—The relation of polar bears to oceanographic and ice conditions, food supplies, land areas of different types, and similar ecological elements should be studied. Mortality factors such as intraspecific strife and cannibalism, accidents, diseases, parasites, and similar factors warrant attention. Much information bearing on these subjects can be obtained in connection with other activities and will not initially require a great amount of extra field work.

Summary

Increasing harvests of polar bear in the seas adjacent to Alaska have not resulted in an apparent reduction in numbers. The observed population does not contain all age classes; the population element consisting of sows with newborn cubs must exist outside the areas visited by Alaska based hunters. Bears are common on the ice adjacent to Alaska north of Bering Strait. A late winter or early spring concentration is apparent just north and west of the Strait. There is no common or regular use of the Alaskan mainland for denning or foraging purposes.

Prior to the advent of aircraft hunting, most harvesting was by Eskimos for subsistence purposes and hides. Since the late 1940's, aircraft hunting by sportsmen has developed and now accounts for most of the bears taken. The 1965 harvest of approximately 300 bears contributed about $450,000 to the economy of Alaska.

Current harvests contain more than 70 percent male bears as a result of selective hunting for large animals. Observations of bears by guides and hunters indicate an average litter size of 1.6.

Regulations limit the take of bear to one per hunter per year, extend complete protection to cubs and sows accompanied by cubs, and prohibit hunting during the summer season except for Eskimo food purposes.

Present research involves the collection and analysis of harvest data and specimens. A systematic program of recording guide and hunter observations is also established.

Specific recommendations regarding research include broadening investigations geographically and undertaking new studies to provide an adequate foundation for proper bear management. Close cooperation between countries is urged.

Partial Bibliography

The following bibliography is neither complete nor confined strictly to polar bear. It may, however, contribute to the later compilation of a more comprehensive bibliography.

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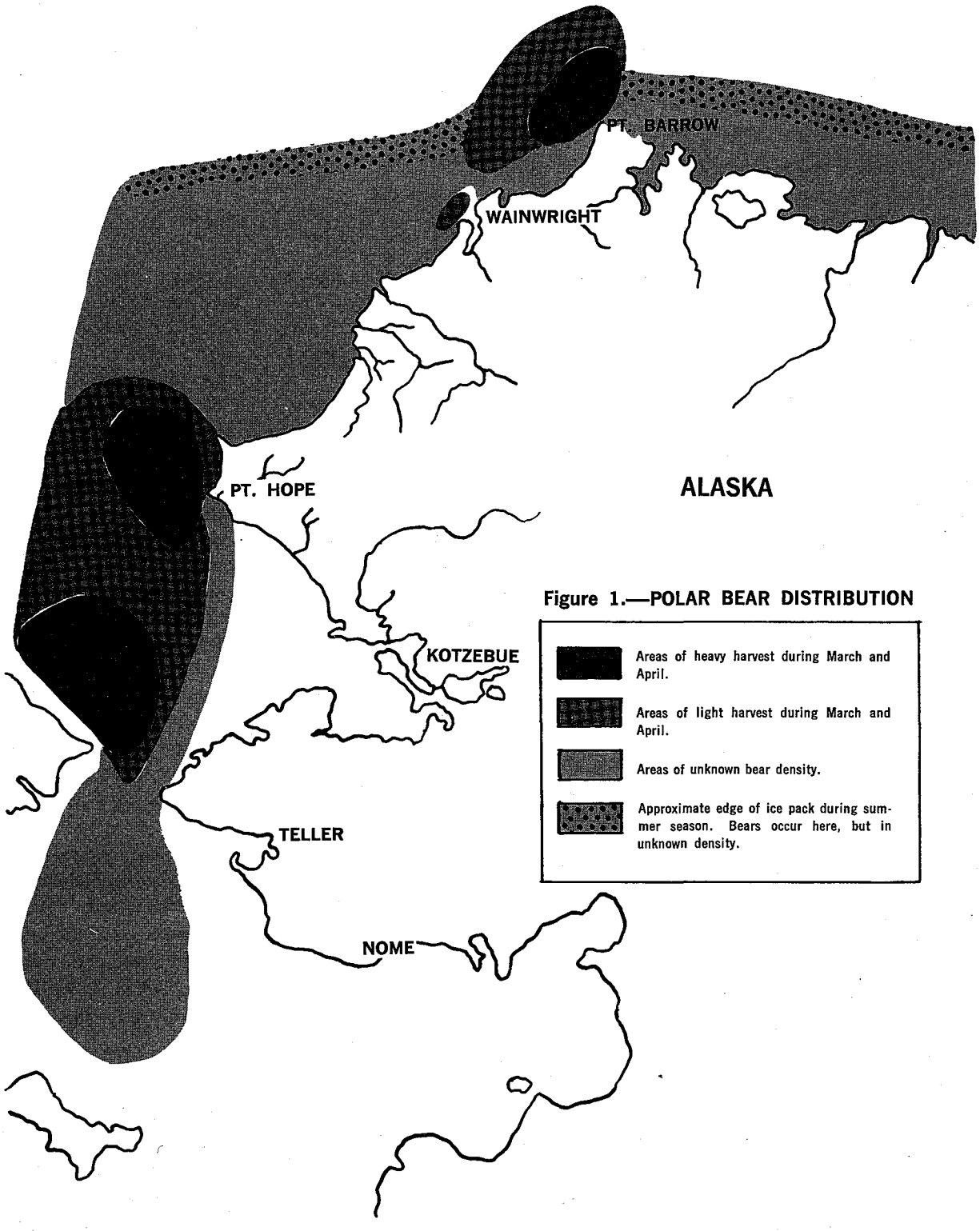

Figure 1.—POLAR BEAR DISTRIBUTION

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THE FIRST INTERNATIONAL

SCIENTIFIC MEETING ON THE

POLAR BEAR

Held at the University of Alaska

Fairbanks, Alaska, U.S.A.

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