ALASKA DEPARTMENT OF FISH AND GAME
JUNEAU, ALASKA

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POLAR BEAR STUDIES

by

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Volume X

Annual Project Segment Report
Federal Aid in Wildlife Restoration
Project W-15-R-3 and W-17-1, Work Plan M and R

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FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECT NO: W-15-R-3 and W-17-1 TITLE: Big Game Investigations

WORK PLAN: M and R TITLE: Bear Studies (Polar Bear)

JOBS: 1, 2, and 10 (W-15-R-3); 1, 2, and 3 (W-17-1)

PERIOD COVERED: January 1, 1968 through December 31, 1968

ABSTRACT

The Alaska polar bear harvest from July 1, 1967 through June 30, 1968 was 351.

The native kill of 111 (32 percent) was higher than it has been for a number of years because ice movement brought bears to more of the Alaska coast than usual, beach carrion made bears relatively easy to hunt in some areas, and hunters have become more mobile as snow machines have replaced dog teams. The native kill was 64 percent males. Bears were taken from October through April.

Nearly all of the trophy harvest of 240 (68 percent) was taken with the aid of aircraft. Non-residents took 52 percent of the total harvest and 72 percent of the airplane harvest. The trophy harvest was 80 percent males. Most bears were taken in March and April, the period when light airplanes can best be used for hunting.

Guides furnished composition data on 751 bears: 30 percent were young, 18 percent were sows with young, and 52 percent were single bears. Average litter size was 1.62. The number of bears seen per flying hour was 1.4, and the number seen per hunting hour was 2.2.

Age determinations based on cementum layering showed the mean age of males taken by non-residents in the Arctic Ocean to be 8.1 years and in the Chukchi Sea to be 8.2 years.

Testes and epididymides from 43 animals were examined for sperm. All February, March, and April specimens from bears 3 years old and older contained sperm. Sperm were not seen in August specimens from mature animals. Sample sizes were small for most age classes.

The Alaska Department of Fish and Game tagged 10 bears in Bering Strait and 81 bears north of Barrow, and the U.S. Bureau of Sport Fisheries and Wildlife tagged 50 bears near Cape Lisburne in March and April 1968. One of the bears tagged near Lisburne was seen from a Coast Guard cutter about 150 miles north of Barrow in September 1968, and another bear tagged near Lisburne was killed at Wainwright in December 1968. Of the 31 bears tagged north of Barrow in 1967, one was shot near Wainwright and two were recaptured north of Barrow in 1968.

RECOMMENDATIONS FOR MANAGEMENT

Continue to obtain and assess harvest information. Make a special effort to obtain teeth for age determination studies.

Consider shortening the period when airplanes can be used for hunting in order to reduce the time Department personnel must be stationed in the field to monitor the harvest. Few bears are taken early and late in the season, yet it is desirable to have personnel in the field at these times to enforce regulations and obtain complete harvest data and related specimens.

Establish a cut-off date for accepting applications for permits to hunt bears as trophies. This would aid in the enforcement of regulations. It would also allow the period of major hunting effort to be predicted quite accurately which would result in more efficient monitoring of the harvest.

Inform North Slope oil workers of polar bear regulations, especially those pertaining to transportation of unsealed skins from the State. Make special effort to enforce these regulations.

Evaluate the subsistence aspect of the native harvest, and consider the need for regulation changes. Some bears are now taken in order to sell the hide rather than for food.

Determine the potential for development of dog team hunting. This should include the number of potential guides, best hunting period and locations, length of time required for hunt, chance of success, cost, hunter interest, and role of Department regarding regulation changes or other action.

Maintain contacts with other countries that have polar bears regarding management practices and characteristics of harvest.

WORK PLAN SEGMENT REPORT

FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECT NO: W-15-R-3 and W-17-1 TITLE: Big Game Investigations

WORK PLAN: M and R TITLE: Bear Studies (Polar Bear)

JOBS: 1, 2, and 10 (W-15-R-3); 1, 2, and 3 (W-17-1)

PERIOD COVERED: January 1, 1968 through December 31, 1968

OBJECTIVES

To determine magnitude, distribution, chronology, and sex, size, and age composition of the hunter harvest.

To describe breeding biology.

To determine if bears off the Alaska coast belong to one or more discrete populations, and if so, the relationship of these populations to bears throughout the polar basin.

METHODS

By regulation, polar bear hides and skulls must be presented to a member of the Department for examination and sealing within 30 days after the date of kill. The greatest segment of the kill, that taken with the aid of aircraft, occurs in late February, March, and April from four hunting locations. To expedite sealing, Department personnel were stationed at three of these locations during most of the hunting period. Information obtained at time of sealing included date and location of kill, sex, hide size, and skull length, width, and condylobasal length. Specimens, including skulls, teeth, reproductive organs, blood samples, and masseter muscle samples, were collected through contact with guides and hunters. Guides were furnished forms and asked to record number, composition, and location of bears seen on hunting flights. Personnel who conducted the sealing program were Greg Bos at Barrow, Ben Ballenger at Kotzebue, and Doug Jones and Dimitri Bader at Point Hope. Bob Pegau in Nome obtained sealing information for bears taken out of Teller.

When bears were sealed the tooth most commonly obtained was a rudimentary lower first premolar. Teeth were decalcified, and a cryostat was used to cut 50-micron cross sections of the root. These were stained with alum hematoxylin and ages assigned by counting cementum layers under 45 to 90 power magnification. Details on tooth sectioning and examination are described by Lentfer et. al. (1968).

Polar bear testes and epididymides have been collected for several years from bears killed by Alaska trophy hunters in February, March, and April and were obtained from bears taken by hunters in Spitsbergen waters in August 1967. Most specimens were frozen for several weeks. They were then thawed, dissected free from the tunica vaginalis, weighed, and fixed and preserved in 10 percent formalin. Specimens were selected for examination so that young, mature, and old animals and the entire time span of the hunting period were represented. Histologic sections of specimens were prepared from the body of the epididimis and underlying portion of the testis. These were examined microscopically for presence of sperm. Ages were assigned to bears from which most specimens were obtained on the basis of tooth cementum layering.

Tagging and marking bears to obtain movement and other life history information which was started in 1967 was continued in 1968 with the cooperation of the U.S. Bureau of Sport Fisheries and Wildlife. Jack Lentfer and Lee Miller, based at the Tin City Air Force facility from February 23 to March 12, tagged bears in Bering Strait. James W. Brooks of the U.S. Bureau of Sport Fisheries and Wildlife was assisted by Sterling Eide of the Alaska Department in the federal program conducted out of the Cape Lisburne Air Force Facility between March 4 and April 8. Lentfer, Miller, and Greg Bos were based at the Naval Arctic Research Laboratory to tag bears north of Point Barrow from March 19 to May 3. Facilities provided by the Air Force and the Naval Arctic Research Laboratory greatly facilitated the work.

Bears were immobilized on the ocean ice by injecting phencyclidine hydrochloride (Sernylan, Parke Davis and Company, Detroit, Michigan) intramuscularly with a syringe gun from a helicopter. Methods were the same as in 1967 (Lentfer 1968), except that in many cases after a bear was immobilized, 50 to 100 mg. of a tranquilizer, propiopromazine hydrochloride (Tranvet, Diamond Laboratories, Inc., Des Moines, Iowa) was administered intramuscularly with a hand syringe. Large bears and bears receiving the greatest dosages of Sernylan were given the most Tranvet. Bears were tagged with a monel metal tag in one ear and a nylon tag in the other. Both tags for one animal had the same number. Tag numbers were in the 1-250 series as designated for Alaska at the international polar bear meeting in Morges, Switzerland in January 1968. Each tag also had a legend that a reward would be paid for its return to the Alaska Department of Fish and Game. Bears captured in Bering Strait and north of Barrow had the ear tag number tattood on the inside of the upper lip. Collars of nylon parachute webbing were fastened around necks of fully mature animals. Some collars were numbered with marking ink and most had a label sewed to them stating that a reward would be paid for return of collar and skull. From 12 to 20 mg./kg. body weight of alizarin red S dye was injected into the body cavity of most bears tagged in Bering Strait and north of Barrow. This should aid in determining pattern of tooth development for age determination of animals from which a tooth may be obtained in the future. A 24- to 30-inch high number corresponding to the ear tag number was dyed on the back or sides of animals with Nyanzol A dye (Nyanza, Inc., Lawerence, Massachusetts). A tooth, usually a first lower premolar, was removed from most bears older than yearlings for age determination. Bears were measured and weights estimated.

The Coast Guard cutters Northwind and Staten Island were provided forms and maps and asked to record ice conditions and marine mammals seen on summer cruises north of Bering Strait. They were also asked to check polar bears seen for marks. Cooperation was excellent.

The University of Sydney in Australia, represented by Professor Harry Messel, and the Department designed a cooperative polar bear radio-tracking project. The work was to be done in segments each of which was to be a complete research project. This was to insure that each phase would supply meaningful information in case funds were not available for subsequent phases. A request for funds from the National Science Foundation was turned down, and the program was redesigned so that the first phase could be funded by the Department and the University of Sydney and could be completed in 1968. Plans were to have a radio collar and aircraft receiver designed and radio collars placed on six bears and monitored at intervals throughout the year. The system which was envisaged and for which specifications were written called for radio collars with a transponder which could be activated from a monitoring aircraft and which would then activate a transmitter in the collar. The radio in the collar was to be capable of transmitting for a total time of at least 400 hours intermittantly over a period of at least 2 years. Aircraft radio equipment was to be designed which would give directional detection of instrumented bears of $\pm$ 2 degrees at a slant range of about 150 miles or more from an aircraft altitude of about 10,000 feet. Radio signals were to be such that each of six bears could be distinguished individually. All components attached to the bear including antenna were to be contained in the collar. Invitations to bid were submitted to three electronic companies much of whose recent experience had been in the space science field. Two companies suggested pilot studies, and the third company thought specifications could be met in time for radio-tracking to start in the spring of 1968. A fixed fee contract was entered into with this company with the stipulation that payment was not to be made until functional equipment had been delivered.

FINDINGS AND DISCUSSION

Characteristics of Harvest

Harvest figures discussed are for the period July 1, 1967 through June 30, 1968. Subsistence and sport hunters took 351 polar bears during this period (Table 1). Comparative harvest figures since 1961 are listed in Table 2.

Natives took 111 bears, considerably more than they've taken during any recent year. Several factors contributed to the high native kill. A steady north wind in early or mid-November drove heavy ice south through Bering Strait to St. Lawrence Island. Bears moved to St. Lawrence Island with this ice, apparently in greater numbers than they have for many years. Heavy ice moved to the northwestern and northern Alaska coast somewhat earlier than usual, and bears were present along beaches for a longer period of time than usual. The number of snowmachines has greatly increased in Arctic Coast villages during the past 2 to 3 years and has increased mobility of hunters traveling inland and along beaches. On St. Lawrence Island most bears were taken on the south side of the island in conjunction

with running a trap line. In most cases hunters followed tracks with a snow machine. On the mainland most bears were killed along beaches either with the aid of a dog team or snow machine. In the Wainwright area, more carrion, mainly walrus and whale carcasses, was reported to be on the beach than usual. This attracted bears and made them easier to hunt. A scarcity of caribou near Wainwright in November probably caused more hunting than usual for bears.

There is no limit on the number of bears that a resident can kill for food, provided that cubs and females with cubs are not taken and that an airplane is not used. Several individuals took more than one bear (Table 3). This was because bears group in family units and at food sources, and thus often more than one can be killed at a time. In addition, some individuals exert more effort to obtain bears or are better hunters than others. Reasons that natives hunt bears other than for food are the prestige which killing a bear brings and the monetary value of the skin. Natives could sell dried unprocessed skins in their villages for between $25 and $30 per lineal foot in 1968. Most skins are purchased by fur dealers or individuals to be made into rugs. Polar bear hair is also used to make artificial fish flies.

Natives were generally non-selective in their hunting, except that cubs of the year and yearlings may not have been taken in some instances. The native harvest was approximately 64 percent males. Both sexes were killed throughout the hunting period which extended from October through April (Figures 1 and 2).

Trophy hunters took 240 bears (68 percent of total kill). One bear was taken by a guided dog-team hunter, and 239 were taken with the aid of aircraft. The kill by hunters using aircraft was somewhat above the 213 bear average of the preceding 7 years and considerably below the 1966 high kill of 347. As in past years most airplane hunting was done out of Teller, Kotzebue, Point Hope, and Barrow (Table 4). Pilots could readily find bears together with ice on which they could land from these four locations, and weather was more favorable for hunting than it has been for some years. The success ratio was high (94 percent for persons not residing in Alaska as indicated by the number of non-resident tags sold). Most hunting was done by two planes flying together. There were 29 two-pilot teams in 1968, a few more than the 25 or 26 which have operated during the past few years.

Non-residents (persons not residing in Alaska) took 52 percent of the total harvest and 72 percent of the airplane harvest, a greater proportion of the airplane harvest than in previous years. The regulation effective July 1, 1966, which limits a guide to six hunters may have caused this increase in the non-resident harvest. When guides were not restricted, most who took out more than six hunters catered to residents. When restricted to six hunters they started booking more hunts with non-residents and charging higher fees. Alaska residents who said they were not guided used aircraft to take 26 bears. In some cases these people followed the intent of regulations; in other cases they did not follow the intent of regulations pertaining to guiding and transporting.

The percent of males taken by non-resident and resident hunters using aircraft was 84 and 66 percent, respectively. As in the past, guides put forth more effort to find trophy animals, which are larger and therefore males, for non-residents who were charged a higher guiding fees than were residents.

Harvest chronology has changed during the past 2 years. Some guides started operating somewhat earlier than they did in the past. In 1968 the first bears were taken out of Teller and Kotzebue in early February, out of Point Hope in mid-February, and out of Barrow in early March. Guides stopped hunting earlier than in most past years. Only six bears were taken after April 20 (Figure 3).

Guides reported number and composition of bears seen on hunting flights (Tables 5 and 6).

Age composition of the harvest as determined by cementum examination is presented in Table 7. Comparative data for 1966 and 1967 are presented in Table 8. The hypothesis exists that bears taken west of Alaska by Teller, Kotzebue, and Point Hope hunters belong to a different sub-population than bears taken along the northern coast by Wainwright, Barrow, and Barter Island hunters, and data are grouped by area. Bears taken north and east of a line extending northwest from Point Lay are designated as Arctic Ocean animals, and bears taken south and west of this line are designated as Chukchi Sea animals. Skull sizes of males taken in 1968 plotted against ages indicate that skulls of males from the Chukchi Sea may be larger than skulls of males from the Arctic Ocean (Figure 4). Average sizes of hides in the 1968 harvest by hunting base are presented in Table 9. Average size of skulls for 1966, 1967, and 1968 are listed in Table 10.

Breeding Biology

Testes and epididymides from 43 bears were examined for presence of sperm (Table II). Sperm were not seen in specimens from a yearling and a 2-year-old. Sperm occurred in February, March, and April specimens of all bears 3 years old and older. The oldest of these were aged at 19 years. Sperm were not seen in August specimens from mature animals. Additional specimens will be examined and detailed findings then reported.

Identity of Populations

A helicopter and a fixed-wing plane were each flown approximately 25 hours over the ice north of the Diomede islands in Bering Strait between March 5 and 12. Ten bears were tagged. Ice and weather conditions would have allowed a tagging operation to begin as early as February 15. A warming trend and south wind which caused ice to break up and bears to move north prevented tagging after March 11. A helicopter was flown approximately 70 hours and a fixed-wing plane approximately 90 hours out of Cape Lisburne between March 9 and April 1. Fifty-one bears were immobilized. Bears were present and weather and ice conditions would have allowed tagging from about February 15 to April 25. At Barrow a helicopter and a fixed-wing plane were each flown approximately 130 hours to immobilize 82 bears between March 20 and April 30. Work could have started as early as March 1. Warming weather precluded work after April 30.

Table 1. 1968 Known Polar Bear Harvest By Area, Type of Hunter, and Sex of Bear.

HUNTING BASE	NON-RESIDENT			RESIDENT-WHITE			RESIDENT-NATIVE			TOTAL						
	♂	♀	Sex Unk.	♂	♀	Sex Unk.	♂	♀	Sex Unk.	♂	♀	Sex Unk.	All Bears	% Total Kill	% Male	% Non Res.
Teller	25	5	-	4	2	-	-	-	-	29	7	-	36	10.3	81	83
Kotzebue	79	7	-	15	3	-	-	-	-	94	10	-	104	29.6	90	83
Pt. Hope	18	2	-	6	-	-	16	8	-	40	10	-	50	14.2	80	40
Barrow	23	12	-	6	11	-	17	5	1	46	28	1	75	21.4	62	47
Nome	-	-	-	-	2	-	-	-	-	-	2	-	2	.6	0	0
St. Lawrence	-	-	-	-	-	-	9	7	-	9	7	-	16	4.6	56	0
Diomede	-	-	-	-	-	-	3	-	-	3	-	-	3	.9	100	0
Wales	-	-	-	-	-	-	1	-	-	1	-	-	1	.3	100	0
Shishmaref	4	1	-	-	-	-	1	-	-	5	1	-	6	1.7	83	83
Kivalina	-	-	-	-	-	-	1	-	-	1	-	-	1	.3	100	0
Wainwright	-	-	-	-	-	-	19	19	2	19	19	2	40	11.4	50	0
Colville R.	1	1	-	-	-	-	-	-	-	1	2	-	3	.9	33	100
Barter Is.	5	5	-	6	1	-	1	-	1	12	1	1	14	4.0	92	36
Sub Total	155	29	-	37	19	-	68	39	4	260	87	4	351			
Percent	84	16	-	66	34	-	61	35	4	74	25	1	100	100		
TOTAL	184 (52%)			56 (16%)			111 (32%)									

Table 2. Polar Bear Harvest and Sex Ratios, 1961-1968.

Year	Non Resident		Resident White		All Sport Hunters		Resident Native		All Hunters	
	No.	% Male	No.	% Male	No.	% Male	No.	% Male	No.	% Male
1961	70	93	59	57	129	77	23	52	152	73
1962	78	85	103	60	181	70	16	50	201	69
1963	106	88	57	68	163	81	22	68	189	79
1964	142	89	86	60	228	78	23	69	253	77
1965	159	89	116	64	275	79	21	50	296	76
1966	195	89	152	66	347	79	52	46	399	74
1967	124	97	42	69	166	90	25	50	191	80
1968	184	84	56	66	240	80	111	61	351	74

Table 3. Number of Bears Killed by Individual Native Hunters.

Village	Number of Hunters Killing the Following Number of Bears							
	1	2	3	4	5	6	7	8
St. Lawrence	3	5	1	-	-	-	-	-
Diomede	1	1	-	-	-	-	-	-
Wales	1	-	-	-	-	-	-	-
Shishmaref	1	-	-	-	-	-	-	-
Kivalina	1	-	-	-	-	-	-	-
Pt. Hope	12	2	-	2	-	-	-	-
Wainwright	4	3	2	1	1	-	1	1
Barrow	7	2	4	-	-	-	-	-
Barter Island	2	-	-	-	-	-	-	-

Table 4. 1968 Polar Bear Airplane Hunting Data.

Hunting Base	No. of Guide Teams	No. of Bears Killed on Guided Hunts	No. of Bears Killed on Unguided Resident Hunts	Percent of Airplane Kill
Teller	6	33	3	15
Kotzebue & Point Hope	15	114	15	54
Barrow	5	51	1	22
Shishmaref	1	5	0	2
Colville River	1	3	0	1
Barter Island	1	5	7	5
Total	29	211	26	100

Table 5. Number of Polar Bears Seen as Reported by Airplane Hunting Guides, 1968.

	No. of Report Forms Received	Flying Time (Hours)[1/]	Hunting Time (Hours)	Bears Seen[2/]	Bears Killed	Bears per Flying Hour	Bears per Hunting Hour
Teller	28	159.3	100.2	298	21(7%)	1.9	3.0
Kotzebue	27	163.3	68.1	231	22(10%)	1.4	3.4
Barrow	54	228.1	176.1	222	47(21%)	.97	1.3
Total	109	550.7	344.4	751	90(12%)	1.4	2.2

1/ Flying and hunting times are for hunting teams, usually two aircraft, and not the combined flying time of both aircraft.

2/ Includes bears killed.

Table 6. Composition of Polar Bears Seen as Reported by Airplane Hunting Guides, 1968.

Area	Sows W/Young			Other Bears			Bears Killed	Total
	1 Young	2 Young	3 Young	Small	Medium	Large		
Teller	24	44	2	28	49	12	21	298
Kotzebue	11	23	-	7	67	44	22	231
Barrow	19	15	-	31	57	4	47	222
TOTAL	54	82	2	66	173	60	90	751

Composite Summary

Young	224	30%
Sows W/Young	138	18%
Other bears seen including bears killed	389	52%
Total	751	100%

Table 7. Age Composition of Polar Bears Harvested in 1968 Based on Tooth Cementum Layering (209 Bears Aged of 351 Harvested).

AGE	NUMBER OF BEARS				
	MALE			FEMALE	
	Airplane		Ground	Airplane	Ground
	Non-Res.	Res.			
Arctic Ocean					
1			1		1
2			2		
3	1	1	5	4	3
4	1	1	5	5	5
5	4	1	6	3	4
6	4		4	3	2
7	2	2		3	1
8	1	1	1	1	2
9-10	2		1	1	2
11+	6	1	3	2	3
Mean Age	8.1	6.4	5.6	5.8	6.2
Range	3-15	3-11	1-17	3-13	1-18
Chukchi Sea					
1		1			
2	2	2			1
3	1	6		2	
4	3	2			1
5	13	3			
6	12	1		1	1
7	11			1	
8	5	1			
9-10	10	2		1	
11+	19	3		3	
Mean Age	8.2	5.8		8.3	4.0
Range	2-17	1-16		3-15	2-6

Table 8. Average Age Based on Tooth Cementum Layering of Polar Bears in Hunter Harvest, 1966-68.

	MALE			FEMALE	
	Airplane		Ground	Airplane	Ground
	Non-Resident	Resident			
Arctic Ocean					
1966	10.1(16)[1/]	7.2(13)	10.6(4)	6.6(8)	5.0(6)
1967	7.7(17)	6.0(10)	4.5(2)	7.0(8)	5.0(2)
1968	8.1(21)	6.4(7)	5.6(28)	5.8(22)	6.2(23)
Chukchi Sea					
1966	9.1(64)	7.0(13)	-	7.2(14)	3.0(1)
1967	7.0(39)	7.0(7)	-	6.0(12)	-
1968	8.2(76)	5.8(21)	-	8.3(8)	4.0(3)

[1/] Numbers in parentheses are numbers in sample.

Table 9. Average Hide Size[1/] in Feet of Polar Bears Taken by Airplane Hunters From Main Hunting Bases in Alaska, 1968.

Hunting Base	Non-Resident		Resident-White		Total	
	Male Size No.[2/]	Female Size No.	Male Size No.	Female Size No.	Male Size No.	Female Size No.
Teller	17.9 24	15.5 5	17.4 4	13.6 2	17.8 28	14.6 7
Kotzebue	18.1 79	15.6 7	17.0 14	13.6 3	18.0 93	14.6 10
Pt. Hope	17.5 19	14.6 2	16.4 6	0	17.2 25	14.6 2
Barrow	17.7 23	15.6 11	16.3 6	14.6 10	17.4 29	15.1 21

1/ Hide size is length from tip of nose to middle of anus plus width from claw tip to claw tip of front feet when hide is laid out flat.

2/ No. is number of hides measured.

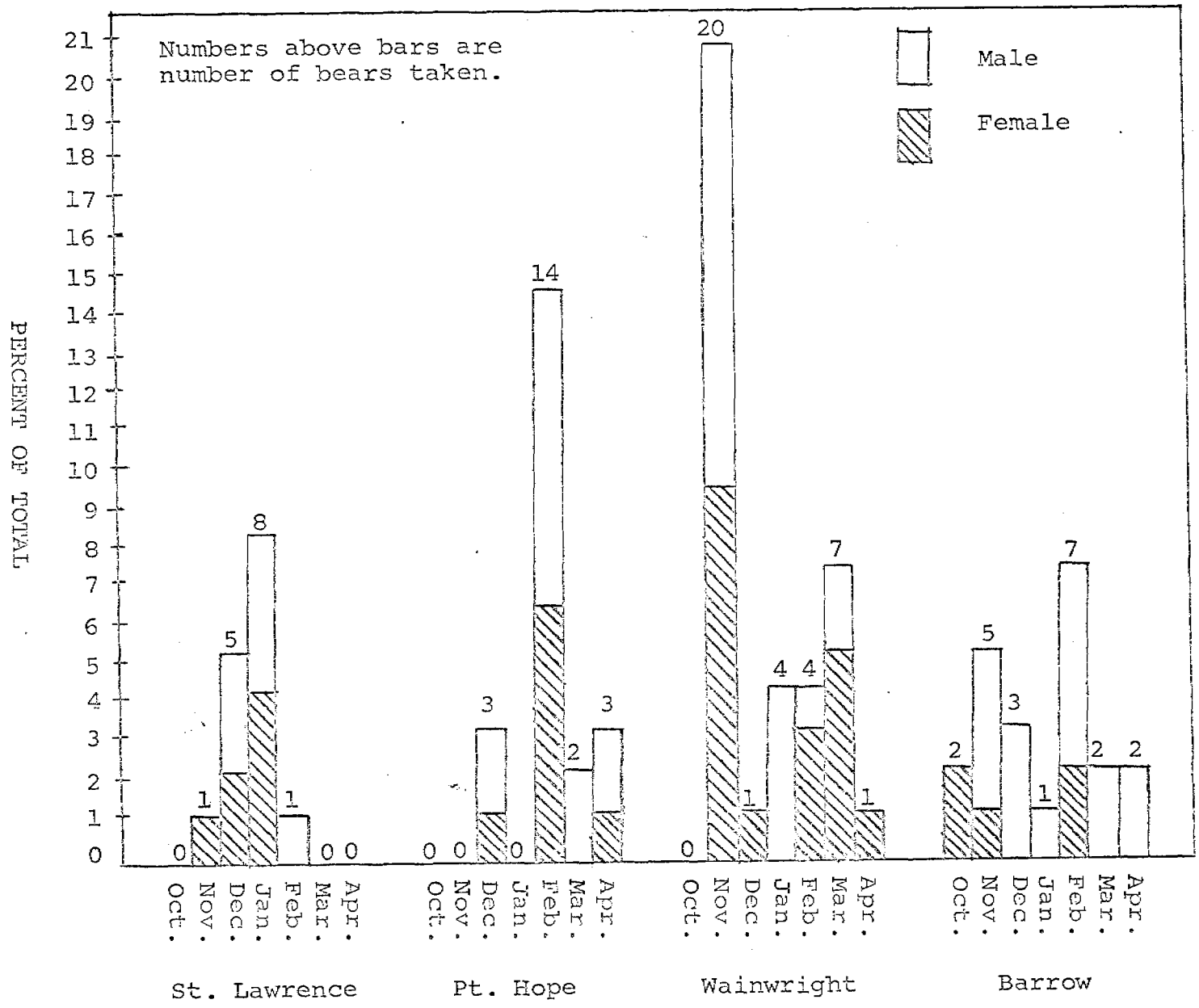
Table 10. Average Skull Size 1/ in Inches of Polar Bears Taken by Airplane Hunters from Main Hunting Bases in Alaska, 1966-1968.

	Non Resident			Resident-White			Total			
Hunting Base	Male Size	N2/	Female Size	N	Male Size	N	Female Size	N	Male Size	N	Female Size	N
Teller										
1966	24.7	41	22.0	5	24.6	9	21.5	4	24.7	50	21.8	9
1967	25.5	26	20.8	1	23.4	2	21.4	1	25.3	28	21.1	2
1968	24.8	24	21.7	5	24.2	4	19.6	2	24.7	28	21.1	7
Kotzebue										
1966	25.6	76	22.2	4	24.4	23	21.6	9	25.3	99	21.8	13
1967	24.9	45	21.8	4	22.8	7	22.3	3	24.6	52	22.0	7
1968	25.3	78	21.4	7	24.1	14	18.6	2	25.1	92	20.8	9
Pt. Hope										
1966	24.3	22	19.1	3	22.8	16	21.2	7	23.7	38	20.6	10
1967	22.6	8	19.5	1	23.3	5		0	22.9	13	19.5	1
1968	24.8	19	20.0	2	25.5	6		0	25.0	25	20.0	2
Barrow										
1966	24.1	25	20.5	6	22.4	44	19.9	26	23.0	69	20.0	32
1967	23.6	22	20.0	5	22.6	14	19.9	7	23.2	36	19.9	12
1968	23.7	23	21.1	12	23.0	5	19.7	10	23.6	28	20.4	22

1/ Skull size is greatest length without lower jaw plus greatest width.

2/ N = Number measured.

Figure 1. Sex and Chronology of Native Polar Bear Harvest, 1968.



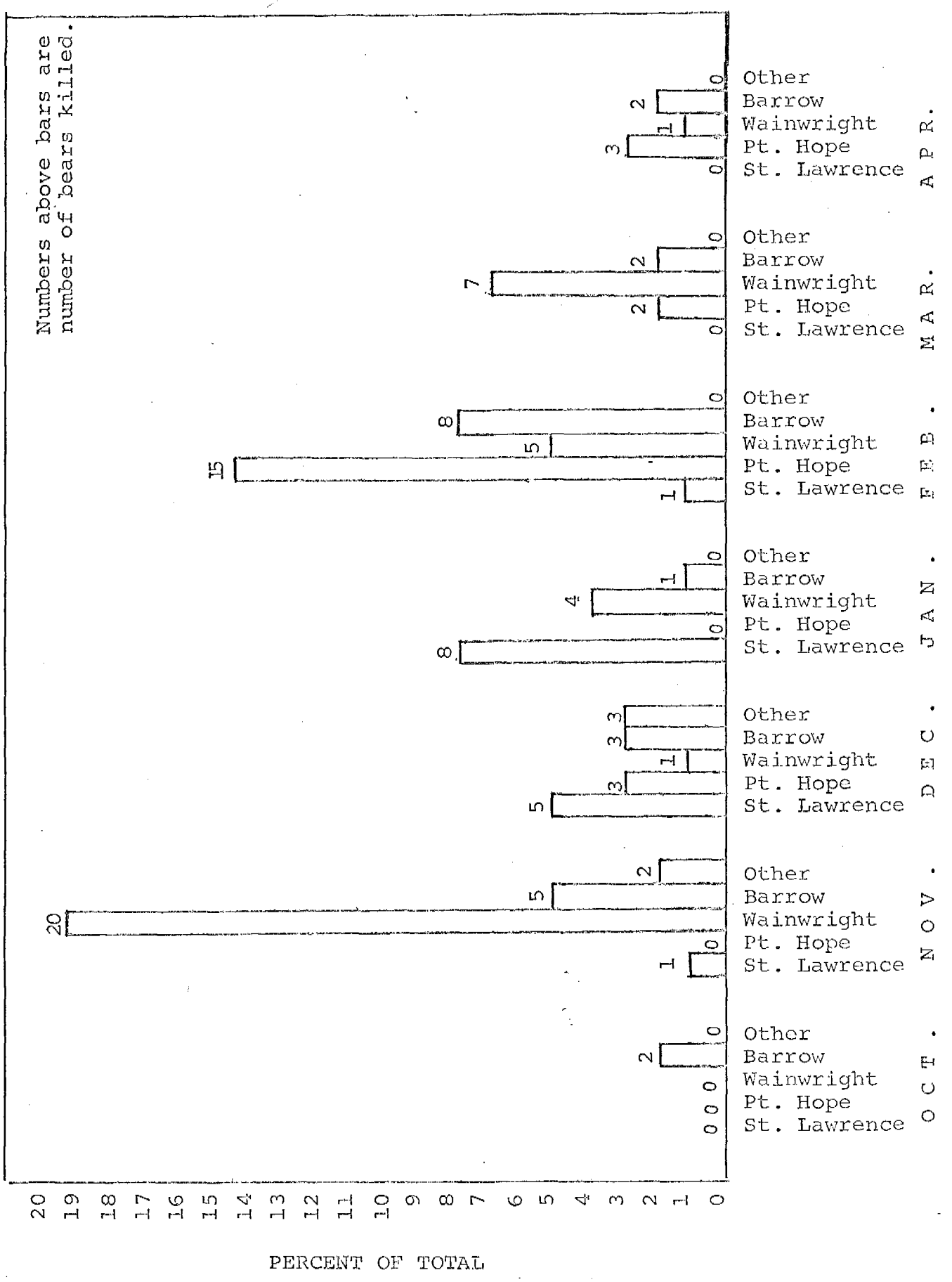


Figure 2. Chronology of Native Polar Bear Harvest, 1968.

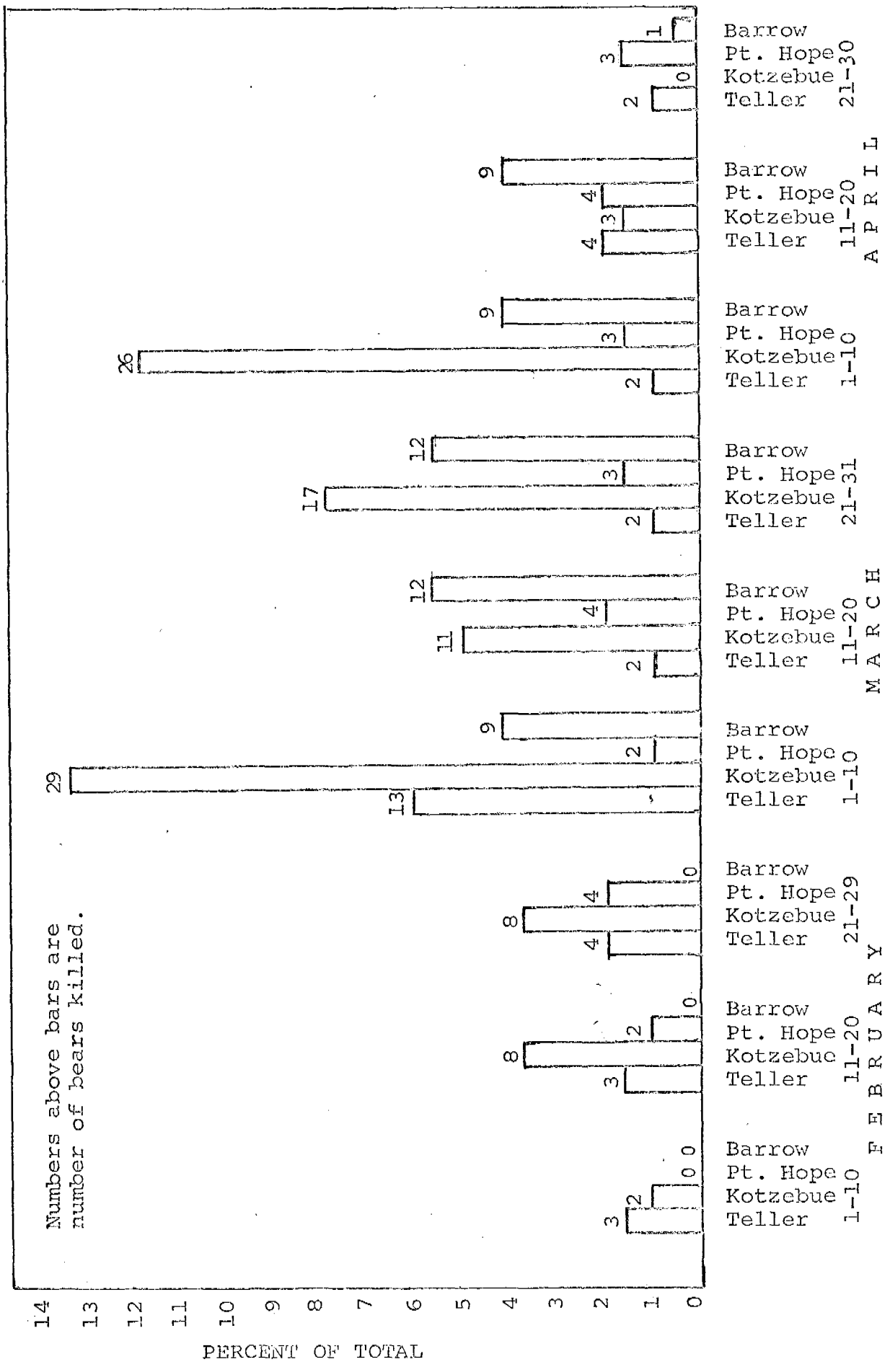


Figure 3. Chronology of Polar Bear Harvest by Hunters Using Aircraft, 1968.

Figure 4. Skull Size Plotted Against Age For Male Polar Bears Killed in 1968.

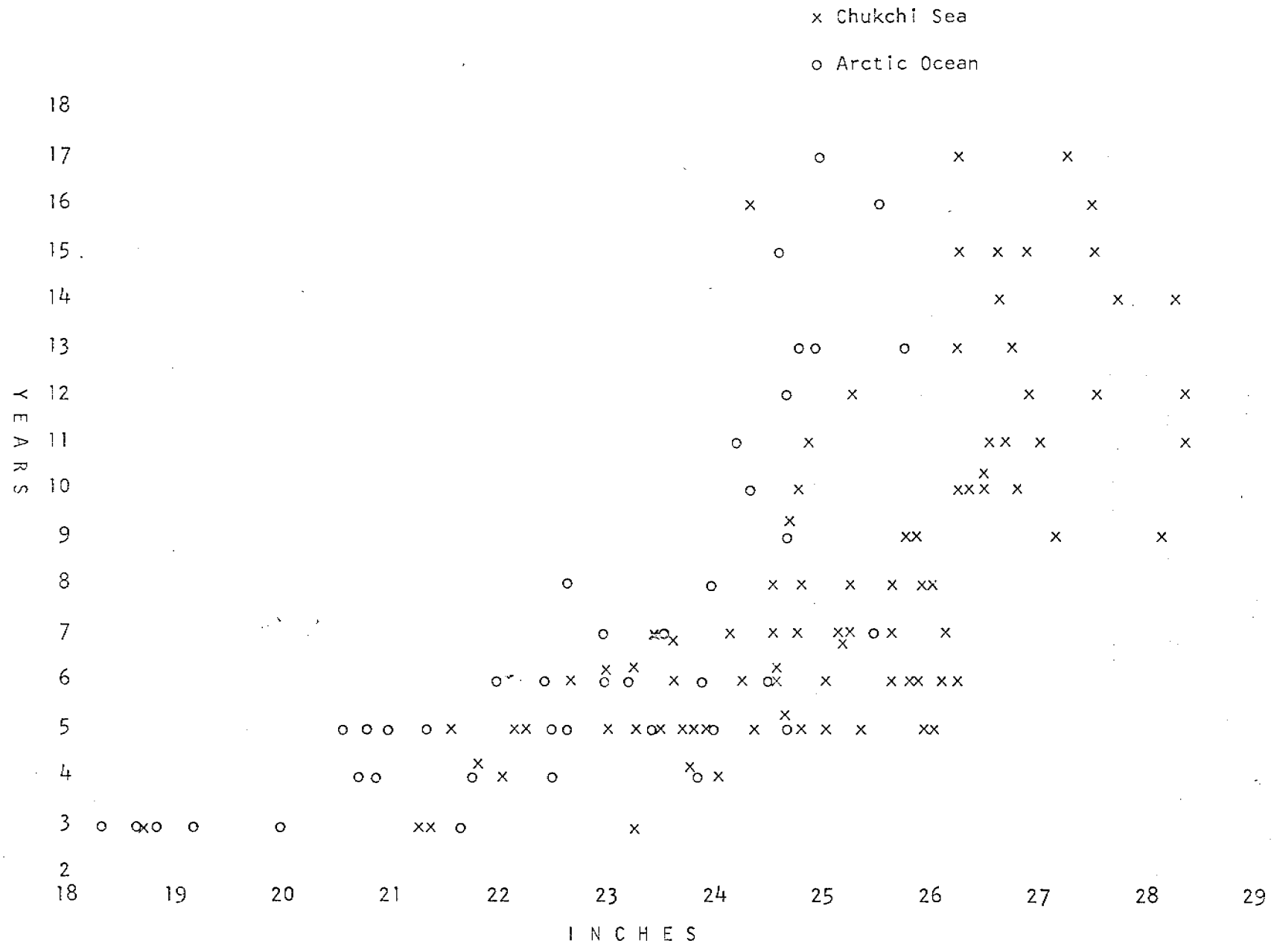


Table 11. Results of Examination for Sperm in Polar Bear Testes and Epididymides.

Age Class	No. of Specimens	Date or Time Period	Sperm Present
1	1	1/3	No
2	1	3/10	No
3	2	2/3 - 3/25	Yes
4-19	34	2/2 - 4/23	Yes
Mature	5	8/12 - 16	No

Of 80 bears that received single injections of Sernylan, 74 were completely immobilized within 1 to 25 minutes with an average time of 9 minutes. Six were never completely immobilized but could be handled. Time to become immobile for 41 of the 63 bears that received more than one injection of Sernylan varied from 12 to 79 minutes after the first injection. Average dosage of Sernylan was 2.33 mg./kg. body weight (1.06 mg./lb.); extremes were 1.20 mg./kg. (0.55 mg./lb.) and 4.88 mg./kg. (2.22 mg./lb.). It appeared that the average dosage of Sernylan was somewhat greater than necessary, and a recommended dosage would be 1.65 mg./kg. (0.75 mg./lb.).

Tranvet injected intramuscularly as soon as possible after a bear was down appeared to enhance the effect of Sernylan and prevent or reduce severity of convulsions which sometimes occur with Sernylan. Complete recovery was observed for only a few animals. Young animals, particularly yearlings, started recovering faster than older animals. It did not appear necessary to observe all bears until they recovered because of experience gained in 1967 and because Larsen (1967) in Spitsbergen had observed 30 bears recover from Sernylan with no mortality and Jonkel (1967, 1968) in Canada had immobilized 27 bears with Sernylan of which 26 recovered and one died. Average period of immobilization for bears in both areas was between 2 and 3 hours. Twenty-nine different bears tagged in Alaska in 1968 were seen apparently fully recovered from 1 to 27 days after being tagged. The only known fatality occurred when four bears were immobilized at the same time, and a large bear lay across a smaller bear's head and smothered it while other animals were being processed. Marking and other data are listed in Tables 12 and 13.

Two bears tagged in 1967 were recaptured north of Barrow in approximately the same location where tagged. One, a mature female, was accompanied by a yearling which became separated from its mother and was not tagged when the female was tagged in 1967. The female had a 2-year-old bear with her in 1968. Her metal ear tag was gone, and the nylon tag was broken so that the number was missing. The lip tattoo was not legible. A collar was retained and provided identification. The collar was olive drab at time of recapture and had lost a blue covering of nylon flagging material which had been sewed to it. Otherwise it was in good condition. The other recapture, 2 years old and with its mother when tagged in 1967, was alone when recaptured in 1968. It had lost its metal ear tag and retained its nylon tag. A lip tattoo was legible. A collar had not been applied in 1967. For both recaptures, ears with nylon tags were healed, and tags had not shifted. Ears to which metal tags had been applied were split and healed. Ear markers of nylon flagging material fastened with metal tags may have helped cause tag loss. A third recovery was provided by an Eskimo who killed a male which was 2 years old when tagged in 1967. The bear was killed on the coast at Point Franklin between Barrow and Wainwright in January 1968 approximately 75 miles from where tagged. Apparently the bear had lost its metal tag and the female portion of its nylon tag, and the tattoo was not evident to the hunter. A collar had not been applied.

Table 14 lists numbers of bears by sex and age class tagged in 1967 and 1968. Three of the adult females tagged north of Barrow after April 15, 1968, had cubs of the year (two with two and one with one). Cubs were not tagged because of their small size.

The cooperative radio-tracking program with the University of Sydney was not successful. A prototype radio collar and aircraft receiver brought to Barrow by an engineer from the contracting electronics firm did not function and could not be made to function during the 3 weeks the engineer was at Barrow. It appeared that not enough design work and testing had been done. The contracting firm reevaluated the program and showed such reluctance to continue that the program with them was dropped. No fees were paid since functional equipment had not been delivered.

Table 12. Ear Tag and Lip Tattoo Numbers and Colors of Collars Applied to Polar Bears, Alaska, 1968.

Area	Tag and Tattoo Number Series	Collar Color	
		Males	Females
Bering Straits	88-102	Olive drab	White
Lisburne	126-182	Red	Green
Barrow	33-87 103-125 183-250	Blue	White or olive drab

Table 13. Polar Bear Tagging Data, Alaska, 1968.

Location	Date	Sex	Age	Ear Tag Numbers	Tattoo Number	Alizarin Red S	Collar
Bering Strait	1/ 3/6	♀	Ad	90	A 90	Yes	White
	3/6	♀	2	92	A 92	Yes	-
	3/6	♀	2	94	A 94	Yes	-
	3/6	♂	Ad	96	A 96	No	O.D. 2/
	3/6	♂	Ad	97	A 97	No	O.D.
	3/5	♂	Ad	88	A 88	Yes	O.D.
	3/11	♂	Ad	98	A 98	Yes	O.D.
	3/11	♀	Ad	99	A 99	Yes	White
	3/11	♂	1	100	-	Yes	-
	3/11	♀	Ad	102	A102	Yes	-
Lisburne	3/10	♀	Sub-ad	126	A126	3/	-
	3/10	♂	Ad	127	A127	No	Red
	3/10	♂	Ad	128	A128	No	-
	3/11	♂	Ad	129-130	A129	3/	-
	3/11	♀	Ad	131	-	No	Green
	3/11	♂	2	132	-	No	-
	3/11	♀	2	133	-	No	-
	3/11	♀	Ad	134	A134	No	Green
	3/12	♀	Sub-ad	135	A135	No	-
	3/12	♀	Ad	136	-	No	Green
	3/14	♂	Ad	137	-	No	-
	3/14	♀	Ad	138	-	No	Green
	3/14	♀	2	139	-	No	-
	3/15	♂	Sub-ad	140	-	No	-
	3/15	♀	Ad	141	-	No	Green
	3/15	♀	2	142-143	-	No	-
	3/15	♂	2	144	-	No	-
	3/16	♂	Sub-ad	145	-	No	-
	3/16	♀	Ad	146	-	No	Green
	3/16	♂	2	147	-	No	-
	3/16	♂	Ad	148	-	No	Red
	3/17	♀	Ad	149	-	No	Green
	3/17	♂	Sub-ad	150	-	No	-
	3/17	♀	Ad	151	-	No	Green
	3/18	♂	Ad	153	-	3/	Red
	3/18	♀	Ad	154	-	3/	-
	3/23	♀	1	155	-	No	-
	3/23	♀	Ad	157	-	3/	Green
	3/23	♂	1	159	-	No	-
	3/23	♀	Ad	158	-	3/	Green
	3/24	♂	Ad	160	-	3/	-

Table 13. Polar Bear Tagging Data, Alaska, 1968 (Continued)

Location	Date	Sex	Age	Ear Tag Numbers	Tattoo Number	Alizarin Red S	Collar
Lisburne (Con't)	3/24	♀	Ad	161	-	3/	-
	3/24	4/	1	162	-	No	-
	3/24	♀	Ad	163	-	No	-
	3/24	♀	1	164	-	No	-
	3/25	♂	Sub-ad	165	-	No	-
	3/25	♀	Sub-ad	167	-	No	-
	3/26	♂	Sub-ad	168	-	3/	-
	3/26	♀	Ad	169	-	No	Green
	3/26	♀	1	170	-	No	-
	3/26	♂	1	171	-	No	-
	3/26	♀	Sub-ad	173	-	No	-
	3/27	♀	2	174	-	No	-
	3/27	♀	Ad	175	-	No	Green
	3/27	♀	Sub-ad	177	-	No	-
	3/27	♀	Sub-ad	178	-	No	-
	3/28	♂	Sub-ad	179	-	No	-
	3/28	♂	Ad	180	-	No	-
	3/28	♀	Sub-ad	181	-	No	-
	4/1	♂	Ad	182	-	No	Red
Barrow	3/20	♀	Ad	103	A103	Yes	White
	3/20	♀	Ad	104	A104	Yes	White
	3/20	♂	1	105	A105	Yes	-
	3/20	♂	1	106	A106	Yes	-
	3/21	♀	Ad	107	A107	Yes	White
	3/21	♀	Ad	108	-	No	White
	3/21	♀	Sub-ad	109	A109	Yes	White
	3/24	♀	Ad	110	A110	Yes	White
	3/24	♂	Ad	111	A111	Yes	-
	3/24	♀ 5/	Sub-ad	78	A 78	No	-
	3/24	♀	Ad	112	A112	No	White
	3/25	♂	Ad	113	A113	Yes	-
	3/25	♀ 5/	Ad	114	A114	Yes	White
	3/25	♀	2	115	A115	Yes	-
	3/25	♀	Ad	117	A117	Yes	White
	3/25	♀	1	118	A118	Yes	-
	3/25	♀	Ad	119	A119	Yes	White
	3/26	♀	Ad	120	A120	Yes	-
	3/26	♀	Ad	121	A121	Yes	-
	3/28	♀	Ad	122	A122	Yes	-
	3/28	♀	Ad	123	A123	Yes	White

Table 13. Polar Bear Tagging Data, Alaska, 1968 (Continued)

Location	Date	Sex	Age	Ear Tag Numbers	Tattoo Number	Alizarin Red S	Collar
Barrow (Con't)	3/28	♂	Ad	124	A124	Yes	-
	3/28	♀	Ad	125	A125	Yes	White
	3/28	♂	1	36	A 36	No	-
	3/29	♂	2	37	A 37	Yes	-
	3/29	♂	Ad	38	A 38	Yes	-
	3/29	♀	Ad	40	A 40	Yes	-
	3/30	♀	Ad	35	A 35	Yes	White
	3/30	♂	Ad	33	A 33	Yes	-
	4/1	♀	Sub-ad	232	A232	Yes	-
	4/1	♀	Ad	50	A 50	Yes	White
	4/2	♀	Ad	234	A234	Yes	White
	4/2	♀	2	236	A236	Yes	-
	4/2	♀	2	237	A237	Yes	-
	4/4	♀	Ad	238	A238	Yes	White
	4/4	♀	2	239	A239	Yes	-
	4/4	♀	Ad	240	A240	Yes	-
	4/4	♀	Sub-ad	242	A242	Yes	-
	4/9	♀	Ad	243	A243	Yes	White
	4/9	♀	2	244	A244	Yes	-
	4/10	♂	2	245	A245	Yes	-
	4/10	♀	Ad	247	A247	Yes	White
	4/10	♀	2	248	A248	Yes	-
	4/10	♀	Ad	249	A249	Yes	White
	4/10	♂	1	250	A250	Yes	-
	4/11	♀	Ad	216	A216	Yes	White
	4/14	♀	Ad	217	A217	Yes	White
	4/14	♂	2	218	A218	Yes	-
	4/14	♂	Ad	219	A219	No	-
	4/14	♀	Ad	220	A220	No	White
	4/14	♀ 6/	Ad	221	A221	No	White
	4/16	♀ 6/	Ad	222	A222	Yes	White
	4/16	♀	Ad	223	A223	Yes	-
	4/17	♀	Ad	225	A225	Yes	-
	4/17	♀	Ad	226	A226	Yes	White
	4/18	♀	Sub-ad	228	A228	Yes	-
	4/18	♂	Sub-ad	229	A229	Yes	-
	4/18	♀	Ad	230	A230	Yes	O.D. Blue inside
	4/19	♀	Ad	191	A191	Yes	O.D. Blue inside
	4/19	♀ 6/	Ad	193	A193	Yes	-
	4/22	♂	Ad	194	A194	Yes	Blue
	4/22	♀	Ad	195	A195	Yes	O.D. Blue inside

Table 13. Polar Bear Tagging Data, Alaska, 1968 (Continued)

Location	Date	Sex	Age	Ear Tag Numbers	Tattoo Number	Alizarin Red S	Collar
Barrow (Con't)	4/22	♀	Ad	196	A196	Yes	O.D. Blue inside
[1]	4/22	♀	Ad	197	A197	Yes	O.D. Blue inside
[1]	4/22	♂	1	198	A198	Yes	-
[1]	4/22	♂	1	199	A199	Yes	-
	4/22	♀	Ad	200	A200	Yes	O.D. Blue inside
	4/25	♂	Ad	183	A183	Yes	Blue
	4/26	♂	Ad	184	A184	Yes	Blue
	4/26	♀	Ad	185	A185	Yes	White
	4/28	♂	Ad	186	A186	Yes	Blue
[1]	4/28	♀	Ad	187	A187	No	White
[1]	4/28	♂	1	188	A188	Yes	-
[1]	4/28	♂	1	189	A189	Yes	-
	4/28	♀	Sub-ad	190	A190	No	-
	4/29	♀	Ad	201	A201	Yes	White
	4/29	♀	Ad	203	A203	No	O.D. Blue inside
	4/29	♂	Sub-ad	204	A204	No	-
[1]	4/29	♀	Ad	205	A205	No	-
[1]	4/29	♂	2	206	A206	No	-
[1]	4/29	♀	2	207	A207	No	-
	4/29	♀ 7/	Ad	208	A208	No	O.D. Blue inside

1/ Brackets indicate family groups

2/ Olive drab.

3/ Small amount of Alizarin Red S injected into tooth socket.

4/ Sex not determined.

5/ Recaptured. Tagged originally in April 1967 north of Barrow.

6/ With two cubs-of-year.

7/ With one cub-of-year.

Table 14. Sex and Age Composition of Polar Bears Immobilized for Tagging, Alaska, 1967 and 1968. 1/

Location	Year	Yearling		2-year-old		Sub-adult		Adult		Total		Total
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
Bering Strait	1968	1		1	1			4	3	6	4	10
Lisburne	1968	1	3	3	4	10	8	7	13	21	28	49
Barrow	1967	3	3	4	2	2	3	4	10	13	18	31
Barrow	1968	5	4	3	7	7	11	5	39	20	61	81
Total		10	10	11	14	19	22	20	65	60	111	171
Percent		12		15		24		49		35	65	

1/ Does not include two tagging mortalities, one bear not aged, and one bear not sexed.

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