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REPORT ON 1967 BROWN BEAR STUDIES

by

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Annual Project Segment Report
Federal Aid in Wildlife Restoration
Project W-15-R-2 and 3, Work Plan M

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WORK PLAN SEGMENT REPORT
FEDERAL AID IN WILDLIFE RESTORATION

STATE:	<u>Alaska</u>	
PROJECT:	<u>W-15-R-2 and 3</u>	TITLE: <u>Big Game Investigations</u>
WORK PLAN:	<u>M</u>	TITLE: <u>Bear Studies (Brown Bear)</u>
JOB:	<u>1 (both segments)</u>	TITLE: <u>Hunter Harvest</u>
	<u>2 (W-15-R-2)</u>	TITLE: <u>Distribution and Movements</u>
	<u>2 (W-15-R-3)</u>	TITLE: <u>Breeding Biology and Productivity</u>
	<u>3 (W-15-R-2)</u>	TITLE: <u>Denning</u>
	<u>4 (W-15-R-2)</u>	TITLE: <u>Life History</u>
	<u>3 & 4 (W-15-R-3)</u>	TITLE: <u>Denning and Life History</u>
	<u>5 (W-15-R-2)</u>	TITLE: <u>Composition Surveys</u>
	<u>6 (both segments)</u>	TITLE: <u>Kodiak Bear-Cattle Relationships</u>
	<u>8 (W-15-R-3)</u>	TITLE: <u>Brown Bear Trend Counts</u>
	<u>9 (W-15-R-3)</u>	TITLE: <u>Bear-Logging Relationships</u>
PERIOD COVERED:	<u>January 1, 1967 to December 31, 1967</u>	

ABSTRACT

The Alaska brown-grizzly bear legal sport harvest during calendar year 1968 was 766 (spring, 385; fall, 381). Seventy percent of the harvest was from Game Management Units 4, 5, 8, and 9. New more restrictive regulations for some units caused the state-wide kill to be somewhat lower than in 1966. Age determinations based on cementum layering were made on bears killed in the fall.

Eight dens were examined in the spring on the Alaska Peninsula.

Bear observations were made at McNeil River, and ten animals, including three marked in previous years, were immobilized and marked.

Jack Lentfer participated in a Bureau of Sport Fisheries and Wildlife bear radio-tracking project on Kodiak.

On Kodiak ten cases of bears killing cattle were verified. Thirteen bears classed as potential predators were killed on the cattle leases.

The composition of 576 bears surveyed in 43.4 hours of flying on the Alaska Peninsula was: females with young, 24 percent; young, 49 percent; and single bears, 27 percent.

The mean number of bears seen on southeastern Admiralty Island spring survey flights was the same as the average of past years; the mean number on the southwestern segment was slightly lower.

RECOMMENDATIONS FOR MANAGEMENT

Continue to obtain and assess harvest information. Make a special effort to obtain teeth for age determination studies. Whenever possible, Game Division personnel should conduct bear sealing activities. This is especially true for southeastern Alaska where data have been of poor quality and where few teeth have been collected.

Set regulations with the objective that unless the need for a change is indicated, regulations will stay in effect for several years. This would eliminate one variable when assessing changes in harvest. When setting regulations, consider possible effects of regulations made for one unit on other units.

Monitor brown bear hunting and assess the camp regulation in Unit 9. In the spring, monitoring should start about April 20 when it is reported that bears are first taken by use of ski planes and without establishing a camp.

If a quota or permit system for brown bears is established, it should probably be statewide rather than for only certain units in order to minimize false kill location reports. Requiring all hunters to obtain permits would allow hunting pressure and success to be measured.

Continue liaison with land controlling agencies to learn of proposed land uses far enough in advance to permit investigation on which to base recommendations for protection of bears. Attempt to reach agreements with land controlling agencies whereby recommendations must be complied with by land users rather than serving only as suggestions.

WORK PLAN SEGMENT REPORT
FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECT: W-15-R-2 and 3 TITLE: Big Game Investigations

WORK PLAN: M TITLE: Bear Studies (Brown Bear)

JOB: 1 (both segments) TITLE: Hunter Harvest

2 (W-15-R-2) TITLE: Distribution and Movements

2 (W-15-R-3) TITLE: Breeding Biology and Productivity

3 (W-15-R-2) TITLE: Denning

4 (W-15-R-2) TITLE: Life History

3 & 4 (W-15-R-3) TITLE: Denning and Life History

5 (W-15-R-2) TITLE: Composition Surveys

6 (both segments) TITLE: Kodiak Bear-Cattle Relationships

8 (W-15-R-3) TITLE: Brown Bear Trend Counts

9 (W-15-R-3) TITLE: Bear-Logging Relationships

PERIOD COVERED: January 1, 1967 to December 31, 1967

OBJECTIVES

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

To obtain information on dens and denning mortality.

To obtain information on movement, female breeding biology, time of family breakup, and amount of cub mortality.

To become familiar with radio-tracking techniques and to instrument selected bears to obtain various life history data.

To determine extent, timing, and character of bear predation on cattle on Kodiak Island; number, composition, origin, and movement patterns of bears on the cattle leases; and effectiveness of a fence in stopping bear movement on cattle leases.

To obtain data on bear distribution, relative abundance, and population composition on the Alaska Peninsula.

To study effects of logging on southeastern Alaska bears so as to be able to recommend logging practices which would be least detrimental to bears.

METHODS

The bear sealing program provided hunter harvest information. By regulation, brown and grizzly bear hides and skulls must be presented to a member of the Department for examination and sealing within 30 days after the date of kill. The fall of 1967 was the first season that hunters had to present skulls with hides for sealing. When a bear was sealed, the date and location of kill, sex, and skull and hide size were recorded. Whenever possible, a tooth, usually a premolar, was obtained for age determination. A premolar was chosen because it is easy to pull, and a hunter is more willing to let it be pulled than other teeth since its removal does not detract from skull appearance. Previous work showed that layers could be recognized in premolar cementum. Teeth obtained in past years were also examined; most were M₃.

During the past two years Joe Blum, Sterling Eide, and Greg Bos have tried various techniques to section teeth and examine cementum.

The first technique was to cut and polish thin sections and examine cementum under a microscope using a variety of light conditions. Layers could be read in the cementum as other workers have found for brown and black bears. The method was not used, however, because it was not satisfactory for polar bear teeth, and it was desired to have a method which could be used for both polar and brown bears.

Decalcification, cutting of thin sections, and staining was then tried. Formic acid, hydrochloric acid, and Decal, a commercial solution, were tested as decalcifying agents. Hydrochloric acid was the most satisfactory because it gave good results in a shorter period of time than the other agents. Teeth were decalcified in 40 dram vials of three percent hydrochloric acid until they became flexible or slightly rubbery. Premolars could be decalcified in one day. Large molars required up to seven days. After decalcification, teeth were washed in running tap water for several hours to remove acid.

Cutting of decalcified teeth was first attempted with teeth that had been embedded in paraffin using standard histological techniques. Teeth were cut with a microtome. In many cases, teeth were too brittle to give satisfactory sections, and sections were difficult to handle because they tended to roll. Decalcified teeth were then frozen by spraying with pressurized freon (tradename: Cryokwik) and cut with a microtome. Satisfactory sections were obtained, but the process was time consuming. The most efficient method for sectioning was by use of an International-Harris cryostat at a temperature of -15°C. Cross sections of different thicknesses were cut; best results were obtained at 50 microns. Generally the portion of tooth showing the best layers

of cementum for reading was about one-third of the distance from the root tip to the root-crown junction. The lower one-third of the root was cut off with a razor blade and six to twelve sections then cut with the cryostat.

Various stains and staining techniques were tried. Best results were obtained with commercially prepared alum-hematoxylin obtained from Paragon C and C Company, New York. Sections were placed in the stain for ten to fifteen minutes and then placed in water preparatory to examination.

Most sections were examined with a Bausch and Lomb zoom dissection microscope with 20X eyepieces and a 2X objective lens attached to the normal 0.7 to 3X objective. This allowed a 28X to 120X range in magnification. Sections were examined with light reflected from both a concave mirror and an opaque surface.

After sections were examined and cementum layers counted, the best two or three sections were dehydrated in 70 percent and then in absolute alcohol each for 30 minutes. After dehydration, sections were cleared in xylene and mounted on permanent slides under cover slips with Permunt as the mounting medium.

Slides were examined and ages assigned by two or three people, who in the majority of cases, agreed on an age. When there was disagreement, teeth were re-read, and readers generally agreed on interpretation.

Ages were assigned following descriptions of cementum formation reported by Mundy and Fuller (1964), Stoneberg & Jonkel (1966), and Marks & Erickson (1966); and descriptions of tooth eruption reported by Couturier (1954). Stained sections generally showed wide light staining or translucent layers alternating with narrow dark staining or opaque layers. Usually the first translucent layer laid down was the widest and the next few progressively decreased in width. Many of the tooth sections of bears killed in the fall showed a dark line on the outer edge indicating that deposition of a narrow dark band, if not completed, at least begins before denning.

The number of dark staining lines and the time of tooth eruption formed the basis for assigning an age. The first upper and lower premolars and the third upper premolar erupt during the first year. These teeth usually show an opaque line close to the cementum-dentine interface, with the number of opaque lines equal to the age of the bear. The third lower premolar and fourth upper and lower premolars are replacement teeth erupting between 13 and 16 months. These teeth have one opaque line less than the age of the bear. The first opaque line is usually separated from the cementum-dentine interface by a wide summer translucent layer. Canines erupt in the second year, resulting in one less opaque line than the age of the bear. Here also the first opaque line is separated from the interface by a wide summer translucent layer. Couturier (op cit.) does not specify time of eruption of the third lower molar. Stained sections suggest that deposition of a dark opaque line, if not eruption of the tooth, begins in the first fall on life. Not all M₃ sections clearly show such an opaque deposition. In some there is only a hint of such an opaque layer, while in others it is not visible.

Many M_3 sections show a definite opaque line very close to the interface or right on it. Often this line separated from the interface, and was most clearly seen in the convoluted area on the lingual or vestibular side of the section. For M_3 sections, the age of the bear was considered the same as the number of opaque lines if the opaque line next to the interface was visible. If a dark line was not visible next to the interface, the age of the bear was considered to be one year more than the number of dark lines.

Certain difficulties were encountered in assigning ages. The outer edge of the cementum often stained dark, and it was sometimes difficult to tell whether or not this was a true opaque line. Knowledge of the kill date (fall or spring) helped in determining this. In old bears, layers became thin toward the outer edge of the cementum, and separation was sometimes difficult. In bears of all ages, fracturing of lines into multiple opaque lines sometimes occurred and made interpretation difficult. In some teeth, particularly molars, the opaque layers would appear as lines on one side of the tooth, and as wider zones on the other side of the tooth; such zones often would appear as two lines with a shaded translucent area between. An experienced reader could usually determine the correct age on such problem specimens because he had seen various degrees of fracturing and zonation on less confusing sections.

Brown bear denning work was conducted from May 5 to May 14 on the Alaska Peninsula in the area from Cinder River and Aniakchak Bay to Sandy River and Humpback Bay. Dens were located by searching from a Supercub, PA 18, with big wheels, and by contacting guides who had been operating in the area since April 15. Several had been asked to record locations of dens seen. Dens were examined by landing as close as possible and walking to the site. Several dens which had been located in the spring were checked again in the fall to determine condition and whether or not they might be used again. Lee Miller did all denning work.

Bear observations were made from the ground, and bears were marked at McNeil River on Lower Cook Inlet in July. Bears were immobilized with drugs delivered with Palmer "Cap-Chur" equipment as they traveled along the river to catch salmon. A combination of succinylcholine chloride (Anectine) and phencyclidine hydrochloride (Sernylan) were used to immobilize the bears. Propiopromazine hydrochloride (Tranvet) was used to reduce convulsions caused by Sernylan. Each bear was tagged with a monel metal tag in one ear and a nylon Rototag in the other ear. Immature bears were marked with fluorescent safety-flag material attached with the metal ear tag, and mature bears were marked by fastening a collar around the neck. Collars were of one and three-fourth inch wide nylon parachute webbing. Collars had been color coded by sewing nylon flagging material to them. Collars were fastened around the necks of animals by overlapping the ends and putting hog rings along the edges of the overlap. Bears were tattooed on the lip, under the front leg, and in the groin. A premolar was pulled for age determination. Alizarin--red S dye, which deposits where calcium is being laid down, was given intraperitoneally. This will aid in determining patterns of tooth development for age determination of bears from which a tooth may be

obtained in the future. Dosages of alizarin red S were 600 mg for bears weighing to 300 pounds, 700 mg for bears from 300 to 500 pounds, and 800 mg for larger bears. All bears were measured and some were weighed. Personnel who participated in McNeil River work were Sterling Eide, Lee Miller, Phil Havens, and Doug Jones.

Jack Lentfer participated in a Kodiak National Wildlife Refuge bear radio-tracking project, primarily to learn techniques. Bears were captured with steel traps and snares and by immobilizing free roaming animals with "Cap-Chur" equipment. Radio collars were attached to four mature females in July and to one mature female and one mature male in October. Transmitter circuitry was as described by Tester (1964). Collars were similar to those developed for black bears by the Bureau of Sport Fisheries and Wildlife, Olympia, Washington Research Station and the Washington Department of Natural Resources. Frequencies were in the citizen's band range of 30+ megacycles. Each collar transmitted on a slightly different frequency to permit identification of individual bears. Battery life for transmitters was estimated to be six to eight months. Collars weighed about four and one-half pounds. Three types of receivers were tested. A fixed station receiver with yagi antenna was not satisfactory because transmission to it was often blocked in the mountainous terrain. Line of sight reception with a portable hand held receiver (D-11/M) was about one and one-half miles. Best results were obtained with a surplus military receiver (R-388) mounted in a Supercub. This receiver could monitor a much larger area than ground receivers. Optimum altitude for first picking up a signal was 1000 feet above the terrain, and for pin-pointing a location was 300 to 400 feet. Signals could be picked up from about five miles in mountainous terrain. Paul Martin of the Bureau of Sport Fisheries and Wildlife Olympia Research Station provided technical guidance in July. Refuge personnel monitored bears from July to December.

On Kodiak, Department personnel examined cattle reported to have been killed by bears. They made bear track counts on major drainages of the Chiniak Peninsula in May and August. A cooperative fencing project with certain of the ranchers was not done; the State furnished materials, but the ranchers did not construct the fence as was originally agreed. Ben Ballenger and Doug Jones did most of the bear-cattle work, and Jack Alexander became familiar with the program after he moved to Kodiak in August.

Surveys were flown from August 8 through 17, 1967, on the Alaska Peninsula when bears were concentrated on salmon streams. Most of the major drainages from the Puale Bay-Becharof Lake area to the False Pass area were surveyed on both the Pacific and Bristol Bay sides. Flying was done from three locations with PA 18 Supercubs on big wheels. Joe Blum worked out of King Salmon, Lee Miller out of Black Lake, and Ben Ballenger out of Port Moller. Total flying time was 101.9 hours, and actual survey time was 43.4 hours.

Aerial surveys were flown in Southeastern Alaska in May and June when bears are concentrated along beaches and at heads of bays. Four survey routes were flown, three on Admiralty Island and one on Chichagof Island. The route on southeastern Admiralty Island includes the shoreline from the northeast head of Gambier Bay to the southwest shore of Chapin Bay, and the route on southwestern Admiralty includes the shoreline from Point Wilson to Cabin Point in Hood Bay. Both these routes have been flown by the Forest Service each year from 1960 through 1964 and in 1966. Two other routes were flown for the first time in 1967. One on Admiralty Island extends from the east side of Seymour Canal to Staunch Point on the west side of Seymour Canal. The other on Chichagof Island extends from the head of Tenekee Inlet along the south shore of the inlet to Trap Point. Two evening flights were completed along each route, and two morning flights were completed along all except the Chichagof Island route. Sterling Eide and Joe Blum made these flights. Bear track counts were made along selected salmon streams between August 10 and August 24. An attempt was made to count tracks when salmon numbers had reached their peak. Tracks along any one stream were considered to be from different bears when they varied from one another by one-fourth inch or more in length and width combined. Sterling Eide and Dave Vugrenes made track counts.

FINDINGS

Harvest

The legal sport kill of brown-grizzly bears during calendar year 1967, as indicated by hides presented for sealing, was 766 (spring season, 385; fall season, 381). Game Management Units with the greatest harvest figures were: Unit 4, 62; Unit 6, 56; Unit 8, 198; and Unit 9, 211. In most areas of major hunting pressure, non-residents took between 45 and 50 percent of the harvest; an exception was the Alaska Peninsula where non-residents took 77 percent of the bears killed. In all areas but Unit 4, the percentage of harvest by non-residents was higher in the fall than in the spring. Tables 1, 2, and 3 list 1967 harvest data by Game Management Unit.

Table 4 permits a comparison of yearly harvests since the sealing program was started in 1961. Data and a discussion of the harvest from 1961 through 1966 were presented in the 1966 Bear Segment Report for five Game Management Units which sustained a high total kill and/or an increase in kill from year to year. These data showing total kill, average male hide size, and sex composition are presented again with the inclusion of 1967 data in Tables 5 through 9.

In Unit 4 the 1967 harvest was somewhat less than in 1966, mainly because of fewer bears being taken by non-residents. There were no significant changes in male hide size or in sex composition from that of the past three years.

Table 1

SPRING-AND FALL--1967--ALASKA

BROWN - GRIZZLY BEAR HARVEST

UNIT	RESIDENT			NON-RESIDENT			TOTAL						
	♂	♀	Unk	♂	♀	Unk	♂	♀	Unk	Total	% of Total	% Male	% Non-Res.
1	9	10	0	3	5	0	12	15	0	27	3.4	44	30
4	23	7	2	20	10	0	43	17	2	62	8.1	69	48
5	2	3	0	6	4	0	8	7	0	15	2.0	53	67
6	18	8	4	17	7	2	35	15	6	56	7.3	63	46
7	0	0	0	1	0	0	1	0	0	1	.1	100	100
8	47	45	1	60	31	0	107	76	1	184	24	58	49
9	28	19	1	115	44	4	143	63	5	211	27.5	68	77
10	3	5	0	0	0	0	3	5	0	8	1.0	38	0
11	4	1	0	6	9	0	10	10	0	20	2.6	50	75
12	3	2	1	4	5	1	7	7	2	16	2.1	44	63
13	10	5	1	6	7	0	16	12	1	29	3.8	55	45
14	3	3	0	3	2	1	6	5	1	12	1.6	50	50
15	1	2	0	1	0	0	2	2	0	4	.5	50	25
16	4	4	1	9	9	1	13	13	2	28	3.7	46	68
17	1	0	0	2	8	0	3	8	0	11	1.4	27	91
18	-	-	-	-	-	-	-	-	-	-	-	-	-
19	3	0	1	4	9	0	7	9	1	17	2.2	41	76
20	5	8	0	1	1	0	6	9	0	15	2.0	40	13
21	1	0	0	0	0	0	1	0	0	1	.1	100	0
22	2	1	0	0	0	0	2	1	0	3	.4	67	0
23	4	1	0	6	1	0	10	2	0	12	1.6	83	58
24	2	2	0	7	1	1	9	3	1	13	1.7	69	69
25	2	2	0	9	4	0	11	6	0	17	2.2	65	76
26	1	0	1	1	1	0	2	1	1	4	.5	50	50
TOTAL	176	128	13	231	153	10	457	286	23	766	100	60	59
%	56	40	4	63	35	2	60	37	3	100	-	-	-

Table 2
SPRING - 1967 ALASKA

BROWN - GRIZZLY BEAR HARVEST

UNIT	RESIDENT			NON-RESIDENT			TOTAL						
	♂	♀	Unk	♂	♀	Unk	♂	♀	Unk	Total	% of Total	% Male	% Non-Res.
1	7	8	0	3	0	0	10	8	0	18	4.7	55	17
4	17	5	2	13	4	0	30	9	2	41	10.6	73	41
5	1	0	0	2	1	0	3	1	0	4	1.0	75	75
6	13	5	3	9	2	0	22	7	3	32	8.3	69	34
7	NO SEASON												
8	33	42	1	40	20	0	78	62	1	141	36.6	55	43
9	21	11	1	63	10	0	89	21	1	111	28.8	60	70
10	1	2	0	0	0	0	1	2	0	3	.8	33	0
11	1	0	0	1	1	0	2	1	0	3	.8	67	67
12	-	-	-	-	-	-	-	-	-	-	-	-	-
13	NO SEASON												
14	NO SEASON												
15	NO SEASON												
16	1	2	0	1	0	0	2	2	0	4	1.0	50	25
17	1	0	0	0	0	0	1	0	0	1	.3	100	0
18	-	-	-	-	-	-	-	-	-	-	-	-	-
19	1	0	0	0	0	0	1	0	0	1	.3	100	0
20	2	2	0	0	0	0	2	2	0	4	1.0	50	0
21	1	0	0	0	0	0	1	0	0	1	.3	100	0
22	1	1	0	0	0	0	1	1	0	2	.5	50	0
23	2	1	0	2	1	0	4	2	0	6	1.6	67	50
24	2	2	0	1	0	0	3	2	0	5	1.3	60	20
25	0	2	0	5	0	0	5	2	0	7	1.8	71	71
26	1	0	0	0	0	0	1	0	0	1	.3	100	0
TOTAL	111	83	7	145	39	0	256	122	7	385	100	65.5	48
%	55.2	41.3	3.5	78.2	21.2	0	66.5	31.7	1.3	100	-	-	-

Table 3

FALL - 1967 ALASKA

BROWN - GRIZZLY BEAR HARVEST

UNIT	RESIDENT			NON-RESIDENT			T O T A L						
	♂	♀	Unk	♂	♀	Unk	♂	♀	Unk	Total	% of Total	% Male	% Non-Res.
1	2	2	0	0	5	0	2	7	0	9	2.4	22	56
4	6	2	0	7	6	0	13	8	0	21	5.5	62	62
5	1	3	0	4	3	0	5	6	0	11	2.9	45	64
6	5	3	1	8	5	2	13	8	3	24	6.3	54	63
7	0	0	0	1	0	0	1	0	0	1	0.3	100	100
8	9	3	0	20	11	0	29	14	0	43	11.3	67	72
9	7	8	0	47	34	4	54	42	4	100	26.2	54	85
10	2	3	0	0	0	0	2	3	0	5	1.3	40	0
11	3	1	0	5	8	0	8	9	0	17	4.5	47	76
12	3	2	1	4	5	1	7	7	2	16	4.2	44	63
13	10	5	1	6	7	0	16	12	1	29	7.6	55	45
14	3	3	0	3	2	1	6	5	1	12	3.1	50	50
15	1	2	0	1	0	0	2	2	0	4	1.0	50	25
16	3	2	1	8	9	1	11	11	2	24	6.3	46	75
17	0	0	0	2	3	0	2	3	0	10	2.6	20	100
18	-	-	-	-	-	-	-	-	-	-	-	-	-
19	2	0	1	4	9	0	6	9	1	16	4.2	38	81
20	3	6	0	1	1	0	4	7	0	11	2.9	36	18
21	-	-	-	-	-	-	-	-	-	-	-	-	-
22	1	0	0	0	0	0	1	0	0	1	0.3	100	0
23	2	0	0	4	0	0	6	0	0	6	1.6	100	67
24	0	0	0	6	1	1	6	1	1	8	2.1	75	100
25	2	0	0	4	4	0	6	4	0	10	2.6	60	80
26	0	0	1	1	1	0	1	1	1	3	0.8	33	67
TOTAL	65	45	6	135	119	10	201	164	16	381	100	52.8	70
%	56.0	38.8	5.2	51.3	44.9	3.8	52.8	43.0	4.2	100	-	-	-

Table 4

ALASKA BROWN-GRIZZLY BEAR SPORT HARVEST BY GAME MANAGEMENT

UNIT AND SEASON, 1961 - 1967

UNIT	SPRING							FALL							SPRING & FALL						
	61	62	63	64	65	66	67	61	62	63	64	65	66	67	61	62	63	64	65	66	67
1	6	7	4	8	7	6	18	7	5	5	12	1	7	9	13	12	9	20	8	13	27
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	28	32	18	41	41	49	41	10	14	13	15	23	26	21	37	46	31	56	64	75	62
5	4	1	4	2	6	4	4	5	6	2	9	9	18	11	9	7	6	11	15	22	15
6	6	9	11	19	23	24	32	7	15	21	13	11	14	24	13	24	32	32	34	38	56
7	No Season							1	1	1	-	-	-	1	1	1	1	-	-	-	1
8	82	96	79	90	118	137	141	36	33	31	28	67	60	43	118	131	110	118	185	197	184
9	69	97	75	64	98	101	111	51	61	88	91	110	128	100	120	158	163	155	208	229	211
10	1	3	-	10	6	5	3	-	-	-	5	4	1	5	1	3	-	15	10	6	8
11	-	-	-	-	2	-	3	5	14	9	22	16	12	17	5	14	9	22	18	12	20
12	3	3	5	1	2	3	-	11	16	18	14	17	9	16	14	19	23	15	19	12	16
13	No Open Season							42	33	41	33	44	63	29	42	33	41	33	44	63	29
14	No Open Season							16	9	13	12	15	5	12	16	9	13	12	15	5	12
15	No Open Season							4	5	4	2	3	4	4	4	5	4	2	3	4	4
16	8	3	3	4	6	5	4	20	15	24	16	31	22	24	28	18	27	20	37	27	28
17	-	-	-	-	-	2	1	2	3	3	5	6	7	10	2	3	3	5	6	9	11
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	1	1	1	13	11	11	19	17	17	16	13	11	11	19	18	18	17
20	7	5	8	5	17	12	4	9	21	34	36	15	45	11	16	26	42	41	32	57	15
21	-	1	-	-	-	-	1	4	6	3	-	-	1	-	4	7	3	-	-	1	1
22	-	1	-	-	1	2	2	1	-	-	-	-	-	1	1	1	-	-	1	2	3
23	-	2	5	10	20	8	6	6	4	6	4	7	4	6	6	6	11	14	27	12	12
24	-	3	3	2	3	1	5	3	3	6	7	8	14	8	3	6	9	9	11	15	13
25	1	-	1	2	5	5	7	3	4	6	9	6	20	10	4	4	7	11	11	25	17
26	1	-	4	11	2	1	1	-	2	6	5	3	8	3	1	2	10	16	5	9	4
Total	216	265	221	269	358	366	385	257	282	347	357	413	490	381	473	547	568	626	771	856	776

Unit 4

Table 5. Alaska Game Management Unit 4 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.	%	
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
67	24	59	17	41	41	8	38	13	62	21	32	52	30	48	62

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	No.	Size	No.		Size	No.	Size	No.	
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
67	13.0	15	13.1	13	13.0	13.5	6	13.4	6	13.4	13.1	21	13.2	19	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.	%		
61	9	90	16	89	25	30	4	80	2	33	6	55	13	87	18	75	31	90
62	9	69	14	74	23	72	0	0	6	60	6	55	9	64	20	69	29	67
63	6	86	10	81	16	59	2	40	2	50	4	44	8	67	12	83	20	74
64	17	77	12	71	29	74	6	75	2	29	8	53	23	77	14	58	37	59
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	73	4	80	9	47	13	52	16	73	31	65	47	67
67	17	71	13	76	30	73	6	75	7	54	13	52	23	72	20	67	43	59

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

T O T A L K I L L															
YEAR	S P R I N G					F A L L					T O T A L				
	RES.		N-R.		TOTAL	RES.		N-R.		TOTAL	RES.		N-R.		TOTAL
	No.	%	No.	%		No.	%	No.	%		No.	%	No.	%	
61	41	50	41	50	82	5	14	31	25	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	45	80	14	31	18	56	32	57	51	55	49	112
64	42	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	43	199
67	81	57	60	43	141	12	28	31	72	43	93	51	91	49	184

Average Male Hide Size (length plus width in feet)

YEAR	S P R I N G					F A L L					T O T A L				
	RES.		N-R.		AVER	RES.		N-R.		AVER	RES.		N-R.		AVER
	SIZE	NO.	SIZE	NO.		SIZE	NO.	SIZE	NO.		SIZE	NO.	SIZE	NO.	
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
67	14.4	38	15.9	40	15.2	14.5	9	16.0	20	15.5	14.4	47	15.9	60	15.3

Number and Percent of Males in Total Harvest

YEAR	S P R I N G						F A L L						T O T A L					
	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	80
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	65	13	93	9	53	22	71	42	74	35	65	77	60
64	26	57	24	60	50	58	7	88	15	75	22	79	33	61	39	65	72	62
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
67	38	47	40	67	78	55	9	75	20	65	29	67	47	51	60	66	107	58

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

YEAR	T O T A L K I L L														
	S P R I N G					F A L L					T O T A L				
	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
67	33	30	78	70	111	15	15	85	85	100	48	23	163	77	211

Average Male Hide Size (length plus width in feet)

YEAR	S P R I N G					F A L L					T O T A L				
	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	15.6	20	17.0	32	16.7	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	15.3	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
67	15.8	21	16.3	67	16.2	15.8	6	15.2	47	15.2	15.8	27	15.9	114	15.8

Number and Percent of Males in Total Harvest

YEAR	S P R I N G						F A L L						T O T A L					
	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	103	79
63	19	73	39	67	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	57
66	19	76	68	93	87	89	21	70	49	53	70	57	40	73	117	70	157	71
67	21	64	63	87	84	89	7	47	47	55	54	54	28	58	115	71	143	62

Unit 13
Table 8. Alaska Game Management Unit 13 Brown-Grizzly Bear Harvest by Year, Season, and Residency of Hunter.

YEAR	T O T A L K I L L				
	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
67	16	55	13	45	29

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
67	12.4	10	13.6	6	12.8

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	55
67	10	63	6	46	16	55

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

YEAR	T O T A L K I L L														
	S P R I N G					F A L L					T O T A L				
	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
67	4	100	0	0	4	9	82	2	18	11	13	87	2	13	15

Average Male Hide Size (length plus width in feet)

YEAR	S P R I N G					F A L L					T O T A L				
	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
67	14.9	2	0	0	14.9	12.1	2	12.9	1	12.3	13.5	4	12.9	1	13.3

Number and Percent of Males in Total Harvest

YEAR	S P R I N G						F A L L						T O T A L					
	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	61
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	66	17	59	11	73	28	64
65	6	60	1	100	7	41	2	40	9	90	11	73	8	33	10	91	18	56
66	6	55	1	100	7	58	13	54	8	40	21	45	19	54	9	43	28	50
67	2	50	0	0	2	50	3	50	1	50	4	36	5	63	1	50	6	40

In Unit 8 an emergency fall closure of the most heavily hunted portion of the Kodiak Refuge reduced the 1967 harvest below that of 1966. More military personnel hunt on Kodiak than in other areas. In Unit 8 in 1967, 50 percent of the successful resident hunters, two percent of the successful non-resident hunters, and 32 percent of all successful hunters were military, as indicated by military base addresses on sealing forms.

In Unit 9 the spring harvest was greater than that of any preceding year, and the fall harvest was less than in both 1965 and 1966. A season opening north of the Meshik River 15 days later than in 1966 reduced the fall harvest to a certain extent. Most of the reduction, however, was probably because of a new regulation which requires aircraft operators to register camp locations before transporting hunters to or from these locations; no more than four camps can be registered at one time.

The regulation was difficult to enforce because camp registrations could be changed throughout the season and because camps do not have to be registered when aircraft are used for hunting for moose and caribou. Nevertheless the trend of an increased harvest each succeeding year changed, and a decrease in the harvest did occur (100 bears taken during the 1967 fall season as compared to 129 taken during the 1966 fall season). Another new regulation in effect throughout the State for the first time in the fall of 1967 prohibits brown bear hunting the same day a hunter is airborne, and may also have helped reduce the kill on the Alaska Peninsula. Effects of a new regulation requiring non-residents to be accompanied by a guide while hunting brown bear is difficult to evaluate for the Alaska Peninsula. The reduction in kill was about equally divided between residents and non-residents; because non-residents kill more bears than residents, the percent of bears killed by non-residents actually increased. The average hide size of male bears for Unit 9 was about the same in 1967 as for the past two years. It was slightly lower in the spring and unexpectedly higher in the fall even though hunters could not look over as many bears as before because of the aircraft restriction. The sex composition of the Unit 9 harvest did not change significantly from that of past years.

In Unit 13 the harvest was less in 1967 than it has been in any year since 1961. This is probably because the season opening was changed from September 1 to September 15. In past years over 60 percent of the harvest has been taken between September 1 and September 15, much of it by hunters seeking other species. Hide size and sex composition did not change significantly in Unit 13 in 1967.

The kill in Unit 20 was less than it has been any year since 1961. Both residents and non-residents killed fewer bears in spring and fall seasons. The spring closure of the southern portion of Unit 20 may have caused the decrease in spring kill. A change in season opening date from September 1 to September 15 may have reduced the fall harvest. The Tanana River flood may also have decreased fall hunting effort.

The harvest in Unit 6, Prince William Sound, increased sharply in 1967 during both spring and fall seasons. This was perhaps because of new restrictions in other units.

The Board of Fish and Game has asked for data so a proposal to establish a bag limit of one brown bear each four years can be considered. Data have been compiled for the Alaska Peninsula and for the State for the four-year period 1964-67. In Unit 9, five residents, all registered guides, and 14 non-residents took more than one bear during this period. The total kill by these 19 hunters was 60 or 41 more than would be taken had a bag limit of one bear each four years been in effect. The 41 bears represented 5.1 percent of the harvest during this four-year period. Statewide, 57 residents, 15 of them guides, and 51 non-residents took 224 bears or 116 (3.8 percent of total harvest) more than would have been taken had the regulation been in effect.

Figures 1 and 2 show kill chronologies for Units 8 and 9, the two units which produce more than half the Statewide harvest.

Ages were assigned to bears from which a tooth had been collected during the past two years. Most of the teeth examined were premolars or M_3 , the teeth which can be obtained the most readily from hunter-killed bears. Cementum layering was easier to interpret in the larger molar sections than in premolar sections. Brown bear skulls had to be presented for sealing for the first time in the fall of 1967. Enough teeth were obtained from bears from several units to perhaps give accurate representations of harvests (Table 10).

In addition to the legal sport harvest, there were 24 bears reported taken illegally or in defense of life or property. These included eleven males, five females, and eight of unknown sex. Seven were reported in Unit 13; four in Unit 6; two each in Units 5, 8, 11, and 15; and one each in Units 4, 9, 14, 20, and 22.

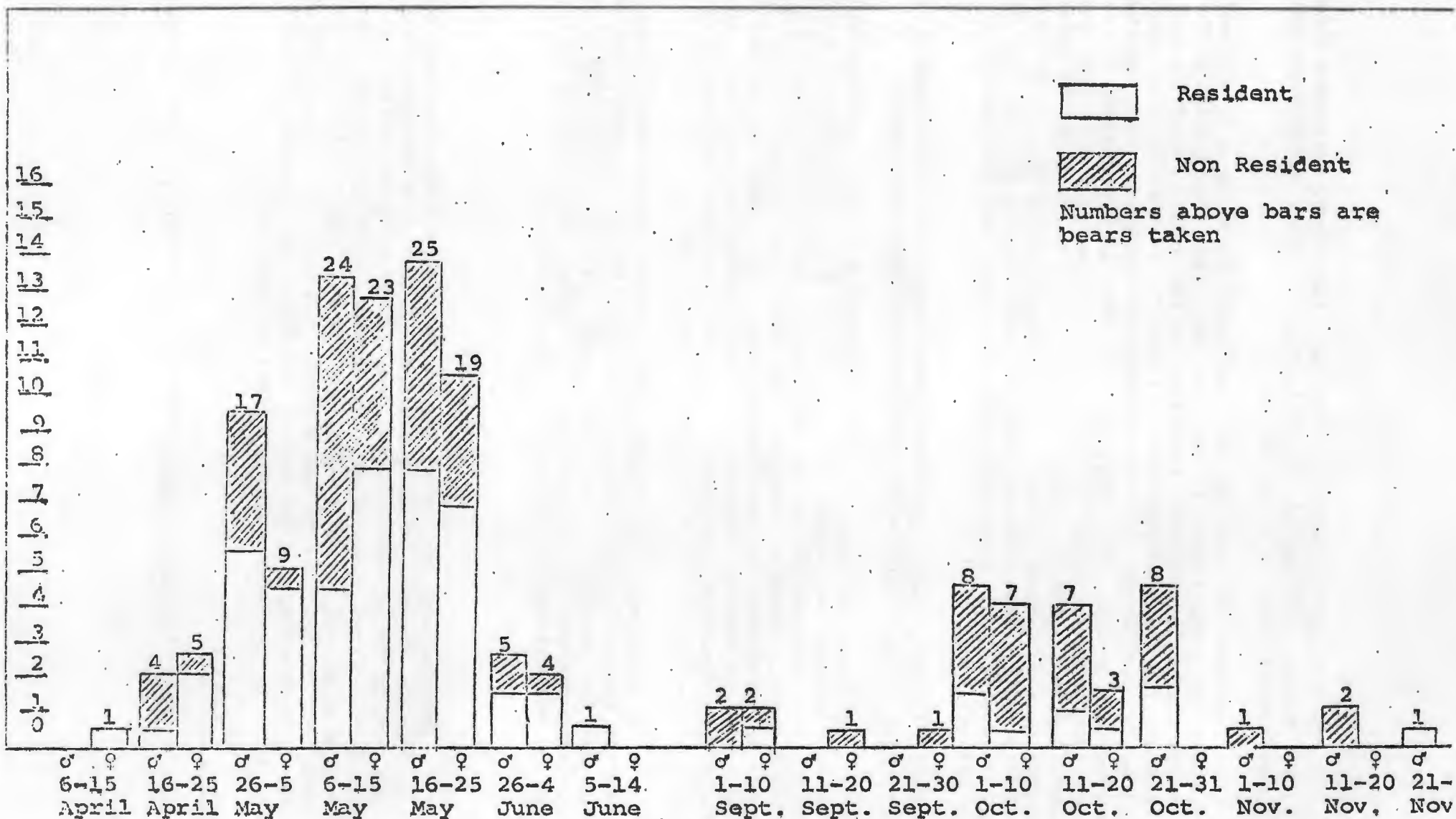
Denning

Denning work was conducted on the Alaska Peninsula from May 5 to May 14. Because of an early spring, most snow was gone from below 2000 feet by May 5, and locating dens by tracking was difficult. Eight dens were located from the air and examined from the ground. Two were located by direct aerial search, and six were located by first contacting brown bear guides. Of 38 hours flown, 9.4 were ferry time, and 28.6 were to contact guides and search for dens. No evidence of mortality was found at den sites. Descriptions of dens follow:

Den 1 - 5/7/67

Site: Southeast slope of Veniaminof Crater; 1,200 foot elevation;

Figure 1. ALASKA BROWN BEAR KILL CHRONOLOGY, 1967, UNIT 8



Unit 9
Figure 2, ALASKA BROWN BEAR KILL CHRONOLOGY, 1967, UNIT 9

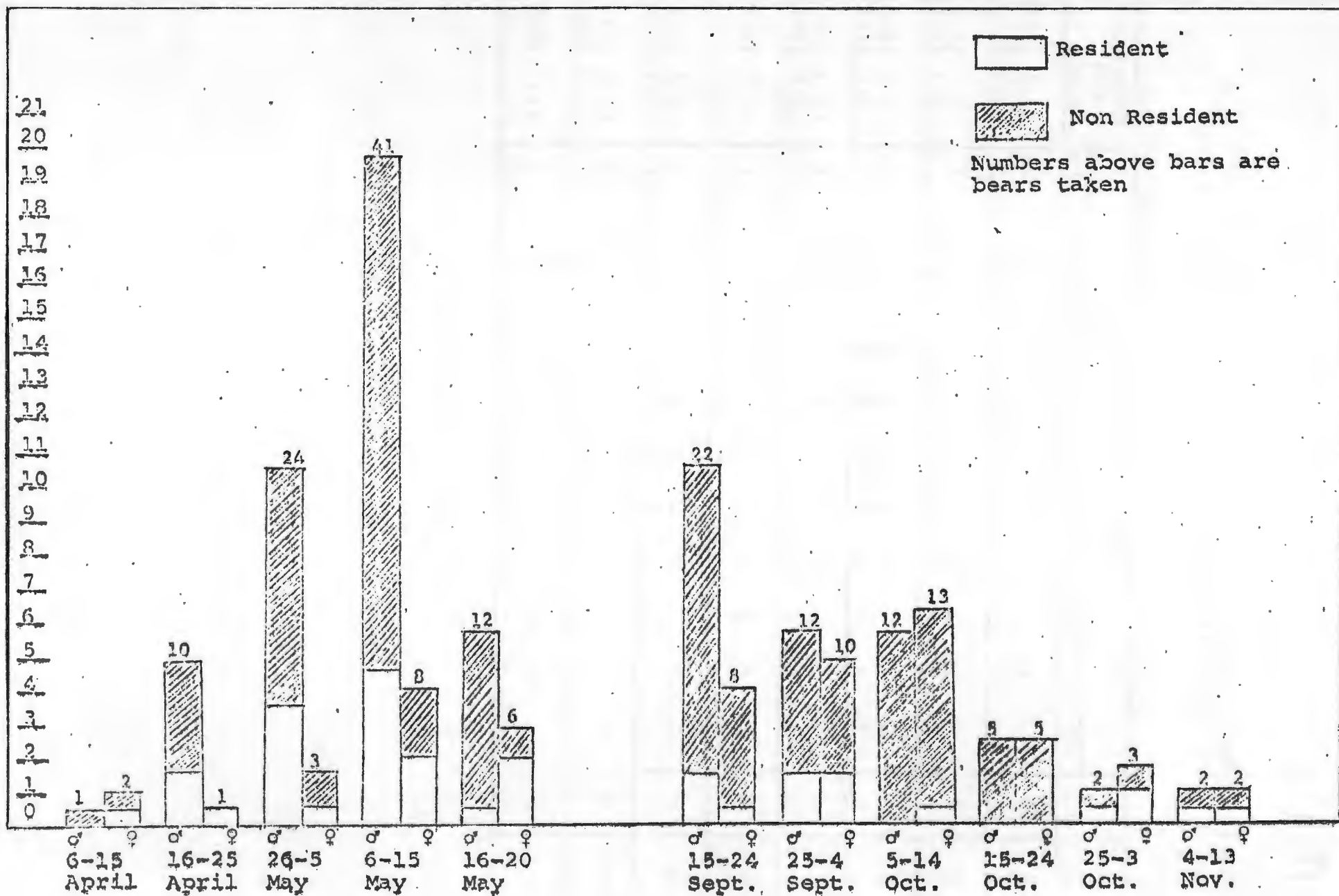


Table 10. Age Composition of Brown Bears Harvested in Alaska During the 1967 Fall Season Based on Tooth Cementum Layering.

Unit	Sex	No. of Bears by Age Class										Mean Age And Range
		1	2	3	4	5	6	7	8	9-10	11+	
6	♂	-	3	3	-	2	-	-	-	1	-	3.9 (2-10)
	♀	-	1	-	-	-	-	-	-	1	3	10.1 (2-19)
8	♂	-	1	3	4	-	5	-	-	-	1	5.0 (2-13)
	♀	-	2	-	1	1	-	-	-	-	-	3.3 (2-5)
9	♂	-	4	9	3	4	1	3	1	-	5	6.6 (2-25)
	♀	1	3	6	3	1	2	2	3	-	2	5.4 (1-22)
11-12	♂	-	-	2	1	-	-	1	-	3	3	10.3 (3-24)
	♀	-	1	2	1	1	2	1	-	1	3	6.8 (2-14)
13	♂	-	4	2	1	1	-	1	-	4	2	6.5 (2-15)
	♀	-	-	-	-	-	-	-	-	-	-	-
16	♂	-	1	-	3	-	1	1	-	1	3	8.1 (2-19)
	♀	-	-	3	1	4	1	-	-	-	2	5.7 (3-12)
17-19	♂	-	-	-	-	-	-	-	-	-	5	12.8 (11-15)
	♀	-	1	1	1	1	1	-	-	5	2	7.9 (2-14)
21-26	♂	-	-	-	-	-	1	-	-	1	5	12.7 (6-22)
	♀	-	-	-	-	-	-	-	-	-	-	-

30° slope facing southeast; no snow; vegetative cover of short grass and low willow.

Appearance: Mound of dirt 16 feet by 7 feet by 3 feet high in front of den. Tunnel 2.5 feet high by 2.8 feet wide at entrance, narrowing to 1.4 feet high by 1.6 feet wide; tunnel 7.0 feet long. Den proper cone-shaped 4.6 feet high by 6.1 feet wide by 6.9 feet wide. Inside of den clean.

Bear Activity: Single bear seen in front of den from air; bear left area when den approached on ground.

Den 2 - 5/8/67

Site: Northeast side of Aniakchak River; 1,500 foot elevation; 10° slope in bottom of ravine at base of steep slope; 15 foot snow depth; above brush line, little or no vegetation.

Appearance: Tunnel about 2.5 feet in diameter and 20.0 feet long; tunnel at a slope of about 65° from horizontal with two turns between entrance and den proper. Den proper cone-shaped 9.0 feet high and 6.7 feet across at the base: bottom at about ground level. Excavation at confluence of den and tunnel 2.9 feet across and 2.0 feet deep, perhaps where bear had started to dig out in wrong direction. Appeared that snow had covered site after bear had denned.

Bear Activity: Fresh claw marks on sides and top of den. Tracks indicated recent use by large single bear.

Den 3 - 5/7/67

Site: West Fork Creek; 1,000 foot elevation; 20° slope facing northwest; 22 inch average snow depth; vegetative cover of alders.

Appearance: Mound of dirt 15 feet by 12 feet by 4 feet high in front of den. Entrance 3.6 feet high and 3.3 feet wide. Main den 9.0 feet long and 4.3 feet high. Some broken alders projecting into den. Den had been dug into ground and covered with snow. No foreign articles in or around den.

Bear Activity: Old tracks indicating that bear had been out for some time.

Den 4 - 5/9/67

Site: Aniakchak River approximately 4 miles below lake; 1,100 foot elevation; 30° slope; 6 to 7 inch snow depth, vegetative cover of alders.

Appearance: Dirt pile in front of den. Den dug into side of hill with entrance 4.2 feet high by 4.8 feet wide. Den 10.0 feet from entrance to back, 7.0 feet wide, and 6.8 feet high. Broken alders protruding into den; no other foreign objects.

Bear Activity: Old single track leading away from den.

Den 5 - 5/9/67

Site: 5 miles north of Black Lake; 700 foot elevation; 30° slope; no snow; vegetative cover of grass and alders.

Appearance: Dug into bank under root of large alder. Mound 6 feet by 15 feet of dirt and rocks outside den. Entrance to den 3.0 feet high by 3.6 feet wide. Tunnel 2.3 feet in diameter and

6.0 feet long. Den proper approximately 4 feet high and 3 feet across; this portion had recently caved in. Inside of den clean. Bear Activity: Sow and two cubs of year seen near den on 5/4/67, and again when checked from ground on 5/9/67. Freshly dug shallow pit 3 feet by 4 feet approximately 50 feet from den; appeared that bears had been spending time there recently. No recent sign seen when rechecked 10/9/67.

Den 6 - 5/10/67

Site: 2 miles north-northwest of Wildman Lake; 200 foot elevation; 15° slope facing south; no snow; vegetative cover of willows, grass, and heath plants.

Appearance: Dug into hillside on small mound on flats. Mound of dirt 8 feet by 12 feet in front of den. Den entrance 4.3 feet high by 2.2 feet wide. Entrance led directly down into den; no tunnel. Den cone-shaped, 3.8 feet high, 6.2 feet long, and 6.5 feet wide. Den clean inside. Same condition when rechecked 10/4/67.

Bear Activity: None recent on 5/10/67. Sow and one yearling reported in den in early December 1966 by guide. Sow and two cubs of year reported in den by same guide prior to recheck on 10/4/67. Bears not seen then nor on 10/10 and 10/11/67 when checked from air.

Den 7 - 5/12/67

Site: 2 miles northwest of Foggy Lake and 4 miles from salt water beach; 100 foot elevation; level slope; no snow; hummocky tundra with moss and grass cover.

Appearance: Mound of dirt 10 feet by 15 feet by 4 feet high in front of den. Entrance to tunnel 3.1 feet wide and 2.8 feet high. Tunnel approximately 2.0 feet high, 4.0 feet wide, and 10.0 feet long with slope of 75°. Den proper 4.2 feet high, 7.0 feet wide, and 5.0 feet long. Den clean inside. Tunnel entrance covered when rechecked 10/4/67.

Bear Activity: Single female bear killed by hunter at den site on 2/1/67. No activity noted on 5/12 or 10/4/67.

Den 8 - 5/13/67

Site: First creek southwest of Red Bluff Creek; 1,200 foot elevation; 20° slope facing north-northwest; vegetative cover of grass and moss.

Appearance: Dirt pile 8 feet by 15 feet in front of den. Tunnel about 4.3 feet in diameter, 6.0 feet long and at slope of 40°. Den proper 4.6 feet high, 4.7 feet long, and 5.0 feet wide. Den clean.

Bear Activity: No recent activity. Den appeared to have been abandoned for some time. No sign of activity on 10/11/67.

Many shallow pits were observed from the air, most of them on hillsides. It appears that bears dig these to lie in after they are out of the den. True dens can usually be distinguished from these pits by the much larger mounds of dirt in front of the dens. A Super-cub with big wheels worked out well during the early spring. During a late spring, skis would be necessary in order to land near some dens.

McNeil River Studies

Ten bears were successfully immobilized and released at McNeil River between July 7 and 27, 1967. These included four males and six females; three of the females had been tagged in previous years.

One bear recaptured in 1967 had first been tagged in 1963. Her age was estimated at three and one-half years in 1963, and she was thought to be in breeding condition. A metal tag was placed in each ear and a polypropylene rope marker fastened to one ear tag. This bear was recaptured in 1965 and had retained both metal ear tags but not the polypropylene marker. Another metal ear tag with a pink polypropylene rope marker was attached in 1965. At this time she was accompanied by two seven-month-old cubs. When recaptured in 1967 she was believed to be in breeding condition, was not accompanied by cubs, and weighed an estimated 400 pounds. All ear tags attached in previous years were present as was the polypropylene marker attached in 1965. The rope had changed from pink to brownish-gray. A number tattooed in the lip in 1965 was clear and easily read. A nylon collar was attached to the bear in 1967. Cementum lines in the first upper premolar indicated the bear was ten and one-half years old. If this is correct, the age in 1963 would have been six and one-half years rather than three and one-half years as estimated. The reason for this discrepancy is not known.

A second female recaptured in 1967 had been tagged in 1963. At that time she weighed 325 pounds and was thought to be three and one half years old and in breeding condition. In 1963 a metal ear tag was placed in each ear and a polypropylene rope was attached to the right ear tag. Only the left ear tag was present when the bear was recaptured in 1967. In 1967, this bear's weight was estimated to be 350 pounds. She was thought to be in breeding condition. Cementum layering established her age as nine and one-half years. She thus would have been five and one-half years old in 1963 rather than three and one-half as estimated.

The third bear recaptured had been tagged and marked in 1965 with two metal ear tags and a polypropylene rope. She was accompanied by two seven-month-old cubs. In 1966 this bear was observed and identified by its polypropylene marker. She apparently was not accompanied by cubs. When immobilized in 1967 she no longer had the right ear tag or tag marker but did have the left ear tag. A number tattooed in the lip in 1966 was legible. This bear was accompanied by two seven-month-old cubs in 1967. Cementum rings established her age at six and one-half years.

A combination of Sernylan and Anectine effectively immobilized free-roaming bears, so they could be found in tall grass and alders. Tranvet administered intramuscularly after bears were immobilized produced a more desirable anesthesia by reducing number and severity of convulsions. Work during this same period and in October at Kodiak indicates that Sernylan and Tranvet without Anectine is probably as effective and less stressing than when Anectine is used. Recommended dosages are 0.75 mg per pound of Sernylan and 35 to 75 mg per bear of Tranvet depending on size of the bear.

An estimated 30 to 35 bears were at McNeil in 1967, approximately the same as in 1966. The highest number of different bears seen in one day was 13, which was slightly higher than the 1966 high of ten. Family groups with cubs of the year were observed in 1966 and 1967, but no family groups with yearlings were observed either year.

During the four years of tagging at McNeil, 35 bears (18 males, 17 females) have been tagged and released. One male has been killed by a hunter, six females have been recaptured once in another year, and one female has been recaptured twice. Although no males have been recaptured, it is believed that certain males have been recognized in succeeding years.

Recapturing of females at McNeil indicates that their normal breeding interval is three years. One exception to this is the female captured in 1965 with cubs of the year. Vulva examination of captured females indicates first estrous when three years old. However recapture of these females has indicated actual breeding age for most bears may be four years. Table 11 lists all bears that have been immobilized.

McNeil River continues to be a popular area for the public to photograph and observe brown bears. In 1967, 14 persons other than Department personnel, observed and photographed bears. At least five could be classed as commercial photographers.

Radio-Tracking

Kodiak Refuge personnel obtained about 100 location fixes from July to December 1967 on six bears instrumented at Karluk Lake. The four females instrumented in July were monitored to the following dates, respectively: August 7, August 17, September 5, and November 17 (at den site, North Fork of Deadman Creek). For bears instrumented in October, the male was monitored for only a day, and the female was monitored to December 15 (at den site, Uyak Bay). Possible reasons that all bears could not be followed to their dens are: malfunction of transmitter, bear in narrow deep canyon which would degrade transmission, long movement by bear to area not searched, and limitation due to weather on amount of flying that could be done to monitor movements.

Unit 9

Table 11. McNeil River Alaska Brown Bear Tagging Data, 1963-67.

No.	Date	Sex	1/ Age	Ear Tag No.		Tattoo No.	Comments
				L.	R.		
1-63	7/11/63	F	3	1802	1801	-	
2-63	7/11/63	F	3	1804	1803	-	Recaptured, 1965
3-63	7/12/63	F	7+	1805	-	-	Died, Anectine overdose
4-63	7/12/63	F	3	1807	1806	-	Recaptured, 1965, 1967
5-63	7/13/63	F	2	1809	1808	-	Recaptured, 1966
6-63	7/13/63	F	5	1811	1810	-	
7-63	7/14/63	M	7	1813	1812	-	
8-63	7/14/63	F	3	1815	1814	-	Killed by hunter, 1964
9-63	7/15/63	F	2	1816	1817	-	
10-63	7/16/63	F	3	1819	1818	-	Recaptured, 1967
11-63	7/17/63	M	10	1820	1821	-	
12-63	7/18/63	F	7	1822	1824	-	Recaptured, 1966
13-63	7/18/63	M	10+	1825	1826	-	Died, Anectine overdose
14-63	7/19/63	M	7	1827	1828	-	
15-63	7/20/63	F	4	1829	1830	-	
16-63	7/21/63	M	5	1831	1832	-	
1-65	7/22/65	M	4	-	-	-	Died, Anectine overdose
2-63	7/24/65	F	5	1804	1803	-	Recaptured from 1963, drowned
2-65	7/26/65	F	-	1854	-	02	
4-63	7/28/65	F	5	1807	1806	03	Recapture from 1963
					1855		
3-65	7/28/65	-	1/2	1856	1857	04	
4-65	7/29/65	F	-	1859	1861	05	Recaptured, 1967
5-65	7/29/65	F	1/2	1865	1864	06	
1-66	7/9/66	M	-	1839	1840	08	
2-66	7/10/66	F	-	1841	1842	09	
5-63	7/19/66	F	5	1809	-	13	Recapture from 1963
				1883	1884		
4-66	7/19/66	F	-	1899	1900	12	
5-66	7/19/66	M	-	-	-	-	Died, Anectine overdose
12-63	7/22/66	F	10	1822	1824	14	Recapture from 1963
				1885			
1-67	7/10/67	M	3*	1	4231	-	
2-67	7/12/67	M	4*	4226	3	16	
3-67	7/13/67	F	2	4	4227	17	
4-67	7/13/67	M	2*	7	4228	18	Died, Sernylan overdose
5-67	7/14/67	F	6	8	4236	19	
6-67	7/16/67	F	4*	31	4211	20	
7-67	7/16/67	M	3*	4212	34	21	
10-63	7/17/67	F	6-9*	1819	9	-	
8-67	7/19/67	M	13*	10	4237	23	
9-67	7/21/67	M	4*	-	-	-	Died, Sernylan overdose
4-63	7/24/67	F	7*	1807	1806	03	Recapture from 1963 & 1965
					1855		
10-67	7/25/67	F	12*	32	4214	22	
11-67	7/26/67	F	6*	-	-	-	Died, Anectine overdose

1/ Ages with asterick are from examination of cementum layering.
Other ages are estimated.

Kodiak Bear-Cattle Relationships

Department personnel examined 22 dead cattle that ranchers reported as suspected bear kills. Nineteen are believed to have died in April and early May. Only ten of the 22 cattle were definitely killed by bears, and it appeared that the other 12 had not been killed by bears. The ten cattle included six steers, two yearlings, and one male and one female of undetermined age.

Track counts made on eleven major drainages on the Chiniak Peninsula in May and again in August and September indicated a large bear on Rough and Portage Creeks in August and four small bears on Lake Creek in September.

Thirteen bears were known to have been killed on the cattle leases. Three were sport kills, one was killed by a rancher, and nine were killed by Department personnel as potential predators. A female bear tagged in Terror Bay in August 1966 in an attempt to learn of movement patterns onto the leases was killed by a hunter on May 7, 1967, in Terror Bay about five miles from where tagged.

Composition Surveys

Aerial surveys were flown on the Alaska Peninsula from August 8 through 17, 1967. It is realized that aerial surveying of big game, particularly brown bears, has definite limitations; however, it appears to be one of the best ways to obtain composition, relative abundance, and distribution data for animals as sparsely distributed as brown bears on the Alaska Peninsula.

In 43.4 hours of surveying, 576 bears (13.3 per hour) were counted and classified as follows: females with young, 24 percent; young, 49 percent; and single bears, 27 percent. Average litter size for cubs of the year was 2.06 and for yearlings was 1.98. The percent of single bears was somewhat lower than in past surveys and is what might be expected as the hunter harvest, primarily of single bears, has been increasing. Table 12 presents data in tabular form.

Counts made in the area from the Meshik and Aniakchak Rivers to False Pass can be compared with counts from past years. Table 13 shows that the percent of single bears was higher in 1958 and 1959 than in 1966 and 1967. The number of bears seen per hour was considerably lower in 1967. One of the main reasons is that much more time was spent surveying in 1967, and therefore areas where bears were less concentrated were counted. Comparisons can also be made for trend count areas (Table 14).

Table 12. Aerial Survey Brown Bear Composition Data, Alaska Peninsula, August 1967.

Females with young	138 (24%)	
Young	281 (49%)	
Cubs		140 (24%)
Small		40 (7%)
Medium		74 (13%)
Large		27 (5%)
Single Bears	157 (27%)	
Small		34 (6%)
Medium		83 (14%)
Large		35 (6%)
Unidentified		5 (1%)
Total	576 (100%)	

Average litter size

Cubs and small (probably cubs of the year)	2.06
Medium and large (probably yearlings)	1.98
All young	2.04

Table 13. Brown Bear Aerial Survey Data, Neshik-Aniakchak Rivers to False Pass, Alaska Peninsula.

	1958		1959		1966		1967	
	No.	%	No.	%	No.	%	No.	%
Females w/young	55	15	25	18	62	23	106	25
Cubs	65	18	34	25	96	35	151	35
Yearlings	52	14	17	12	37	14	64	15
Cubs and yearlings	117	32	51	37	133	49	215	50
Single bears	189	52	63	45	79	29	106	25
Total bears	361		139		274		427	
Hours flown	21.2		6.7		10.2		33.4	
Bears per hour	17.1		20.9		26.9		12.8	

Table 14. Brown Bear Aerial Survey Data From Alaska Peninsula
Trend Count Areas.

Area	Year	Dates	No. of Bears	Hours Flown	Bears Per Hour	% Single Bears
Ugashik Lakes	1965	9/12-13	65	3.6	18.1	29
	1966	8/23	55	2.8	19.6	27
	1967	8/10-11	58	2.4	24.2	31
Meshik Drainage	1965	9/13	0	0.5	0	-
	1966	8/11	0	2.2	0	-
	1967	8/10	10	2.0	5.0	20
Black- Chignik Lakes	1962	7/31	118	2.5	47.2	1/
	1965	8/6	123	2.5	49.2	16
	1966	8/9	108	2.5	43.2	31
	1967	8/10	82	2.7	30.4	20
Sandy Lake	1965	8/10	42	0.9	46.7	24
	1966	8/10	37	0.7	52.9	19
	1967	8/11	19	0.4	47.5	11
Canoe Bay	1966	8/21	19	0.3	63.3	32
	1967	8/11	37	1.5	24.7	24
Moffett Bay	1966	8/21	60	1.6	37.5	32
	1967	8/10	55	2.5	22.0	35

1/ Not recorded.

Bear-Logging Relationships

The average number of bears counted on southeastern Admiralty Island spring survey flights was slightly lower than in 1966, and the same as the average since 1960. Aerial counts on southwestern Admiralty Island were slightly lower than the average since 1960 (Table 15). In Seymour Canal, one bear was seen in the entire 40 miles of the survey route, and in Tenekee Inlet, 23 bears were seen for an average of one bear per 4.6 miles. More bears were seen on evening flights than on morning flights in all cases.

Data obtained by track counts are believed to be unreliable, and they are not presented. Sources of error are due to varying stream conditions, i.e., flooded or low, and inability of observers to accurately identify individual tracks. As an example, 13 bears and only one set of tracks were seen at Pack Creek. Track counts will be discontinued in the future.

Table 15. Brown Bears Seen During Spring Survey Flights, Southern Admiralty Island, Alaska, 1960-66.

Year	Southeastern Segment		Southwestern Segment	
	Ave. No./ Flight	Miles/ Bear	Ave. No./ Flight	Miles/ Bear
1960	21	7.1	18	4.4
1961	19	7.9	8	10.0
1962	12	12.5	10	8.0
1963	16	9.4	11	7.3
1966	21	7.1	12	6.7
1967	18	8.3	9	9.0
Average	18	8.3	11	7.3

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