

1965 MOOSE STATUS REPORT --- ALASKA

by R. A. Rausch, Leader- Big Game Project

INTRODUCTION

This interim report was prepared for the purpose of consolidating preliminary data on the status of the major populations of moose in Alaska. Most of the data has appeared previously in several of the Division of Game's Monthly reports.

A synthesis of all biological data pertaining to a particular moose herd may provide perspective when game management considerations are deliberated in mid-April. Our research efforts are organized on a state-wide basis and I have not attempted to regionalize this report. The material is presented by game management unit, 1 through 26, with appropriate local names, and maps to provide orientation. The following sections are included: State-wide report of harvest, including distribution and return of harvest tickets and magnitude of the harvest by unit and sub-unit, Aerial sex and age composition counts, productivity, based upon pregnancy rates, age composition of the harvest, selected chronology of harvest, and finally, discussion of several important herds currently providing 60 to 70 percent of the annual harvest of moose.

MOOSE HARVEST, 1965

Nearly complete records for the 1965 season suggest that this year's harvest of moose was nearly identical to that of 1964. The composition of the harvest was also similar; 6,048 males, 2,470 antlerless, and 104 sex unknown in 1965, and 6,016 males, 2,684 antlerless, and 70 sex unknown in 1964.

Three important units showed major changes in production during 1965 -- units 13, 14, and 15. In game management unit 13, there was no antlerless season in 1965, whereas 394 antlerless moose were harvested in 1964. The harvest of male moose in 1965 exceeded the 1964 harvest of male moose by approximately 100 animals. The unit supports an extremely large population of moose and a substantial increase in the harvest of both male and female moose could be provided without danger of over-exploitation.

The harvests in units 14 and 15 present a number of problems in interpretation and to future management endeavors. Portions of these units are being utilized at, or near, maximum sustained yield. Continuing a sustained yield management concept on these areas will be complicated by the unpredictability of weather and the whims of hunters who seem to seek areas receiving the most favorable publicity, or where moose can be seen easily. In unit 15 the harvest of male moose dropped some 30% in 1965 and the harvest of male and antlerless dropped 24%, from 2,070 animals in 1964 to 1,584 in 1965.

Post season aerial surveys indicated populations at, or above, the levels recorded in 1964, with the possible exception that the male population has been reduced in local areas around Homer. The unit can support harvests equal to that of 1964 if the seasons are set in such a manner as to recognize the problems associated with utilization of male moose prior to the breeding season, and to harvest antlerless moose after the "Alpine" population has intermingled with the "lowland" moose -- fairly late in November. Late seasons on antlerless moose cause some administrative problems, but effective utilization of the resource necessitates late seasons; i.e., after snow fall has forced some of the animals to the lowland areas.

Unit 14, where 2,262 moose were harvested in 1965, ranks as this year's number one producer. The harvest represents a 71% increase over 1964. In subunit 14-A in excess of one moose per square mile was harvested. A population of three to four moose remained after the season. Continued adequate harvests will be possible only with appropriate regulations that take advantage of seasonal population shifts.

MOOSE HARVEST, 1965 (continued)

In unit 20, the 1965 harvest of antlered moose was approximately equal to the 1964 harvest. Unit 20, like unit 13, could sustain a greatly increased annual harvest of moose. In 1965 the harvest of antlerless moose dropped nearly 50% in unit 20-C. The reduced harvest represents the effects of a shortened antlerless season.

The Southeastern Alaska moose season was summarized in a publication by John Crawford a few weeks ago and only unit 5 was considered in this summary. The harvest in unit 5 increased about 5% in 1965. Analysis of aerial composition counts, productivity data, and age composition of the kill suggest that the moose herd is in excellent condition.

MOOSE HARVEST TICKET PROGRAM - FEBRUARY 15, 1966

Tickets issued by vendors	32,924	
Ticket stubs returned by hunters	30,864	(93.8%)
Tickets outstanding	2,060	(6.2%)
Successful hunters		
Male moose	6,048	
Female moose	2,470	
Sex unknown	<u>104</u>	
Total kill	8,620	
Unsuccessful & Did Not Hunt	22,244	
Could not contact because of insufficient address, deceased, moved and ect.	862	
No response to reminder letters	<u>1,198</u>	
TOTALS	32,924	

STATE WIDE COMPILATION*

Feb. 15, 1966

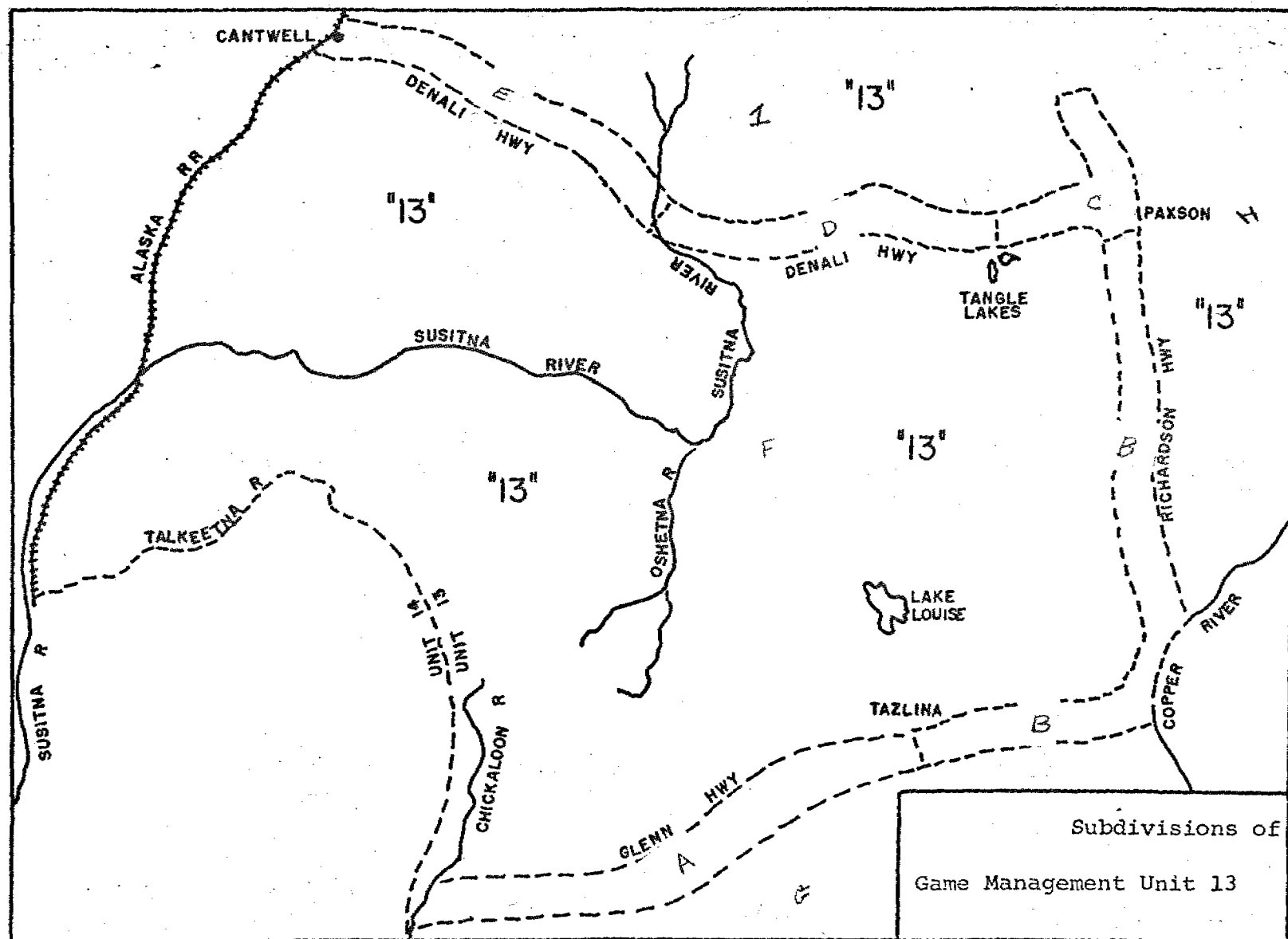
UNIT	♂	♂	♀	♀	SEX UNK.	TOTAL
1	128	0	35	0	4	176
5	153	0	125	0	4	282
6	24	0	0	0	0	24
7	60		1	0	0	61
9	200	13	63	5	4	285
11	116	0	70	0	2	188
12	151	0	33	0	6	190
13	1318	0	3	0	10	1331
14	1127	0	1125	0	10	2262
15	841	0	731	0	12	1584
16	333	0	52	0	7	392
17	41	0	1	0	0	42
18	28	0	0	0	2	30
19	114	7	27	1	1	150
20	1050	0	140	0	33	1223
21	87	9	30	1	1	128
22	52	3	3	0	2	60
23	44	0	0	0	1	45
24	58	8	14	0	4	84
25	51	1	1	0	0	53
26	0	0	0	0	1	1
No Unit	32	0	9	0	0	41
TOTALS	5976	41	2419	7	104	8591

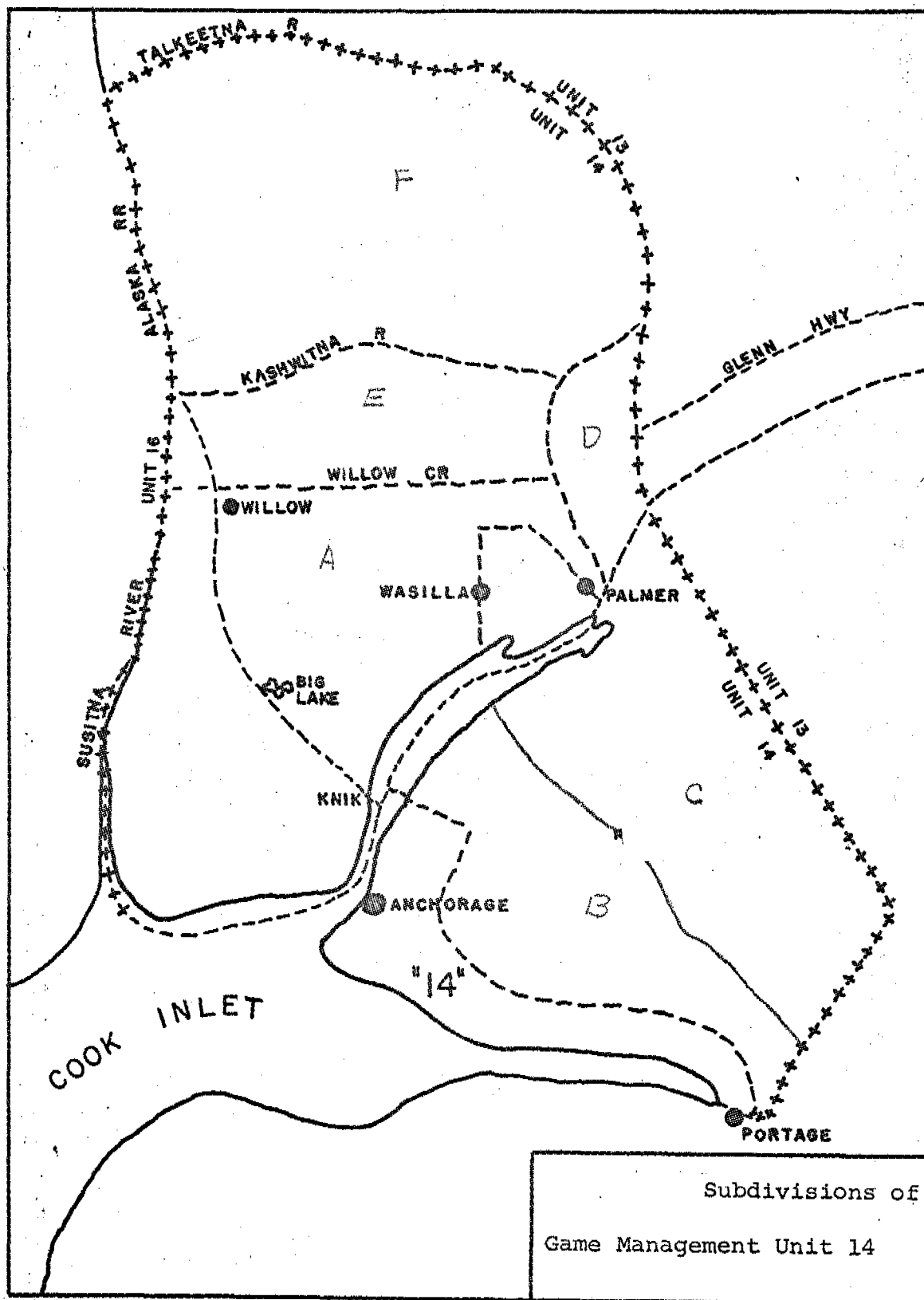
* Totals through Feb. 15, 1966 -- approximately 10% of tickets were outstanding

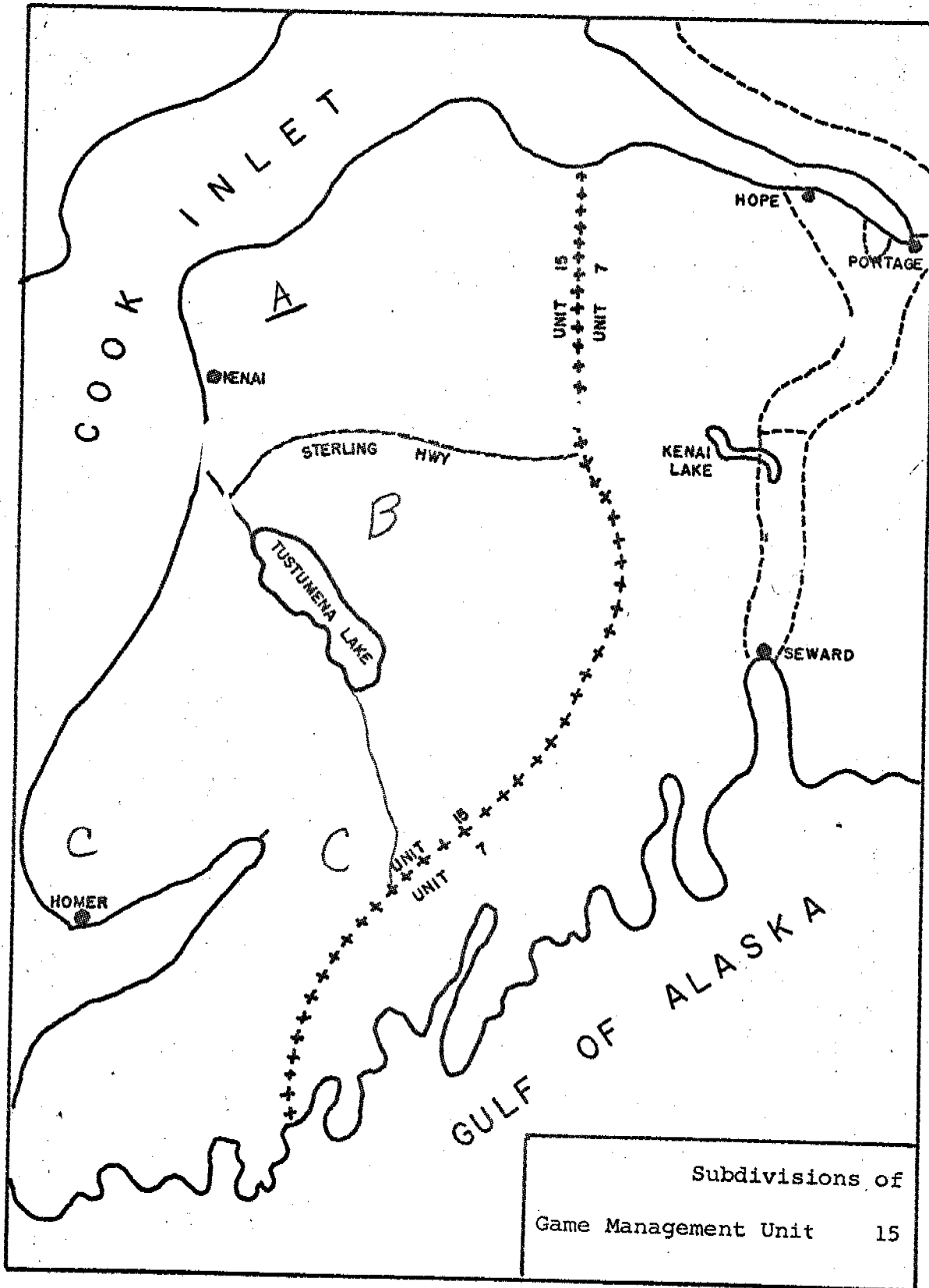
MOOSE HARVEST SUBUNIT BREAKDOWN

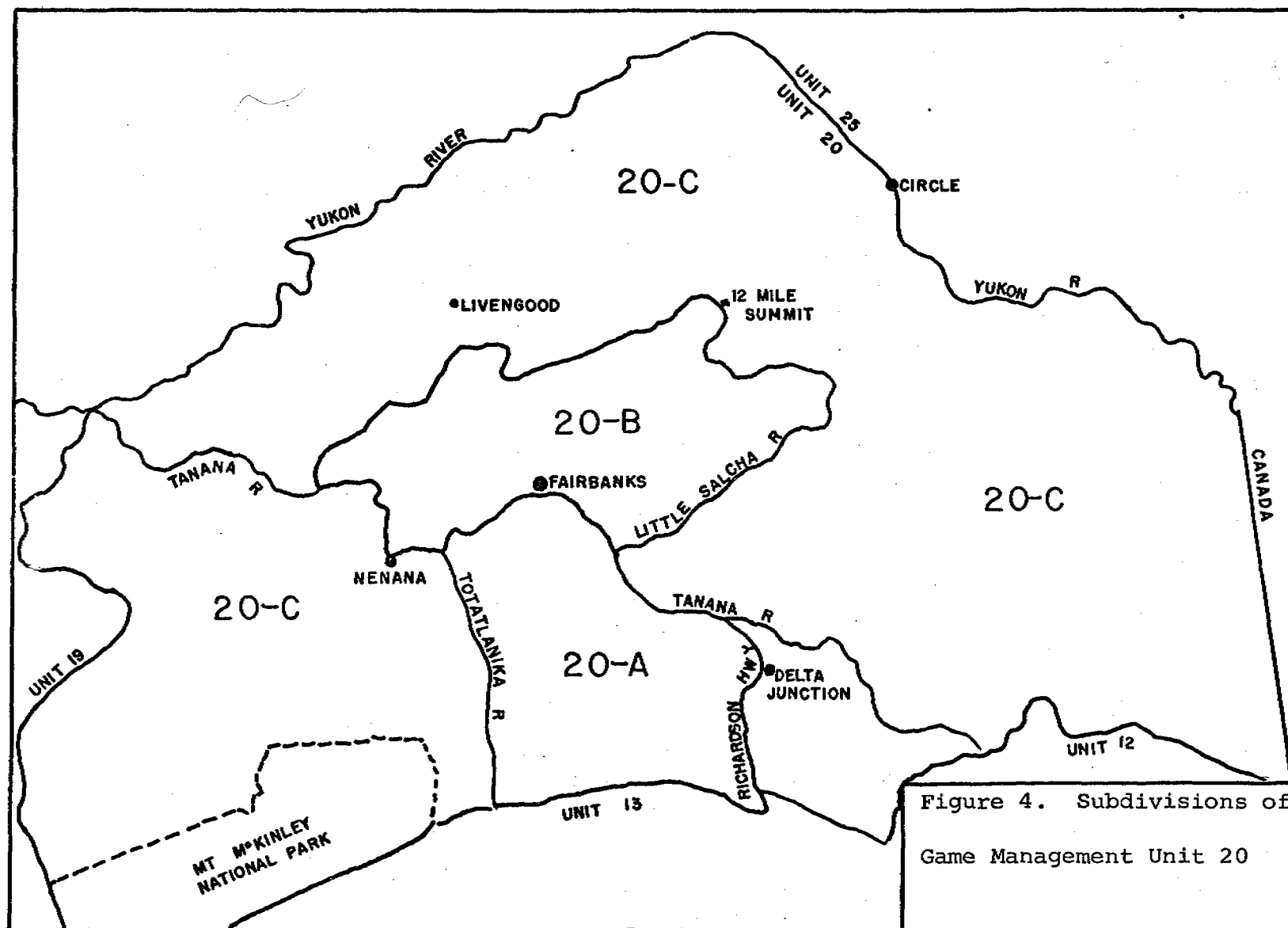
Feb. 15, 1966

UNIT	SUBUNIT	♂	♀	Sex Unk.	Total Moose
1	A	28	1	1	30
	B	34	0	2	36
	C	<u>66</u>	<u>34</u>	<u>1</u>	<u>101</u>
	Total	128	35	4	167
7	A	17	0	0	17
	B	10	0	0	10
	C	21	0	0	21
	D	6	0	0	6
	E	3	0	0	3
	Other	<u>3</u>	<u>1</u>	<u>0</u>	<u>4</u>
	Total	60	1	0	61
13	A	196	1	0	197
	B	183	0	0	183
	C	114	0	1	115
	D	123	0	1	124
	E	49	0	1	50
	F	299	0	1	300
	G	107	0	1	108
	H	1	0	0	1
	I	163	1	3	167
	Other	<u>83</u>	<u>1</u>	<u>2</u>	<u>86</u>
	Total	1318	3	10	1331
14	A	580	661	6	1247
	B	191	184	2	377
	C	44	27	0	71
	D	78	44	0	122
	E	118	102	1	221
	F	82	52	1	135
	Fort Rich.	11	38	0	49
	Other	<u>23</u>	<u>17</u>	<u>0</u>	<u>40</u>
	Total	1127	1125	10	2262
15	A	365	299	5	669
	B	183	193	1	377
	C	248	224	4	476
	Other	<u>45</u>	<u>15</u>	<u>2</u>	<u>62</u>
	Total	841	731	12	1584
20	A	171	47	6	224
	B	273	4	8	285
	C	<u>606</u>	<u>89</u>	<u>19</u>	<u>714</u>
	Total	1050	140	33	1223









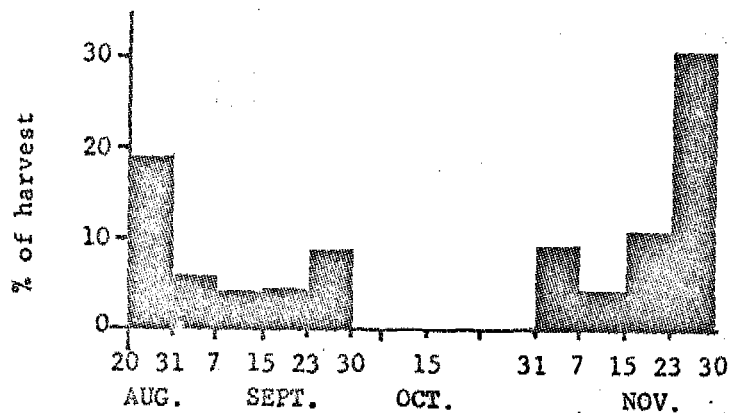
CHRONOLOGY OF MOOSE HARVEST, EXPRESSED IN PERCENT BY PERIOD

Unit or Subunit

Sample
Size

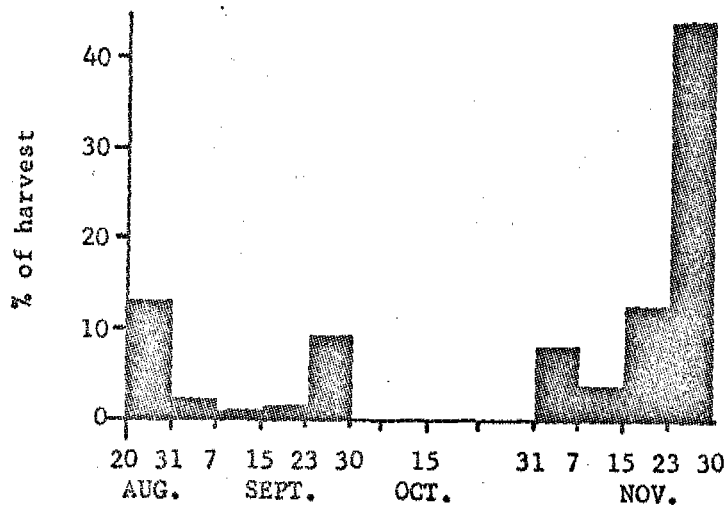
15A males

343



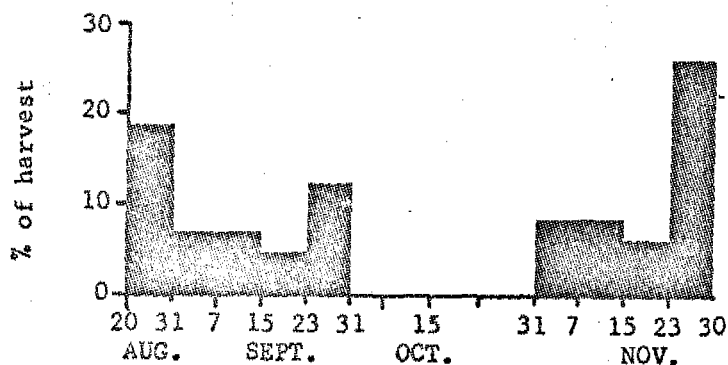
15B males

172



15C males

240



15 other males

40

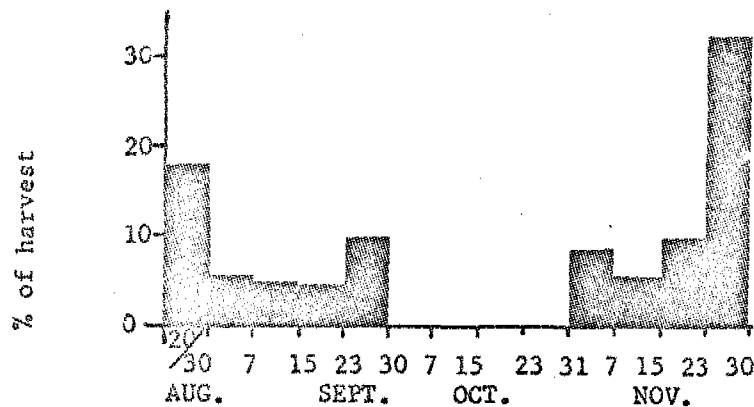


CHRONOLOGY OF MOOSE HARVEST, EXPRESSED IN PERCENT BY PERIOD (continued)

Unit or Subunit

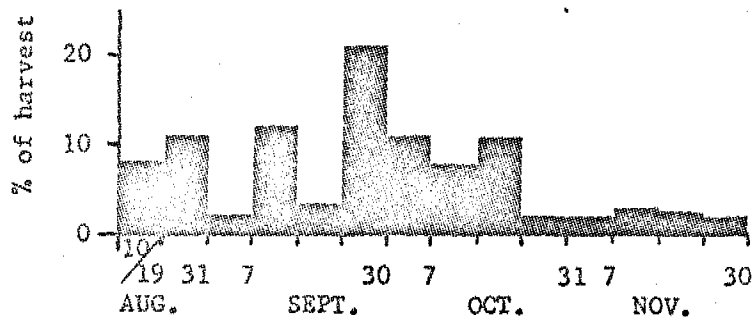
Sample
Size

15 composite
summary, male
harvest



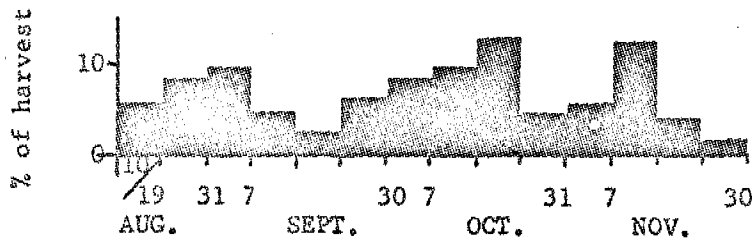
795

5 males



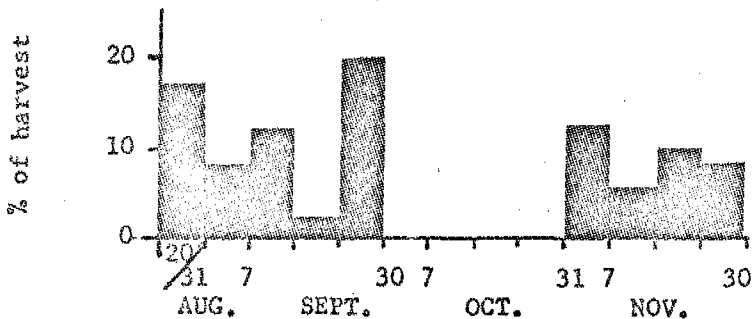
150

5 females



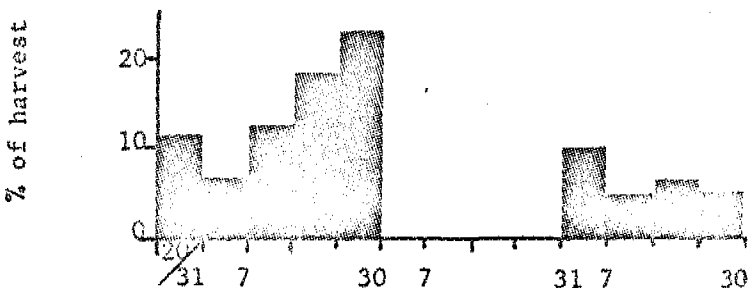
119

13A males



189

13B males



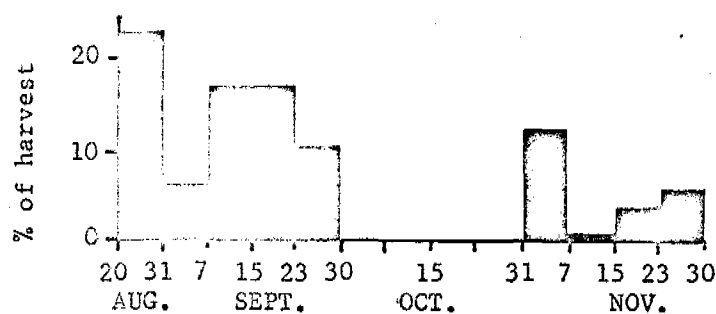
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CHRONOLOGY OF MOOSE HARVEST, EXPRESSED IN PERCENT BY PERIOD (continued)

Unit or Subunit

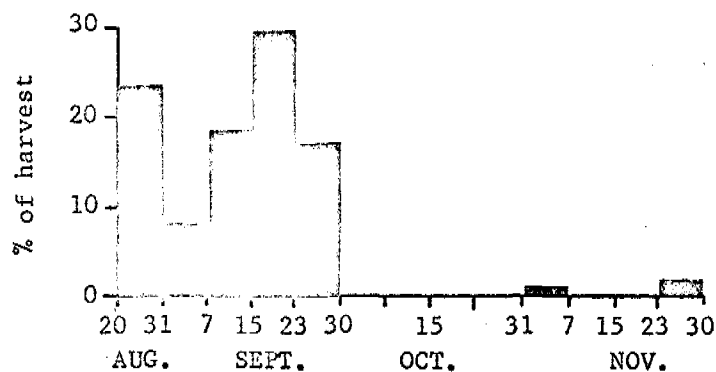
Sample
Size

13C males



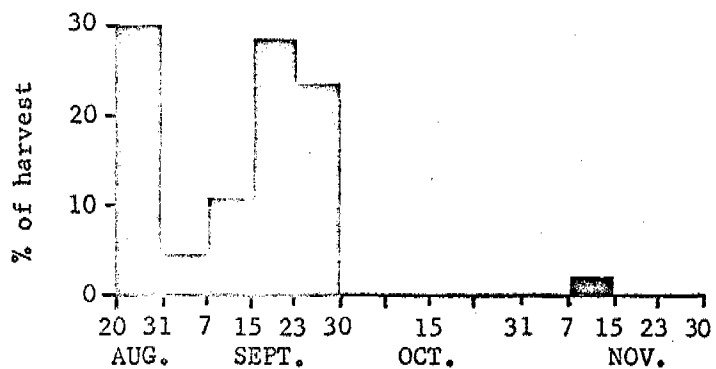
110

13D males



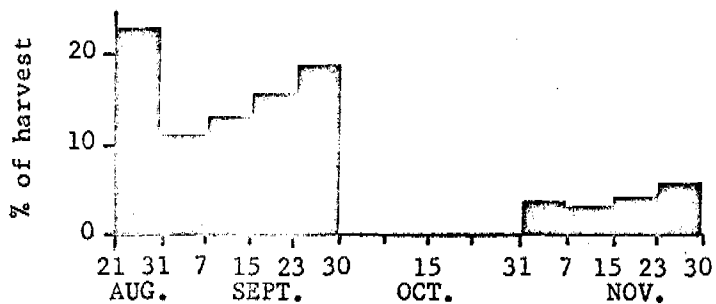
108

13E males



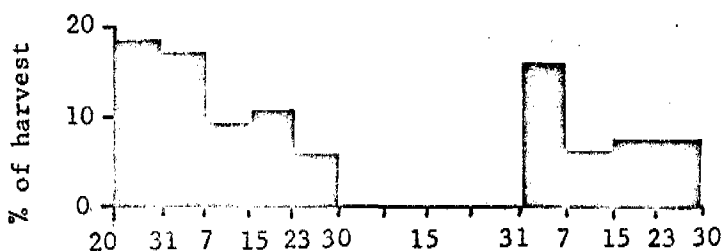
46

13F males



284

13G males



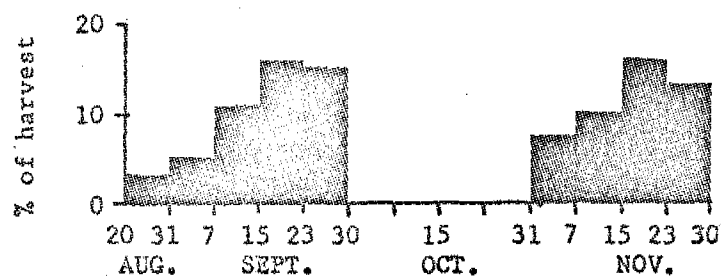
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CHRONOLOGY OF MOOSE HARVEST, EXPRESSED IN PERCENT BY PERIOD (continued)

Unit or Subunit

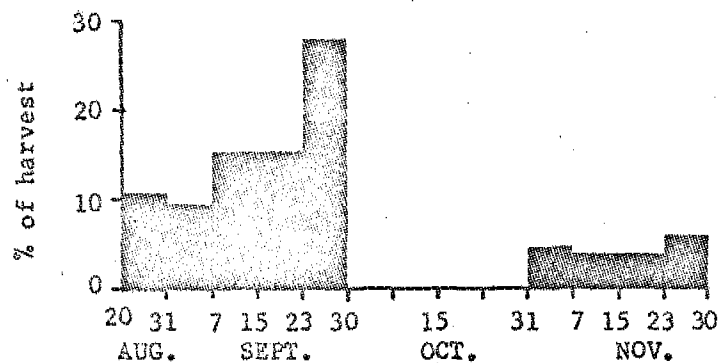
Sample Size

13I males



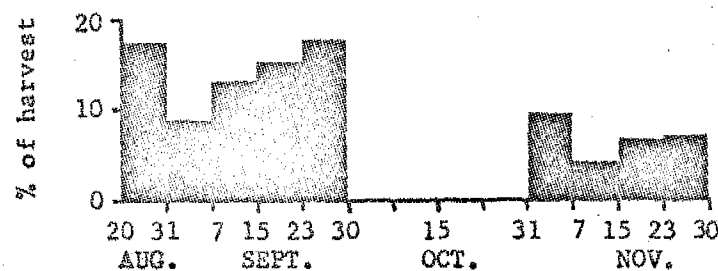
157

13 other males



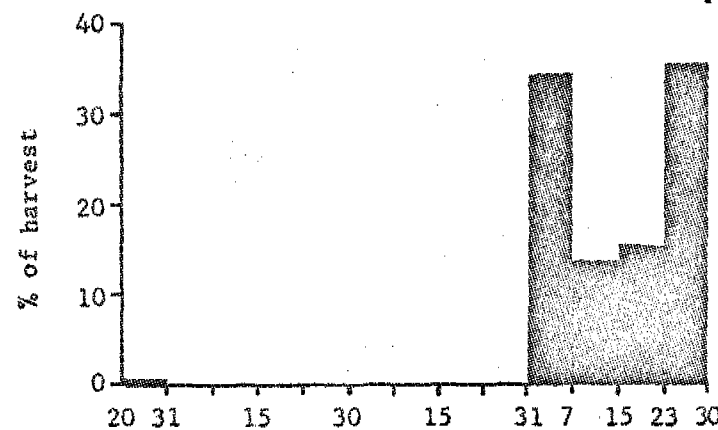
81

13 composite males



1284

14A males



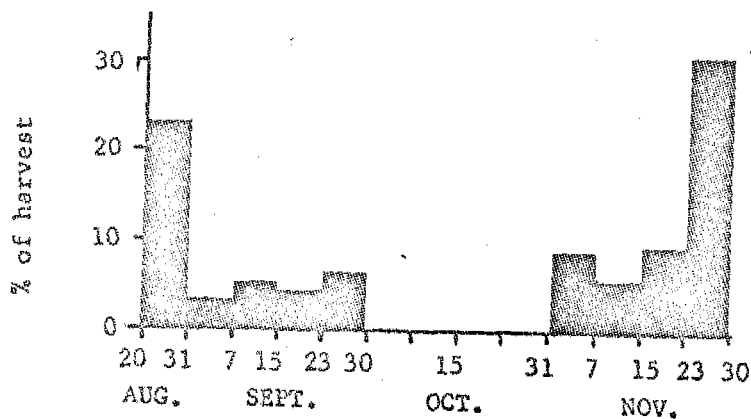
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CHRONOLOGY OF MOOSE HARVEST, EXPRESSED IN PERCENT BY PERIOD (continued)

Unit or Subunit

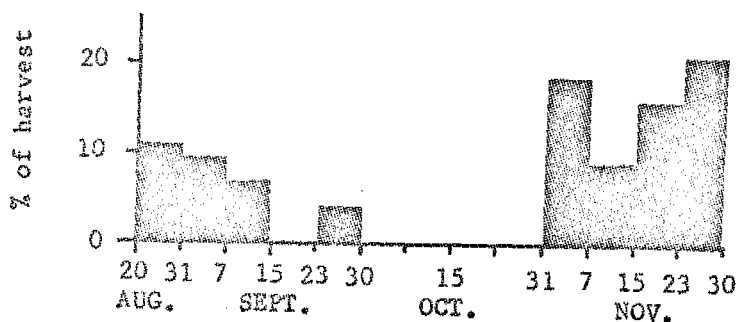
Sample
Size

14B males



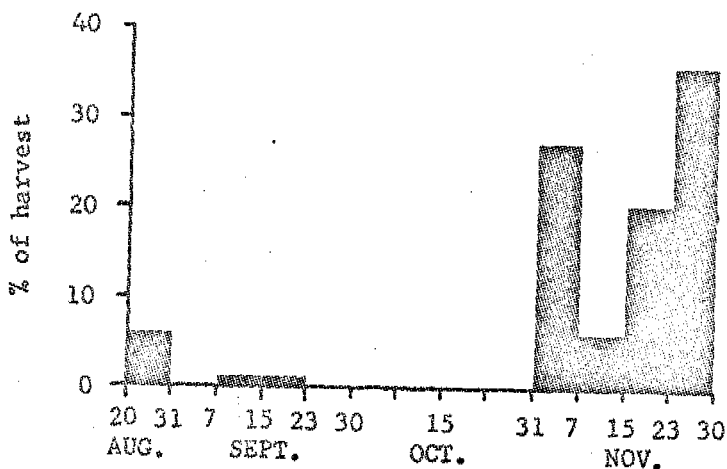
186

14C males



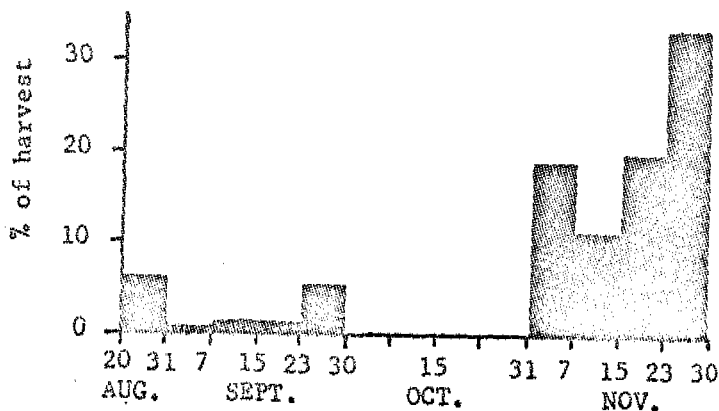
42

14D males



76

14E males



116

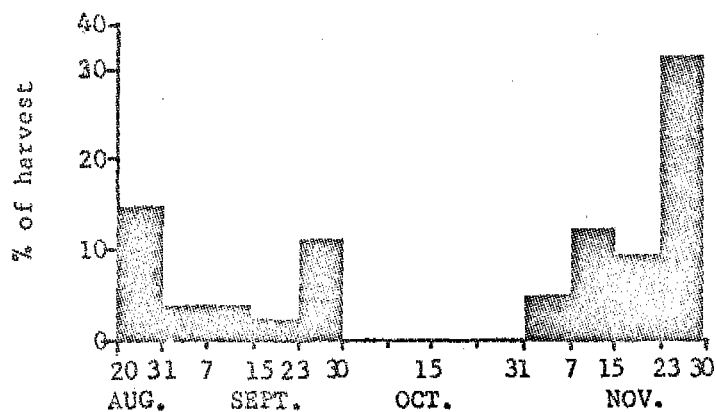
CHRONOLOGY OF MOOSE HARVEST, EXPRESSED IN PERCENT BY PERIOD (continued)

Unit or Subunit

Sample
Size

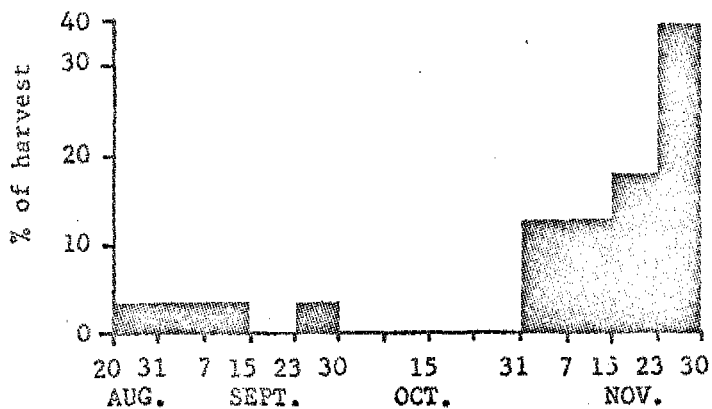
14F males

81



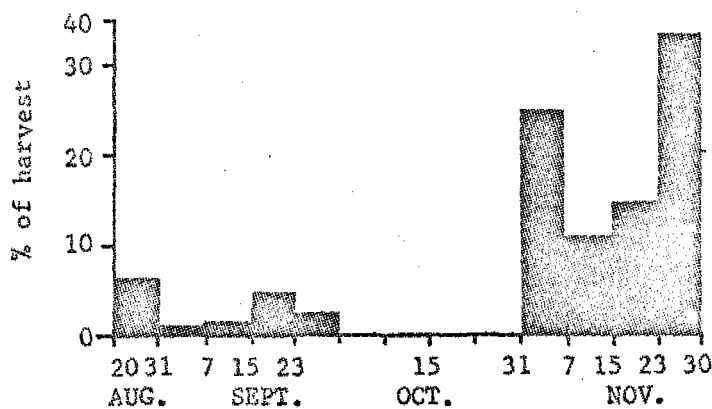
14 other males

22



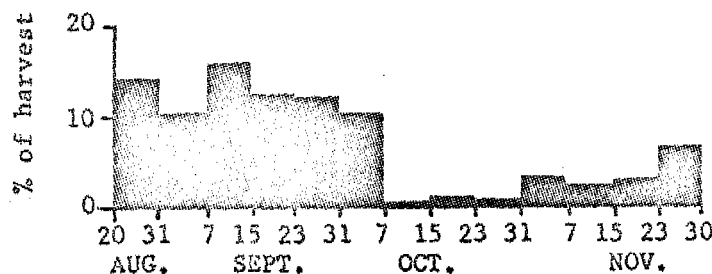
14 composite
males

1090



20A males

164



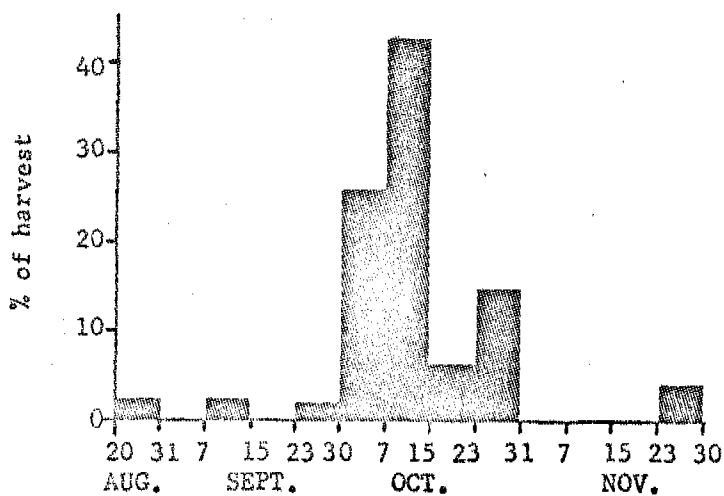
CHRONOLOGY OF MOOSE HARVEST, EXPRESSED IN PERCENT BY PERIOD (continued)

Unit or Subunit

Sample
Size

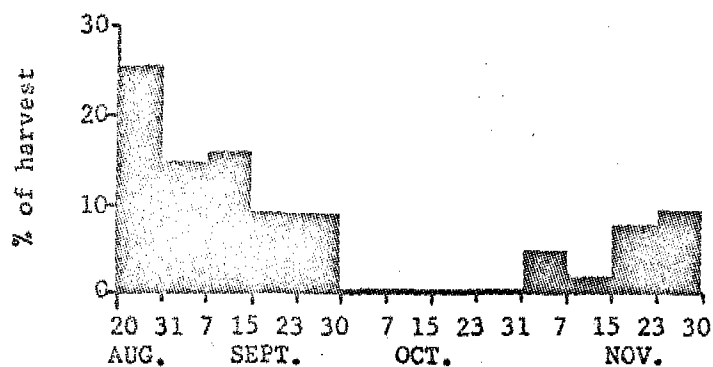
20A females

47



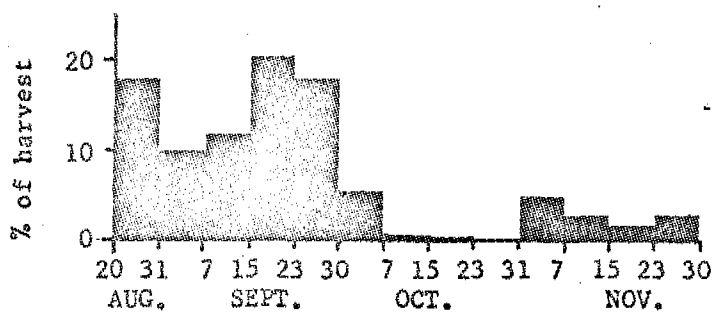
20B males

273



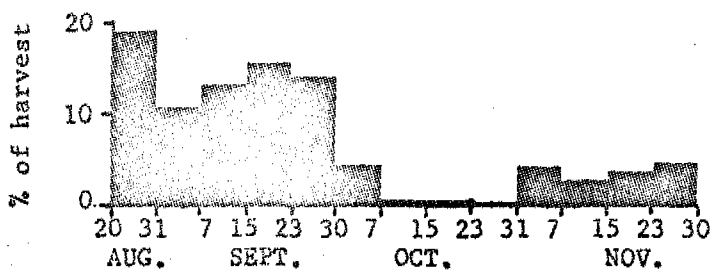
20C males

597



20 composite
males

1031



AERIAL COMPOSITION COUNTS, 1965-1966

Aerial sex and composition counts of moose, generally made during the late fall before males shed their antlers, have been used for approximately fifteen to twenty years to measure the relative proportions of recognizable population components of important moose herds.

We are able to recognize four primary population components, adult bulls, yearling bulls, cows, and calves. The ratios and percentages derived from these four components tell us a great deal about the status of the herd at the particular time surveyed, and if made periodically over a number of years, serve as a valuable index to long-term population trends.

The ratios are generally expressed as the number of calves or bulls per one hundred cows. These figures, particularly as they relate to productivity, i.e., calves per one hundred cows, are frequently confusing, and it is believed that in comparing productivity trends from year to year or from area to area that descriptive terms indicating the general trends are more meaningful than numerical ratios. For this reason, the terms poor, fair, good, and excellent have been used. These terms correspond to the following numerical values:

- Poor--fewer than 20 calves per 100 cows.
- Fair--20 to 35 calves per 100 cows.
- Good--36 to 50 calves per 100 cows.
- Excellent--more than 50 calves per 100 cows.

It should be remembered that for any one year, these terms relate only to productivity at approximately 6 to 8 months as measured by the calf:cow ratio, and they do not necessarily indicate the over-all welfare of the herd. For example, a population exhibiting poor productivity may have over-all excellent survival and a net gain in population for the year. Conversely a population may have excellent productivity at six months and poor over-all survival for the balance of the year, and end up with a net decrease.

Generally, however, excellent productivity is associated with an expanding herd. The counts in Tables 1 through 21 which were made in 1965, represent moose populations from most of the State. Productivity as measured by the ratio of calves per one hundred cows varies from poor to excellent.

In the intensely hunted areas, such as the Matanuska Valley, Kenai Peninsula, and portions of Unit 13, male moose have been much reduced. It would be desirable in a few of these areas to utilize more antlerless moose and to take males only after the breeding season.

Table 1 SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, MATANUSKA VALLEY 1965

Area	Flying Time	Young ♂	Adult ♂	Total ♂	♀ W/0	♀ W/1	♀ W/2	♀ Total	Unid. Adults	Calves	Total Moose	Calf % in Herd	Moose Per Hour
MATANUSKA VALLEY													
1. Above Timberline	2.00	30	17	47	114	76	6	196	1	88	332	26.5	166.0
1. Below Timberline	3.80	8	2	10	29	22	2	53	1	26	90	28.9	23.7
TOTAL THIS AREA	5.80	38	19	57	143	98	8	249	2	114	422	27.0	72.8
2.	2.40	1	1	2	14	11	0	25	0	11	38	28.0	19.0
3.	1.00	2	1	3	17	13	1	31	0	15	49	30.6	49.0
4.	1.70	0	1	1	11	26	0	37	0	26	64	40.6	37.0
5. Above Timberline		21	12	33	76	75	7	158	5	89	285	31.2	
5. Below Timberline		23	6	29	63	57	4	124	0	65	218	29.8	
TOTAL THIS AREA	4.25	44	18	62	139	132	11	282	5	154	503	30.6	118.0
6.	1.25	2	0	2	2	2	0	4	0	2	8		6.0
7. All Counts Above Timberline	2.50	21	40	61		34	4	149	0	42	252		100.8
	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
TOTAL ALL AREA	19.80	108	80	188	336	316	24	767	7	334	1336	25.0	67.0

TABLE 2 MOOSE SEX AND AGE COMPOSITION, MATANUSKA VALLEY, 1965

Area	Total Bulls Per 100 Cows	Young Bulls Per 100 Adult Bulls	Calves Per 100 Cows	Twin Calves Per 100 Cows w/Calf	Calf % in Total Herd	Young Bulls % in Total Herd	Young Bulls Per 100 Bull Calves	Young Bulls Per 100 Cow	Moose Per Hour	Total Moose
MATANUSKA VALLEY										
1. Above Timberline	24	176	45	7	27	9	68	15	166	332
1. Below Timberline	4	400	49	8	29	9	62	15	23.7	90
TOTAL THIS AREA	8	200	46	8	27	9	67	15	73	422
2.	8	200	44	0	28	3	18	4	19	38
3.	10	200	48	7	31	4	26	6	49	49
4.	3	0	70	0	41	0	0	0	37	64
5. Above Timberline	21	175	56	9	31	8	47	13	--	285
5. Below Timberline	23	383	52	7	30	11	70	19	--	218
TOTAL THIS AREA	22	24	55	8	31	9	57	16	118	503
6.	50	--	50	0	25	25	200	50	6	8
7. All Counts Above Timberline	41	66	28	11	17	8	100	14	100	252
TOTAL ALL AREAS	25	135	44	7	25	8	65	14	67	1336

TABLE 3 SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, LOWER SUSITNA RIVER, 1965

Area	Flying Time**	Young ♂	Adult ♂	Total ♂	♀ W/O	♀ W/1	♀ W/2	Total ♀	Unid.* Adults	Total Adults	Calves	Total Moose
Willow-Little Willow above timberline. Bratlie & Didrickson 4 orange tags 2 white tags	3.33	31	48	79	369	144	7	520	4	603	158	761
Willow-Little Willow below timberline. Bratlie & Didrickson	0.85	5	5	10	35	21	1	57	1	68	23	91
TOTALS THIS AREA	4.18	36	53	89	404	165	8	577	5	671	181	852
Little Willow- Kashwitna above timberline. Bratlie & Didrickson	0.75	3	9	12	37	11	4	52	1	65	19	84
Little Willow- Kashwitna above timberline. Bratlie & Didrickson	1.5	1	5	6	34	22	1	57	0	63	24	87
TOTALS THIS AREA	2.25	4	14	18	71	33	5	109	1	128	43	171
Kashwitna-Montana above timberline. Bratlie & Didrickson	2.15	17	61	78	203	74	2	279	0	357	78	435
Montana-Talkeetna above timberline. Bratlie & Didrickson	0.5	4	17	21	51	16	1	68	0	89	18	107

(continued)

TABLE Continued
Summary of Moose Population Composition Counts, Lower Susitna River, 1965

Area	Flying Time**	Young ♂	Adult ♂	Total ♂	♀ W/0	♀ W/1	♀ W/2	Total ♀	Unid.* Adults	Total Adults	Calves	Total Moose
Montana-Talkeetna below timberline. Bratlie & Didrickson	0.5	1	4	5	8	5	1	14	0	19	7	26
TOTALS THIS AREA	1.0	5	21	26	59	21	2	82	0	108	25	133
TOTALS ALL AREAS	9.58	62	149	211	737	293	17	1047	6	1264	327	1591

* All are Yearlings.

** Flying time in hours and tenths.

TABLE 4. MOOSE SEX AND AGE COMPOSITION, LOWER SUSITNA VALLEY, 1965

Area	Total Bulls Per 100 Cows	Young Bulls Per 100 Adult Bulls	Calves Per 100 Cows	Twin Calves Per 100 Cows w/Calf	Calf % in Total Herd	Young Bulls % in Total Herd	Young Bulls Per 100 Bull Calves	Young Bulls Per 100 Cows	Moose Per Hour	Total Moose
Willow - Little Willow Above Timberline	15	65	30	5	21	4	4	6	229	761
Willow - Little Willow below Timberline	18	100	40	5	25	5	43	9	107	91
TOTAL THIS AREA	51	68	31	5	21	4	4	6	204	852
Little Willow-Kashwitna above Timberline	17	29	39	13	25	2	18	36	71	71
Kashwitna-Montana	28	28	28	3	18	4	44	6	202	435
Montana-Talkeetna above Timberline	31	24	26	6	17	4	44	6	214	107
Montana-Talkeetna below Timberline		25	36	17	27	4	28	7	52	26
TOTAL THIS AREA	32	24	30	9	19	4	40	6	133	133
TOTAL ALL AREAS	20	42	31	8	21	4	39	6	166	1591

TABLE 5 AERIAL MOOSE COMPOSITION COUNTS - HOMER AREA, DECEMBER, 1965

Area	Date	Flying Time	Large ♂	Small ♂	Total ♂	♀ W/O	♀ W/1	♀ W/2	Total ♀	Lone Calf	Total Calves	Unid. Adults	Total Adults	Total Moose	Moose Per Hr.
H	11/30 12/1	2.50	9	5	14	56	21	2	79	0	25	0	93	118	47
A.P.	12/1,2	5.28	22	24	46	196	106	6	308	3	121	0	354	475	90
Hom	12/2,4	5.62	8	7	15	189	83	5	277	1	94	0	292	386	69
C	12/8,9	3.80	39	23	62	155	32	2	189	4	40	0	251	291	77
3	12/16	3.50	0	4	4	20	10	0	30	1	11	0	34	45	13
A	12/17	3.50	8	12	20	45	21	2	68	2	27	0	88	115	33
B	12/17	2.75	0	0	0	21	6	0	27	0	6	0	27	33	12
1	12/21	3.50	2	0	2	41	7	2	48	0	7	0	50	57	16
I	12/16 12/17	2.67	177	37	214	104	27	1	138	1	30	3	349	379	142
Unit Totals		33:12	265	112	377	827	313	20	1158	12	361	3	1538	1899	57

Table 6 MOOSE SEX AND AGE COMPOSITION, HOMER AREA, 1965

Area	Total Bulls Per 100 Cows	Young Bulls Per 100 Adult Bulls	Calves Per 100 Cows	Twin Calves Per 100 Cows W/Calf	Calf % in Total Herd	Young Bulls % in Total Herd	Young Bulls Per 100 Cows	Moose Per Hour	Total Moose
Kenai Peninsula									
<u>Below Tustumena Lake</u>									
H	18	55	32	9	21	4	6	47	118
A.P.	15	109	39	5	25	5	8	90	475
Homer	5	87	34	6	24	1.8	2.5	69	386
C	33	59	16	6	14	8	12	77	291
3	13	8	36	0	24	9	13	13	45
A	29	150	40	8	23	10	18	33	115
B	-	-	22	-	18	-	-	12	33
1	4	-	15	22	15	-	-	16	57
1	162	21	29	3.5	8	10	28	142	379
TOTALS	33	42	31	6	19	6	10	57	1899

Table 7. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, UNIT 7
Chugach National Forest, Helicopter Counts, January 1966.

Area	Date	Flying Time	Adult ♂	Young ♂	Total ♂	♀ W/0	♀ W/1	♀ W/2	Total ♀	Lone Calf	Total Calves	Total Adults	Total Moose	Moose Per Hour
Quartz Creek	1/11- 1/12	3.25	1	0	1	76	30	1	107	2	34	108	142	43
Juneau Creek	1/11	2.25	0	6	6	145	20	0	165	1	21	171	192	85
Trail River	1/12 1/13	2.67	1	0	1	36	10	0	46	1	11	47	58	21
Twenty- Mile	1/14	1.50	2	0	2	62	14	3	79	0	20	81	101	67
Portage Creek	1/14	2.90	0	2	2	28	13	3	44	0	19	46	65	72
Placer Creek	1/14	2.75	0	2	2	15	6	0	21	0	6	23	29	41
		=====	=	=	=	=====	=	=	=====	=	=====	=====	=====	=====
TOTALS		11.33	4	10	14	362	93	7	462	4	111	476	587	52

Table 8 MOOSE SEX AND AGE COMPOSITION, CHUGACH FOREST, JANUARY, 1966*

Area	Calves Per 100 Cows	Twin Calves Per 100 Cows W/Calf	Calves % in Herd	Moose Per Hour	Total Moose
Quartz Creek	34	3	24	43	142
Juneau Creek	13	0	11	85	192
Trail River	24	0	19	21	58
Twenty-Mile	25	21	20	67	101
Portage Creek	43	23	29	72	65
Placer Creek	29	0	21	41	29
	=	=	=	=	=
TOTALS	23	7	19	52	587

*Counts made after males had shed antlers, most meaningful statistic is percent calves in total herd as many males counted as females.

TABLE 9. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, NELCHINA BASIN, 1966

Area	Flying Time	Young ♂	Adult ♂	Total ♂	♀ W/1	♀ W/2	Total ♀	Unid. Adults	Total Adults	Calves	Total Moose	Calf % in Herd	Moose per Hour	♀ W/O
1. Wells Creek, Upper Nenana	4.3	32	54	86	25	1	184	0	270	27	297	9.1	69	158
2. East Drainages or Maclaren River	4.8	23	70	93	44	4	181	0	274	52	326	16.0	68	133
3. Upper Susitna	9.2	60	121	181	51	2	309	0	490	54	544	9.9	59	256
4. West Fork, Maclaren River	1.1	9	44	53	40	1	180	0	233	42	275	15.3	250	139
5. Alphabet Hills	13.6	98	276	374	310	4	921	2	1297	318	1615	19.5	118	607
6. Clearwater Maclaren Above Denali Hwy.	5.3	42	62	104	89	1	336	0	440	91	531	17.1	100	246
7. Middle Susitna, Jay Cr. & Coal Cr.	6.3	32	108	140	38	0	234	0	374	38	412	9.5	65	196
8. Paxson Lake to Sourdough	3.75	7	37	44	50	0	148	0	192	50	242	20.7	64.5	98
9. Paxson to Sourdough East of Highway	3.2	7	20	27	47	2	88	0	115	51	116	30.7	52	39
10. Gakona Glacier	2.2	38	128	166	57	1	291	0	457	59	516	11.4	235	233
11. Mt. Drum and Mt. Sanford Areas	3.3	34	74	108	25	0	134	1	243	25	268	8.6	81	109

(continued)

Table 9 Continued

Summary of Moose Population Composition Counts, Nelchina Basin, 1965

												Calf Moose			
		Flying Time	Young ♂	Adult ♂	Total ♂	♀ W/1	♀ W/2	Total ♀	Unid. Adults	Total Adults	Calves	Total Moose	% in Herd	Per Hour	♀ W/0
12.	Lake Louise Flats	5.5	4	9	13	11	1	40	0	53	13	66	18.7	12	28
13.	Big Oshetna	2.4	5	10	15	19	0	86	0	101	19	120	15.8	50	67
14.	Black River-Goose Creek	3.5	20	33	53	40	0	185	0	238	40	278	14.3	80	145
15.	Klutina - Tazlina Areas	4.1	14	55	69	10	1	99	0	168	12	179	6.7	44	88
16.	Christochina Area	3.0	35	136	171	38	2	151	0	322	42	364	11.6	121	111
		==	==	==	==	==	==	==	=	==	==	==	==	==	==
TOTALS ALL AREAS		89.2	460	1237	1697	894	20	3567	3	5267	933	6700	15.0	70	2653

Table 10. MOOSE SEX AND AGE COMPOSITION, NELCHINA BASIN, 1965

Area	Total	Young				Young	Young			
	Bulls	Bulls	Calves	Twin	Calf	Bulls	Bulls	Young		
	Per 100	Per 100	Per 100	Calves	Per	% in	% in	Per 100	Bulls	Moose
	Cows	Adult	Cows	100 Cows	W/Calf	Total	Total	Bull	Per 100	Per
		Bulls				Herd	Herd	Calves	Cows	Hour
										Total
										Moose
1. Wells Creek, Upper Nenana	47	17	15	4	9	11	237	17	69	297
2. East Drainages of Maclaren River	13	33	29	8	16	7	88	13	68	326
3. Upper Susitna	59	50	17	4	10	11	222	19	59	544
4. West Fork, Maclaren River	29	20	23	3	15	3	43	5	250	275
5. Alphabet Hills	41	36	36	12	20	6	62	11	118	1615
6. Clearwater Maclaren above Denali Hwy.	31	68	27	1	17	8	92	13	100	531
7. Middle Susitna, Jay Cr. & Coal Cr.	60	30	16	0	10	8	168	14	65	412
8. Paxson Lake to Sourdough	30	19	34	0	21	3	28	5	65	242
9. Paxson to Sourdough East of Highway	31	35	58	4	31	4	27	8	52	116
10. Gakona Glacier	57	30	20	2	11	7	128	13	235	516
11. Mt. Drum and Mt. Sanford Areas	85	43	19	0	9	13	272	25	81	268

Continued

Table 10 Continued

MOOSE SEX AND AGE COMPOSITION, NELCHINA BASIN, 1965

Area	Total Bulls Per 100 Cows	Young Bulls Per 100 Adult Bulls	Calves Per 100 Cows	Twin Calves 100 Cows W/Calf	Per Calf % in Herd	Young Bulls % in Total Herd	Young Bulls Per 100 Bull Calves	Young Bulls Per 100 Cows	Moose Per Hour	Total Moose
12. Lake Louise Flats	33	44	33	8	19	6	53	10	12	66
13. Big Oshetna	12	50	22	0	16	4	50	6	50	120
14. Black River-- Goose Creek	29	61	22	0	14	7	100	11	80	278
15. Klutina--Tazlina Areas	70	25	12	9	7	8	58	14	44	179
16. Christochina Area	113	26	28	5	12	10	167	23	121	364
	==	==	==	=	==	==	==	==	==	==
TOTAL ALL AREAS	48	37	26	2	15	7	98	13	70	6200

TABLE 11 SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, YAKUTAT, 1965

Area	Flying Time	Young ♂	Adult ♂	Total ♂	♀		Total ♀	Unid. Adults	Total Adults	Calves	Total Moose	Calf Moose		
					W/1	W/2						% in Herd	Per Hour	♀ W/0
East River to Alsek River		7	22	29	6	0	23		52	6	58	10.3	18.3	17
Alsek River to Tanis River		8	37	45	18	1	73		118	20	138	14.5	46.0	54
Dangerous River to Situk River		11	28	39	16	1	93		132	18	150	10.4	56.2	76
Italio River to Dangerous River		4	22	26	16	0	65		91	16	107	15.0	32.9	49
Italio River to Tanis River		1	18	19	14	2	47		66	18	84	21.4	33.6	31
TOTAL	13.50	31	127	158	70	4	301		459	78	537	14.5	40.2	227

TABLE 12 MOOSE SEX AND AGE COMPOSITION, YAKUTAT, 1965

Area	Total Bulls Per 100 Cows	Young Bulls Per 100 Adult Bulls	Calves Per 100 Cows	Twin Calves Per 100 Cows w/Calf	Calf % in Total Herd	Young Bulls % in Total Herd	Young Bulls Per 100 Bull Calves	Young Bulls Per 100 Cows	Moose Per Hour	Total Moose
East River to Alsek River	126	32	26	0	10	12	233	30	18	88
Alsek River to Tanis River	62	22	27	5	15	6	80	11	46	138
Dangerous River to Situk River	42	39	19	6	10	7	122	12	56	150
Mid Italio River to Dangerous River	40	18	25	0	15	4	50	6	33	107
Mid Italio River to Tanis River	40	6	38	13	21	1	11	2	34	84
TOTAL ALL AREAS	52	24	25	5	16	6	79	10	40	537

Table 13 SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, TANANA FLATS, INTERIOR ALASKA 1965

Area	Flying Time (Hrs)	Young Adult Total			♀			Total ♀	Unid. Adults	Total Adults	Calves	Calf Moose		
		♂	♂	♂	W/1	W/2	W/0					Total Moose	% in Herd	Per Hour
2	7.7	15	73	88	35	0	126	161	0	249	36	285	13	37
3	1.9	3	13	16	18	0	34	52	0	68	18	86	21	45
4	2.0	3	15	18	3	0	33	36	1	54	3	57	5	29
5	2.8	7	19	26	29	0	40	69	0	95	29	124	23	44
6	2.9	6	30	36	14	0	46	60	0	96	14	110	13	38
7	1.8	3	4	7	2	0	37	39	0	46	4	50	8	28
8	2.3	3	17	20	14	0	46	60	1	81	14	95	15	41
9	3.3	6	19	25	34	1	83	118	0	143	39	182	22	55
Totals Area 2 Through 9	24.7	46	190	236	149	1	445	595	1	832	157	989	16	40

Table 14

SEX AND AGE COMPOSITION RATIOS TANANA FLATS

Area	Total ♂ Per 100 ♀	Young ♂ per 100 Adult ♂	Calves per 100 Cows	Incidence of twin calves per 100 cows w/calf	Calf % in total herd	Young ♂ % in total herd	Young ♂ per 100 bull calves	Young ♂ per 100 ♀	Moose per Hour	Total Moose
2	54	20	22	0	13	5	83	9	37	285
3	31	23	35	0	21	3	33	6	45	86
4	50	20	8	0	5	5	200	8	29	57
5	38	37	42	0	23	6	46	10	44	124
6	60	20	23	0	13	5	86	10	38	110
7	18	75	10	0	8	6	150	8	28	50
8	33	18	23	0	15	3	43	5	41	95
9	21	32	33	2.8	22	3	30	5	55	182
TOTALS	40	24	26	.7	16	5	58	8	40	989

Table 15 SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, UPPER WOOD RIVER 1965

Area	Flying Time (hrs)	Young ♂	Adult ♂	Total ♂	♀ W/1	♀ W/2	♀ W/0	Total ♀	Unid. Adults	Total Adults	Calves	Total Moose	Calf % in herd	Moose per Hour
1 (Foothills- Japan Hills)	5.2	5	66	71	50	0	173	223	6	300	50	350	14	67
Upper Wood River	2.3	15	124	139	40	3	161	204	0	343	46	389	12	169
TOTALS	7.5	20	190	210	90	3	334	427	6	643	96	739	13	98

Table 16

SEX AND AGE COMPOSITION RATIOS-UPPER WOOD RIVER

Area	Total ♂ per 100 ♀	Young ♂ per 100 Adult ♂	Calves per 100 Cows	Incidence of twin calves per 100 cows w/calf	Calf % in total herd	Young ♂ % in total herd	Young ♂ per 100 bull calves	Young ♂ per 100 ♀	Moose per Hour	Total Moose
1 Foothills										
Japan Hills	32	8	22	0	14	1	20	2	67	350
Upper Wood River	68	12	23	6	12	4	65	7	169	389
TOTALS	49	11	22	3	13	3	41	5	98	739

Table 17 SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, TOKI AREA, AREA 3.

Area	Flying Time	Young ♂	Adult ♂	Total ♂	♀ w/o	♀ w/1	♀ w/2	Total ♀	Unid. Adults	Total Adults	Calves	Total Moose	Calf % in Herd	Moose Per Hour
Slana #3 11-11-65	2.8	23	20	43	63	20	1	84	0	127	22	149	14.8	53
Nabesna & Tanacross Area #3 11-23-65	.3	1	3	4	4	0	1	.	0	9	2	11	18.2	33
Tok River (Little Tok) 11-23-65	1.5	12	18	40	62	12	1	75	3	118	14	132	10.6	88
Nabesna Road 11-9-65	3.8	14	13	27	56	22	2	80	0	107	26	133	19.5	35
Tok R. Drainage #3 11-12-65	3.3	32	85	117	45	18	2	65	0	182	23	205	11.2	62
	==	=	==	==	==	=	=	==	=	==	=	==	==	==
Total Area #3	11.7	82	139	231	230	72	7	309	3	543	87	630	13.8	54

Table 18 MOOSE SEX AND AGE COMPOSITION, TOK AREA.

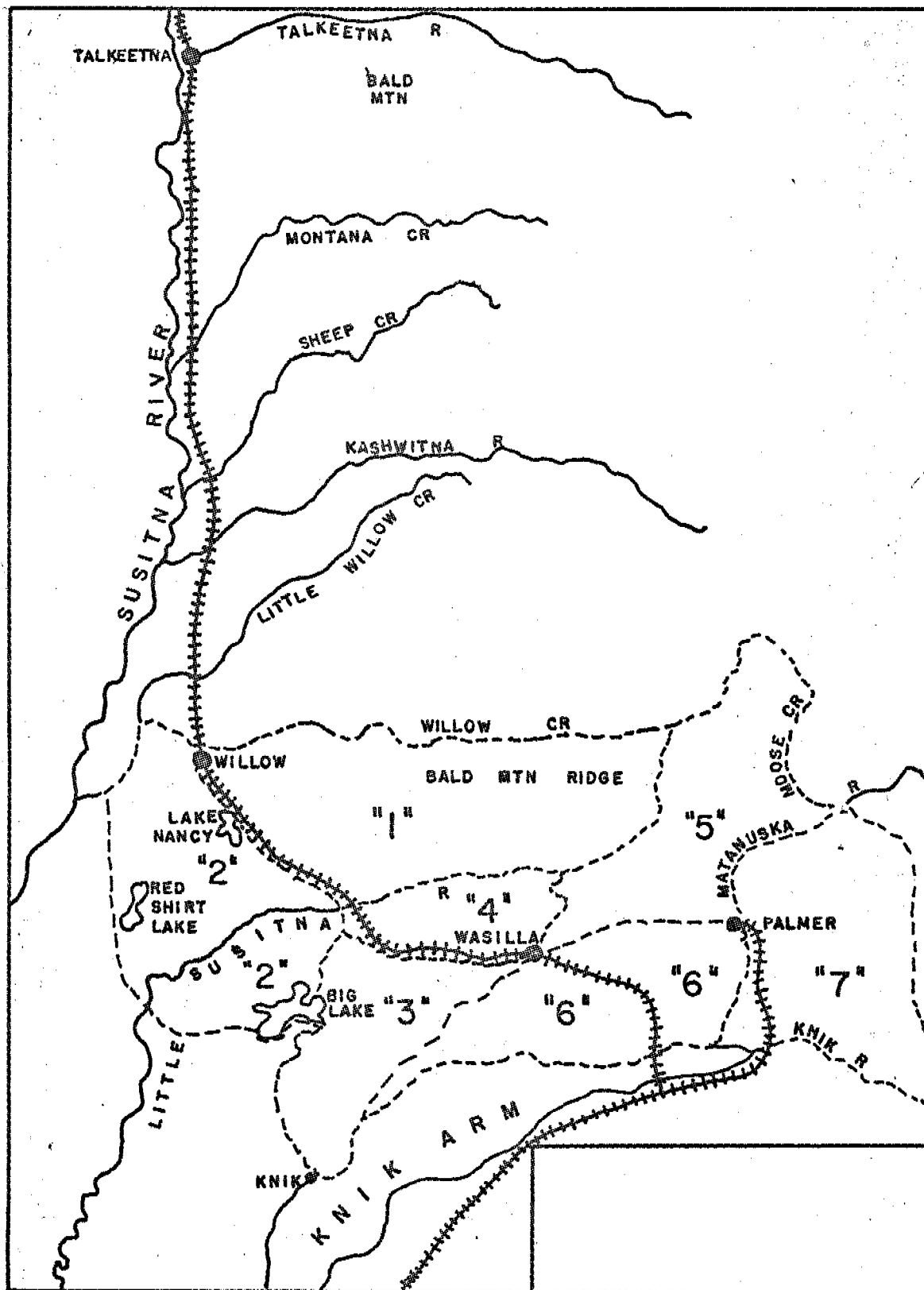
Area	Total Bulls Per 100 Cows	Young Bulls Per 100 Adult Bulls	Calves Per 100 Cows	Twin Calves Per 100 Cows w/Calf	Calf % in Total Herd	Young Bulls % in Total Herd	Young Bulls Per 100 Bull Calves	Young Bulls Per 100 Cows	Moose Per Hour	Total Moose
Total Area #3	45	59	28	9	13.8	13.0	18.9	26	54	630

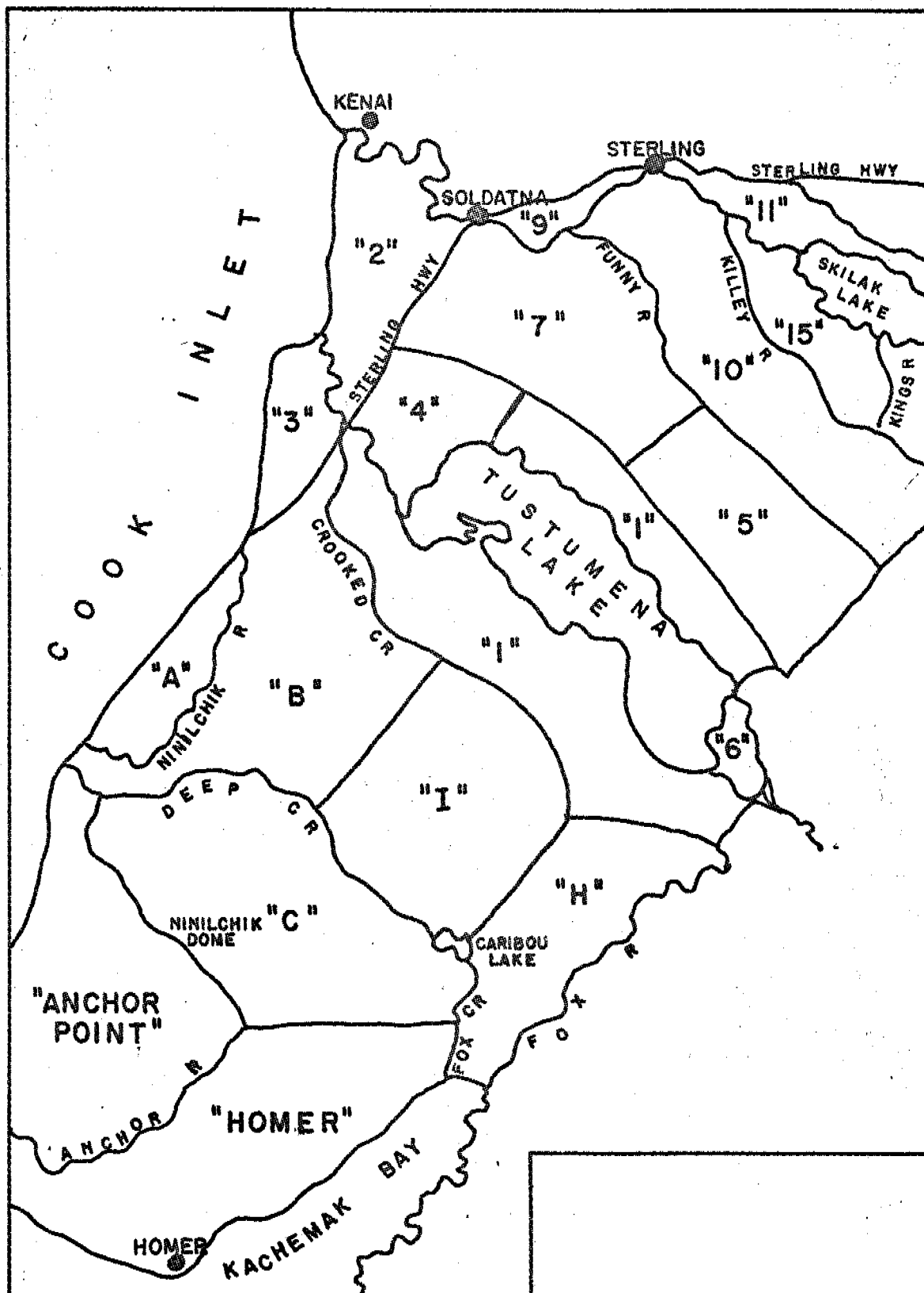
Table 19 SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, AREA 2B, TOK AREA.

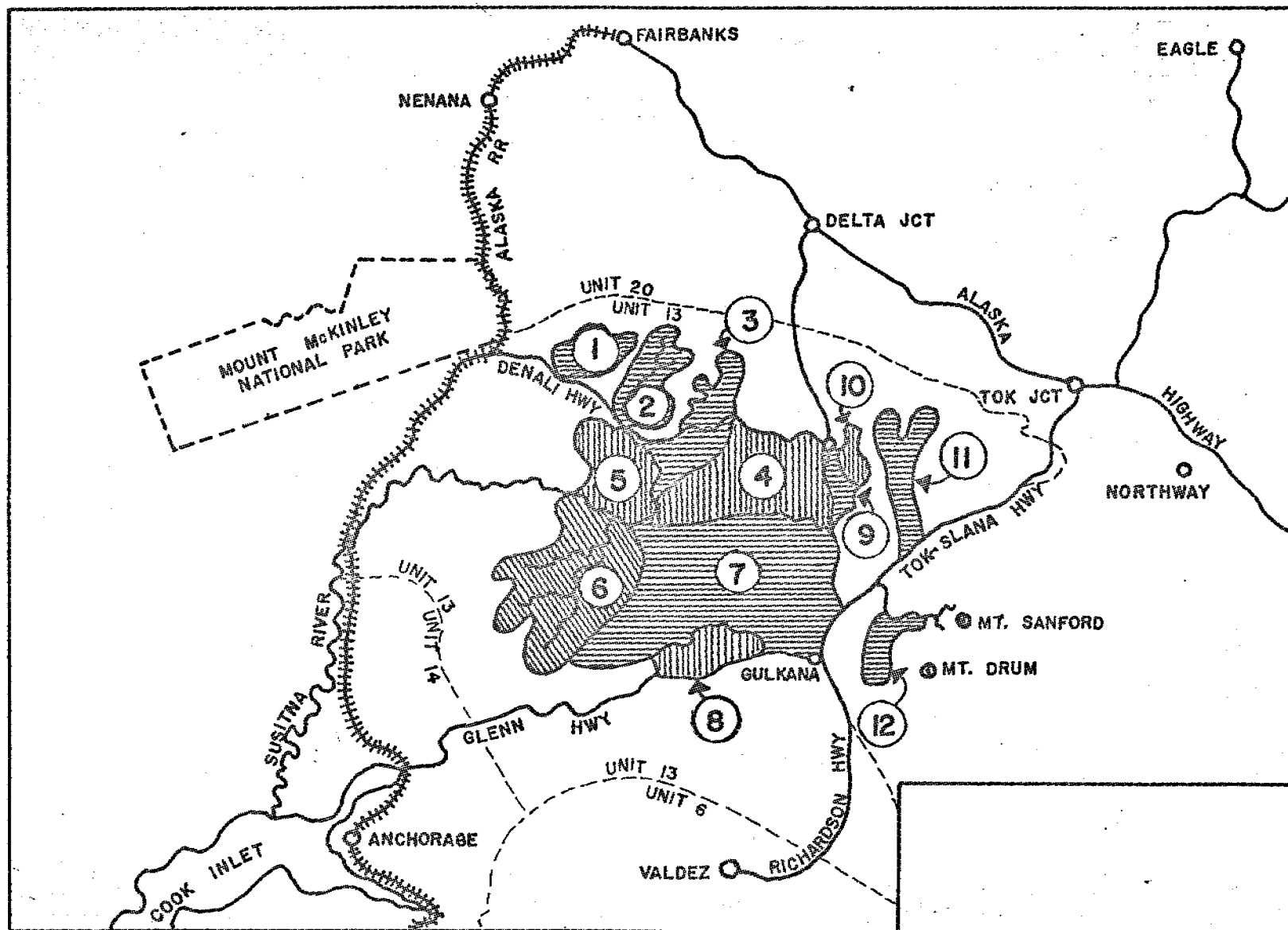
Area	Flying Time	Young ♂	Adult ♂	Total ♂	♀ w/0	♀ w/1	♀ w/2	Total ♀	Unid. Adults	Total Adults	Calves	Total Moose	Calf % in Herd	Moose Per Hour
Tanana Valley Tok to Midway Lake 11-15-65	3.3	3	9	12	8	8	0	16	0	28	8	36	22	11
Tanana Hills to Cathedral Rapids 11-25-65	1.5	2	4	6	9	8	0	17	0	23	8	31	26	21
Tanana Hills Wolf Lake 11-24-65	.1	0	8	8	2	0	0	2	1	11	0	11	0	138
Alaska Range 7 Mile Hill West	3.3	18	28	46	54	18	0	72	1	73	18	91	20	28
	==	=	=	=	=	=	=	==	=	==	=	==	=	=
Total Area #2B	8.2	23	49	72	73	34	0	107	2	135	34	169	20	21

Table 20 MOOSE SEX AND AGE COMPOSITION, TOK AREA.

Area	Total Bulls Per 100 Cows	Young Bulls Per 100 Adult Bulls	Calves Per 100 Cows	Twin Calves per 100 Cows W/Calf	Calf % in Total Herd	Young Bulls % in Total Herd	Young Bulls Per 100 Bull Calves	Young Bulls Per 100 Cows	Moose Per Hour	Total Moose
Total Area 2B	67	47	32	0	20	14	135	21.5	21	169







Productivity

Analysis of moose uteri and ovaries, collected during antlerless seasons, are particularly useful in determining the potential productivity of identifiable moose herds.

In 1965, collections of moose reproductive materials were made from four important moose populations, the Matanuska Valley, the Kenai Peninsula, the Anchorage area, and Yakutat.

Some effort was expended in obtaining collections from other areas, including the interior region and Willow area. However, the nature and magnitude of the harvest precluded successful completion of this objective.

Past analysis of reproductive materials suggests that reproductive processes may reflect the effect of range and weather and moose population densities more quickly than any other index to population status currently available to resource workers. The data gathered this year, presented in Tables A through G, reveal considerable contrast.

The Matanuska Valley continues to exhibit excellent productivity. In excess of ninety percent of the animals older than yearlings were pregnant. Approximately twenty percent of the yearlings examined were gravid, a somewhat reduced incidence of yearling fertility from 1964. This is not too surprising, in view of the age composition and population density of moose in the area. It appears that past hunting efforts have not been of sufficient intensity to alter the age composition of the herd or to reduce the total population.

Fetus sizes were closely grouped, and indicate a short span of conception. This information supports the regulations of the past two years which limited the hunting of male moose to the period after the late September early October breeding season. Survival of 1964 calves to twelve months and then to the subsequent hunting season, was excellent as measured by spring aerial counts and by age composition of the harvest.

Productivity information on the Kenai is not so encouraging. The range in fetus sizes was tremendous, and a fairly large proportion of the animals examined may not have been bred. The harvest of male moose prior to the breeding season may be sufficient in local areas to create shortages of males during the peak of oestrus. Some consideration should be given to adjusting the seasons on male moose in the affected local areas if maximum production of moose is desired. The age composition of the herd indicates a relatively light utilization

of antlerless moose in proportion to the total population.

The antlerless hunts on Fort Richardson and Elmendorf provided the first opportunity to obtain a sample of reproductive material from this herd. Productivity appears excellent, and a continued antlerless harvest is recommended--Table C.

The Yakutat moose population exhibits the highest potential productivity observed in North America. Apparently the range conditions on this area where moose are relative "newcomers", is still excellent. Survival of calves to the yearling stage apparently is quite variable, as yearlings were not abundant in this year's harvest, but they did comprise a major segment of the harvest in 1963 and 1964.

Fecundity rates approaching those exhibited in Yakutat where antlerless and male moose seasons are concurrent throughout the season, could be realized in other areas with appropriate harvest levels.

TABLE A

MOOSE PREGNANCY RATES, MATANUSKA VALLEY, 1965

Cementum Age Class	Not Pregnant	Pregnant	1 Fetus	2 Fetuses	At Least 1 Fetus	% Pregnant	Twins/100 Pregnancies
Calf	21					0	---
1	21	5	4			19.2	0
2	1	7	7				0
3	2	13	10	3			23
4		13	12	1			8
5	2	17	13	4			24
6		10	6	4			40
7		10	9	1			10
8		8	8				0
9		6	6				0
10		7	3	3	1		43
11		4	4		1		0
12		7	5	1			14
13		4	3	1			25
14	4	2	2				0
15		2	2				0
UNKNOWN	20	49	38	9	2	71.0	10
TOTALS	71	164	132	28	2	69.8	17
Totals Exclud- ing Calves, Yearling & Unknown	9	115	96	19	2	92.7	17

TABLE B

MOOSE PREGNANCY RATES,
FORT RICHARDSON (DEC. 1965) AND ELMENDORF (JAN. 1966)

Cementum Age Class	Not Pregnant	Pregnant	One Fetus	Two Fetuses	At Least One Fetus	Percent Pregnant	Twins/100 Pregnancies
Calf	1						0
1	4	2	2			33.3	0
2		5	4	1			20
3	2	9	3	1			11
4	1	6	3				0
5		7	5	2			29
6		4	3	1			25
7		1	1				0
8							0
9							0
10		1		1			100
11		1	1				0
Unknown	3	4	3	1		57.1	25
Totals	11	42	35	7		79.2	17
Totals exclud- ing calves & yearlings		40	33	7		87.0	18

TABLE C

COMPOSITE SUMMARY OF
MOOSE PREGNANCY RATES, UNIT 15, NOV. 1965

Cementum Age Class	Not Pregnant	Pregnant	One Fetus	Two Fetuses	At Least One Fetus	Percent Pregnant	Twins/100 Pregnancies
1	8	1	1			13	0
2		6	5		1		0
3		6	3	1	2		17
4		10	3	2	5		20
5		11	7	3	1		27
6		2	1	1			50
7		4	3		1		0
8	2	6	3	1	2		17
9							
10	2	3	1	1	1		33
11		2		1	1		50
12		2	2				0
Unknown	3	20	17	1	2	87	5
Totals	15	73	46	11	16	83	15
Total Excl. Yearlings	7	72	45	11	16	91	15

TABLE D

MOOSE PREGNANCY RATES - KENAI RIVER NORTH, NOV. 1965

Cementum Age Class	Not Pregnant	Pregnant	One Fetus	Two Fetuses	At Least One Fetus	Percent Pregnant	Twins/100 Pregnancies
1	2					0	0
2		2	2				0
3		1		1			100
4							
5		5	3	1	1		20
6							
7							
8							
9							
10	2	3	1	1	1		33
11		1		1			100
Unknown		4	4			100	0
Totals	4	16	10	4	2	80	25
Totals Excl. Yearlings	2	16	10	4	2	89	25

TABLE E

MOOSE PREGNANCY RATES - KENAI RIVER SOUTH, NOV. 1965

Cementum Age Class	Not Pregnant	Pregnant	One Fetus	Two Fetuses	At Least One Fetus	Percent Pregnant	Twins/100 Pregnancies
1	6	1	1			14	0
2		4	3		1		0
3		5	3		2		0
4		10	3	2	5		20
5		6	4	2			33
6		2	1	1			50
7		4	3		1		0
8	2	6	3	1	2		17
9							
10							
11		1			1		0
12		2	2				0
Unknown	3	16	13	1	2	84	6
Totals	11	57	36	7	14	84	12
Totals Excl. Yearlings	5	56	35	7	14	92	13

TABLE F

MOOSE PREGNANCY RATES, YAKUTAT, UNIT 5, 1965

Cementum Age Class	Not Pregnant	Pregnant	1 Fetus	2 Fetuses	3 Fetuses	At Least 1 Fetus	% Pregnant	Twins/100 Pregnancies
1	2	3	3				60	0
2	1	7	2	5				71
3	1	4		4				100
4		3		1		2		33
5	1	4		4				100
6		3		3				100
7		3	1	2				67
8		3	2	1				33
9		4	1	3				75
10								0
11								0
12								0
13		1		1				100
14		2		1	1			50
15								0
UNKNOWN		2	2					0
TOTALS	5	39	11	25	1	2	98.6	54
Totals Exclud- ing Yearlings	3	36	8	25	1	2	92.4	69

TABLE

G

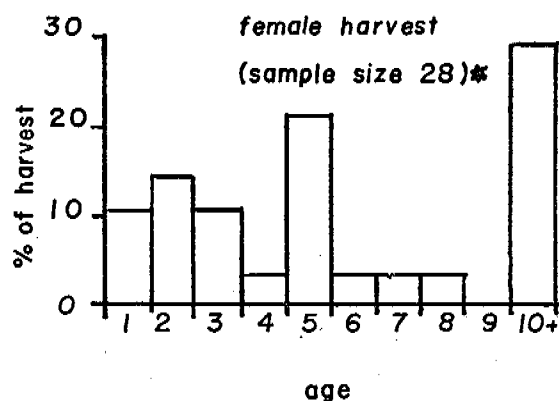
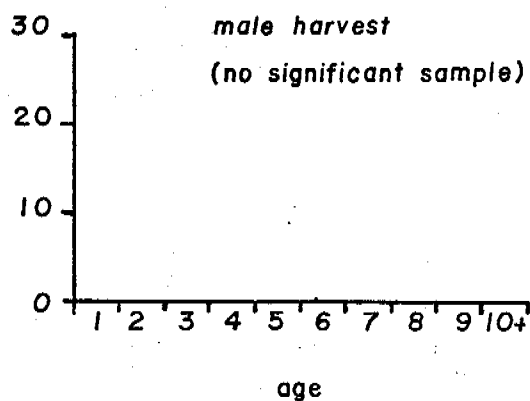
MOOSE PREGNANCY RATES, HAINES
1965

Cementum Age Class	Not Pregnant	Pregnant	One Fetus	Two Fetuses	At least 1 Fetus	% Pregnant	Twins/100 Pregnancies
C	2	0				0	
1	1	0				0	
2	0	0				0	
3	0	1			1		0
4	0	1			1		0
5	0	2			2		0
6	0	0					
7	0	0					
8	0	1			1		0
Unknown	1	1	1			50.0	0
TOTALS	4	6	1		5	60	0
Totals Excluding Calves & Yearlings	1	6	1		5	85.7	0

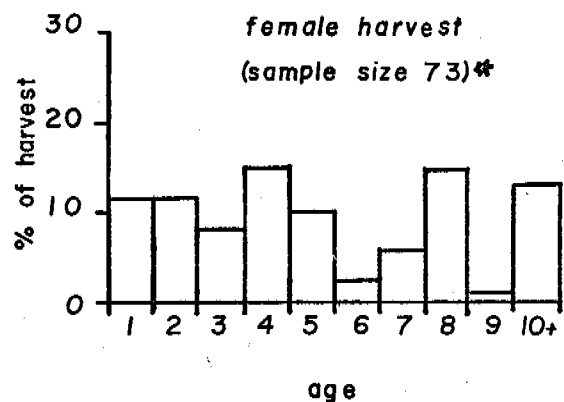
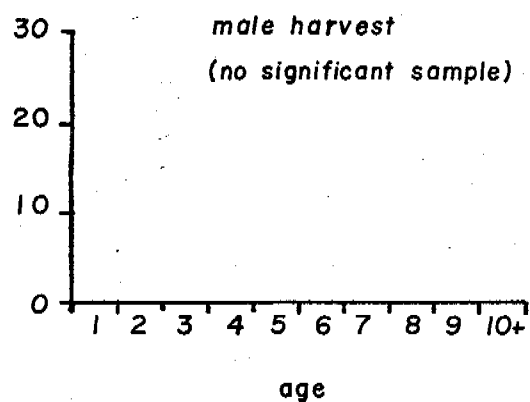
AGE COMPOSITION OF MOOSE HARVESTED FALL 1965
(AGE DETERMINATION BASED ON CEMENTUM DEPOSITION)

area

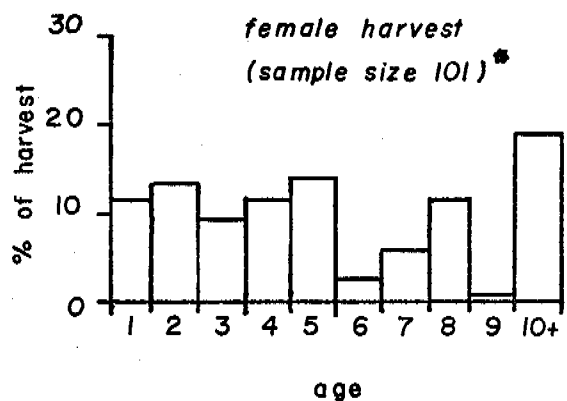
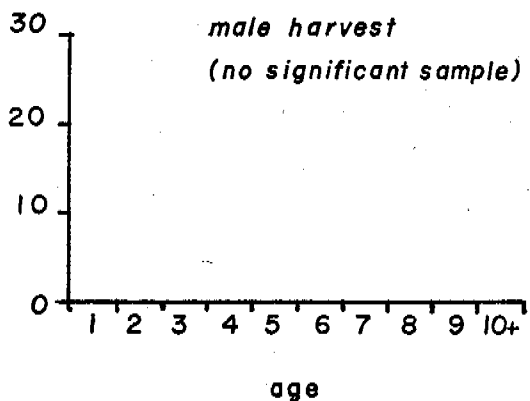
SOLDOTNA



HOMER



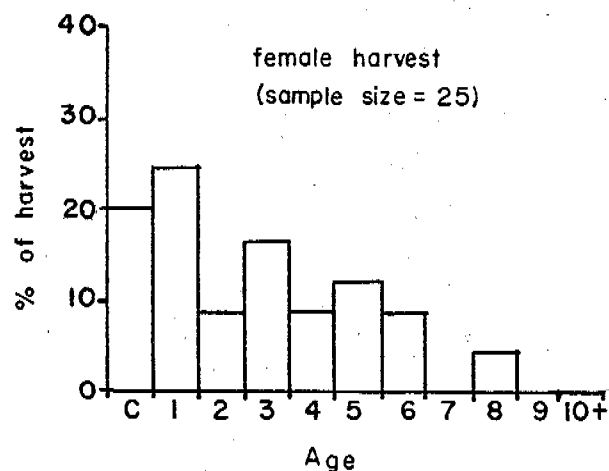
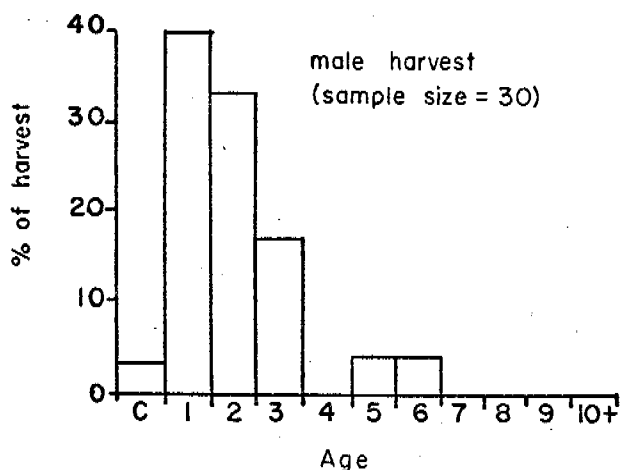
KENAI
COMPOSITE



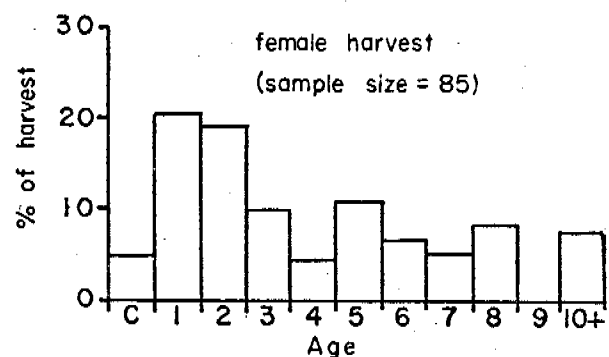
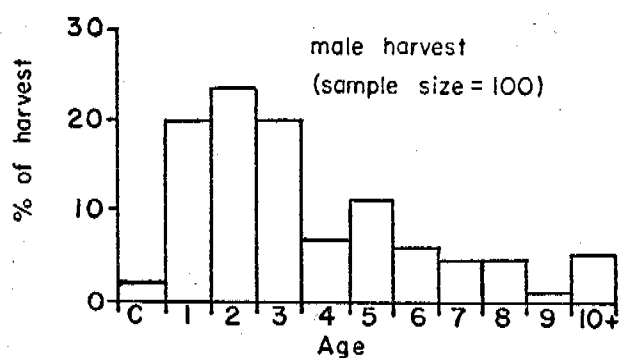
*calves deleted from sample.

AGE COMPOSITION OF MOOSE HARVESTED FALL 1965, CONTINUED

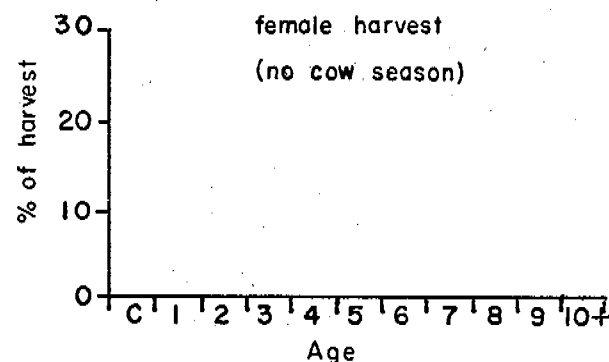
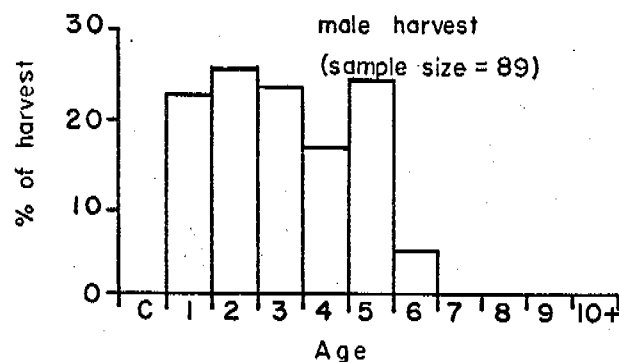
area
Haines



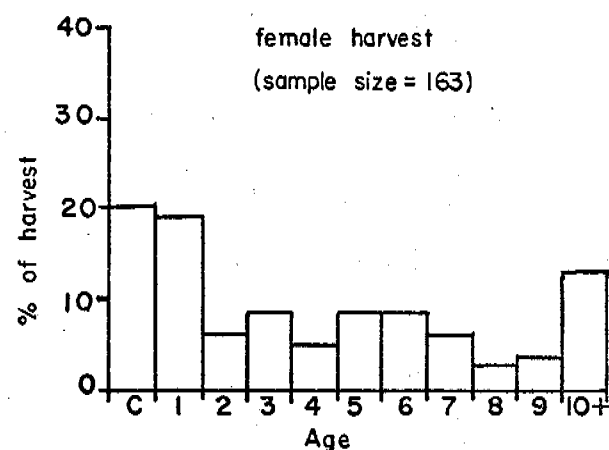
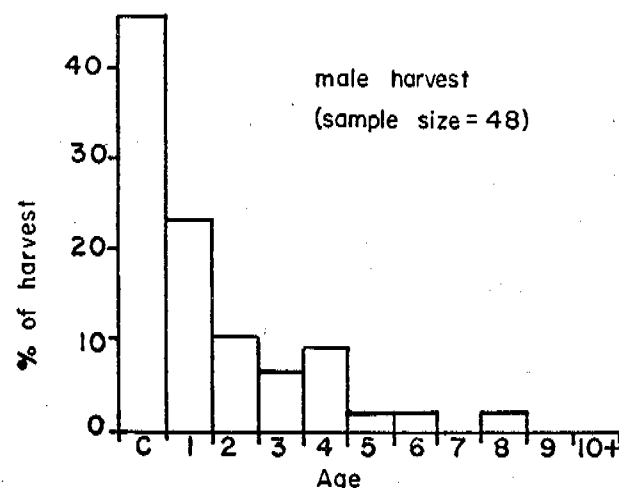
Yakutat



Denali



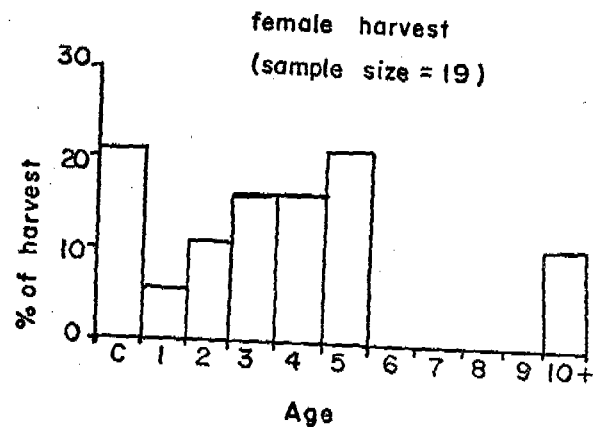
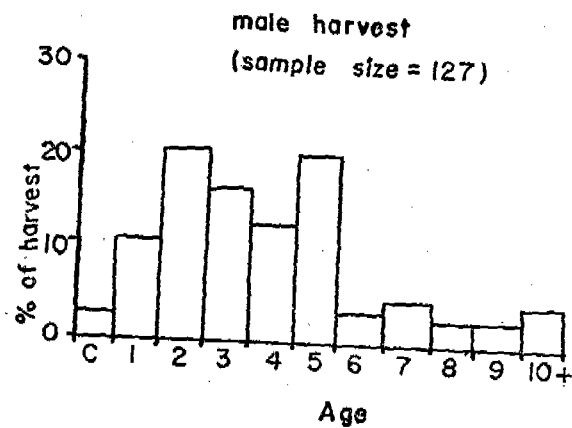
Matanuska



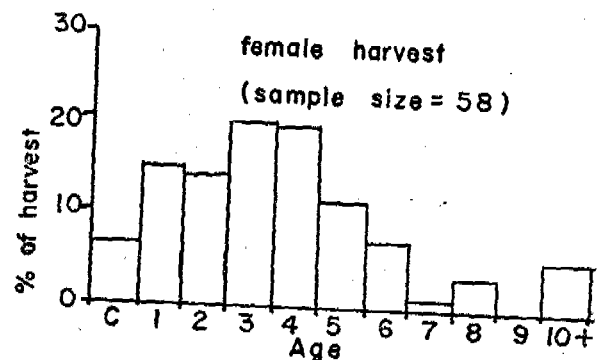
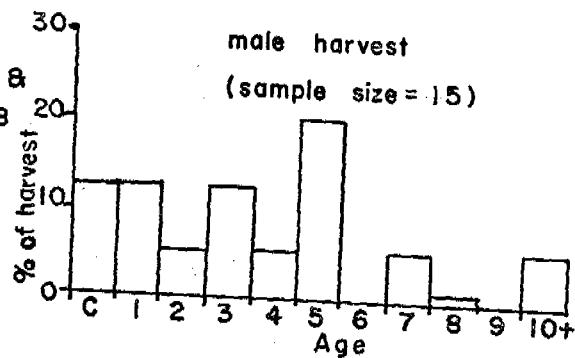
AGE COMPOSITION OF MOOSE HARVESTED FALL 1965, CONTINUED

area

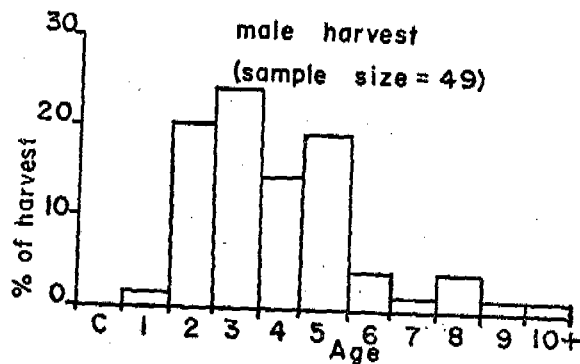
unit 20



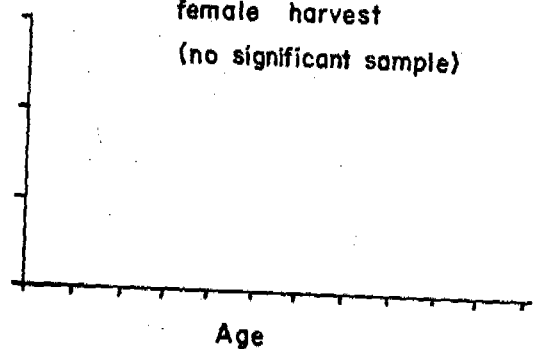
Ft. Richardson &
Elmendorf AFB



Taylor Hwy.



female harvest
(no significant sample)



DISCUSSION

Game Management Unit 14 (Matanuska Valley).

Since statehood a 500 - 1000 square mile portion of the Matanuska Valley has been used as a major field laboratory for testing moose research theory and perfecting management techniques. The practices have not always functioned perfectly and certainly not always scientifically, still, because of the relative confidence and support of the residents of the area, as shown by their recent regulation recommendations, considerable latitude in management practices has been granted to the Department by the Board.

The record of the harvest prior to statehood and those for a similar six year period following statehood are presented in Table 22. The estimated residual moose population in 1965 is nearly identical to the estimate for the same population in 1954. The annual harvests, however, have nearly tripled, yet the remaining populations are fully utilizing the winter range. This has resulted primarily because our estimates of total populations through 1964 were undoubtedly much too conservative. Recent censuses, population sex and age ratios, and age composition of the population, all support the former view.

Seasons on antlerless moose, which have varied from December to August, and from August to November on antlered moose, have not always been designed to yield maximum insight into the potential productivity of this laboratory herd. Consequently the large harvest in 1962 was followed by a very limited harvest in 1963 and 1964.

In 1964 unusually good weather for hunting provided a harvest sufficient to suggest that the past harvest of antlerless moose had not significantly altered the age composition of the Valley moose herd.

In the meantime returns from tagged animals showed that the Valley herd as a whole was relatively discrete, i.e. there was little immigration or emigration.

Censuses, population composition, and age compositions of the antlered animals all point to a residual population of 7 to 8 animals per square mile on 400 square miles of winter range -- this means a minimum of 3000 animals remained after approximately 1000 had been harvested. Regulations covering the harvest of antlered moose were changed two years ago to test the theory that a sufficient percentage of the male moose had been removed by late September in previous years to adversely affect conception rates and periods. The data collected in 1964 and 1965 shows clearly a more concise period of conception. And, even with a late, cold spring in 1964, survival of calves as evidenced by the yearling proportion in this years harvest, was substantially better than in 1963.




TABLE 22

MOOSE HARVESTS 1954 - 1965

MATANUSKA VALLEY, ALASKA

<u>Year</u>	<u>Males</u>	<u>Antlerless</u> (cows and calves)	
1954	275	0	
1955	275		
1956	275		
1957	275		
1958	300		
1959	300		
TOTALS	1700	0	
1960	300	150	x
1961	300	300	x
1962	350	1000	xx
1963	350	300	xxx
1964	250	275	
1965	580	660	
TOTALS	2130	2685	

Combined ♂ & ♀ harvest - 4,815

x permit hunts
 xx registration hunt
 xxx harvest tickets

Finally, weather, access, and an abundance of hunters combined to provide a large harvest during a one day season in 1965 --- a most valuable harvest, biologically, and if we can translate our findings into regulations it will point the way to effective maximum sustained yield management.

While the use of a 1000 square mile area as a laboratory to test research theory and to develop effective management techniques may seem rather daring, the results thus far have been most beneficial to the resource and to the State. In fact a sufficient body of data has been collected so that further experimentation is not as important as implementation of past findings.

The Matanuska Valley, from Willow to Palmer, will produce approximately 1000 moose annually, depending upon survival of the calves. Full advantage of our present knowledge of this moose population can be obtained by taking antlered moose during the period November 1 - 30, or some similar period after October 15th. Since the animals are predominantly yearling males meat quality is a minor consideration. The harvest of approximately 400 to 600 antlerless animals could take place any time after November 1st, preferably near the end of November.


Problems relating to an overabundance of hunters similar to what occurred in 1965 could be solved by registration huts, or permits, if the problem is of sufficient consequence to require special consideration at this time.

GAME MANAGEMENT UNIT 15--THE KENAI PENINSULA AND KENAI NATIONAL MOOSE REFUGE

This important recreational area adjacent to Anchorage provides from 15 to 20 percent of the annual harvest of moose. Greatly increased human activities in the form of mineral extraction, proposed timber removal, and agricultural endeavors, will undoubtedly influence the welfare of moose populations in the next five and ten years. Fortunately a large portion of the better range is in the Kenai National Moose Refuge and is reasonably secure.

Since many portions of the Kenai Peninsula moose range are accessible to the human populations of the Anchorage area, constant changes in management techniques will be required if we are to realize the greatest benefit from these moose populations.

There are several areas where it would appear that the harvest of male moose prior to the breeding season is having an adverse effect upon the potential productivity of local herds. On the opposite end



of the ledger are the apparently little utilized moose populations in the inaccessible areas.

Since the Kenai moose is one of our more illustrious citizens, it would appear that a dicotomous management effort might be justified. Such a system would provide maximum recreation on the accessible ranges, the maximum sustained yield concept, whereas other portions of the range might best be used for the production of trophy bulls. This latter concept would not preclude the taking of some antlerless moose.

UNIT 13, NELCHINA BASIN, PAXSON, DENALI AND GLENNALLEN HIGHWAY AREAS

This Game Management Unit supports an estimated twenty thousand to thirty thousand moose. In excess of six thousand moose were counted during eighty nine hours of aerial survey work this past fall. The total population, of course, is made up of many local or identifiable groups, but identification of individual populations with precision will take considerable additional effort. Still those populations that are contributing significantly to the present harvest can be identified because the proportion of males in the population has been reduced, although the reduction is not serious in any area at this time.

Unit 13 provides approximately fifteen percent of the Statewide harvest of moose, and with better access and an increased utilization of antlerless moose, it could sustain a harvest two to four times the present annual yield.

