

ALASKA DEPARTMENT OF FISH AND GAME
JUNEAU, ALASKA

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BEAR STUDIES

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Volume VII
Annual Project Segment Report
Federal Aid in Wildlife Restoration
Project W-6-R-6, Work Plan F and W-15-R-1, Work Plan M

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(Printed July 1966)

WORK PLAN SEGMENT REPORT
FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECTS: W-6-R-6
AND: W-15-R-1

TITLE: Alaska Wildlife Investigations
TITLE: Big Game Investigations

WORK PLAN: F (6-R-6) and
M (15-R-1)

TITLE: Bear Studies

JOB NO.: 1, 2, 3, 4, 5, & 6

PERIOD COVERED: January 1, 1965 to December 31, 1965

ABSTRACT

Brown Bear

The legal sport kill of brown-grizzly bears during calendar year 1965 was 771. This continues the upward trend in total kill recorded since the bear sealing program was initiated in 1961. Areas from which most of the increase came were Kodiak-Afognak and the Alaska Peninsula during both the spring and fall seasons, and Southcentral Alaska during the fall season. On an area basis, 28 percent of the harvest was taken on the Alaska Peninsula, 24 percent on Kodiak-Afognak, 17 percent in the Interior-Arctic region, 16 percent in Southeastern Alaska, and 15 percent in Southcentral Alaska.

Statewide in 1965, 46 percent of the brown-grizzly bears were killed during the spring season and 54 percent during the fall season. The spring harvest was 69 percent males, the fall harvest was 56 percent males, and the combined harvest was 63 percent males. Hunters residing outside Alaska took 64 percent males and Alaska hunters took 61 percent males. Statewide, 52 percent of the bears were taken by non-residents. The Alaska Peninsula had the highest percentage of non-resident hunters, and Southeastern Alaska had the lowest percentage. The success figure for non-residents was 52 percent based on non-resident tag sales.

The largest bears were killed on the Alaska Peninsula and Kodiak-Afognak, and the smallest bears were killed in Southcentral and Interior-Arctic Alaska. The average hide size of males killed in Game Management Unit 4, the main brown bear producing area of Southeast Alaska, was less than in previous years. The average hide size for males killed on Kodiak-Afognak in 1965 was less than in 1961, 1962, and 1963, but greater than

in 1964. Average hide size for males killed on the Alaska Peninsula was less in 1965 than in any of the previous 4 years. There were no significant reductions in hide sizes in other units.

While there is some variation from year to year in percent of males harvested, there is, as yet, no apparent trend in change in sex ratios from year to year.

As in past years the incidence of rubbed hides was fairly high, 23 to 38 percent, among coastal brown bears in the spring. Incidence in the fall throughout the state varied from 3 to 6 percent except on Kodiak-Afognak where it was 21 percent.

A brown bear den with a female and cubs was examined in the spring on the Alaska Peninsula. Several dens were located by flying in the fall and will be examined in the spring.

Five bears were captured, marked, and released at McNeil River on lower Cook Inlet. Observations were made here from the ground and on the Alaska Peninsula from the air to determine the feasibility of obtaining relative abundance and population trends by aerial survey. It appears that meaningful data may be obtained if flying is done only when bears are concentrated on streams feeding on salmon.

On Kodiak, track counts along salmon streams in August and October indicated about 50 bears on the active cattle leases, about 20 more than were thought to be present in 1964. Death of 41 cattle and wounds on 5 cattle were attributed to bears. Predation occurred from March through November. Most cattle were killed in or near alder cover.

Thirty bears were killed on the leases in 1965 by hunters, ranchers, and Department personnel. The proportion of adult males was higher than would be expected in a resident population. It was believed that 8 of the 30 bears had definitely killed cattle; all 8 were adult males. Poor fish runs and only a fair berry crop may have caused bears to disperse more and prey on cattle more in 1965 than they did in 1964.

Polar Bear

The known polar bear harvest in 1965, including 5 bears collected by the University of Alaska for its museum, was 301. This is the highest kill since the sealing program was inaugurated in 1961. Over 90 percent of the harvest was taken by hunters who utilized guides with light aircraft.

The four hunting bases from which most of the kill was taken and the percent of total kill from each are: Kotzebue, 37; Barrow, 28;

Point Hope, 18; and Teller, 13. The greatest increase over 1964 in number of bears killed was at Barrow by hunters residing in Alaska and at Kotzebue by hunters not residing in Alaska.

Non-residents took 54 percent, white resident hunters took 39 percent, and natives took 7 percent of the harvest. The success figure for non-residents was 87 percent based on non-resident polar bear tag sales.

The harvest was 77 percent males with non-residents taking 89 percent males, resident white hunters taking 65 percent, and native hunters taking 50 percent.

Average distance in miles that bears were killed from shore was: Kotzebue, 123; Barrow, 51; Point Hope, 92; and Teller, 67.

The change in average hide size that appeared most significant was for males at Barrow where a decline of nearly a foot was noted from the average of the past 4 years. This was primarily because a greater number of 16-14 foot (7-8 foot squared) bears were taken. This was related to the greater number of resident hunters at Barrow who, in general, paid lower guiding fees than non-residents and often took the first legal bear that was sighted.

Kill chronology was similar to that of past years in that most of the harvest was taken from March 1 to the end of the season, the period when light airplanes can best be used for flying over the ice.

Guides furnished some information on number and composition of bears seen. Of 110 sows with young which were reported, 38 had 1 young, 71 had 2, and 1 had 3.

The coast from Wainwright to the Canadian border was examined from the air between October 17 and 24 for evidence of polar bear denning. Ice conditions were such that bears could have come ashore prior to or during this period. Seven sightings of tracks representing three females with young and four singles bears were made. Two of the single bears had walked straight inland, possibly to den. This survey, interviews with residents of the area, and information from guides tend to substantiate previous opinions that bears do not den on shore in large numbers in Alaska at least east of Point Barrow and that a certain number of bears are born on the ice.

RECOMMENDATIONS

Continue the bear sealing program to obtain information on which to base most management decisions. Data should not be lumped to the extent

that they have in the past but should be analyzed for smaller areas so that changes in individual populations or in populations in relatively small areas can be recognized. Data can best be handled by use of I B M facilities.

Continue to obtain information on various aspects of bear biology so that as hunting pressure increases and maximum permissible harvests are approached, information other than harvest data will be available on which to base management decisions. Reliable aging techniques are necessary from several standpoints and can perhaps best be worked out from skulls. It is now mandatory that polar bear skulls accompany hides until they are sealed. This provision should be put into effect for brown-grizzly bears.

Total harvest and average hide size data indicate that at present the brown bear harvest from three areas should be carefully assessed. These are Game Management Unit 4 in Southeastern Alaska, Kodiak and Afognak Islands, and the Alaska Peninsula.

Various segments of the public are sometimes critical of certain methods used to hunt bears. Most of this criticism is leveled at use of airplanes for hunting brown bears on the Alaska Peninsula and for hunting polar bears. The Department should perhaps evaluate airplane hunting as it is now done, and if it seems necessary and feasible, suggest alternate methods of hunting. It should be realized that airplanes will always be necessary as a means of transportation for some hunters.

Closer liaison should be maintained with land-controlling agencies so that areas of prime bear habitat can be maintained as such and not dedicated to a use incompatible with bears. Potential conflicts are with ranching on the Alaska Peninsula and extension of ranching on Kodiak and with lumbering in Southeastern Alaska.

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OBJECTIVES

To determine magnitude, areal distribution, chronology, and sex, size, and age composition of the hunter-harvest of brown-grizzly and polar bears.

To obtain information on the breeding biology and productivity of brown-grizzly and polar bears.

To obtain information on characteristics of dens and on denning mortality.

To discover characteristics of movement, time of family break-up, cub mortality, and population composition in selected populations of brown bears.

To investigate Kodiak bear-cattle relationships to determine the extent, timing, and character of bear predation, the number and composition of bears on the cattle leases, the origin and movement pattern of bears on the leases, and the feasibility of keeping bears off the leases by fencing.

To design a census which will give a statistically valid estimate of the polar bear population subject to harvest by Alaskan-based hunters.

METHODS

The bear sealing program provided harvest information. By regulation brown-grizzly and polar bear hides must be presented to a member of the Department for sealing within 30 days after the date of kill. An

affidavit prepared at the time of sealing attests to the location and date of kill, sex of bear, and size and condition of hide. Skulls were measured and a lower back molar (M₃) obtained for sectioning whenever possible. Men based at Kotzebue, Barrow, and Point Hope during March and April obtained polar bear harvest data and information from guides on areas hunted, number of hours flown, and number and composition of bears seen.

Female reproductive tracts obtained from 15 brown bears and 7 polar bears were preserved and examined macroscopically by sectioning ovaries and opening the uterus. Testes were also obtained whenever possible and have been preserved. Most specimens were obtained from hunter-killed bears through the cooperation of guides.

A brown bear den on the Alaska Peninsula occupied by a female with two new cubs was examined May 24. Areas on the Alaska Peninsula with high brown bear populations were flown in the fall to locate dens for examination in the spring. The coast between Wainwright and the Canadian border was examined from the air between October 17 and 24 for evidence of polar bear denning.

Brown bear observations were made from the ground and five bears were anesthetized, marked, and released at McNeil River on lower Cook Inlet. Bears were captured by shooting them with a dart-filled drug as they traveled along the river to catch fish. A New Zealand dart gun and a Palmer "Cap-chur" powder-propelled dart gun were used. Succinylcholine chloride (Sucostrin) was used as the immobilizing agent and pentobarbital sodium (Halatal) was used to produce anaesthesia. Weights of bears were estimated and dosages used as described by Erickson (1957) and Black (1958). These were 1 mg. of Sucostrin per 3 pounds of body weight and 1 cc of Halatal per 5 pounds of body weight. Bears were tattooed on the lip, under the front leg, and in the groin in addition to being tagged. Cubs were marked with a 2 x 4 inch piece of vinyl material folded over the edge of the ear and held in place by a metal ear tag. Polypropylene rope markers were fastened to the ears of older bears with the metal ear tag.

A limited amount of flying was done in certain areas on the Alaska Peninsula to determine the feasibility of obtaining relative abundance and population trends of brown bear populations and to provide comparisons with past surveys.

On Kodiak, aerial surveys were flown on the cattle leases to determine movement, distribution, and population composition of bears and to locate dead cattle on the cattle leases. Dead cattle were

examined to determine cause of death, age, sex, and physical condition. Bears killed on the leases were examined to determine age, sex, and physical condition. Track counts were made along salmon streams to determine number and population composition of bears. A tagging program was conducted adjacent to the lease area to learn of movement patterns of bears onto the leases.

Plans were made for flying to be done out of Barrow to attempt to develop techniques which will give statistically valid estimates of polar bear populations. Two light aircraft will be used and flying will be done in late April 1966 after the hunting season. Data from 1966 guide observation forms will be used to determine the exact area to be surveyed.

Activities which were planned but not completed because of time limitations were examination of testes and sectioning of all teeth which were collected. A study to determine feasibility of keeping bears off Kodiak cattle leases by fencing was not completed because of lack of rancher cooperation.

Personnel devoting much of their time to bear work were Jack Lentfer, Joe Blum, and Lee Miller stationed at Anchorage and Sterling Eide stationed at Kodiak. Doug Jones assisted with polar bear sealing and work on Kodiak, and Ben Ballenger assisted with work on Kodiak.

FINDINGS

Brown-Grizzly Bear

Harvest

The legal sport kill of brown-grizzly bears during calendar year 1965 as indicated by hides presented to Department personnel for sealing was 771, of which 358 (46 percent) were killed during the spring season, and 413 (54 percent) were killed during the fall season. Percentages of the kill from various areas are: Alaska Peninsula, 28 percent; Kodiak-Afognak, 24 percent; Interior-Arctic, 17 percent; Southeastern, 16 percent; and Southcentral, 15 percent. Sealing documents indicate that males made up 69 percent of the spring harvest, 56 percent of the fall harvest, and 63 percent of the combined harvest. Hunters residing out of the state killed 52 percent of the bears (spring, 46 percent; fall, 57 percent). The ratio of non-resident to resident hunters has been nearly the same each year since the sealing program was started in 1961. The Alaska Peninsula had the highest percentage of non-residents, 64 percent, and Southeastern had the lowest, 38 percent. Percentage of harvest taken by non-residents was

higher in the fall than in the spring in all areas. Tags required by non-residents prior to hunting provide a non-resident success figure; of 753 non-residents who bought brown-grizzly tags, 402 (52 percent) were successful in killing bears.

The earliest reported kills were during the second week in April in Southeastern Alaska and on Kodiak and the Alaska Peninsula. The peak of kill on Kodiak occurred slightly before the middle of May and on the Alaska Peninsula slightly after the middle of May. The peak of kill in the Interior-Arctic region occurred the first week of April and was caused in part by polar bear hunters remaining in the Arctic to hunt grizzlies after the close of polar bear season. During the fall season, high kills were recorded during September for all areas other than Kodiak. Most of the Kodiak-Afognak area was not open to hunting until October 1, and most of the harvest occurred during October. October was also a high-kill month on the Alaska Peninsula. The latest kills reported were in late December on Kodiak. Various 1965 harvest data for game management units and for larger areas of the state are presented in Tables 1 through 4. For purposes of comparison, various data from past years, along with similar data from 1965, are presented in Tables 5, 6, and 7.

Incidence of rubbed hides in 1965 was fairly high in the spring in Southeastern Alaska, and on Kodiak-Afognak and the Alaska Peninsula, 38, 35, and 23 percent respectively. Incidence was low in the fall for all areas other than Kodiak where it was 21 percent (Table 8). These figures are similar to those of past years.

Lumping data from large areas often prevents recognizing changes in different populations or groups of animals in smaller areas. A brief discussion of the bear harvest in various smaller areas follows.

Southeastern Alaska: This area includes Game Management Units 1 through 6. Although Prince William Sound is generally not considered part of Southeastern Alaska, bear harvest data from the two areas have been combined since the bear sealing program was started. The 1965 total kill in Units 1 through 6 was 121. This was about the same as in 1964 and was up about 50 percent from the previous 3 years. Average hide size and sex ratio in 1965 did not differ appreciably from past years.

The harvest of bears in Unit 1, which is on the mainland, is low with 20 the greatest number which have been taken during the 5 years for which sealing data have been collected. There are no brown bears in Unit 2 and only a few in Unit 3 on Wrangell Island. Unit 4 includes Admiralty, Baranof, and Chichagof Islands, the main bear producing area of Southeastern Alaska. Bears are hunted on these islands during

TABLE 1

1965 ALASKA BROWN-GRIZZLY BEAR HARVEST BY AREA,
TYPE OF HUNTER, AND SEX OF BEAR

AREA	RESIDENT			NON-RESIDENT			TOTAL						
	♂	♀	Unk	♂	♀	Unk	♂	♀	Unk	Total	% of Total Kill	% Male	% Non-Res
Southeastern													
Spring	36	16	1	15	9	-	51	25	1	77	22	67	31
Fall	14	8	-	14	7	1	28	15	1	44	11	65	50
Total	50	24	1	29	16	1	79	40	2	121	16	66	38
Kodiak & Afognak													
Spring	36	24	1	34	23	-	70	47	1	118	33	60	48
Fall	21	13	-	20	13	-	41	26	-	67	16	62	50
Total	57	37	1	54	36	-	111	73	1	185	24	61	49
Alaska Peninsula													
Spring	30	11	-	54	9	-	84	20	-	104	29	81	61
Fall	19	19	-	40	32	4	59	51	4	114	28	54	67
Total	49	30	-	94	41	4	143	71	4	218	28	67	64
Southcentral													
Spring	3	-	3	2	-	-	5	-	3	8	2	100	25
Fall	30	16	3	28	29	3	58	45	6	109	26	56	55
Total	33	16	6	30	29	3	63	45	9	117	15	58	53
Interior & Arctic													
Spring	17	14	-	18	2	-	35	16	-	51	14	69	39
Fall	15	19	-	24	19	2	39	38	2	79	19	51	57
Total	32	33	-	42	21	2	74	54	2	130	17	58	50
Statewide													
Spring	122	65	5	123	43	-	245	108	5	358	100	69	46
Fall	99	75	3	126	100	10	225	175	13	413	100	56	57
Total	221	140	8	249	143	10	470	283	18	771	100	63	52
Percent Male	61			64									

TABLE 2

1965 ALASKA BROWN-GRIZZLY BEAR HARVEST
BY GAME MANAGEMENT UNIT

AREA	UNIT	RESIDENT			NON-RESIDENT			TOTAL			TOTAL
		♂	♀	Unk.	♂	♀	Unk.	♂	♀	Unk.	
Southeastern	1	6	1	-	-	1	-	6	2	-	8
	4	22	8	1	21	11	1	43	19	2	64
	5	9	2	-	3	1	-	12	3	-	15
	6	13	13	-	5	3	-	18	16	-	34
Total		50	24	1	29	16	1	79	40	2	121
Kodiak-Afognak	8	57	37	1	54	36	-	111	73	1	185
Alaska Peninsula	9	42	28	-	94	40	4	136	68	4	208
	10	7	2	-	-	1	-	7	3	-	10
Total		49	30	-	94	41	4	143	71	4	218
Southcentral	7	-	-	-	-	-	-	-	-	-	-
	11	2	1	1	6	8	-	8	9	1	18
	13	15	7	1	10	11	-	25	18	1	44
	14	3	5	-	4	3	-	7	8	-	15
	15	1	1	-	-	1	-	1	2	-	3
	16	12	2	4	10	6	3	22	8	7	37
Total		33	16	6	30	29	3	63	45	9	117
Interior and Arctic	12	5	10	-	3	-	1	8	10	1	19
	17	1	-	-	1	4	-	2	4	-	6
	18	-	-	-	-	-	-	-	-	-	-
	19	1	2	-	5	9	1	6	11	1	18
	20	8	13	-	10	1	-	18	14	-	32
	21	-	-	-	-	-	-	-	-	-	-
	22	-	-	-	1	-	-	1	-	-	1
	23	8	1	-	16	2	-	24	3	-	27
	24	4	3	-	3	1	-	7	4	-	11
	25	3	2	-	2	4	-	5	6	-	11
	26	2	2	-	1	-	-	3	2	-	5
Total		32	33	-	42	21	2	74	54	2	130
TOTAL		221	140	8	249	143	10	470	283	18	771

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SPRING 1965 ALASKA BROWN-GRIZZLY BEAR HARVEST
BY GAME MANAGEMENT UNIT

AREA	UNIT	RESIDENT			NON-RESIDENT			TOTAL			TOTAL
		♂	♀	Unk.	♂	♀	Unk.	♂	♀	Unk.	
Southeastern	1	5	1	-	-	1	-	5	2	-	7
	4	17	4	1	11	8	-	28	12	1	41
	5	4	-	-	2	-	-	6	-	-	6
	6	10	11	-	2	-	-	12	11	-	23
Total		36	16	1	15	9	-	51	25	1	77
Kodiak-Afognak	8	36	24	1	34	23	-	70	47	1	118
Alaska Peninsula	9	24	11	-	54	9	-	78	20	-	98
	10	6	-	-	-	-	-	6	-	-	6
Total		30	11	-	54	9	-	84	20	-	104
Southcentral	7	-	-	-	-	-	-	-	-	-	-
	11	1	-	1	-	-	-	1	-	1	2
	13	-	-	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-	-	-
	15	-	-	-	-	-	-	-	-	-	-
	16	2	-	2	2	-	-	4	-	2	6
Total		3	-	3	2	-	-	5	-	3	8
Interior and Arctic	12	1	1	-	-	-	-	1	1	-	2
	17	-	-	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-	-	-
	19	-	1	-	-	-	-	-	1	-	1
	20	6	10	-	1	-	-	7	10	-	17
	21	-	-	-	-	-	-	-	-	-	-
	22	-	-	-	1	-	-	1	-	-	1
	23	5	-	-	14	1	-	19	1	-	20
	24	2	1	-	-	-	-	2	1	-	3
	25	2	1	-	1	1	-	3	2	-	5
	26	1	-	-	1	-	-	2	-	-	2
Total		17	14	-	18	2	-	35	16	-	51
TOTAL		122	65	5	123	43	0	245	108	5	358

TABLE 4

FALL 1965 ALASKA BROWN-GRIZZLY BEAR HARVEST
BY GAME MANAGEMENT UNIT

AREA	UNIT	RESIDENT			NON-RESIDENT			TOTAL			TOTAL
		♂	♀	Unk	♂	♀	Unk	♂	♀	Unk	
Southeastern	1	1	-	-	-	-	-	1	-	-	1
	4	5	4	-	10	3	1	15	7	1	23
	5	5	2	-	1	1	-	6	3	-	9
	6	3	2	-	3	3	-	6	5	-	11
Total		14	8	-	14	7	1	28	15	1	44
Kodiak-Afognak	8	21	13	-	20	13	-	41	26	-	67
Alaska Peninsula	9	18	17	-	40	31	4	58	48	4	110
	10	1	2	-	-	1	-	1	3	-	4
Total		19	19	-	40	32	4	59	51	4	114
Southcentral	7	-	-	-	-	-	-	-	-	-	-
	11	1	1	-	6	8	-	7	9	-	16
	13	15	7	1	10	11	-	25	18	1	44
	14	3	5	-	4	3	-	7	8	-	15
	15	1	1	-	-	1	-	1	2	-	3
	16	10	2	2	8	6	3	18	8	5	31
Total		30	16	3	28	29	3	58	45	6	109
Interior and Arctic	12	4	9	-	3	-	1	7	9	1	17
	17	1	-	-	1	4	-	2	4	-	6
	18	-	-	-	-	-	-	-	-	-	-
	19	1	1	-	5	9	1	6	10	1	17
	20	2	3	-	9	1	-	11	4	-	15
	21	-	-	-	-	-	-	-	-	-	-
	22	-	-	-	-	-	-	-	-	-	-
	23	3	1	-	2	1	-	5	2	-	7
	24	2	2	-	3	1	-	5	3	-	8
	25	1	1	-	1	3	-	2	4	-	6
	26	1	2	-	-	-	-	1	2	-	3
Total		15	19	-	24	19	2	39	38	2	79
TOTAL		99	75	3	126	100	10	225	175	13	413

TABLE 5

ALASKA BROWN-GRIZZLY BEAR SPORT HARVEST BY GAME MANAGEMENT
UNIT AND SEASON, 1961-1965

Area	GMU	<u>Spring</u>					<u>Fall</u>					<u>Spring & Fall</u>				
		<u>61</u>	<u>62</u>	<u>63</u>	<u>64</u>	<u>65</u>	<u>61</u>	<u>62</u>	<u>63</u>	<u>64</u>	<u>65</u>	<u>61</u>	<u>62</u>	<u>63</u>	<u>64</u>	<u>65</u>
Southeastern	1	6	7	4	8	7	7	5	5	12	1	13	12	9	20	8
	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4	28	32	18	41	41	10	14	13	15	23	37	46	31	56	64
	5	4	1	4	2	6	5	6	2	9	9	9	7	6	11	15
	6	6	9	11	19	23	7	15	21	13	11	13	24	32	32	34
	AREA TOTAL	44	49	37	70	77	29	40	41	49	44	73	89	78	119	121
Kodiak-Afognak	8	82	98	79	90	118	36	33	31	28	67	118	131	110	118	185
Alaska Peninsula	9	69	97	75	64	98	51	61	88	91	110	120	158	163	155	208
	10	1	3	-	10	6	-	-	-	5	4	1	3	-	15	10
	AREA TOTAL	70	100	75	74	104	51	61	88	96	114	121	161	163	170	218
Southcentral	7	-	-	-	-	-	1	1	1	-	-	1	1	1	-	-
	11	-	-	-	-	2	5	14	9	22	16	5	14	9	22	18
	13	-	-	-	-	-	42	33	41	33	44	42	33	41	33	44
	14	-	-	-	-	-	16	9	13	12	15	16	9	13	12	15
	15	-	-	-	-	-	4	5	4	2	3	4	5	4	2	3
	16	8	3	3	4	6	20	15	24	16	31	28	18	27	20	37
	AREA TOTAL	8	3	3	4	8	88	77	92	85	109	96	80	95	90	117
Interior-Arctic	12	3	3	5	1	2	11	16	18	14	17	14	19	23	15	19
	17	-	-	-	-	-	2	3	3	5	6	2	3	3	5	6
	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	19	-	-	-	-	1	13	11	11	19	17	13	11	11	19	18
	20	7	5	8	5	17	9	21	34	36	15	16	26	42	41	32
	21	-	1	-	-	-	4	6	3	-	-	4	7	3	-	-
	22	-	1	-	-	1	1	-	-	-	-	1	1	-	-	1
	23	-	2	5	10	20	6	4	6	4	7	6	6	11	14	27
	24	-	3	3	2	3	3	3	6	7	8	3	6	9	9	11
	25	1	-	1	2	5	3	4	6	9	6	4	4	7	11	11
	26	1	-	4	11	2	-	2	6	5	3	1	2	10	16	5
	AREA TOTAL	12	15	26	31	51	52	70	93	99	79	64	85	119	130	130
Unidentified Areas		-	-	1	-	-	1	1	2	-	-	1	1	3	-	-
STATEWIDE TOTAL		216	265	221	269	358	257	282	347	357	413	473	547	568	627	771

TABLE 6

ALASKA BROWN-GRIZZLY BEAR SPORT HARVEST
AND PERCENT OF MALES, 1961-1965

	<u>1961</u>		<u>1962</u>		<u>1963</u>		<u>1964</u>		<u>1965</u>	
	%		%		%		%		%	
	<u>No.</u>	<u>Male</u>	<u>No.</u>	<u>Male</u>	<u>No.</u>	<u>Male</u>	<u>No.</u>	<u>Male</u>	<u>No.</u>	<u>Male</u>
Southeastern										
Spring	44	86	49	77	37	77	70	76	77	67
Fall	29	44	40	62	41	50	49	63	44	65
Total	73	70	89	70	78	63	119	70	121	66
Kodiak - Afognak										
Spring	82	72	98	75	79	69	90	58	118	60
Fall	36	53	33	55	31	70	28	79	67	62
Total	118	66	131	70	110	69	118	63	185	61
Alaska Peninsula										
Spring	70	82	100	79	75	83	74	80	104	81
Fall	51	61	61	51	88	49	96	59	114	54
Total	121	73	161	69	163	64	170	69	218	67
Southcentral										
Spring	8	78	3	50	3	75	4	100	8	100
Fall	88	44	77	53	92	60	86	57	109	56
Total	96	47	80	53	95	60	90	59	117	58
Interior-Arctic										
Spring	12	82	15	62	26	54	31	91	51	69
Fall	52	58	70	63	93	60	99	57	79	51
Total	64	63	85	63	119	59	130	59	130	58
Statewide ^{1/}										
Spring	216	79	265	76	221	73	269	91	358	69
Fall	257	51	282	57	347	56	358	59	413	56
Total	473	64	547	66	568	63	627	65	771	63

^{1/} Statewide totals include a few bears for which kill areas are unknown.

TABLE 7

AVERAGE HIDE SIZE (LENGTH EXCLUDING FLAP PLUS WIDTH IN FEET)
OF ALASKA BROWN-GRIZZLY BEAR SPORT HARVEST, 1961-1965

SPRING

SOUTHEASTERN

	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>	<u>1965</u>
Male	14.9(36) ^{1/}	14.7(34)	14.4(24)	14.5(47)	14.4(42)
Female	13.2(6)	13.4(10)	12.6(7)	12.7(15)	12.8(25)
Both Sexes	14.7(42)	14.4(44)	14.0(31)	14.0(62)	13.8(67)

KODIAK-AFOGNAK

Male	16.7(56)	16.7(72)	16.1(53)	14.8(52)	15.5(69)
Female	14.5(22)	15.0(24)	14.3(24)	13.6(33)	13.5(45)
Both Sexes	16.1(78)	16.3(96)	15.6(77)	14.3(85)	14.7(114)

ALASKA PENINSULA

Male	16.9(53)	16.4(76)	17.0(58)	16.3(58)	16.5(84)
Female	14.0(12)	13.0(20)	13.3(12)	13.2(14)	13.0(19)
Both Sexes	16.3(65)	15.7(96)	16.4(70)	15.7(72)	15.9(103)

SOUTHCENTRAL

Male	13.1(7)	16.1(2)	14.7(3)	13.3(4)	13.4(5)
Female	9.8(2)	11.8(2)	12.3(1)	None	None
Both Sexes	12.4(9)	13.9(4)	14.1(4)	13.3(4)	13.4(5)

INTERIOR-ARCTIC

Male	12.5(9)	12.5(8)	13.3(12)	13.7(24)	14.0(34)
Female	11.6(2)	10.9(5)	12.3(10)	12.7(4)	11.1(16)
Both Sexes	12.3(11)	11.9(13)	13.0(22)	13.5(28)	13.3(50)

^{1/} Numbers in parentheses are number of hides measured

TABLE 7 (Con't)

AVERAGE HIDE SIZE (LENGTH EXCLUDING FLAP PLUS WIDTH IN FEET)
OF ALASKA BROWN-GRIZZLY BEAR SPORT HARVEST, 1961-1965

FALL

SOUTHEASTERN

	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>	<u>1965</u>
Male	13.5(12) <u>1/</u>	15.4(23)	14.1(16)	14.2(28)	13.8(28)
Female	13.7(15)	13.2(14)	12.7(16)	13.0(18)	14.2(15)
Both Sexes	13.6(27)	14.6(37)	13.4(32)	13.7(46)	13.9(43)

KODIAK-AFOGNAK

Male	17.4(19)	15.8(18)	16.5(21)	16.0(22)	16.1(41)
Female	14.8(17)	15.7(15)	16.3(9)	15.6(6)	14.6(24)
Both Sexes	16.2(36)	15.7(33)	16.4(30)	15.9(28)	15.5(65)

ALASKA PENINSULA

Male	15.6(27)	16.5(29)	14.9(41)	16.1(51)	14.5(57)
Female	13.6(17)	13.7(28)	13.2(43)	13.7(34)	13.6(43)
Both Sexes	14.8(44)	15.1(57)	14.0(84)	15.2(85)	14.1(100)

SOUTHCENTRAL

Male	12.8(35)	13.1(40)	12.7(53)	12.9(45)	13.1(54)
Female	12.6(45)	11.8(35)	12.0(36)	11.9(37)	11.9(45)
Both Sexes	12.7(80)	12.5(75)	12.4(89)	12.4(82)	12.5(99)

INTERIOR-ARCTIC

Male	12.6(28)	13.0(41)	12.5(49)	12.7(56)	12.9(35)
Female	11.8(20)	11.9(24)	11.7(32)	11.7(39)	11.6(38)
Both Sexes	12.3(48)	12.6(65)	12.2(81)	12.3(95)	12.2(73)

1/ Numbers in parentheses are number of hides measured

TABLE 7 (Con't)

AVERAGE HIDE SIZE (LENGTH EXCLUDING FLAP PLUS WIDTH IN FEET)
OF ALASKA BROWN-GRIZZLY BEAR SPORT HARVEST, 1961-1965

SPRING AND FALL

SOUTHEASTERN

	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>	<u>1965</u>
Male	14.5(48) <u>1/</u>	15.0(57)	14.3(40)	14.4(75)	14.1(70)
Female	13.5(21)	13.3(24)	12.7(23)	12.8(33)	13.4(40)
Both Sexes	14.2(69)	14.5(81)	13.7(63)	13.9(108)	13.9(110)

KODIAK-AFOGNAK

Male	16.9(75)	16.5(90)	16.2(74)	15.2(74)	15.8(110)
Female	14.6(39)	15.3(39)	14.9(33)	13.9(39)	13.9(69)
Both Sexes	16.1(114)	15.9(129)	15.8(107)	14.7(113)	15.1(179)

ALASKA PENINSULA

Male	16.4(80)	16.4(105)	16.1(99)	16.2(109)	15.7(141)
Female	13.8(29)	13.4(48)	13.2(55)	13.5(48)	13.4(62)
Both Sexes	15.7(109)	15.5(153)	15.1(154)	15.4(157)	15.0(203)

SOUTHCENTRAL

Male	12.9(42)	13.2(42)	12.8(56)	12.9(49)	13.1(59)
Female	12.4(47)	11.8(37)	12.0(37)	11.9(37)	11.9(45)
Both Sexes	12.6(89)	12.6(79)	12.5(93)	12.5(86)	12.6(104)

INTERIOR-ARCTIC

Male	12.6(37)	12.9(49)	12.7(61)	13.0(80)	13.4(69)
Female	11.7(22)	11.7(29)	11.8(42)	11.8(43)	11.7(54)
Both Sexes	12.3(59)	12.5(78)	12.3(103)	12.6(123)	12.6(123)

1/ Numbers in parentheses are number of hides measured

TABLE 8

INCIDENCE OF RUBBED HIDES, ALASKA BROWN-GRIZZLY
BEAR HARVEST, 1965

	<u>No. of Hides Examined</u>	<u>Percent Rubbed</u>
SOUTHEASTERN		
Spring	75	38
Fall	43	5
Total	118	26
KODIAK-AFOGNAK		
Spring	117	35
Fall	65	21
Total	182	30
ALASKA PENINSULA		
Spring	103	23
Fall	110	3
Total	213	12
SOUTHCENTRAL		
Spring	8	13
Fall	107	6
Total	115	7
INTERIOR-ARCTIC		
Spring	50	2
Fall	79	4
Total	129	3

both the spring and fall seasons mainly with boats and skiffs as the chief means of transportation to hunting areas at the heads of the bays. A few residents also fly to various locations and hunt on foot out of a camp. The 1965 sport kill of 64 in Unit 4 is up slightly from 1964 and is considerably higher than the 1961 to 1963 average. The 1964 and 1965 increases were primarily because of an increase in the number of resident hunters. The average hide size of bears killed in Unit 4 in 1965 was smaller than in previous years, primarily because of a decrease in size of males taken both by residents and non-residents. Whether this indicates that larger bears have been cropped to the extent that average hide size has decreased, or whether it is because of some other factor is not known.

Relatively little work has been done to assess bear numbers and habitat in Unit 5, the Yakutat area. Not too many bears are taken here; the 15 that were harvested in 1965 is the greatest number taken during the 5 years that harvest figures have been obtained.

The 1965 kill in Unit 6, the Prince William Sound area, was 34, about the same as in 1963 and 1964. The area will probably receive increased hunting pressure as more people hunt and if seasons on Kodiak and the Alaska Peninsula are ever shortened.

Kodiak-Afognak: Kodiak, Afognak, and adjacent islands make up Unit 8. This is one of the most popular bear hunting areas in Alaska and along with the Alaska Peninsula has consistently produced the largest bears taken in Alaska. Bears are often hunted by spotting from boats in salt water bays and from smaller skiffs on some inland lakes. Airplanes are used for transportation to hunting camps, but seldom to spot bears and then land and hunt. About 75 percent of the bears are taken in the spring. The major bear producing areas are on the Kodiak Wildlife Refuge, managed by the U. S. Fish and Wildlife Service principally to maintain bear populations and furnish hunting. Average hide sizes on Kodiak for both males and females have shown some decline over the past years. The sport harvest in 1965 was 185 (118, spring; 67, fall). This is a 50 percent increase over the annual kill of the previous 4 years. The increase was about equally divided between the spring and fall seasons. Possible reasons for the increased kill during the fall in 1965 are poor fish runs and poor berry crops which caused bears to travel more widely than usual in search of food and thus become more vulnerable to hunting. The percent of males in the 1965 harvest was about the same as in 1964 and somewhat less than during the previous 3 years. A need for further hunting restrictions may be indicated if the high kill of 1965 repeats itself in 1966, or if the trend toward smaller bears continues, or if the percent of males in the harvest decreases. The most desirable restriction might be to close the season earlier in the spring.

Alaska Peninsula: The Alaska Peninsula, comprised of Units 9 and 10, has a high brown bear population which is intensively hunted. The Alaska Peninsula, along with Kodiak, has consistently produced the largest bears taken in the state. Aircraft are used in some manner for almost all hunting. Some hunters fly to pre-established camps or fly to a location and establish a camp and then hunt on foot. Others locate bears from the air and land as close as possible in order to hunt. Between 160 and 170 bears of which 64 to 69 percent were males were killed annually in 1962, 1963, and 1964. In 1965, 218 bears of which 67 percent were males were killed. The average hide size for males dropped .5 of a foot below that of previous years. The harvest on the Alaska Peninsula which is one of the most important brown bear producing areas in Alaska will be watched closely. A decrease in hide size or an increase in percent of females may indicate that a large segment of the larger bears are being taken and that harvest restrictions are necessary if average hide is to be maintained at a certain level. It might also indicate that hunters are becoming less selective. This could happen, for example, if guides were to book more hunters for the same length of season. Thus less time would be available to find a large bear for each hunter. Hide size might also be reduced if airplane hunting were more restricted; hunters could not look over as many bears from the ground as from the air to select a large one. On the other hand, the total harvest would probably be decreased if airplane hunting were restricted.

Southcentral: The 1965 harvest in Southcentral Alaska was 117, an increase of about 30 percent from the average of the previous 4 years. There were no significant changes in hide size or sex composition. The density of bears and number of animals harvested varies considerably from area to area in Southcentral Alaska.

Unit 11, the Wrangell Mountains, has provided 10 to 20 bears each year. Hunting is now permitted in the spring but most bears are taken in the fall, probably in conjunction with hunting other game.

About one-third of the Southcentral harvest comes from Unit 13, the Nelchina-Upper Susitna area. This area has a well developed road system and sustains heavy hunting pressures by Alaskan standards for caribou, moose, and sheep. Part of the bear harvest is incidental to hunting for these other species. Airplanes can land throughout much of the area in the spring, and it has been closed to spring hunting since 1958. The annual kill in Unit 13 has stabilized at between 35 and 45. There have been no significant changes in hide sizes or sex ratios of bears harvested during the 5 years sealing data have been obtained.

In Unit 14, the Anchorage area, 10 to 15 bears have been taken annually during a relatively short fall season.

The 1965 kill in Unit 16, the lower Susitna area, was 37. The annual kill before 1965 fluctuated between 18 and 28. The season is open in the spring and fall in Unit 16, and most bears are taken in the fall along Cook Inlet or on salmon streams tributary to the Susitna River.

Units 7 and 15 make up the Kenai Peninsula. Bear numbers are so low that the area does not provide a significant amount of hunting. The annual sport harvest is usually less than five.

Interior-Arctic: The Interior-Arctic area includes the area of Alaska north and west of the Alaska Peninsula and the Alaska Range. Bears are distributed throughout nearly all of this area, but are generally more sparsely distributed than in salmon-producing areas to the south. The 1965 sport harvest of 130 from the Interior-Arctic area which contains more than two-thirds of the land area of Alaska was only 17 percent of the statewide harvest of 771. The harvest was the same as in 1964 and slightly higher than that of preceding years. Average hide size was slightly larger and percent of males harvested slightly lower than in preceding years.

In Unit 12, the Upper Tanana-White River area, the kill has stabilized at 15 to 25 bears, most of which are taken in the fall. Many of these are probably taken by hunters seeking other game.

Unit 20, the Fairbanks area, produces the greatest number of bears taken in any one unit in the Interior-Arctic area, probably because of the high human population and access provided by roads and river systems. The 1965 kill was 32, down slightly from that of 1963 and 1964. The spring kill was considerably higher and the fall kill was considerably lower than in previous years. There have been no significant changes in average hide sizes or sex ratios during the 5 years the bear sealing program has provided harvest data.

Unit 19, the McGrath area, has had an annual harvest of less than 20 bears nearly all of which have been taken in the fall.

Harvests have been low in Bristol Bay, Yukon-Kuskokwim Delta, middle Yukon, and Nome areas (Game Management Units 17, 18, 21 and 22) with an average annual kill for these four areas combined of less than ten bears. This is because of sparse bear populations in much of this area and the relative remoteness of the area from human population centers. The 1965 kill of 27 in Unit 23, the Kotzebue Sound area,

was higher than in preceding years, mainly because of increased hunting early in the spring by polar bear guides and hunters. The kill in future years will probably be reduced since new regulations have established a time interval between the end of polar bear season and beginning of brown bear season in this unit.

The reported sport harvest in the Koyukuk, Fort Yukon, and Arctic Slope areas (Game Management Units 24, 25, and 26) has been low each year, averaging about ten a year for each unit.

The sealing program provides data on the legal sport kill; however, little information is being obtained for non-sport and illegal kills which according to some reports may form a substantial portion of the harvest in some areas. It would be desirable to have these figures so that as hunting pressure increases we will have as accurate as possible an indication of the numbers of bears that various areas have produced over the years. Illegal and non-sport kills could also furnish information relating to breeding biology and aging which is difficult to obtain since specimens from legal kills cannot be obtained year around nor from cubs or females with cubs. Hides from illegal and non-sport kills could also be better utilized. It might be desirable to establish a policy that hides would be salvaged and made available to the public on a bid or auction basis or to universities or other non-profit organizations benefiting the public.

Illegal and non-sport kills fall into several categories. Perhaps the most widespread is the kill by commercial fishermen. Various reports indicate that a considerable number of bears are killed by fishermen in Southeastern Alaska and on Kodiak and the Alaska Peninsula. Probably some of these, all of which are not reported, are justified to protect life and property. Others are merely a shooting and leaving of bears on the beach. A number of bears are also killed by loggers in Southeastern Alaska. As with commercial fishing, part of this may be justified to protect life and property and part is needless. The conflict between bears and human activities associated with logging will become more widespread as more areas are logged in Southeastern Alaska. Ranching, mainly on Kodiak Island, also results in a number of non-sport and illegal kills. Ostensibly, ranchers kill bears to protect cattle. A certain number of these are not reported to Department personnel contrary to regulation. The bear-ranching conflict will become more severe should more land on Kodiak or land on the Alaska Peninsula be dedicated to ranching.

Several measures might provide better information about the non-sport kill and perhaps reduce it. One is to make people more aware of and enforce more strictly the regulation that any kill for protection

of life or property must be reported. Department personnel should investigate each case thoroughly and obtain skulls, reproductive tracts, hides, and other specimens. All reported illegal kills should also be investigated thoroughly. An increased effort by Department personnel could make supervisors and workers in logging camps aware of regulations pertaining to bears and means other than killing to alleviate bear-camp conflicts.

Breeding Biology and Productivity

Reproductive tracts from 15 female brown bears were collected and examined. Findings will be reported when more tracts have been collected and examined.

Denning

Work was started to obtain information on characteristics of dens and denning mortality. A few observations were made between May 15 and 24, 1965, on the Alaska Peninsula incidental to gathering of harvest information. Dens were located by direct aerial search and by checking locations reported by guides. Dens were observed at the heads of tributaries in the Black, Chignik, Sandy, and Bear Lake drainages between 1100 and 1500 feet in elevation. Low ceilings prevented much flying above 1500 feet. Snow depth was 12 to 24 inches in these areas.

Several shallow depressions designated as false dens were seen. It appeared that bears had dug these in the fall but had not used them during the winter. Snow melting faster in and around the depressions than on the surrounding ground made the depressions appear deeper than they actually were, and guides reported several as actual dens. Most of these false dens were on a more level slope and at a lower elevation than dens which were considered to have been actually used during the winter.

On May 24 a den with a female and three cubs was examined from the ground. This was in cooperation with a commercial operator who had a permit to kill a female bear and obtain cubs for a zoo. The den was at the 1400-foot level in willow and alder on Broad Creek in the Black Lake drainage on a steep slope 55 to 60 degrees from the horizontal. The entrance was flat on the bottom and shaped like an arch on the sides and top. The entrance was 37 inches wide on the bottom and 43 inches high. The den itself extended horizontally into the hill and sloped down, up, and to each side from the entrance. The walls converged toward the top so the den had a cone shape. The greatest width of the den was 60 inches, the greatest depth was 96 inches, and

greatest height was 58 inches. The floor of the den had about a 1-foot wide snow lip; the rest of the floor was earth. The bottom had been lined with willows in the fall.

Some flying was done in early November in the Ugashik, Black, Sandy, and Bear Lake areas to attempt to locate dens so they could be examined in the spring. The weather was bad and only about 20 hours were spent actually searching for dens. Relatively few bears and tracks were seen as compared to the number of bears seen in surveys flown in August and September, indicating that at least some bears were probably in dens. Six or seven dens were located at from 1000 to 2000 feet in elevation. All but one were on open slopes above the brush line. All were in snow-covered areas and were located by sighting the ground disturbance caused by recent digging.

In a denning study flying time can probably be used more profitably in the spring than in the fall. In the spring when a den near which a plane can be landed is located, the den can immediately be examined from the ground if so desired.

Life History

Work was continued on a study started in 1963 on McNeil River on lower Cook Inlet to obtain various types of brown bear life history information by marking and observing bears. Bears congregate along McNeil River in July and early August to feed on chum salmon and are readily observed. A series of rapids on the lower section of the river stop fish temporarily in their upstream movement and is especially favored as a feeding area by bears. The McNeil drainage is closed to hunting in order to maintain a high number of bears for the public to observe and photograph.

In 1965 various Department personnel flew over McNeil River periodically during the first half of July. Fish were later than usual in arriving and only a few bears (none to two or three) were seen along the length of the stream on any one flight. Ground observations were started July 15. There were only a few fish in the river and only a few bears. More bears appeared each day. July 21 was the first day there was a fair showing of fish. Bears were at peak numbers from about July 22 to July 27. Numbers declined on July 28, 29, and 30, the last day of observations. There were considerably fewer bears in 1965 than in 1961 and about the same number as in 1962 and 1963, other years that Lee Miller has made observations. There were also considerably fewer bears than reported in 1958 by Rausch (1958). On one occasion in 1958, 87 different bears were counted from the ground. In 1965, the greatest number of different bears counted from the ground was 26 on July 25.

Variation in abundance from year to year might be caused by several things. One is change of bear numbers caused by high natural mortality of one or more age-classes during a previous year or by variation in hunting mortality from year to year. Hunting mortality has not affected McNeil bears since the McNeil drainage is closed to hunting and adjacent areas receive only light hunting pressure. Food can also affect distribution of bears. In years when fish are especially abundant, bears might fish along the length of the river rather than concentrating at the falls. Bears might also be dispersed if fish runs are late or poor. This may have been the case in 1965. An abundant berry crop might cause the bears to move away from the river earlier than during a year of average berry production.

Of bears which were tagged at McNeil in 1963 with metal ear tags and polypropylene rope ear markers, ten could still have been alive in 1965. One of these, a female, was recaptured in 1965. When tagged in 1963, she apparently had never bred and her age was estimated at $3\frac{1}{2}$ years. When recaptured in 1965, she had three cubs-of-the-year indicating an initial breeding at 4 years if she was correctly aged when first tagged. The polypropylene marker applied in 1963 was gone. Both tags applied in 1963 were still in the ears, and the ears were well healed. Two other bears were seen with metal ear tags. None were seen with the polypropylene markers.

Five bears were marked and released in 1965. These were a single female estimated to be $2\frac{1}{2}$ years old and a female and cub from each of two different family groups of a female and two cubs.

Observation of bears revealed considerable variation in size among animals of the same age in the younger age-classes. Considerable variation existed between cubs-of-the-year of different litters and even among cubs of the same litter. There was also considerable variation in size among young bears older than cubs. It is not known if all bears older than cubs still accompanying females were yearlings or if some might be 2-year-olds. This indicates a need for caution in assigning ages when making composition counts, especially from the air when often bears are seen only for a short period. Age assignment would be increasingly difficult late in the season because of longer hair on bears at that time. There is also a need for careful interpretation of data from composition counts, especially if some 2-year-olds still accompany females.

An interesting observation was made at McNeil River of yearlings nursing. On July 24, a female accompanied by three yearlings laid on her back for approximately 4 minutes while all the yearlings nursed intermittently.

A limited amount of flying was done in certain areas on the Alaska Peninsula which are hunted intensively to determine the feasibility of obtaining relative abundance and population trends of brown bear populations by aerial survey and to provide comparisons with past surveys. A 150 horsepower Supercub on floats was used for all surveys. After making ground observations at McNeil River it was thought that complete accuracy could not be obtained in classifying young bears to year-class from the air. Therefore, young bears accompanying females were classified in one of four categories: cubs-of-year, small, medium, or large. This classification should provide a comparison from year to year, and as more is learned about size and appearance of young and length of time young stay with the female, it may be possible to classify young bears to year-class.

The Black-Chignik Lakes area which was surveyed intensively in 1962 was flown August 6 and 7, 1965. Survey conditions and number of fish in the streams appeared to be similar for both years. Table 9 presents results of 1965 surveys in this area and in the Sandy Lake area. The 1965 survey is compared to the 1962 survey (Erickson 1963) and a 1958 survey (Rausch 1958) in Table 10. Because young were classified differently in the three surveys, all young are lumped for the comparison.

The higher percentage of sows and young counted in 1962 and 1965 as compared to 1958 may indicate a higher percentage of producing bears in the Black-Chignik area than on the lower Peninsula as a whole. If future surveys of representative areas of the entire Peninsula show higher female and young ratios than were present in 1958, it may indicate that the greatly increased hunting pressure since that time has significantly reduced the number of single bears.

Two flights were made in 1965 over the same course flown 27 times in 1962. The numbers of bears counted on the two flights in 1965 were 123 and 113. The greatest number counted on any one of the 27 flights in 1962 was 118.

Bear River and streams above Bear Lake were surveyed the same day, August 8, that the adjacent Sandy Lake drainage was surveyed. Fish presumed to be red salmon were seen in the clear river below Bear Lake but none were seen in streams draining into the lake. No bears were seen in the entire drainage. Bears and bear sign were fairly plentiful when the area was flown in May 1965, and guides and hunters report good numbers of bears here in past years. It would appear from this that bears may move out of a drainage when salmon are more readily obtained in an adjacent drainage.

TABLE 9

BROWN BEAR AERIAL SURVEY DATA, ALASKA PENINSULA, 1965

AREA	DATE	Survey Time (Hrs.)	•♀ w/young												Other Bears	Total
			Cubs			Small			Medium			Large				
			♀ w/1	♀ w/2	♀ w/3	♀ w/1	♀ w/2	♀ w/3	♀ w/1	♀ w/2	♀ w/3	♀ w/1	♀ w/2	♀ w/3		
Black-Chignik	8/6	2.5	1	6	4		5	3	3	3	3	2	3		20	123
Black-Chignik	8/7	2.5	1	6	2	2	2	2	4	4	4	2	1	2	16	113
Sandy	8/10	0.9	1	3			3		1	2	1				10	42

Composite Summary

- 23 -
 ♀♀ w/young 76 (27%)
 Young 156 (56%)
 Cubs 51 (18%)
 Other Young 105 (38%)
 Small 37 (13%)
 Medium 50 (18%)
 Large 18 (6%)
 Other bears 46 (17%)
 Total bears 278 (100%)

 Average litter size
 Cubs 2.13
 Other young 2.02
 All young 2.05

Bears seen per hour 47

TABLE 10
BROWN BEAR AERIAL SURVEY DATA, ALASKA PENINSULA

YEAR	AREA	Percent Composition			Average Litter Size	Total Bear Observations
		♀♀ w/ Young	Young	Other Bears		
1958	Lower Alaska Peninsula	15	32	52	2.13	361
1962	Black-Chignik Drainages	26	52	23	2.02	1,718
1965	Black-Chignik and Sandy Drainages	27	56	17	2.05	278

Additional flying was done on other drainages in late August and September. Relatively few bears were counted because bad weather hampered flying, and bears had started to move off the streams. This movement was probably due to high water making fish hard to catch and fish runs having peaked out. Bears that were seen were for the most part on smaller tributary drainages with clear water where fish were easier to catch than in large or muddy streams.

It is believed from this year's work that meaningful abundance and composition data can be obtained from aerial surveys if flying is done only when fish have concentrated bears along the streams.

Kodiak Bear-Cattle Relationship

On Kodiak during calendar year 1965, death of 41 cattle and wounds on 5 cattle were attributed to brown bears. In addition, two cattle were killed in snares set for bears. Cause of death of 11 cattle was unknown. Death of 23 other cattle was from various causes. These figures are for mortalities which were actually examined. Cattlemen state that more than 100 cattle were killed by bears. This figure is probably high as ranchers tend to list cattle that are not found as having been killed by bears. Nevertheless, predation which was verified did result in considerable economic loss.

Predation began in March and continued through November and was most severe in June and November. In 1964, most predation occurred in June. Poor fish runs in 1965 and only a fair berry crop may have caused bears to disperse more and prey on cattle more than they did in 1964.

Age composition of cattle whose deaths were attributed to bears was: calves, 8; yearlings, 13; and adults, 20. Ranchers state that many calves are killed that are not found. The yearling kill is relatively high probably because yearlings are often pastured in areas with cover, primarily alder. Most cases of bear predation have been in or close to alder cover. An observation in November of a bear tracking a calf indicates that bears may actually seek out cattle rather than attacking them only when they may happen to meet. Cattle that were killed by bears were not in poor condition as indicated by condition of bone marrow.

Track counts along salmon streams were a better indicator than aerial surveys of the number of bears on the leases. Track counts in August and September indicated about 50 bears on the active leases; the maximum number of bears observed during any one flight was 4. Track counts on the leases in October indicated that bears had moved off the salmon drainages. The track counts indicated 18 more bears on the leases in 1965 than in 1964.

Thirty bears were killed on the leases in 1965 by hunters, ranchers, and Department personnel. It was believed that eight of these bears had definitely killed cattle; all eight were adult males.

An attempt to determine origin and movement patterns of bears on the cattle leases by live trapping and tagging resulted in the tagging of only one bear. This bear, a yearling male, was captured in Terror River, August 14. No observations were made after it was tagged.

Polar Bear

Harvest

Three main types of polar bear hunters are recognized. These are: guided airplane hunters not residing in Alaska most of whom reside elsewhere in the United States, guided airplane hunters residing in Alaska, and native hunters who live on the coast and shoot bears without using an aircraft. The 1965 polar bear harvest was similar to that of past years in that over 90 percent of the bears harvested were taken by hunters who utilized guides with light aircraft at Kotzebue, Barrow, Point Hope, and Teller. The total kill including five bears collected by the University of Alaska for its museum was 301 (Table 11). This is the highest since the compulsory hide sealing program was inaugurated in 1961. The annual kill since 1961 has averaged 199.

TABLE 11

1965 ALASKA POLAR BEAR HARVEST BY AREA, TYPE OF HUNTER AND SEX OF BEAR^{1/}

HUNTING BASE	NON- RESIDENT			RESIDENT - WHITE			RESIDENT - NATIVE			T O T A L						
	♂	♀	Sex Unk.	♂	♀	Sex Unk.	♂	♀	Sex Unk.	♂	♀	Sex Unk.	All Bears	% of Total Kill	% ♂	% Non- Resident
Kotzebue	79	9		12	8	1				91	17	1	109	37	84	81
Barrow	20	4		37	17		2	2	1	59	23	1	83	28	72	29
Point Hope	17	2		18	12		3	2		38	16		54	18	70	35
Teller	22	2	1	8	3			1		30	6	1	37	13	83	68
Colville	3									3			3	1	100	100
Barter Is.							1			1			1	-	100	0
Wainwright							1	2		1	2		3	1	33	0
Kivalina							1			1			1	-	100	0
Shismaref							1			1			1	-	100	0
Diomede								1			1		1	-	0	0
King Island							1	2		1	2		3	1	33	0
Sub Total	141	17	1	75	40	1	10	10	1	226	67	3	296	100	77	
	39%	11%	-	65%	34%	1%	48%	48%	5%	76%	23%	1%				
TOTAL	159 (54%)			116 (39%)			21 (7%)			296 (100%)						

^{1/} Does not include 5 bears collected for University of Alaska museum.

Percent of total harvest in 1965 from these main hunting bases was: Kotzebue, 37; Barrow, 28; Point Hope, 18; and Teller, 13. The greatest increase over 1964 in number of bears killed was by resident hunters at Barrow (24 to 54) and non-resident hunters at Kotzebue (72 to 88). The kill by Kotzebue-based hunters would probably have been somewhat higher had an unusually long spell of bad weather not kept planes grounded for one period of nearly 3 weeks. Of the 183 non-residents who bought polar bear tags, 159 (87 percent) killed bears.

Kotzebue and Barrow are the two most popular hunting bases because scheduled airlines service them most days of the week, places to stay and eat are somewhat better than in other villages, gas can be obtained or flown in cheaper than in other villages, and telephone service is available for guide-hunter contacts.

Kotzebue is the most popular hunting base for non-residents who in 1965 took more bears here than from all other locations combined. Large bears are apparently somewhat more readily available out of Kotzebue than out of Barrow as evidenced by average hide size of males taken by non-residents (Table 12). It is assumed that Kotzebue and Barrow guides would exert comparable effort in trying to obtain a large bear for a non-resident hunter. Barrow had the greatest number of resident hunters, more than the other three locations combined, and when compared with the other hunting bases, the lowest percentage of non-resident to resident hunters. Generally, residents pay a smaller guide fee and less time is spent looking for a large bear; often the first legal bear that is seen is taken. Guides prefer Barrow for this type of hunting because legal bears, but not necessarily large bears, are found closer to the mainland and therefore, less flying is involved.

The percent of males in the harvest excluding three bears whose sex was not determined was 77. Non-residents took 89 percent males, resident sport hunters took 65 percent, and natives took 50 percent. The non-resident and resident sex ratios are very close to ratios of past years.

As in past years, hunting was confined to two general areas, the Chukchi Sea from the Bering Straits north to Point Hope and the area north of the coast between Barrow and Wainwright. The average distance in miles that bears were killed from shore by main hunting base was: Kotzebue, 123; Barrow, 51; Point Hope, 92; and Teller, 67.

Hide size which 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, was obtained for most of the bears harvested. Average hide size was 16.4 feet (non-resident, 17.2; resident white, 15.5; and native,

TABLE 12

AVERAGE HIDE SIZE^{1/} IN FEET OF POLAR BEARS TAKEN FROM
MAIN HUNTING BASES IN ALASKA, 1965

HUNTING BASE	NON-RESIDENT				RESIDENT-WHITE				TOTAL INCLUDING NATIVE			
	Male Size	N ^{2/}	Female Size	N	Male Size	N	Female Size	N	Male Size	N	Female Size	N
Kotzebue	18.1	79	13.9	9	16.8	12	14.0	8	17.9	91	14.0	17
Barrow	15.9	21	14.7	4	15.6	32	14.1	4	15.7	54	14.1	20
Point Hope	17.5	18	16.4	1	16.4	19	14.7	12	16.8	39	14.9	15
Teller	16.8	24	15.4	2	16.1	8	14.9	3	16.7	23	15.1	5

^{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/} N=number measured

15.1) (Table 12). Average skull size from 264 skulls that were measured was 24.4 inches (non-resident, 25.3; resident, 22.7; and native, 21.2) (Table 13). The largest bears as indicated by hide size were taken from Kotzebue. Non-residents consistently killed larger bears than residents.

Hide measurements for 1965 do not include length of the flap, the piece of skin between the anus and the most posterior part of the hide. Length of flap varies according to how the bear was skinned. For comparison hide size without the flap was obtained from all sealing forms previous to 1965 and data separated by sex of bear and area hunted, Chukchi Sea or Arctic Ocean. These are two distinct hunting areas from which all bears are taken and which could possibly have different bear populations. Data were also grouped to show percentage of hides in various size categories to determine if there has been a change in the size of bears harvested that has not been evident from average hide size. For example, if average hide size remains the same, is it because the percent of bears in each size class is the same, or because less large and less small bears are being killed along with more medium-sized bears? (Table 14).

TABLE 13

AVERAGE SKULL SIZE^{1/} IN INCHES OF POLAR BEARS TAKEN
FROM MAIN HUNTING BASES IN ALASKA, 1965

HUNTING BASE	NON-RESIDENT				RESIDENT-WHITE				TOTAL INCLUDING NATIVE			
	Male		Female		Male		Female		Male		Female	
	Size	N	Size	N	Size	N	Size	N	Size	N	Size	N
Kotzebue	25.9	76	21.1	3	23.8	11	21.9	3	25.7	87	21.5	6
Barrow	24.1	13	21.1	3	23.5	26	20.3	12	23.7	39	20.5	15
Point Hope	24.3	17	22.4	2	23.4	14	21.4	6	23.9	31	21.4	8
Teller	26.5	14	21.6	2	24.5	3	21.3	2	26.3	18	21.4	4

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

The major change indicated by Table 14 is a drop in the 1965 hide size of Arctic Ocean males due primarily to an increase in the number of 16-14 foot (7-8 foot squared) bears taken. This probably reflects increased harvest by residents who often shoot the first legal bear that is seen. Changes in female hide sizes are probably not significant especially considering the relatively few that are taken.

The polar bear season opened October 15. Kill was light until airplane hunting started the last part of February. Most of the kill occurred between March 7 and April 30 when the season closed (Table 15). This pattern is similar to that of past years.

Breeding Biology and Productivity

Reproductive tracts from seven females were obtained and examined. Findings will be presented when more specimens have been examined. A large sample of testes were obtained and have been preserved. All specimens were obtained during the hunting season through the cooperation of guides.

As in past years, some of the guides furnished information on number and composition of bears seen on hunting flights. Of 110 sows accompanied by young which were reported, 38 had 1 young, 71 had 2, and 1 had 3. Other bears reported included 51 small, 96 medium, 47 large, and 9 of undetermined size.

TABLE 14

PERCENTAGES OF HIDES IN VARIOUS SIZE CATEGORIES AND AVERAGE
HIDE SIZE, ALASKA POLAR BEAR HARVEST, 1961-65

PERCENTAGE AND NUMBER OF HIDES						Average Hide Size In Feet
20'+	20-18'	18-16'	16-14'	Less than 14'		
<u>Chukchi Sea</u>						
Male						
1961	7%(5) <u>1/</u>	41%(31)	29%(22)	17%(13)	7%(5)	17.4(74)
1962	7 (7)	37 (39)	26 (27)	25 (26)	7 (7)	17.2(106)
1963	7 (7)	41 (40)	34 (33)	13 (13)	5 (5)	17.5(99)
1964	7 (11)	59 (87)	21 (31)	12 (17)	1 (2)	18.0(154)
1965	7 (11)	39 (64)	34 (56)	17 (28)	3 (4)	17.4(165)
Female						
1961	0	0	7 (2)	57 (16)	36 (10)	14.2(27)
1962	0	0	3 (1)	67 (24)	31 (11)	14.3(41)
1963	0	5 (1)	5 (1)	62 (13)	29 (6)	14.9(21)
1964	0	0	9 (3)	58 (19)	33 (11)	14.7(35)
1965	0	0	11 (4)	63 (24)	26 (10)	14.1(39)
<u>Arctic Ocean</u>						
Male						
1961	0	46%(10)	27%(6)	23%(5)	5%(1)	17.1(24)
1962	3%(1)	32 (11)	35 (12)	21 (7)	9 (3)	16.9(34)
1963	6 (2)	25 (8)	31 (10)	28 (9)	9 (3)	16.8(33)
1964	0	13 (5)	45 (18)	33 (13)	10 (4)	16.3(38)
1965	0	15 (9)	28 (17)	47 (28)	10 (6)	15.7(60)
Female						
1961	0	0	38 (3)	25 (2)	38 (3)	15.1(9)
1962	0	0	10 (2)	62 (13)	29 (6)	14.3(16)
1963	0	0	6 (1)	75 (12)	19 (3)	14.4(17)
1964	0	0	21 (6)	61 (17)	18 (5)	15.0(26)
1965	0	0	5 (1)	55 (11)	40 (8)	14.1(20)

1/ Numbers in parentheses are numbers of hides measured.

TABLE 15

1965 ALASKA POLAR BEAR KILL CHRONOLOGY

	Kotzebue	Barrow	Point Hope	Teller	Other	Total	
						No.	%
2/1-6							
2/7-13		1			1	2	1
2/14-20				2	1	3	1
2/21-27	8					8	3
2/28-3/6	4		1	1		6	2
3/7-13	15	2	2	11	1	31	13
3/14-20	14	9	12	2	2	39	14
3/21-27		2	3		3	8	3
3/28-4/3	12	2	9	2	3	28	10
4/4-10	10	6	9	3	2	30	11
4/11-17	16	21	4	2		43	16
4/18-24	17	21	5	2	3	48	18
4/25-5/1	8	10	1	2	4	25	9
5/2-8							
5/9-15	1				1	2	1
5/16-22							
5/23-29					1	1	-

No new-born cubs were reported on the standard guide-sight record forms, but Barrow and Point Hope guides reported seeing new-born cubs. Cubs of one set 40 to 50 miles north of Barrow in late March were so small they had difficulty traveling. Young that were reported were listed as either small or large but older than cubs-of-the-year. The occurrence of family groups with either small or large young, older than cubs-of-the-year, was borne out by a limited number of observations made by Department personnel.

Denning

Russian and Canadian workers believe that most polar bear denning occurs on large islands and that bears that den come ashore to do so in September or October, the exact time depending mainly on ice conditions.

The Alaskan coast from Wainwright to the Canadian border and most of the small offshore islands between the Colville Delta and Brownlow Point were examined from the air between October 17 and 24. Ice cover from the Canadian border to Pitt Point was nearly solid. This was old ice formed the previous winter or earlier and recently drifted to shore, interspersed with new and young ice a few days to a few weeks old. Narrow open-water leads were also present. There were wide leads and new and young ice only from Pitt Point to Barrow and an estimated 25 miles of open water between the beach and the old ice from Barrow to Wainwright. Old ice had been into the beach at Barrow earlier in the fall but had been drifted out again by wind.

Tracks of 13 bears were seen, all between the Colville Delta and Barter Island. These included what were judged to be three females each with two young and four single bears. Tracks of most of the bears indicated that they were hunting seals along leads or had come to the beach and then gone out on the ocean ice again.

One of the single bears had traveled straight inland at the mouth of Hulahula River. Tracks of one of the other single bears indicated that it may have gone inland along the main channel of the Sagavanirktok River. Snow was so windblown that tracks could not be followed inland. These two bears were possibly going inland to den.

Eskimos at Barter Island stated they seldom saw polar bear tracks inland when hunting caribou in the fall. The only residents other than military between the Canadian border and Point Barrow are two families who have lived for a number of years at the mouth of the Colville River. These people believe that bears do not regularly come ashore to den along this section of the coast. Bud Helmericks, one of these residents

who has done much flying along the coast and guided polar bear hunters for about 20 years, has seen few tracks that would indicate inland denning. He sees a number of sets of new-born cubs on the ice each spring, some as far as 80 miles offshore. Some are so young they have difficulty traveling. He believes they were born on the ice.

Observations made on this survey and information obtained by interviewing residents tends to substantiate previous thinking that Alaska does not have maternity centers at least east of Point Barrow and that a certain number of bears are born on the ice.

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