

Library
U.S. Fish & Wildlife Service
1011 E. Tudor Road
Anchorage, Alaska 99503

BEAR STUDY - KARLUK LAKE, 1956.



Webster A. Clark, Refuge Biologist
Kodiak National Wildlife Refuge

Office Memorandum • UNITED STATES GOVERNMENT

TO : Refuge Supervisor, FWS, Kenai, Alaska

FROM : Refuge Manager, FWS, Kodiak, Alaska

SUBJECT: Attached Karluk Lake Bear Studies

DATE: 28 March 1957

I have just briefly got to glance over Kim's summer report and have not had time to read it in detail. My comments are the following:

The report follows a similar pattern to last year's report and should as the studies were identical. As a whole, I feel the report is well written and contains valuable information. In a few cases it could have been more concise and a few tables could have been combined. Comments which we are not concerned with should be omitted. I'm referring to one comment on the Karluk River fishery where it was insinuated that commercial fishing should have been closed during the past poor red salmon run.

As last year, the report indicates a lot of field work was done and good observations made and records kept. Something we should all strive for.

Improvement over last year in getting the report in earlier was shown, but I feel it could be completed sooner. This year Kim assisted me more in my work and of course this caused some delay.

Some of the bear life history data is pretty well completed, and in the future we should stress studies which would give us information that we do not have at present such as more information on breeding data, denning, movements, cub survival, etc.; however this can be discussed later.

Note some of the excellent photographs, and Kim is to be complimented on this phase of the work. Nothing can dress up a report better than a few photographs, and of course makes it more interesting to read.

Will Troyer

WT:hs



KARLUK LAKE IN AUGUST

BEAR STUDY - 1956
KARLUK LAKE

	Page
I. INTRODUCTION	1
II. BEAR DATA	2
A. POPULATION DETERMINATION	2
1. SIGHTINGS	2
2. COMPARISON WITH FORMER YEARS	3
a. SIGHTINGS AND ESTIMATES	3
b. DENSITY	4
c. HUNTING PRESSURE	4
3. COMPOSITION	5
a. GENERAL	5
b. SOW-CUB DATA	6
c. AGE CLASSES	6
d. BEAR UNITS	7
4. NEARBY AREAS	8
a. DOG SALMON CREEK	8
b. AYAKULIK (RED) LAKE & RIVER	8
c. OTHER SURVEYS	9
B. MOVEMENT	10
1. GENERAL	10
2. MIGRATIONAL	10

	Page
C. FOOD	10
1. FEEDING SIGNS	11
2. SCAT EXAMINATION	13
3. STOMACH ANALYSIS	14
D. ACTIVITY	16
1. GENERAL	16
2. INDIVIDUAL	17
E. PHYSICAL CHARACTERISTICS	17
1. PELAGE	17
2. MEASUREMENTS AND WEIGHTS	18
3. PARASITES	21
4. PREGNANCY	21
III. BEAR-SALMON INVESTIGATIONS	22
A. HALFWAY CHINK	22
1. ESCAPEMENT	22
2. RESULTS	25
IV. SPawning SPEED STUDY	27
A. SALMON TAGGING	27
B. RESULTS	27
V. BEAR MARKING	28
A. BOTTLE STATIONS	28
B. RESULTS	29

	Page
VI. BEAR DETERRENTS	29
A. ELECTRIC FENCE	29
B. FIRECRACKERS	30
VII. OTHER INVESTIGATIONS	31
A. BALD EAGLE	31
B. GOSHAWK	32
C. GULLS	32
D. BIRD LIST	33
E. DOLLY VARDEN	34
F. TEMPERATURES	35
VIII. COLLECTIONS	36
A. PLANKTON	36
B. BEAR MATERIAL	37
C. PLANTS	37
IX. EQUIPMENT	37
X. SUMMARY	37

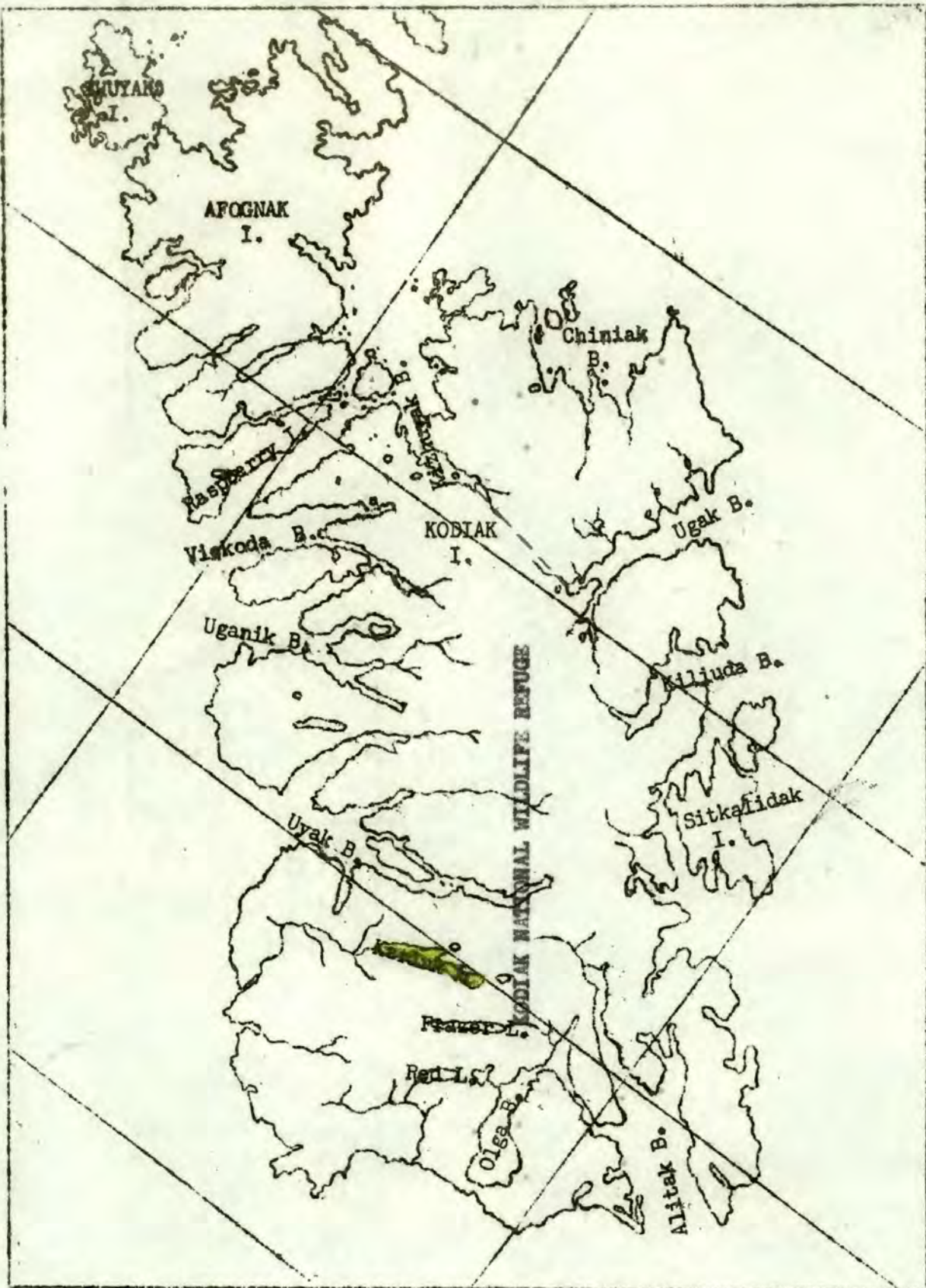
BEAR STUDY - 1956
KARLUK LAKE, KODIAK

I INTRODUCTION

A longer period was spent in the field by the writer this year than in any of the previous three years of investigation (1). The first trip was made to Karluk Lake in mid-May, then summer residence from June 15 to November 9, and the last visit with refuge manager, Troyer, during the week of December tenth.

In general the study was similar to that of 1955 with possibly even greater emphasis on census and composition of the population at Karluk and nearby areas. Movement, bear-salmon relationships, physical data and other phases of life history were investigated. Considerable attention was paid to bear-guide relationships. Bear marking and salmon tagging continued. Also

- (1) CLARK, W.R., 1952, Bear-Salmon Study - Karluk Lake
" " , 1954, Bear Study " "
" " , 1955, " " " "



MAP OF KODIAK ISLAND GROUP SHOWING LOCATION OF KARLUK LAKE

miscellaneous data were accumulated.

Kenneth Durloy, Biological Aid was available as assistant; Will Troyer, Refuge Manager, also assisted in censusing.

II BEAR DATA

A. POPULATION DETERMINATION

1. SIGHTINGS

Detailed observation and differentiation of individuals of the bear population to approximate a census in the Karluk Lake area resulted in a figure of 117. A breakdown of the data is shown in Table I. The technique used was similar to that of 1954, '55. (Possible duplications were deleted). Records of locations and descriptions of individuals were kept. Overnight trips were made to high points for better observation of important drainages. Also, a few nights were spent in jungle hammocks on some streams.

This year, the censusing period extended from June 16 to August 8, when new dark coats of some bear were causing confusion in differentiation. Also about this time berry crops were ripening and bear most often seen

TABLE I
Bear Sightings - 1956

Area	Females & Cubs		Sub-Adult (Sm)	Sub-Adult (Med)	Adult (Lge) (Male)	1956 Total	1955 Total	1954 Total
	1st Yr.	2nd Yr.						
Canyon- O'Malley	F & 1 ¹ F & 1 ¹ F & 3 ¹	F & 1 ² F & 2 ² F & 3 ²	2	4	1	24	29	15
Cascade		F & 3 ²			1	5	2	9
Meadow	F & 2 ¹			1	1	5	9	11
Eagle			2	1		3	4	
Halfway			1	1		2	7	18
Grassy	F & 2 ¹					3	13	9
Second		F & 2 ² F & 3 ²				7	1	
Karluk R. (Weir)		(F & 1 ²)			(1)	(3)	(5)	2
Moraine	(F & 3 ¹)	F & 2 ²		1		8	3	3
Cottonwood			1	1	1	3	3	11
Little Bear			1	1		2	1	
Alder				1		1		2
Thumb-Lower	F & 1 ¹ F & 2 ¹ F & 3 ¹	F & 2 ² F & 2 ²	3	1	1	20	16	29
Thumb-Upper	F & 1 ¹ F & 2 ¹	F & 1 ² F & 2 ² F & 3 ²	5	3	7	29	32	18
Long- Barabara				1 F?	1	2		5
Totals	11-F & 21 ¹	13-F & 27 ²	15	16	14	117	125	132
	24 F & 46 ¹ & 2							

() Sightings by Weir Crew

KARLUK RIVER

BEIR

SPRING CREEK

MORaine CREEK

GROVE POINT

SECOND CREEK

TENT POINT

COTTONWOOD CREEK

BOULDER POINT

LITTLE BEAR CREEK

BEAR POINT

BIG BEAR CREEK

GRASSY POINT

GRASSY CREEK

ALDER CREEK

GOLD P.

IN-BETWEEN

CAMP

LITTLE LAOON

SURFBIRD MT.

#1 BEAR SIGHT STA.

HALFWAY CREEK

ISLAND POINT

THE THUMB

TENT POINT

LOST DOG CREEK

LOWER THUMB R.

SALMON CREEK

THUMB

LAKE

UPPER THUMB R.

NORTH FORK

EAST FORK

MT. SHUMAN

KENKIMBLOS PK.

EAGLE CREEK

MAP OF KARLUK LAKE

(Based on Reconnaissance Survey, 1926, by Willis H. Rich)

TRUE NORTH

MAGNETIC NORTH

LEGEND

X = CABIN OR CACHE

EAGLE CREEK

BLUFF
POINT

22

K

M

LONG CREEK

LONG POINT

MEADOW
CREEK

BARABARA POINT

STONY
POINT

CANYON
CREEK

CASCADE
CREEK

O'MALLEY
RIVER FALLS CREEK

O'MALLEY

LAKE

#2 BEAR SIGHT STA.
FRIENDLY MT.

0
1
2
3
Miles

APPROX. 350 FT ABOVE SEA LEVEL

NARROW LAKE

BEAR, SUB-ADULT,
ON LAKESHORE

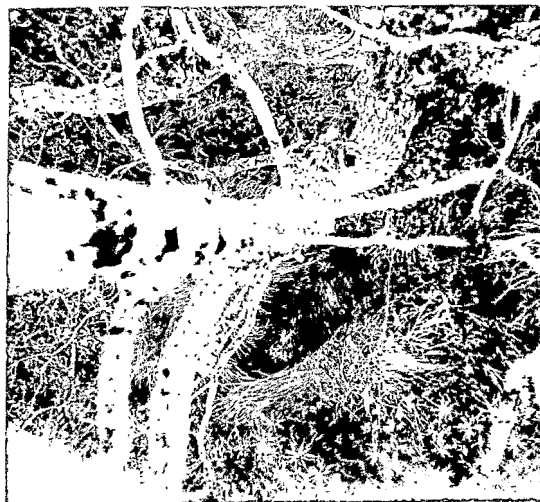


BEAR
SIGHTING
STATION

BEAR, SUB-ADULT,
ON STREAM



JUNGLE HAMMOCK
IN COTTONWOOD

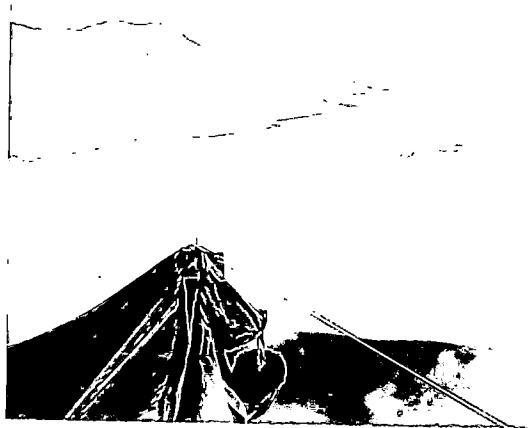


HAMMOCK-VIEW OF ADULT
BEAR - TOPSIDE

SUB-ADULT - ADULT
AT DUSK



LOWER THUMB



CANYON- O'MALLEY

DOG SALMON



SIGHTING AREAS

on streams were apparently the same 'diehards' from day to day.

During the period, a total of 221 bears were observed. After deleting repeats, the number of different bear seen by Refuge employees was 110. Fisheries personnel at the weir saw an apparent additional 7 to bring the final estimate to 117.

2. COMPARISON WITH FORMER YEARS

a. SIGHTINGS AND ESTIMATES

Comparing sightings and estimates for the years 1952 to 1956 in Table II, it is seen that 1953 and 1956 figures are slightly lower than those for other years. In 1953⁽²⁾ few bear were seen on the streams, apparently due to an early ripening berry crop. The 1956 figure might reflect the high hunter take of the preceding year. In neither instance is the decrease alarming.

Figure 1 indicates population trend, 1952 to 1956.

(2) GROGAN, Frank, 1953, Bear-Salmon Study Karluk Lake

TABLE II

Bear Population Estimates - Karluk Lake 1952 - 56

Year	Period	Sightings			Esti- mate	Bear Per Sq. Mi.	Cub Crop	Loss to Hunters, Etc.
		By Refuge Personnel	By Others	Less Dupli- cations				
		Total						
1952	7/15 - 10/15	239		124	<u>124</u>	1.55		19
1953	7/11 - 8/31	76		64	<u>115</u>	1.44		23
1954	7/7 - 10/1	242		106	<u>132</u>	1.65	22	19
1955	7/2 - 8/24	204		119	<u>125</u>	1.56	22	31
1956	6/17 - 8/8	221		110	<u>117</u>	1.46	21	17

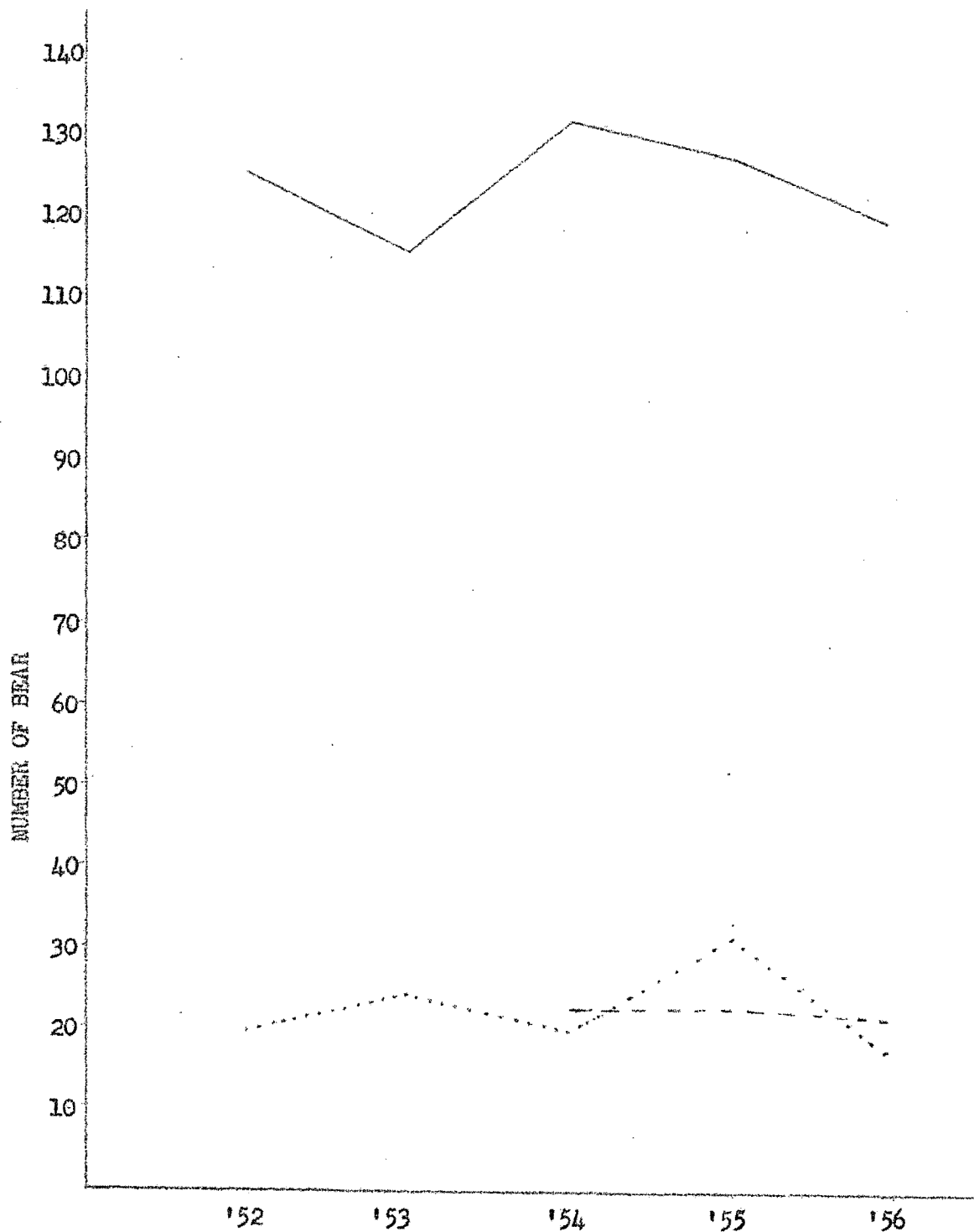


Fig. 1. KARLUK LAKE BEAR POPULATION TREND - 1952 - 56.

—— Total Population Estimate
..... Known Loss
----- Gain - Cub Crop

b. DENSITY

The estimate for 1956 of 117 for the 80 sq. miles of surrounding area, yields a density of 1.46 bear per square mile. This is but slightly lower than the approximate 1.5 average of the last 4 years.

c. HUNTING PRESSURE

The take was light this year due mainly to a late ice breakup and few bear seen during the spring hunts. Of 15 bear taken, (4 in spring, 11 in fall), all but one were taken by non-residents. Two other bear were found dead during the summer, cause of death unknown.

Three guide camps were in operation. Guides cooperated quite well although one showed little respect for the request that sows with cubs not be taken. One female with cubs of the year was killed, but not the cubs. Another was shot at and missed, but its cub killed. Data on cubs of two lactating females, taken by hunters, are not known. This occurred in the fall when sows with cubs are commonly seen. Cubs of the year are rarely seen during the spring hunts.



SR. JUAN LABEIRA (right) OF MONTERREY, MEXICO
WITH 'EL OSO GRANDE', MALE WEIGHING 777 LBS.,
ALF MADSEN, GUIDE.

TABLE III

A. Known Karluk Lake Bear Loss - 1956

<u>Year</u>	<u>Hunter Take</u>			<u>Other</u>	<u>Grand Total</u>
	<u>Spring</u>	<u>Fall</u>	<u>Total</u>		
1952			19		19
1953			23		23
1954			18	1	19
1955	16	15	31	(1 possible seriously wounded)	31
1956	4	11	15	2	17

B. Hunter - Take Composition

		<u>Sex of Bear</u>		<u>Hunter Residence Status</u>	
		<u>Male</u>	<u>Female</u>	<u>Non-Res.</u>	<u>Res.</u>
1954	Spring	8	1	9	
	Fall	4	5	5	4
	Total	12	6	14	4
1955	Spring	13	3	14	2
	Fall	7	8	8	7
	Total	20	11	22	9
1956	Spring	2	2	4	
	Fall	7	4	10	1
	Total	9	6	14	1

Protection of breeding females is necessary to continuation of an adequate yearly cub crop to meet the ever increasing hunting pressure. If certain guides do not adhere to the request to not take cubs with cubs, the regulations might be changed to protect this known breeding stock. Possibly this rule might be hard to enforce, but it should deter a registered guide who values his license. Resident hunters would also be less prone to take females with young.

3. CUB CATCHING

a. GENERAL

Table IV indicates the apparent composition of the Serengeti lion population. Groups, such as cow-cub, and the singles are listed as in 1955. The sub-ad-ad head-in is still used because of numerous medium-size lion cubs that could be adult and unborn females or large sub-adult males.

The cub crop was 21, which is only one less than that for each of the last two years. Lions in their 2nd year were estimated at 27 or 5 more than first

TABLE IV

Karluk Lake Bear Population Composition

GROUPS

	Sow-Cubs				Sub-Ads	
	<u>No. of Groups</u>	<u>No. of Individuals</u>			<u>No. of Groups</u>	<u>No. of Individuals</u>
		<u>F</u>	<u>Cubs</u>			
			<u>1st Yr</u>	<u>2nd Yr</u>		
1 cub	7	7	4	3		
2 cub	10	10	8	12	2	4
3 cub	7	7	9	12		
4 cub	—	—	—	—	—	—
	24	24	21	27	2	4

26 groups
76 bear

SINGLES

<u>Sex</u>	<u>Sub-Ad</u>	<u>Sub-Ad-Ad</u>	<u>Ad</u>
Unknown	11	15	
Male (Probably)			14
Female	—	—	1
	11	15	15

41 bear

Total 76 & 41 = 117

year cubs seen in 1955. This larger number would seem to indicate either that some of the small cubs were not seen the preceding year or that new sow-cub groups had moved into the area.

b. SOW-CUB DATA

One-cub families were quite numerous this season, but no 4-cub groups were observed. The resultant cub/female ratio was 2.00; a figure lower than any preceding records indicate.

	<u>CUBS/FEMALE</u>	<u>1st. Yr.</u>	<u>CUBS/FEMALE</u>	<u>2nd. Yr.</u>	<u>CUBS/FEMALE</u>
1952	2.13				
1954	2.17				
1955	2.35		2.2		2.5
1956	2.00		1.9		2.1

c. AGE CLASSES

Comparison of age classes for the last 2 years and 1952 is shown in table V.

TABLE 7
1956 CENSUS

	1956		1955		1954		1952	
	No.	%	No.	%	No.	%	No.	%
Cubs-in 1st.yr.	21	15	22	13	22	17		
Cubs-in 2nd.yr.	27	21	24	10	25	18	51	41
Sub-ad-adult, 3rd. or 4th.yr.	15	13	30	24	22	22		
Sub-ad-ad-adult or 4th.yr.							37	30
Adults beyond 4th. yr.	15	12	16	13	17	13		
TOTALS	117	100	125	100	132	100	124	100

No drastic changes in any age groups have occurred. Even the Sub-ad and Sub-ad-ad classes, which are the most confusing in identification in the field, show no consequential variance.

A good crop of cubs is needed each year to maintain an adequate population. Protection to the producers of this crop, the breeding females, is good in the Canyon-Corral area, but poor in the remainder.

d. BEAR UNITS

By giving groups, as sub-ad and sub-ad-ad a value of two, the same as single bears, then dividing this number into the total population a value results called by the writer, a "bear unit". The constant from 1956 figures is 1.75 or $117/67$ (67=26 groups plus 41 singles).

This is little different from those found in years previous (1.7 and 1.8). The bear unit, as stated in other reports, might be used in arriving at a truer figure on plane surveys by multiplying the number observed by the constant.

4. NEARBY AREAS

a. DOG SALMON CREEK

At the same time that overnight mountain trips were made to the Canyon-O'Malley area at the southeast end of Karluk Lake, nearby upper Dog Salmon drainage was also checked. Four visits were made and a minimum of 14 different bear observed. No cubs of the season nor large adults were observed. Two females had single second year cubs and one had two.

b. AYAKULIK (RED) LAKE & RIVER

Two different trips with a total of 3 nights spent on mountain ridges resulted in observation of a minimum of 27 bear on Connecticut and East Creeks of this lake. Again no seasonal cubs were seen and only one large adult. A female with 3 second year cubs and one with a single were noted.

On the river 5 Sub-adults were seen.

c. OTHER SURVEYS

Again Don Devan of Fisheries Research Institute kept good records of bear sightings while making salmon surveys on Kodiak, Afognak and the Alaska Peninsula. In Table VI is the summary of his observations 1952 - 1956. Total sightings include possible duplications.

TABLE VI

	1956	1955	1954	1953	1952
	7/3-9/14	7/7-9/15	7/9-9/30		
Sightings	265	284	125	121	166
% 2 yrs. or older	68	62	69	67	60
% Cubs + Yearlings	32	38	31	33	40
% 2 yrs. or older Sows with Cubs or Yearlings	22	27	20	20	25
Ave. No. Cubs/F	2.2	2.3	2.2	2.7	2.6
" " Yearlings/F	1.6	2.1	2.0	2.1	1.5

	1956	
	1st.yr.	2nd.yr.
Sows w/1 young	4	4
Sows w/2 young	15	5
Sows w/3 young	10	2

B. MOVEMENT

1. GENERAL

There seemed to be nothing unusual in general movement. A normal vegetative season was experienced with a good berry crop, especially elderberry, Sambucus racemosa pubens. The scarcity of salmon this year seemed to have no effect, and no noticeable migration of bear in or out of the lake area was noted.

2. MIGRATIONAL

Sows with cubs and yearlings seemed more numerous in late October and early November than earlier. Whether they came from nearby areas is not known. Probably most were resident groups.

C. FOOD

Not as much attention was paid to food habits as heretofore. Little of unusual nature was noted. Use of salmon streams appeared normal until ripening of the elderberry crop and the centering of feeding activities on the lower brushy slopes.

Feeding signs were noted and some scats were examined. Stomach analyses were made of several fall-killed bear.

1. FEEDING SIGNS

No feeding signs were seen until vegetation became noticeable on south slopes about mid-May. The usual early greens were noted as having been grazed.

These included:

Horsetail	<u>Equisetum arvense</u>
Sedges	<u>Carex lyncei</u> , <u>C. mertensii</u>
Grasses	
Bluejoint	<u>Calamagrostis canadensis</u> <u>langsdorffii</u>
Beach Rye	<u>Elymus arenarius</u> <u>mollis</u>
Meadow	
Barley	<u>Hordeum brachyantherum</u>
Hairgrass	<u>Deschampsia beringensis</u>
Nettle	<u>Urtica lyalli</u>
Angelica,	
Seacoast	<u>Angelica lucida</u>
Angelica,	
Bent-leaved	<u>Angelica goniflexa</u>
Cow Parsnip	<u>Heraclium lanatum</u>

During June and early July the same vegetation was being grazed, especially in upper slopes where tender vegetation emerged as snowbanks melted.

Salmon, Red chiefly, Oncorhynchus nerka, were taken during July and early August, but grazing also continued. The use of Seacoast Angelica drops off as flowering stage is reached, but apparently the flowering heads and upper portions of Bent-leaved Angelica



BLUEJOINT GRASS



SEACOAST ANGELICA



RED SALMON



BEAR CARCASS (BURIED)

FEEDING SIGNS

are much relished. Horsetail, grasses and sedges continued in use.

As berry crops ripened in August the bear grazed less, left the salmon streams and attacked the abundant fruit supply. Even before fully ripe, the ever popular and plentiful elderberry fruit was eaten.

Other fruits utilized included:

Salmonberry,	<u>Rubus spectabilis</u>
Highbush Cranberry,	<u>Viburnum edule</u>
Crowberry,	<u>Saxifraga nigrum</u>
Twisted Stalk,	<u>Streptopus amplexicaulis</u>

Most of September was also spent in elderberry thickets. As the frosts and snow of October destroyed most berries except Highbush Cranberry, the larger streams and lakeshore were visited for salmon carcasses - little actual fishing occurred.

Almost every bear carcass left by hunters was used for food by October and November bears. Highbush Cranberry continued to be eaten. The few garbage dumps in the area were visited. Red poque, Boschniakia rossica, conks, Panus applanatus, were also used. In fact, nearly any thing with any food value was utilized in this pre-dorming period.



GRASS & HORSETAIL



CHIEFLY SEDGE



FISH



FIRST ELDERBERRY

BEAR SCATS

Percentage Groups
T - 100% (Total)
100 - 75
75 - 50
50 - 25
25 - 5
5 - Tr. (Trace)

TABLE VII

APPEARANCES AND APPROXIMATE PERCENTAGES OF FOODS IN 66 SCATS
FIELD EXAMINED, KARLUK LAKE - JUNE TO OCTOBER 1956

FOOD	June (25 Scats)					July (23 Scats)					August (13 Scats)					October (5 Scats)					June-October (66 Scats)					Total Appearances			
	T	100	75	50	25	5	Tr.	T	100	75	50	25	5	Tr.	T	100	75	50	25	5	Tr.	T	100	75	50		25	5	Tr.
Horsetails	2		3		2	8		1	1	2	1	2							1	1				3	4	2	4	11	24
Sedges			2					3				2	2					1		1				3	2	1	2	3	11
Grasses	5		6	1		8	2		1	1	1	7					3	1	2		2					1			
Angelica lucida			2	2	2	4		3	3	4	3	1			1	1								4	6	6	5	18	41
Angelica genuflexa																			1	3							5	26	
*Cow parsnip						1																					1		4
Nettle					1							3								2							6		1
Fish									2		2	1					3	1							2	3	3	1	9
*Salmonberry																1		1	1						1		1	1	3
Elderberry																1	1		4	1							6	1	8
Highbush cranberry																			2	1		1	2				2	1	6
Cowberry																1			2					1			2		3
Red poque																										2			2
Donk 1													5															5	5
																													149

ow parsnip
almonberry
ighbush cranberry
owberry
i poque
dk

Heracleum lanatum
Rubus spectabilis
Viburnum edule
Empetrum nigrum
Boschniakia rossica
Fomes applanatus

Also many droppings containing Seacoast Angelica and some with fish remains were seen in July.

The small number of scats recorded in the October column and others examined in the field during October showed considerable use of Highbush Cranberry. This fruit appears to be able to withstand frost and cold and is the only berry available above snow cover late in the fall. The fruit is very persistent and can be seen on the plants even in the following spring. Red Pique, an alder root parasite, and Conks, Fomes applanatus, found usually on cottonwood, are also commonly seen in late fall droppings and in some found in the spring.

As usual, cub scats showed a greater variety of foods eaten than did those of older bear.

4. STOMACH ANALYSES

In the following table are listed the foods found in stomachs of several fall-killed bear.

"K" indicates those taken at Karluk Lake; the remainder were taken near the Navy Base.

TABLE VIII

STOMACH ANALYSES OF ELEVEN FALL-KILLED KODIAK BEAR

NO.	DATE	AGE (Approx.)	SEX	WGT.(lbs.) CONTENTS	APPROXIMATE VOLUMETRIC CONTENTS					
					Elder- berry	Highbush cranberry	Red poque	Conk	Fish	Waste
1 K	Oct. 9	2nd. yr.	M	10	70		20		10	
2	" 14	2nd.	F		50	20			30	
3	" 18	(5th)	M	16	20		5		75	
4	" 19	(4th)	F		50	10				40 - Cub carrion
5	" 19	(6th)	M	4	50					50 - Navy gray paint, veg., debris
6 K	Nov. 1	(3rd.)	M			40		60		
7 K	" 4	(5th)	M	7						100 - Bear carrion
8 K	" 5	(4th)	F	17					100	
9 K	" 6	(3rd.)	M	3					40	60 - Dump waste & veg., debris incl. cloth & cellophane
10	" 19	(10th)	M	28						100 - Dump waste incl. olives, denim & cheesecloth
11	Dec. 16	(5th)	M	30						100 - Cattle butchering

Of the stomach contents weighed, the least was 3 lbs. the most 30; all stomachs contained some food. During October, elderberry was found in all stomachs examined and volumetrically made up 50% of the foods noted.

The fish remains found were primarily bones.

Bear No. 4 was killed while feeding on a cub carcass (No.2); apparently its own, shot 5 days earlier when she herself was wounded.

Bear No. 5 had eaten gray paint which had been used on firing range equipment at the Naval Station. Additional paint was found in the lower colon.

Bear No. 7 K was taken at the carcass of No. 6 K.

Bear No. 9 K had apparently been visiting the dump near the weir cabin at Karluk River. A greasy cloth and cellophane were items found.

Bear No. 10 was taken at a Navy dump. It was very thin but had a full stomach of garbage. Besides starchy and fatty materials; olives, a piece of blue denim and a large piece of cheese cloth, apparently used for meat wrapping were present.

The last bear, No. 11, was taken at a ranch in December. Its stomach contained cattle butchering waste which it had located near a small barn. Cattle nearby were not disturbed according to the caretaker.

D. ACTIVITY

1. GENERAL

The seasonal pattern appeared normal, starting with considerable roaming of adults in early spring, usually at high elevations. The breeding season seemed at its height during the last half of May and early June, with indications of some breeding activity both earlier and later.

No females with cubs of the year were seen until June 27, indicating that they appear usually as breeding activity diminishes, a possible way to escape predation by males.

With the ripening of elderberries in early August, little activity was noted on the streams where salmon were much less numerous than normally.

An early cold period with snow in October appeared to cause less movement of bear, subsequently, most activity was noted near the head of Karluk River, the outlet, and the mouths of the two main tributaries, Thumb and Canyon-C'Malley Rivers. Some trails were followed but the bear found apparently were using their beds temporarily, rather than for winter quarters, for most of these were situated in rather open and unprotected locations. Sow-cub groups were quite numerous at this time.



RUBBING TREE



CUBS' PLAY AREA



TRAIL AT STREAM CROSSING



BED IN HEAVY BRUSH

BEAR

SIGN



DEN ON ALPINE SLOPE

In December no fresh sign was noted, but then snow cover was thin and old. No denning bear were found. The lake was about one-fifth open on December 10, but on the 12th completely ice-covered.

2. INDIVIDUAL

A mother bear, with three wrestling cubs on a snow field, attempted to enter the fun but they appeared to be somewhat distrustful of her large paws. She did hold one a short while with her front feet in an awkward, though gentle manner.

Three cubs of the year, which were spared when their mother and two other cubs were killed in October of 1955, were kept in mind, but none resembling the trio was seen this season.

Two other cubs of this season were observed at the carcass of their mother, killed in November. They were apparently feeding on her body, especially the mammary glands and soft parts. They appeared also to be scraping vegetational debris against the carcass to bury it, as older bear are commonly known to do. In December only bones remained.

E. PHYSICAL CHARACTERISTICS

1. PELAGE

Spring and summer bear show much color variation due to rubbing, and the fact that the old fur appears

to lighten before being shed. The new fall coats of most all bear are quite dark and during September short in length.

Even most light colored animals are dark about the legs, the rear and ventral areas. Anteriorly, a bear may seem very light and posteriorly quite dark, in fact hardly recognizable as the same bear when viewed from opposite ends.

Cubs of the season usually have very dark brown coats. Roughly, 50 per cent may have light buffy, full or partial neck rings. One cub was seen with a wide ring extending even behind the fore legs and gave the impression that the little bear was wearing a short sleeveless sweater.

According to Leonard Helgason, bear guide of Terror Bay, an adult female there with a permanent nepe mark, produces young that carry the same mark, although whether permanent is not known.

2. MEASUREMENTS AND WEIGHTS

Carcasses of several bear were measured and weighed during the fall hunting period - seven males and four females. Although a few boars appeared fairly old, none weighed over 1000 lbs. The large males generally seemed to carry little fat. Most of these

were taken on or near the Naval Station where fall bear activity seemed more intensive than in recent years.

In the following table are presented physical statistics of eleven bear.

All bear were measured and weighed by the investigator, except No. 1, weighed by Refuge Manager, Troyer and No. 3 weighed by Navy personnel.

In several instances removable fat was weighed. The thin condition of some of the larger bear is indicated by the fact that their fat percentage ranged from 2 to 20 per cent, whereas a female weighed in October 1955 carried 27 per cent.

The intestines of four bear were measured with following results.

	Approx. age	Sex	Intestine length
No. 2 -	2nd yr.	Male	51 ft.
No. 6 -	(6th)"	"	92 "
No. 7 -	(5th)"	"	64 "
No.10 -	(10th)"	"	96 "

The last bear (No.10) was definitely an old animal, determined by tooth wear. Length of intestine might possibly be used as a criterion for determining age, although many more bear would need to be examined.

TABLE IX

KODIAK BEAR MEASUREMENTS AND WEIGHTS - 1956

NUMBER	1	2	3	4	5	6	7	8	9	10	11
DATE	Sep. 15	Oct. 9	Oct. 14	Oct. 18	Oct. 19	Oct. 19	Nov. 4	Nov. 5	Nov. 6	Nov. 19	Dec. 16
LOCALE	Afognak R.	Karluk L.	Buskin L.	Anton Larson Bay	Buskin L.	Salonie Crk.	Karluk L.	Karluk L.	Karluk L.	Buskin R.	Anton Larsen Bay
SEX	Female	Male	Female Cub	Male	Female	Male	Male	(Lactating Female)	Male	Male	Male
PROBABLE AGE	2nd.yr.	2nd.	2nd.	(5th)	(4th)	(6th)	(5th)	(4th)	(3rd)	(10th+)	(5th)
MEASUREMENTS											
TOTAL LENGTH(mm)		1677	(1423)	(2097)	(1856)		2186	1856	(1868)	(2186)	2135
TAIL		89			(128)		127	(102)	(152)	127	152
HINDFOOT		266x146	(254x?)	(7x178)	(267x?)	(330x203)	305x178	(254x152)		(381)x203	318x178
EAR		127				127	114	114		114	128
FOREPAD (ins.)		3½		(7)		8	7	6		8	7½
HIDE SQUARE(ft.)		(7)		(9)	(7½)	10	9½	8	9	9½	9½
WEIGHTS (lbs.)											
HIDE		31		(100)	58	104	70	42	50	86	78
HEAD		13		66	39	32	30	20	18	45	46
NECK		25				53	50	33	35	53	41
RIB CAGE		54		162	87	201	150	68	86	85	120
Rt.FOREQUARTER		28		72	45	87	64	35	43	62	66
Lf. "		31		69	41	77	64	42	42	62	69
Rt.HINDQUARTER		42		70	47	86	83	53	52	64	70
Lf. "		36		70	51	103	82	50	51	65	69
*PELVIS		40	130	110	56	100	98	80	77	70	85
VISCERA		50		78	56	76	64	54	43	99	81
HEART-LUNGS		5		17	9	23	11	10	11	21	14
BLOOD-JUICES		(10)		(12)	(10)	(18)	6+(5)=(11)	(10)	(10)	7+(3)=(10)	(13)
TOTAL	280	365	295	826	499	960	777	497	518	722	752
FAT		75				118	152	50	75	(10)	40
LIVER				21		25	12	12		18	13

* Includes kidneys and abdominal wall

() Indicates partial estimate



WEIGHING PORTION OF CARCASS (BEAR)



BEAR MEAT



STOMACH OF BEAR CONTAINING 28 LBS.
OF GARBAGE, INCLUDING OLIVES,
DENIM AND CHEESECLOTH



FAT IN RUMP AREA - 4 INS. THICK

The weight of the liver of several bear are also included in the table.

With the accumulation of sufficient weight data it may be possible to weigh a certain portion of a carcass and arrive at a fairly accurate figure for total weight. For instance, a hind or forequarter, including most of the foot, would be easy to detach and weigh after an animal has been skinned. Of course the butchering would need be done in a manner similar to that from which the data for a table or graph were taken.

The hide or head might also be used, but probably would not give as true a figure because the amount of fat on the animal is not indicated; since there is little fat about the head and fat on the hide would vary with the technique of the skinner.

Plotting of the meager available weight data using hindquarter values indicates a fairly uniform trend, as shown in the accompanying graph. When use of Head and/or Hide figures is attempted, the pattern is more scattered.

Using the same data percentage wise; with males the Hindquarter/Total weight, ratio is 9.5%; with females, 9.7⁺% or roughly 10 per cent.

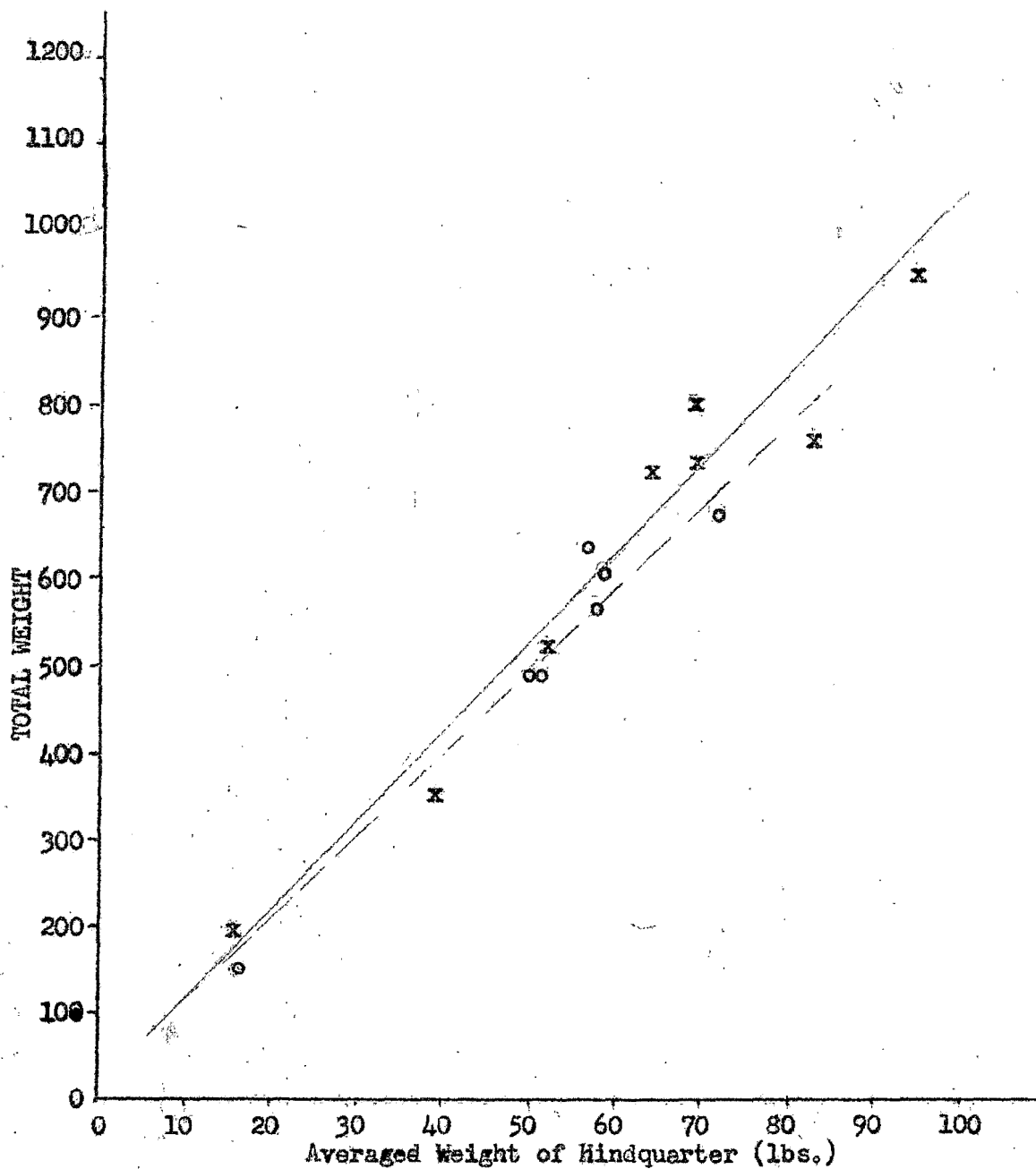


Fig. 2. CORRELATION OF HINDQUARTER TO TOTAL WEIGHTS OF THIRTEEN
FALL-KILLED KODIAK BEAR - 1955, '56.

— x — Males - 8
— o — Females - 5

For field estimates from these data a bear would weigh short of 10 times the weight of a hindquarter.

3. PARASITES

The cestode, Diphyllibothrium sp., was only noted by the author in intestines of two bear, No. 4, a male in which one was found and No. 8, a female, which had several. The female yearling No. 3 was reported by Navy personnel to have had some.

The intestines of one bear, No. 2, contained numerous Ascaris sp.. A few were found in No. 8 but in no others.

Very few Nematodes were found in the stomachs of any bear examined.

4. PREGNANCY

The two mature females examined both had young - no indications of pregnancy were noted.

III BRAN-SALMON INVESTIGATIONS

The lowest red salmon escapement (137,647) ever

recorded for Karluk, little more than a third of even the low tallies of 1954 and 1955, was reflected in

the small number of fish found in spawning streams.

at Karluk

The June fishery village appeared to affect considerably the loss of early spawners; the only one that use the smaller lake tributaries.

V. HALFWAY CREEK

A weir was again installed and operated on this small stream to tally the escapement into the short spawning stretch. Also the weir and attached escape pen caught dying and dead fish.

It was found necessary to construct an electric fence to protect the installation from visiting bears;

human odor seemed to have little "scare-effect."

Several fish were taken from the pen and the choke-

wire slides knocked down during the night prior to

erecting the fence. No more visits to the weir area were known to have been made by bear after the fence

was activated.

I. ESCAPEMENT

Salmon were entering the stream by July 9 when

the weir was closed. In 1955, it was not until July 17



WEIR & ESCAPE PEN



CRUSHED WIRE OF ESCAPE PEN
AFTER VISIT BY BEAR



CONSTRUCTING ELECTRIC FENCE



COMPLETED ELECTRIC FENCE
ENCLOSING WEIR AREA

HALFWAY CREEK

that fish were ascending in numbers, and the weir installed. In both seasons the presence of the weir appeared to disturb the fish at first as none were counted through it for several days after construction. Most fish entering were ripe and usually spawned within a very short time.

Missing dates in the following table indicate no fish tallied.

TABLE X
HALFWAY WEIR TALLY

<u>DATE</u>	<u>ESCAPEMENT</u>	<u>REMARKS</u>
July 9		Weir closed - 30 fish counted in stream before closing.
July 11		24 Fish counted.
July 13	(140)	140 Fish counted upstream. Bear knocked down sides of pen. At least 19 fish taken.
July 14		Erected electric fence.
July 15	56	First tally through weir.
July 16	1	
July 17	30	
July 18	48	
July 19	8	
July 21	1	
July 23	6	

TABLE X (Cont.)

<u>DATE</u>	<u>HALFWAY WEIR TALLY</u> <u>ESCAPEMENT</u>	<u>REMARKS</u>
July 24	139	
July 25	69	
July 26	38	
July 27	18	
July 28	21	
July 29	9	
July 30	26	
August 1	3	
August 2	34	
August 3	10	
August 11	7	
August 13	1	Weir in several days longer to collect carcasses
August 20		Only 2 fish counted in stream.
TOTAL	665	

This figure, (665), is roughly one-fourth the escapement of 1955 - 2845 and is one/fifteenth that of 1948, a good year, with 10,230.

Going back to the Table it is noted that no salmon were tallied until July 15, six days after weir installation, but even so the number of fish observed

in the stream increased to 140 by July 13, when bear visited the weir area. Apparently the chickenwire of the pen was crushed low enough to allow salmon to by-pass the weir.

The weir was opened on August 21st and removed soon thereafter.

An inadequate escapement this year was evidenced by the fact that considerable amounts of good spawning gravel contained only occasional redds and spawning fish.

2. RESULTS

Of the 665 tallied escapement, 526 carcasses were collected and examined; a discrepancy of 21 per cent. This many were unaccounted for in spite of daily visits and checking each stream bank at least 50 ft. back. A loss even greater than this has occurred in other years; 25% in 1955, 35% in 1948. One answer is that some of the small salmon, of which there are several in the Halfway Creek population, may be able to pass through the wider picket openings of the weir when disturbed and reach the lake, only to be counted again when they return upstream. One tagged fish was caught above the weir and then caught in back of the weir a few days later; indicating that this one could be tallied twice.

The area above the cascade barrier was again

checked this year for possible spawners but none seen.

As might be expected with such a small escapement, the bear take of unspawned salmon increased percentage-wise. Ofcourse the number taken at the escape pen before protecting with the electric fence, included several unspawned individuals since the visit occurred early in the spawning period. The following table indicates the condition of the 526 carcasses examined:

Of the unspawned bear-take, although less than 50% spawned out, most all appeared to have spawned to some extent. Only 6 of the 22 known bear-taken unspawned fish were females. Most of the data used to arrive at the figure of 13%, were therefore from the more promiscuous males, the least valuable of the two sexes.

In spite of 341 bear-taken fish of the 526 carcasses examined (65%), the actual damage to the run in unspawned individuals taken seems relatively low, indicating that even on small streams, damage by bear is less actual than apparent.

TABLE XI

RED SALMON CARCASSES EXAMINED AT HALFWAY CREEK
1956 - 526 WEIR + UPSTREAM CARCASSES - ESCAPEMENT: 665

Cause of death	WEIR				STREAM + BANKS				COMBINED			
	Unspawned	Spawned	?	Totals	Unspawned	Spawned	?	Totals	Unspawned	Spawned	?	Totals
Bear-taken	<u>7</u>	<u>32</u>	<u>51</u>	<u>90</u>	<u>17</u>	<u>63</u>	<u>171</u>	<u>251</u>	<u>24</u>	95	222	341
Natural	7	163		<u>170</u>			2	<u>2</u>	7	163	2	172
Unknown	3	3	4	<u>10</u> <u>270</u>	1	1	1	<u>3</u> <u>256</u>	4	4	5	<u>13</u> <u>526</u>
B-T of unknown	$\frac{90}{90 + 170} \times 10 = 3$				$\frac{251}{251 + 2} \times 3 = 3$				$3 + 3 = 6$			
Unspawned of B-T (?)	$\frac{7}{7 + 32} \times 51 + 3 = 10$				$\frac{17}{17 + 63} \times 171 + 3 = 37$				$10 + 37 = 47$			
Unspawned Bear-take	$\frac{7 + 10}{270} = 6\%$				$\frac{17 + 37}{256} = 21\%$				$\frac{24 + 47}{526} = 13\%$			

2

IV SPAWNING SPEED STUDY

Again salmon were tagged at the mouth of Halfway Creek, then dip-netted and examined daily when possible, as observed in the stream, in an effort to learn more of the speed and other facts of the spawning process.

A. SALMON TAGGING

A total of 43 fish were tagged with metal cattle tags. Of these salmon, 27 were ripe when tagged and usually within a week were seen in the stream, although only 12 were netted once or more.

On Grassy Creek two spawning pairs were tagged in an attempt to determine amount of promiscuity and movement.

B. RESULTS

In general, results agreed with those found last year. The data indicate that females can deposit most of their eggs in as little as 2 days after a redd is established. One female (#753) went through the spawning act as often as every 15 seconds when a male present. Interference by other salmon increased the period to as much as 2 minutes. When her mate was netted and tagged, another larger male moved into the redd and serviced the female. Within an hour the



SEINING



ATTACHING TAG

RED SALMON TAGGING

TABLE XII

SPAWNING DATA - TAGGED RED SALMON
HALFWAY CREEK - 1956

	Tag.No.	Date Tagged	FIRST NETTED		Spawned	Last Netted	Remarks
			In Stream	At Redd			
Female	753	Jul.18R*	Jul.24	Jul.25	Jul.27	Jul.27	Jul.25 eggs-fresh-thin just above weir. Jul.27 No eggs-at Redd
	754	Jul.18	" "			Jul.25	Jul.24 - ripe-fresh 75 yds. up - plump
	770	" "	" "			Jul.24	Jul.24 - ripe-fresh-plump 50 yds. up - plump
	773	Jul.18R	Jul.20	Jul.25	Jul.27	Jul.30	In protected area, behind weir, Jul.30 - old, gray
Male	747	Jul.16	Jul.24			Jul.24	10 yds. above weir
	748	" "	Jul.19	Jul.19		Jul.19	Netted only once at Grassy Crk. 2 mi.N.-Milt thin-worn skin
	763	Jul.18R	Aug.1			Aug.1	Netted once behind weir - milt medium-thin body
	764	" "	Jul.19	Jul.19		Jul.22	Behind weir, milt thin Jul.22 - milt thinner seems to be still spawning
	787	Jul.20R	Jul.24	Jul.27		Jul.28	Jul.24-milt thick - 50 yds. up Jul.27-milt thin - 35 yds. up Jul.28 - at weir
	790	" "	Jul.27	" "		" "	Jul.27 - milt thick -35yds. up Jul.28 - milt medium- " "
	793	" "	Aug.3			Aug.3	Behind weir - milt thin
	799	Jul.25R	Jul.25	Jul.25		Jul.27	Jul.25 Spawning with #753 - milt thin just above weir Jul.27 with new mate - 50yds.UP

GRASSY CREEK - 2 SPAWNING PAIRS

	Tag.No.	Date Tagged	FIRST NETTED		Spawned	Last Netted	Remarks
			In Stream	At Redd			
Female	F 795	Jul.19R		Jul.19		Jul.19	Jul.20 - not located
Male	M 796	" "		" "		Jul.22	Jul.20 -5ft. above redd Jul.22 -60ft. down stream
Female	F 797	" "		" "		Jul.20	Jul.20 -40ft. upstream
Male	M 798	" "		" "		" "	Jul.20 -near redd, but another pair in it.

*R = Ripe when tagged.

F = FEMALE
M = MALE

original male, now #799, was back with her. Two days later he was nearly 50yds. upstream with another female at its redd. The former mate could not be found. This incident shows a tendency to promiscuity among the sexes and considerable movement of the males, but less on the part of the females.

A male with thin milt continues to consort with spawning females. How long he is effective in fertilizing eggs is debatable. He apparently continues to be active in attempting fertilization, as long as he is sufficiently strong to maintain his position in the current and against other males.

V BEAR MARKING - 57 -

A. BOTTLE STATIONS

Two colors were used this season in two different sections of the lake area in an attempt to determine bear movement, especially local.

Nineteen bottle stations were constructed along the lake shores and the Thumb area during the last four days of August. Small bottles were half-filled with orange (red lead) paint. Six others in the Canyon O'Malley area were also set up using white lead. No stations were installed at the northwest end of the lake.



PREPARING BOTTLES



CONNECTING TRIPWIRE



STATION ON BEAR TRAIL

BOTTLE STATIONS

B RESULTS

Nearly all stations were tripped several times during September and until after mid-October when an early cold spell caused thickening of paint in the bottles.

At least three orange-marked bear were known taken by hunters; another was passed by because of too much paint. All were found in the "orange" area except one. This one was killed in the "white" area, yet not more than 4 miles from the nearest "orange" station. Durability of the paint seemed quite good. A painted bear shot in early November still had a considerable amount of paint well adhered to fur of the rump area.

VI BEAR DETERRENTS

The use of deterrents during the season was mainly as an adjunct to another operation rather than a major investigation.

A. ELECTRIC FENCE

As mentioned earlier, a short fence protected the weir and escape pen at Halfway Creek from bear depredation. It was very effective; after installation no fish were known taken and the wire was not broken.

It was a 2-strand type with strips of cloth hung at intervals.

B. FIRECRACKERS

A few nights were spent by refuge personnel in jungle hammocks in trees on stream banks to observe number of bear and effects of "crow-scare" firecracker string explosions. Since the occasional bear spent so little time in the vicinity, apparently due to scarcity of fish, good tests could not be effected. Again birds were noted to be only disturbed at first. One investigative magpie flew to the branch where the firecrackers hung directly after one exploded.

A Kamishak Bay stream guard, Ivan Marx, tried firecrackers to keep bear away from a weir which he tended ^{in 1956}. They were not very effective, he stated, the bear only laid their ears back. He also tried roman candles, though more expensive, ^{they} were much more effective, especially when aimed near the bear.

An automatic device might be contrived to cover a spawning stretch. Roman candles, aimed upstream and others down stream, linked with fuse rope to allow firing at set or varying intervals.

VII OTHER INVESTIGATIONS

A. BALD EAGLE

The bald eagle, Haliaeetus leucocephalus, population appeared low and there were few successful nestings in the lake area.

In mid-May a few incubating birds were seen, but when the nests were again examined in mid-June one-half were deserted, some still contained one egg, others had none. Not more than 8 nests about the lake contained young.

As indicated in the following list, Barluk eagles make considerable use of Dolly Varden, Salvelinus malma, in feeding their young. Red salmon are also used, but usually seem to be taken while scavenging rather than fishing. The only eagle seen to catch a fish in the area caught a Dolly Varden.

RESULTS OF VISITS TO TWO EAGLE NESTS - 1956

<u>Nest No.</u>	<u>Date</u>	<u>No. Eaglets</u>	<u>Approx. age</u>	<u>Wgts. (lbs)</u>	<u>Food Comments</u>
# 4	May 12	2 (eggs)			
"	June 26	2	2 wks.	1½	3 Dolly Varden 1 Red Salmon
"	July 17		5 wks.	6½, 7	1 Dolly Varden
"	Aug. 19		10 wks.	11	1 Red Salmon
# 7	" "	2	9 wks.		1 Red Salmon



MAY 12 - EGGS IN DEPRESSION



SIZE COMPARED TO THAT OF WATCH



JUNE 26 - ABOUT 2 WEEKS OLD
WEIGHT - $1\frac{1}{2}$ LBS.



JULY 17 - ABOUT 5 WEEKS OLD
WEIGHT - $6\frac{1}{2}$, 7 LBS.



BALD EAGLET

DEVELOPMENT

AUGUST 19 - ABOUT 10 WEEKS OLD
WEIGHT - 11 LBS. - BAND ON LEG

During the summer 6 immature eagles were banded.

B. GOSHAWK

An incubating goshawk, Astur atricapillus, was found on May 12. Later visits were made when the young were about 3 weeks old; again at 4 weeks when each weighed 2 lbs. On this latter visit, mouse fur, Microtus sp., was found at the base of the nest tree. In the nest were bones of a magpie-size bird.

On July 17 the last visit was made when the young hawks were approximately 7 weeks of age and ready to fly. One was banded. Food found in the nest included mouse fur, magpie, Pica pica, and fox sparrow, Passerella iliaca, feathers and bird bones.

The parent goshawks were much more aggressive toward an intruder than eagles seem to be.

C. GULLS

On Gull Island near Camp Island, nesting short-billed gulls, Larus canus, apparently suffered almost complete destruction of their nests and eggs this season by either red foxes, Vulpes harrimani, or land otter, Lutra canadensis pacifica, or both. Hardly an immature short-billed gull was seen.



ADULT AT NEST



JUNE 29 -
ABOUT 4 WEEKS OLD
WEIGHT - 2 LBS.

GOSHAWK SERIES



BAND ON LEG - ABOUT 10 WEEKS OLD

The stomachs of 3 short-billed gulls examined on August 5, contained only stickleback, Gasterosteus sp., remains. This seemed somewhat surprising since salmon were spawning at the time.

The stomach of a glaucous-winged gull, Larus glaucescens, examined at the same time contained nothing.

According to Douglas Hilliard, parasitologist, Arctic Health Research Center, only glaucous-winged gulls, of the 2 species, have been found harboring the cestode, Diphyllibothrium sp. which infects red salmon and Kodiak bear.

D. BIRD LIST

Again, a record of daily bird sightings was kept and is included below.

Attempts to locate the mountain top bird, identified as a surf bird, Aphria virgata, in 1955, were not successful. Birds seen and bird cries heard on high ridges at dusk fitted the description of surf birds, but no nesting individuals were located.

By mid-May many of the summer residents had arrived. They seemed most plentiful in the zone including the upper alders, willows and low alpine

MAY 1956

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 9 20 21 22 23 24 25 26 27 28 29 30 31

* No.7 - Uyak Sun-cldy
" 8 - Mt. cldy
" 9 - Cldy
" 10 - Cldy

No. 11 - SE. storm
" 12 - Mt. cldy
" 13 - Mt. rain
" 14 - Drizzle

Mt. Mt. Mt. Mt. Mt.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 9 20 21 22 23 24 25 26 27 28 29 30 31

[illegible]

SIGHT RECORD

Kenai

九

mt.

此：

• 52, 54

•••••

Avakulik L.
Caher

Gabay

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

[illegible]

Ayakulik (Med)-Pt. Barrow

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

[illegible]

- -/fograk- - - - -

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 9 20 21 22 23 24 25 26 27 28 29 30 31

[illegible]

OCTOBER 1956

~~Revelation~~

Modine

NOVEMBER 1936

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 9 20 21 22 23 24 25 26 27 28 29 30 31

LONGSPUR AL.
BUNTING SN.

KIM CLARK

BIRDS OF KARLUK LAKE - KODIAK, ALASKA SIGHT RECORD

DECEMBER 1956

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

[illegible]

areas, about 1,000 to 1500 ft. above sea level. Ptarmigan, Lagopus sp., cocks were calling continuously in early morning especially in the valley areas. The first to leave for the south again were the violet-green swallows, Tachycineta thalassina, observed commonly until mid-August. The last sighting was entered on August 27. Most other summer residents were but rarely seen after mid-September.

E. DOLLY VARDEN

Stomach analyses of 30 Dolly Varden seined on June 16 near Camp Island indicated the following;

TABLE XIII

VOLUMETRIC PERCENTAGES AND APPEARANCES OF FOODS IN ANALYSES OF 30 DOLLY VARDEN STOMACHS

Percentage Groups

T - Total (100%)

100 - 75

75 - 50

50 - 25

25 - 5

Tr. - Trace

Camp Island, Karluk Lake

	T	100	75	50	25	5	Tr.	Total
								Appearances
*Molluscs	7	3			2	3		15
*Crustaceans					1			1
*Insects	1	1			1			3
*Stickleback	1	1				3		5
*Algae					2	2		4
Empty	7							7

*Molluscs

Crustaceans

Insects

Stickleback

Planorbis sp. (Bythinia sp.)

Gammarus sp.

Caddis, Trichoptera

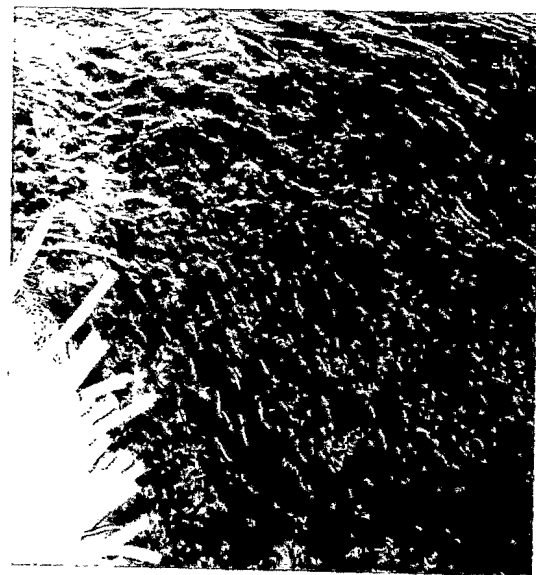
Gasterosteus (Aculeatus)



CESTODE, DIPHYLLIBOTHRIUM SP., ENCYSTED ON
RED SALMON VISCERA



MOLLUSCS, CHIEFLY, PLANORBIS SP.,
IN DOLLY VARDEN STOMACH



STICKLEBACK, - A FOOD OF
DOLLY VARDEN, ALSO OF
SHORT-BILLED GULLS

Of these 30 char, 17 were male. Weights ranged from $\frac{1}{2}$ to $2\frac{1}{2}$ lbs. and lengths (nose to fork of tail) from 12 to $19\frac{1}{2}$ inches. There appeared to be no correlation between size of fish and type of food taken. On July 16, the stomachs of 5 Dolly Varden taken at the lake outlet, Karluk River were examined and found empty.

All these char were examined by Mr. J. S. Hilliard, during his parasitological studies. Heccerel. Carter, to determine presence of the cestode, Diphyllibothrium, in encysted form. He found that 20 showed very light to light infestation.

F. TEMPERATURES

Lake (surface) water and air temperatures (Fahrenheit) were taken generally every 2 or 3 days, usually between 0800 and 0900.

In mid-May when ice vestiges were fast melting in water temperatures of about 37 degrees, air temperatures at the same time were in the low forties.

By mid-June water temperatures were in the low forties and air in the low fifties.

The first 50 degree water reading was recorded on July 14 and a high of 56 degrees by the 22nd.

This temperature held nearly constant for a month, then began a gradual decline reaching 50 degrees again by mid-September. Air temperatures roughly were similar. After mid-September air temperatures dropped considerably, averaging 10 degrees or more below those of lake surface water, which hovered around 35 degrees by the first of November. Now small lakes had frozen but Karluk Lake had only shore ice in protected areas.

On December 10 both ends of the lake were ice covered, leaving possibly one-fifth of its central area ice-free, although the water temperature was 32 degrees. Air temperatures reached 12 degrees and on the 12th the entire lake surface was frozen. On January 30, 1957 ice was found to be 13 inches thick and water temperature 32 degrees.

VIII COLLECTIONS

A. PLANKTON

Weekly plankton samples were taken and forwarded to Douglas Hilliard, Arctic Health Research Center in Anchorage. These are being studied to learn more of the life cycle of the tapeworm, Diphyllobothrium sp. that infects the bear as a final host.

B. BEAR MATERIAL

Several skulls and other bones of bear were collected; to be studied by Arctic Health Research Center personnel.

C. PLANTS

Again some plants, especially alpinas were collected and pressed.

IX EQUIPMENT

The sturdy refuge skiff, built in 1952 from a kit, was repainted and the bottom covered with fiberglass. Except for slight prop breakage its two 7½ Hp. motors operated efficiently.

Additional sleeping bags, two mountain tents and two jungle hammocks were available and used during the season.

X SUMMARY

1. The 1956 estimated bear population of 117 was slightly below that of 125 in 1955. Known hunter take was 15 while 2 more bear were found dead of unknown causes; the kill a year ago was 31.

2. The cub crop was estimated at 21, only one less than that of each of the last two years.

CABIN



APPLYING
FIBERGLASS

SKIFF
REFINISHED



It was interesting to note that the number of young estimated in 2nd. year was 27 or 5 more than first year cubs estimated in 1955.

3. The 1st. and 2nd. year young/sow ratio was only 2.0, it was 2.35 last year. Seasonal cub/sow ratio for 1955 was only 1.9. Numerous one-cub groups were seen, but none of 4 cubs this season. In the fall, numerous sow-cub families were observed near the larger streams, very vulnerable to being taken by hunters.

4. All age classes were well represented and showed little change, although less were estimated in the sub-adult and more in the adult classes than in the last two years.

5. Vegetative conditions were normal. During the month of July, bears were active on the spawning streams but with August and ripening elderberries they soon were difficult to locate on the brushy slopes.

6. Food habits were observed but not emphasized as in the past two years. No definite change was noted, except that less total amount of fish appeared to be used, primarily because the escapement into Earluk Lake was the lowest on record, 137,647, or

little more than a third of the escapement for each of the last two years.

7. Stomachs of several fall-killed bear were analyzed and found to contain the usual berries, fish, red pogue and conks but also paint, and pieces of cloth.

8. Measurements and weights were recorded of these same bear. The heaviest male weighed 960 pounds. None of the larger bear appeared fat.

9. A weir at Halfway creek indicated ^{red salmon} escape-
ment of 665, roughly one-fourth that of 1955 (2845). Only 526 carcasses were examined. Unspawned bear-take amounted to 13%, based primarily on data from male salmon. In 1955 the figure was only 1.5 per cent.

10. A small spawning speed study revealed the same as last year - deposition of eggs in as little as 48 hours after locating a redd. The spawning act was observed to occur as often as every 15 seconds to as much as 2 minutes.

11. Twenty-five bottle stations were constructed and numerous contacts made. At least 3 marked bear were taken and another passed by because of too much paint. None had left the "paint" area.

12. A short 2-strand electric fence proved very effective at the weir area on Halfway Creek. It was established after a nocturnal visit by bear resulted in loss of several unspawned fish.

13. Investigations of eagle, goshawk and gull food habits were made. Eight eaglets were banded; one goshawk. A daily bird list was kept. Some Dolly Varden food habits data and surface water and air temperatures were recorded.

Library
U.S. Fish & Wildlife Service
1011 E. Tudor Road
Anchorage, Alaska 99503