

ALASKA DEPARTMENT OF FISH AND GAME  
JUNEAU, ALASKA

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MOOSE REPORT

by

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Volume IV  
Annual Project Segment Report  
Federal Aid in Wildlife Restoration  
Project W-6-R-4, Work Plan B

The subject matter contained within these reports is often fragmentary in nature and the findings may not be conclusive; consequently, permission to publish the contents is withheld pending permission of the Department of Fish and Game.

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WORK PLAN SEGMENT REPORT  
FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska  
PROJECT NO.: W-6-R-4 TITLE: Alaska Wildlife Investigations  
WORK PLAN: B TITLE: Moose Investigations  
JOB NOS.: 1-a,d; 2-a,b,c,d,f; 3-a,b  
PERIOD COVERED: May 1, 1962 to June 30, 1963.

ABSTRACT

Southeast Alaska:

The results of 12 aerial composition counts conducted in the late fall of 1962 and late winter of 1963 indicated that the per cent of calves in the various herds was normal and calf survival through late winter was good.

The total known moose kill was 261 animals; the estimated total kill was 385 moose (310 bulls and 75 cows).

Alaska Peninsula:

In November 1962, 1,113 moose within the boundaries of four newly established transect areas were categorized by sex and age. The overall bull per cow ratio was nearly 1:1. Calf production was good in the Cinder River and Mother Goose Lake areas but poor in the Dog Salmon River and Ugashik Lakes areas.

It was ascertained, through aerial spring counts, that the calf winter mortality was 15 per cent.

A small sample of 15 cows with calves in late May 1963 exhibited a high incidence of twinning.

Southcentral Alaska:

Nearly 54 hours were flown in the fall of 1962 sexing and aging 4,948 moose throughout southcentral Alaska. The number of calves per 100 cows diminished by well over a third from the previous year. The most probable explanation of this drop is that the abnormally deep snow cover during the winter of

1961-1962 so debilitated the pregnant cows as to affect the survival of the then unborn calves.

During a composition count flight of about 2 1/2 hours in March of 1963 in the vicinity of Cordova, 67 moose were observed, of which 33 per cent were calves.

In February of 1963, 585 moose were tallied in 713 square miles within the Matanuska Valley. The total estimated population was 1,476 animals or 2.1 moose per square mile.

Periodic aerial counts of the calving grounds were utilized to determine the pattern and magnitude of calving in 1962. Calving peaked on approximately June 5 and the estimated production was 101 calves per 100 cows.

A comparison of data obtained through the use of conventional aircraft with those obtained with helicopters cast some doubt into the complete validity of observations made from fixed-wing aircraft.

One hundred and twenty calves were tagged in the lower Susitna and Matanuska Valleys during late May and early June 1962.

The total known, legal hunter take during the 1962 season was 2,479 moose: 560 passed through checking stations; 104 were determined to have been taken by residents of the Matanuska Valley during the regular season; 1,770 were harvested by participants in the antlerless hunts; 25 bulls were taken at Cordova during a registration hunt (unlimited number of participants) from August 20 to September 4, 1962 when closure was effected by a Commissioner's announcement; and personal interviews disclosed the killing of 20 more animals.

Specimen materials collected during the November 1-7 antlerless hunt included incisorform teeth from 695 moose and eyeballs representing 541 animals.

From July 1962 through May 1963, 81 moose were known to have died from causes other than hunter harvest: 53 car kills; 14 Department kills for reasons of public safety; 5 illegal kills; 4 train kills; and 5 that died from unknown causes. Specimens were collected and weights and measurements were taken from as many of these animals as possible.

## Interior-Arctic Alaska:

Aerial composition counts conducted in the late fall on the Goodpaster-Shaw Creek Flats resulted in samples numerically too small for meaningful conclusions.

Fall composition counts on the Yukon River indicated poor calf production.

March composition counts of 1,650 moose on the Koyukuk and Yukon Rivers again denoted a low percentage of calves in the sample.

The Tanana Valley fall aerial sexing and aging of moose resulted in information which indicated the population was in good shape: there were 44 calves per 100 cows; the calf per cent in the herd was 23; and there was about a 1:2 bull to cow ratio.

One thousand seven hundred and forty-two people registered for the three antlerless moose hunts and 861 participants took 113 antlerless and 31 antlered animals.

### RECOMMENDATIONS

Harvest data from the Stikine River moose population indicate a continuing trend of an overbalance in the take of 1 1/2 - 2 1/2 year old animals. A reduction in the annual kill may soon be necessary.

When registration seasons are held in the future, if at all feasible, the public should be allowed to register throughout the hunts.

When accuracy is paramount in moose composition count results from important but rather small, confined populations and when economics allow, two place helicopters should be used in preference to single-engine, fixed-wing aircraft.

The "Information & Education" aspects of the moose investigations should be presented to the public at every opportunity; our program sorely needs emphasis at this level.

WORK PLAN SEGMENT REPORT  
FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECT NO.: W-6-R-4 TITLE: Alaska Wildlife Investigations

WORK PLAN: B TITLE: Moose Investigations

JOB NOS.: 1-a,d; 2-a,b,c,d,f; 3-a,b

PERIOD COVERED: May 1, 1962 to June 30, 1963

OBJECTIVES

Southeast Alaska:

To obtain information on the total numbers, distribution, sex and age composition of the moose herds in Southeast Alaska and to collect and evaluate hunter harvest data.

Western Alaska:

To determine seasonal population distribution and movements.

To obtain an estimate of total numbers or establish population density indices.

To determine herd composition.

To collect and evaluate hunter harvest data.

Alaska Peninsula:

To determine the distribution and relative abundance of identifiable moose populations of the Alaska Peninsula.

To establish aerial transects in key watersheds as a means of evaluating changes in population density and herd composition from year to year. To obtain information regarding calf production of Peninsula moose herds.

Southcentral Alaska:

To determine the distribution, abundance, and composition of moose.

To tag moose calves to determine patterns of movement and obtain known-age jaws.

To determine patterns of calving, initial productivity, and calf survival.

To obtain information indicative of the hunter kill, area hunting pressure, age composition of the kill, hunter success, and the chronological distribution of the kill.

To record the incidence and effect of the various causes of mortality other than hunting which operate against moose populations subject to significant hunting pressures.

To delineate primary and secondary moose winter ranges, during the critical winter period in selected areas using methods presently available and by developing such new techniques as may be necessary.

To establish standard basic methods of evaluating condition of moose winter ranges in relation to plant succession and degree of use by moose.

#### Interior-Arctic Alaska:

To determine the sex and age composition of moose populations in relation to hunting and predation.

To establish an index to relative abundance in areas where herd composition counts are conducted.

To determine the relative mortality and survival of moose to the yearling age.

To obtain information indicative of the total hunter kill, areas hunted, age composition of the kill, hunter success, and the chronological distribution of the kill.

To collect in a systematic manner history and biological data pertaining to moose populations of Interior and Arctic Alaska in those areas where specific investigations are not in progress.

### TECHNIQUES

#### Southeast Alaska:

Fall and early spring aerial counts were conducted in

specific drainages to determine the sex and age structure of several moose populations.

Harvest data were obtained by contacting hunters in the field, at their places of residence, and by the examination of an airline's shipment records.

#### Alaska Peninsula:

In November of 1962 four transect areas were established on the Alaska Peninsula for the purpose of conducting aerial composition counts of moose (Figure 1). These areas were named after the most outstanding topographic features encompassed within the transects' boundaries: Cinder River transect (283 square miles), Mother Goose Lake transect (323 square miles), Dog Salmon River transect (349 square miles), and Ugashik Lakes transect (291 square miles).

Fall and spring aerial counts were conducted within these transect areas to establish the sex and age composition of the moose populations therein.

#### Southcentral Alaska:

Fall composition counts, through the use of light aircraft, were conducted in several pre-established areas to ascertain the sex and age make-up of the populations.

Periodic aerial counts during May, June, and July were made over several moose calving areas to determine the pattern of calving and calf survival.

Military and commercial helicopters provided a feasible means to tag moose calves on the calving grounds.

The moose harvest was determined through information collected from check stations, mandatory reporting by permit holders, estimates by Department field personnel, personal interviews with guides, hunters, and lodge proprietors.

Check stations were maintained on the Kenai Peninsula one mile west of the junction of the Seward and Sterling Highways, at Mile 36 on the Palmer Highway, and mile one on the Denali Highway. The Kenai station was operated from August 18 to September 16; the Eklutna station on the Palmer Highway was operated from August 20 to September 30 and from November 1-17; The Denali check station was open from August 20 to October 20 and then was moved to the junction of the Richardson Highway;

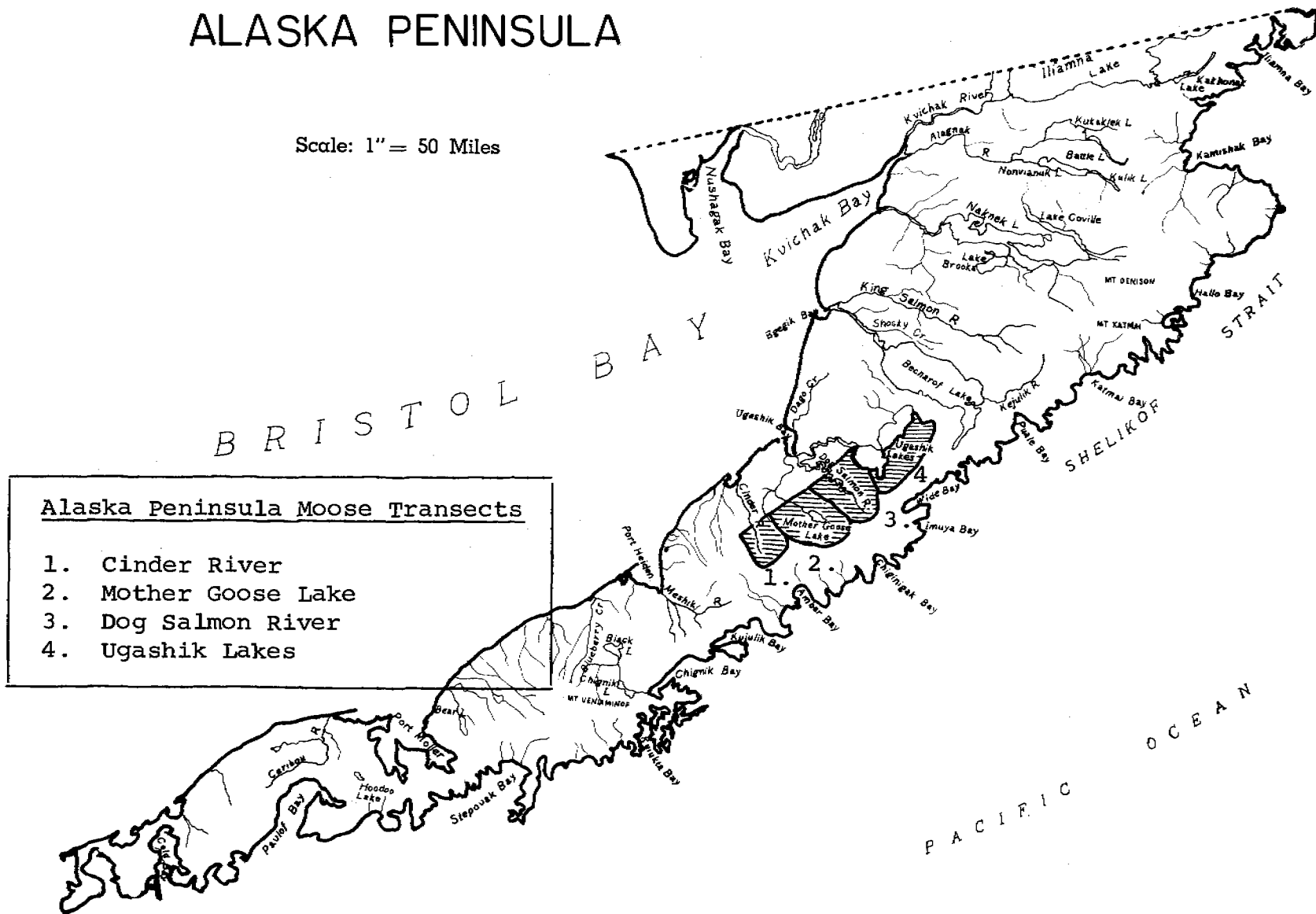


Figure 1.

# ALASKA PENINSULA

Scale: 1" = 50 Miles

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and the Tok cutoff where it remained from October 21-25. On October 26 this station was transferred to King Mountain Lodge on the Glenn Highway (Mile 77) and remained there from October 26 to November 7.

All instances of mortality resulting from railroad and highway accidents, predation, pathological causes, paristism and winter kill were investigated. Reproductive data and weights and measurements were recorded; in addition, specimen materials were collected and preserved.

#### Interior-Arctic Alaska:

Fall and spring aerial counts were conducted on several moose populations to determine their sex and age compositions.

Kill data were secured from the antlerless moose seasons through the mandatory checking in and out of the hunts by all participants.

### FINDINGS

#### Southeast Alaska

##### Composition Counts:

Aerial moose composition counts were conducted in southeast Alaska in the late fall of 1962 and again in the late winter of 1963 (Tables 1 and 2). The 12 sample counts were generally small, varying from 15 to 181 animals and averaging 61. Most of the late fall flights were made after the bulls had been dropping their antlers for at least two weeks; consequently, the "per cent of calves in the sample" and "total moose" sections comprised the main benefits derived from the observations.

The per cent of calves in the various herds was normal (15-25 per cent) for the time of year. Berners Bay was an exception to this in the fall (probably because of the small sample size) but the percentage was up in the later count.

Assuming adult mortality to be slight, the calf per cent in the late winter counts showed little difference from the observations attained four months previous. Snow depths well below average in southeast Alaska probably were a factor in this light mortality.

Presently, there is a paucity of details relative to the counting conditions existing at the time of each flight. Such information has a direct bearing on the interpretation of these

Table 1. Moose Compsition Counts  
Late Fall, 1962  
Southeast Alaska

Area	Date	Bulls	Adult Cows	Uniden- tified	Calves	Per Cent Calves In Herd	Total Moose	Moose Per Hour
Haines Area	12/18/62	8	134	0	39	22	181	Unknown
Berners Bay	11/26/62	7	7	0	1	7	15	Unknown
Berners Bay	12/17/62	12	6	0	2	10	20	13
Taku R.	11/23/62	1	35	0	6	14	42	Unknown
Taku R.	12/18/62	1	16	2	5	21	24	13
Stikine R.	12/24/62	-	-	101	24	19	125	42

Table 2. Moose Composition Counts  
 Late Winter, 1963  
 Southeast Alaska

Area	Date	Unidentified Adults	Calves	Per Cent Calves In Herd	Total Moose	Moose Per Hour
Chilkat Valley	3/22/63	86	10	10	96	Unknown
Berners Bay	3/ 7/63	13	3	19	16	11
Taku R.	2/18/63	52	3	5	55	51
Taku R.	3/ 7/63	29	8	22	37	28
Stikine R.	3/ 8/63	36	8	18	44	21
Stikine R.	4/ 1/63	59	16	21	75	27

data. Thus, the "moose per hour" and the "total number of animals" categories will gain added significance as techniques and procedures for these counts become standardized.

Harvest:

In southeast Alaska during the fall of 1962 the Yakutat hunt was the most liberal, offering an August 10-November 30 season with a bag limit of one animal of either sex (Table 3). A hunter was confined to the taking of a bull in the Haines area and on the Taku and Stikine Rivers where the open seasons were: September 1-October 15 at Haines and September 15-October 15 in the other two locations.

Hunters killed an estimated 250 moose in the Yakutat region. Shipment records at the Pacific Northern Airlines office indicated that 55,860 pounds of meat, representing 126 animals, were flown out of Yakutat during the fall. Of these 126 moose, 70 per cent were bulls and 30 per cent were cows. The sex ratio of the total estimated kill is based on these records. The hunter success ratio was judged to be 95 per cent. Available information indicates this figure (which is not substantiated by specific data) to be the highest success ratio for an area of its size within the state during 1962.

At Haines and on the Stikine and Taku Rivers 66, 35, and 34 bulls were taken respectively. Aging, by the use of tooth replacement and wear, denoted an unusually high percentage of 1 1/2 and 2 1/2 year old animals in the Haines and Stikine harvests: Haines - 93 per cent and Stikine - 94 per cent. No jaws were collected from the Taku River moose take. Such data are usually indicative of an over-utilized population and if the trend continues (especially on the Stikine River where it has been in evidence for several years) restrictive measures may be necessary.

The total known moose kill for southeast Alaska then was 261 animals. In addition it was estimated that the known take at Yakutat was deficient by 124 moose, thus the estimated total kill was 385 moose (310 bulls and 75 cows).

Table 3. 1962 Moose Harvest  
Southeast Alaska

Area	Season	Bag	Male	Female	Total	Per Cent Hunter Success	Ave. No. Days Hunted by All Hunters	Age Classes Represented in Harvest		
								1 1/2	2 1/2	3 1/2+
Yakutat*	Aug. 10- Nov. 30	1 Either- Sex	175	75	250	95	-	-	-	-
Haines	Sept. 1- Oct. 15	1 Male	66	-	66	-	-	16**	11	2
Taku R.	Sept. 15- Oct. 15	1 Male	34	-	34	-	-	-	-	-
Stikine R.	Sept. 15- Oct. 15	1 Male	35	-	35	29	3.0	11**	4	1
Totals			280	75	395					

\* Sex ratio of kill based on Pacific Northern Airlines shipment records of 126 animals.

\*\* Jaws were not obtained from all animals harvested.

Western Alaska

Staffing problems have prevented the actuation of any moose investigations in the western region during this period.

## Alaska Peninsula

### Composition Counts:

Within the first week and a half of November 1, 113 moose within the four transect areas were classified by sex and age (Table 4). The cow element in the sample may have been slightly over-emphasized, for the observer noted that 30 bulls had shed one antler by November 10. This was three weeks earlier than a corresponding number of bulls, in a similar sample size, could have been witnessed with only one antler in southcentral Alaska. For the purpose of this report no attempt was made to establish the degree of bias.

The overall bull per cow ratio was nearly 1:1 as would be expected in a population which was open to the harvesting of both sexes but which experienced very light hunting pressure. According to the criteria set up by Rausch (1958) calf production was good in the Cinder River and Mother Goose Lake areas (40 and 41 calves per 100 cows, respectively) but poor in the Dog Salmon River and Ugashik Lakes areas (16 and 12 calves per 100 cows, respectively). The number of twin calves per 100 cows with calves was remarkably higher in the Cinder River and Mother Goose Lake areas than in the Dog Salmon River and Ugashik Lakes areas (25, 21 and 1, 0 respectively). This would, of course, coincide with the calves per 100 cows ratios previously mentioned.

The answers to such a drastic difference in the calf populations between such closely situated areas will be disclosed only after additional study.

Five hundred and fifty moose were located within the Cinder River, Mother Goose Lake, and Dog Salmon River areas during counts of April 18, 19, and 21 (Table 5). The Ugashik Lakes transect was omitted from the spring counts. The main purpose in conducting these counts was to ascertain the mortality of the over-wintering calf segment of the population.

For convenience of comparing these data, the Ugashik transect figures have been eliminated from the following discussion which describes how the calf mortality was determined. The per cent of calves in the fall population was 15 per cent. This was based on a count of 989 animals of which 153 were classed as calves. The April survey provided a sample of 550 animals of which 13 per cent, or 72, were classified as short yearlings. The fall sample (989) was divided by the spring sample (550) to arrive at the weight index (1.8); then the number of calves in the spring sample (72) was multiplied by the weight index



Table 4. Moose Composition Counts  
November 1962  
Alaska Peninsula

Area	Bulls /100 Cows	Young Bulls /100 Adult Bulls	Calves /100 Cows	Twin Calves /100 Cows w/Calves	Per Cent Calves In Herd	Per Cent Young Bulls In Herd	Young Bulls /100 Cows	Total Moose	Moose /Hour
Cinder River	119	21	40	25	15	7	18	265	74
Mother Goose Lake	70	36	41	21	19	8	18	486	128
Dog Salmon River	112	25	16	1	7	10	23	238	94
Ugashik Lakes	170	4	12	0	4	2	6	124	56
Means	99	24	33	49	14	8	19	278	91

	Cows W/0 Calves	Cows W/1 Calf	Cows W/2 Calves	Young Bulls	Mature Bulls	Total Moose	Moose /Hour
Totals	352	96	31	91	385	1,113	91

Table 5. Moose Composition Counts  
 April, 1963  
 Alaska Peninsula

Area	Adults W/0 Calves	Cows W/1 Calf	Cows W/2 Calves	Per Cent Calves in Herd	Total Moose	Moose Per Hour
Cinder River	59	10	1	17	82	41
Mother Goose Lake	213	15	4	10	255	85
Dog Salmon River	146	23	7	21	213	76
Ugashik Lakes	Not included in survey					
Totals	418	48	12	15	550	71

to give equal weight to both samples. The product (130) was subtracted from the number of calves observed in the fall (153) to establish the numerical loss (23). To calculate the mortality as a percentage, the calf loss (23) was divided by the number of calves observed in the fall. For these data, the over-wintering calf mortality amounted to 15 per cent.

The surveys conducted in the spring did not provide for the assessment of population segments other than calves and so adult mortality could not be computed. The great discrepancy between the number of animals observed in the fall and those observed in the spring appeared to be attributable to emigration of moose off the transect areas, rather than to mortality. It must be realized that these transects were only established in 1962 and there may be need for some refinement when sufficient data are accrued.

Initial Productivity:

The only available information relative to the 1963 calf crop on the Alaska Peninsula was collected incidental to other activities (Table 6). These data were not confined to the transect areas; however, the 15 observations are interesting in respect to the high ratio of cows with twins versus those with single calves: of these 15 cows with calves, 12 (80 per cent) had twins. Whether these figures were representative of the entire population will be known only as a product of future studies.

Table 6. Calf Moose Observations  
 May, 1963  
 Alaska Peninsula

Area	Date	Cows W/1 Calf	Cows W/2 Calves
Head of King Salmon River	26	-	1
Ugashik Lakes	26	-	3
Mother Goose Lake	26	-	1
Cinder River	26	-	1
Aniakchak River	26	-	1
Meshik River	26	-	1
Meshik River	27	-	1
Port Heiden	27	1	-
Black Lake	27	-	1
McNeil River	28	1	1
Kamishak River	29	<u>1</u>	<u>1</u>
TOTALS		3	12

## Southcentral Alaska

### Abundance and Distribution:

Fifty-three hours and fifty-nine minutes were spent actually searching for moose in southcentral Alaska during the fall composition counts of 1962; the sex and age were determined for 4,948 animals (Table 7). These totals do not include the results of a short flight made for composition count purposes at Cordova, which will be discussed later.

Counting conditions were poor until mid-November in the upper Copper River and Susitna River drainages. In the lower Susitna River Valley, the Matanuska Valley, Anchorage area, and the northcentral Kenai Peninsula adequate snow for counting purposes was even later in arriving. Thus, some of the counts lasted into the second week of December, a time when the shedding of antlers, especially by the older bulls, was well under way.

Supercubs were the main source of transportation for the observers, although a Champion was occasionally utilized. The Army donated an H-21 helicopter for use in the Anchorage area.

Sex and age ratios, as determined from the composition count data, appear in Table 8. The most obvious change in the 1962 data from those of 1961 (Atwell, 1961) is the decreased number of calves per 100 cows; generally, this ratio diminished by well over a third. Abnormally deep snow cover over much of southcentral Alaska during the winter of 1961-1962 may have so debilitated the pregnant cows as to affect the survival of the then unborn calves. Similar data were obtained in the fall of 1956 after deep snow occurred in the upper Susitna and Copper River Valleys the previous winter (Rausch, 1958).

Parturient moose observations in the spring of 1962 were all but non-existent in the areas on which the deeper snow depths had been known to exist for the winter and early spring months; however, Skoog (1962) did note what appeared to be a set of stillborn twin calves at Clarence Lake on May 31, 1962. This isolated case may be an indication as to one way in which the calf crop was adversely affected by the severe winter. Mortality within a few days following birth may also have been increased as a result of the cow, still feeling the effects of the winter, producing insufficient quantities of milk or none at all (Verme, 1962).

Table 7. Moose Composition Counts  
Southcentral Alaska  
Fall, 1962

Area Censused	Date	Time Spent Counting	Cows W/0 Calves	Cows W/1 Calf	Cows W/2 Calves	Young Bulls	Adult Bulls	Total Moose	Moose Per Hr.
<u>Upper Susitna-Copper</u>									
<u>River Valleys</u>									
S. Lake Louise Flats	12-1	3 hr. 20 min.	60	15	4	9	18	129	39
N. Maclaren & Clearwater R.	10-23	2 hr. 35 min.	110	44	3	-----86-----		293	113
S. Maclaren & Clearwater R.	11-24	1 hr. 38 min.	65	18	0	12	8	121	74
Alphabet Hills	11-25	4 hr. 44 min.	209	68	2	34	135	520	110
	11-27 *								
Black. Big, & Little Oshetna Rivers, & Sanona Creek									
	11-28	4 hr. 27 min.	177	53	1	42	88	416	94
Kiana & Klutina Lakes	11-29	4 hr. 50 min.	99	24	1	35	79	264	55
Paxson	11-25	1 hr. 46 min.	41	23	2	9	11	113	64
Upper Gakona & Chistochina Rivers									
	11-24	3 hr. 49 min.	139	64	5	76	143	501	131
	11-25 *								
Totals		27 hr. 9 min.	900	309	18	217**	482**	2,357	
<u>Lower Susitna-Matanuska</u>									
<u>Valleys</u>									
Matanuska Valley	11-30	7 hr. 13 min.	123	94	2	6	3	326	45
	12-4*								
	12-5*								
Willow Area	11-29	1 hr. 36 min.	61	18	4	8	10	127	79
Kashwitna Area	11-26	2 hr. 30 min.	47	13	1	4	15	95	38
Mt. Susitna-Beluga Area	11-27	1 hr. 50 min.	27	8	0	12	24	79	43
Peters Hills	11-29	1 hr. 35 min.	118	27	3	23	67	271	171
Anchorage Area	12-12	5 hr. 20 min.	147	43	4	9	25	279	52
	12-14*								
Totals		20 hr. 4 min.	523	203	14	62	144	1,177	

(Continued next page)

Table 7 (Continued)

Area Censused	Date	Time Spent Counting	Cows W/0 Calves	Cows W/1 Calf	Cows W/2 Calves	Young Bulls	Adult Bulls	Total Moose	Moose Per Hr.
<u>Kenai Peninsula</u>									
Headwaters of Big & Little									
Indian Creeks	12-5	1 hr. 46 min.	120	24	2	7	57	238	135
Juneau Flats	12-4	1 hr. 55 min.	205	58	4	26	43	402	210
Resurrection Creek	12-5	1 hr. 20 min.	81	17	0	11	41	167	125
Caribou Hills	10-26	1 hr. 45 min.	253	82	3	44	137	607	347
Totals		6 hr. 46 min.	659	181	9	88	278	1,414	210
GRAND TOTAL		53 hr. 59 min.	2,082	693	41	367**	904**	4,948	92

990

\* Data not available.

\*\* Plus a total of 86 bulls not broken down to young &amp; adult animals.

Table 8. Moose Sex and Age Ratios Determined From Composition Count Data  
 Fall, 1962  
 Southcentral Alaska

Area Censused	Bulls /100 Cows	Young Bulls/ 100 Adult Bulls	Calves /100 Cows	Twin Calves/ 100 Cows W/Calves	Per Cent Calves In Herd	Per Cent Young Bulls In Herd	Young Bulls/ 100 Bull Calves	Young Bulls/ 100 Cows
<u>Upper Susitna-Copper</u>								
<u>River Valleys</u>								
S. Lake Louise Flats	34	50	29	42	18	7	75	11
N. Maclaren & Clearwater R.	55	NA*	32	13	17	NA	NA	NA
S. Maclaren & Clearwater R.	24	150	22	0	15	10	133	15
Alphabet Hills	61	25	26	6	14	7	94	12
Black. Big, & Little Oshetna Rivers, & Sanona Creek	56	48	24	4	13	10	150	18
Kiana & Klutina Lakes	92	44	21	8	10	13	269	28
Paxson	30	82	41	16	24	8	64	14
Upper Gakona & Chistochina Rivers	105	53	36	15	15	15	205	37
Totals	57	NA	28	11	15	NA	NA	NA
<u>Lower Susitna-Matanuska</u>								
<u>Valleys</u>								
Matanuska Valley	4	200	45	4	30	2	12	3
Willow Area	22	80	31	36	21	6	62	10
Kashwitna Area	31	27	25	14	16	4	50	7
Mt. Susitna-Beluga Area	103	50	23	0	10	15	300	34
Peters Hills	61	34	22	20	12	9	135	16
Anchorage Area	18	36	26	17	18	3	35	5
Totals	28	43	31	13	18	5	53	8



Table 8. (Continued)

Area Censused	Bulls /100 Cows	Young Bulls/ 100 Adult Bulls	Calves /100 Cows	Twin Calves/ 100 Cows W/Calves	Per Cent Calves In Herd	Per Cent Young Bulls In Herd	Young Bulls/ 100 Bull Calves	Young Bulls/ 100 Cows
<u>Kenai Peninsula</u>								
Headwaters of Big & Little								
Indian Creeks	44	12	19	15	12	3	50	5
Juneau Flats	26	61	25	13	16	7	79	10
Resurrection Creek	53	27	17	0	10	7	122	11
Caribou Hills	54	32	26	7	14	7	100	13
	43	32	23	9	14	6	88	10
GRAND TOTALS	48	41**	28	11	16	8**	95**	13**

\* Not available.

\*\* Does not include N. Maclaren & Clearwater R. bull data.

Only the calf ratios exhibited an extreme change, signifying that mortality of other age classes during the winter and early spring was not of decimating proportions. The young bulls per 100 adult bulls and young bulls per 100 cows ratios remained relatively stable while the young bulls per 100 bull calves ratio increased, again signifying that the most severe effect of the winter was on a year class not yet born rather than on those animals actually experiencing the rigors of the winter.

On March 15, 1963, a flight of two hours and 20 minutes on the Copper River flats west of the Copper River terminated with the tallying of 67 moose (Table 9).

Table 9. Moose Composition Counts  
March 1963  
Copper River Delta

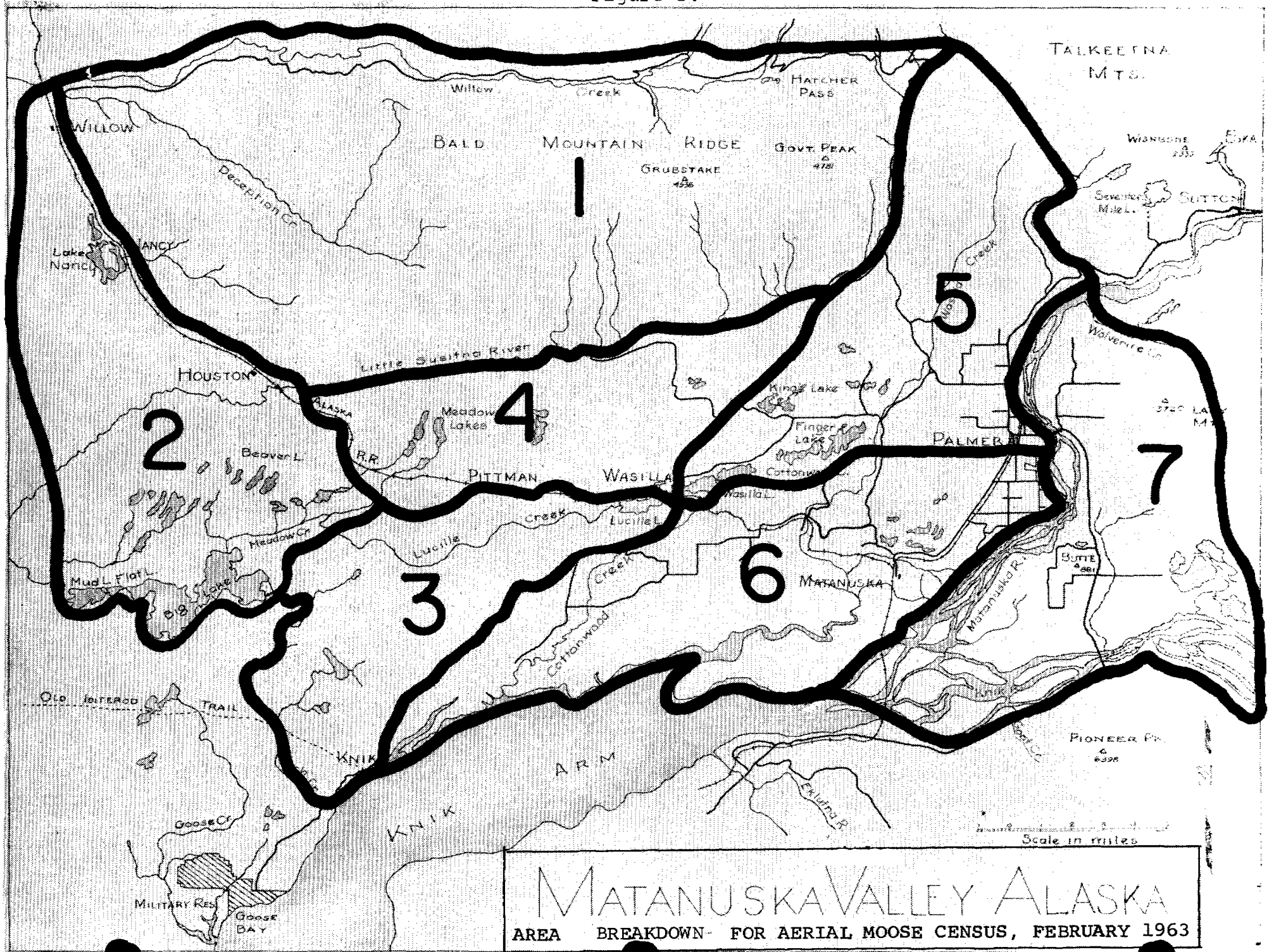
Adults W/O Calves	Cows W/1 Calf	Cows W/2 Calves	Bulls	Per Cent		Moose Per Hour
				Calves In Herd	Total Moose	
24	18	2	1	33	67	29

Sighting conditions were only fair with 1 1/2 inches of fresh snow on a 0-6 inch base which accounts for only 29 moose per hour being located. The calf element in the herd (33 per cent) was good for March. Two sets of twins were noted out of 20 cows accompanied by calves.

On February 9, 10, and 11, 1963, a census was made of the moose in the Matanuska Valley, 50 miles north of Anchorage. Sighting conditions were poor with generally less than a foot of snow on the Valley proper and about two feet on the south-facing slopes of the Talkeetna Mountains. The Valley was divided into seven segments and the moose sighted were tallied in relation to the particular segment or area number within which they were located (Figure 2 and Table 10).

Five hundred and eighty-five moose were counted within the 713 square miles censused. Using criteria such as tracks left by animals which were not seen, topography, and sighting conditions, an estimate was made of the per cent of the total population actually counted in each area. These estimates, when correlated with the moose observed, resulted in an estimated total population of 1,476 animals. The number of moose per square mile was then

Figure 2.



MATANUSKA VALLEY ALASKA  
AREA BREAKDOWN FOR AERIAL MOOSE CENSUS, FEBRUARY 1963

-22-

Table 10. Matanuska Valley Aerial Moose Census  
February, 1963  
Southcentral Alaska

Area	Approx. Number Sq. Miles	Estimated % Total Pop. Counted	Cows W/1 Calf	Cows W/2 Calves	Unidentified	Total Moose Counted	Per Cent Calves In Herd	Moose Per Hour	Total Estimated Moose
1	230	20	9	1	30	51	22	28	255
2*	98	25	1	0	11	13	8	21	208
3	58	20	2	0	16	20	10	36	100
4	48	25	6	0	20	32	19	34	128
5	98	85	88	6	84	278	36	67	327
6	93	60	34	2	57	131	29	30	218
7	88	25	6	1	45	60	13	28	240
Totals	713	--	146	10	263	585	28	40	1,476

\* Only 1/4 of area flown.

.8 for the actual total count and 2.1 for the estimated total population. The per cent of calves in the herd was 28, only two less than the figure obtained from the fall counts (Table 8).

### Productivity:

#### Pattern of Calving

Periodic aerial counts were utilized to determine the pattern of calving. The progression of calving is presented in Table 11 which shows the results of the counts. The progression of calving and parturition appear in Table 12.

A graphical interpretation of the data is presented in Figure 3, which illustrates the observed progression rate of calving. Figure 4 represents the estimated progression of calving with "status unknown cows" included with the "cows with calves" segment. Curves on both graphs were fitted visually and follow the technique described by Skoog (1958). That a peak of calving occurred on approximately June 5, is shown in both Figures 3 and 4.

#### Magnitude of Calving

The calf crop estimate for 1962 was based upon standard productivity computations by Rausch (1959), parturition counts, and past in utero examinations. The 1962 parturition counts revealed a twinning ratio of 19.5 sets of twins per 100 parturitions. This figure was rounded off to 20.

Past in utero examinations revealed that 95 per cent of the cows older than 30 months were pregnant. Rausch estimated, based on a normal winter survival, that 12 per cent of the adult cow population would be comprised of 24 month old, nonproductive cows. To standardize and lend continuity to production data, this 12 per cent figure has been used in past reports as it is in this one.

Hence, if we take a figure of 100 cows, subtract the 12 or 12 per cent figure of 24 month old nonproductive cows we would then have 88 cows. From these 88 cows we know that only 95 per cent or 84 of them will be pregnant as revealed by past in utero examinations.

Based upon a twinning ratio of 20 sets of twins per 100 parturitions, the 84 pregnant cows would have 17 sets of twins and 67 singletons, for an estimated production of 101 calves per 100 cows.

Table 11. Progression of Moose Calving in the Lower Susitna and Matanuska Valleys during May, June, and July, 1962.

Date	C O W S					Total Calves	Adult Bulls	Y E A R L I N G S				Unkn.	Total All Animals
	Stat. Unkn.*	W/O Calves	W/1 Calf	W/2 Calves	Total Cows			Unkn.	Male	Female	Total		
5-16	1	60	3	1	65	5	6	0	6	11	17	0	93
5-18	3	72	2	1	78	4	2	0	7	21	28	0	112
5-22	0	94	9	3	106	15	1	35	-	-	35	0	157
5-26	3	36	13	3	55	19	0	20	-	-	20	4	98
5-29	6	34	16	1	57	18	1	14	-	-	14	0	90
6-5	22	32	39	7	100	53	16	34	-	-	34	0	203
6-8	3	24	13	5	45	23	10	23	10	11	44	1	123
6-15	9	34	17	4	64	25	16	0	17	16	33	2	140
7-3	3	18	7	4	32	15	2	0	14	20	34	0	83
TOTALS	50	404	119	29	602	177	54	126	54	79	259	7	1,099

\* Status Unknown

Table 12. Progress of Calving in the Lower Susitna and Matanuska Valleys as Indicated by the Various Parturition Ratios

Date	Observed Parturitions/100 Cows*	Estimated Parturitions/100 Cows**	Observed Calves/100 Cows	Observed Twins/100 Parturitions	Total Cows In Sample
May 16	6.1	7.7	7.7	25.0	65
May 18	3.8	7.7	5.1	33.3	78
May 22	11.3	11.3	14.1	25.0	106
May 26	29.1	34.5	34.5	18.7	55
May 29	29.8	40.3	31.6	5.9	57
June 5	46.0	68.0	53.0	15.2	100
June 8	40.0	46.7	51.1	27.8	45
June 15	32.8	46.9	39.1	19.0	64
July 3	34.4	43.7	46.9	36.4	32

\* "Parturitions/100 Cows" differs from "Calves/100 Cows" in that "parturitions" includes both single and twin calves.

\*\* Computed by including unknown status females as having calves.

Figure - 3. Actual Parturition: Cow Observation Made in May, June, and July, 1962. Lower Susitna and Matanuska Valleys.

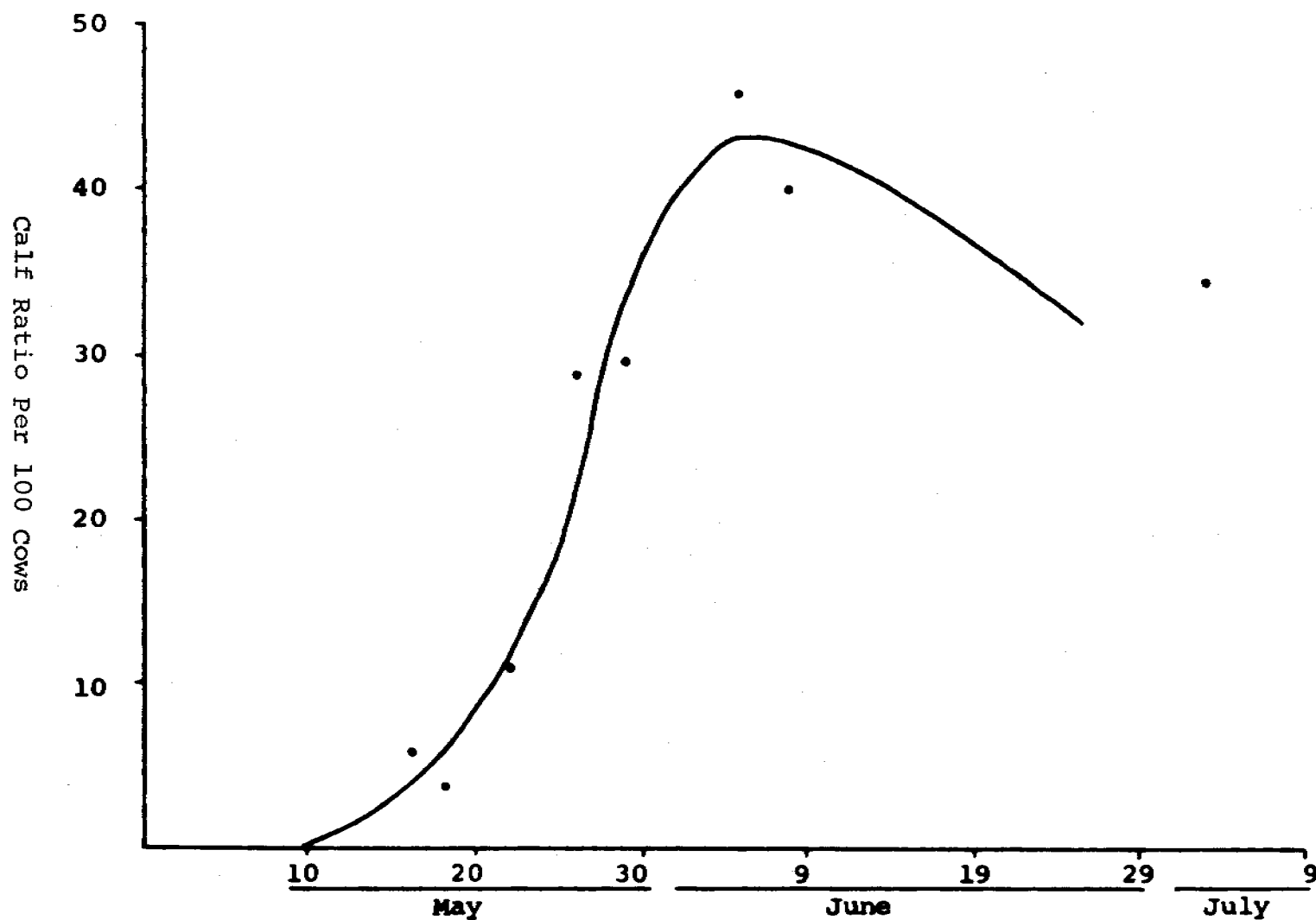
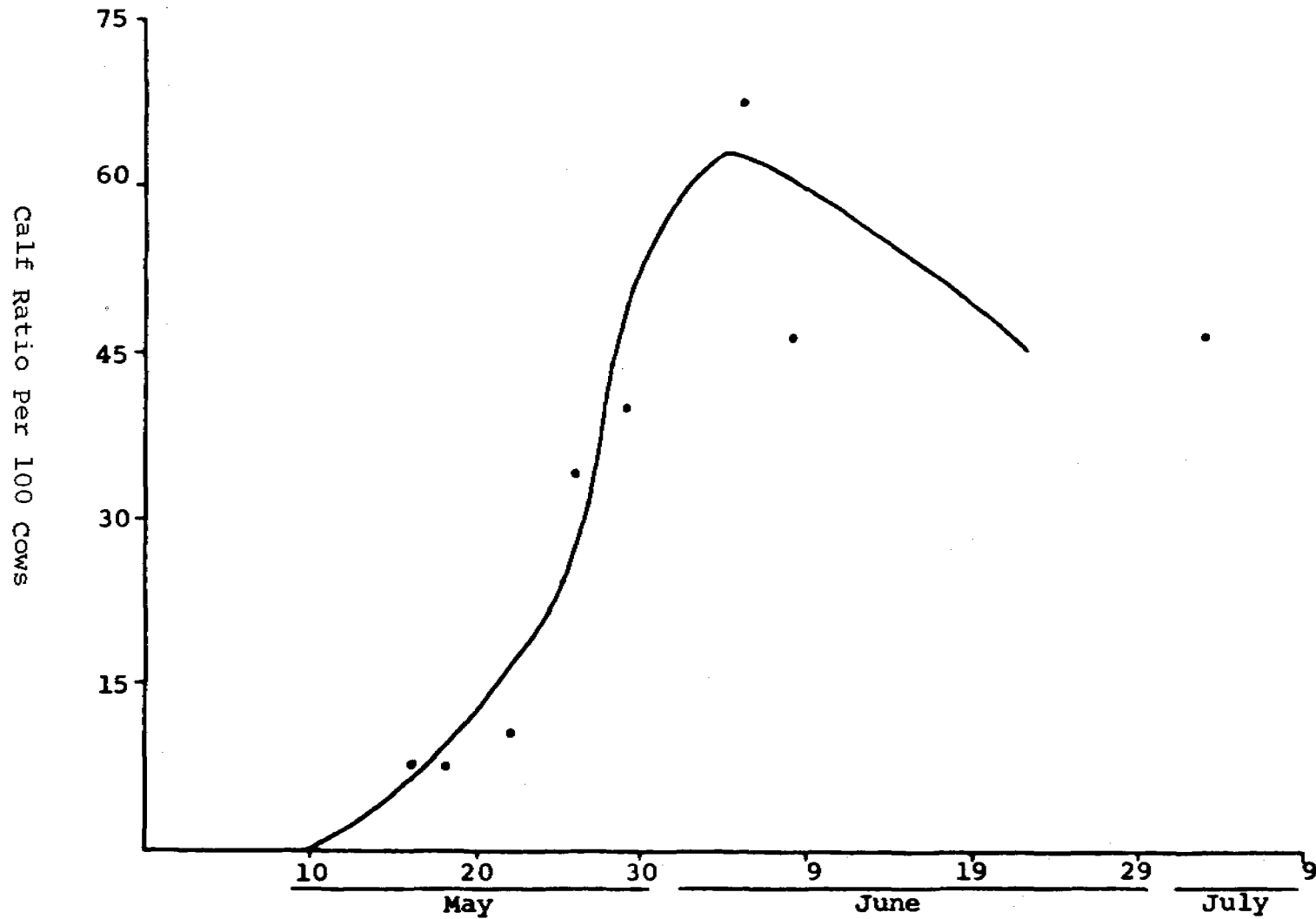




Figure 4. **Estimated Parturition: Cow Observation Made in May, June, and July. Lower Susitna and Matanuska Valleys, 1962.**



## Calf Survival

Aerial calf counts subsequent to the peak of parturition were conducted to assess calf survival. The ratios of calves to cows dropped off slowly from the peak date of 53 calves per 100 cows on June 5 to 47 calves per 100 cows on July 3. A small sample of cows (32) counted on July 3 may well negate any positive conclusions from this final count. If the small sample is ignored, then it appears that early survival was excellent.

### Evaluation of Techniques

Comparison of conventional aircraft counting results with helicopter counts casts some doubt on the validity of aircraft counts. Results of the counting by aircraft type are seen in Table 14. It is of note that the ratio of male to female yearlings, as obtained by conventional aircraft, is greatly distorted in favor of the female. Counts obtained by helicopter show an almost even yearling sex ratio.

The "adult bull" and "cow without calf" categories are other segments of the counts that the helicopter observations cast doubt upon. Through the use of conventional aircraft it is difficult early in the spring to differentiate between cows without calves and adult bulls. This type of error would influence the productivity conclusions.

### Calf Tagging:

One hundred and twenty calves were tagged in the lower Susitna and Matanuska Valleys during late May and early June (Figure 5). Results of the tagging by areas are seen in Table 13.

Table 13. 1962 Calf Tagging Results By Area  
Southcentral Alaska

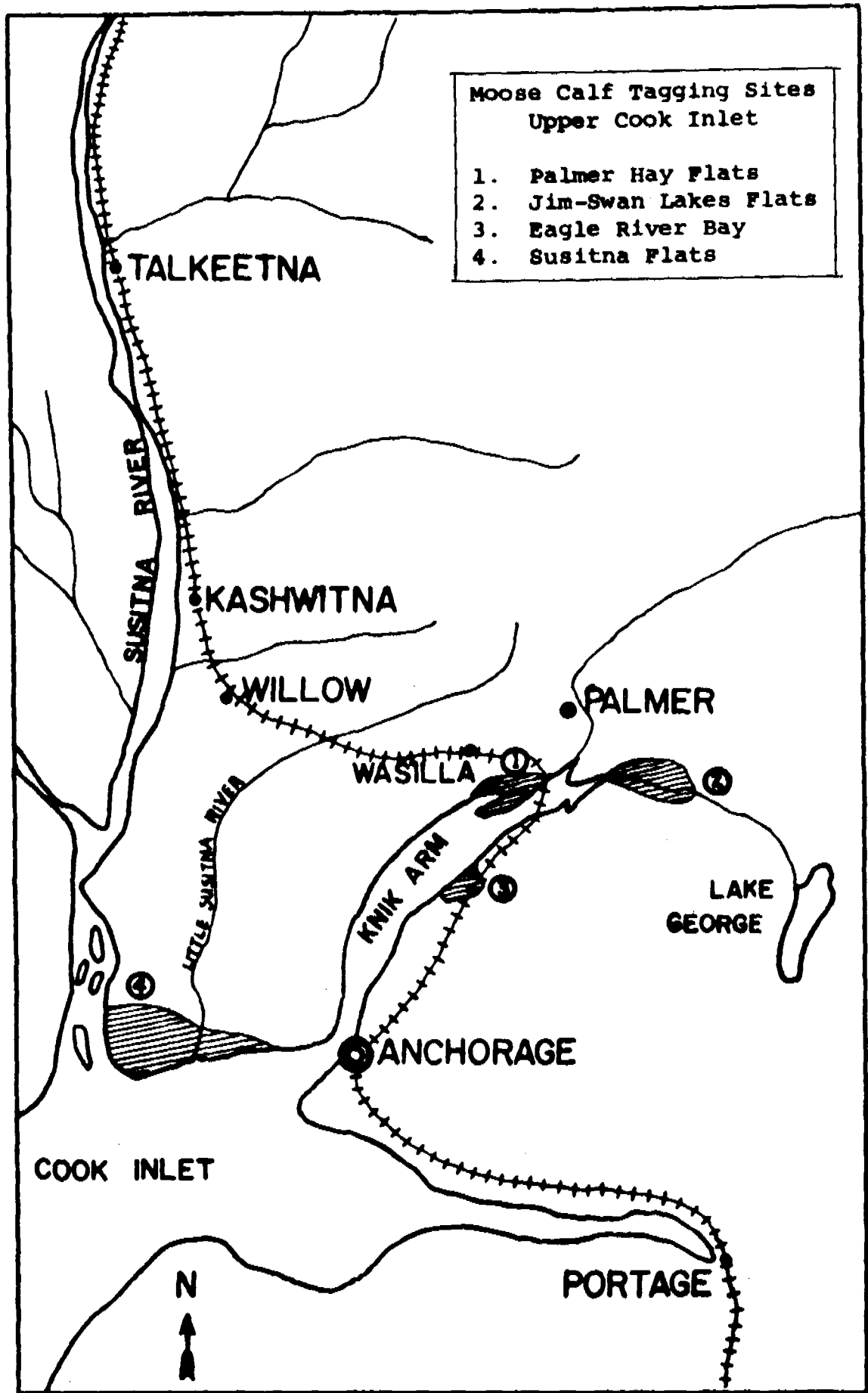
	Total No. of Calves	No. Of Males	No. Of Females	Sets of Twins	One of Set	Color Marker	Tagging Efforts
Palmer Hay Flats	50	24	26	7	2	Orange	4
Jim-Swan Lake Flats	31	17	14	5	2	Yellow	3
Susitna Salt Flats	37	17	20	7	2	Red	1
Eagle Bay	<u>2</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>0</u>	White	<u>2</u>
<b>TOTALS</b>	120	58	62	19	6		10

Table 14. Moose Calving Progression Counts, Methods, Flying Time, and Observers, Lower Susitna and Matanuska Valleys, 1962.

Date	Aircraft Type	Observer	Counting Time	No. of Cows	No. of Calves	No. of Bulls	Y E A R L I N G S			Total Animals*	Moose Per Hour
							Male	Female	Total		
May 16	Supercub	Didrickson	5 hrs. 0 min.	65	5	6	6	11	17	93	19
May 18	Cessna 170	Didrickson & Crawford	4 hrs. 30 min.	78	4	2	7	21	28	112	25
May 22	Supercub	Atwell	5 hrs. 40 min.	106	15	1	-	-	35	157	28
May 26	Supercub	Crawford	2 hrs. 15 min.	55	19	0	-	-	20	98	44
May 29	Supercub	Crawford	3 hrs. 0 min.	57	18	1	-	-	14	90	30
June 5	Supercub	Didrickson	5 hrs. 0 min.	100	53	16	-	-	34	203	41
June 8	Helicopter	Crawford	3 hrs. 0 min.	45	23	10	10	11	44	123	41
June 15	Helicopter	Didrickson	3 hrs. 0 min.	64	25	16	17	16	33	140	47
July 3	Helicopter	Somerville	3 hrs. 0 min.	32	15	2	14	20	34	83	28
TOTALS: Nine flights			34 hrs. 25 min.	602	177	54	54	79	259	1,099	31

\* Includes animals unidentified as to age and sex not otherwise included in this table.

Figure 5.



Most of the tagging was done in the Palmer area as an effort was made to gain a concentrated sample of tagged animals. Fifty calves were tagged on the Palmer Hay Flats and 31 calves were tagged on nearby Jim-Swan Lakes Flats.

Aerial observations of the Palmer tagging areas after the tagging showed that 27 per cent of the calves observed were tagged. This figure is based on a cumulative total of 63 calves observed on June 8, June 15, and July 3, of which 17 were tagged. This information may be biased toward untagged animals as it is believed that soon after parturition the cow and calf leave the calving grounds. If this were the case, then aerial counts were sampling a segment of the population that had generally calved after the tagging operations.

#### Characteristics of the Moose Harvest:

The general moose season in southcentral Alaska extended from August 20 to September 30 and from November 1-30 in most Game Management Units. Two registration hunts for antlerless moose were held during the 1962 hunting season: one from August 20 to September 30 and the other during November 1-7. There were non-registration antlerless hunts in Units 11 and 13 from November 1-30 and November 1-7, respectively, exclusive of a closed area in Unit 13 which appears in Appendix A. The bag limit in all hunts was one moose.

The 1962 southcentral moose harvest was determined through information collected from check stations, mandatory reporting by permit holders, estimates by Department field personnel, and personal interviews with guides, hunters, and lodge proprietors.

#### Hunter Success

The 4,312 moose hunters that passed through southcentral Alaska checking stations during the general seasons harvested 560 animals for a 13 per cent success ratio (Table 15 and Figure 6). Hunter success ranged from a low of 9 per cent on the Denali Highway to a high of 21 per cent for the individuals checking through the Eklutna station. Hunter success was lowest during the first week of August and highest during early November; however, the hunting pressure and the take were extremely low during November 1-7. The number of moose taken daily (as seen in Table 16) was lower on weekends than during the week.

Factors affecting the harvest were the mild fall weather which allowed the moose to remain at higher altitudes longer than usual and a National alert in mid-October which curtailed the hunting pressure by military personnel.

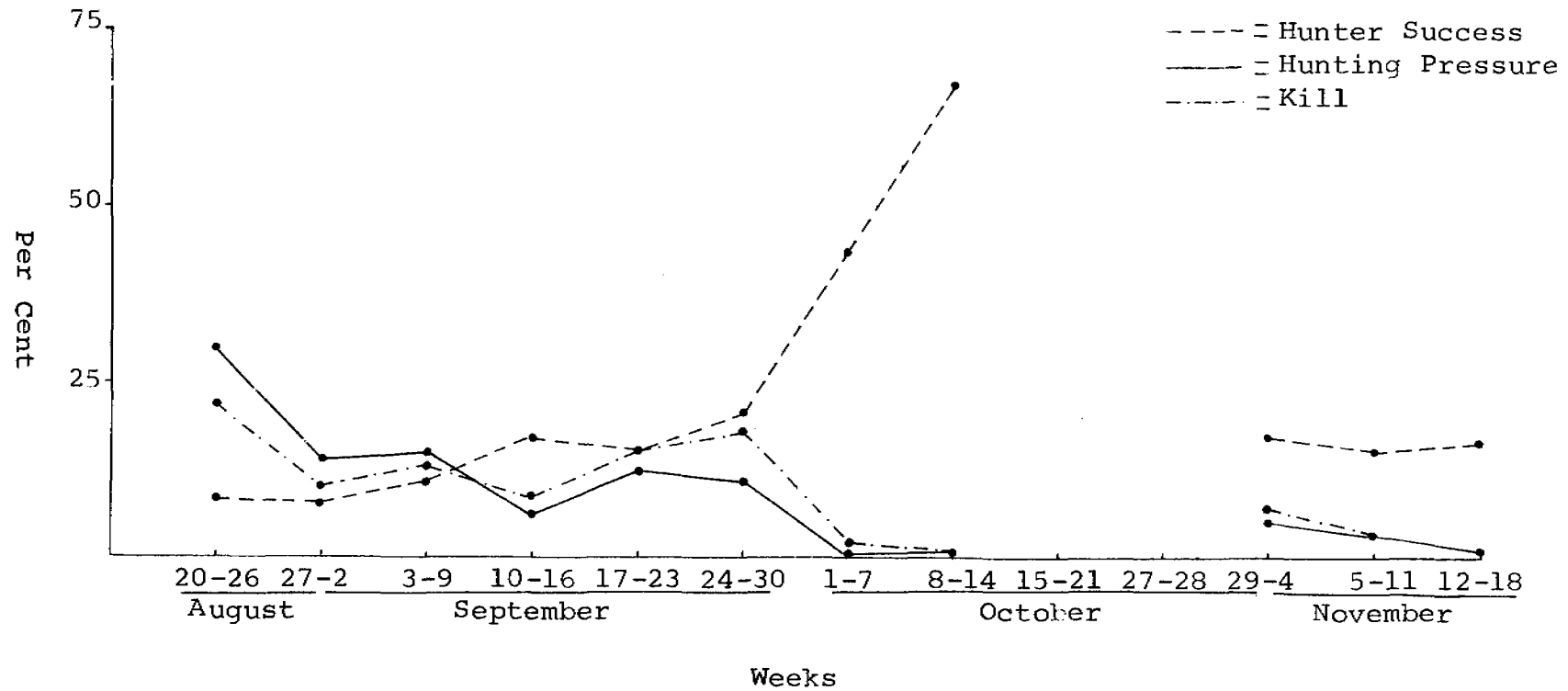
Table 15. 1962 Southcentral Alaska Moose Harvest: Chronological Distribution of the Hunting Pressure, Hunter Success, and Kill Related to Check Stations. General Season.

	DENALI CK. STA.		EKLUTNA CK. STA.		KENAI CK. STA.		TOTAL		Per Cent Success
	No. Moose Hunters	No. Moose Harvested	No. Moose Hunters	No. Moose Harvested	No. Moose Hunters	No. Moose Harvested	No. Moose Hunters	No. Moose Harvested	
Aug. 20-Aug. 26	610 (22)*	30 (12)	559 (47)	68 (27)	135 (38)	23 (44)	1,304 (30)	121 (22)	10
" 27-Sept. 2	402 (14)	21 ( 8)	134 (11)	28 (11)	70 (20)	4 ( 8)	606 (14)	53 (10)	9
Sept. 3- " 9	458 (17)	29 (11)	98 ( 8)	30 (12)	100 (29)	16 (31)	656 (15)	75 (13)	11
" 10- " 16	220 ( 8)	18 ( 7)	41 ( 3)	24 ( 9)	46 (13)	9 (17)	307 ( 7)	51 ( 9)	17
" 17- " 23	480 (17)	48 (19)	78 ( 7)	39 (15)			558 (13)	87 (15)	15
" 24- " 30	431 (16)	65 (26)	63 ( 5)	37 (15)			494 (11)	102 (18)	21
Oct. 1-Oct. 7	25 ( 1)	11 ( 4)					25 ( 1)	11 ( 2)	44
" 8- " 14	3 (**)	2 ( 1)					3 (**)	2 (**)	67
" 15- " 21									
" 22- " 28									
" 29-Nov. 4	101 ( 4)	19 ( 8)	120 (10)	18 ( 7)			221 ( 5)	37 ( 7)	17
Nov. 5- " 11	32 ( 1)	11 ( 4)	81 ( 7)	6 ( 2)			113 ( 3)	17 ( 3)	15
" 12- " 18			25 ( 2)	4 ( 2)			25 ( 1)	4 ( 1)	16
TOTALS	2,762 (100)	254 (100)	1,199 (100)	254 (100)	351 (100)	52 (100)	4,312 (100)	560 (100)	13

\* Figures in parenthesis are percentages of totals.

\*\* Less than 1 per cent.

Figure 6. Southcentral Alaska moose harvest, 1962:\* Chronological distribution of the hunting pressure, hunter success and kill. General season.



\*Data derived from the Denali, Eklutna and Kenai check stations.

Table 16. 1962 Southcentral Alaska Moose Harvest Related to Weekends and Weekdays. General Season.\*

	Days		Moose Hunters			Kill			
	No.	Per Cent	No.	Per Cent	No. Per Day	No.	Per Cent	No. Per Day	Per Cent Success
Weekends and Holidays	18	31	2,228	52	124	244	44	14	11
Weekdays	41	69	2,084	48	51	316	56	8	15
TOTALS	59	100	4,312	100	73	560	100	9	13

\* Data derived from the Denali, Eklutna and Kenai check stations.

Five hundred and sixty successful moose hunters sampled were in the field an average of 2.6 days each (Table 17).

Table 17. 1962 Southcentral Alaska Moose Harvest: Effort of Successful Hunters, General Season.

Data Source	No. Succ. Hunters	Days Hunted	X Number of days / Succ. Hunter
Denali Ck. Sta.	254	784	3 days
Eklutna Ck. Sta.	254	550	2.2 days
Kenai Ck. Sta.	52	155	3 days
TOTAL	560	1,489	2.6 days

#### Magnitude of the Harvest

Tables 18 and 19 present area hunting pressures and kill data provided by the checking stations. Area 17 (Figure 7) sustained the largest percentage (18.3) of the harvest.



Table 18. 1962 Southcentral Alaska Moose Harvest: Hunting Pressure And Kill By Area. General Season<sup>1</sup>.

Area <sup>2</sup>	Total Moose Hunters	Kill	Per Cent of Total Kill
1	353	54	9.6
2	25	4	.7
3	37	8	1.4
4	275	49	8.7
5	39	17	3.0
6	47	16	2.8
7	69	13	2.3
8	4	1	.2
9	21	10	1.8
10	104	33	5.9
11	80	31	5.5
12	11	5	.9
13	13	11	2.0
14	126	67	11.9
15	19	9	1.6
16	409	59	10.5
17	16	103	18.3
18	7	62	11.0
19	4	3	.5
20	8	3	.5
21	204		
22	126		
23	11		
24	24		
25	6		
26	922		
27	1,260		
28	12		
29	8		
30	48		
31	6		
Unknown	18	5	.9
TOTALS	4,312	563 <sup>3</sup>	100

<sup>1</sup>Data derived from the Denali, Eklutna, and Kenai check stations.

<sup>2</sup>For area locations refer to Figure 7. Areas 21-31 are combinations as shown in Table 19. Each kill was assigned to the area in which the animal was taken and because numbers 21-31 are combinations of previous areas (1-20) no kills appear opposite them (21-31).

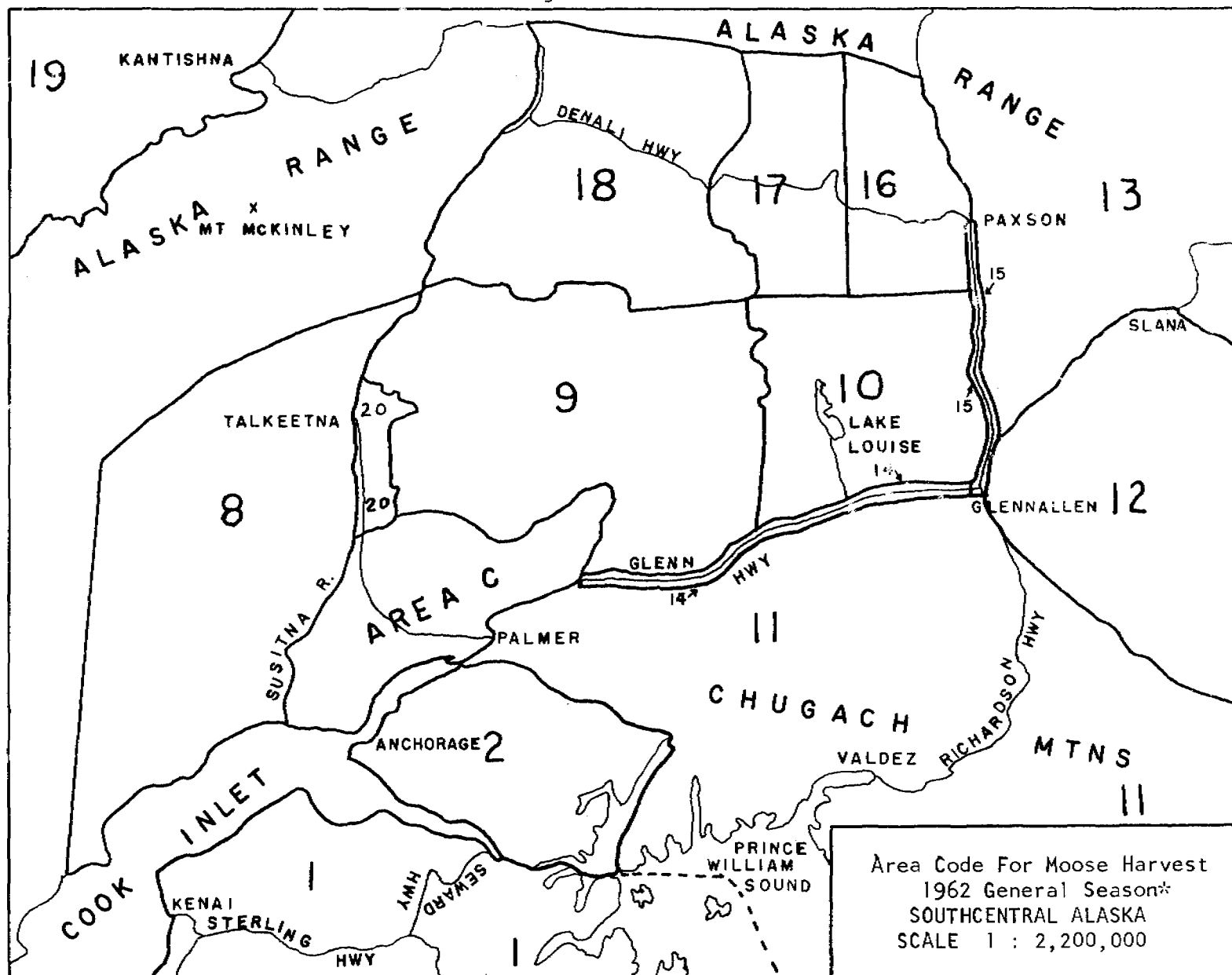
<sup>3</sup>Differs from prior totals because of failure of check station attendants to mark both portions of check station form identically.

Table 19. Code Key For Combined Areas On Maps Used At Checking Stations

<u>Area Code</u>	<u>Areas Combined</u>
21	4 and 5
22	4, 5 and 6
23	4, 5 and 7
24	4, 5, 6 and 7
25	14 and 15
26	16 and 17
27	16, 17 and 18
28	16, 17, 18 and 19
29	17 and 18
30	10, 14, and/or 15
31	14, and/or 15, and Denali Highway

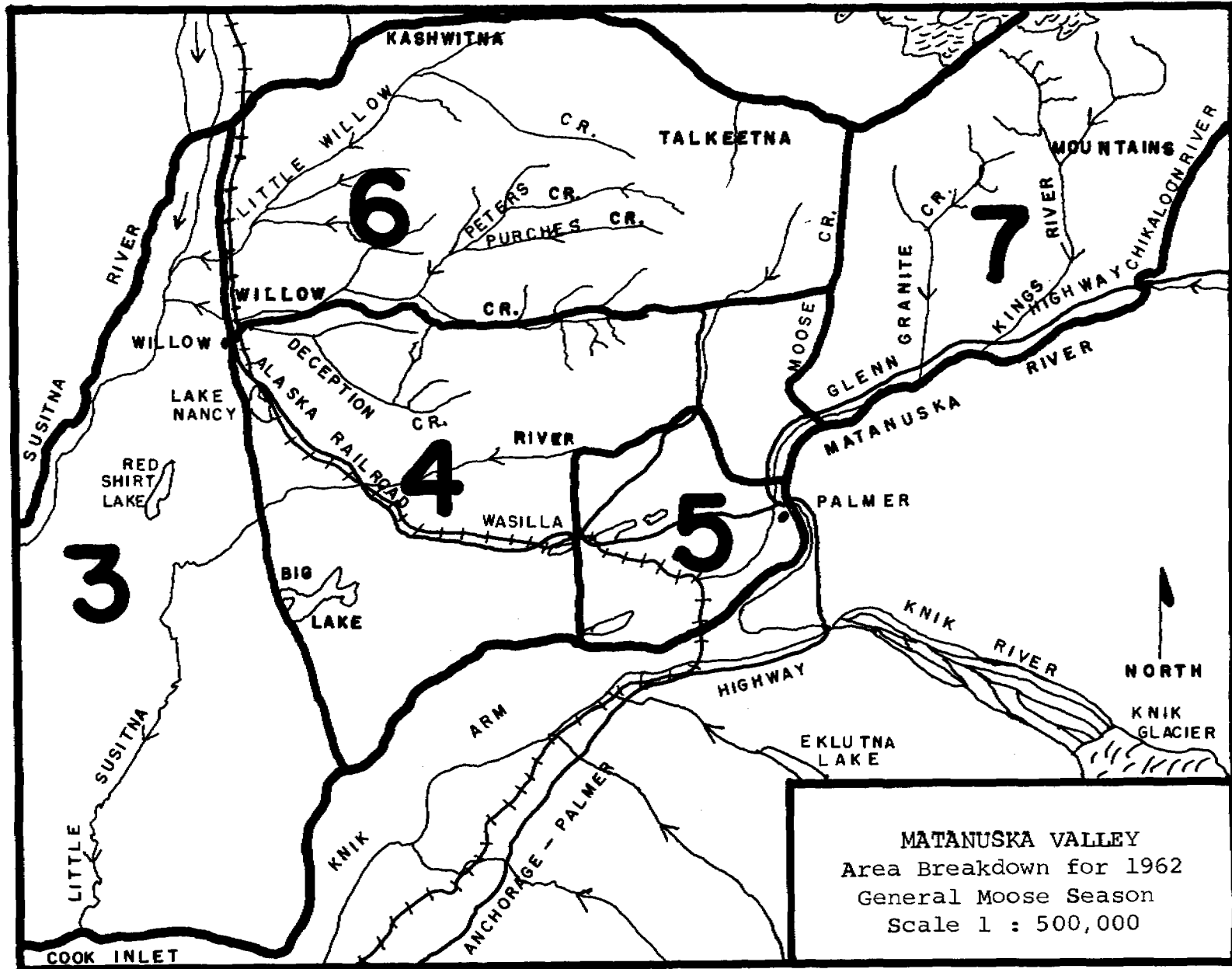
Areas 14 and 15 -- Strips two miles wide (one mile on each side of the highway).

Figure 7.



\* See Figure 8 for breakdown of area C.

Figure 8.



## Matanuska Valley Hunter Survey

A post-season door-to-door hunter survey was conducted in mid-December (18-21) and early January (2-3) in the Matanuska Valley to determine the bull kill by Valley residents. This kill would not have been tallied at check stations. By using sample areas predetermined by the Statistical Division and contacting everyone living in these areas, a bull kill of 104 moose was computed.

### Other Personal Interviews

Personal interviews of lodge owners and hunters accounted for only 20 moose kills not otherwise recorded.

### Antlerless Moose Registration Hunts

Seven thousand one hundred and twenty-eight individuals were issued permits to hunt antlerless moose in Area C from August 20 to September 30; 969 were successful in taking a moose (Figure 9). The age composition of the kill appears in Table 20.

Despite limited antlerless hunts in the Matanuska Valley since 1960, 10 per cent of the 1962 kill was old adults. The calf and yearling kills combined totaled 262 moose or a moderate 27 per cent of the overall take.

Six thousand four hundred and seventy-three registrants received permits to hunt antlerless moose from November 1-7 in southcentral Alaska. The areas involved appear in Figure 10. Descriptions of areas closed to the taking of antlerless moose in the Matanuska Valley and Unit 7 during this hunt may be found in Appendix B.

The harvest during this hunt was 801 moose of which 753 were segregated to tooth wear classes (Table 21). Calves (124) and yearlings (81), when added together, comprised 27 per cent of the total kill assigned to tooth wear classes. Old adults (wear class 9) represented four per cent and the remaining adults (521) comprised 69 per cent of the 753 total animals aged by the wear class method.

Of the 801 moose killed in this hunt over 50 per cent (439) were taken in Area D. A combined total of 1,266 moose were harvested in Unit 14 during the two antlerless hunts.

Figure 9.

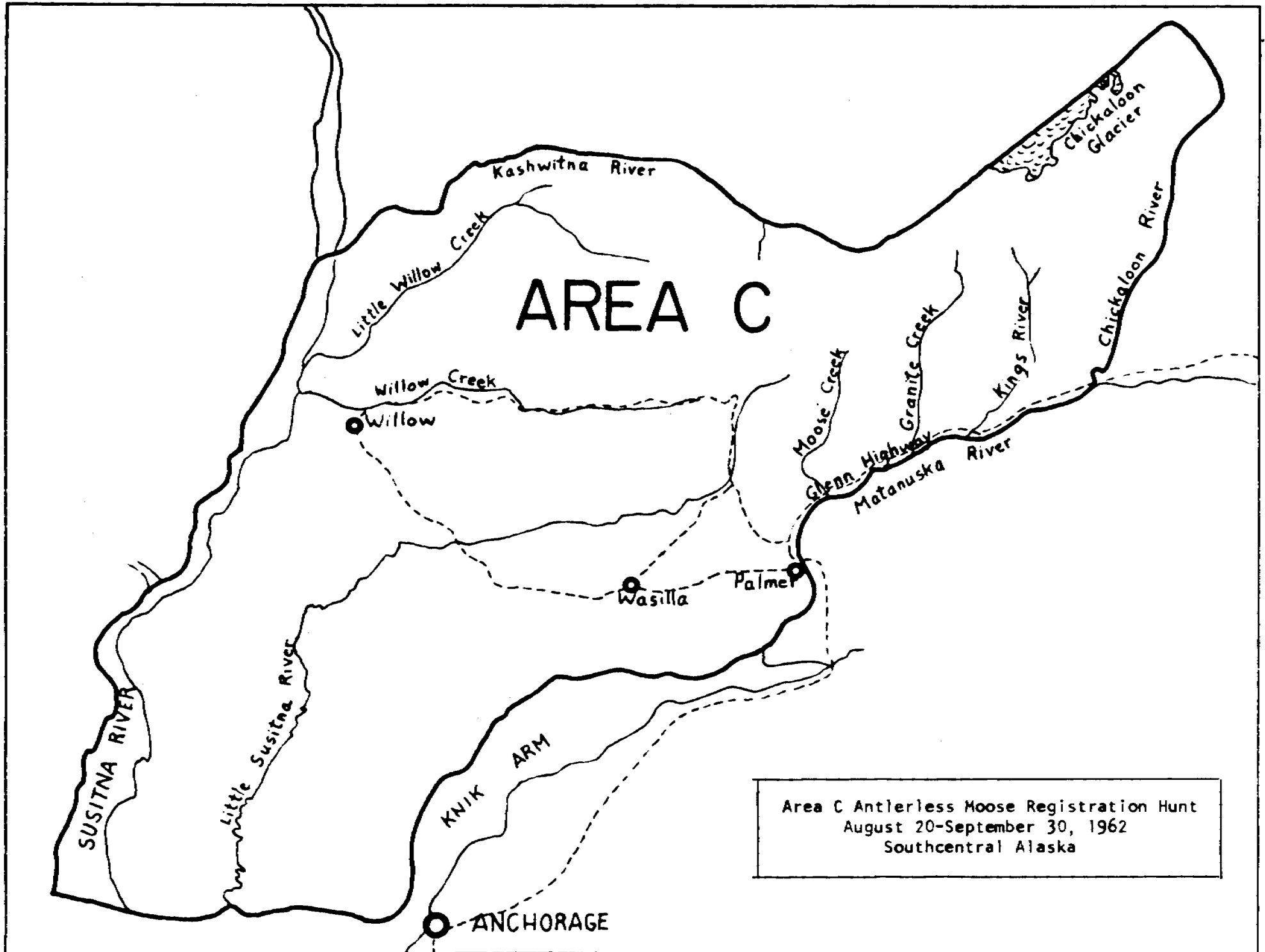


Table 20. Age Composition of Antlerless Moose Harvest  
 Registration Hunt. August 20 to September 30, 1962  
 Area C (Matanuska Valley)

	Calves	Yearlings	Adults	Old Adults <sup>1</sup>	Total Aged	Number Not Aged <sup>2</sup>	Total Kill
Anchorage Hunt Headquarters	83	77	391	61	612	47	659
Palmer Hunt Headquarters	18	46	130	21	215	95	310
Totals	101	123	521	82	827	142	969
Kill adjusted to accomodate animals not aged <sup>3</sup>	118 (12%)	144 (15%)	611 (63%)	96 (10%)			969

<sup>1</sup>Lensink's wear class 1X or above (Lensink, 1955).

<sup>2</sup>Include jaws not brought in by hunters and those jaws not otherwise available for aging.

<sup>3</sup>Accomplished by assigning non-aged animals to categories in proportion to aged moose.

Figure 10.

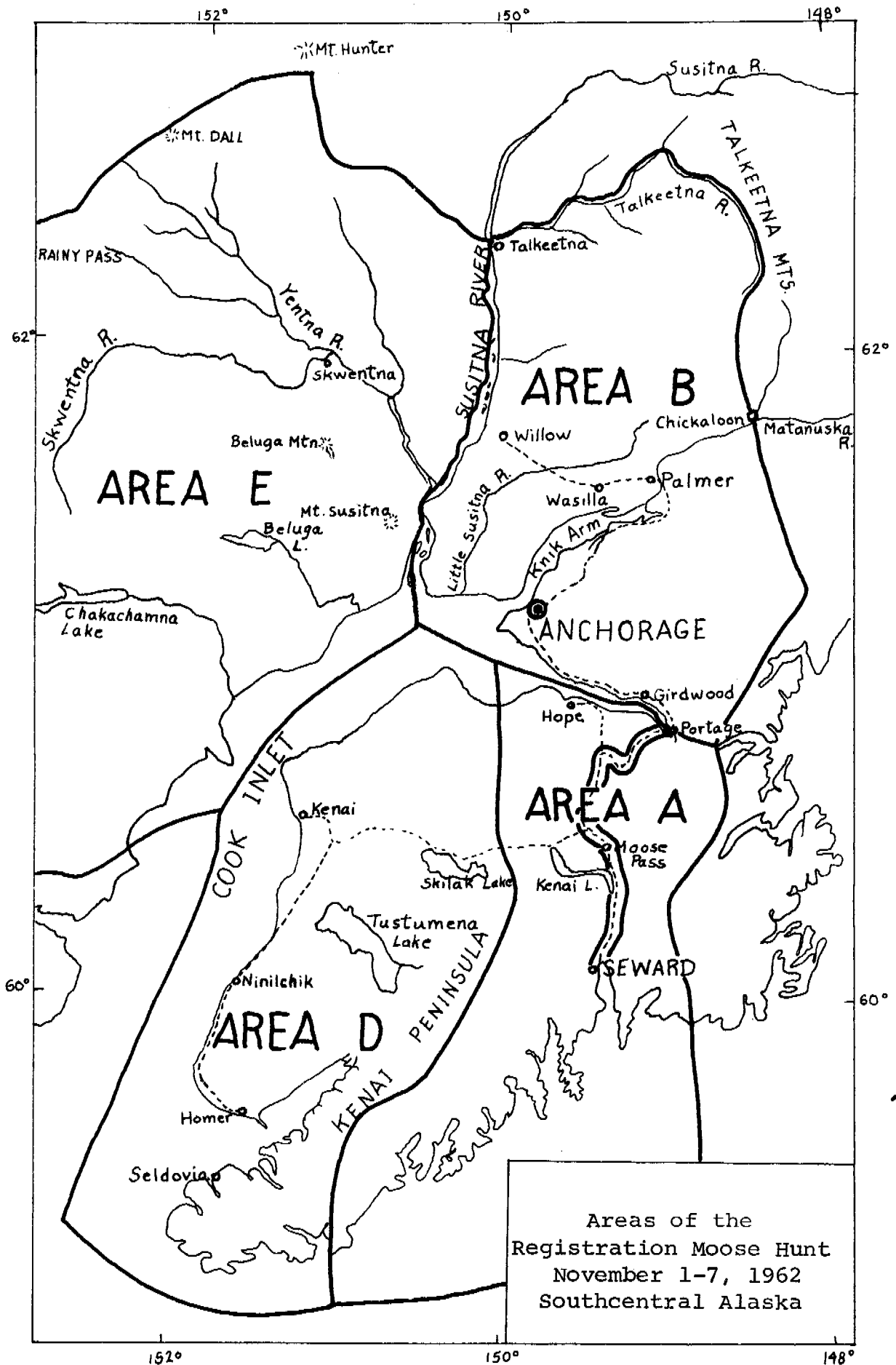




Table 21. Tooth Wear-Class Composition of Antlerless Moose Harvest  
 Registration Hunt, November 1-7, 1962  
 Southcentral Alaska

	Tooth Wear Classes*										Total Aged Kill	Totals**
	C Calf	1 Yearling	2	3	4	5	6	7	8	9		
Area A Unit 7, east side of Kenai Peninsula	5	6	6	7	6	5	2	3	2	0	42	46
Area B Part of Unit 14, Lower Susitna- Matanuska Valleys	51	40	18	29	34	17	34	21	9	22	275	297
Area D Unit 15, west side of Kenai Peninsula	<del>68</del>	35	51	85	44	42	48	29	12	5	419	439
Area E Unit 16, northwest drainages of upper Cook Inlet	0	0	5	2	4	2	1	1	2	0	17	19
TOTALS	124	81	80	123	88	66	85	54	25	27	753	801

\* Lensink, op. cit.

\*\* Totals include unknown age animals not shown in Table.

Table 22 relates the harvest to each of the seven days of the hunt by area. Area E is deleted from this table because of the small kill in that section. The totals do not agree with Table 21 because of incomplete data on the check out forms. It is interesting to note that, except in Area B, the weekend kill (in terms of moose taken per day) was no different than weekday kills. The total take for all areas was spread out quite uniformly.

Table 22. Antlerless Moose Harvest Related to Kill Dates  
November 1962, Southcentral Alaska

Kill Date	Area A		Area B		Area D		Totals	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
November 1 (Thurs.)	12	27	49	18	86	20	147	20
" 2 (Fri. )	4	9	31	12	51	12	86	12
" 3 (Sat. )	6	13	60	23	57	13	123	16
" 4 (Sun. )	4	9	53	20	51	12	108	14
" 5 (Mon. )	3	7	19	7	82	19	104	14
" 6 (Tues. )	7	15	28	10	55	12	90	12
" 7 (Wed. )	<u>9</u>	20	<u>28</u>	10	<u>55</u>	12	<u>92</u>	12
TOTALS	45		268		437		750	

The November 1-7 antlerless harvest is related to kill site in Table 23. Again, the totals appearing in this table do not correspond to Table 21 because of occasional incomplete data on the check out cards.

In Area A, 22 animals (49 per cent of a total kill of 45) were taken along the Sterling Highway between its junction with the Seward Highway and the boundary of Game Management Unit 7.

In Area B, 90 moose (33 per cent of a total kill of 277) were killed between Potter and the Knik River and 87 (31 per cent of the kill) were shot in a section of the Matanuska Valley bordered on the east by the Fishhook Road, on the north by Willow Creek, and on the south by the Alaska Railroad.

Table 23. Antlerless Moose Harvest Related To Kill Site  
 Registration Hunt, November 1962  
 Southcentral Alaska

Area A

Kill Site	Kills	
	No.	Per Cent
1. Portage to Sterling Highway along Seward Highway	6	13
2. Hope Road (including Palmer Creek Road)	8	18
3. Sterling Highway west from Seward Highway to Unit 7 boundary	22	49
4. Seward Highway south from Sterling Highway to Seward	9	20
TOTAL	45	

Area B

1. Portage to Potter along Seward Highway	19	7
2. Potter to Knik River	90	33
3. Knik River north to Area B boundary and west to Fishhook Road and Knik Road	60	22
4. West of Knik Road and south of Alaska Railroad	15	5
5. West of Fishhook Road; north of Alaska Railroad; south of Willow Creek	87	31
6. North of Willow Creek; south of Kashwitna River	5	2
7. North of Kashwitna River	1	0
TOTAL	277	

Table 23. Continued

## Area D

Kill Site	Kills	
	No.	Per Cent
1. Sterling Highway from Unit 7 boundary west to Soldotna	42	10
2. Skilak Lake Cutoff Road	31	7
3. Swanson River Road Complex	105	24
4. Soldotna to Kenai and North Kenai Road	55 <sup>233</sup>	13
5. Soldotna to Clam Gulch	105	24
6. Clam Gulch to Anchor Point	11	2
7. Anchor Point to Homer and East Side Road	88	20
TOTAL	437	

The kill of 437 moose in Area D was rather evenly distributed.

Anchorage hunters, by sheer numbers, accounted for high percentages of the moose kills in Areas A, B, and D (Table 24). The kill in Area D was distributed among hunters from more different places of residence than in either Area A or B.

The total known legal hunter-take of moose in southcentral Alaska during the 1962 season was then 2,454: 560 passed through checking stations, 104 were determined to have been taken by residents of the Matanuska Valley during the regular season, 1,770 were harvested by participants in the antlerless hunts, and personal interviews disclosed the killing of 20 more animals.

Table 24. Antlerless Moose Harvest Related to Hunters' Residence  
Registration Hunt, November 1962  
Southcentral Alaska

Hunters' Residence	Kill by Hunt Area					
	A		B		D	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Matanuska Valley (Talkeetna to Knik River)	0		59	21	1	0
Anchorage (Knik River to Portage and Whittier)	16	35	213	77	91	21
Seward (All Unit &)	27	59	0		58	13
Kenai (Boundary of Unit 7 to Ninilchik)	1	2	0		180	42
Homer (Ninilchik to Homer, Eastside Road and Seldovia)	0		2	1	100	23
Other	<u>2</u>	4	<u>2</u>	1	<u>4</u>	1
TOTALS	46		276		434	

## Specimens

Specimens, with potential as aging tools, were collected during the November 1-7 hunt. These materials included incisor-form teeth from 695 moose and eyeballs representing 541 animals. The specimens will be studied during the spring and summer of 1963 to ascertain their aging values.

### Mortality Studies (Other Than Hunter Harvest):

From July 1, 1962 through May 31, 1963, 81 moose were known to have died from causes other than hunter harvest in southcentral Alaska. Car-kills were the heaviest source of mortality as may be observed in Figure 11. Fifty-three moose or 65 per cent of the 81 known instances of mortality were high-way kills. Of these 53 animals age data are available for 49 as follows: calves-24 (49 per cent), yearlings-8 (16 per cent), and adults-17 (35 per cent). The mild winter caused the car-kill to be spread out over several months although the period of December through March sustained the majority of car-moose incidences (Figure 12).

Fourteen animals had to be disposed of by Department personnel for public safety reasons. Six of these 14 Department kills took place at Anchorage International Airport where moose were frequenting the runways.

Both the known illegal kills and those animals observed that had died for unknown reasons were comparatively few, five in each category.

The Alaska Railroad kill was unusually low, only four moose being reported hit and killed by trains. The mild winter undoubtedly was a major reason behind this.

Predesignated specimens were collected whenever feasible. Sixty-one sets of lower jaws, 33 reproductive tracts, and eyeballs representing 50 moose were preserved for study.

Fifty-five moose livers were examined for parasites; cysts were present in 32 (58 per cent).

Measurements were made of 51 animals and weights were taken of 47.

Figure 11. Moose Mortality In The Anchorage Area

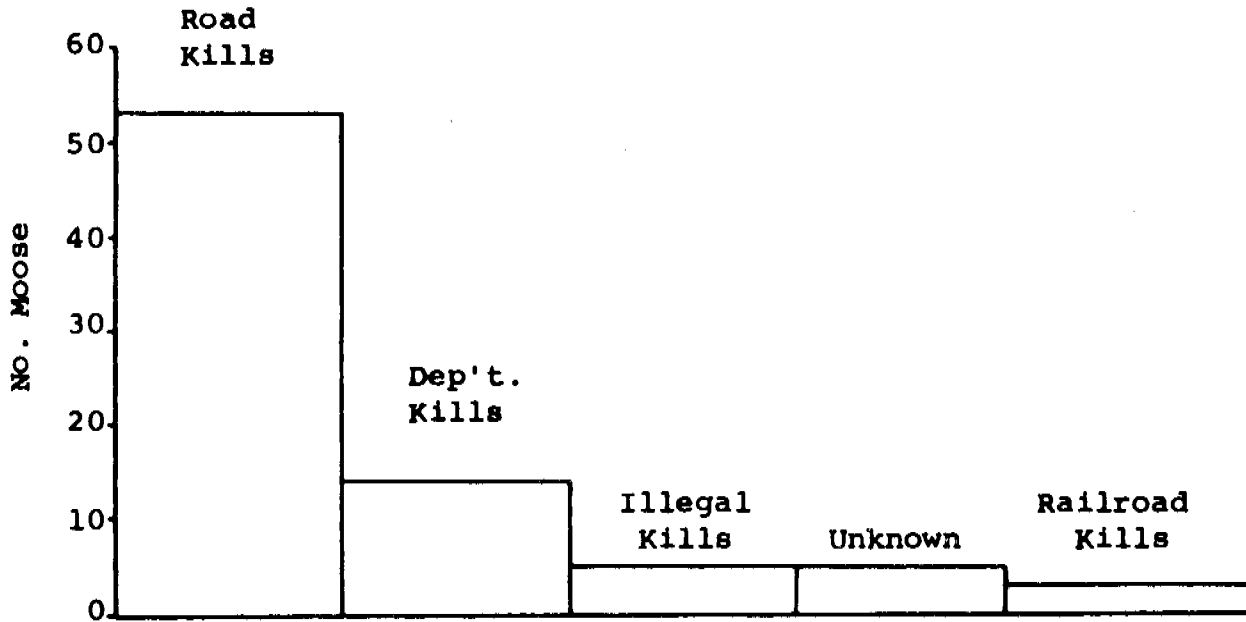
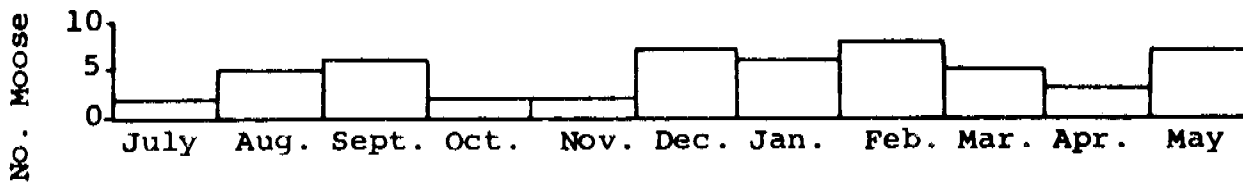


Figure 12 . Moose Highway Mortality In The Anchorage Area Related to Month



## INTERIOR-ARCTIC ALASKA

### Abundance and Composition Surveys:

Moose composition counts were flown on the Goodpaster-Shaw Creeks Flats and on the Yukon River during late November and early December 1962. A summary of the results appears in Table 25.

The samples from the Goodpaster-Shaw Creek Flats were small and few conclusions may be drawn; however, if the overall calves per 100 cows ratio was representative of the actual population, production was good.

Calf production in the Yukon River samples was poor, averaging only 15 calves per 100 cows. The ratio of young bulls per 100 cows (17) indicates that, although production may be poor, survival through the first winter and second summer was good, at least for that particular age class.

Early spring counts made on the Koyukuk and Yukon Rivers in March of 1963 resulted in the observation of 1,650 moose (Table 26). The number of moose located per hour of flying was high; however, the per cent of calves in the populations was low. No data are presently available to explain the apparently low production.

Fall counts conducted to sex and age moose in the Tanana Valley are presented in Table 27. For a description of the specific areas refer to Bently, 1961.

The Tanana Valley moose population appears to be in fine shape: production at 44 calves per 100 cows is good; the calf per cent in the herd is 23, and there is about a 1:2 bull to cow ratio.

### Characteristics of the Hunter Harvest:

Only kill data secured from the antlerless moose hunts were sufficiently complete to warrant being included in this section. These hunts were:

1. The September 20-30 hunt in Unit 20.
2. The November 1-7 hunt on the Tanana Flats.
3. The November 1-7 Delta Junction hunt.



Table 25. Moose Composition Counts  
 Fall, 1962  
 Interior-Arctic Alaska

Area	Date	Cows W/0 Calves	Cows W/1 Calf	Cows W/2 Calves	Young Bulls	Adult Bulls	Calves /100 Cows	Per Cent Calves In Herd	Total Moose
Goodpaster River	12/ 1/62	3	6	-	2	1	67	33.3	18
Goodpaster River (South Fork)	12/ 2/62	1	3	-	-	-	75	37.5	8
Volkman River	12/ 2/62	18	11	-	-	6	38	23.9	46
Shaw Creek & Flats	12/ 2/62	10	4	-	1	1	29	20.0	20
<b>Totals</b>		32	24	-	3	8	43	26.1	92
Yukon River- Paimiut to Anvik	11/26/62	181	22	6	33	44	16	10.6	320
Yukon River- Iditarod & Shageluk Hills	11/25/62	35	2	-	10	26	5	2.5	75
<b>Totals</b>		216	24	6	43	70	15	9.1	395

Table 26. Moose Composition Counts  
 Early Spring, 1963  
 Interior-Arctic Alaska

	Date	Adult W/0 Calves	Cows W/1 Calf	Cows W/2 Calves	Per Cent Calves In Herd	Total Moose	Moose Per Hour
Koyukuk River- Mouth to Roundabout Mt.	3/ 2/63 3/ 6/63 3/18/63	780	104	5	11	1,003	133
Yukon River- Koyukuk Village to Kaltag	3/ 2/63	207	37	0	13	281	112
Yukon River- Koyukuk Village to Birches below Tanana Village	3/ 6/63 3/17/63	178	38	5	18	269	116
Yukon River- Nowitna River upstream from Mud River	3/ 1/63	64	15	1	18	97	48
TOTALS		1,229	194	11	13	1,650	

Table 27. Moose Composition Counts  
 Fall, 1962  
 Tanana Valley, Interior Alaska

Area*	Date	Cows W/0 Calves	Cows W/1 Calf	Cows W/2 Calves	Lone Calves	Young Bulls	Adult Bulls	Uniden- tified	Total Moose
1	11-29-62	38	33	5	2	6	37	11	175
2	12-12-62	62	20	0	2	11	31	5	151
3	12-17-62	38	6	0	0	1	9	0	60
4	12- 6-62	46	48	0	3	2	16	0	163
5	11-30-62	22	29	4	3	2	13	1	111
6	12-17-62	65	16	0	3	5	29	0	134
7	11-27-62	27	25	0	1	10	40	4	132
8			Omitted	from	1962	counts.			
9	11-27-62	43	20	4	5	7	29	4	140
TOTAL		341	197	13	19	44	204	25	1,066

\* For a description of the specific areas see Bently, 1961.

Table 28. Analysis of Permittees For The  
September 20-30, 1962 Antlerless  
Moose Hunt In Unit 20  
Interior Alaska

	<u>No.</u>	<u>Per Cent of Total Registered</u>
Total number of persons registering for hunt	870	
Persons who killed a bull prior to the hunt or in another area	24	2.8
<hr/>		
	<u>No.</u>	<u>Per Cent of Poten- tial No. of Persons</u>
Potential number of persons who could participate in the hunt	846	
Persons who did not hunt	376	44
Persons who hunted	432	51
Persons who reported but had incomplete reports	25	3
Persons not reporting	13	2

Analysis of Permittees Who Hunted

	<u>No.</u>	<u>Per Cent</u>
Persons who killed antlerless moose	48	11
Persons who killed antlered moose	22	5
Unsuccessful permittees	362	84
Total number of permittees who hunted	432	
<hr/>		
Total number of moose killed (antlered and antlerless)	70	16

For the exact descriptions of the boundaries of these hunts refer to Appendix C.

All participants had to check in and out of the hunts and were allowed one animal each.

An analysis of permittees of the September 20-30 hunt appears in Table 28. Of the 870 persons who registered for the hunt, 432 were known to have actually hunted; the remainder either did not hunt, filed incomplete reports or no reports at all. Seventy of the registrants killed moose: 48 antlerless and 22 antlered animals.

One hundred and twenty (94 per cent) of the 127 participants of the November 1-7 hunt on the Tanana Flats failed to kill a moose (Table 29). Six hunters took antlerless moose and one took an antlered animal.

Three hundred and two permittees of the 347 registered for the November 1-7 Delta Junction hunt went afield after moose; 45 did not (Table 30). Only 67 hunters (19 per cent of the total number registered and 22 per cent of those who hunted) took moose: 8 antlered and 59 antlerless.

This was the only one of these three hunts where permittees were allowed to register throughout the hunt. This technique met with hunter approval; 87 per cent of the registrants hunted and all of them turned in their permits.

Thus in these three hunts 1,742 people registered: 861 hunted and took 113 antlerless and 31 antlered moose.

Table 29. Antlerless Moose Hunt  
 Tanana Flats, November 1-7, 1962  
 Interior Alaska

	<u>No.</u>	<u>Per Cent of Total Registered</u>
Total number of persons registering for hunt	525	
Did not participate	377	72
Persons not reporting (as of Jan. 15, 1962)	21	4
Persons who hunted	127	24

Analysis of Permittees Who Hunted

	<u>No.</u>	<u>Per Cent of Total Registered</u>
Persons who killed antlerless moose	6	5
Persons who killed antlered moose	1	(less than 1)
Unsuccessful permittees	120	94
Total number of permittees who hunted	127	

Table 30. Antlerless Moose Harvest  
Delta Junction, November 1-7, 1962  
Interior Alaska

	<u>No.</u>	<u>Per Cent of Total Registered</u>
Total number of persons registering for hunt	347	
Did not participate	45	13
Persons not reporting	0	0
Persons who hunted	302	87

Analysis of Permittees Who Hunted

	<u>No.</u>	<u>Per Cent of Total Registered</u>
Persons who killed antlerless moose	59	19
Persons who killed antlered moose	8	3
Unsuccessful permittees	235	78
Total number of permittees who hunted	302	

APPENDIX A

A Description of the Area Closed  
To The Taking of Antlerless Moose  
In Unit 13 During the November 1-7, 1962 Hunt

That portion of Game Management Unit 13 south of the Denali Highway, west of the Richardson Highway, north of the Glenn Highway, and east of the Little Nelchina, the Oshetna and the Susitna Rivers.



APPENDIX B

A Description of that Portion of the Matanuska Valley  
Closed to the Taking of Antlerless Moose During the  
November 1-7, Registration Hunt

That area enclosed by a line drawn from Old Knik and following the Knik Road to Wasilla, thence to the Little Susitna Lodge by way of the Fishhook Road, and from the Little Susitna River to Mint Glacier, thence a line drawn from Mint Glacier to the headwaters of Moose Creek, thence down Moose Creek to the Matanuska River and return to old Knik along northerly bank of Matanuska River and Knik Arm.

A Description of that Portion of Game Management Unit 7  
Closed to the Taking of Moose During the Nov-  
ember 1-7, 1962 Antlerless Moose Registration Hunt

That portion of Unit 7 within a three mile strip paralleling the Seward Highway on both sides from Portage Creek to Seward.

## APPENDIX C

### Descriptions of the Boundaries of the September 20-30 & November 1-7, 1962 Antlerless Moose Hunts in Unit 20

1. September 20-30.

Unit 20, but only that portion of Unit 20 bounded on the east by the Bonnifield Trail from the point where it crosses the Tanana River to the Point where it crosses the Wood River, thence upstream along the west bank of the Wood River to its headwaters, thence along a line coinciding with the boundary of Unit 13 to the Nenana River, thence along the east bank of the Nenana River to its confluence with the Tanana River, thence upstream along its north bank to the point of beginning.

2. November 1-7 (Tanana Flats).

Unit 20, but only that portion of Unit 20 bounded on the east by the Bonnifield Trail from the point where it crosses the Tanana River to the point where it crosses the Wood River, thence upstream along the west bank of the Wood River to its headwaters, thence along a line coinciding with the boundary of Unit 13 to the Nenana River, thence along the east bank of the Nenana River to its confluence with the Tanana River, thence upstream along its north bank to the point of beginning.

3. November 1-7 (Delta Junction).

Unit 20, but only that portion of Unit 20 bounded by the north bank of the Tanana River from its confluence with the Little Delta River upstream to its confluence with the Gerstle River, thence upstream along the east bank of the Gerstle River to its headwaters, thence by a line along the crest of the Alaska Range to the headwaters of the Little Delta River, thence downstream along the west bank of the Little Delta River to the point of beginning.

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