WORK PLAN SEGMENT REPORT
FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECT NO.: W-6-R-5 and 6 TITLE: Alaska Wildlife Investigations

WORK PLAN B TITLE: Moose Studies

JOB NOS.: W-6-R-5: 1, 2, 3, 4, 5, 6, 7
W-6-R-6: 1, 2, 3, 4, 5, 6

PERIOD COVERED: July 1, 1963 to June 30, 1965.

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This report covers a period when the Moose Work Plan was without a leader, September 1963 to July 1964, and the period of reorganization that followed to June 30, 1965. Most of the data presented has appeared in annual summary reports prepared for either the Game Division meetings or the annual meetings of the Fish and Game Board. Some of the material was published in July of 1965 (see 1965-66 Segment Report). The purpose of this report is to bring together the data collected by the Alaska Department of Fish and Game and cooperating agencies, so that it can be found under one cover. Therefore, emphasis here is on presentation of numerical data with a minimum of analysis. Job 6 of W-6-R-5 is not reported as no work was accomplished on it. Accomplishments under Job 7 of W-6-R-5 were reported separately in a comprehensive report titled "1963 Report on Game Studies" and printed as Volume V, August 1964.

Current plans include preparation of a comprehensive report, including a review and analysis of all past federal aid supported moose investigations in Alaska. The exact date for publication of this report is indefinite; hopefully it will be complete in early 1968.

OBJECTIVES

To obtain and evaluate information on the status of Alaska's moose populations in terms of productivity, trends of abundance, fertility, movements, sex and age composition, and harvest.

To obtain information on basic relationships of climate and range and the physiological response of moose to these environmental components in order to facilitate future management.

TECHNIQUES

Aerial counts in fall, winter, and spring by Department biologists and by biologists of cooperating agencies (U.S. Forest Service, and U.S. Fish and Wildlife Service) provided information on the productivity, abundance, and sex and age composition of various moose populations.

Movements, survival rates, and peak of calving were studied by tagging newborn calves with the aid of helicopters and light aircraft.

Collection of mandibles and reproductive tracts, and mandibles and skulls from tagged animals, aided studies of fertility, productivity, age determination techniques, and movements.

A mandatory harvest ticket report instituted in 1963 provided the first insight into magnitude, chronology and locality of annual harvest.

Natural mortality was recorded along certain highways near urban areas and along the Alaska Railroad.

An inventory of range types in the Matanuska and Lower Susitna River Valleys was inaugurated.

FINDINGS

Sex and Age Composition

Aerial sex and age composition counts of herds utilized intensively and those utilized primarily for trophy and subsistence hunting were surveyed during this reporting period. Generally, aerial sex and age composition counts are most valuable when conducted prior to antler shedding in late November and early December. Unfortunately, snowfall is not always adequate during October and November and the counts must be made in late winter. Although sex composition cannot be obtained then, the late counts yield information on the relative abundance of moose and percent of calves in the total population. The latter information is most useful if previous counts have established the ratio of adult males to adult females.

Previous work has suggested that standardization of flight patterns and equipment, and using the same pilots and observers, all contribute to reducing problems attendant to aerial counts (Rausch, 1958. Alaska, Project W-3-R-13. 13 (2):3-4). Standard recording forms were used on these counts; examples are attached in the appendix.

The data from the three years includes the most intensive and extensive count efforts that have been made in Alaska. The counts were made possible through the cooperation of the U. S. Forest Service, which conducted most of the counts on the National Forests, and the U. S. Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife, whose personnel performed most of the counts on the Kenai National Moose Range.

The aerial counts are grouped by area by year and a plate outlining the count area follows the count data, Tables 1-34 and Figures 1-7. No interpretation of the data is presented. Those individuals wishing to assess the counts are referred to R. A. Rausch, op. cit.) for a description of relative production standards.

TABLE 1. MOOSE SEX AND AGE RATIOS, CHUGACH NATIONAL FOREST, 1963

Area	Twin calves per 100 cows with calf	Percent calves in herd	Total moose
1. Resurrection R. Drainage	16.0	39.0	77
2. Ptarmigan Lake	0.0	27.8	18
3. Snow River	12.5	32.2	31
4. Trail River Drainage	18.8	33.3	63
5. Portage Flats	7.8	35.7	196
6. 20 Mile River	8.3	29.4	68
7. Seattle Creek	25.0	41.7	12
8. Little Indian	33.0	30.8	13
9. Big Indian	0.0	27.7	47
10. Resurrection Cr.	6.7	19.5	174
11. Six Mile & Bear Creek	0.0	28.6	28
12. Juneau & Swan Lakes	9.3	25.2	250
13. Quartz Creek	6.5	32.7	162
14. Devils Creek to Summit Lake	0.0	26.0	50
15. Summit Lake to Granite Creek Guard Station	4.8	32.4	71
16. Russian Lakes Drainage	18.2	37.8	45
17. Kenai River	0	34.1	44
18. Kenai Lake	0	20.8	24
19. Trail Lake Drainage	0	30.0	10
TOTALS	8.2	29.8	1,383

TABLE 2. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, KENAI NATIONAL MOOSE RANGE, JANUARY 1964.

	♀/1	♀/2	Total ♀	Total Calves	Unid. Adults	Total Moose	Moose Per Hour
1.	44	5	49	54	179	228	49
2.	3	0	3	3	15	18	7
3.	20	0	20	20	17	37	46
4.	31	1	34	33	63	97	33
5.	44	2	46	48	457	503	110
6.	0	0	0	0	3	3	12
7.	48	2	50	52	375	425	61
8.	1	0	1	1	11	12	5
9.	4	1	5	6	13	18	18
10.	20	1	21	22	94	115	44
11.	29	0	29	29	107	136	55
12.	81	2	83	85	284	367	32
15.	12	2	14	16	145	159	175
16.	2	0	2	2	12	14	16
17.	13	0	13	13	62	75	17
18.	120	10	130	140	564	694	67
19B.	19	0	19	19	66	104	18
19D.	9	5	14	19	27	60	20
19E.	8	0	8	8	27	43	20
19F.	13	1	14	15	143	172	26
TOTAL	521	32	553	585	2,666	3,804	43

TABLE 3. MOOSE SEX AND AGE RATIOS, KENAI NATIONAL MOOSE RANGE, JANUARY 1964

	Twin Calves Per 100 Cows With Calves	Percent Calves in Herd	Total Moose
1.	10	23.7	228
2.	0	16.7	18
3.	0	54.0	37
4.	3	34.0	97
5.	4	9.5	503
6.	0	0	3
7.	4	12.2	425
8.	0	8.3	12
9.	20	33.3	18
10.	5	19.1	115
11.	0	21.3	136
12.	2	23.2	367
15.	14	10.1	159
16.	0	14.3	14
17.	0	17.3	75
18.	8	20.2	694
19B.	0	18.3	104
19D.	36	31.7	60
19E.	0	18.6	43
19F.	7	8.7	172
TOTAL	6	15.4	3,804

TABLE 4. MOOSE SEX AND AGE RATIOS, LOWER KENAI PENINSULA, 1963

Area	Twin Calves/ 100 ♀'s w/calves	Percent Calves in Herd	Total Moose
Anchor Point	5	32.6	321
"A" west of Ninilchik River	11	51.5	150
"I" west of Tustamina Lake	14	26.3	288
"I" Caribou Hills	4	13.8	231
"H" Fox River	12	34.3	223
Homer	11	47.6	456
"C" Ninilchik Dome	11	55.9	223
TOTALS ALL AREAS	10	36.6	1,993

TABLE 5. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, LOWER SUSITNA RIVER, JANUARY 11-13, 1964

Area	Adult ♂	Young ♂	Total ♂	♀/1	♀/2	Total ♀	Total Calves	Unid. Adults	Total Moose	Moose Per Hour
Above timberline, Willow to Little Willow (including Peters, Little Willow but not Purchase & main Willow)	8	12	20	61	4	65	69	229	383	---
Below timberline	0	0	0	68	0	68	68	121	257	103
TOTALS THIS AREA	8	12	20	129	4	133	137	350	640	---
Little Willow to Kashwitna above timberline	10	9	19	24	1	25	26	77	147	---
Below timberline	0	4	4	59	0	59	59	195	317	99
TOTALS THIS AREA	10	13	23	83	1	84	85	272	464	---
Kashwitna to Montana above timberline	34	0	34	13	0	13	13	110	170	---
Below Timberline	12	1	13	84	0	84	85	113	296	---
TOTALS THIS AREA	46	1	47	97	0	97	99	223	466	---

TABLE 5. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, LOWER SUSITNA RIVER, JANUARY 11-13, 1964 (CONTINUED)

Area	Adult ♂	Young ♂	Total ♂	♀/1	♀/2	Total ♀	Total Calves	Unid. Adults	Total Moose	Moose Per Hour
Montana to Talkeetna above timberline	17	12	29	30	1	31	32	100	192	137
Below Timberline	4	0	4	64	2	66	68	141	279	140
TOTALS THIS AREA	21	12	33	94	3	97	100	241	471	139
Red Shirt-Nancy Lakes	2	0	2	23	0	23	23	52	100	42
Totals all areas east of Susitna	87	38	125	426	8	434	444	1,138	2,141	---
Susitna-Beluga	8	0	8	57	0	57	57	178	300	55

TABLE 6. MOOSE SEX AND AGE RATIOS, LOWER SUSITNA RIVER, 1963

Area	Twin Calves Per 100 Cows With Calves	Percent Calves in Herd	Total Moose
Above timberline, Willow to Little Willow (including Peters, Little Willow but not Richardson and Main Willow)	6	81.2	383
Below Timberline	0	100	257
Total This Area	3	89.5	640
Little Willow to Kashwitna above timberline	4	59.1	147
Below Timberline	0	93.6	317
Total This Area	1	79.4	464
Kashwitna to Montana above timberline	0	27.6	170
Below Timberline	0	88.6	296
Total This Area	0	68.8	466
Montana to Talkeetna above timberline	3	53.3	192
Below Timberline	3	97.1	279
Total This Area	3	76.9	471
Red Shirt-Nancy Lakes	0	92.0	100
Total all areas east of Susitna	2	79.4	2,141
Susitna-Beluga	0	87.7	300

TABLE 7. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, UPPER SUSITNA-DENALI HIGHWAY AREA, NOVEMBER 13-19, 1963

Area	Adult ♂	Young ♂	Total ♂	♀/1	♀/2	Total ♀	Total Calves	Total Moose	Moose Per Hour
Wells Creek, Nenana River, all above Denali Highway	44	12	56	32	2	112	36	204	185
Maclaren River, below Denali, left side	39	8	47	25	0	71	25	143	57
Head of Nenana River and Upper Susitna above Denali Highway	56	22	78	37	5	135	47	260	95
Clearwater and Maclaren Rivers above Denali Highway	92	45	137	146	14	388	174	699	175
Alphabet Hills	84	11	95	49	2	122	53	270	90
Gakona Glacier	78	36	114	35	0	116	35	265	168
Maclaren River below Denali Highway, right side	12	7	19	30	0	50	30	99	99
Middle Susitna below Denali Highway and Butte Creek	27	4	31	25	0	65	25	121	145
TOTALS	432	145	577	379	23	1,059	425	2,061	120

TABLE 8. MOOSE SEX AND AGE RATIOS, UPPER SUSITNA-DENALI HIGHWAY AREA, 1963.

Area	Young ♂/100 Adult ♂	♂/100 ♀	Calves/ 100 ♀	Twin Calves/ 100 cows w/calves	Percent Calves in Herd	Percent Yearling ♂ in Herd	Young ♂/100 ♂ Calves	Young ♂/ 100 Cows	Total Moose
Wells Creek Nenana River all above Denali Highway	27	50	32	6	17.6	7.1	67	11	204
Maclaren River below Denali, left side	21	66	35	0	17.5	6.8	64	11	143
Head of Nenana and Upper Susitna above Denali	39	58	35	12	18.1	10.3	94	16	260
Clearwater and Maclaren above Denali	49	35	45	9	24.9	8.6	52	12	699
Alphabet Hills	13	78	43	4	19.6	5.1	17	9	270
Gakona Glacier	46	98	30	0	13.2	15.6	206	31	265
Maclaren River below road, right side	58	38	60	0	30.3	10.1	47	14	99

TABLE 8. MOOSE SEX AND AGE RATIOS, UPPER SUSITNA-DENALI HIGHWAY AREA, 1963 (CONTINUED)

Area	Young ♂/100 Adult ♂	♂/100 ♀	Calves/ 100 ♀	Twin Calves/ 100 cows w/calves	Percent Calves in Herd	Percent Yearling ♂ in Herd	Young ♂/100 ♂ Calves	Young ♂/ 100 Cows	Total Moose
Middle Susitna below Denali and Butte Creek	15	48	38	0	20.7	4.2	32	6	121
TOTALS	34	54	40	6	20.6	8.9	72	14	2,061

TABLE 9. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, TANANA FLATS, AREAS 1-9, OCTOBER 1963

Area	Adult ♂	Young ♂	Total ♂	♀/0	♀/1	♀/2	Total ♀	Total Calves	Unid. Sex and Age	Total Moose	Moose Per Hour
1.	55	15	70	77	24	2	103	30	0	203	221
2.	25	6	31	27	15	0	42	15	0	88	66
3.	35	15	50	45	37	2	84	42	0	176	160
4.	50	7	57	37	25	2	64	29	0	150	80
5.	40	19	59	35	37	4	76	47	0	182	68
6.	26	1	27	19	31	1	51	34	2	114	104
7.	29	2	31	39	9	1	49	12	0	92	61
8.	35	3	38	24	14	0	38	16	0	92	46
9.	31	4	35	39	33	2	74	38	0	147	47
TOTALS	326	72	398	342	225	14	581	263	2	1,244	81

TABLE 10. MOOSE SEX AND AGE RATIOS, TANANA FLATS, OCTOBER 1963

Area	Yearling ♂/100 Adult ♂	Total ♂/100 ♀	Calves/ 100 ♀	Twin Calves/100 ♀ w/calf	Percent Calves in Herd	Percent Yearling ♂ in Herd	Yearling ♂/100 ♂ Calves	Yearling ♂/100 ♀	Total Moose
1.	27	68	29	8	14.8	8.7	100	15	203
2.	24	73	36	0	17.0	8.2	80	14	88
3.	42	59	50	5	23.9	11.2	58	18	176
4.	14	89	45	7	19.3	5.8	50	11	150
5.	47	77	62	10	25.8	14.1	81	25	182
6.	3	52	67	3	30.4	1.3	6	2	114
7.	6	63	24	10	13.0	2.5	33	4	92
8.	8	100	42	0	17.4	3.9	38	8	92
9.	12	47	51	6	25.8	3.7	21	5	147
TOTALS	22	68	45	6	21.1	7.4	55	12	1,244

TABLE 11. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, 20B and C, 1963

Area	Date	Adult ♂	Young ♂	Total ♂	♀/1 Calf	♀/2 Calves	Total ♀	Total Calves	Unid. Moose	Total Moose	Moose Per Hour
Chena River	11/6/63-12/6/63	58	17	75	50	4	154	58	17	304	18.5
Salcha River	12/7/63-12/11/63	39	7	46	30	1	140	32	1	223	33.0
Shaw Creek	12/13/63	14	5	19	10	0	54	10	0	83	26.0
Gold Stream	12/9/63	2	4	6	15	4	33	23	1	63	25.0
Goodpaster River	1/30/64-1/31/64	--	--	--	14	3	17	20	--	204	29.2

TABLE 12. MOOSE SEX AND AGE RATIOS, TANANA VALLEY, 20B and C, 1963

Area	Yearling ♂/100 Adult ♂	♂/100 ♀	Calves/ 100 ♀	Twin Calves/ 100 ♀ w/Calves	Percent Calves in Herd	Percent Young ♂ in Herd	Young ♂/100 ♂ Calves	Young ♂/100 Cows	Total Moose
Chena River	29	49	88	7	19.5	7.4	59	11	304
Salcha River	18	33	23	3	14.4	3.8	44	5	223
Shaw Creek	36	35	19	0	12.0	6.8	100	9	83
Gold Stream	200	18	70	21	37.1	10.2	35	12	63
Goodpaster River	--	--	--	18	9.8	--	--	--	204

TABLE 13. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, TOK AREA, 1964

Area	Date	Adult ♂	Young ♂	Total ♂	♀/1	♀/2	Total ♀	Total Calves	Unid. Moose	Total Moose	Moose Per Hour
Tanacross	1/14	0	0	0	12	0	12	12	34	58	14.5
Ketchumstock Flats	1/27-28	1	0	1	31	0	31	31	88	151	37.7
Northway Flats		1	0	1	13	0	13	13	33	60	30.0
Tetlin		1	0	1	14	0	14	14	37	66	22.0

TABLE 14. MOOSE SEX AND AGE RATIOS, TOK AREA, 1964

Area	Twin Calves/100 ♀'s with Calves	Percent Calves In Herd	Total Moose
Tanacross	0	20.7	58
Ketchumstock Flats	0	20.5	151
Northway Flats	0	21.7	60
Tetlin	0	21.2	66

TABLE 15. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, ALASKA PENINSULA, NOVEMBER, 1963

Area	Adult ♂	Young ♂	Total ♂	♀/1	♀/2	Total ♀	Total Calves	Unid. Moose	Unid. Adults	Total Moose	Moose per Hour
Alaska Peninsula	499	118	617	170	36	993	242	0	0	1,852	104.04

TABLE 16. MOOSE SEX AND AGE RATIOS, ALASKA PENINSULA, 1963

Area	Young ♂/100 Adult ♂	♂/100 ♀	Calves/ 100 ♀	Twin Calves/ 100 ♀ W/Calves	% Calves in Herd	% Young ♂ in Herd	Young ♂/100 ♂ Calves	Young ♂/100 ♀ Cows	Total Moose
Alaska Peninsula	24	62	24	17	13	7	98	12	1,852

TABLE 17. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS HAINES AREA, NOVEMBER 4, 1963

Total ♀	Total Calves	Unid. Moose	Unid. Adults	Total Moose	Moose per hour
105	36	21	0	193	---

TABLE 18. MOOSE SEX AND AGE RATIOS, HAINES AREA, 1963

♂/100 ♀	% Calves in Herd	Total Moose
30	18.6	172*

*Unidentified moose not used in calculating ratios.

TABLE 19. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS STIKINE RIVER, 1963

Area	Date	Total ♂	♀/1	♀/2	Total ♀	Total Calves	Unid. Moose	Unid. Adults	Total Moose	Moose per hour
Stikine River	2/5/64	0	1	1	2	3	40	-	45	30.0
Berners Bay	2/4/64	0	2	3	5	8	3	9	25	20.0
Stikine Flats & upper River	2/11/64	0	16	-	16	16	19	65	116	73.42
Stikine River	3/5/64	0	9	4	13	17	-	97	127	39.08
Taku River	4/1/64	-	-	-	-	5	54	-	59	23.60

TABLE 20. MOOSE SEX AND AGE RATIOS, STIKINE RIVER, 1963

Area	Twin Calves/ 100 ♀ W/Calves	% Calves in Herd	Total Moose
Stikine River (3/5/64)	31	13.4	127

TABLE 21. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, AND SEX AND AGE RATIOS, CORDOVA, 1963

Date	Adult ♂	Young ♂	Total ♂	♀/1	♀/2	Total ♀	Total Calves	Unid. Moose	Unid. Adults	Total Moose	Moose per hr	Twin Calves/ 1CO ♀ W/Calves	% Calves in Herd
1/28/64 to 2/23/64	10	5	15	27	9	36	45	0	40	136	17	25	33.1

TABLE 22. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, KENAI MOOSE RANGE 1964

Unit	Flying Time (Hr)	Adult ♂	Young ♂	Total ♂	♂/1	♂/2	Total ♀	Total Calves	Total Moose
2	2:40	0	6	6	37	3	100	45	151
4	2:00	6	2	8	5	1	37	7	52
5	2:25	110	10	120	14	0	64	14	198
6	:25	10	0	10	1	1	17	3	30
7	5:35	29	8	37	13	1	117	16	170
8	1:30	2	1	3	6	2	19	14	36
9	1:10		1	1	11	1	42	13	56
10	3:35	71	13	84	38	0	196	38	318
11	1:50	8	2	10	41	4	144	49	203
12	7:55	44	19	63	101	5	427	122	612
15	4:10	111	6	117	47	3	293	53	463
16	:40	62	1	63	3	0	20	3	86
17	4:55	24	3	27	10	0	136	10	173
18	10:30	67	33	100	246	10	712	274	1086
19B	5:00	2	0	2	13	1	72	17	91
19D	2:20	2	1	3	21	0	55	21	79
19E	3:10	9	4	13	9	1	79	11	103
19F	5:30	11	5	16	22	1	181	24	221
TOTALS	62:00	568	115	683	638	34	2,711	734	4,128

Per Cent Bulls 16.5

Per Cent Calves 17.8

TABLE 23. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, LOWER KENAI PENINSULA, DECEMBER 8-17, 1964

Area	Adult ♂	Young ♂	Total ♂	♀/1	♀/2	Total ♀	Unid. Adults	Total Adults	Calves	Total Moose	Moose Per Hour
Anchor Point	3	1	4	58	1	59	136	199	61	260	52
"A" West of Ninilchik R.	2	2	4	7	0	18	0	22	9	31	22
"3" West of Kasilof R. and Sterling Hwy.	6	14	20	25	1	95	0	115	31	146	146
"1" West of Tustamena Lake	8	4	12	14	0	187	0	199	14	213	27
"1" Caribou Hills	37	6	43	26	0	26	164	233	26	259	80
"B"	12	2	14	15	0	84	0	98	15	113	28
"H" Fox River	22	15	37	59	2	61	148	246	64	310	82
Homer	1	3	4	112	3	115	182	301	121	422	59
"C" Ninilchik Dome	6	5	11	20	0	20	43	74	20	94	40
TOTAL Lower Kenai	97	52	149	336	7	665	673	1,487	361	1,848	52
Total all areas except Caribou Hills	60	46	106	310	7	639	509	1,254	335	1,589	

TABLE 24. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, LOWER KENAI PENINSULA, JANUARY 18-22, 1964

Area	Adult ♂	Young ♂	Total ♂	W/1 ♀	W/2 ♀	Total ♀ w/calves	Unid. Adults	Total Adults	Calves	Total Moose	Moose Per Hour
Anchor Point	1		1	71	4	75	166	242	79	321	56
"A" West of Ninilchik River	1	2	3	39	5	44	52	99	51	150	68
"3" W. of Kasilof R. and Sterling Highway	0	2	2	20	0	20	15	37	20	57	47
"1" W. of Tustamena Lake	6	8	14	44	7	51	163	228	60	288	51
"I" Caribou Hills	31	1	32	24	1	25	146	203	28	231	77
"B" Between Ninilchik & Deep Creek, upper 1/2 of area	0	0	0	10	1	11	21	32	12	44	35
"H" Fox River	9	0	9	45	6	51	106	166	57	223	51
Homer	10	0	10	116	15	131	168	309	147	456	48
"C" Ninilchik Dome	4	0	4	62	8	70	69	143	80	223	47
TOTALS OF ALL AREAS	13	62	75	431	47	478	906	1459	534	1993	52

TABLE 25. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, MATANUSKA VALLEY, 1964

Area	Date	Adult ♂	Young ♂	Total ♂	♀/1	♀/2	Total ♀	Total Calves	Unid. Adults	Total Moose	Moose Per Hour
1	12/23	0	2	2	7	0	7	9	20	38	12
2	12/23	4	1	5	18	1	19	20	23	67	35
3	12/21 12/23	5	7	12	59	4	63	68	93	236	89
4	12/11	3	7	10	61	2	63	70	84	227	95
5	12/21	4	9	13	62	1	63	67	135	278	86
6	12/21	3	20	23	99	3	102	105	80	310	100
7	12/18	18	5	23	61	1	62	63	108	256	155
TOTALS		37	51	88	367	12	379	402	543	1412	77

TABLE 26. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, SOUTHCENTRAL ALASKA, 1964

Area	Date	Adult ♂	Young ♂	Total ♂	♀/1	♀/2	Total ♀	Total Calves	Unid. Adults	Total Moose	Moose Per Hour
Alaska Peninsula											
Cinder River		148	22	170	38	7	202	52	-	424	106
Mother Goose Lake		151	38	189	51	4	349	59	-	597	199
Dog Salmon River		98	24	122	11	0	158	11	-	291	145
TOTAL		397	84	481	100	11	709	122	-	1312	146
Willow-Talkeetna	March 1965				39	7	-	51	280	379	29
Cordova Unit 6	12/9-10 17-31/64	14	11	25	33	10	-	53	73	194	

TABLE 27. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, NELCHINA BASIN, 1964

Area	Date	Adult ♂	Young ♂	Total ♂	♀/1	♀/2	Total ♀	Total Calves	Unid. Adults	Total Moose	Moose Per Hour
Wells Creek	3/17/65	11	3	14	10	1	11	12	25	62	33
Malclaren R. below Hwy. left side	3/30/65	13	3	16	13	4	17	21	28	82	103
Maclaren R. below Hwy. right side	3/19/65	14	4	18	11	0	11	11	61	101	67
Maclaren & Clearwater above Hwy.	3/18/65	2	0	2	3	0	3	3	6	14	70
Middle Susitna & Butte Crk.	3/19/65	35	13	48	36	1	37	38	84	207	69
Head of Nenana & Upper Susitna Rivers	3/17/65	21	8	29	10	0	10	10	31	70	64
Alphabet Hills	3/18/65	39	11	50	42	0	42	42	89	223	42
West Paxon Lake	12/4/64	15	15	30	21	1	81	23	0	134	64
Fish Crk to McMahan's & W. of Paxson to Haggard Crk	12/5/64	106	46	152	90	4	371	98	0	621	141
TOTALS*					236	11		258		1514	73

*Columns with totals missing were not totalled because data on sex are not comparable in all cases due to antler shedding by bulls.

TABLE 28. MOOSE SEX AND AGE RATIOS, SOUTHCENTRAL ALASKA, 1964

Area	Young ♂/100 adult ♂	♂/100 ♀	Calves/100 ♀	Twin calves /100 ♀/calves	Percent calves in herd	Percent young ♂ in herd	Young ♂ /100 ♂ calves	Young ♂ /100 cows	Total Moose
Matanuska Valley Areas 1-7	138	9.5	44	3	28.5	5	27	5.5	1,412
Willow Talkeetna	-	-	-	15	13	-	-	-	379
Cordova, Unit 6	79	22	47	23	27	-	42	9	194
Unit 9, Alaska Peninsula:									
Cinder River	15	84	26	16	12	5	85	11	424
Mother Goose Lake	25	54	17	7	10	6	131	11	597
Dog Salmon River	24	77	7	0	4	8	400	15	291
Unit 9, Totals	21	68	17	11	11	7	137	12	1,312

TABLE 28. (cont'd) MOOSE SEX AND AGE RATIOS, SOUTHCENTRAL ALASKA, 1964

Area	Young ♂/ 100 Adult ♂	♂/100 ♀	Calves/100 ♀	Twin Calves /100 ♀ /calves	Percent calves in herd	Percent young ♂ in herd	Young ♂ /100 ♀	Total Moose
Unit 15 Refuge sub-units 2-19F	20	25	27	5	17.8	2.7	4	4,128
Homer Area	77	9	29	2	21.0	2.8	4	1,589
Caribou Hills	16	23	14	0	10.0	2.3	3	259
Unit 13 Nelchina Area				4.4	17.0			1,514

TABLE 29. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS, INTERIOR ALASKA, 1964

Area	Date	Adult ♂	Young ♂	Total ♂	♀/1	♀/2	Total ♀	Total Calves	Unid. Moose	Unid. Adults	Total Moose	Moose Per Hour
Delta Junction	12/3-6/64	23	29	52	56	6	133	68	7	0	260	
Goodpaster Healy Lake area	12/3-6/64	3	5	8	19	2	40	18	0	67	143	
Tok-Slana	2/24/65 2/1/65	-	-	-	70	6	-	82	25	242	425	57
Ketchum-stock	2/24/65 2/1/65	-	-	-	47	2	-	51	2	169	271	57
Tok Tanana Flats	2/24/65 3/1/65	-	-	-	13	0	-	14	0	46	73	21
TOTALS		-	-	-	205	16	-	233	34	524	1172	

TABLE 30. MOOSE SEX AND AGE RATIOS, INTERIOR ALASKA, 1964

Area	Young ♂/ 100 Adult ♂	♂/100 ♀	Calves /100 ♀	Twin Calves /100 ♀/calves	Percent Calves in herd	Percent Young ♂ in herd	Young ♂/100 ♀	Total Moose
Delta Jct.	126	39	51	10	27	11	22	260
Goodpaster Healy Lake area	160	42	--	0	12.5	--	--	143
Tok-Slana	---	--	--	8	20.5	--	--	425
Ketchum-stock	---	--	--	4.0	19.0	--	--	271
Tok, Tanana Flats	---	--	--	0	19.0	--	--	73

TABLE 31. SUMMARY OF MOOSE POPULATION COMPOSITION COUNTS AND SEX AND AGE RATIOS, STIKINE RIVER, 1964

Date	♀/1	♀/2	Total Calves	Unid. Moose	Unid. Adults	Total Moose	Moose Per Hour	Twin Calves /100 ♀ /calves	Percent Calves in herd
2/11/65	16	0	19	19	65	119	47.6	0	19.0

TABLE 32. POST-TAGGING MOOSE PARTURITION COUNTS, PALMER AREA, 1964

Area	Date	♀/0	♀/1	♀/2	♀/?	Tagged Calves Singleton	Twins	♀/1 Yrg.	♀/2 Yrgs.	Lone Yrgs.	Tagged Yrgs.	Other Tagged M	Calves Tagged 1964	Calves Tagged 1963
Jim-Swan Lakes	6/7	9	26	4	7	10	2	3	-	14	3	1	14	48	37
Hay Flats	6/7	5	5	5	2	4	3	2	-	2	1	-	2	42	37
TOTALS		14	31	9	9	14	5	5		16	4	1	16	90	74
Jim Swan Lakes	6/8	11	27	3	5	11	2	5	2	16	5	1	20		
Hay Flats	6/8	7	12	4	1	6	3	4	1	7	2	0	8		
TOTALS		18	39	7	6	17	5	9	3	23	7	1	28		

TABLE 32. POST-TAGGING MOOSE PARTURITION COUNTS, WILLOW AREA, 1964 (CONTINUED)

Area	Date	♀/0	♀/1	♀/2	♀/?	Tagged Calves Singleton	Tagged Calves Twins	♀/1 Yrg.	♀/2 Yrgs.	Lone Yrgs.	Tagged Yrgs.	Other Tagged	M	Calves Tagged 1964	Calve Tagge 196
Willow-Little Willow	6/5	7	37	2	3	9	1								
Little Willow Kashwitna	6/5	9	20	3	5	0	1								
Willow Flats	6/5	2	11	3	1	3	1								
TOTALS		18	68	8	9	12	3	2	0	15	0	0		77	44
Willow-Little Willow	6/6	11	25	2	8	9	0								
Little Willow Kashwitna	6/6	5	35	6	3	4	1								
Willow Flats	6/6	1	8	1	3	4	0								
TOTALS		17	68	9	14	17	1	1	1	15	0	0			

TABLE 33. MOOSE PARTURITION COUNTS, TANANA FLATS, AREAS A AND B, 1962

Date	♀/0	♀/1	♀/2	♀/?	Total Births	Total Yrg.	Total ♂	Total ♀	Total Moose	Flying Time (Hr.)
6/11	72	90	7	13	97	48	172	182	506	4.0
6/12	75	96	15	27	111	54	208	213	601	4.2
Combined Total	147	186	22	40	208	102	380	395	1,107	8.2
6/19	43	48	1	5	49	43	100	97	290	2.9

TABLE 34. MOOSE PARTURITION COUNTS, MATANUSKA-LOWER SUSISTNA VALLEY, 1964

Area	Date	♀/0	♀/1	♀/2	♀/?	Total Births	Total Yrgs.	Total ♂	Total ♀	Total Moose
	5/20	96	2	1	0	3	21	20	109	154
	5/21	95	6	1	0	7	20	15	102	145
	5/23	72	12	2	0	16	27	18	96	148
Lower Susitna	5/26	26	25	11	12	36	26	11	74	158
Willow area	5/31	10	32	1	5	33	13	16	48	111
"	6/5	20	68	8	9	76	17	16	105	222
"	6/6	19	68	9	14	77	18	23	110	228
Palmer-Swan Lake	6/7	19	31	9	9	40	25	18	68	160
"	6/8	30	39	7	6	46	38	28	82	201

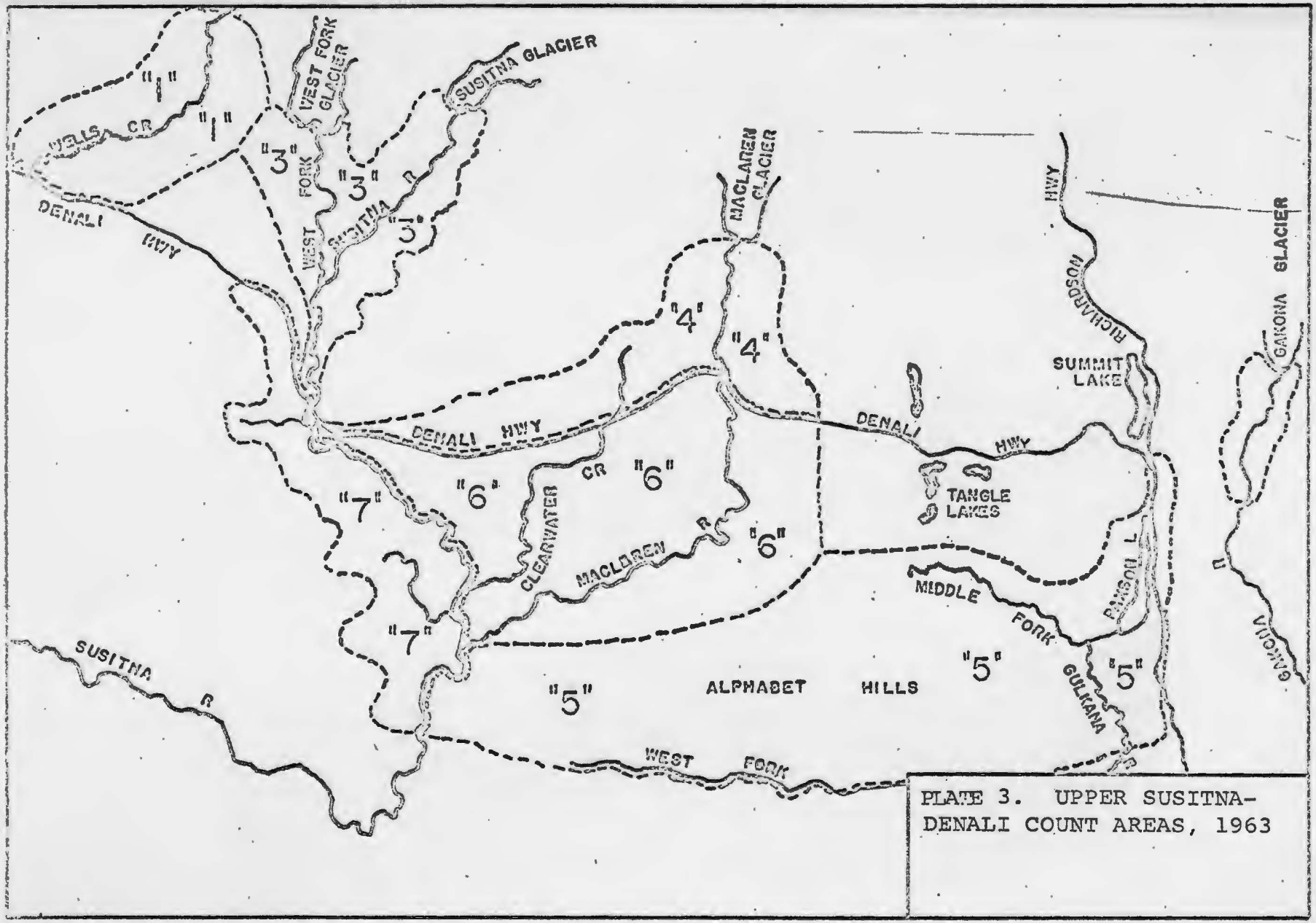

PLATE 3. UPPER SUSITNA-DENALI COUNT AREAS, 1963

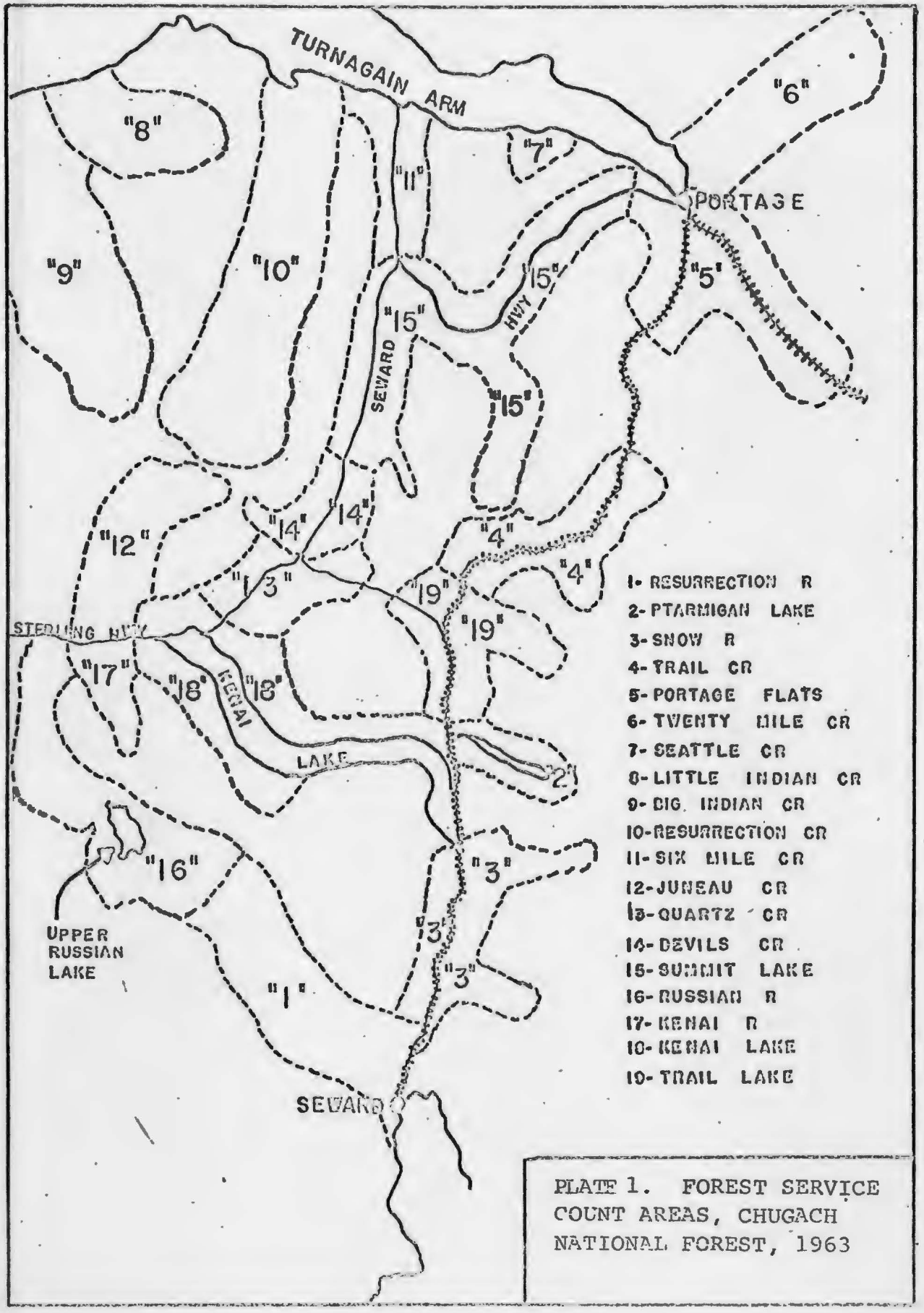

PLATE 1. FOREST SERVICE COUNT AREAS, CHUGACH NATIONAL FOREST, 1963

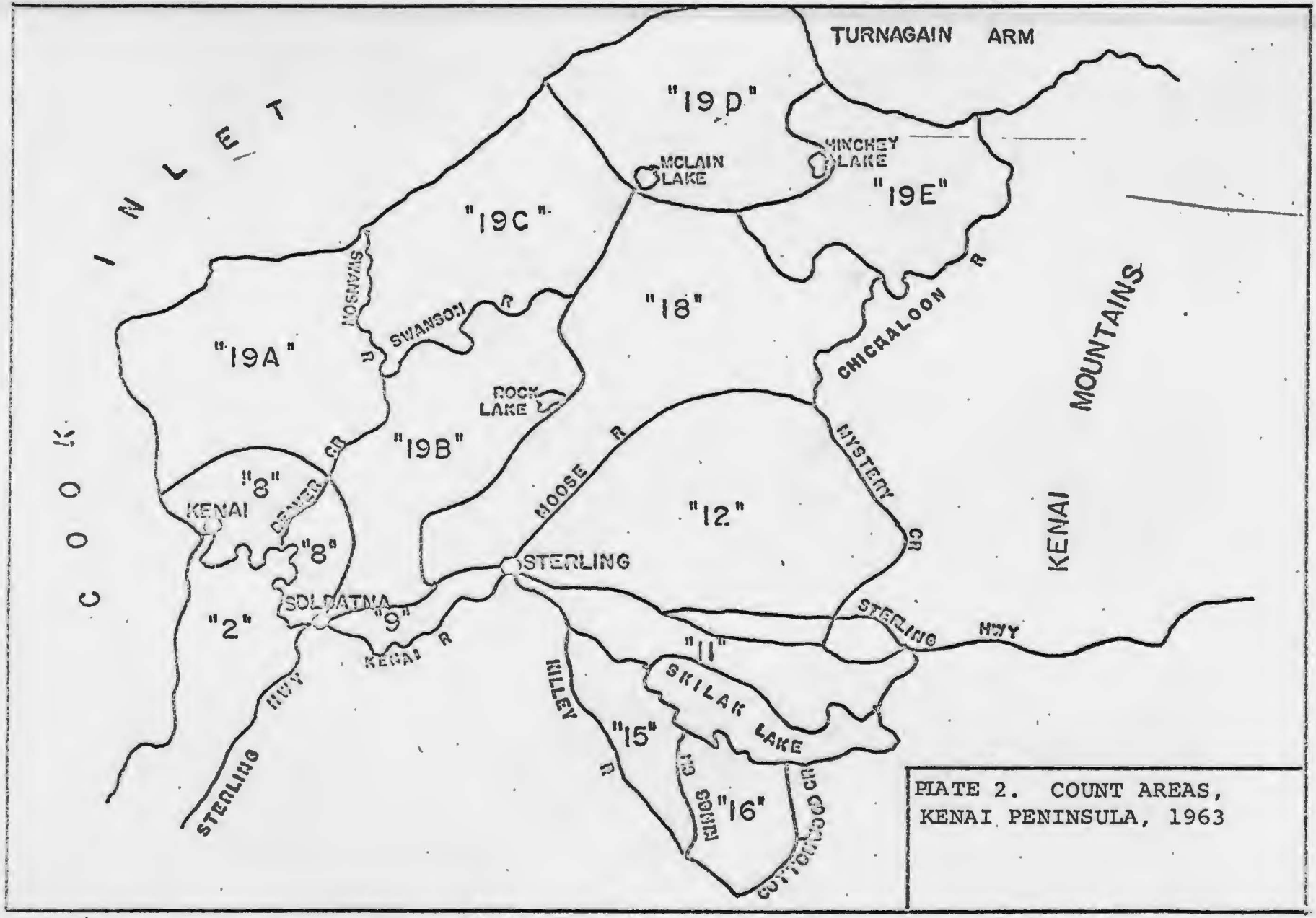

PLATE 2. COUNT AREAS, KENAI PENINSULA, 1963

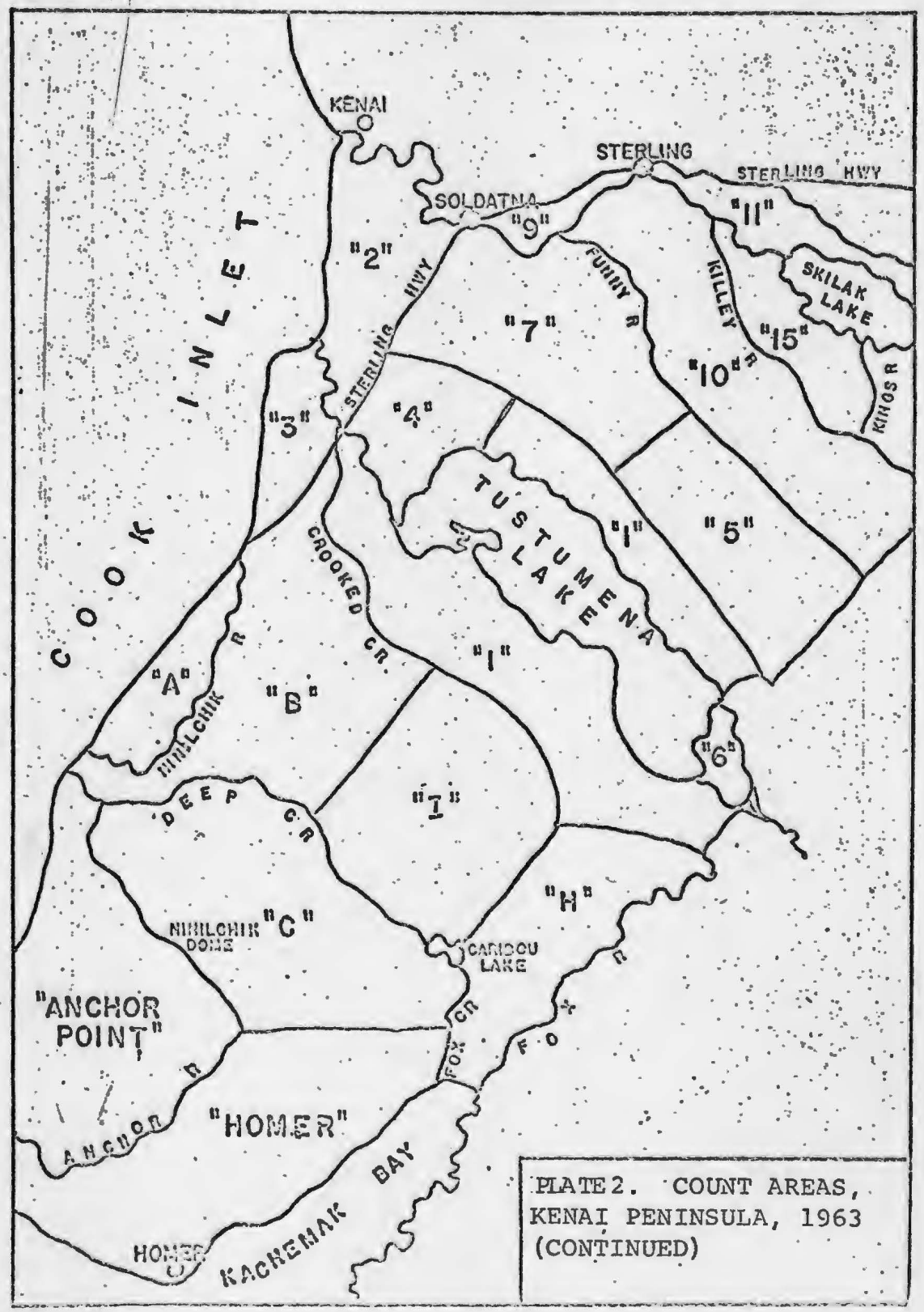

PLATE 2. COUNT AREAS, KENAI PENINSULA, 1963 (CONTINUED)

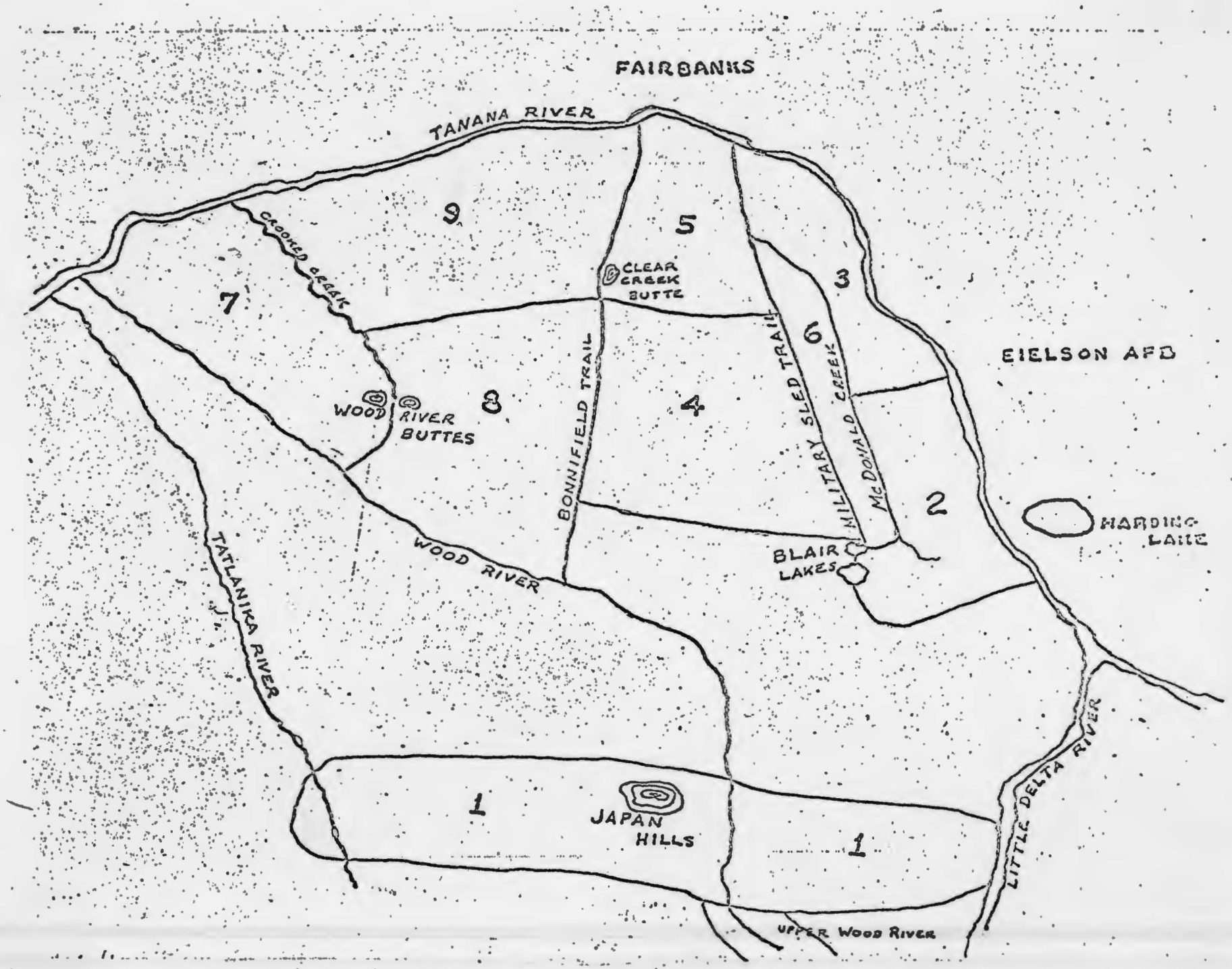

PLATE 4. TANANA FLATS AND UPPER WOOD RIVER COUNT AREAS, 1963

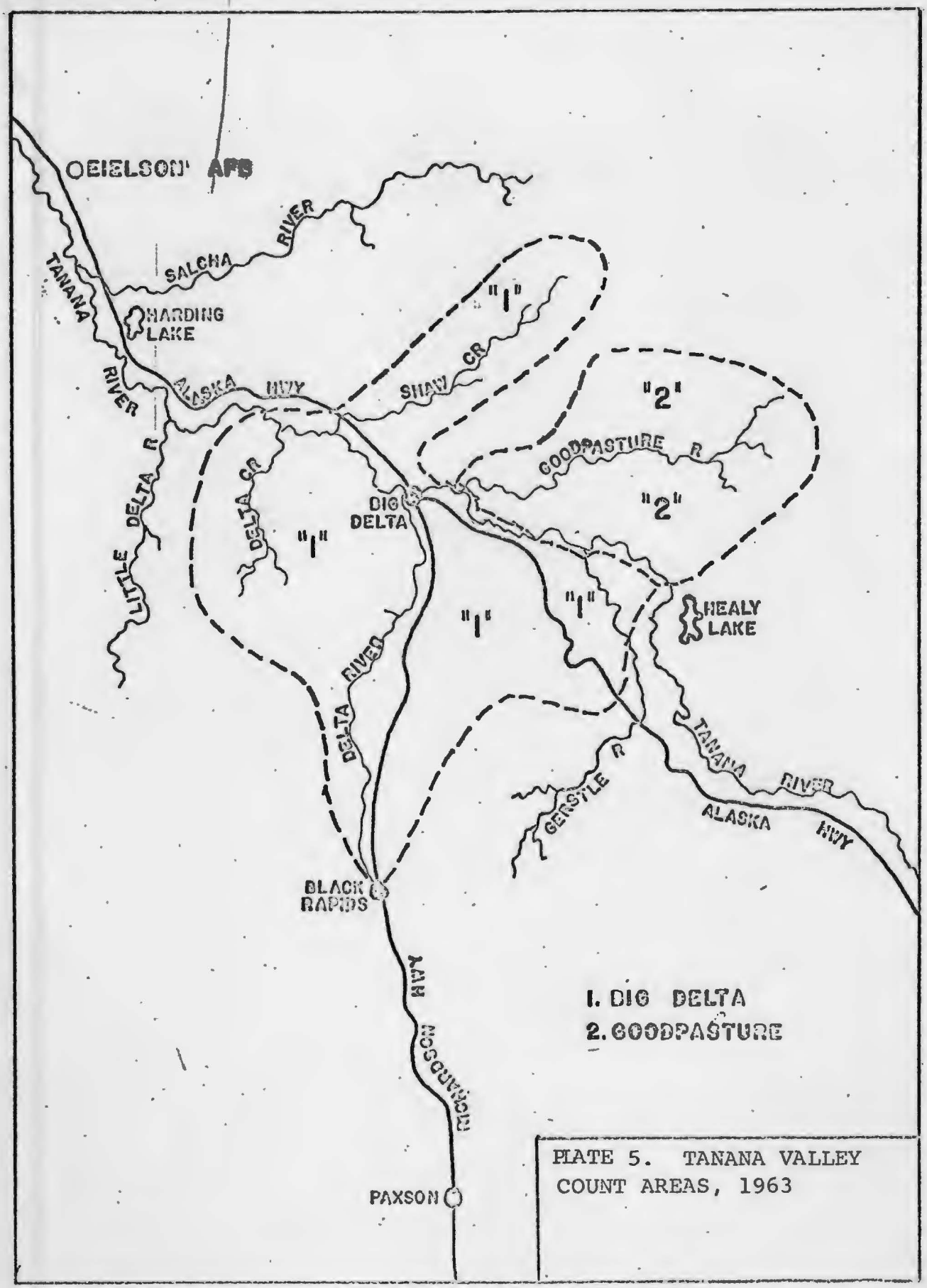

PLATE 5. TANANA VALLEY COUNT AREAS, 1963

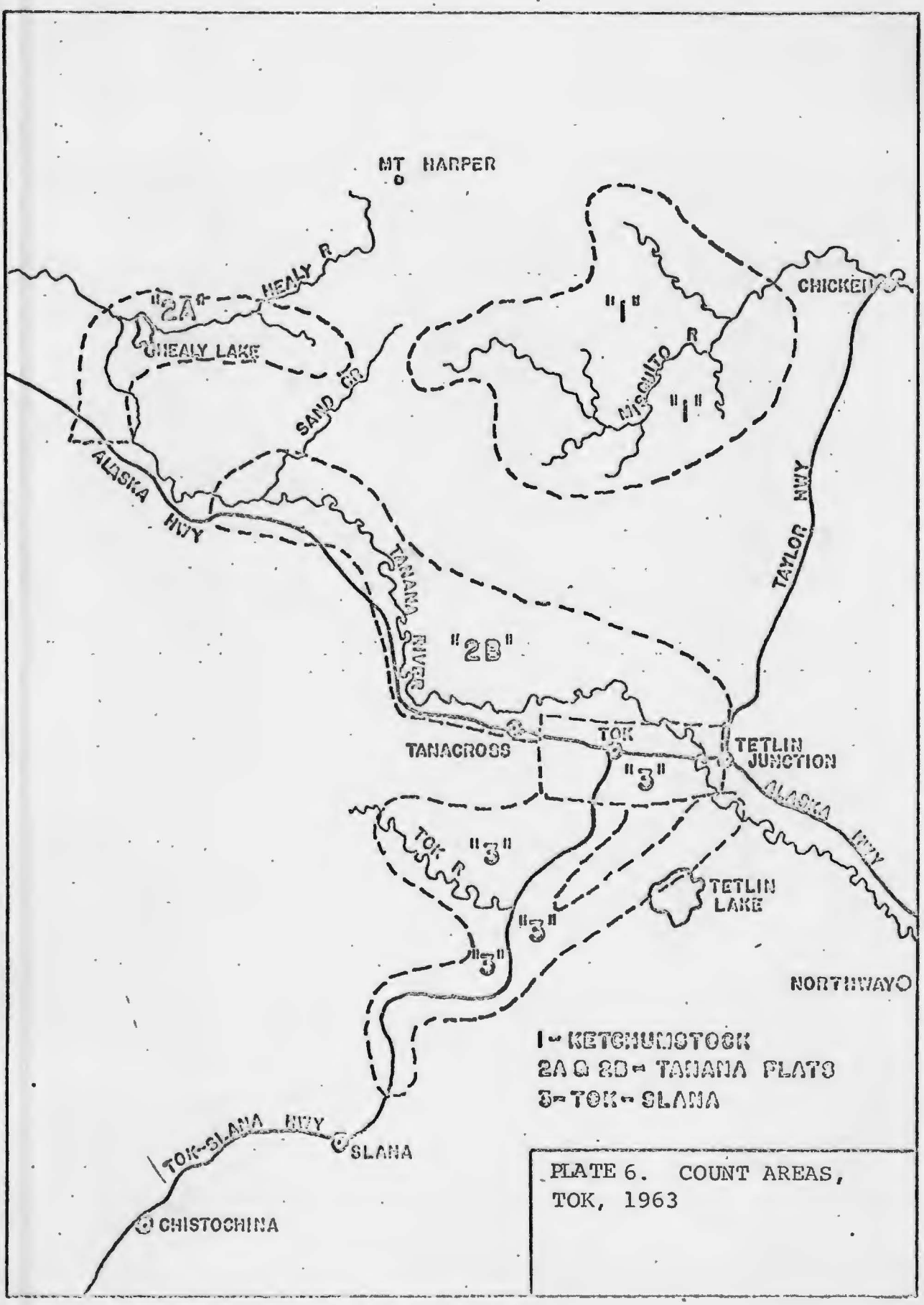

PLATE 6. COUNT AREAS, TOK, 1963

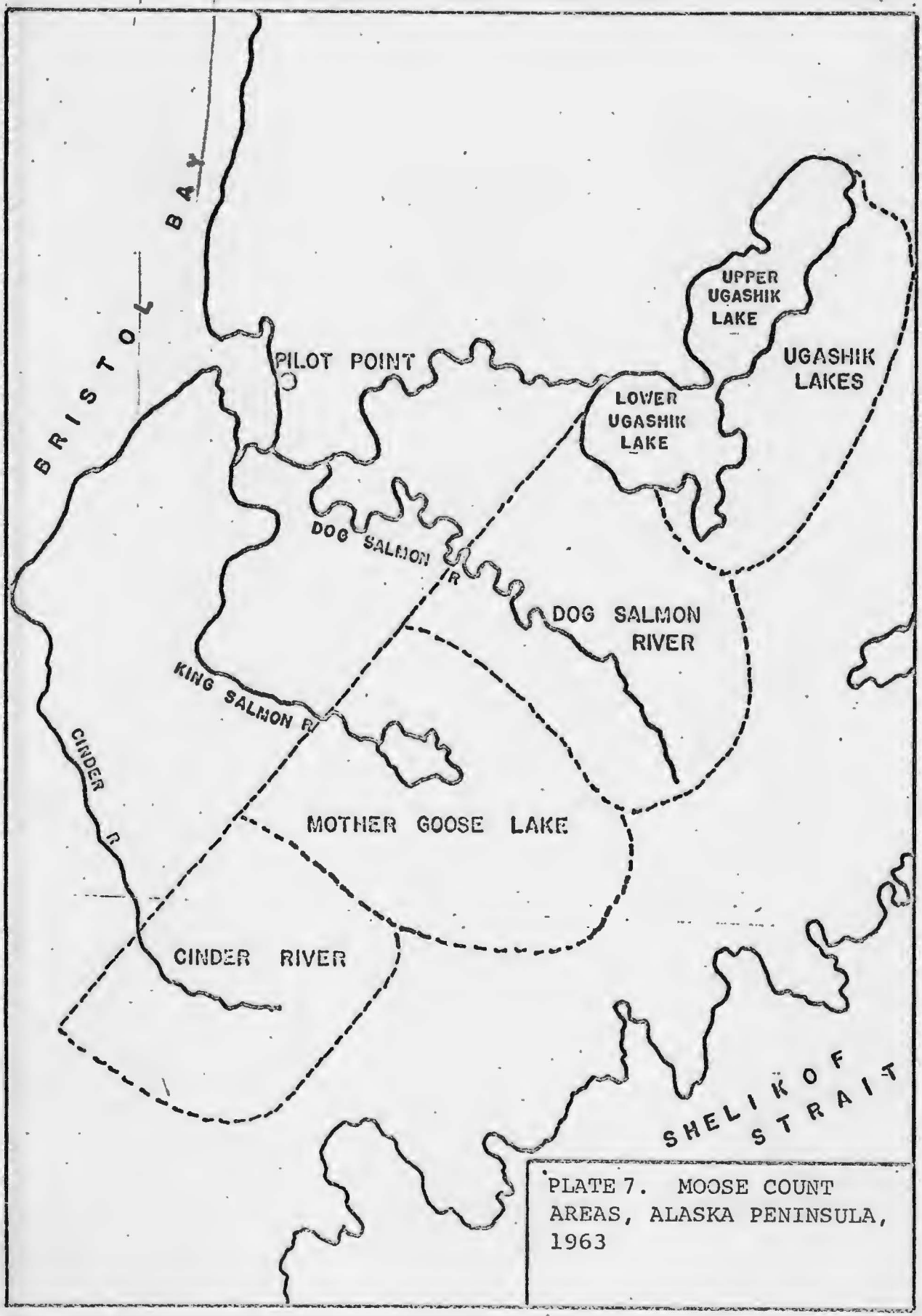

PLATE 7. MOOSE COUNT AREAS, ALASKA PENINSULA, 1963

PRODUCTIVITY

Spring Survival Counts

Counts of yearlings surviving to late May and early June are made concurrent to natality counts and yield an estimate of net production at one year, (Tables 35-41).

Natality Counts

Counts of key calving areas where calves are tagged annually, are used to establish the peak and magnitude of calving on these areas, (Tables 35-41). Replicate counts following calf tagging operations in 1964 and 1965 established that about 30 percent of the tagged calves can be located immediately after tagging. Tagging intensity varied from 50 percent of the new calf crop on the Hayflats and Jim-Swan areas to 20 percent on the Willow-Kaswitna area.

Initiation of Yakutat Moose Production and Survival Studies

Beginning May 16, 1965, daily flights were made from Yakutat using Supercub and Cessna 180 aircraft. The first two days were devoted primarily to determining pregnant cow concentration areas. The flights thereafter consisted of low level, low speed, criss-cross flying patterns over areas of known concentrations. All moose seen were examined until the sex and age status could accurately be determined. Counting time extended from 0330 to 0800.

Calving Grounds

The major calving areas were found to be in the alder-bordered sedge flats along the Ahrnklin-Dangerous Rivers, Italio River, Ustay-Tanis Rivers and southeast of Tanis Mesa. These areas are outlined in Figure 8. The counting effort was minimal on the Italio River as the many islands of spruce and cottonwood trees made accurate observations difficult even though many moose were seen. In addition to the areas of concentration mentioned, pregnant cows were scattered over the entire Yakutat plain though the number diminished as one neared the foothills of the St. Elias range. All suitable habitat appeared to be well occupied.

Productivity

The first flight on May 16 revealed three newborn calves (one singleton, one set of twins) in a sample of 133 adult cows. From this it is assumed that calving began about May 15.

The progression of calving as determined by daily flights is tabulated in Table 41. Additional data were obtained during a patrol flight which was made on May 23 with Protection Officer Brantley in a Cessna 180. Sixty-one moose were counted and recorded on this flight, including 21 cows, 13 bulls, three yearlings, and ten unknowns. Five cows had twins and six had singletons. This data is not included in Table 36, since the flight was made late in the day and we were not following specific flight patterns.

TABLE 35. MOOSE PARTURITION COUNTS, TANANA VALLEY, 1965

Date	♀/0	♀/1	♀/2	♀/?	Total Births	♀/1 Yrg.	♀/2 Yrg.	Lone Yrg.	Total Yrg.	Total ♂	Total ♀	Total Moose
5/15	70	0	0	0	0	36	0	0	36	63	106	205
5/18	277	1	0	0	1	49	1	1	52	161	328	542
5/19	269	2	1	0	3	42	0	2	44	171	314	533

TABLE 36. SPRING, SEX AND AGE RATIOS, TANANA VALLEY, 1965

Date	♂/100 ♀	Yearling/100 ♀'s	Twin/100 ♀/Calves	%Yearling in Herd	Sample Size
5/15	59	34	0	17.5	205
5/18	49	16	0	9.6	542*
5/19	54	14	2	8.2	533*

* = Helicopter

TABLE 37. POST-TAGGING MOOSE PARTURITION COUNTS, LOWER SUSITNA-MATANUSKA VALLEY, 1965

Area	Date	♀/0	♀/1	♀/2	♀/?	♀/1 Yrg.	♀/2 Yrg.	Lone Yrg.	Total Yrg.	Total ♂	Total ♀	Total Moose	Tagged Singletons	Tagged Twins
Willow-Kashwitna	6/2	24	66	10	22	3	0	15	18	32	125	261	20	2
"	6/3	13	48	8	20	2	0	11	13	13	91	181	11	2
Palmer Hay Flats	5/31	10	20	4	2	6	1	13		2	43	92	12	2

TABLE 38. MOOSE PARTURITION COUNTS, LOWER SUSITNA-MANTANUSKA VALLEY, 1965

Area	Date	♀/0	♀/1	♀/2	♀/?	♀/1 Yrg.	♀/2 Yrg.	Lone Yrg.	Total Yrg.	Total ♂	Total ♀	Total Moose
Willow Flats	5/23	69	34	5	2	7	0	5	12	6	117	179
Susitna Flats	5/24	25	14	4	2	12	0	11	23	15	57	117
Jim-Swan Lakes	5/27	9	26	2	1	4	1	10	16	7	43	90
Palmer-Hay Flats	5/27	12	17	8	1	4	0	11	15	9	42	95
Jim-Swan, Palmer Combined		21	43	10	2	8	1	21	31	16	85	185
Jim-Swan	5/31	12	34	9	8	0	1	20	22	12	64	150

TABLE 39. CALVING PROGRESSION ON YAKUTAT PLAIN - MAY 1965

Date	Observed Part / 100 Cows Sample Size in ( )	Estimated Part 100 Cows Sample Size in ( )	Observed Calves / 100 Cows Sample Size	Cow Sample Size
5/21	3.2 (6)	5.3 (10)	4.7 (9)	188
5/20	7.3 (13)	9.5 (17)	12.3 (22)	179
5/19	4.3 (8)	5.4 (10)	8.0 (13)	184
5/18	4.0 (7)	6.2 (11)	5.6 (10)	177
5/17	1.8 (2)	6.4 (5)	2.7 (3)	110
5/16	1.5 (2)	5.3 (7)	2.2 (3)	133

TABLE 40. COMPARISON OF SUPERCUB AND CESSNA 180 FOR AERIAL MOOSE PARTURITION COUNTS

	5/18/65		5/19/65	
Hours Flown	Supercub	180	Supercub	180
Moose/Hour	103.8	91.76	95.5	86.4
Bulls	97	72	117	59
Cows W/0	171	134	175	138
Cows W/1	3	1	5	3
Cows W/2	3	0	4	2
Yearlings	63	0	60	0
Unid. Sex & Age	0	52	0	36
TOTAL	328	260	374	245

TABLE 41. MOOSE PARTURITION COUNTS, YAKUTAT, PROGRESSION AND COMPOSITION COUNT, 1965

Date	Adult ♂	♀ W/0	♀ W/1	♀ W/2	Total ♀	Total Calves	Total Yrgs.	Stat. Unkn.	Total All Animl.	Moose Per Hour
5/16	44	131	1	1	133	3	49	5	229	73.9
5/17	58	108	1	1	110	3	59	3	230	69.1
5/18	79	171	3	3	177	9	63	4	328	103.8
5/19	117	175	5	4	184	13	60	3	374	95.5
5/20	129	166	4	9	179	22	65	4	395	89.4
5/21	63	182	3	3	188	9	62	0	322	85.9
TOTALS	490	933	17	21	971	59	358	19	1,878	

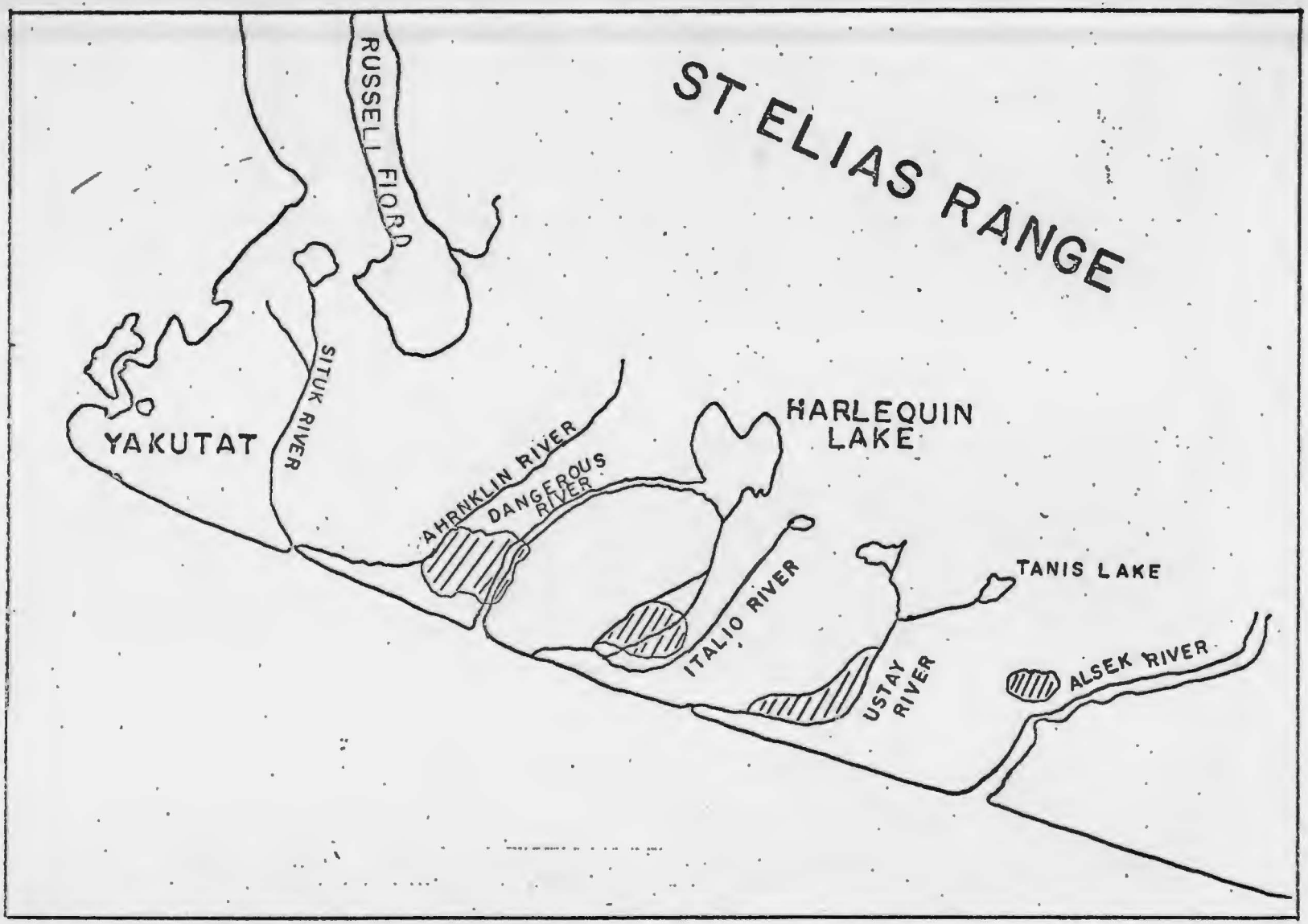

PLATE 8. YAKUTAT PARTURITION COUNT AREAS, 1965.

The project terminated before any data on survival of newborn calves could be obtained.

During the parturition counts a total of 971 cows and 356 yearlings were noted, giving a ratio of 36.6 yearlings per 100 cows. Survival of yearlings thus appears good.

Calving progression along with composition is seen in Table 43. Of 38 observed parturitions, 21 sets of twins were observed for a twinning ratio of 55.3 sets of twins per 100 parturitions. Although the sample is small, it agrees with *in utero* observations.

Considerable variation is noted when comparing counting results from the Supercub and the Cessna 180, (Table 40). When using the Supercub it was possible to obtain the sex and age of all animals observed; whereas with the "180", a total of 88 were classified as unknown. Sex and age ratios obtained from the two different aircraft show appreciable differences. For this reason, data obtained via the "180" were not entered into calculations for results presented.

Miscellaneous

Only about 10 percent of the sedge meadows showed traces of "greening up" upon commencing the counts on May 16. By May 23, when parturition was in full swing, about 50 percent of the sedge meadows showed signs of greenness.

Calf Tagging

The results of tagging operations in 1963, 1964, and 1965 are presented in Tables 42, 43, and 44. A total of 669 calves were tagged during the three operations: 161 in 1963; 248 in 1964; and 260 in 1965.

Tagging intensity was directed toward those populations presently experiencing considerable utilization, and to those populations such as the Jim-Swan Lakes herd that are near heavily exploited populations but that apparently do not intermingle. This factor, which suggests identifiable local populations, will be especially important as management gains in precision.

Tags returned from animals killed by hunters, accidents and natural causes provide known-age materials for developing age determination techniques and a record of movement and dispersal from the calving grounds. Recovery of tagged moose from 1960-1964 is shown in Table 47.

TABLE 42. 1963 TAGGING RESULTS BY AREA

	Area	Total Calves	Males	Females	Sets of Twins	One of Set	Color Marker
1.	Jim Swan Lakes	37	21	16	7	0	Yellow
2.	Palmer Hay Flats	37	17	20	4	0	Orange
3.	Goose Bay	7	6	1	0	0	White
4.	Willow-Kashwitna	44	22	22	4	3	Green
5.	So. Lake Nancy	3	1	2	1	0	Pink
6.	Susitna Flats	28	14	14	6	0	Red
	Chickaloon Flats	5	5	0	1	1	Pink
	TOTALS	161	86	75	23	4	

TABLE 43. 1964 TAGGING RESULTS BY AREA

	Area	Total Calves	Males	Females	Sets of Twins	One of Set	Color Marker
1.	Jim Swan Lakes	48*	23	23	6	0	Yellow
2.	Palmer Hay Flats	42	21	21	4	1	Orange
3.	Goose Bay	8	5	3	3	0	White
4.	Willow-Kashwitna	77	33	44	7	1	Green
5.	So. Lake Nancy	14	4	9	2	0	Pink
6.	Susitna Flats	54	29	25	14	2	Red
	Flat Horn Lake	5	4	1	1	0	Red
	TOTALS	248	119	126	37	4	

* When total does not agree with number of males and females tagged, difference is due to questionable sex.

TABLE 44. 1965 TAGGING RESULTS BY AREA

	Area	Total Calves	Males	Females	Sets of Twins	One of Set	Color Marker
1.	Jim Swan Lakes	59*	33	25	6	2	Various
2.	Palmer Hay Flats	50	30	20	10	0	S-White ** TW-Yellow
4.	Willow-Kashwitna	56	33	23	4	4	S-Red TW-White
6.	Susitna Flats	59	30	29	13	0	S-Green TW-Pink
7.	Kashwitna-Montana	4	2	2	1	0	S-Red TW-White
8.	Willow Flats	12	5	7	1	0	S-Red TW-White
	Deception Creek	19	7	12	3	0	S-Red TW- White
	Thunderbird Creek	1	1	0	0	0	Yellow

* When total does not agree with number of males and females tagged, difference is due to questionable sex.

** S= singleton; color listed is applied to singleton.
TW= twin; singleton color plus color listed are applied to twins

TABLE 45. MOOSE CALF TAG RECOVERIES, SOUTHCENTRAL ALASKA, 1960-1964

Year Recovered	Year Tagged					Totals
	1960	1961	1962	1963	1964	
1960	5	0	0	0	0	5
1961	12	0	0	0	0	12
1962	13	16	7	0	0	36
1963	2	1	8	3	0	14
1964	2	3	4	5	2	16
TOTALS	34	20	19	8	2	83

TABLE 46. TAGGED MOOSE CALVES RECOVERED IN 1964, SOUTHCENTRAL ALASKA

Tagging Data					Recovery Data		
Spec #	Tag Number	Date	Sex	Location	Date	Miles from Tag Site	Location
55-130	207-208	5/26/60	♀	Big Susitna	11/23/64	5	Mouth of Big Su.& Figure 8 Lk
159	752-753	6/1/61	♀	#32 Mouth of Sus. R.	11/30/64	18	Lewis R. Flats
9	1117-1116	5/28/62	♂	#11 Jim-Swan Lks.Flats	11/10/64	8	2 mi.up Knik R. from Friday Crk.on left side Knik
41	2037-2038	5/30/62	♂	#12 Jim-Swan Lks.Flats	9/27/64	3	Mouth of Friday Crk,Knik R.
120	2130-2131	6/5/62	♂	#5 Palmer Hay Flats	9/12/64	30	Above timberline,Lt.Willow Cr
100	2222-2223	5/29/63	♀	#103 Willow-Kashwitna Flats	11/24/64	4	500 yds. S. of Willow School, 200 yds. W. of road
58	574-575	5/28/61	♀	#25 Palmer Hay Flats	11/24/64	11	Fishhook Rd.,4 mi.from Little Susitna
115	2255-2256	5/29/63	♀	#44 Willow-Kashwitna Flats	3/23/64	6	Mi. 200 ARR (2 mi. S. of Caswell Ck. bridge)
7-208	2924-2925	6/4/64	♀	#4-62 Willow-Kashwitna Flats	11/30/64	6	1 mi. S. of Kashwitna R. along highway
10-85	279-280	5/26/60	♂	Goose Bay	3/27/64	36	Mi. 199 ARR
85	2142-2143	5/28/63	♂	#16 Palmer-Hay Flats	11/17/64	11	1-1/2 mi. S. of Palmer-Fishho Wasilla-Fishhook junction on the Palmer-Fishhook Road.
133	2294-2295	5/31/63	♂	#4 Goose Bay	11/28/64	7	Homestead Rd. near 7 Mi. Lake
95	2212-2213	5/28/63	♂	Palmer Hay Flats	11/29/64	16	3-1/2 mi. up Buffaloe Mine Road

TABLE 46. TAGGED MOOSE CALVES RECOVERED IN 1964, SOUTHCENTRAL ALASKA (Continued)

Tagging Data					Recovery Data		
Spec #	Tag #	Date	Sex	Location	Date	Miles from Tag Site	Location
17-190	3043-3044	6/3/64		Willow Flats	11/24/64	36	1 mi. up Buffaloe Mine Road
15(61)	482-483	5/26/61		Susitna Flats #32	11/24/64	5	2 mi. S.E. Figure 8 Lake
71(62)	2071-2072	6/4/62		Susitna Flats #1	11/24/64	7	2 1/2 mi. S.E. Figure 8 Lake
7-180	2883-2884	6/3/64		103 Willow-Kashwitna	3/29/65	4	3 mi. from Willow on Little Willow Road

TABLE 47. MOOSE PREGNANCY RATES, INCLUDING YEARLINGS AND CALVES, SOUTHCENTRAL ALASKA, 1964

Cementum Age	Not Preg.	Pregnant	Preg.W/1	Preg.W/2	At Least 1 Fetus	Can't Tell* If Preg.	%Preg.	Sample Size
Calf	19	0	0	0	0	0	0	19
1 (Yearling)	30?	8?	7	0	1	1	21.05	38
All Adults (Older than 1)!	10/15	162/223	125/179	32/36	5/8	2/3	94.18/93.69	172/238 !
Totals Including only Cement Age Known ♀								
Adults + Calves	29	162	125	32	5		84.81	191*
Adults + Yearlings	40	170	132	32	6		80.95	210*
Adults + Yearlings and calves	59	170	132	32	6		74.23	229*
Totals Including Cementage Known and Unknown ♀								
Adults + Calves	34	223	179	36	8		86.77	257*
Adults + Yearlings	45	231	186	36	9		83.69	276*
Adults + Calves and Yearlings	64	231	186	36	9		78.30	295*

! Numerators include only animals for which age has been determined. Denominators include numerators plus animals for which a specific age could not be determined.

RATIO TWINS TO SINGLES (Age Known) w/0 yearlings = 32/157 = 20.38%

RATIO TWINS TO SINGLES (Age Known) w/yearlings = 32/164 = 19.51%

Movements

Movements as measured by recovered tagged animals suggest that calves may wander a considerable distance from their natal grounds. These data are difficult to interpret, as hunters, the primary source of recovered tags, tend to hunt only those areas having easy access, whereas the calves were tagged in quite inaccessible areas. Furthermore, the bulk of the tag return represents only the hunting seasons, August 20 - September 30, and November 1 - November 30 during most years.

Confirmation of replicate use of calving areas by adults in successive years was obtained by color marking calves and observing these animals on the same general area the following year. As yearlings, the marked calves evidently returned to the calving area with their mothers.

Pregnancy Rates

Pregnancy rates by area and age class are presented in Tables 48-62. Pregnancy determinations based on in utero examinations of cows taken before November 1 are difficult to make and tend to underestimate the true rate of pregnancy. Therefore, only those areas where substantial collections of uterii and ovaries were made after November 1 are listed.

The 1964 pregnancy rates of female moose older than class 1 (yearlings 12 to 24 months old) on the important Kenai Peninsula (92%) and Matanuska Valley-Lower Susitna Valley (95%) areas are very similar. The ratio of twin fetuses to singletons appears quite variable, with the Matanuska Valley apparently producing few twins. Cross-checking with the fall counts, which are available for the Matanuska Valley only in 1965, suggests that the in utero sample for the Matanuska Valley was non-representative, or survival of twins was unusually good, as the twin-singleton ratios for the two periods are nearly equal.

The reverse situation is found on the Homer-Cohoe unit, where twins in utero were common; here few twin calves survived to December of 1965. Low survival of twins seems typical of "old" ranges with dense populations of animals.

TABLE 48. MOOSE PREGNANCY RATES OF ADULTS BY YEAR OF AGE, SOUTHCENTRAL ALASKA, 1964

Cementum Age	Not Preg.	Preg.	Preg. W/1	Preg. W/2	At Least One Fetus	Can't Tell If Preg.	% Preg.	Sample Size
2	3	28	26	1	1	0	90.32	31
3	1?	28?	21	6	1	1	96.55	29
4	2	31	22	9	0	0	93.93	33
5	1	24	18	6	0	0	96.00	25
6	0	10	7	2	1	0	100.00	10
7	0	11	11	0	0	0	100.00	11
8	1	9	6	3	0	0	90.00	10
9	0	5	3	2	0	0	100.00	5
10	0	5	3	0	2	0	100.00	5
11	1	2	1	1	0	0	66.66	3
12	0	9	7	2	0	0	100.00	9
13	0?	0?	0	0	0	1	--	0
14	1	0	0	0	0	0	0	1
15	0	0	0	0	0	0	--	0
16	0	0	0	0	0	0	--	0
17	0	0	0	0	0	0	--	0
18	0	0	0	0	0	0	--	0
19	0	0	0	0	0	0	--	0
Unknown	5	61?	54	4	3	1	92.42	66
TOTALS (1)	10*	162	125	32	5	2*	94.18	172
(2)	15	223	179	36	8	3	93.69	238

(1) Total excluding age unknown group

(2) Total including age unknown group

* Not used in compilation

TABLE 49. MOOSE PREGNANCY RATES, MATANUSKA VALLEY, NOVEMBER 24, 1964

Cementum Age Class	Not Preg.	Preg.	No. Fetuses 1	2	At Least 1 Fetus	% Preg.	Incidence of Twins/100 Singletor
1	8	4	4	0	0	33	0
2	1	6	6	0	0	86	0
3	0	9	7	2	0	100	22
4	1	12	11	1	0	92	8
5	1	6	5	1	0	86	17
6	0	1	1	0	0	100	0
7	0	4	4	0	0	100	0
8	0	1	1	0	0	100	0
9	0	1	1	0	0	100	0
10	0	2	2	0	0	100	0
11				0	0		0
12	0	2	2	0	0	100	0
Unk	1	22	20	0	2	96	0
Totals	12	70	64	4	2	85	6
Totals Excluding Age 1	4	66	60	4	2	94	6

TABLE 50. MOOSE PREGNANCY RATES, WILLOW-TALKEETNA AREA NOV. 23-30, 1964

Cementum Age Class	Not Preg.	Preg.	No. Fetuses 1	2	At Least 1 Fetus	% Preg.	Incidence of Twins/100 Singletons
1	5	1	1	0		17	
2	1	3	3	0		75	
3	0	1	1	0		100	
4	0	1	1	0		100	
5	0	3	2	1		100	
6	0	1	1	0		100	
7	0	2	2	0		100	
8	0	1		1		100	
9	0						
10	0	1			1	100	
11	0	1		1		100	
Unk.	0	12	11	1	1	100	
Total	6	27	21	4	2	82	16
Total Excluding Age Class 1	1	26	20	4	2	96	17

TABLE 51. MOOSE PREGNANCY RATES, COHOE RD.--KENAI RIVER, NOV. 23-27, 1964

Cementum Age Class	Not Preg.	Preg.	No. Fetuses 1	No. Fetuses 2	At least 1 Fetus	% Preg.	Incidence of Twins / 100 Singletons
1	4	0	0	0			
2	1	1	1	0			
3	0	0	0	0			
4	1	2	1	1			
5	0	2	1	1			
6	0	2	0	1	1		
7	0	1	1	0			
8	0	0	0	0			
9	0	1	1	0			
10	0	0	0	0			
11	0	1	1	0			
Unk.	1	5	4	1			
TOTALS	7	15	10	4	1	68	29
Totals Excluding Age Class 1	3	15	10	4	1	83	29

TABLE 52. MOOSE PREGNANCY RATES, HOMER-COHOE RD., NOV. 23-27, 1964

Cementum Age Class	Not Preg.	Preg.	No. Fetuses 1	No. Fetuses 2	At Least 1 Fetus	% Preg.	Incidence of Twins / 100 Singletons
1	13	2	2	0	0	15	0
2	0	11	9	1	1	100	10
3	0	15	11	3	1	100	21
4	0	12	7	5		100	41
5	0	9	7	2		100	22
6	0	3	2	1		100	33
7	0	4	4	0		100	0
8	0	3	1	2		100	66
9	0	1	0	1		100	100
10	0						
11	0						
12	0	2	0	2		100	100
13							
14	1	0	0	0		0	
Unk.*	3	15	14	1		83	7
TOTALS	17	77	57	18	2	82	24
Totals Excluding Age Class 1	4	75	55	18	2	95	25

*Unk. age may include some yearlings although I attempted to separate uterii from yearlings on the basis of morphological characteristics.

TABLE 53. MOOSE PREGNANCY RATES, KENAI RIVER-KENAI LAKE, NOV. 23-27, 1964

Cementum Age Class	Not Preg.	Preg.	No Fetuses 1	No Fetuses 2	At Least 1 Fetus	% Preg.	Twins / 100 Singletons
1	4	1	1	0			
2	1	7	7	0			
3	1	4	3	1			
4	0	4	2	2			
5	0	4	3	1			
6	0	3	3	0			
7	0	0					
8	1	4	4	0			
9	0	2	1	1			
10	1	2	1	0	1		
11	1	0					
12	0	5	5				
Unk.	0	7	6	1			
TOTALS	9	43	36	6	1	83	14
Totals Excluding Age Class 1	5	42	35	6	1	89	15

TABLE 54. MOOSE PREGNANCY RATES, DENALI-PAXSON, SEPT. 24-30, 1964

Cementum Age	Not Preg.	Preg.	No. Fetuses 1	No. Fetuses 2	Can't Tell If Preg.
Calf	2	0	0	0	0
1	2	0	0	0	1
2	3	1	1	0	
3	1	0	0	0	
4	4	1	1	0	
5	3?	2?	2	0	2
6	1	1	1	0	
7	0	0?	0	0	1
8	0	0	0	0	
9	0	0	0	0	
10	1	0	0	0	
11	1	2	2	0	
12	4	0	0	0	
.					
.					
19	1	0	0	0	
Unknown	4	3	3	0	1
TOTALS	27	10	10	0	5
Totals Less Calves Yearlings and unknown	19	7	7	0	4
Totals W/Yearlings Less Unknown and Calves	21	7	7	0	4
Totals W/Unknown Less Yearling and Calves	23	10	10	0	4

TABLE 54. MOOSE PREGNANCY RATES, DENALI-PAXSON, SEPT. 24-30, 1964 (Cont'd)

Cementum Age	Not Preg.	Preg.	No. Fetuses 1	No. Fetuses 2	Can't Tell If Preg.
% PREGNANT					
W/O Calves, Yearling, Unknown		7/23 = 30.4			
W/Yearling, W/O Unknown and Calves		7/2 = 33.3			
W/Yearling and Unknown, W/O Calves		10/25 = 40.0			

TABLE 55. MOOSE PREGNANCY RATES, TANANA FLATS, 1963

Cementum Age	Not Preg.	Preg.	W/1	Preg. W/2	At Least 1 Fetus
C	1				
1	1				
2	2	2	1	1	
3		1	1		
4	1	4	4		
5		3		3	
6		1		1	
7	1	1	1		
8	1	2			2
.					
.					
13		1	1		
Unknown		4*	2	2*	
TOTALS	7	17	10	5	2

*L.M., M-01 Squirrel River 3/25/64, Excluded from totals and calculations.

% PREGNANT	
Excluding Calves	35.3
Excluding Calves and Yearlings	29.4
Excluding Calves, Yearlings & Unknown	38.4
Incidence of Twins/ 100 ♀ w/Calf	33.3

TABLE 56. MOOSE PREGNANCY RATES, INTERIOR ALASKA (EXCLUDING DENALI HWY. COUNTRY), 1963

Cementum Age	Not Preg.	Total Preg.	W/1	W/2	Can't Tell If Preg.	At Least 1 Fetus
C	1	0	0	0		
1	2	0	0	0	1	
2	2	2	1	1	1	
3	0	1	1	0		
4	1	4	4	0		
5	0	4	1	3		
6	0	2	0	1		1
7	1	1	1	0		
8	1	2	0	0		2
.						
.						
13	0	1	1	0		
Unknown	1*	6	4	2		
TOTALS	9	23	13	7	2	3

* Age Class IX

TOTALS

W/O Calves, and Unknown Yearlings	5	17	9	5	2	3
W/Yearlings W/O Calves, Unknown	7	17	9	5	2	3
W/Unknown, Yearlings, W/O Calves	8	23	13	7	2	3

TABLE 56. MOOSE PREGNANCY RATES, INTERIOR ALASKA (EXCLUDING DENALI HWY. COUNTRY), 1963 (CONTINUED)

PERCENT PREGNANT

W/0 Calves, Yearlings or Unknown	=	17/22 = 77.27
W/Yearlings, W/0 Calves, Unknown	=	17/24 = 70.8
W/Unknown and Yearlings, W/0 Calves	=	23/31 = 74.19

RATIO TWINS TO SINGLES

W/0 Calves, Yearlings or Unknown	=	5/14 = 35.71%
W/Yearlings,W/0 Calves, Unknown	=	5/14 = 35.71
W/Unknown and Yearlings W/0 Calves	=	7/20 = 35.00

TABLE 57. MOOSE PREGNANCY RATES, TANANA FLATS, SEPT. 26 - NOV. 15,1964

Cementum Age	Not Preg.	Preg.	No. Fetuses 1	No. Fetuses 2	Can't Tell If Preg.
2	0?	0?	0	0	1
3	0	1	1	0	
4	0	1	1	0	
.					
7	0	1	1	0	
Unknown	1	2	1	1	

% PREGNANT

W/O Yearlings or Unknown 3/3 = 100

W/Unknown 5/6 = 83.33

RATIO TWINS TO SINGLES

No Twins In Age Known

W/Unknown = 1/5 - 20%

TABLE 58. MOOSE PREGNANCY RATES, TOK, OCT. 1 - 7, 1964

Cementum Age	Not Preg.	Preg.	Preg. W/1	Preg. W/2
C	1	0	0	0
2	1	0	0	0
3	0	1	1	0
8	0	1	1	0
Unknown	2	3	3	0
TOTALS	4	5	5	0

% PREGNANT

W/0 Calves, Yearlings, Unknown = 2/3 = 66%

W/Unknown, W/0 Calves = 5/8 = 62.5

TABLE 59. MOOSE PREGNANCY RATES, DELTA AREA, OCT. 1 - 7, 1964

Cementum Age	Not Preg.	Preg.	Preg. W/1	Preg. W/2	At Least 1 Fetus	Can't Tell If Preg.
C	2	0	0	0		
1	4	0	0	0		
2	0	0	0	0		
3	0	1	1	0		
4	0	2	2	0		
5	0	1	1	0		
6	0	0	0	0		
7	0	0	0	0		
8	0?	2?	2	0		2
9	0	1	1	0		
10	0	3	2	0	1	
11	0	1	1	0		
12	2	0	0	0		
13	1	0	0	0		
14	1	0	0	0		
15	0	2	2	0		
Unknown	2	5	5	0		
TOTALS	12	18	17	0	1	2
W/0 Calf, Yrg, Unknown	4?	13				
W/Yrgs., W/0 Calves, Unknown	8?	13?	12	0	1	
W/Unknown, and Yrg, W/0 Calves	10?	18?	17	0	1	

TABLE 59. MOOSE PREGNANCY RATES, DELTA AREA, OCT 1-7, 1964 (CONT'D)

		% PREGNANT
W/0 Calves, Yrgs, Unknown	13/17	= 76.47%
W/Yrgs., W/0 Calves, Unknown	13/21	= 61.90
W/Unknown and Yrg., W/0 Calves	18/28	= 64.28

TABLE 60. MOOSE PREGNANCY RATES, YAKUTAT, SEPT.-Nov., 1964

Cementum Age	Not Preg.	Preg.	1 Fetus	2 Fetuses	At Least 1 Fetus
1	0	1	1		
2	1 (9,18,64)	2	0	2	
3	0	3	1	1	1
4	0	1	1		
5					
6					
7	1 (9,24,64)				
8	0	1		1	
TOTALS	1	8	3	4	1
Totals Excluding Age 1	1	7	2	4	1

% PREGNANT	All Ages	Excluding Age 1
	89	86
Incidence of Twins/WO	57	67

TABLE 61. REPRODUCTIVE STATUS OF UNKNOWN AGE MOOSE FROM ANCHORAGE OFFICE, SEPTEMBER 1963

Date	Not Pregnant	Preg. W/1	Preg. W/2	Can't Tell If Pregnant
MATANUSKA VALLEY				
9/24	4	1		
9/25	1			
9/28	1	2		
9/29	1	2		
TOTALS	7	5	0	0
DENALI HIGHWAY				
9/24	3	1		1
9/25	2	1		
9/27		1		
9/28	1			
9/29			1	
9/30	2			
TOTALS	8	3	1	1

TABLE 62. MISCELLANEOUS MOOSE PREGNANCY OBSERVATIONS, 1963.

Cementum Age	Not Pregnant	Pregnant W/1	Pregnant W/2	At Least One Fetus	Can't Tell if Pregnant
DENALI					
1	1	1*			
3			1		
4		1			
8	1	1			
DELTA					
1	1				
2					1
-					
-					
5		1			
6				1	
Unknown	1**	2			
TOK					
1					1

* Fo215M notes in book - fetus and reproductive tracts not saved.

**Age Class IX

Mortality

Hunter Harvest

Starting in 1963, each moose hunter was required to obtain a non-revenue moose harvest ticket. The portion of the ticket returned (see thermofax of harvest ticket in appendix), indicated whether the holder hunted, if so, was he successful or unsuccessful, and if successful the location, date, and sex of the moose taken. The analyses of the 1963 and 1964 moose harvest ticket program are presented in Tables 65-72.

Hunters who do not voluntarily return harvest tickets are sent two reminder letters. Hunters fail to return tickets voluntarily for a variety of reasons. Nearly 20 percent of those who obtain tickets do not hunt and in excess of 40 percent of those who hunt, hunt unsuccessfully. Apparently these two categories of hunters fail to appreciate the need for their harvest tickets since a large proportion of the late returns is from these categories. An additional segment of Alaska's population is made up of transients, and about 3 percent of the ticket holders cannot be located.

In 1963 and 1964, 92.7 percent of the tickets were returned after two reminder letters had been sent to the delinquent permitees. I believe the data on total harvest, chronology of harvest, and location of kill is accurate and represents an unusual degree of cooperation from the public. Even though the ticket return provision was mandatory, in practice few hunters were cited into court for failing to comply with the regulation.

Moose Harvest, Southeast Alaska, 1964

Returns were received from 96 percent of the moose harvest tickets issued in southeast Alaska. Results from the various herd units in the Panhandle are seen in Table 70.

Hunter harvest shows a 14 percent decrease for the Yakutat area in comparison with 1963. A total of 302 moose were taken in Yakutat during the 1963 hunt.

The bull take in Game Management Units 1 through 4 remained constant in comparison with 1963. A cow harvest in the Haines area increased the overall take in Units 1 through 4 by 40 percent.

Best hunter success was in Yakutat where 65 percent of the hunters were successful. Good results were also obtained in the Haines area where 54 percent of the hunters were successful. Hunter success for all southeastern herd units is seen in Table 71.

Chronology

The chronology of the harvest in units that contribute most of the kill is presented in Table 72. Disregarding the antlerless harvests which generally were limited to a week or less at the end of September or November, it is apparent that the opening weekend is important but that there is considerable

Table 63. 1963 statewide moose harvest ticket distribution and return*

			Percent
Harvest tickets issued to hunters		32,412	
Harvest tickets returned		30,563	94.2
Tickets outstanding		1,849	5.8
Analysis of returned tickets			
Total reported moose harvest		8,860	
Male moose	6,847		71.1
Antlerless moose	1,981		28.9
Sex not reported	32		
Total moose harvest		8,860	
**Unsuccessful hunters		16,287	60.3
Obtained ticket did not hunt		5,415	21.9
Did not return ticket		1,849	5.1

*Extracted from final IBM tabulation

**Computed after eliminating the 5415 permittees who did not hunt

Table 64. Comparison of 1963 and 1964 harvest by Game Management Unit.

Unit	1963* ♂	♀	?sex	Total	1964** ♂	♀	?sex	Total
1	149	1		150	158	65		223
2	2			2				
3	4			4				
4	1	2		3				
5	189	111	2	302	154	111		265
6	15	2		17	15			15
7	251	174	2	427	163	206		369
8				0				
9	179	46	2	227	185	64		249
10	1			1				
11	86	37		123	89	38		127
12	138	22	1	161	145	16		161
13	1385	343	7	1735	1213	394		1607
14	925	557	4	1486	795	525		1320
15	1021	417	2	1440	1212	858		2070
16	344	27	2	373	262	61		323
17	61			61	31	1		32
18	75	3		78	39			39
19	144	24		168	96	33		129
20	1324	131	2	1457	1034	242		1276
21	168	72	7	247	137	49		186
22	68	1		69	57			57
23	76	1		77	73			73
24	92	4		96	84	18		102
25	77	2		79	55	2		57
26	13			13	13			13
Unknown Unit	59	4	1	64	6	1	70	77
TOTALS	6847	1981	32	8860	6016	2684	70	8770

* Extracted from final IBM tabulation

** Obtained from statewide compilation of harvest ticket returns

Table 65. 1964 statewide moose harvest ticket distribution and return*

Harvest tickets issued to hunters		29,904	
Harvest tickets returned		27,731	(92.7)
Tickets outstanding		2,173	(7.3)

Analysis of returned tickets

Total reported moose harvest		8,770	(31.8)
Male moose	5,997		
2nd male moose	19		
Total male moose	6,016		
Antlerless moose	2,676		
2nd antlerless moose	8		
Total " "	2,684		
Sex not reported	70		
Total moose harvest		8,770	
Unsuccessful hunters		12,365	(45.0)
Obtained ticket, did not hunt		6,380	(23.2)
Did not return ticket			
Contacted by letter but failed to comply	1,382		
Unable to locate ticket holder	791		
Total		2,173	

* Obtained from statewide compilation of April 15, 1965

Table 66. 1964 moose harvest compilation, Southeast region*

Total overlays issued	1,771
Total tickets returned	1,696
Total moose reported	595

Total moose harvest

Male moose	394	
Female moose	199	
Sex unknown	2	
TOTAL	595	

Total unsuccessful hunters	808
Obtained tickets, did not hunt	290
No information	3
Tickets outstanding	75

Undeliverable	24	
Contacted, failed to reply	51	
TOTAL	75	

* Obtained from statewide compilation of April 15, 1965

Table 67. 1964 moose harvest compilation, Southcentral Region *

Total overlays issued		18,360
Total overlays returned		17,244
Total moose reported		5,903
Total moose harvest		
Male moose	3,832	
2nd male moose	1	
Total male	3,833	
Female moose	2,070	
TOTAL	5,903	
Total unsuccessful hunters		6,924
Obtained ticket, did not hunt		4,107
No information		0
Tickets outstanding		1,426
Undeliverable	459	
Contacted, failed to reply	967	
TOTAL	1,426	

* Obtained from statewide compilation of April 15, 1965

Table 68. 1964 moose harvest compilation, Interior-Arctic Region

Total overlays issued	9,773
Total tickets returned	9,101
Total moose reported	2,272

Total moose harvest

Male moose	1,770	
2nd male	19	
Total male	1,789	
Female moose	407	
2nd female	8	
Total female	415	
Unknown sex	68	
TOTAL	2,272	

Total unsuccessful hunters		4,633
Obtained ticket, did not hunt		1,989
No information		207
Tickets outstanding		672
Undeliverable	306	
Contacted, failed to reply	366	
TOTAL	672	

Table 69. Summary of 1964 harvest by subdivision of those Game Management Units involving the intensively utilized populations.

UNIT	SUBUNIT	1964 ♂	♀	Total Moose
1	Haines	79	65	144
	Stikine	35	0	35
	Taku	35	0	35
	Berners Bay	6	0	6
	Other	3	0	3
	Total	158	65	223
7	18	36	32	68
	19	75	142	217
	20	37	28	65
	22	10	2	12
	Other	5	2	7
	Total	163	206	369
15	15	513	267	780
	16	224	253	477
	17	468	337	805
	Other	7	1	8
	Total	1212	858	2070
13	8	159	93	252
	9	131	28	159
	10	89	34	123
	11	110	75	185
	12	129	45	174
	13	562	111	673
	Other	33	8	41
	Total	1213	394	1607
14	3	37	16	53
	4	176	139	315
	5	62	37	99
	6	98	55	153
	7	47	12	59
	14	153	156	309
	23	88	34	122
	Other	134	76	210
	Total	795	525	1320

Table 69. Continued

UNIT	SUBUNIT	1964 ♂	♀	Total Moose
20	20-A	137	46	183
	20-B	219	3*	222
	20-C	626	182	808
	20	52	11	63
	Total	1034	242	1276

* Illegal Kill

TABLE 70. RESULTS OF RETURNED HARVEST TICKETS, SOUTHEAST ALASKA, 1964.

Herd Unit	Unsuccessful	Successful Bull Kill	Successful Cow Kill	Sex Unknown Kill	Total Kill
Yakutat	144	153	111	---	264
Haines	126	79	65	2	146
Berner's Bay	11	6	---	---	6
Taku River	66	35	---	---	35
Stikine-Thomas Bay	146	35	---	---	35
Unuk River	2	2	---	---	2
TOTALS	495	310	176	2	488

TABLE 71. HUNTER SUCCESS, SOUTHEAST ALASKA, 1964

Herd Unit	Number Hunters	Total Kill	Percent Hunter Success
Yakutat	408	264	65
Haines	272	146	54
Berner's Bay	17	6	35
Taku	101	35	35
Stikine	181	35	19
Unuk	4	2	50
TOTALS	983	488	50

Table 72. Chronology of the 1964 harvest involving the intensively utilized populations.

Unit	Subunit	August ♂ 20/30	September ♂ 1/7	September ♂ 8/15	September ♂ 16/23	September ♂ 24/30	September ♀ 24/30	October ♀ 1/7	October ♀ 7/31	November ♂ 1/7	November ♂ 8/15	November ♂ 16/23	November ♂ 24/30	November ♀ 24/30	No Date
7															
	18	10	2			4				5	6	2	4	33	
	19	15	3	1	1	4				5	2	15	28	138	
	20	9	1	2	3	3					2	6	9	27	
	22	2								1		1	2	2	
	Other	—	4	2	2	1	—	—	—	—	—	—	—	—	
	Total	36	10	5	6	12				11	10	24	43	200	
13															
	8	27	10	14	29	33	93			3	6	14	20		
	9	20	0	18	32	24	28			1	12	4	8		
	10	17	11	5	19	22	32			2	3	0	4		
	11	15	8	17	25	32	73			1	3	5	1		
	12	26	11	16	27	31	46			0	0	5	2		
	13	104	108	81	99	96	111			18	8	18	28		155
	Total	209	148	151	231	238	383			25	32	46	63		155
14															
	3	0	0	0	0	0				2	2	12	21	16	
	4	3	1	0	0	1				21	21	43	138	76	
	5	0	2	0	0	0				15	19	7	19	37	
	6	8	3	4	4	2				8	15	21	21	52	
	7	1	4	1	0	1				6	6	10	10	11	
	14	23	9	1	9	2				8	9	42	79	106	
	23	14	3	1	6	5				2	6	17	30	33	
	24	26	3	7	3	2				8	16	16	28	65	
	Other	3	7	5	3	0				—	—	—	—	—	0
	Total	78	32	19	25	13				70	94	168	346	396	0

Table 72. (Continued)

Unit	Subunit	August ♂ 20/30	September ♂ 1/7	September ♂ 8/15	September ♂ 16/23	September ♂ 24/30	September ♀ 24/30	October ♀ 1/7	October ♀ 7/31	November ♂ 1/7	November ♂ 8/15	November ♂ 16/23	November ♂ 24/30	November ♀ 24/30	No Date
15															
	15	78	58	36	42	55				34	29	161	16	267	
	16	18	9	3	15	20				13	16	112	7	253	
	17	32	13	13	29	23				11	57	183	10	337	
	Other	1	0	0	0	0				0	0	0	0	0	21
	Total	129	80	52	86	98				58	102	544	33	857	21
20															
	A	29	19	14	19	23	26		20	7	9	10	7		
	B	54	22	32	32	32	0			1	5	5	13		12
	C	112	62	73	140	122	0	182		16	10	19	19		
	Other	16	8	4	11	6	7	4		0	2	5	0		57
	Total	211	111	123	202	183	33	186	20	24	26	39	39		69

variation in the chronology of kill from area to area.

In Interior Alaska, Unit 20, the first, fourth and fifth periods provide the bulk of the harvest. The November season in most years adds little to the harvest primarily because of severe temperatures during November and closing of many secondary roads. The last two weeks in September coincide with leaf-fall and the portion of the breeding season when moose are actually seeking partners - a period when males seem to be less weary.

In Units 14 and 15 in Southcentral Alaska the pattern of harvest is reversed. The major harvest of males took place in November following a heavy snowfall which may have forced moose from the inaccessible alpine areas to the foothills accessible by road.

Following the chronology of the harvest for a number of years may yield important inferences for managing these herds. For example, the harvest from Kenai Peninsula during August and September suggests that the valley floor population of males, if separate valley and alpine populations exist, may be harvested to near extinction. A check of the age of the males harvested in the valley areas during August and September would clarify this point.

Age Composition

The development of techniques for determining the age of moose on the basis of cementum layers in the incisors provides opportunity to examine the age composition of the harvest. The cementum technique has been modified by our staff to the extent that some 15 to 20 teeth per hour can be ground and read. Now it is possible to handle the entire sample of moose teeth obtained from the harvested animals. Figure 9 shows the results of the 1964 collections. The figures are self explanatory. A few populations show significant effects of years of male-only seasons; the harvest consists primarily of yearling males. The age composition of the female population segment provides a rather dramatic contrast. These data should be very useful to management as hunting pressure increases on the accessible moose populations.

Other Mortality:

Moose die and are killed as a result of contact with natural pathogens and environmental fluctuations and as the result of human activities. Those animals dying in areas accessible to man have been salvaged and autopsied to determine the cause of death or to determine if a physical debility may have been a contributing factor to its demise. Unfortunately, most moose facing severe food shortages as the result of unusual accumulations of snow or over population seek the cover of dense timber and relatively few of those that succumb are found. Nevertheless, a considerable number of animals dying from a variety of causes have been autopsied since 1960 and much of the information has not found its way into segment reports. The following tables present data by cause of death by sex in chronological sequence, external morphological characteristics, weights, and age composition of those animals autopsied.

FIGURE 9

AGE COMPOSITION OF MOOSE HARVESTED FALL 1964
(AGE DETERMINATION BASED ON CEMENTUM DEPOSITION)

c ia

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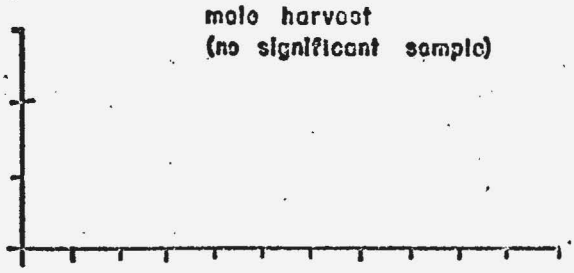
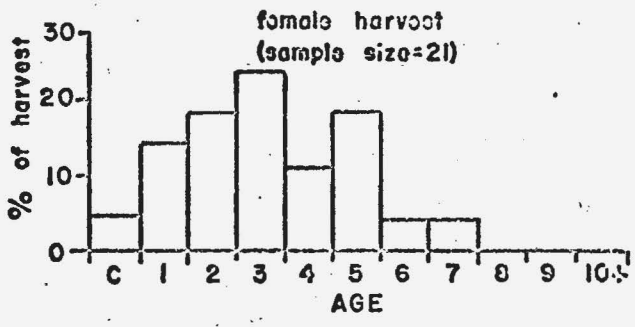
H NES





UNIT 6
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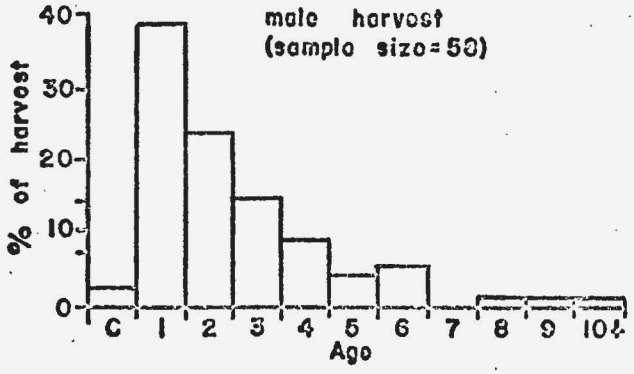
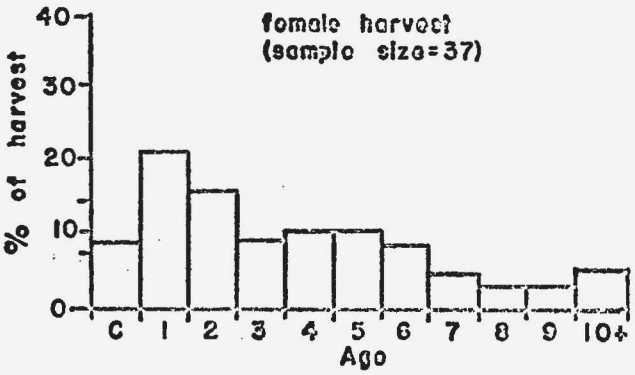
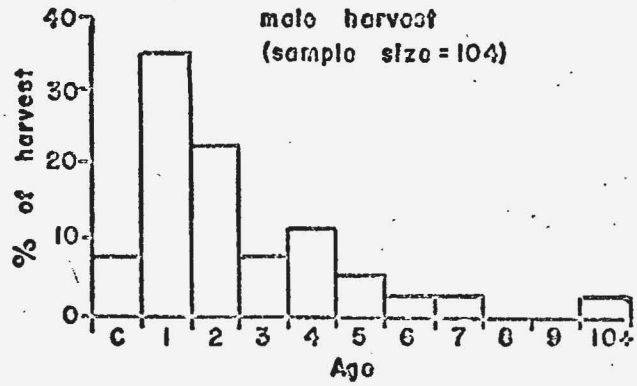
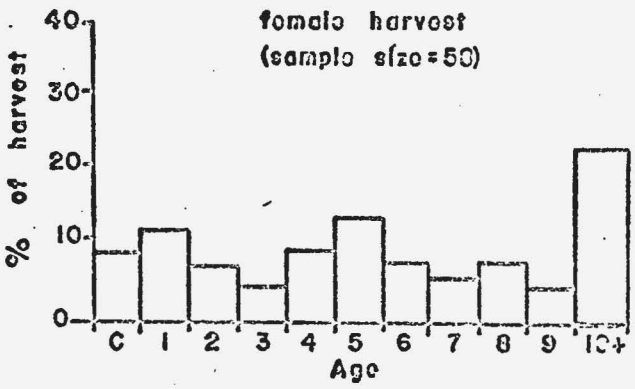




UNIT 13
D NALI HWY &
P KSON AREA





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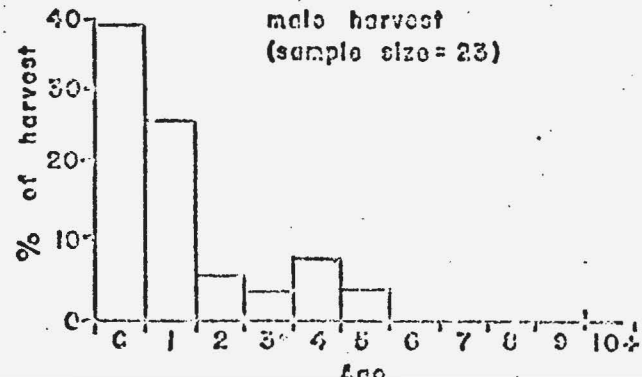


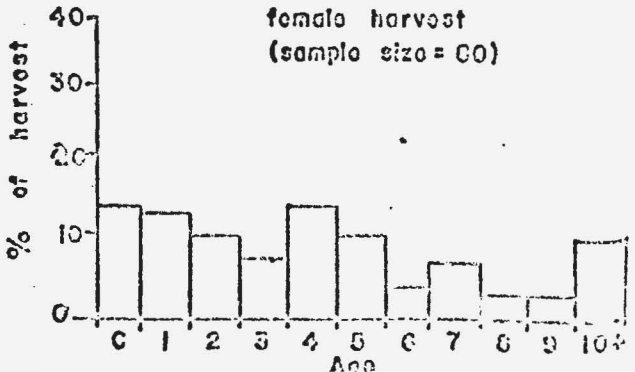
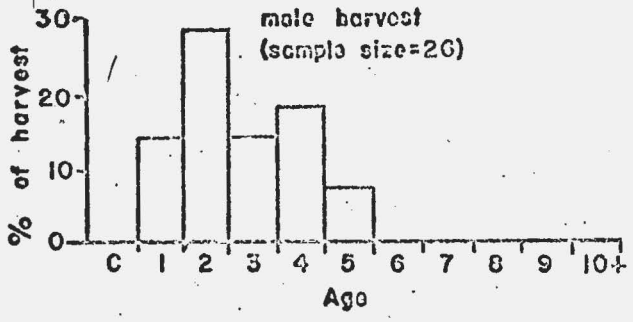
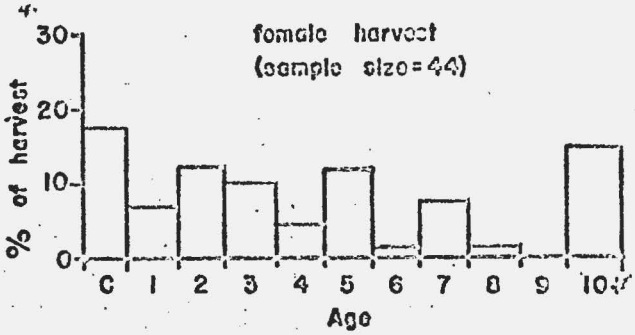


FIGURE 9: AGE COMPOSITION OF MOOSE HARVESTED FALL 198[illegible] CONTINUED

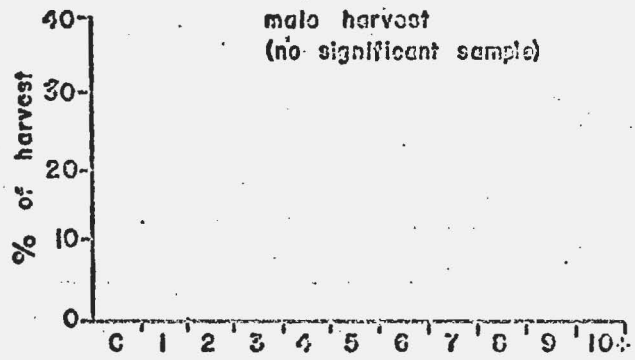
area

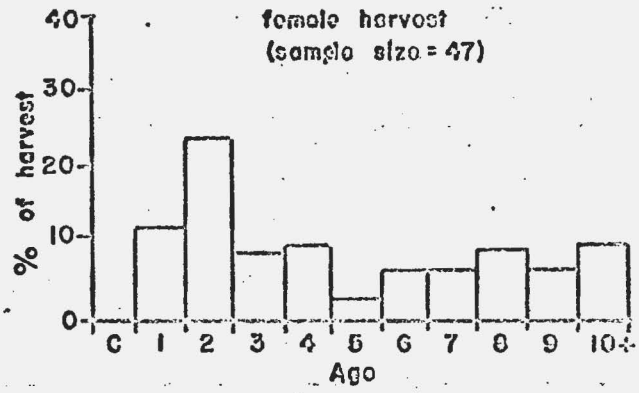
UNIT 14
V"LLOW



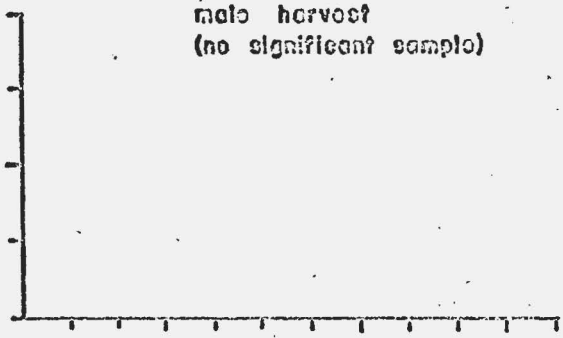


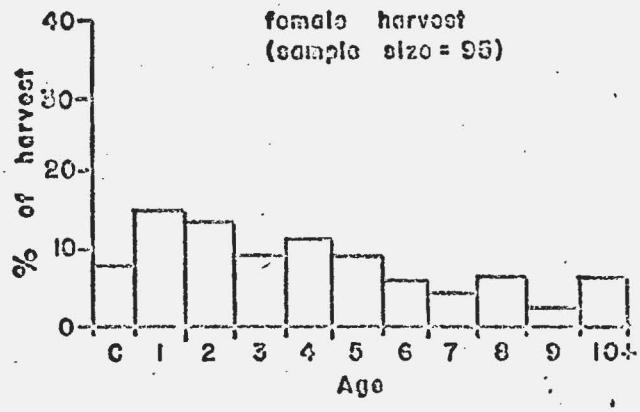
L IT 7
KENAI LAKE
CHECK STATION



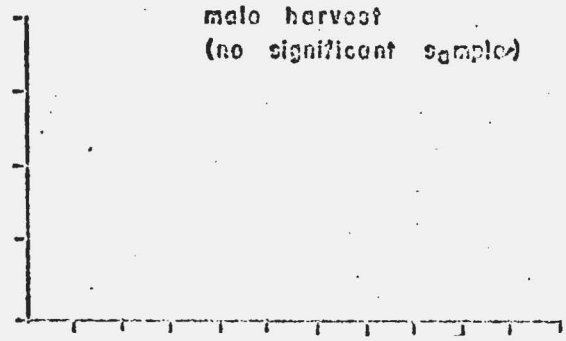


IT 15
SOLDOTNA





IT 15
HOMER



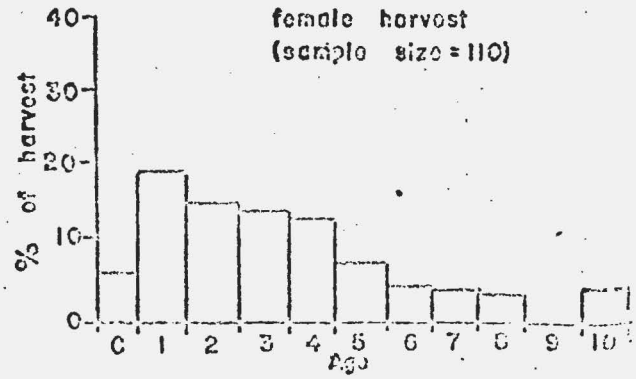
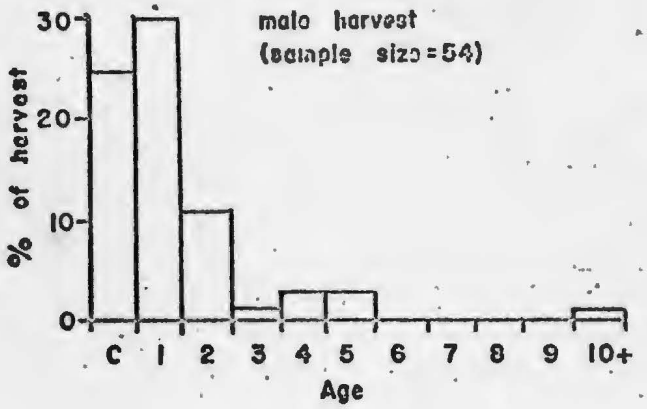
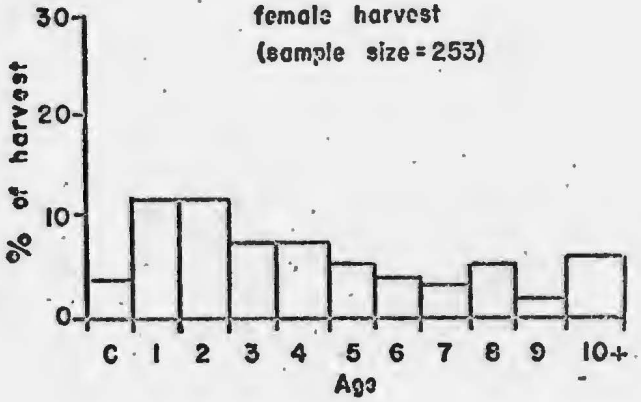


FIGURE 9. AGE COMPOSITION OF MOOSE HARVESTED FALL 1964, CONTINUED

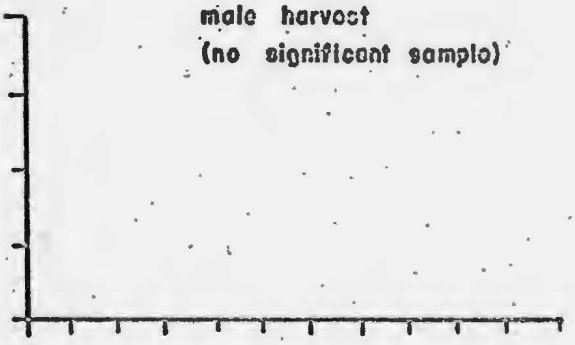
area

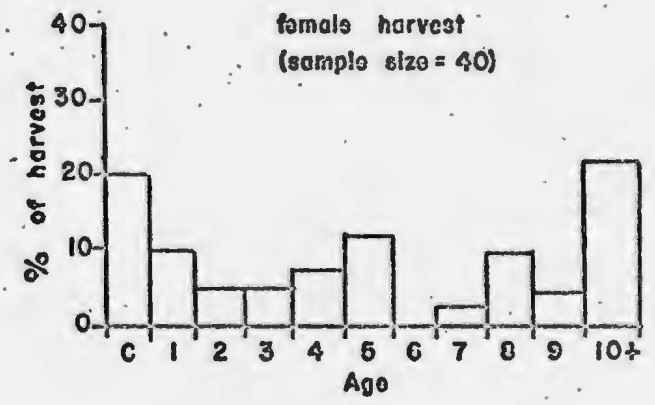
UNIT 15 AND 7 COMPOSITE OF KENAI LAKE, SOLDOTNA AND HOMER



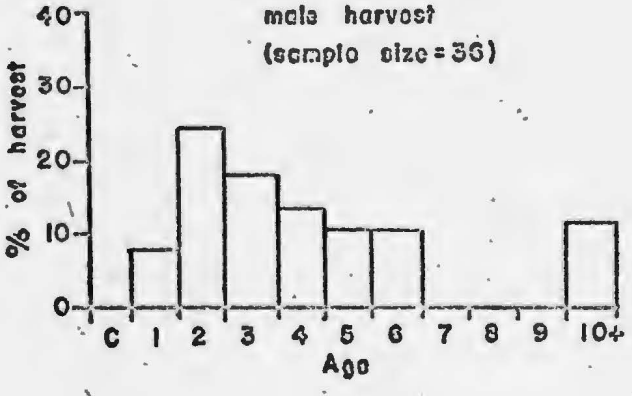


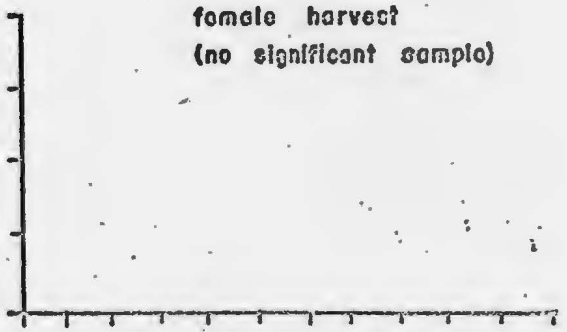
UNIT 20 DELTA





UNIT 20 TEESE AND ELLIOTT HWY





There are a number of additional analyses to be completed in order to determine if the accidentally killed animals are representative of the population as measured by hunter killed animals. The material of weights and measurements will be particularly relevant as similar material becomes available from ranges of differing quality and latitude.

SUBMITTED BY:

R. A. Rausch
Study Leader

APPROVED BY:

Don H. Strode
Federal Aid Coordinator

James W. Brooks, Director
Division of Game

TABLE 73 HIGHWAY, RAIL AND MISCELLANEOUS KILLED MOOSE, ANCHORAGE AREA, 1959 - JUNE 30, 1965 (NO WEIGHTS AND MEASUREMENTS AVAILABLE)*

ACCESSION #	DATE	AREA	SEX	CAUSE OF DEATH**	COMPARATIVE WEAR AGE CLASS
0051	1959	Ft. Richardson	♀	2	IV
0052	1959	Tudor Road	♀	2	I
0053	1959	" "	♀	2	C
0058	1960	Yucca Club	♀	2	C
0059	1960	Sheep Mtn.	♀	3	V
0065	1960	Mi 53, Glenn	♀	2	C
0066	1960	Palmer	♂	2	I
0067	1960	Willow Rd.	♀	3	VII
0068	1960	Chugiak	♀	3	IV
0069	1960	Eklutna Rd.	♀	7	V
0070	1960	4 Corners	♀	4	?
0071	1960	Portage	♂	4	C
0075	1960	Huffman Rd.	♂	2	C
0076	1960	Rainbow Lke.	♂	4	II
0077	1960	Seward Hwy	♀	7	IV
0078	1960	Seward Hwy	♀	7	C
0080	1960	Mi 108 Sterling	♀	4	V
0081	1960	Mi 200 ARR	♀	1	III
0082	1960	Mi 216 ARR	♂	1	C
0083	1960	207 ARR	♂	1	II
0084	1960	Ft. Richardson	♂	2	I
0085	1960	Willow	♀	1	II
0086	1960	Mi 213 ARR	♂	1	II
0087	1960	Mi 199.5 ARR	♂	1	I
0088	1960	So of Potter	♀	2	V
0091	1960	Eagle River Rd.	♀	7	II
0092	1960	" " "	♀	7	VI
0101	1960	Seward	♂	3	C
0106	1960	Mi 84 Sterling	♀	7	I
0107	1960	Mi 127 Sterling	♀	7	I
0109	1960	Mi 48 Sterling	♀	2	C
0110	1960	Mi 33.9 ARR	♂	1	III
0112	1960	Mi 171 Sterling	♂	7	C
0115	1960	Mi 48 Sterling	♂	6	VI
0119	1960	Mi 10 Glenn	♀	2	C
0120	1960	Tudor Rd	♀	2	VII
0121	1960	Mi 135 Glenn	♀	7	I
0122	1960	165 Glenn	♂	2	C
0123	1960	Mi 48 Slana-Tok	♀	2	C
0124	1960	Mi 81 Glenn	♂	2	C

* Does not include accession # 0688 - 0790 of 1961 & 1962 which are listed in W-6-R-3 Segment Report pp 72, 73 and 74.

** 1, Railroad; 2, Auto; 3, Department kill & miscellaneous; 4, Unknown, 5, Pathological; 6, Old injury; 7, Illegal kill.

TABLE 73 (continued)

ACCESSION #	DATE	AREA	SEX	CAUSE OF DEATH**	COMPARATIVE WEAR AGE CLASS
0125	1960	Mi 145 Richardson	♀	4	C
0126	1960	Gulkana R	♀	4	C
0128	1960	Sheep Mtn Lodge	♀	3	VI
0188	1960	Goose Bay	♀	4	VIII
0189	1960	" "	♀	4	C
0190	1960	" "	♀	4	IX
0191	1960	Jonesville	♀	2	C
0192	1960	Mi 58 Glenn	♀	2	V
0207	1960	14.8 W.of Wasilla	♀	2	VIII
0208	1960	Seward & Sterling Hwy	♂	7	I
0209	1960	Mi 56 Glenn	♂	2	C
0210	1960	Mi 1 Wasilla	♂	2	C
0211	1960	Chickaloon-R.	♀	7	I
0212	1960	" "	♀	7	I
0213	1960	" "	♀	7	VII
0214	1960	Kasiloff	♀	4	VI
0218	1960	Mi 198 ARR	♀	1	VI
0219	1960	Mi 200 ARR	♀	1	V
0222	1960	Mi 239 ARR	♀	1	II
0223	1960	Mi 239 ARR	♂	1	?
0224	1960	Mi 60 ARR	♀	1	VII
0225	1960	Elmendorf	♀	2	II
0230	1960	Lk Louise Rd	♂	7	V
0231	1960	Kenny Lake	♀	7	III
0243	1960	Hope	♀	2	III
0244	1960	Seward Hwy	♀	3	VII
0245	1960	Willow	♀	7	C
0248	1960	Potter	♀	7	VIII
0249	1960	Kenai	♂	4	C
0251	1960	Pittman Rd	♂	4	C
0254	1960	Wasilla	♂	2	III
0255	1960	"	♂	2	C
0256	1960	Fishhook Rd	♂	2	C
0257	1960	Wasilla	♂	2	C
0258	1960	Mi 48 Glenn	♀	2	IX
0259	1960	King River	♀	2	VIII
0260	1960	Mi 205 ARR	♀	1	I
0264	1960	Mi 194 ARR	♂	3	?
0266	1960	Mi 236 ARR	♀	1	C
0267	1960	Mi 236 ARR	♀	1	VII
0273	1960	Mi 186 ARR	♂	1	C
0274	1960	Mi 195 ARR	♀	1	I
0275	1960	Mi 199 ARR	♀	1	C
0276	1960	Mi 200 ARR	♂	1	C
0277	1960	Mi 203 ARR	♂	1	C
0278	1960	Mi 203 ARR	♀	1	?
0279	1960	Mi 217 ARR	♀	1	?
0284	1960	Mi 20 ARR	♀	1	C
0285	1960	Mi 236 ARR	♂	1	VI

TABLE 73 (continued)

ACCESSION #	DATE	AREA	SEX	CAUSE OF DEATH**	COMPARATIVE WEAR AGE CLASS
0286	1960	Lake Otis	♂	3	C
0642	1960	Mi 64 Seward	♂	2	C
0643	1960	Fishhook Rd	♀	2	?
0645	1960	Boniface	♂	2	C
0646	1960	Mi 15 Glenn	♀	2	C
0649	1961	Mi 11 Glenn	♀	2	?
0651	1961	Eagle R. Rd	♂	3	C
0677	1961	Mi 36 ARR	♀	1	?
0678	1961	Mi 36 ARR	♀	1	?
0679	1961	Elmendorf	♂	2	?
0680	1961	Anchorage	♂	3	?
0681	1961	Otter Lake	♀	4	C
0682	1961	Eagle River	♂	2	C
0683	1961	Eklutna Lake	♀	7	?
0791	1962	Ft. Richardson	?	-	-
0793	1962	" "	♀	3	I
0795	1962	DeBarr Rd	♂	3	I
0797	1962	" "	♂	3	I
0800	1962	" "	♀	3	I
0802	1962	Seward at Edgewater	♂	2	I
0803	1962	DeBarr Rd	♀	3	I
0804			?	-	-
0805			?	-	-
0815	1962	EAFB	♀	2	?
0818	1962	Girdwood	♀	2	C
0825	1962	Lake Otis Rd	♂	3	C
0826	1962	Huffman Rd	♀	2	C
0842	1963	Mi 50 ARR	♂	1	C
0853	1963	Elmendorf	♀	3	III
0860	1963	Boniface Rd	♀	2	VIII
0861	1963	Mi 15 Palmer	♂	2	I
0869	1963	Mi 10 Glenn	♀	2	I
0870	1963	Mi 15 Glenn	♀	2	III
0871	1963	Mi 15 Glenn	♀	2	II
0883	1963	Mi 7 Glenn	♀	2	IX
0884	1963	Mi 48 ARR	♀	1	?
0886	1963	EAFB	♀	2	I
0887	1963	Mi 10 Glenn	♀	7	A
0889	1963	Boniface Rd	♀	2	VI
0890	1963	EAFB	♀	2	A
0891	1963	Mi 1 Glenn	♂	2	IV
0892	1963	Mi 9 Glenn	♀	2	?
0894	1964	Muldoon Rd	♀	3	V
0895	1964	Portage	♀	1	II
0896	1964	"	?	1	C
0897	1964	Ft. Richardson	♀	2	A
0898	1964	" "	♂	2	II

TABLE 73 (continued)

ACCESSION #	DATE	AREA	SEX	CAUSE OF DEATH**	COMPARATIVE WEAR AGE CLASS
0900	1964	Mi 5 Glenn	♀	2	A
0901	1964	No. Lights Blvd	♀	2	C
0902	1964	Gate 3 Glenn	♀	2	C
0903	1964	Gate 2 Glenn	♂	2	C
0904	1964	Mi 10 Glenn	♀	2	II
0905	1964	Gate 2 Glenn	♂	2	C
0906	1964	Mi 15 Glenn	♂	2	C
0907	1964	Sand Lake Rd	♂	2	C
0908	1964	Mi 2 Glenn	♀	2	IV
0909	1964	Gate 3 Glenn	♂	2	C
0910	1964	No. Lights Blvd	♂	2	C
0911	1964	Mi 7 Glenn	♂	2	C
0912	1964	Mi 95 Seward	♀	2	C
0913	1964	Bonaface & Glenn	♀	2	A
0914	1964	Juneau St.	♀	3	VIII
0915	1964	" "	♂	3	C
0916	1964	Mi 10 Glenn	♀	2	II
0917	1964	Mi 13 Glenn	♀	2	A
0918	1964	DeBarr Rd	♀	2	I
0919	1964	O'Mally Rd	♂	2	C
0920	1964	Mi 11 Glenn	♀	2	III
0921	1964	Mi 13 Glenn	♀	2	II
0922	1964	Mi 1 Sterling	♂	2	C
0923	1964	EAFB	♀	7	C
0924	1964	EAFB	♀	7	V
0925	1964	Seward & Hope cutoff	♂	2	C
0926	1964	Portage	♀	1	II
0927	1964	EAFB	♀	2	C
0928	1964	Eagle R Rd	♀	4	C
0929	1964	DeBarr Rd	♂	2	C
0930	1964	Silver Tip	♀	4	A
0931	1964	Mi 4 Glenn	♀	4	IV
0932	1964	Portage	♀	1	C
0933	1964	EAFB	♀	6	VII
0934	1964	Mi 5 Glenn	♂	2	II
0935	1964	Mi 25 Glenn	♀	3	IX
0936	1964	Mi 11 Glenn	♀	2	I
0937	1964	DeBarr	♀	4	VII
0938	1964	Mi 5 Tudor	♂	4	C
0939	1964	Mi 3 Glenn	♀	2	I
0940	1964	O'Mally Rd	♀	2	C
0941	1964	Mtn View	♀	3	IX
0942	1964	EAFB	♂	2	C
0943	1964	Tudor Rd	♀	2	A
0944	1964	Mi 7 Glenn	♂	2	C
0945	1964	Fireweed	♀	6	C
0946	1964	EAFB	♀	4	I
0947	1964	Anderson Rd	♀	6	IX

TABLE 73 (continued)

ACCESSION #	DATE	AREA	SEX	CAUSE OF DEATH**	COMPARATIVE WEAR AGE CLASS
0948	1964	Ft. Richardson	♀	3	II
0949	1964	EAFB	♀	2	I
0950	1964	Eagle R. Rd	♀	7	I
0951	1964	Mi 9 Glenn	♀	4	II
0952	1964	Mi 3 Seward	♂	4	III
0953	1964	Mi 29 Glenn	♀	4	I
0954	1964	Mi 7 Glenn	♀	4	II
0955	1964	Spenard Rd	♀	2	C
0956	1964	Rabbit Cr & Seward	♀	2	I
0957	1964	DeBarr Rd	♀	2	A
0958	1964	Mi 7 Glenn	♀	2	C
0959	1964	Mi 29 Glenn	♂	2	C
0960	1964	Mi 29 Glenn	♀	2	C
0961	1964	Ft. Richardson	♀	3	A
14000	1964	Mi 3 Seward	♀	2	II
14001	1964	Gate 3 Glenn	♂	2	I
14002	1964	Weigh Sta. Glenn	♀	2	C
14003	1964	Mi 4 Glenn	♂	2	C
14004	1964	Mi 8 Glenn	♂	2	IV
14005	1964	Mi 21 Seward	♂	2	C
14006	1964	Mi 2 Glenn	♂	2	I
14007	1964	Mi 1 Seward	♀	2	C
14008	1964	Mi 8 Glenn	♂	2	C
14009	1964	Boniface Rd	♂	2	C
14010	1964	Mi 10 Glenn	♂	2	C
14011	1964	Seward & O'Malley	♀	2	III
14012	1964	Mi 12 Glenn	♂	2	C
14013	1964	Mi 12 Glenn	♀	2	VI
14014	1964	Mi 12 Glenn	♀	2	C
14015	1964	Mi 20 Glenn	♂	2	I
14016	1964	Gate 3 Glenn	♀	2	V
14017	1964	Tudor Rd	♀	2	C
14018	1964	Mi 3 Glenn	♀	2	C
14019	1964	Government Hill	♂	3	C
14020	1965	Tudor Rd	♀	2	V
14021	1965	Tudor Rd	♂	2	C
14022	1965	Boniface Rd	♀	2	V
14023	1965	Tudor Rd	♀	2	III
14024	1965	Weigh Sta on Glenn	♀	2	II
14025	1965	Mi 21 Glenn	♀	2	C
14026	1965	Mi 6 Seward	♀	2	IX
14027	1965	Fort Richardson	♂	2	V
14028	1965	Glenn at Ship Cr	♀	2	I
14029	1965	EAFB	♂	2	C
14030	1965	EAFB	♂	2	C
14042	1965	Glennallen	♀	2	VI
14045	1965	Tudor Rd	♀	2	C

Table 74. Weights and measurements of highway, rail and miscellaneous killed moose, Anchorage area, January 1960 - June 1965.*

Date	Accession number	Age class**	Sex	Cause of death***	Measurements in millimeters						Weight in lbs.	
					Girth	Shoulder height	Body	Hind foot	Total length	Ear	Body	Total
3/ 5/60	0280	II	♀	1		1848		800				
3/24/60	0221	I	♂	1		1772	1327		2184	254		
3/24/60	0220	III	♂	1				832		241		
2/27/60	0129	I	♀	1		1537	1410	806	1930	254	485	745
2/27/60	0130	III	♂	1		1816	1778	338	2648	268	705	1065
2/27/60	0185	I	♂	1		1676		826		248		555
2/27/60	0186	III	♂	1						248	695	
2/26/60	0184	IV	♀	1	1981	1772	1549	806	2096	241	575	820
2/13/60	0262	C	♀	1		1384		699		216	193	
12/29/60	0648	A	♀	2	1905	1822	1842	813	2477	254	645	915
12/16/60	0647	C	♀	2	1372	1410	1251	686	1880	216		
11/24/60	0644	A	♀	3	1721	1575	1461	768	2540		460	665
9/23/60	0031	A	♂	3		1740	1524	819	2565	254	648	843
9/20/60	-	II	♂	3			1600	832	2642		525	880
9/14/60	0024	A	♀	2	2134	1803	1702	813	2438	267	670	1025
5/15/60	0283	A	♀	2	1829	1759	1575	813	2769	254	560	900
5/10/60	0282	C	♀	4	1295	1257	1219	686	1969	203		
5/ 9/60	0281	C	♂	5	1365	1416	1156	705	1816	216	185	275
4/28/60	0272	V	♀	3						267	502	772
4/15/60	0246	C	♂	4	1321	1448	1086	711	1637	222	185	295
4/15/60	0247	IX	♀	4		1854	1651	781	2642	254		
4/11/60	0242	C	♀	6	1359	1461	1270	743	1924	216	240	375
4/ 5/60	0235	IX	♀	4	1765	1759	1676	813	2927	235		
4/ 5/60	0234	C	♂	4		1403	1016	679	1848	222	255	

* Excluding accession numbers 0688-0790 (7/5/61 - 4/25/62) which are reported in W-6-R-3, Work Plan B, Job No. 2-E, pp. 72-74.

** C signifies calf; A signifies adult, age unknown.

*** 1. Railroad; 2. Automobile; 3. Shot; 4. Unknown; 5. Pathological; 6. Old injury.

Table 74. Continued

Date	Accession number	Age class**	Sex	Cause of death***	Measurements in millemeters						Weight in lbs.	
					Girth	Shoulder height	Body	Hind foot	Total length	Ear	Body	Total
4/ 2/60	0229	C	♂	4		1497	1270	724	1994	241	380	
4/ 2/60	0228	A	♀	4		1600		787	2540	229		
4/ 1/60	0227	C	♀	3	1422	1397	1187	686	1854	210	195	290
3/31/60	0226	C	♀	4	1346	1245	1041	692	1943	222		265
3/23/60	0215	C	♂	4	1219	1219	1143	673	2032	210		280
3/23/60	0217	C	♀	3		1448		724		210	205	335
3/22/60	0216	C	♀	3		1378	1200	705	1816	203	215	340
3/15/60	0206	IX	♀	4				819	2743	254	365	680
3/14/60	0193	C	♂	3	1676	1295	1245	737	2108	203	235	345
3/14/60	0269	C	♂	4	1454	1473	1264	787	1892	229	225	385
3/12/60	0271	C	♂	3	1314	1378	1111	699	1956	222	200	325
3/ 9/60	0187	C	♀	4	1403	1365	1276	826	2056	248		337
3/ 4/60	0111	I	♀	2	1575	1664	1397	749	2337	248	365	535
3/ 4/60	0270	III	♀	2							555	800
3/ 3/60	0268	I	♂	3	1676	1524	1403	749	2153	235	375	570
2/22/60	0116	III	♂	6	1867	1708	1422	826	2343	254		
2/21/60	0265	C	♀	4	1359	1378	1219	673	1880	216	183	293
2/19/60	0117	C	♂	3	1422	1537	1207	737	2108	216	270	425
2/19/60	0118	C	♂	2	1403	1454	1302	711	1969	216	260	385
2/17/60	0089	I	♂	4				756			260	485
2/17/60	0090	VIII	♀	3	2007	1778	1556	838	2604	260	610	955
2/11/60	0113	C	♀	3		1276	1181	716	1854	203	185	320
2/11/60	0261	C	♂	4	1505	1461	1289	724	2076	210	220	350
2/11/60	0079	III	♀	4	1803	1607	1600	826	2591	254		
2/ 6/60	0253	IX	♀	2		1772		800		254	580	1020
2/ 6/60	0252	IX	♀	3	1892	1918	1772	864	2597	260	480	701
2/ 5/60	0108	V	♀	4	2184	1721	1715	800	2543	248		
2/ 4/60	0251	C	♂	4	1378	1251	1137	660	1702	197		260
2/ 4/60	0114	IV	♀	4							635	1000
2/ 3/60	0250	IV	♀	2	1899	1835	1717	838	2007	241	440	725

Table 74. Continued

Date	Accession number	Age class**	Sex	Cause of death***	Measurements in millemeters						Weight in lbs.	
					Girth	Shoulder height	Body	Hind foot	Total length	Ear	Body	Total
1/31/60	0074	IV	♀	2							585	885
1/30/60	0073	I	♀	4	1880	1530	1537	787	2299	254	595	958
1/27/60	0104	I	♂	2	1600	1689	1454	768	2350	241	365	605
1/27/60	0105	IV	♀	2	2197	1530		787		254		
1/26/60	0102	IV	♀	4	1930		1638	826	2629	241	495	870
1/26/60	0103	II	♀	4	1880	1848	1715	800	2642	254	540	895
1/23/60	0100	II	♂	4	1791	1880	1715	795	2350	260	435	720
1/22/60	0072	VII	♀	4	1873	1784	1588	787	2692	248	540	850
1/20/60	0099	V	♀	4	1880	1829	1575	826	2515	260	475	810
1/18/60	0063	C	♂	6	1473	1511	1346	724	2083	229		425
1/17/60	0098	I	♀	2	1626	1586	1524	775	2184	241	335	540
1/16/60	0062	I	♀	2	1524	1461	1372	813	2400	254	200	415
1/14/60	0097	C	♂	2	1245	1422	1295	711	1359	210	215	305
1/13/60	0096	C	♂	4	1549	1524	1264	737	1880	222	235	405
1/12/60	0095	V	♀	4	1854	1842	1702	819	2718	248	520	825
1/12/60	0057	C	♀	2	1524	1334	1448	699	2007	210		410
1/11/60	0056	C	♀	2		1334	1143	718	2083	203		390
1/10/60	0093	C	♂	2	1295	1420	1245	673	1994	216	198	288
1/ 6/60	0055	V	♀	3	1956	1797	1486	819	2743	254	595	945
1/ 4/60	0054	I	♂	2	1651	1588	1575	813	2286	248	355	585
6/ 4/61	0687	C	♂	4		832	483	457	1054	133		
5/ 3/61	0684	A	♀	3		1803	1803	800	2743	254		
5/18/61		C	♂	4	419	711	451	396	832	124		
5/14/61	0685	A	♀	2	1562	1905	1549	787	2527		440	675
3/ 2/61	0665	A	♀	4	1988	1734	1499	800	2832	248		
3/23/61	0676	C	♂	4	1359	1473	1410	756	2197	241	165	285
3/22/61	0675	C	♀	1	1473	1473	1346	737		247		
3/17/61	0674	C	♂	2	1524	1524	1499	737	2007	203		
3/16/61	0673	A	♂	2	2032	1943	1829	864	2845	273		
3/15/61	0672	A	♀	4	1803	1753	1740	813	2489	248	345	710

Table 74. Continued

Date	Accession number	Age class**	Sex	Cause of death***	Measurements in millemeters						Weight in lbs.	
					Girth	Shoulder height	Body	Hind foot	Total length	Ear	Body	Total
3/15/61	0671	A	♀	4	1981	1778	1981	838	2604	260	435	885
3/15/61	0670	C	♂	4	1422	1549	1549	775	2210	241	225	485
3/15/61	0669	A	♀	4	1956	1765	1905	813	2642	279	450	935
3/13/61	005C	A	♀	2	1905	1511	1676	787	2743			
3/21/61	004C	A	♀	2		1473	1778	787	2769	254		
3/ 6/61	0668	C	♂	2	1511	1549	1499	768	2070	229	220	450
3/ 5/61	002C	A	♀	2		1626	1588	800	2591	229		
3/ 4/61	0667	C	♀	4	1295	1397	1372	711	1880	191		325
3/ 4/61	0666	A	♀	4	1854	1740	1778	851	2692	273	410	855
3/ 2/61	001C	A	♀	4	1880	1765	1626	775	2572	241		
2/28/61	0664	C	♂	2	1499	1549	1499	756	1994	229	215	
2/23/61	0663	A	♀	4	1518	1708	1651	781	2387	241	340	720
2/19/61	010M	A	♀	4	1746	1715	1499	826	2629	254		
2/18/61	0662	A	♀	4	1829	1816	1778	826	2794	273	425	890
2/18/61	0661	C	♀	4	1499	1473	1435	730	2134	229	215	400
2/18/61	0660	A	♀	4	1880	1880	1727	800	2667	273	465	932
2/14/61	0659	A	♀	2	1854	1721	1702	806	2584	260	435	810
2/14/61	0658	C	♀	2	1384	1422	1295	711	2007	222	175	385
2/13/61	008M	C	♂	3	1422	1359	1226	711	1930	222		
2/12/61	0657	A	♀	2	2007	1708	1626	787	2553	254	355	825
2/11/61	0656	A	♀	2	2057	1816	1778	813	2540	267	410	835
2/ 9/61	0655	C	♂	2	1308	1245	1143	635	1499	203	65	185
2/ 4/61	0654	A	♀	4	1791	1598	1499	775	2578	251	330	670
2/ 2/61	006M	A	♀	4		1664	1854	853	2667	267		
1/23/61	005M	C	♀	4	1384	1403	1422	692	2019	206		
1/17/61	003M	A	♀	4	1930	1735	1829	820	2769	260		
1/19/61	004M	C	♂	4	1473	1384	1384	699	1816			
1/17/61	002M	A	♀	2	1880	1556	1600	699	2362	235		
1/ 9/61	0650	C	♀	2	1702	1480	1283	711	2064	216	235	375
1/ 8/61	001M	A	♀	4	1981	1734	1715	737	2527	254		

Table 74. Continued

Date	Accession number	Age class**	Sex	Cause of death***	Measurements in millemeters						Weight in lbs.	
					Girth	Shoulder height	Body	Hind foot	Total length	Ear	Body	Total
3/ 6/62	RC18	A	♀	4	1778	1422	1473	787	2489	292		
3/ 5/62	RC17	A	♀	4		1575	1346	749	2642	260		
2/28/62	RC15	I	♂	4	1473	1219	1194	737	1956	216		
2/16/62	RC14	I	♀	4	2210	1499	965	699	1803	229		
2/ 9/62	RC13	A	♀	4	2083	1715	1372	787	2718	254		
12/19/62	0824	C	♂	2	1702	1473	1397	711	2083	222	270	420
12/17/62	0823	C	♀	2	1499	1448	1346	711	2184	229	245	390
12/16/62	0822	C	♀	2	1575	1473	1346	711	2057	203	245	375
12/11/62	0821	I	♀	2	1753	1626	1448	787	2184	241	385	555
12/ 1/62	0820	C	♀	2	1422	1346	1295	686	2083	216		
11/27/62	0819	C	♂	2	1676	1448	1575	711	1930	216		
10/24/62	0817	C	♀	2	1422	1346	1257	673	1930	222	215	325
10/10/62	0816	I	♂	3	1880	1600	1575	813	2489	241	525	712
10/ 2/62	0814	I	♀	3	1829	1600	1499	737	2438	241	510	725
9/19/62	0809	C	♀	2	1486	1359	1308	705	2019	226		
9/23/62	0810	I	♀	2	1981	1600	1524	787	2438	254	600	800
9/24/62	0811	A	♀	2			1473	813	2642	254		
9/26/62	0812	III	♀	2	2134	1702	1676	813	2591	251	635	890
9/30/62	0813	C	♂	2	1397	1270	1194	648	1702	210	200	300
8/12/62	0812	I	♂	2	1740	1588	1245	756	2146	248	420	595
8/12/62	0801	C	♂	2	1334	1194	927	648	1651	210	180	260
8/ 2/62	0799	A	♀	4	2108	1727	1384	775	2527	254		
7/14/62	0796	A	♀	2	1765	1715	1600	794	2692	257	580	790
7/23/62	0798	A	♀	2	1880	1702	1397	838	2743	267	590	880
6/29/62	0794	I	♀	2	1549	1524	1219	749	2184	235	410	550
6/13/62	0792	A	♀	2		1372	1245	737	2134	241	290	
1/ 5/63	0827	I	♂	2	1727	1651	1448	762	2616	241	415	625
1/ 7/63	0828	C	♂	2	1549	1499	1346	711	2108	222	230	280
1/ 7/63	0829	C	♂	2	1575	1473	1372	711	2134	222	240	390
1/10/63	0830	I	♀	2	1778	1626	1499	762	2489	229	395	590

Table 74. Continued

Date	Accession number	Age class**	Sex	Cause of death***	Measurements in millemeters						Weight in lbs.	
					Girth	Shoulder height	Body	Hind foot	Total length	Ear	Body	Total
1/16/63	0831	III	♀	3	1905	1854	1549	787	2794	241	560	845
1/18/63	0832	C	♀	3	1524	1524	1372	724	2210	222	255	450
1/22/63	0833	I	♀	3	1702	1676	1549	762	2591	241	410	640
1/22/63	0834	C	♀	6	1600	1473	1372	737	2210	229	260	410
1/28/63	0835	II	♀	3	1930	1880	1549	826	2692	260	570	870
1/29/63	0836	I	♀	3	2057	1854	1600	800	2794	260	590	920
1/30/63	0837	IV	♀	3	1803	1803	1473	813	2489	248	465	690
2/ 1/63	0838	I	♀	2	1727	1702	1448	762	2489	235	410	625
2/ 5/63	0839	VIII	♀	2	2032	1854	1702	813	2743	267	575	860
2/10/63	0841	C	♂	2	1499	1422	1346	699	2108	235	225	350
2/ 9/63	0840	C	♀	2	1575	1473	1321	673	2159	229	220	380
2/19/63	0843	II	♂	2	1880	1778	1575	813	2565	248	450	700
2/22/63	0844	I	♂	2	1956	1778	1549	813	2565	248	460	695
2/25/63	0845	III	♂	2	1930	1854	1575	826	2794	254	540	810
3/ 2/63	0846	IV	♀	2	1905	1740	1549	787	2667	254	450	725
3/ 2/63	0847	C	♀	2	1473	1499	1168	724	2032	229	210	335
3/ 6/63	0848	C	♂	2	1626	1575	1321	737	2184	235	255	385
3/13/63	0849	I	♂	2	1880	1778	1473	813	2413	235	405	615
3/23/63	0850	II	♂	2	1905	1829	1524	838	2819	260	455	690
3/30/63	0851	C	♂	2	1524	1600	1372	762	2184	216	260	410
4/17/63	0852	C	♀	2	1524	1499	1270	711	2235	222	240	360
4/26/63	0854	C	♀	2	1448	1524	1283	749	2108	229	250	365
5/10/63	0855	V	♀	2	1905	1918	1588	851	2692	267	535	840
5/11/63	0856	V	♀	2	1905	1839	1549	800	2769	254	505	790
5/16/63	0857	A	♀	2	1880	1803	1575	813	2210	267	510	795
5/20/63	0858	C	♀	5	1448	1549	1295	737	2108	222		355
5/21/63	0859	II	♀	2	2057	1829	1651	851	2769	260	545	870
6/ 9/63	0862	I	♀	2	1524	1524	1295	749	2108	235	295	410
6/12/63	0863	A	♀	2	1829	1702	1626	762	2438	267	405	680
6/14/63	0864	I	♂	2	1626	1473	1346	737	2159	241		

Table 74. Continued

Date	Accession number	Age class**	Sex	Cause of death***	Measurements in millemeters						Weight in lbs.	
					Girth	Shoulder height	Body	Hind foot	Total length	Ear	Body	Total
6/14/63	0865	C	♂	2	940	965	711	508	1118	165		82
6/ 7/63	0866	C	♂	4	648	838	635	457	1016	146		
6/17/63	0867	C	♀	2	864	1067	762	559	1168	165		
6/19/63	0868	C	♀	6	787	1016	711	533	1245	165		90
7/28/63	0877	III	♀	2	1854	1829	1651	787	2616	254		
7/28/63	0876	VI	♀	2		1829	1626		2743	267		
7/18/63	0875	III	♀	2	1702	1803	1803	864	2565	267		
7/14/63	0874	V	♀	2	1956	1880	1727	864	2743	267		
7/14/63	0873	I	♀	2	1397	1575	1372	660	2184	203		
7/12/63	0872	C	♂	2	1524	1397	1397	756	2235	241		
8/ 2/63	878A	C	♀	2	1143		1092	610	1549	191		
8/15/63	0881	C	♂	2		1181	1092	654		197		
8/24/63	0882	I	♀	2	1702	1702	1384	756	2318	248	450	635
8/ 8/63	878B	C	♀	2	1575	1753	1499		2388	229	425	550
8/15/63	0880	C	♀	2	1168	1346	1168	660	1829	203		
8/12/63	0879	II	♂	4	1981	1575	2540	813		254	625	875
9/13/63	0885	C	♂	2	1372	1372	1219	635	1829	229	245	350
10/17/63	0888	C	♂	4	1575	1422	1321	699	1981	216	275	410
12/17/63	0893	II	♀	4	1930	1791	1651	775	2565	241		
1/23/61	0653	A	♀	2	1867	1880	1727	800	2413	260		
1/16/65	14031	C	♂	3	1524	1524		711	1879	228		370
1/21/65	14032	C	♀	3	1549	1473		711	2006	215	162	300
1/23/65	14033	III	♀	2	2260	2146		812	2336	241	475	800
1/24/65	14034	C	♀	2	1447	1409		711	1816	215	200	345
1/30/65	14035	IX	♂	3	2362	1790		819	2514	254	610	1030
2/ 8/65	14036	I	♂	2	1850	1690		820	2470	250	363	562
2/ 8/65	14037	VIII	♀	3	2326	1803		187	2692	226	685	930
2/ 8/65	14038	C	♀	2	1739	1409		711	1930	240	225	400
2/15/65	14039	C	♀	2	1752	1219		736	1701	203	185	340
2/19/65	14040	X	♀	3	2133	1701		812	2108	254	550	890

Table 74. Continued

Date	Accession number	Age class**	Sex	Cause of death***	Measurements in millemeters					Weight in lbs.	
					Girth	Shoulder height	Body	Hind foot	Total length	Ear	Body	Total
2/19/65	14041	C	♀	1	1530	1447		698	1930	203	190	300
2/24/65	14043	I	♀	2	1955	1676		787	2260	241	400	660
2/27/65	14044	I	♂	2	1981	1473		787	2209	241		600
3/21/65	14046	IV	♀	2	1981	1524		812	2362	254	475	725
3/21/65	14047	C	♂	4	1879	1625		774	2184	234		480
5/10/65	14049	I	♀	2	1485	1257		703	2070	215	210	340

Table 75. Age class* of male moose killed in Anchorage area, 1959-June 30, 1965 by highway, rail and miscellaneous mortality.

Year	C	I	II	III	IV	V	VI	VII	VIII	IX	X & over	Unknown Adult	?	Totals
1959														
1960	36	10	5	6		1	2					1	2	63
1961	18	1										1	2	22
1962	17	12										2		31
1963	11	6	3	1	1									22
1964	23	3	2	1	1									30
1965	5	2				1				1				9
TOTALS	110	34	10	8	2	2	2			1		4	4	177

* Age classes determined by comparative wear

Table 76. Age class* of female moose killed in Anchorage area, 1959-June 30, 1965 by highway, rail and miscellaneous mortality.

Year	C	I	II	III	IV	V	VI	VII	VIII	IX	X & over	Unknown Adult	?	Totals
1959	1	1			1									3
1960	27	13	6	6	7	11	4	6	5	7		5	4	101
1961	13	6										43	4	66
1962	15	11		1								21	1	49
1963	12	9	4	5	1	3	2		2	1		5	2	46
1964	17	9	8	2	2	3	1	2	1	3		8		56
1965	7	3	1	2	1	2	1		1	1		1		20
TOTALS	92	52	19	16	12	19	8	8	9	12		83	11	341

* Age classes determined by comparative wear.

Table 77. Cause of death, male moose, Anchorage area, 1959-June 30, 1965, (highway, rail and miscellaneous mortality).

Year	Causes of death							
	Railroad	Highway	Department kill	Unknown	Pathological	Old injury	Illegal kill	Totals
1959								
1960	15	18	9	14	1	3	3	63
1961	2	8	2	6				18
1962		16	11	3		3	2	35
1963	1	1	1					3
1964		26	2	2				30
1965		4						4
Totals	18	73	25	25	1	6	5	153

Table 78. Cause of death, female moose, Anchorage area, 1959-June 30,1965, (highway, rail and miscellaneous mortality).

	Causes of death							
Year	Railroad	Highway	Department kill	Unknown	Pathological	Old injury	Illegal kill	Totals
1959		3						3
1960	18	30	15	23		1	14	101
1961	3	23	8	19		2	2	57
1962		22	20	7	3	1	6	59
1963	1	9	1				1	12
1964	3	33	6	8		3	3	56
1965		9						9
Totals	25	129	50	57	3	7	26	297

Table 79. Miscellaneous moose mortality, Matanuska and Lower Susitna Valleys, July 1, 1964-March 10,1

Mortality Factor	Adult Males	Juvenile Males	Total Males	Adult Females	Juvenile Females	Age Unknown	Total Females	Sex Unknown	TOTAL MOOSE
Road kills	2	4	6	8	5	5	18		24
Defense of life and property	3	2	5	6	3		9		14
Railroad kills	6	2	8	13			13		21
Illegal kills	1		1	8	1		9	3	13
Accidents				2	3		5		5
Unknown causes (winter kills, etc.)					2		2	3	5
TOTAL KILLS	12	8	20	37	14	5	56	6	82

APPENDIX

1 - Aerial Moose Count Form

2 - Xerox of Moose Harvest Ticket

A: PILOT & OBSERVER: DATE:

THER & SNOW-CONDITIONS:

E OF PLANE: TIME OFF: TIME ON:

AC BER:

BULLS		COWS				Unid.	Time Count	Timber-	Below	
Large	Small	W/O Calves	W/1 Calf	W/2 Calves	Lone Calves	Sex & Age	Started & Ended	line & Above	Timber line	REMARKS

Fig. 1. Aerial Moose Composition Count Form

1965 No. C 55...

MOOSE HUNTING REPORT

NON-TRANSFERABLE

I, _____
Hunter's Name (print)

A. HUNTED MOOSE ☐ Yes ☐ No

B. MOOSE KILLED ☐ Yes ☐ No ☐ Male ☐ Female

C. KILLED IN GAME MGMT. UNIT ☐

D. SPECIFY LOCALITY _____

E. DATE MOOSE KILLED 1 / 65
MO. DAY

THIS REPORT MUST BE FILLED OUT AND MAILED WITHIN 15 DAYS IF YOU KILL A MOOSE, OR WITHIN 30 DAYS AFTER CLOSE OF SEASON IF YOU DID NOT HUNT, OR HUNTED BUT WERE UNSUCCESSFUL.

MOOSE HARVEST TICKET 1965 No. C 55301
NON-TRANSFERABLE

Name _____
Mailing Address _____

License No. _____ Date Issued _____, 1965

DETACH AND MAIL TO ALASKA DEPT. OF FISH AND GAME, 604 BARNETT–ROOM 116, FAIRBANKS

WRITE NUMBER OF THIS TICKET ON BACK OF APPLICANT'S LICENSE.

MOOSE HARVEST TICKET 1965 No. C 55301
NON-TRANSFERABLE

Name _____
Mailing Address _____

License No. _____ Date Issued _____, 1965

Punch month and date and attach this ticket immediately upon taking to a permanent life and retained portion of the moose.

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

AUG. ○ SEPT. ○ OCT. ○
NOV. ○ DEC. ○