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REPORT ON 1966 BEAR STUDIES

by

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Volume VIII

Annual Project Segment Report
Federal Aid in Wildlife Restoration
Project W-15-R-1 and 2, Work Plan M

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FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

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WORK PLAN: M TITLE: Bear Studies

JOB: 1, 2, 3, 4, 5, and 6

PERIOD COVERED: January 1, 1966 to December 31, 1966

ABSTRACT

Brown-Grizzly Bear

The legal sport kill of brown-grizzly bears during calendar year 1966 was 856. Statewide, 43 percent of the harvest was taken during the spring season and 57 percent during the fall season. Males made up 66 percent of the spring harvest, 52 percent of the fall harvest, and 58 percent of the combined harvest. Non-residents killed 58 percent of the bears (spring, 49 percent; fall, 64 percent). The percentage of harvest by non-residents in areas of major hunting pressure varied from 48 on Kodiak to 74 on the Alaska Peninsula. The success figure for non-residents was 51 percent based on non-resident tag sales.

Game management units with the highest harvest figures are: Unit 4, 75; Unit 8, 199; Unit 9, 230; Unit 13, 63; and Unit 20, 57. Because of increased hunting pressure from year to year in these units, harvests should be assessed more closely than in the state as a whole.

Poor flying weather limited the amount of denning work that could be done in the spring on the Alaska Peninsula. Six dens were located from the air, and two of these were examined from the ground.

There were fewer bears than in previous years at McNeil River, due possibly to a small fish run. Six bears were captured and released. Two were females that had been tagged in 1963.

Aerial surveys were made on the Alaska Peninsula in August when bears were concentrated on salmon streams. Much of what is considered the best bear habitat between Becharof Lake and Moffet Bay was surveyed. A total of 345 bears were counted and classified as follows: females with young, 22 percent; young, 49 percent; and single bears, 29 percent. Average litter size was 2.19. Areas for future trend counts have been delineated from the results of this year's surveys and hunter kill location data.

On Kodiak, 66 cattle and 2 horses that had died were examined by Department personnel. One calf had been killed by a bear. Most of the others were winter-kills. Ranchers estimate that five cattle were killed by bears. Of the eight bears killed on the leases, six were adult males, one was a 2 1/2 year-old male, and one was an adult female. Track counts on salmon streams indicated fewer bears on the leases than in 1965 and about the same number as in 1964.

Polar Bear

The number of polar bears classed as sport kills taken by licensed hunters from July 1, 1965 to June 30, 1966 was 399. Airplane hunters took 87 percent of the harvest and Eskimos without aircraft took 13 percent. Of the airplane hunters, 56 percent were non-residents and 44 percent were residents. Twelve bears were killed and two were captured during various biological investigations. Two bears were killed in defense of property.

The four hunting bases for most of the airplane hunting and percent of airplane harvest from each are: Kotzebue, 34; Point Hope, 14; Teller, 17; and Barrow, 29. Most of the native kill was at Barrow, Wainwright, and Point Hope.

The sport harvest was higher than in recent years. The number of guides operating was about the same. The increase in harvest was due to a number of guides taking a few more bears and a few guides taking substantially more bears. The greatest portion of the increase in kill in 1966 over the kill in 1965 was by non-residents at Teller and by residents and a few non-residents at Barrow.

The harvest was 76 percent males (non-residents, 89 percent; resident white hunters, 66 percent; and natives, 52 percent).

In 1966, for the first time, skulls had to be presented for examination when hides were presented for sealing. Skulls were measured and a tooth obtained from about half of the bears harvested. Teeth will be sectioned and cementum examined for growth layers. Average hide and skull sizes were about the same in 1966 as in recent years.

Most airplane hunting was done in the Chukchi Sea from the Bering Straits north to Point Hope and in the area north of the coast between Barrow and Wainwright. Average distances in miles that bears were killed from shore by airplane hunters at main hunting bases were: Kotzebue, 118; Point Hope, 86; Teller, 87; and Barrow, 54.

Most bears were taken in March and April, the period when light aircraft can best be used for hunting.

Guides furnished information on number and composition of bears seen. Of 1,090 bears seen, 33 percent were young, 20 percent were sows with young, and 47 percent were single bears. The number of bears seen per flying hour was 1.03 and the number seen per hunting hour was 1.8. Average litter size was 1.62.

Female reproductive tracts were examined and a beginning made on interpretation of placental scars and ovarian bodies.

The coast from Barter Island to Point Hope was examined from the air in late October for evidence of polar bear denning. Ice conditions were such that bears could have come ashore at nearly any point between Barter Island and Cape Lisburne. Few tracks and bears were seen. This is similar to what was observed a year ago and indicates that bears probably do not move inland to den in any numbers in Alaska. Four females with new cubs were seen from 20 to 100 miles north of Point Barrow in April, 1966. It appeared that the cubs could not have traveled from shore and were probably born on the ice.

Flying was done out of Barrow in late April to determine the feasibility of censusing polar bears on the ice. Different search patterns starting from randomly selected sample points were tested. Warming weather after two-thirds of the survey was completed prevented flying to complete the survey. Because different search patterns were used and because the survey was not completed, data cannot be used to make a population estimate with acceptable confidence limits. Shortcomings of a survey of this type are inability to assess the number of bears that are flown over and not seen and lack of precision in being able to relate area sampled to total area. It is recommended that in future work a heat sensor be tested as an aid in locating polar bears.

RECOMMENDATIONS FOR MANAGEMENT

Continue the bear sealing program to obtain most information for management decisions. Expand the program so that skulls of brown-grizzly bears must accompany the hides for sealing as is now required for polar bears. Skull measurements do not show the variation caused by measuring under different conditions that hide measurements do, and it is believed that skull measurements are a better indicator of age than hide measurements. In addition, a tooth can be obtained from a large sample of the skulls presented for sealing, and for brown bears at least, an exact age can be determined by counting annual layers in the cementum.

Restrict spotting and herding with airplanes as a method for hunting brown bears on the Alaska Peninsula. Spotting and then herding game animals with an airplane, a practice which is generally not considered a desirable way to hunt, is becoming more widespread on the Alaska Peninsula. It could be restricted if aircraft operators were required to pre-register landing sites. This would still allow access to much of the Peninsula but would prevent the type of hunting in which a bear is spotted from the air, a spot found to land and the hunter dropped off, and the bear then driven to the hunter with the airplane.

Maintain close liason 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 logging in

Southeastern Alaska. Procedures should be established so that any proposal for land use is reviewed by Department personnel and stipulations for protection of bears be made a part of the permit issued for the land use.

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PERIOD COVERED: January 1, 1966 to December 31, 1966

BROWN-GRIZZLY BEAR

OBJECTIVES

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

To obtain information on breeding biology and productivity.

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

To discover characteristics of movement, time of family breakup, amount of cub mortality, and population composition in selected populations.

To learn radio tracking techniques for application to future projects and to instrument selected bears to obtain various life history data.

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

To determine effects of logging in Southeastern Alaska on bears.

METHODS

The bear sealing program provided harvest information. By regulation, brown-grizzly hides must be presented to a member of the Department for sealing within 30 days after the date of kill. An affidavit prepared at time of sealing attests to the location and date of kill, sex of bear, and size and condition of hide. Skull measurements were obtained for 33 percent of the harvest and a lower back molar (M_5) was obtained for sectioning from 7 percent of the harvest.

Denning work was conducted on the Alaska Peninsula between May 10 and May 28. Flying to locate dens was done in the area between Mother Goose Lake and Bear Lake, and when possible, dens were examined from the ground. Work was done by Jack Lentfer and Lee Miller.

Bear observations were made from the ground and bears were marked at McNeil River on lower Cook Inlet in July. Bears were captured by shooting them with a drug-filled dart as they traveled along the river to catch fish. A New Zealand Paxarms gun and a Palmer "Cap-Chur" gun were used. Succinylcholine chloride (Anectine) was used as an immobilizing agent and pentabarbitol sodium (Halatal) was used to produce anesthesia. Weights of bears were estimated and the following dosages given: 1 mg. of Anectine per 3 pounds of body weight; 1 cc. of Halatal per 5 pounds of body weight. Numbered monel metal ear tags were applied to each ear. A colored polypropylene rope marker 3 inches in diameter and approximately 5 inches long was fastened to one ear with the ear tag. Bears were tattooed on the lip, under the front leg, and in the groin. Personnel who participated in McNeil River work were Jack Lentfer, Joe Blum, Lee Miller, and Phil Havens.

A cooperative study was planned with the U.S. Fish and Wildlife Service to learn of radio tracking techniques and to instrument selected bears on Kodiak Island. The program was cancelled shortly before field work was scheduled to begin because the Fish and Wildlife Service decided not to participate.

Surveys were flown in August on the Alaska Peninsula to obtain data on bear distribution, numbers, and composition. Flying was confined to salmon streams, and an attempt was made to survey only during the period when bears were concentrated on the streams feeding on salmon. The area covered includes much of what is considered the best bear habitat between Ugashik Lakes on the north and Moffet Bay near Cold Bay on the south. Lee Miller made all survey flights. Planes used were a 150 Horsepower Super Cub on big wheels and a 150 Super Cub on floats.

On Kodiak, aerial surveys were flown periodically to determine movement, distribution, and population composition of bears and to locate cattle mortalities on the cattle leases. Cattle mortalities reported as bear kills 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 conducted along salmon streams in August and September to determine number and population composition of bears. An attempt was made to tag bears along Terror River adjacent to the leases to obtain information on movements of bears onto the leases. Sterling Eide planned and supervised the Kodiak work. He, Ben Ballenger, Doug Jones, and Al Thomas did the field work.

In Southeastern Alaska, U.S. Forest Service personnel were accompanied on bear survey flights of southern Admiralty Island. This was in late spring when bears were concentrated at the heads of bays. Forest Service personnel were again accompanied in August when they made their annual bear track counts of selected salmon streams when bears were concentrated on the streams. Joe Blum did most of the planning and all of the field work for the Department's program in Southeastern Alaska.

FINDINGS

Harvest

The legal sport kill of brown-grizzly bears during calendar year 1966, as indicated by hides presented to Department personnel for sealing, was 856. Of these, 366 (43 percent) were killed during the spring season, and 490 (57 percent) were killed during the fall season. Game management units with the highest harvest figures are: Unit 4, 75; Unit 8, 199; Unit 9, 230; Unit 13, 63; and Unit 20, 57.

Sealing documents indicate that males made up 66 percent of the spring harvest, 52 percent of the fall harvest, and 58 percent of the combined harvest. Hunters residing out of the state killed 58 percent of the bears (spring, 49 percent; fall, 64 percent). The percentage of harvest by non-residents in areas of major hunting pressure varied from 48 on Kodiak to 74 on the Alaska Peninsula. The 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 statewide non-resident hunter success figures; of 968 non-residents who bought brown-grizzly tags, 496 (51 percent) were successful in killing bears. Harvest data by game management unit are presented in Tables 1, 2, and 3.

Incidence of rubbed hides was fairly high in the spring on Kodiak, in Southeastern Alaska, and on the Alaska Peninsula, 52, 30, and 27 percent, respectively. Incidence was lower in the fall, but still fairly high on Kodiak and in Southeastern Alaska, 18 and 14 percent, respectively (Table 4).

It appears that the harvest in five game management units in the state should be assessed fairly closely because of a fairly high total kill and/or an increase in kill from year to year. These are Unit 4 in Southeastern Alaska; Unit 8, Kodiak; Unit 9, the Alaska Peninsula; Unit 13 in Southcentral Alaska; and Unit 20 in the Interior. Harvest data are available for each year beginning in 1961 to the present. Certain of these data are presented in Tables 5 through 10 and permit a comparison from year to year of total kill, average male hide size, and sex composition. Female hide sizes are not included because changes in age composition of the female harvest would probably not be reflected by changes in hide size. The data are also broken down by class of hunter, resident or non-resident. Most non-residents are guided and most residents are unguided.

Kill chronology data for these five units are presented in Figures 1 through 5. Harvest figures for 1966 have been combined with those from 1964 and 1965 in order to have more data with which to demonstrate the kill chronology of recent years.

In Unit 4 beginning in 1964, the kill increased each year over the kill of the preceding year. Increases were mainly because of more kills by residents in the spring and more kills by non-residents in the fall, and in 1966, because of more kills by non-residents in the spring also. Although hide size data are not as reliable for Southeastern Alaska as for other parts of the state, they may give some indication of the size of bears harvested.

The average male hide size shows some decrease since 1961 for resident hunters and a greater decrease for non-resident hunters. Non-resident hunters took larger bears than residents from 1961 through 1964; the size was about the same for both classes of hunters in 1965 and 1966. Sex composition of the total kill has not shown too much fluctuation from year to year. There are more fluctuations when resident and non-resident data are examined separately, but no trends are evident.

In Unit 8, Kodiak and adjacent islands, the harvest was fairly stable from 1961 through1964 and then increased substantially in 1965 and again in 1966. The increase was due primarily to increased harvests by resident hunters in both spring and fall seasons and secondarily to increased harvests by non-residents in spring and fall. Average hide size of males has shown some decline since 1961. The greatest drop in hide size has been for bears killed by non-resident hunters indicating that guides are not producing bears of the size they formerly were. Males taken by resident hunters, who often are unguided and not too selective, have always been smaller than those taken by non-residents, and have shown little decline in average size. The number and percent of females in the harvest has been greater in 1964, 1965, and 1966 than in the 3 preceding years. This change has been due mainly to both residents and non-residents taking more females in the spring. Formerly the percent of females in the harvest was greater in the fall or about the same in the fall as in the spring. Now the percent of females is greater in the spring than in the fall.

In Unit 9, the Alaska Peninsula, the harvest increased substantially in 1965 over the average of the past 4 years. The harvest was high again in 1966. The increase was due mainly to non-resident hunting in both spring and fall. Non-residents have almost consistently taken a greater percentage of the harvest than residents each year in this unit than they have in any other heavily hunted unit. The average size of male hides was slightly smaller in 1965 and 1966 than in preceding years. This is because smaller bears were taken in the fall these years by both residents and non-residents. Males killed in the spring have nearly always averaged larger than males killed in the fall and have not shown any decrease in size. This is perhaps because of less selective hunting for bears in the fall when other species can also be hunted. The percent of males in the annual harvest has remained fairly constant and has been somewhat higher than in other areas in the state. The percent of males has been higher for both residents and non-residents in the spring than in the fall and generally has been higher for non-residents than residents.

In Unit 13, the Nelchina-Upper Susitna area, the season is closed in the spring when ski-equipped aircraft can land throughout much of the area. The 1966 kill was substantially higher than the kill of previous years mainly because of an increased kill by non-residents. The average male hide size has shown some fluctuation from year to year but no trend. The percent of males in the harvest is less than in heavily hunted coastal brown bear areas. The percent of males fluctuates from year to year but does not show a trend.

In Unit 20, in interior Alaska, the kill increased in 1966 over the average of previous years. This was because of increased hunting in the fall by non-residents, and to a lesser extent, by residents. Average hide size of males has fluctuated from year to year but has not shown a trend toward a smaller size. The percent of males taken annually has decreased but no pattern of harvest is evident to account for the change.

TABLE 1. BROWN-GRIZZLY BEAR HARVEST, SPRING 1966

UNIT	RESIDENT			NON-RESIDENT			T O T A L						
	♂	♀	Unk.	♂	♀	Unk.	♂	♀	Unk.	Total	% of Total	% Male	% Non-Res.
1	3	1	0	2	0	0	5	1	0	6	1.6	83	33
4	12	5	3	22	6	1	34	11	4	49	13.4	76	59
5	2	1	1	0	0	0	2	1	1	4	1.1	67	0
6	12	8	1	2	1	0	14	9	1	24	6.6	61	13
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8 .	33	44	3	34	23	0	67	67	3	137	37.4	50	42
9	19	6	0	68	5	3	87	11	3	101	27.6	89	75
10	3	1	0	1	0	0	4	1	0	5	1.4	80	20
11	0	0	0	0	0	0	0	0	0	0	0	0	0
12	2	1	0	0	0	0	2	1	0	3	.8	67	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0
16	4	1	0	0	0	0	4	1	0	5	1.4	80	0
17	2	0	0	0	0	0	2	0	0	2	.5	100	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	1	0	0	0	0	0	1	0	1	1.4	0	0
20	6	5	0	1	0	0	7	5	0	12	3.3	58	83
21	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	1	0	1	0	0	1	1	0	2	.5	50	50
23	2	0	0	6	0	0	8	0	0	8	2.2	100	75
24	1	0	0	0	0	0	1	0	0	1	.3	100	0
25	0	1	0	3	1	0	3	2	0	5	1.4	60	80
26	1	0	0	0	0	0	1	0	0	1	.3	100	0
TOTAL	102	76	8	140	36	4	242	112	12	366	100	68	49
%	55	41	4	78	20	2	66	31	3	100			

TABLE 2. BROWN-GRIZZLY BEAR HARVEST, FALL 1966

UNIT	RESIDENT			NON-RESIDENT			T O T A L						
	♂	♀	Unk.	♂	♀	Unk.	♂	♀	Unk.	Total	% of Total	% Male	% Non-Res.
1	3	2	0	1	1	0	4	3	0	7	1.4	57	29
4	4	1	0	9	11	1	13	12	1	26	5.3	52	81
5	1	1	0	8	7	1	9	8	1	18	3.7	53	89
6	4	6	0	2	2	0	6	8	0	14	2.9	43	29
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	17	6	0	22	16	1	39	22	1	62	12.7	64	63
9	21	9	2	49	44	4	70	53	6	129	26.3	57	75
10	0	1	0	0	0	0	0	1	0	1	.2	0	0
11	1	1	1	9	0	0	10	1	1	12	2.4	91	75
12	1	3	0	3	2	0	4	5	0	9	1.8	44	56
13	11	9	2	22	17	2	33	26	4	63	12.9	56	65
14	1	2	0	1	1	0	2	3	0	5	1.0	40	40
15	1	2	0	0	1	0	1	3	0	4	.8	25	25
16	3	5	0	4	9	1	7	14	1	22	4.5	33	64
17	0	2	1	2	2	0	2	4	1	7	1.4	33	57
18	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	2	1	5	9	0	5	11	1	17	3.5	31	82
20	13	11	0	8	12	1	21	23	1	45	9.2	48	47
21	1	0	0	0	0	0	1	0	0	1	.2	100	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0
23	2	0	0	1	1	0	3	1	0	4	.8	75	50
24	4	1	1	2	8	0	6	9	1	16	3.3	40	63
25	6	4	0	9	1	0	15	5	0	20	4.1	75	50
26	1	2	1	3	1	0	4	3	1	8	1.6	57	50
TOTAL	95	70	9	160	145	11	255	215	20	490	100	54	64
%	55	40	5	51	46	3	52	44	4	100			

TABLE 3. BROWN-GRIZZLY BEAR HARVEST, SPRING AND FALL 1966

UNIT	RESIDENT			NON-RESIDENT			T O T A L						
	♂	♀	Unk.	♂	♀	Unk.	♂	♀	Unk.	Total	% of Total	% Male	% Non-Res.
1	6	3	0	3	1	0	9	4	0	13	1.5	69	31
4	16	6	3	31	17	2	47	23	5	75	8.8	67	67
5	3	2	1	8	7	1	11	9	2	22	2.6	55	73
6	16	14	1	4	3	0	20	17	1	38	4.4	54	18
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	50	50	3	56	39	1	106	89	4	199	23.2	54	48
9	40	15	2	117	49	7	157	64	9	230	26.9	71	75
10	3	2	0	1	0	0	4	2	0	6	.7	67	17
11	1	1	1	9	0	0	10	1	1	12	1.4	91	75
12	3	4	0	3	2	0	6	6	0	12	1.4	50	42
13	11	9	2	22	17	2	33	26	4	63	7.4	56	65
14	1	2	0	1	1	0	2	3	0	5	.6	40	40
15	1	2	0	0	1	0	1	3	0	4	.5	25	25
16	7	6	0	4	9	1	11	15	1	27	3.2	42	52
17	2	2	1	2	2	0	4	4	1	9	1.1	50	44
18	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	3	1	5	9	0	5	12	1	18	2.1	29	78
20	19	16	0	9	12	1	28	28	1	57	6.7	50	39
21	1	0	0	0	0	0	1	0	0	1	.1	100	0
22	0	1	0	1	0	0	1	1	0	2	.2	50	50
23	4	0	0	7	1	0	11	1	0	12	1.4	92	67
24	5	1	1	2	8	0	7	9	1	17	2.0	44	58
25	6	5	0	12	2	0	18	7	0	25	2.9	72	56
26	2	2	1	3	1	0	5	3	1	9	1.1	63	44
TOTAL	197	146	17	300	181	15	497	327	32	856	100	60	58
%	54.7	40.5	4.7	60.5	36.5	3	58	38	3.8	100			

TABLE 4. INCIDENCE OF RUBBED HIDES, BROWN--GRIZZLY BEAR HARVEST, 1966

AREA	SPRING		FALL	
	Hides Examined	Percent Rubbed	Hides Examined	Percent Rubbed
Southeastern	57	30	50	14
Kodiak-Afognak	134	52	56	18
Alaska Peninsula	102	27	123	2
Southcentral	29	8	115	3
Interior-Arctic	33	6	122	2

Table 5. Game Management Unit 4 Brown-Grizzly Bear Harvest by Year, Season, and Residency of Hunter

TOTAL KILL																
YEAR	SPRING					FALL					TOTAL					
	RES.		N-R.		TOTAL	RES.		N-R.		TOTAL	RES.		N-R.		TOTL
	No.	%	No.	%	No.	No.	%	No.	%	No.	No.	%	No.	%	No.
61	10	36	18	64	28	6	55	5	45	11	16	41	23	59	39
62	13	41	19	59	32	2	17	10	83	12	15	34	29	66	44
63	7	39	11	61	18	5	56	4	44	9	12	44	15	56	27
64	23	57	17	43	40	8	53	7	47	15	31	56	24	44	55
65	22	54	19	46	41	9	39	14	61	23	31	48	33	52	64
66	20	41	29	59	49	5	19	21	81	26	25	33	50	67	75

Average Male Hide Size (length plus width in feet)

YEAR	SPRING					FALL					TOTAL				
	RES.		N-R.		AVER	RES.		N-R.		AVER	RES.		N-R.		AVER
	Size	No.	Size	No.	SIZE	Size	No.	Size	No.	SIZE	Size	No.	Size	No.	SIZE
61	14.6	10	16.2	13	15.5	12.4	3	14.9	2	13.4	14.1	13	16.0	15	15.1
62	13.9	9	15.5	12	14.8	0	0	13.9	6	13.9	13.9	9	14.9	18	14.6
63	13.9	6	15.0	9	14.5	13.0	2	14.7	2	13.8	13.7	8	14.9	11	14.4
64	14.2	16	15.3	9	14.6	13.2	6	13.0	2	13.2	13.9	22	14.9	11	14.2
65	13.4	14	13.8	9	13.5	15.4	5	13.2	10	13.9	13.9	19	13.5	19	13.7
66	13.0	11	13.5	23	13.4	12.6	4	12.5	9	12.6	12.9	15	13.3	32	13.1

Number and Percent of Males in Total Harvest

YEAR	SPRING						FALL						TOTAL					
	RES.		N-R.		Total		RES.		N-R.		Total		RES.		N-R.		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
61	9	90	16	89	25	89	4	80	2	33	6	55	13	87	18	75	31	80
62	9	69	14	74	23	72	0	0	6	60	6	55	9	64	20	69	29	67
63	6	86	10	91	16	89	2	40	2	50	4	44	8	67	12	80	20	74
64	17	77	12	71	29	74	6	75	2	29	8	53	23	77	14	58	37	69
65	17	77	11	58	28	68	5	56	10	77	15	68	22	71	21	51	43	68
66	12	71	22	79	34	76	4	80	9	47	13	52	16	73	31	65	47	67

Table 6. Game Management Unit 8 Brown-Grizzly Bear Harvest by Year, Season, and Residency of Hunter

YEAR	TOTAL KILL														
	SPRING					FALL					TOTAL				
	RES.		N-R.		TOTAL	RES.		N-R.		TOTAL	RES.		N-R.		TOTAL
	No.	%	No.	%	No.	No.	%	No.	%	No.	No.	%	No.	%	No.
61	41	50	41	50	82	5	14	31	86	36	46	39	72	61	118
62	41	43	55	57	96	6	17	29	83	35	47	36	84	64	131
63	43	54	37	46	80	14	31	18	56	32	57	51	55	49	112
64	48	53	42	47	90	8	29	20	71	28	56	47	62	53	118
65	62	52	57	48	119	34	51	33	49	67	96	52	90	48	186
66	80	58	57	42	137	23	37	39	63	62	103	52	96	48	199

Average Male Hide Size (length plus width in feet)

YEAR	SPRING					FALL					TOTAL				
	RES.		N-R.		AVER	RES.		N-R.		AVER	RES.		N-R.		AVER
	SIZE	NO.	SIZE	NO.	SIZE	SIZE	NO.	SIZE	NO.	SIZE	SIZE	NO.	SIZE	NO.	SIZE
61	15.5	30	18.1	26	16.7	15.9	3	17.7	16	17.4	15.5	33	17.9	42	16.9
62	15.5	26	17.4	46	16.7	15.4	4	15.9	14	15.8	15.5	30	17.0	60	16.5
63	14.8	28	17.6	25	16.1	16.4	11	16.6	10	16.5	15.2	39	17.3	35	16.2
64	14.8	27	14.9	25	14.8	15.1	7	16.4	15	16.0	14.9	34	15.5	40	15.2
65	14.9	36	16.3	33	15.5	16.1	21	16.0	20	16.1	15.3	57	16.2	53	15.7
66	14.9	32	16.3	34	15.6	15.1	15	16.4	22	15.9	15.0	47	16.3	56	15.7

Number and Percent of Males in Total Harvest

YEAR	SPRING						FALL						TOTAL					
	RES.		N-R.		TOTAL		RES.		N-R.		TOTAL		RES.		N-R.		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
61	31	76	28	68	59	72	3	75	16	50	19	53	34	76	44	60	78	66
62	26	63	46	84	72	75	4	67	15	52	19	54	30	64	61	73	91	70
63	29	67	26	70	55	69	13	93	9	53	22	71	42	74	35	65	77	69
64	26	57	24	60	50	58	7	88	15	75	22	79	33	61	39	65	72	63
65	36	59	34	60	70	59	21	62	20	61	41	61	57	60	54	60	111	60
66	33	43	34	60	67	50	17	74	22	58	39	64	50	50	56	59	106	54

Table 7. Game Management Unit 9 Brown-Grizzly Bear Harvest by Year, Season, and Residency of Hunter

YEAR	TOTAL KILL															
	SPRING					FALL					TOTAL					
	RES.		N-R.		TOTAL	RES.		N-R.		TOTAL	RES.		N-R.		TOTAL
	No.	%	No.	%	No.	No.	%	No.	%	No.	No.	%	No.	%	No.
61	27	39	42	61	69	22	43	29	57	51	49	41	71	59	120
62	43	45	52	55	95	15	25	45	75	60	58	37	97	63	155
63	29	39	46	61	75	21	24	68	76	89	50	30	114	70	164
64	19	30	45	70	64	28	31	63	69	91	47	30	108	70	155
65	36	37	62	63	98	35	32	75	68	110	71	34	137	66	208
66	25	25	76	75	101	32	25	97	75	129	57	25	173	75	230

Average Male Hide Size (length plus width in feet)

YEAR	SPRING					FALL					TOTAL				
	RES.		N-R.		AVER	RES.		N-R.		AVER	RES.		N-R.		AVER
	SIZE	NO.	SIZE	NO.	SIZE	SIZE	NO.	SIZE	NO.	SIZE	SIZE	NO	SIZE	NO.	SIZE
61	15.8	20	14.1	5	16.8	15.1	9	15.9	18	15.6	15.6	29	16.9	50	16.4
62	16.2	32	16.6	42	16.4	15.7	5	16.7	24	16.5	16.1	37	16.6	66	16.4
63	16.4	19	17.3	39	17.0	14.6	6	14.9	35	14.9	15.6	25	16.2	74	16.1
64	15.1	15	16.6	37	16.2	15.8	12	16.2	36	16.1	15.4	27	16.4	73	16.1
65	14.9	24	17.4	54	16.6	13.7	17	14.8	39	14.5	14.4	41	16.3	93	15.7
66	15.0	19	16.7	69	16.4	14.3	20	15.1	49	14.8	14.7	39	16.0	118	15.7

Number and Percent of Males in Total Harvest

YEAR	SPRING						FALL						TOTAL					
	RES.		N-R.		TOTAL		RES.		N-R.		TOTAL		RES.		N-R.		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
61	20	80	35	83	55	82	11	55	19	66	30	61	31	69	54	76	85	73
62	33	77	44	85	77	81	5	33	27	60	32	53	38	66	71	73	109	70
63	19	73	39	87	58	83	6	32	36	55	42	49	25	56	75	68	100	65
64	15	83	36	84	51	84	15	54	37	64	52	60	30	65	73	72	103	70
65	25	69	53	85	78	80	18	51	40	56	58	55	43	61	93	70	136	67
66	19	76	68	93	87	89	21	70	49	53	70	57	40	73	117	70	157	71

Table 8. Game Management Unit 13 Brown-Grizzly Bear Harvest by Year, Season, and Residency of Hunter (No spring season)

	T O T A L K I L L				
YEAR	RESIDENT		NON-RESIDENT		TOTAL
	No.	%	No.	%	No.
61	16	38	26	62	42
62	15	44	19	56	34
63	15	36	27	64	42
64	13	37	22	63	35
65	23	52	21	48	44
66	22	35	41	65	63

Average Male Hide Size (length plus width)

YEAR	RESIDENT		NON-RESIDENT		AVERAGE
	SIZE	NO.	SIZE	NO.	SIZE
61	13.0	9	13.0	9	13.0
62	13.8	9	13.9	12	13.8
63	12.5	8	12.7	13	12.6
64	11.9	4	13.2	10	12.8
65	12.8	15	12.9	9	12.9
66	13.6	11	13.0	22	13.2

Number and Percent of Males in Total Harvest

YEAR	RESIDENT		NON-RESIDENT		TOTAL	
	NO.	%	NO.	%	NO.	%
61	10	67	10	40	20	50
62	9	60	13	68	22	65
63	8	53	14	54	22	54
64	4	31	10	48	14	41
65	15	68	10	48	25	58
66	11	55	22	56	33	56

Table 9. Game Management Unit 20 Brown-Grizzly Bear Harvest by Year, Season, and Residency of Hunter

YEAR	TOTAL KILL														
	SPRING					FALL					TOTAL				
	RES.		N-R.		TOTAL	RES.		N-R.		TOTAL	RES.		N-R.		TOTAL
	NO.	%	NO.	%	NO.	NO.	%	NO.	%	NO.	NO.	%	NO.	%	NO.
61	6	100	0	0	6	7	64	4	36	11	13	76	4	24	17
62	4	100	0	0	4	17	77	5	23	22	21	81	5	19	26
63	10	100	0	0	10	27	79	7	21	34	37	84	7	16	44
64	5	100	0	0	5	26	63	15	37	41	31	67	15	33	46
65	16	94	1	6	17	5	33	10	67	15	21	66	11	34	32
66	11	92	1	8	12	24	53	21	47	45	35	61	22	39	57

Average Male Hide Size (length plus width in feet)

YEAR	SPRING					FALL					TOTAL				
	RES.		N-R.		AVER	RES.		N-R.		AVER	RES.		N-R.		AVER
	SIZE	NO.	SIZE	NO.	SIZE	SIZE	NO.	SIZE	NO.	SIZE	SIZE	NO	SIZE	NO.	SIZE
61	13.7	4	0	0	13.7	13.8	5	11.3	4	12.6	13.7	9	11.3	4	13.0
62	13.9	1	0	0	13.9	12.8	10	11.9	4	12.5	12.9	11	11.9	4	12.6
63	12.0	4	0	0	12.0	12.2	18	13.7	2	12.4	12.2	22	13.7	2	12.4
64	13.4	5	0	0	13.4	13.0	12	12.9	11	13.0	13.1	17	12.9	11	13.0
65	13.8	6	13.9	1	13.8	13.6	2	13.7	9	13.7	13.7	8	13.7	10	13.7
66	12.6	6	15.7	1	13.0	12.9	12	14.0	8	13.3	12.8	18	14.2	9	13.2

Number and Percent of Males in Total Harvest

YEAR	SPRING						FALL						TOTAL					
	RES.		N-R.		TOTAL		RES.		N-R.		TOTAL		RES.		N-R.		TOTAL	
	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO	%	NO.	%	NO.	%	NO.	%
61	4	67	0	0	4	67	5	71	3	75	8	73	9	77	3	75	12	71
62	1	25	0	0	1	25	10	59	5	100	15	68	11	52	5	100	16	62
63	4	44	0	0	4	44	19	76	2	29	21	66	23	68	2	29	25	61
64	5	100	0	0	5	100	12	50	11	73	23	56	17	59	11	73	28	64
65	6	60	1	100	7	41	2	40	9	90	11	73	8	38	10	91	18	56
66	6	55	1	100	7	58	13	54	8	40	21	48	19	54	9	43	28	50

Table 10. Statewide Brown-Grizzly Bear Harvest Data by Year, Season, and Residency of Hunter

YEAR	TOTAL KILL SPRING RES. No.	%	N-R. No.	%	TOTAL No.	FALL RES. No.	%	N-R. No.	%	TOTAL No.	TOTAL RES. No.	%	N-R. No.	%	TOTAL No.
61	104	48	113	52	217	112	44	144	56	256	216	46	257	54	473
62	130	50	129	50	259	122	43	160	57	282	252	47	289	53	541
63	117	53	103	47	220	151	44	192	56	343	268	48	295	52	563
64	147	55	119	45	266	167	46	197	54	364	314	50	316	50	630
65	194	54	165	46	359	177	43	236	57	413	371	48	401	52	772
66	186	51	180	49	366	174	36	316	64	490	360	42	496	58	856

Average Male Hide Size (length plus width in feet)

YEAR	SPRING RES. SIZE	NO	N-R. SIZE	NO	AVER SIZE	FALL RES. SIZE	NO.	N-R. SIZE	NO.	AVER SIZE	TOTAL RES. SIZE	NO.	N-R. SIZE	NO.	AVER SIZE
61	14.8	81	17.1	80	16.0	13.6	51	14.6	70	14.2	14.3	132	16.0	150	15.2
62	15.2	90	16.8	102	16.1	13.9	67	14.8	84	14.4	14.6	157	15.9	186	15.3
63	14.7	71	17.0	79	15.9	13.3	78	14.0	102	13.7	14.0	149	15.3	181	14.7
64	14.4	101	15.7	84	15.0	13.8	89	14.5	113	14.2	14.1	190	15.0	197	14.6
65	14.6	115	16.2	119	15.4	14.0	94	14.2	121	14.1	14.3	209	15.2	240	14.8
66	14.5	100	15.8	142	15.3	16.8	87	15.8	160	16.1	15.6	187	15.8	302	15.7

Number and Percent of Males in Total Harvest

YEAR	SPRING RES. No.	%	N-R. No.	%	TOTAL No.	%	FALL RES. No.	%	N-R. No.	%	TOTAL No.	%	TOTAL RES. No.	%	N-R. No.	%	TOTAL No.	%
61	82	80	88	78	170	79	59	55	70	50	129	52	141	68	158	63	299	65
62	91	71	106	82	197	76	66	56	90	56	156	56	157	64	196	68	353	66
63	74	67	82	82	156	74	85	59	104	58	189	59	159	63	186	66	345	66
64	102	73	84	73	186	73	94	58	117	63	211	61	196	65	201	67	397	65
65	123	65	122	74	245	69	99	57	126	56	225	56	222	61	248	63	470	62
66	102	57	140	80	242	68	95	58	160	52	255	54	197	57	300	62	497	60

Figure 1. Brown Bear Kill Chronology 1964-1966 Unit 4

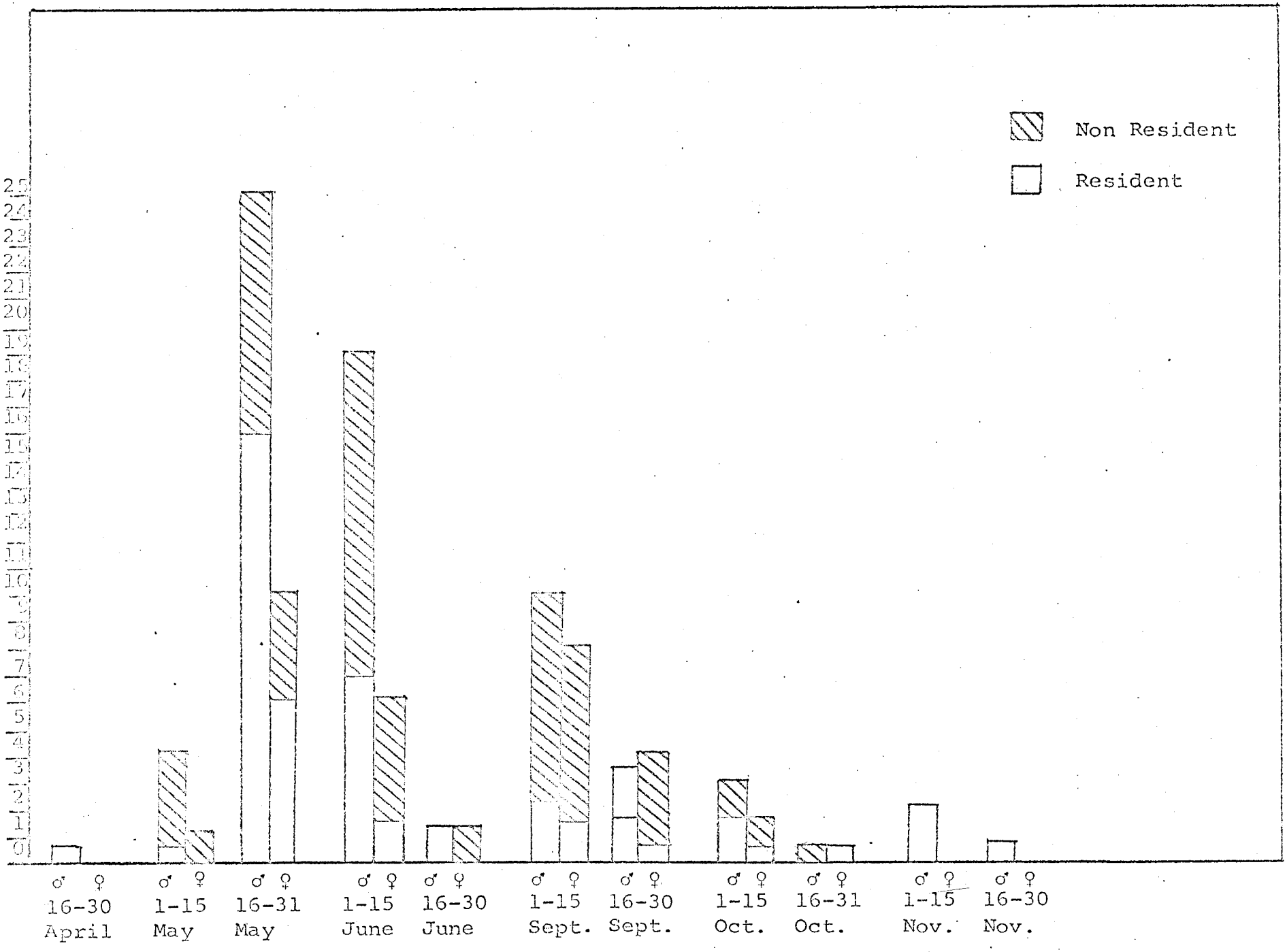


Figure 2. Brown Bear Kill Chronology 1964-1966 Unit 8

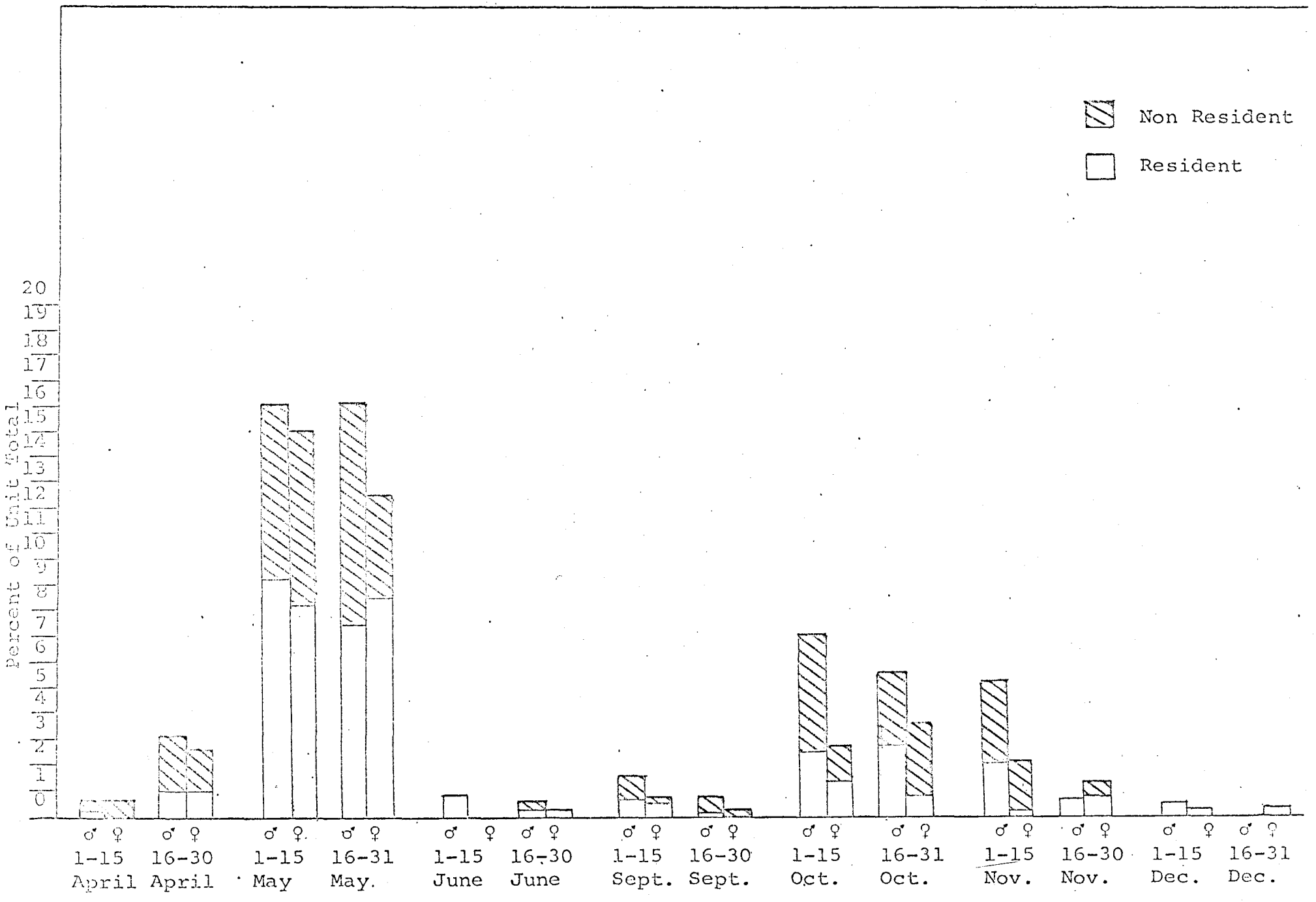


Figure 3. Brown Bear Kill Chronology 1964-1966 Unit 9

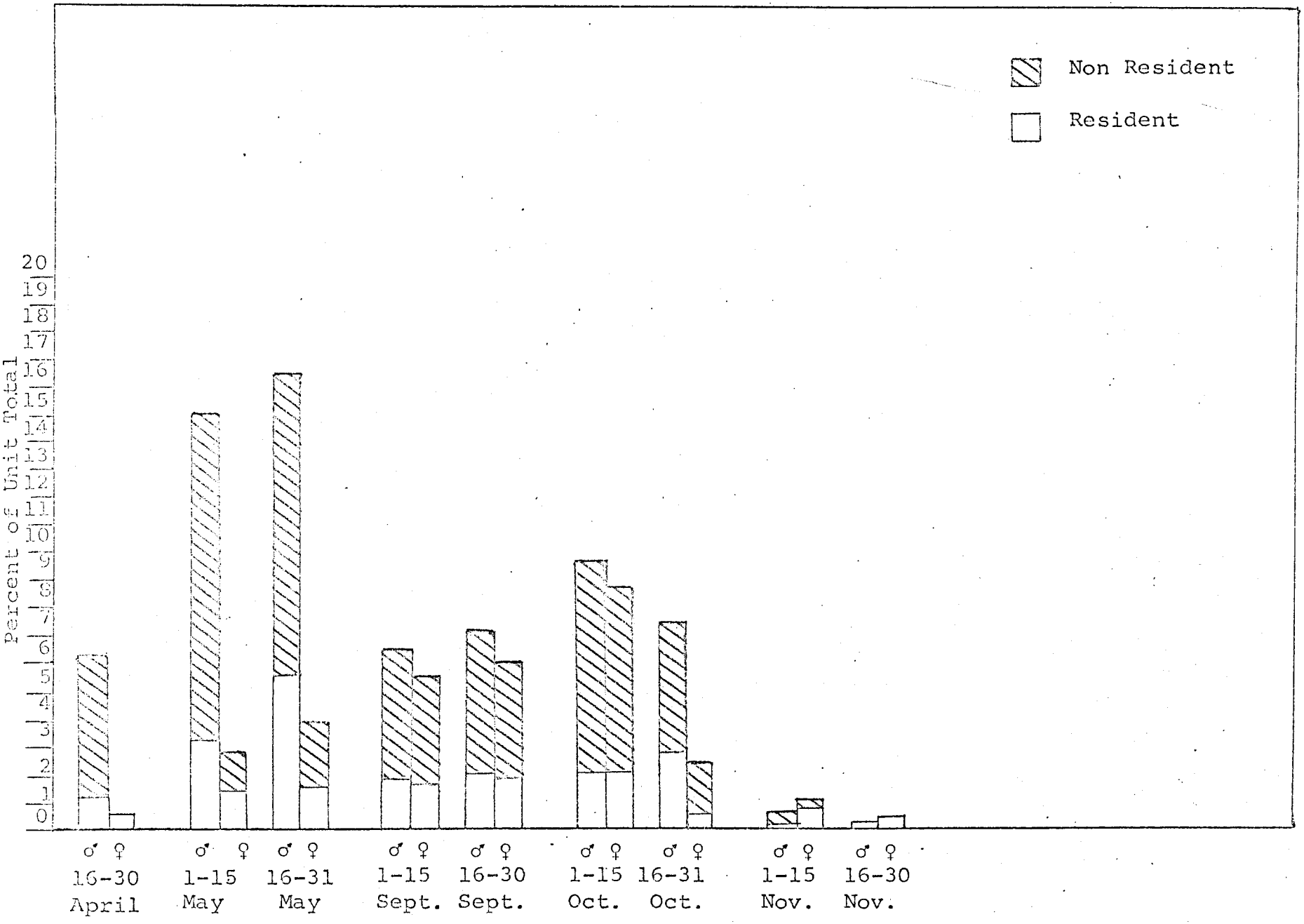


Figure 4. Brown Bear Kill Chronology 1964-1966 Unit 13

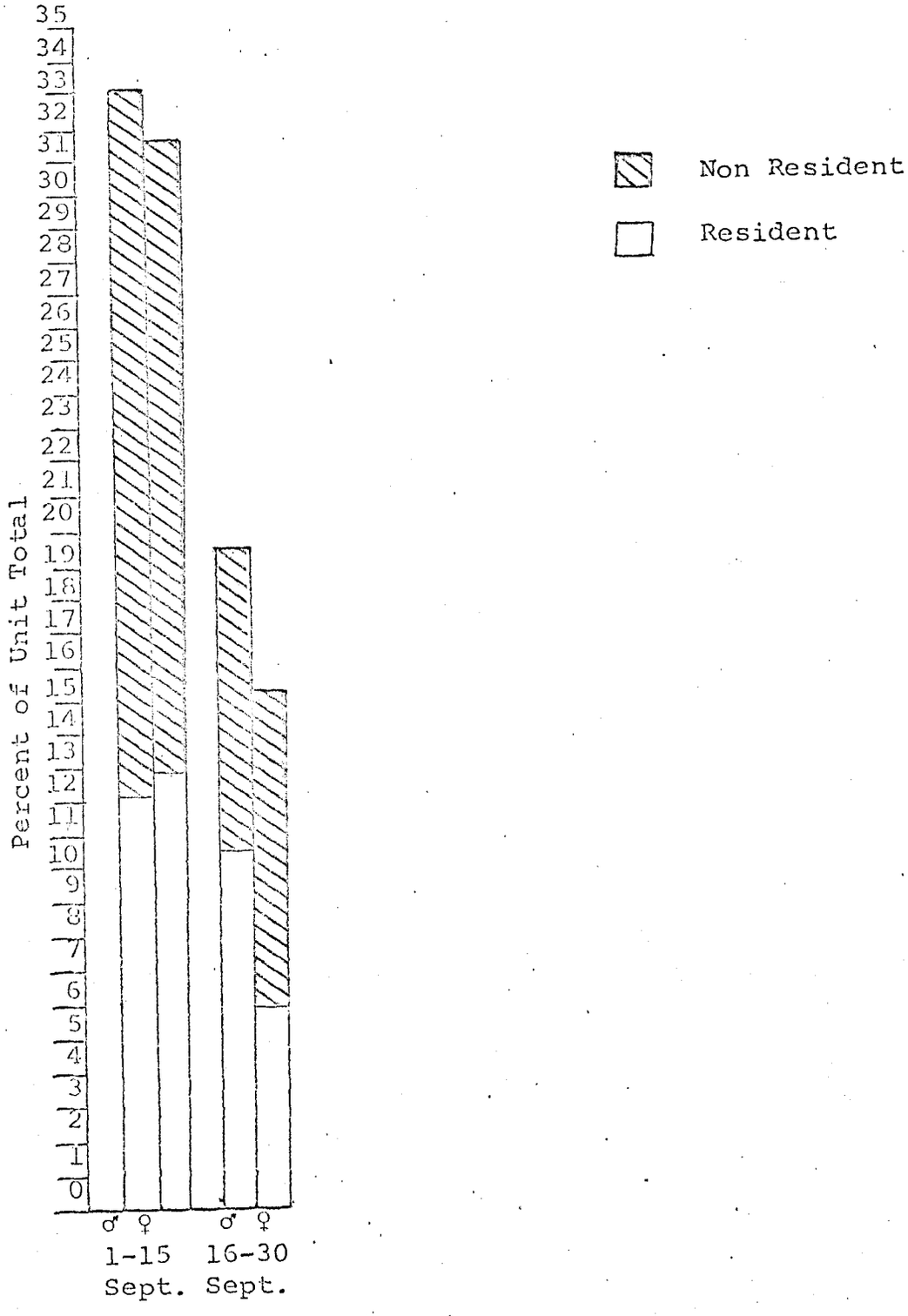
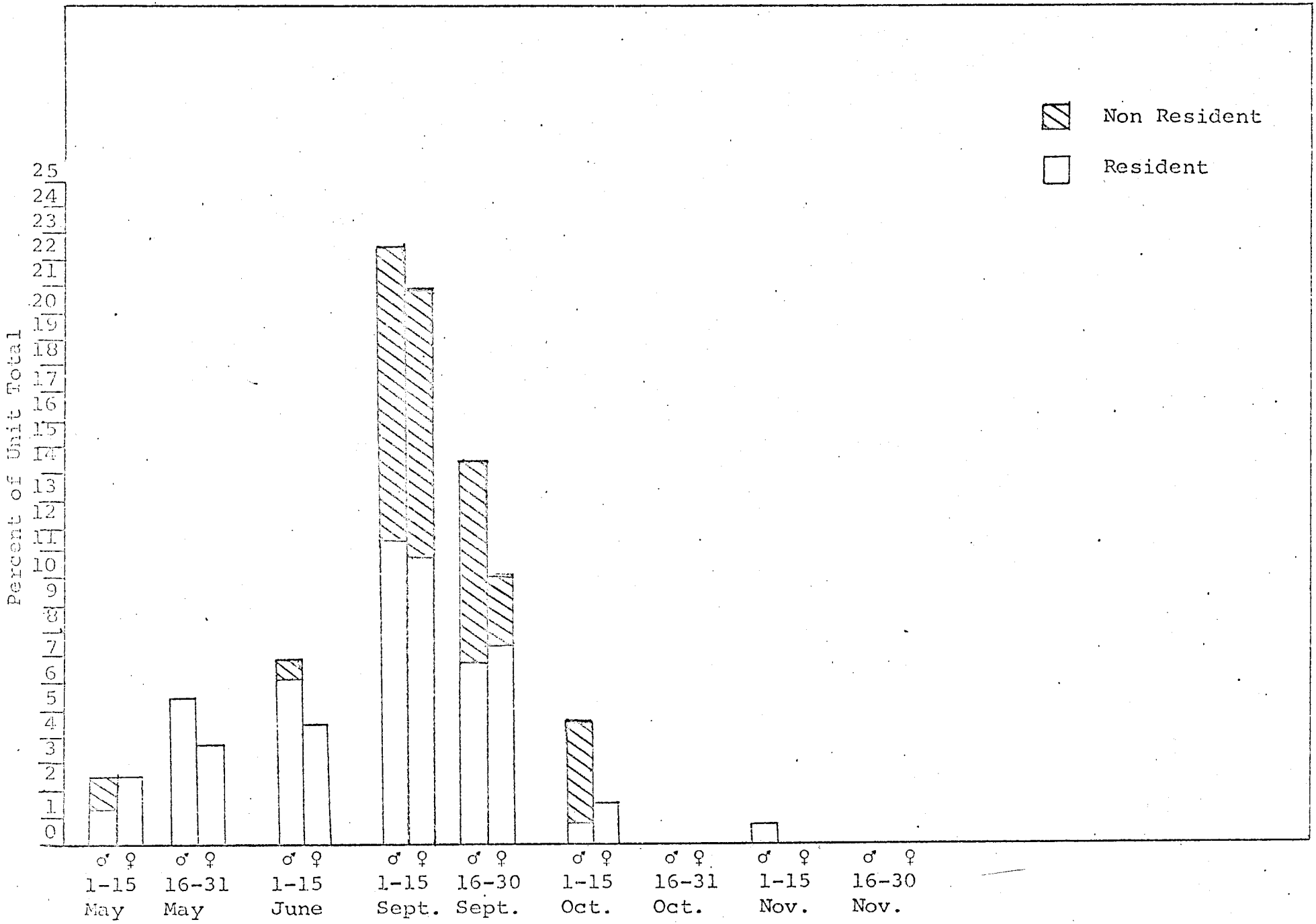


Figure 5. Brown Bear Kill Chronology 1964-1966 Unit 20



Denning

Denning work was conducted on the Alaska Peninsula between May 10 and May 28. An unseasonably long period of bad weather limited the amount of flying that could be done in the mountains, and searching for dens was limited to parts of 6 days.

A 150 Horsepower Super Cub on big wheels was used for all flights. Main areas flown were drainages flowing into Mother Goose Lake, drainages flowing into the King Salmon River from the south, Cinder River, Aniakchak River, Aniakchak Crater drainages from the northwest to the southern portion of the crater, head of the Meshik River, all drainages of Black Peak into Bristol Bay, Black Lake drainages, Sandy River drainages, and Bear Lake drainages.

Six dens were located from the air. Table 11 provides descriptive information as obtained from the airplane.

Two of these dens were examined from the ground.

The den on the Aniakchak River, which was one of these, was on a south slope from which most of the snow had disappeared. There were no tracks, and the bear or bears had apparently left while the ground was still snow-covered. Disturbance to the ground was recent enough that the den was judged to have been used the past winter. The den had consisted of a horizontal tunnel and larger chamber. The roof of both the tunnel and chamber had caved in. Distance into the hill of the tunnel and chamber measured along the floor of the tunnel was 9 feet 8 inches. Width of the tunnel was about 2 1/2 feet. The chamber was about 5 feet in diameter and estimated to be 4 to 5 feet high. A mound of dirt about 5 feet by 7 feet by 2 1/2 feet high was in front of the den.

The other den which was examined was on Broad Creek at 1100 feet. This den, which had a single set of tracks leading from it, was completely blown in with snow. The mound of dirt in front of the den was 7 feet by 8 feet by 2 feet high.

Although only a few dens were examined in 1966, it appears that more could be examined in the spring if weather did not hamper flying too greatly. Airplane choice would be first a Super Cub on big wheels and then a Super Cub on ski-wheels. If there were helicopters on the Peninsula doing oil work, it might be possible to have a helicopter fly a person into a den once it had been located from a Super Cub.

Table 11. Brown Bear Dens Observed on Alaska Peninsula, May 1966

DATE	LOCATION	ELEVATION	SLOPE	COVER	SNOW DEPTH	HOW LOCATED	BEAR ACTIVITY
5/25	Indecision Creek, Mother Goose Lake	1600'	45° facing SE.	Open, above brush line	3' plus	Large muddy area in front of den	Recent use. Female and 3 new cubs seen about 3 miles away, lower and in brush
5/23 & 5/25	Unnamed drainage flowing into Mother Goose Lake from southeast	1000'	60° facing N.	Small open area in alders	2 to 3'	Muddy area in front of den	Tracks around den. Female looked out of den on 5/23. Femal and 3 new cubs 10 yar from den on 5/25.
5/25	North side of Aniakchak River about 12 miles up-stream from mouth	1200'	45° facing S.	Grassy knob in alders	Snow gone	Mound of dirt in front of den	No bears seen in area Den used this spring but not recently. Caved in. No tracks.
5/17	East Fork of Clark River, Chignik Lake	1000'	50° facing NW.	Upper edge of alder line	1 to 2'	Bears observed within 200 yards	Female with 1 cub, 1 large bear, and 1 smal bear feeding on carca (probably moose) with 200 yards of den. Tra blown in. Could not tell which bears had used den.
5/20	Side canyon draining into Broad Creek, Black Lake	1100'	45° facing SW.	Open, above brush line	3' plus	Back tracked old tracks. Muddy area in front of den	No bears seen in area Blown in tracks indi-cated use this spring probably by single be
5/20	Side canyon draining into Broad Creek, Black Lake	1150'	40° facing W.	Open, above brush line	3' plus	Old tracks in area. Small muddy area in front of den	Bear had been out sor time. Blown in tracks were seen about 1/4 mile above den.

Life History

Work was continued at McNeil River on Lower Cook Inlet to obtain various types of brown bear life history information by observing and marking bears.

Bears feed on red salmon and are readily observed on Mikfik Creek, the small drainage immediately south of McNeil River, during the first half of July. When dog salmon run up McNeil River during the last half of July, bears congregate and are readily observed at a series of rapids near the mouth of the river. The McNeil drainage is closed to hunting in order to keep it as a study area and to maintain a high number of bears for the public to observe and photograph. In 1966, ten photographers were at McNeil obtaining pictures for various commercial endeavors, and two teachers obtained pictures for teaching aids.

Field work by the Department started July 7. Bears were feeding on red salmon in Mikfik Creek at this time. There was no bear activity at McNeil River until about July 14 when the first dog salmon arrived. Bears did not use Mikfik Creek to any extent after the dog salmon came into McNeil River. The McNeil run started July 14, peaked July 16, and began to drop off July 26. The run was smaller than average this year and was small compared to runs in adjoining bays as reported by Commercial Fish Division biologists.

The number of bears observed this year was low, probably because of the low fish run and greater numbers of fish available in adjacent drainages. It is also possible that disturbance caused by the high number of photographers tended to keep bears away from the river. The greatest number of bears seen in one day at the rapids, after fish were concentrated there, was ten.

Two females which had been tagged in 1963 were recaptured in 1966. Both had lost the monel metal ear tag and polypropylene marker from one ear, and both had retained the monel ear tag in the ear where a marker was not fastened. All ears were healed.

One of the females tagged in 1963 was listed as an unbred 2 1/2 year-old at the time. She would have been 5 1/2 years old when recaptured in 1966. She was without cubs, not lactating, had pale small teats, and a swollen and turgid vulva in 1966. This would indicate that she had not had cubs before 1966 and was just completing or was in estrous.

The other female tagged in 1963 and recaptured in 1966 was mature when first tagged in 1963. Teat condition in 1963 and the fact that she was alone indicated that family breakup had occurred recently. Condition of vulva indicated that she had probably gone through an estrous period during the past two months. When recaptured in 1966, teat and vulva condition indicated again that she had only recently abandoned cubs, and had experienced an estrous period. Thus, for this bear the period between successful breedings may have been 3 years and the length of time cubs stayed with her approximately 2 years.

Two other females were tagged in 1966. One was a young bear that had never been bred. The other was a mature single bear that had had cubs and had recently gone through or was in estrous.

The two other bears tagged in 1966 were a young male and mature male.

A female marked in 1965 was seen in 1966 still with a polypropylene marker attached to an ear. When marked in 1965 she had two cubs-of-the-year, and when seen in 1966 she was alone. This indicated that cubs had died or family breakup had occurred prior to the time the cubs were 1 1/2 years old.

One observation of a cub becoming separated from others in its family group was made. This occurred as a female with three cubs carried a fish from the river to an alder patch on higher ground. One cub was in the lead and took a different trail than the other bears did. The cub was seen alone and the other bears were seen again a short time later. The lone cub was not seen again; the female and two cubs were seen together later the same day. The female never gave any indication of missing a cub. This was the last day of observations at McNeil and the ultimate fate of the cub was not learned.

Composition Surveys

Brown bear surveys were flown on the Alaska Peninsula in August to obtain information on populations other than that provided by our sealing program in this heavily hunted area. It is realized that aerial surveying of big game, particularly of brown bears, has definite limitations; however, aerial surveying appears to be the only way to obtain abundance and composition data that might be meaningful for animals as sparsely distributed as bears over an area as large as the Alaska Peninsula. The primary objective was to determine distribution, abundance, and composition of bears on that portion of the Peninsula which sustains most of the hunter harvest. From this, areas would be delineated for making trend counts in succeeding years.

Much of what is considered the best bear habitat between Becharof Lake on the north and Moffet Bay near Cold Bay on the south was surveyed between August 9 and August 23. Two aircraft were used, a 150 Horsepower Super Cub on big wheels and a 150 Super Cub on floats. Total flying time was 32.5 hours and actual survey time was 18.0 hours. Contract award pilots on the Peninsula could not do all the flying, and it was necessary to have a contract pilot from Anchorage fly to the area. This caused the total flying time to be somewhat higher than might be expected in relation to total surveying time.

It is believed that young bears cannot be classified with complete accuracy to age class from the air. Therefore, young bears accompanying females were classified in one of four categories: cub, small, medium, and large. It is believed that all animals classed as cubs and most animals classed as small are young of the year and that most animals classed as medium and all animals classed as large are older than one year. Animals in the four categories can probably be placed in age classes as more is learned about size and appearance of young at different ages and length of time young stay with the female.

For purposes of analysis the Peninsula below Becharof Lake was divided into seven areas, with the areas generally extending across the Peninsula from Bristol Bay to the Pacific Ocean. (Figure 6)

A total of 345 bears were counted and classified as follows: females with young, 22 percent; young, 49 percent; and single bears, 29 percent. Tables 12 through 20 present data in more detail.

Average litter sizes were: cubs and small (primarily cubs of the year), 2.17; medium and young (primarily yearlings), 2.24; and all young, 2.19. It is assumed that other factors remaining constant, yearling litter size would be somewhat smaller than cub litter size because of a higher rate of mortality during the first year of life. This is not the case. A possible explanation is that the smaller cubs are harder to see, and therefore, only partial litter counts are obtained more often for them than for yearlings.

From the results of this year's surveys, certain areas have been designated as trend count areas. All except the Meshik River have known concentrations of bears when salmon are in the streams. No bears were seen in the Meshik drainage in 1965 and 1966 surveys, although bears were seen in 1958 and 1959 surveys. Salmon runs had peaked out, and there were not too many fish available when the area was counted in 1966. The Meshik is an important hunting area, and it will be flown in future years to learn of movement patterns and, if possible, the relationship of bear usage in this drainage to usage in adjacent drainages.

The trend count areas are as follows:

Ugashik Lakes Area -- all drainages into Upper and Lower Ugashik Lakes between Ugashik Creek and Elizabeth Lake drainage, Ruth Lake and Creek, the drainage into the cove at the southeastern end of Becharof Lake, Burls Creek, and all drainages into Wide Bay between Big Creek and Short Creek.

Meshik Drainage -- the Meshik River and all drainages into it.

Black-Chignik Area -- all drainages into Black and Chignik Lakes and Chignik River.

Sandy Lake Area -- Sandy Lake and all drainages into it.

Canoe Bay Area -- all drainages into Canoe Bay.

Moffet Bay Area -- all drainages into and including Moffet Bay.

Some aerial survey data are available from past years for these areas. Total count figures for past years and for 1966 are presented in Table 21.

Figure 6. 1966 Alaska Peninsula brown bear aerial survey areas and proposed trend count areas.

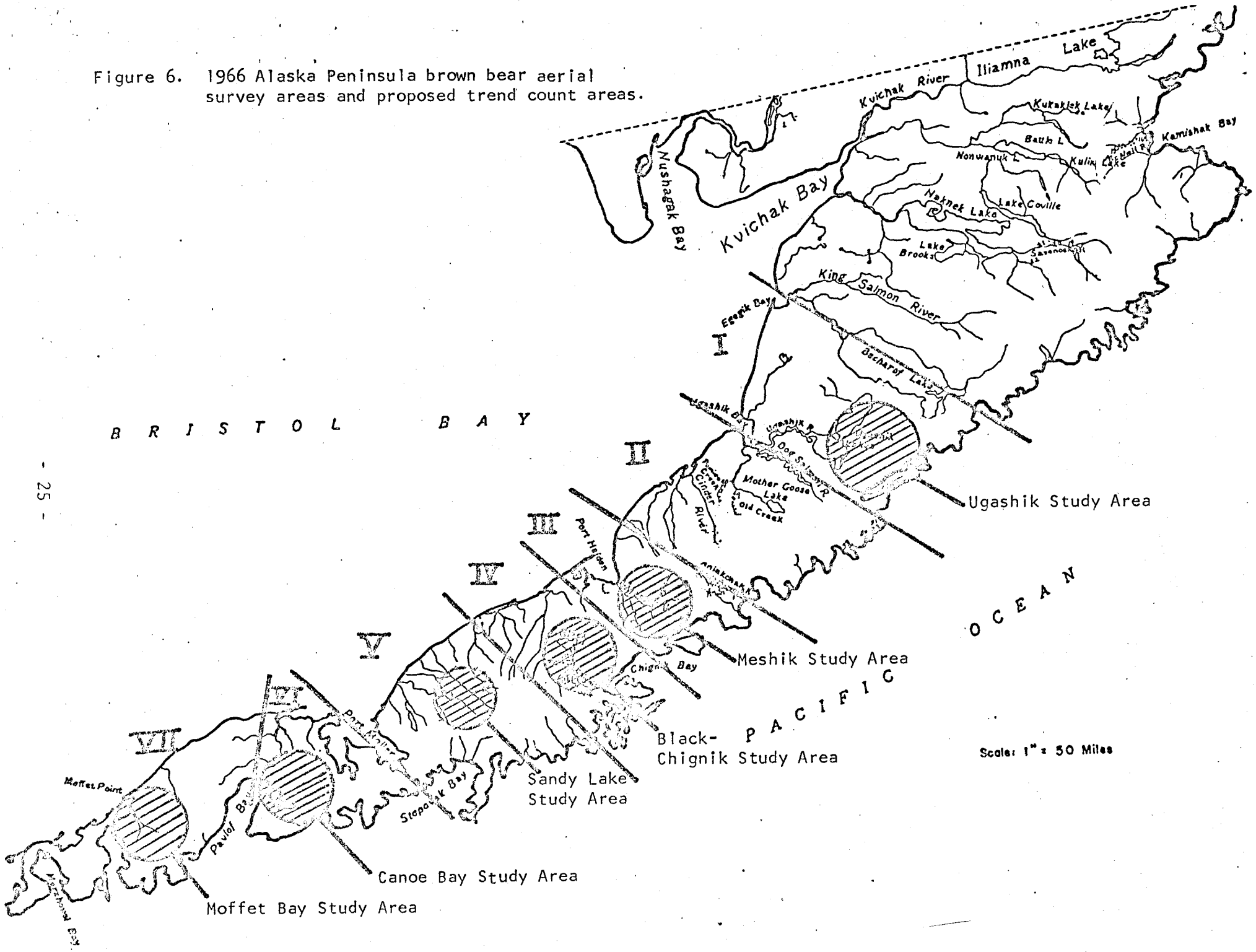


Table 12. Brown Bears Counted and Salmon Availability During Aerial Surveys, Alaska Peninsula, August 1966

AREA	DATE	NO. OF BEARS	HOURS FLOWN	BEARS/ HOUR	% OF TOTAL	SALMON AVAILABILITY
I	8/23	55	2.8	19.6	16	All but a few streams with an excellent supply of fish.
II	8/22	16	1.6	10.0	4	Streams with only fair number of live fish and quite a few carcasses indicating peak of run had occurred some time earlier.
III	8/11	0	1.1	0	0	Fish availability poor to fair; runs had possibly peaked earlier.
IV	8/9 & 11	108	3.8	28.4	31	Good numbers of fish in most streams.
V	8/10	54	2.3	23.5	16	Fish numerous in Sandy River; low numbers in most other streams.
VI	8/21	34	1.0	34.0	10	Fish available in good numbers in most streams.
VII	8/21	78	3.1	25.1	23	Fish available in good numbers in most streams.

Table 13. Aerial Survey Brown Bear Composition Data, Alaska Peninsula, August 1966

AREA	FEMALES WITH YOUNG																SINGLE BEAR				TOTAL
	CUBS				SMALL				MEDIUM				LARGE								
	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	S	M	L	Unid.	
I	1	-	2	-	1	1	1	-	-	-	4	-	1	1	-	-	5	6	4	-	55
II	-	2	-	-	-	-	-	-	-	-	-	1	-	-	-	-	4	1	-	-	16
III	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IV	1	9	2	-	1	1	3	-	-	-	2	-	2	3	-	-	13	8	7	5	108
V	1	1	3	-	1	4	1	1	-	-	1	-	-	-	-	-	1	7	2	-	54
VI	1	2	-	-	-	1	-	-	-	-	3	-	-	-	-	-	2	2	4	3	34
VII	1	1	3	-	1	4	1	-	1	4	-	-	2	-	-	-	7	9	9	-	78
TOTAL	5	15	10	-	4	11	6	1	1	4	10	1	5	4	-	-	32	33	26	8	
TOTAL BEARS	10	45	40	0	8	33	24	5	2	12	40	5	10	12	0	0	32	33	26	8	345

Composite Summary

♀♀ w/young	77 (22%)	
Young	169 (49%)	
Cubs		65 (19%)
Small		48 (14%)
Medium		43 (13%)
Large		13 (4%)
Single Bears	99 (29%)	
Small		32 (9%)
Medium		33 (10%)
Large		26 (7%)
Unidentified		8 (2%)
Total	345 (100%)	

Average Litter Size

Cubs and Small	2.17
Medium and Large	2.24
All Young	2.19

Table 14. Aerial Survey Brown Bear Composition Data, Alaska Peninsula, August 23, 1966

AREA I	FEMALES WITH YOUNG																SINGLE BEAR				TOTAL
	CUBS				SMALL				MEDIUM				LARGE								
	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	S	M	L	Unid	
Ugashik Cr.	1	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	1	1	-	12
Head of Ugashik & Burls Cr.	-	-	-	-	1	-	-	-	-	-	1	-	-	1	-	-	1	2	3	-	15
Featherly Cr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
N. of Featherly Cr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Ruth Cr. & L.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Crooked Cr. & Deer Cr.	-	-	1	-	-	1	-	-	-	-	1	-	1	-	-	-	-	1	-	-	14
Lower Ugashik Dr.& Black Cr.	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	2	2	-	-	12
Elizabeth Lake Dr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
TOTAL	1	-	2	-	1	1	1	-	-	-	4	-	1	1	-	-	5	6	4	-	55

Table 15. Aerial Survey Brown Bear Composition Data, Alaska Peninsula, August 22, 1966

AREA II	FEMALES WITH YOUNG																SINGLE BEAR				TOTAL
	CUBS				SMALL				MEDIUM				LARGE								
	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	S	M	L	Unid	
High Cr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Lava Cr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Meloy Cr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cinder R.	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	4
Wiggly Cr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Ray Cr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Pumice Cr.	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	6
Old Cr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Painter Cr.	INCOMPLETE				-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	5
TOTAL	-	2	-	-	-	-	-	-	-	-	-	1	-	-	-	-	4	1	-	-	16

Table 16. Aerial Survey Brown Bear Composition Data, Alaska Peninsula, August 11, 1966

AREA III	FEMALES WITH YOUNG																SINGLE BEAR				TOTAL
	CUBS				SMALL				MEDIUM				LARGE								
	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	S	M	L	Unic	
Braided Cr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Blue Violet Cr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Plenty Bear Cr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0

Table 17. Aerial Survey Brown Bear Composition Data, Alaska Peninsula, August 9 and 11, 1966

AREA IV	FEMALES WITH YOUNG																SINGLE BEAR				TOTAL
	CUBS				SMALL				MEDIUM				LARGE								
	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	S	M	L	Unid.	
Chignik L.	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	7
Chiaktuak Cr.	-	2	-	-	-	-	1	-	-	-	-	-	-	-	-	-	2	1	-	-	13
Fan Cr.	-	1	1	-	1	-	1	-	-	-	1	-	2	-	-	-	-	1	-	5	27
Alec Cr.	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Boulevard Cr.	-	4	-	-	-	1	1	-	-	-	-	-	-	1	-	-	3	-	1	-	26
Conglomrate Cr.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	5
Broad Cr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cathedral Cr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-	3
West Fork Cr.	-	1	-	-	-	-	-	-	-	-	1	-	-	2	-	-	3	3	5	-	24
Fracture Cr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Fire Weed Cr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Fire Weed to Red Bluff Cr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
TOTAL	1	9	2	-	1	1	3	-	-	-	2	-	2	3	-	-	13	8	7	5	108

Table 18. Aerial Survey Brown Bear Composition Data, Alaska Peninsula, August 10, 1966

AREA V	FEMALES WITH YOUNG																SINGLE BEAR				TOTAL
	CUBS				SMALL				MEDIUM				LARGE								
	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	S	M	L	Unid.	
Sandy R. above Lake	-	-	2	-	-	3	1	1	-	-	1	-	-	-	-	-	1	5	1	-	37
Head of Bear L.	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	3
Bear Pass to Port Moller	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
Port Moller to Bear R.	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	7
TOTAL	1	1	3	-	1	4	1	1	-	-	1	-	-	-	-	-	1	7	2	-	54

Table 19. Aerial Survey Brown Bear Composition Data, Alaska Peninsula, August 21, 1966

AREA VI	FEMALES WITH YOUNG																SINGLE BEAR				TOTAL
	CUBS				SMALL				MEDIUM				LARGE								
	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	S	M	L	Unid	
Buck Valley	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Hoodoo L. & R.	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	2	-	10
Canoe Bay	1	-	-	-	-	1	-	-	-	-	2	-	-	-	-	-	1	1	2	2	19
Settlement Cr.	-	1	-	INCOMPLETE					-	-	-	-	-	-	-	-	-	-	-	1	4
TOTAL	1	2	-	-	-	1	-	-	-	-	3	-	-	-	-	-	2	2	4	3	34

Table 20. Aerial Survey Brown Bear Composition Data, Alaska Peninsula, August 21, 1966

AREA VII	FEMALES WITH YOUNG																SINGLE BEAR				TOTAL
	CUBS				SMALL				MEDIUM				LARGE								
	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	♀w/1	♀w/2	♀w/3	♀w/4	S	M	L	Unid	
Moffet Bay and R.	1	1	2	-	-	4	1	-	1	2	-	-	2	-	-	-	7	7	5	-	60
Cathedral Drainage	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	2	-	10
Between Cathedral & Caribou Cr.	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	1	2	-	8
TOTAL	1	1	3	-	1	4	1	-	1	4	-	-	2	-	-	-	7	9	9	-	78

Table 21. Comparative Aerial Brown Bear Counts from Several Areas on the Alaska Peninsula, 1958-1966

Area	Year	Date of Survey	No. of Bears
Ugashik Lakes	1958	8/12 & 13	32
	1959	8/2	15
	1965	9/12 & 13	65
	1966	8/23	60
Meshik	1958	8/1 & 14	70
	1959	8/4 & 5	67
	1965	9/12 & 13	0
	1966	8/11	0
Black-Chignik	1958	8/1	75
	1959	8/6	73
	1965	8/6	123
	1966	8/9	108
Sandy Lake	1958	7/31 & 8/1	34
	1965	8/8	42
	1966	8/10	37
Canoe Bay	1966	8/21	19
Moffet Bay	1958	Between 7/21 & 8/18	95
	1966	8/21	60

Kodiak Bear-Cattle Relationships

Aerial surveys were conducted in the spring to determine movement, distribution, and population composition of bears on cattle leases. The earliest bear movements were observed during the middle of May. At that time bear tracks were observed in Narrow Cape, Anton-Larsen Bay, and Saltery Cove. Bears entered Saltery Cove from the upper end of Rough Creek and entered the valley where cattle were grazing either by moving down Rough Creek itself or by walking around Saltery Lake. The bear at Narrow Cape apparently was a resident of that area since bear tracks were observed in the same area in December 1965. No extensive movements were observed, although bear tracks were observed on the Saltery Cove, Anton-Larsen, and Pasagshak leases during most of the year. No tracks of cubs or yearlings were observed.

During 1966, Department personnel examined 66 cattle and 2 horses that had died on the ranges. One female Angus calf was determined to have been killed by bears on October 20, 1966. One Angus calf had been shot by hunters or vandals. Other mortalities were attributed to diseases associated with malnutrition. Winter mortality began in February, peaked in April, and ended in late May. Mortalities reported by ranchers include approximately 80 to winter kill, 3 to hunters or vandals, and an estimated 5 to bears. One rancher stated that he was unable to locate 15 calves; although he did not know what happened to them he suspects bears may have killed them.

Eight bears were known to have been killed on the cattle leases in 1966. Of these, five were depredation kills by Department personnel, two were taken by trophy hunters, and one was taken as a sport kill by a rancher who saved the meat for a friend. Skulls were obtained from the five Department kills. One of the Department kills was a 2 1/2 year-old male, three were adult males, and one was an adult female. Skulls were not available from the other three bears, but all were apparently adult males based on information given by hunters. No information is available for bears that ranchers may have shot and not saved the hides of or not reported.

Track counts on salmon streams when bears were on the streams indicated numbers of bears on the streams as follows: Saltery Cove, three; Pasagshak, two; Anton-Larsen, one; Middle Bay, Kalsin Bay, and Narrow Cape, none. No tracks of cubs or yearlings were observed. Tracks indicated about the same number of bears on the leases as in 1964 and less than in 1965.

An attempt was made for the second season to tag bears along Terror River adjacent to the leases to obtain information on movements of bears on to the leases. The project was relatively unsuccessful. One adult female was marked and tagged with ear tag No. 2942-5.

Bear-Logging Relationships

A long term study is being initiated in Southeastern Alaska to evaluate the effects of logging on brown bears. The principle objective is to gather sufficient data to make meaningful recommendations to the U.S. Forest Service concerning both the effects of land use practices and logging practices on brown bear populations.

The field work is divided into two segments: late spring when bears are concentrated at the heads of bays, and late summer when bears are concentrated on salmon streams. Late spring work in 1966 consisted of accompanying Forest Service personnel on four aerial survey flights of Southern Admiralty Island. There are two flight routes, the southeast segment which includes the shoreline from the northeast head of Gambier Bay to the southwest shore of Chapin Bay and the southwestern segment which includes the shoreline from Point Wilson to Cabin Point in Hood Bay. Data from these four flights and from past years' flights are summarized in Table 22.

Extensive logging has been going on in a large area of the southwestern segment (Whitewater Bay) since June 1960 and to a lesser degree in a smaller area of the southeastern segment (Eliza Harbor) since April 1963. From the data collected to date it appears that on a long term basis this technique may be useful to measure trends in bear composition and distribution.

The late summer work involved accompanying Forest Service personnel on their annual bear track counts along selected salmon streams. Table 23 summarizes these counts and compares them with counts made in 1965. There are fewer bears estimated than tracks measured because it is assumed that tracks from one bear are sometimes measured more than once. Clear tracks are considered to be from the same bear if they are within 1/8 inch of each other in width. Indistinct tracks are considered to be from the same bear if they are within 1/4 inch of each other in combined width and length. The variation from 1965 to 1966 is due to a combination of poorer tracking conditions, a reduction of upstream fish numbers, and possibly less bear use. Thus far there appears to be no way to assess the variables which affect this technique, and therefore it is perhaps not reliable for measuring bear abundance.

Table 22. Number of Bears Seen During Spring Survey Flights, Southern Admiralty Island, 1960-66

Year	SOUTHEASTERN SEGMENT		SOUTHWESTERN SEGMENT	
	Ave. No./Flight	Highest No. Any One Flight	Ave. No./Flight	Highest No. Any One Flight
1960[1]	21	32	18	21
1961	19	22	8	10
1962	12	15	10	12
1963	16	21	11	15
1964[2]	-	-	-	-
1965[2]	-	-	-	-
1966	21	27	12	13
Ave.	17.8	23.4	11.8	14.2

1/ 1960-1963 data from Brown Bear Studies - Interim Report 1958-1963, North Tongass National Forest, Juneau, Alaska

2/ No flights made in 1964 and 1965

Table 23. Number of Bears Estimated to be on Certain Admiralty Island Salmon Streams as Determined by Track Counts, 1965 and 1966

STREAM	TRACKS MEASURED		BEARS ESTIMATED	
	1965	1966	1965	1966
Falls Cr., Hood Bay	12	5	8	4
Whitewater Cr.	12	5	10	5
Chiak Cr.	14	16	12	14
Wilson Cove	8	11	7	7
Rodman Cove	20	18	20	15

POLAR BEAR

OBJECTIVES

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

To obtain information on breeding biology and productivity.

To determine the amount of denning along the Alaskan coast.

To develop a censusing technique that would give a statistically valid population estimate.

METHODS

The bear sealing program provided harvest information. By regulation, polar bear hides and skulls must be presented to a member of the Department within 30 days after the date of kill. Various data relating to the harvest are obtained at this time. Department personnel whose primary duty was to monitor hunting activity and obtain harvest data were stationed at Kotzebue, Point Hope, Teller, and Barrow, the main hunting bases, during the period when most of the harvest was taken. A lower back molar (M_3) was obtained for sectioning from 54 percent of the bears harvested. Reproductive tracts were obtained from 14 females and testes were obtained from about half of the males harvested. Personnel who monitored the harvest were Lee Miller at Kotzebue, Joe Blum at Point Hope, Darwin Braden and Joe Blum at Teller, and Doug Jones and Jack Lentfer at Barrow.

Two family groups of three bears each were collected. Reproductive and other specimen material and weights and measurements were obtained.

The coast between Barter Island and Point Hope was searched from the air in late October for tracks that might indicate bears going inland to den. People at Barrow, Wainwright, and Point Hope were interviewed to obtain information on denning. This work was done by Jack Lentfer.

An aerial survey was conducted in late April and early May out of Barrow to determine the feasibility of censusing polar bears, and if possible, estimate the bear population in the area surveyed. Personnel who participated were Jack Lentfer, Frank Ossiander, Joe Blum, and Lee Miller, Alaska Department of Fish and Game; Clint Schoenleber and Harry Pederson, contract pilots; and for a few days, George Dudzinski, biometrician with the Australian government. Food, lodging, hangar facilities, and gasoline furnished by the Arctic Research Laboratory greatly facilitated the work.

FINDINGS

Harvest

The number of bears classed as sport kills taken by licensed hunters from July 1, 1965 to June 30, 1966 was 399. An additional 16 bears were removed from the population (Table 24).

Guided airplane hunters took 87 percent of the sport harvest. Non-resident (not residing in Alaska) airplane hunters took 49 percent and resident airplane hunters took 38 percent of the total sport harvest. Most of the plane hunting was done out of four locations, Kotzebue, Teller, Point Hope, and Barrow. The normal pattern is for two planes to fly together; there were 25 two-pilot teams operating in 1966. Most airplane hunting was done in the Chukchi Sea from the Bering Straits north to Point Hope and in the area north of the coast between Barrow and Wainwright. Average distances in miles that bears were killed from shore by airplane hunters at main hunting bases were: Kotzebue, 118; Point Hope, 86; Teller, 87; and Barrow, 54 (Table 25).

Native sport hunters not utilizing aircraft took 13 percent of the harvest. Most of the native kill was at Barrow, Wainwright, and Point Hope.

The 16 bears not included in the sport kill by licensed hunters were: 6 collected for study purposes by Alaska Department of Fish and Game out of Kotzebue; 5 killed during a polar bear marking study sponsored by the Arctic Institute of North America out of Barrow; 1 female killed and 2 cubs captured by the Arctic Research Laboratory at Barrow for study; and 2 killed in defense of property.

Nine bears, all taken by Eskimos, were killed between October 15 and February 1. Guided hunters took a few bears in February. Most of the harvest occurred after March 1, however, and the number of bears killed each week was fairly constant from the first part of March until the season closed April 20. The main hunting effort at Barrow was about 2 weeks later than at the other locations (Figure 7).

The percent of males in the harvest excluding seven bears whose sex was not determined was 76. Non-residents took 89 percent males, resident white hunters took 66 percent, and natives took 52 percent.

Hide size, which is length from tip of nose to middle of anus plus width which is distance from claw tip to claw tip of front feet when hide is laid out flat, was obtained for most of the bears killed. Average hide size was 16.4 feet (non-resident, 17.4; resident white, 15.8; and native, 14.3)(Table 26).

Average skull size from 372 (93 percent of the harvest) that were measured was 23.3 inches (non-resident, 24.5; resident white, 22.3; and native, 20.7) (Table 27). Apparent inconsistencies in these data, e.g., the largest male non-resident skulls from Kotzebue and larger hides from Barrow and Teller, are probably due in part to hides being measured under differing sets of conditions (unfleshed, fleshed, after washing in salt water). An attempt was made to measure hides immediately after fleshing. However, in some cases, measurements were obtained at other times resulting in smaller measurements.

Table 2.4. 1966 Known Polar Bear Harvest by Area, Type of Hunter, and Sex of Bear[1/]

HUNTING BASE	NON-RESIDENT			RESIDENT - WHITE			RESIDENT - NATIVE			TOTAL						
	♂	♀	Sex Unk.	♂	♀	Sex Unk.	♂	♀	Sex Unk.	♂	♀	Sex Unk.	All Bears	% of Total Kill	% Male	% Non-Res.
Kotzebue	76	4	-	26	12	-	-	-	-	102	16	-	118	30	86	68
Pt. Hope	22	3	-	16	7	1	2	7	-	40	17	1	58	15	70	43
Teller	41	5	-	9	4	-	-	-	-	50	9	-	59	15	85	78
Barrow	25	6	-	44	26	-	12	8	-	81	40	-	121	30	67	26
Colville	4	1	-	-	-	-	-	-	-	4	1	-	5	1	80	100
Barter Is.	-	-	-	3	-	-	3	1	-	6	1	-	7	2	86	0
Shishmaref	5	3	-	2	2	-	-	-	1	7	5	1	13	3	58	62
Wainwright	-	-	-	-	-	-	6	6	3	6	6	3	15	4	50	0
Gambell	-	-	-	-	-	-	1	-	1	1	-	1	2	1	50	0
Kivalina	-	-	-	-	-	-	-	-	1	-	-	1	1	-	-	0
Sub Total	173	22	0	100	51	1	24	22	6	297	95	7	399	100	76	49
	89	11	0	66	33	1	46	42	12	74.4	23.8	1.8				
TOTAL	195 (49%)			152 (38%)			52 (13%)			399 (100%)						

1/ Does not include 16 bears removed from the population as follows:

Biological investigation - 6 males, 8 females
Defense of property - 1 male, 1 female

Table 25. Distribution of Polar Bear Airplane Hunting by Hunting Base and Average Distances of Kills Offshore from Hunting Bases, 1966

HUNTING BASE	NO. OF AIRPLANE TEAMS	NO. OF BEARS KILLED	PERCENT OF AIRPLANE KILL	AVERAGE DISTANCE FROM SHORE (MILES)	
				NON-RES.	RES.
Kotzebue	9	118	34	121	111
Pt. Hope	3	49	14	98	72
Teller	5	59	17	87	88
Barrow	5	101	29	68	49
Shishmaref	1	12	3	130	120
Colville	1	5	1	25	-
Barter Is.	1	3	1	-	23
TOTAL	25	347	100		

Figure 7. Polar Bear Kill Chronology 1966

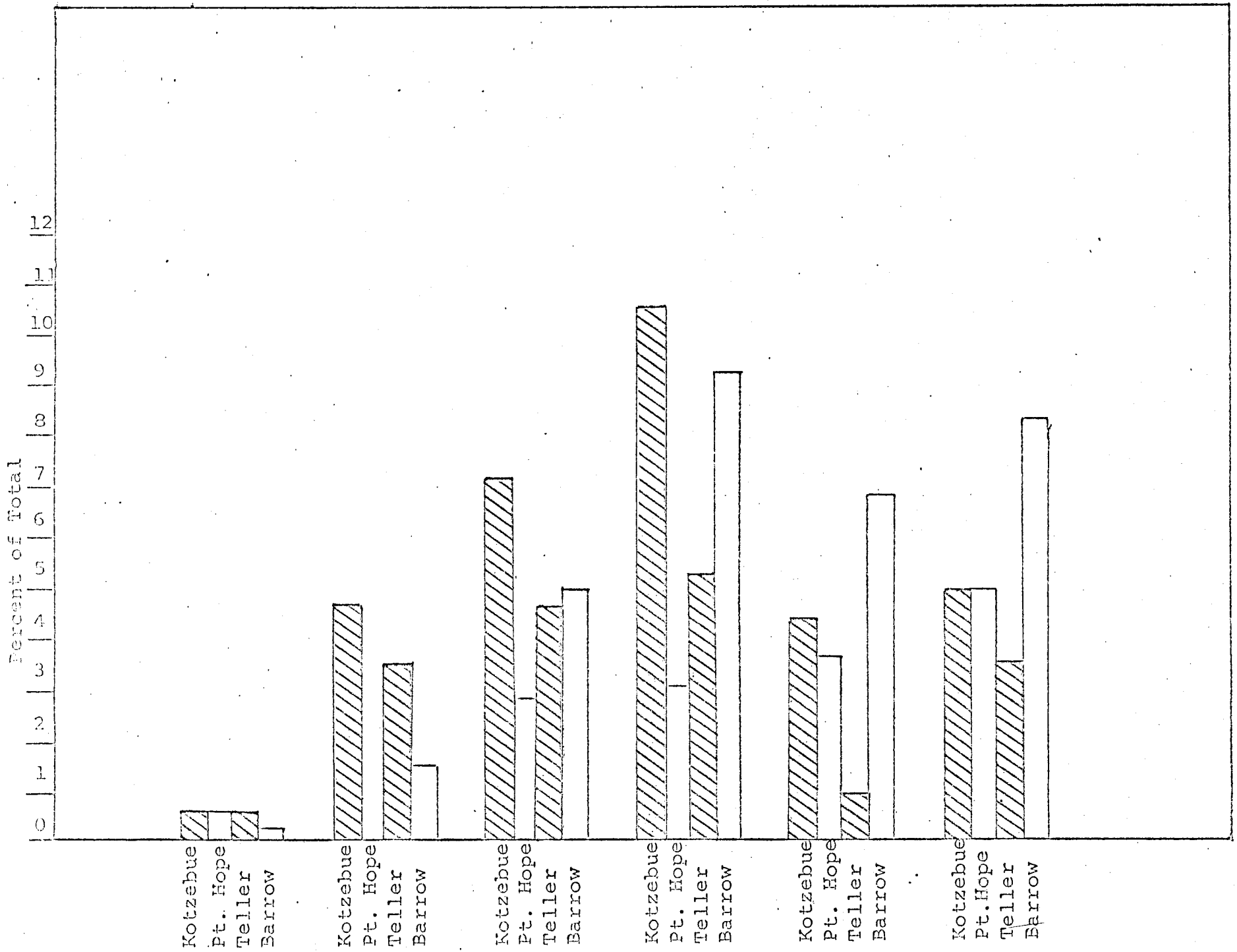


Table 26. Average Hide Size[1] in Feet of Polar Bears Taken from Main Hunting Bases in Alaska, 1966

HUNTING BASE	NON-RESIDENT				RESIDENT-WHITE				TOTAL INCLUDING NATIVE			
	MALE		FEMALE		MALE		FEMALE		MALE		FEMALE	
	Size	N[2]	Size	N	Size	N	Size	N	Size	N	Size	N
Kotzebue	17.6	76	15.4	4	16.6	26	14.2	12	17.3	102	14.5	16
Pt. Hope	17.4	22	14.5	3	16.3	16	14.6	7	16.8	40	14.4	17
Teller	18.0	41	15.5	5	17.7	9	15.9	4	18.0	50	15.9	9
Barrow	17.9	25	14.9	6	16.2	44	14.8	26	16.5	81	14.6	40

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

Table 27. Average Skull Size[1] in Inches of Polar Bears Taken from Main Hunting Bases in Alaska, 1966

HUNTING BASE	NON-RESIDENT				RESIDENT-WHITE				TOTAL INCLUDING NATIVE			
	Male		Female		Male		Female		Male		Female	
	Size	N[2]	Size	N	Size	N	Size	N	Size	N	Size	N
Kotzebue	25.6	76	22.2	4	24.4	23	21.6	9	25.3	99	21.8	13
Pt. Hope	24.3	22	19.1	3	22.8	16	21.2	7	23.6	40	20.8	13
Teller	24.7	41	22.0	5	24.6	9	21.5	4	24.7	50	21.8	9
Barrow	24.1	25	20.5	6	22.4	44	19.9	26	22.7	77	20.1	37

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

2/ N=number measured

The 1966 harvest differed from past harvests in some respects. The sport kill of 399 was the greatest in recent years. Since 1961 when a sealing program was inaugurated, the annual kill has averaged 218. There have been no marked changes in percentages of bears taken by non-resident, non-native resident, and native hunters during this period. However the 1966 kill of 52 bears by natives, although not substantially higher percentage-wise, was more than twice the number taken during any of the preceding 5 years. Most of the 1966 native kill was at Barrow, Wainwright, and Point Hope. Hunting effort by Eskimos was probably not greater in 1966 and may have been less than in some preceding years because of increased opportunity for construction work. It appears that the increased kill by natives in 1966 was because there were more bears along the coast in the vicinity of these villages. The reason for this is not known.

From 1961 through 1963 the annual kill by airplane hunters ranged from 130 to 180. About one-fourth of the hunting was done out of Barrow and about three-fourths, equally divided, out of Kotzebue and Point Hope. In 1963, 20 pilot-guide teams were operating. Starting in 1964 the harvest increased each succeeding year. Twenty-five guide teams operated in 1964. Hunting effort that year increased somewhat at Kotzebue and Barrow, and to a lesser degree at Teller, and decreased at Point Hope. In 1965 the number of guides remained the same, but fewer guides operated at Point Hope and more at Teller. The increase in kill in 1965 was due partly to some of the guides taking a few more bears and also to a few of the guides taking substantially more bears, especially for resident hunters at Barrow. The 1966 kill at Kotzebue and Point Hope remained about the same as in 1965. The greatest portion of the increased kill was by non-residents at Teller and by residents and a few non-residents at Barrow.

Sex composition of bears taken by the three classes of hunters and chronology of the harvest in 1966 did not change from past years.

Age composition of this year's harvest has not been determined. Possibly this can be done by sectioning and examining teeth obtained from about 50 percent of the bears killed. Average size data for hides and skulls, which to a certain extent reflect age composition, can be compared with data from past years (Table 28). This comparison is only of males taken by airplane hunters. Females are not included because their range in size is so small that changes in age composition would probably not be reflected in hide or skull measurements. The native kill is not compared because it is so small that comparisons would have little meaning. Because the major hunting effort is exerted on mature males by airplane hunters, it is believed that any major change in the population due to hunting would first be noticed in this segment of the harvest.

At Kotzebue and Point Hope in 1966, average hide and skull sizes were about the same or down slightly from past years. At Teller the hide size was about the same and skull size was down slightly from past years. At Barrow the average hide size was about the same and average skull size was somewhat smaller than in past years.

Two factors probably account for the lack of correlation between hide size and skull size noted in several instances in Table 28. In 1966, for the first time, all skulls had to be presented for measuring. Formerly, skulls that were presented were probably somewhat biased towards those of larger animals. Also, the condition of the hide when it is measured (unfleshed, fleshed, salted, etc.) can affect the measurement that is obtained.

Areas where most of the hunting was done in 1966 were about the same as in past years, and distances from shore that bears were killed are similar to distances reported in past years.

As in past years guides furnished information on number and composition of bears seen on hunting flights. Data are presented in Tables 29 and 30. It should be realized that guides often track only single bears and therefore are biased toward seeing single bears.

Breeding Biology and Productivity

Female reproductive tracts from 11 hunter killed bears were obtained and examined. Findings will be reported when more tracts have been examined. Testes were also collected and preserved. Enough testes have now been collected during the period when most hunting occurs, that in the future, only testes from small bears or bears killed early or late in the season will be obtained.

Two family groups were collected and reproductive tracts of the females examined.

A female with two yearling cubs collected March 8, 1966, had two prominent placental scars, one in each horn of the uterus. No corpora lutea were seen in the ovaries. Follicular activity in the ovaries was light. The female was lactating.

A female accompanied by two 2-year-old bears collected March 10 had two prominent and two faded placental scars, one of each in each horn of the uterus. No corpora lutea were seen in the ovaries. Follicular activity in the ovaries was classed as moderate, indicating that the bear may have been approaching an estrous period. The female was lactating; surprisingly, development of the mammae was greater and they appeared to have more milk than those of the female with the yearling cubs. Condition of the external genitalia did not indicate that the female with the 2-year-olds had entered an estrous period.

From these very limited observations, it appears that in polar bear:

1. Placental scars may persist for as long as 6 years and can be distinguished for at least two different pregnancies.
2. Corpora lutea are not visible after a year.
3. At least in some cases young stay with the mother until they are over 2 years old, probably until she is bred 3 years after the preceding successful breeding.
4. In some cases females with young lactate at least until the young are over 2 years old and probably until the female is bred again and family breakup occurs.

Table 28. Average Hide Sizes (length plus width in feet) and Average Skull Sizes (length plus width in inches) of Male Polar Bears Taken by Airplane Hunters from Main Hunting Bases, 1961-66.

	HIDE				SKULL			
	Non-Resident		Resident White		Non-Resident		Resident White	
	Size	No. 1/	Size	No.	Size	No.	Size	No.
Kotzebue								
1961	18.1	37	17.1	15				
1962	17.8	41	16.7	5				
1963	18.1	46	17.8	8	26.0	41	24.8	8
1964	18.4	66	18.3	17	25.9	53	24.1	15
1965	18.1	79	16.8	12	25.9	76	23.8	11
1966	17.6	76	16.6	26	25.6	76	24.4	23
Pt. Hope								
1961	16.1	10	15.7	6				
1962	17.1	13	16.6	37				
1963	18.2	14	16.8	17	26.1	14	25.2	11
1964	18.3	15	17.0	16	25.3	15	23.5	7
1965	17.5	18	16.4	19	24.3	17	23.4	14
1966	17.4	22	16.3	16	24.3	22	22.8	16
Teller								
1961	-	0	-	0				
1962	18.4	6	-	0				
1963	15.6	3	17.7	2	23.4	3	-	0
1964	18.3	17	18.3	11	26.4	13	26.5	8
1965	16.8	24	16.1	8	26.5	14	24.5	3
1966	18.0	41	17.7	9	24.7	41	24.6	9
Barrow								
1961	17.3	12	16.6	10				
1962	18.0	11	16.6	14				
1963	18.1	16	15.7	9	24.8	15	22.4	4
1964	17.0	23	15.2	10	24.6	13	23.5	4
1965	15.9	21	15.6	32	24.1	13	23.5	26
1966	17.9	25	16.2	44	24.1	25	22.4	44

1/ No. is number of hides or skulls measured

Table 29. No. of Polar Bears Seen as Reported by Airplane Hunting Guides, 1966

	No. of Report Forms Received	Flying Time (Hours) 1/	Hunting Time (Hours) 1/	No. Bears Seen	Bears/ Flying Hour	Bears/ Hunting Hour
Kotzebue	57	439	156	516 (65) 2/	1.2	3.3
Pt. Hope	3	16	10	10 (5)	0.6	1.0
Teller	39	240	153	370 (27)	1.5	2.4
Barrow	51	250	210	180 (61)	0.7	0.9
Colville	24	108	83	14 (5)	0.1	0.2
TOTAL	174	1053	612	1090 (163)	1.03	1.8

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

2/ Numbers in parenthesis are bears which were seen and killed; these are included in preceding figure (number of bears seen).

Table 30. Composition of Polar Bears Seen as Reported by Airplane Hunting Guides, 1966

	Sows W/ Young			Other Bears			Bears Killed	Total
	1 young	2 young	3 young	Small	Medium	Large		
Kotzebue	37	62	1	47	108	32	65	516
Pt. Hope	1	-	-	2	1	-	5	10
Teller	31	52	2	51	55	11	27	370
Barrow	18	15	1	3	29	2	61	180
Colville	2	-	-	1	2	2	5	14
TOTAL	89	129	4	104	195	47	163	1090

Composite Summary

Young	359	33%
Sows w/young	222	20%
Other bears seen including bears killed	509	47%
	1090	100%

Average litter size 1.62

Denning

The Arctic Coast was flown in late October from Barter Island to Point Hope to search for polar bears and their tracks, and especially for tracks that might indicate bears going inland to den. Canadian and Russian workers have found that bears move to denning sites on land shortly after ice has formed in the fall, enabling the bears to walk ashore. Ice conditions at the time of the present flight were such that bears could have come on shore at nearly any point between Cape Lisburne and Barter Island. The coast was ice free south of Cape Lisburne.

Flights were made out of Barrow. The coast between Point Barrow and Point Hope was flown October 25, and the coast between Point Barrow and Barter Island was flown October 26. Old tracks which could not be followed were seen at Cape Simpson between Point Barrow and the mouth of the Colville River. Tracks of a family group traveling along the beach were seen at Point Franklin between Point Barrow and Wainwright. A female with two long yearlings was also seen at Point Franklin. The absence of any number of tracks indicating bears moving inland to den is similar to what was observed a year ago, and indicates that bears probably do not move inland to den in any numbers in Alaska. Denning was discussed with residents of Barrow, Wainwright, and Point Hope. The general concensus was that only a very limited amount of denning occurs on land in Alaska, and that most denning probably occurs on the ice.

During survey work conducted north of Barrow in late April 1966, four females with two new cubs each were seen in 39 hours of flying. Distance from shore for individual sightings ranged from 20 to 100 miles. The cubs were small, and leads and pressure ridges made it difficult for them to travel. It is believed that they probably could not have traveled the distance they were from shore, and that they were probably born on the ice.

Survey

An aerial survey was conducted out of Barrow to determine the feasibility of censusing polar bears and if possible estimate the bear population in the area surveyed. Support furnished by the Arctic Research Laboratory greatly facilitated the work. Approximately two-thirds of the flying which was planned was completed in flights made April 24, 25, 26, 28, 30, and May 1. A rise in temperature after May 1 caused fog and heavy overcast along the coast. Past weather records indicated that once the weather turned warm in May there would probably be extended periods of unflyable weather. It was decided on May 4 to end the survey.

Bear kill and guide sighting data from the 1966 hunting season which ended just prior to the survey indicated that bears were killed rather randomly in all directions in an area about 20 to 100 miles from Barrow. Sixty random points were chosen in this area as starting locations from which to fly search patterns. Points were located on the ice by contact with the Barrow DEW-Line radar station and by dead reckoning. Radar was satisfactory out to about 40 to 50 miles. Beyond this distance a plane had to climb so high (about 6000 feet at 80 miles), that an excessive amount of time was used in obtaining a location fix.

Chartered aircraft were used. They were a Cessna 180 and a Super Cub, both flown by experienced polar bear guides. They were flown together and radio and visual contact maintained. The Super Cub was flown low and a continuous search made for bears. The 180 was flown low when searching for bears in sampling areas. It was generally flown at a somewhat higher elevation when going from point to point, and personnel obtained a broader view of ice conditions. Radar fixes were obtained and navigating done by personnel in the 180.

Bears were not randomly distributed as information from guides had indicated. This was not because of deliberate inaccurate reporting by guides, but because methods of reporting were not precise enough to pinpoint locations. As was expected, bears were more numerous in areas with leads; these areas were not randomly distributed. The productive leads were those covered with young ice and bordered with rough broken ice, the result of recent ice action. There was a definite correlation between bears and seals--the greater the number of seals (as indicated by animals and seal holes) the greater the number of bears (as indicated by animals and tracks).

Various search patterns starting from the random points were tried. The first pattern was to search a square unit area with the random point as a corner of the area. This was not satisfactory especially in areas where there were not many leads because much time was spent searching areas which were obviously without bears. The next search pattern tried was to search in one direction for 30 minutes along a lead from a random starting point. This was unsatisfactory because so much distance was covered in one direction that often adjacent sampling areas were crossed. Also it was difficult to keep track of position when following a lead in one direction and more time had to be spent getting location fixes by radar. The search pattern which appeared most satisfactory was to search for 30 minutes the nearest lead and then other leads in the general area of the sampling point, choosing leads to be sampled rather arbitrarily so as to stay in the general area of the sampling point. Flight paths were marked on a map. It was planned to relate number of bears seen per unit distance of lead to total leads and relate leads to total area. Number and type of leads were recorded on flights to and from Barrow and between sampling points in order to relate leads to total area. Bear tracks, seals, and relative amount of seal activity were also recorded.

Sighting and tracking conditions were influenced by light, snow cover, and ice conditions. It appeared that bears were easier to see on a slightly overcast day than on a bright day. Tracks were easier to see on a bright day. In general, tracking was difficult because snow cover was old, and in some areas tracks were so numerous that a single set could not be followed. Also the snow was wind blown and in some areas so hard that tracks were difficult to see, and their age could not be determined. It is presumed that bears were harder to see in broken ice than on smoother ice.

There are two apparent shortcomings to a survey of this type. Bears are often difficult to see, and there is no way to determine the number

of bears that are flown over and not seen. Also there is a lack of precision in trying to determine the average number of bears per unit length of lead, and then relate leads to the total area for which a population estimate is being made.

Warm weather and open leads resulted in fog and prevented flying after May 1. At this time two-thirds of the planned survey had been completed. Because search patterns had been changed several times and because the sampling plan was not completed, confidence limits for any population estimate based on this survey are so wide that a population estimate is almost meaningless.

Actual flying time over the ice was 39 hours for each of the two planes. During this time 20 sightings of single bears or family groups were made. Of these, 13 sightings were made while searching sample areas and 7 were made while flying to and from Barrow or between sample points. Composition of bears seen was:

1 female with 1 new cub	2
4 females with 2 new cubs each	12
2 females with 2 yearlings each	6
3 small single bears	3
7 medium sized single bears	7
3 large single bears	3
TOTAL	33

In any future similar work, ice conditions should be mapped during preliminary flights with a fast long range aircraft. A sampling area can then be stratified or different types studied intensively and findings then applied to a larger area. Any future survey should be completed in April because of weather.

It is often difficult to see white bears against a white background, and as has been pointed out, there is no way visually to determine the number of bears that are flown over and not seen. It is possible that a heat sensing device could be used to help in locating animals on the ice. The sensor would indicate a heat source as the plane flew over it, and the area would then be searched visually until the heat source was located and identified. Heat sensors are available that might be suitable and will probably be tested in future work.

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