

ALASKA DEPARTMENT OF FISH AND GAME

JUNEAU, ALASKA

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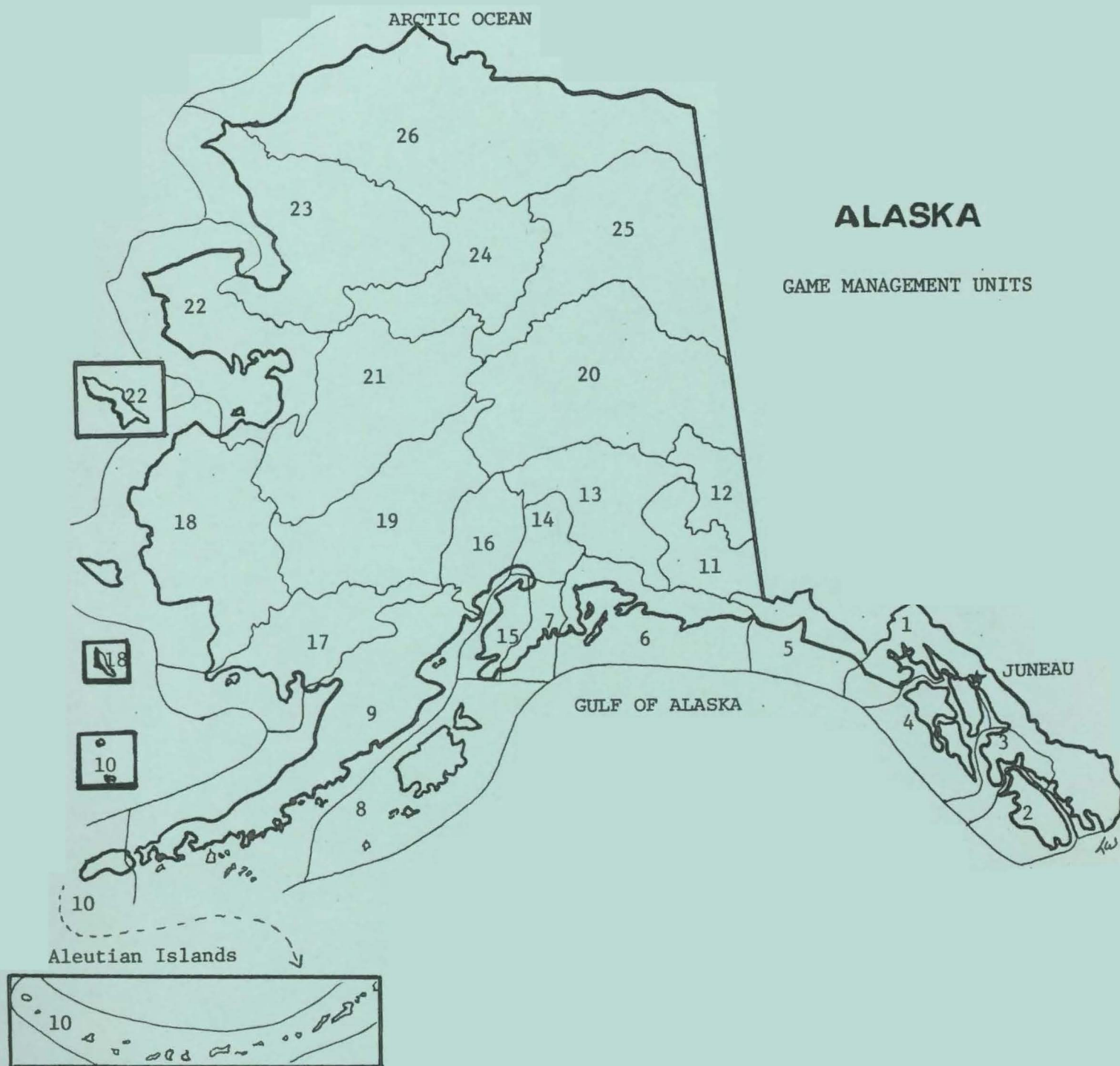
ANNUAL REPORT OF SURVEY-INVENTORY ACTIVITIES PART III. MOOSE

Edited and compiled by
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Volume VIII
Federal Aid in Wildlife Restoration
Project W-17-8, Jobs No. 1 and 22

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(Printed September 1978)



STATEWIDE HARVESTS AND POPULATION STATUS

Moose

The statewide reported moose harvest for 1976-77 was 4,067, an increase of more than 800 animals from the year before. The actual harvest may be considerably higher, since compliance with reporting requirements is poor in some rural Game Management Units such as 17, 19, 21, 23, 24, 25, and 26.

Harvests increased dramatically in Units 1 and 15 without benefit of cow moose seasons, while in Units 16, 22, and 23 partially because of cow moose harvests. Unit 17 suffered a greater than 50 percent decline in reported harvest, primarily due to an 81-day reduction in season length.

Conservative season lengths, low water conditions in West Central Alaska and increased restrictions concerning airborne hunting practices all combined to moderate harvest level increases.

STATEWIDE MOOSE HARVEST - 1976*

<u>Unit</u>	<u>Bulls</u>	<u>Cows**</u>	<u>Unknown</u>	<u>Total</u>
1	76	18	1	95
5	14	---	1	15
6	35	17	1	53
7	71	---	6	77
9	194	44	10	248
11	48	---	--	48
12	77	---	2	79
13	708	1	23	732
14	289	1	6	296
15	319	---	4	323
16	310	143	3	456
17	48	---	1	49
18	11	1	--	12
19	284	23	2	309
20	315	3	9	327
21	272	28	5	305
22	186	51	3	240
23	133	16	--	149
24	63	3	1	67
25	78	---	2	80
26	43	19	4	66
Unknown	36	---	5	41
TOTAL	3,610	368	89	4,067

* Figures are taken from Moose Harvest Reports and may differ slightly from figures given in the reports contained herein.

**While some Units did not have legal cow seasons, hunters occasionally reported taking cows in these Units; in some cases they may have erroneously filled out the harvest report.

TABLE OF CONTENTS

Game Management Unit Map	1
Statewide Harvests and Population Status	11
Statewide Moose Harvest-1976	111
Moose	2
GMU 1A and B-Southeast Mainland-Cape Fanshaw to Canadian Border	2
GMU 1C-Juneau	4
GMU 1D-Haines	6
GMU 5-Yakutat	10
GMU 6-East of Copper River.	12
GMU 6-West of Copper River.	15
GMU 7-Seward.	19
GMU 9-Alaska Peninsula.	26
GMU 11-Chitina Valley-Eastern Half of Copper River Basin.	37
GMU 12-Upper Tanana and White Rivers.	41
GMU 13-Upper Susitna, Nenana, Delta, Copper and Matanuska River Drainages.	43
GMU 14A-Palmer.	48
GMU 14B-Willow to Talkeetna	53
GMU 14C-Anchorage	58
GMU 15A-Kenai	64
GMU 15B-Soldotna.	72
GMU 15C-Homer	80
GMU 16-West Side of Cook Inlet.	85
GMU 17-Bristol Bay.	93
GMU 18-Yukon-Kuskokwim Delta.	96
GMU 19-McGrath.	97
GMU 20A-Tanana Flats-North Slope of Alaska Range.	101
GMU 20B-Fairbanks	104
GMU 20C-Tok-Tanana-Upper Yukon.	106
GMU 20D	111
GMU 21-Middle Yukon	113
GMU 22-Seward Peninsula	118
GMU 23-Kotzebue Sound	122
GMU 24-Koyukuk Drainage	124
GMU 25-Chandalar and Eastern Yukon Drainages.	126
GMU 26-Arctic Slope	128

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Units 1A and 1B - Southeast Mainland from Cape
Fanshaw to the Canadian Border

Seasons and Bag Limits

Unit 1A	Sept. 15 - Oct. 15	One bull
Unit 1B	Sept. 15 - Oct. 15	One bull

Harvest and Hunting Pressure

The 1976 harvest ticket return data indicate that 2 moose were taken in Subunit 1A, which is similar to previous years. Both moose taken were from the Unuk River drainage.

The reported harvest in Subunit 1B was 31 animals, a 29 percent increase over 1975. Of the 31 moose taken, 16 were from the Stikine River, 14 from Thomas Bay and 1 from Crittenden Creek.

In Subunit 1A, one moose was taken on September 18 and one on October 9. In Subunit 1B the harvest was nearly equal in September and October.

The two successful hunters in Subunit 1A spent a total of 10 days hunting moose whereas 13 unsuccessful hunters spent 54 days hunting. In Subunit 1B, successful hunters spent 283 days pursuing moose for an average of 9.1 days per hunter. One hundred fifty-one unsuccessful hunters hunted a total of 1272 days for an average of 8.4 days each.

The Stikine harvest was monitored in the field by contacting hunters and it was estimated that nearly 150 hunters killed 20 bulls in 1976.

In Canada the harvest within 8 miles of the border on the Stikine River was estimated at 12 moose, compared to 14 in 1975.

Composition and Productivity

No counts were conducted in Subunit 1A.

Sixty-six moose were counted in the Stikine area on January 27, 1977, which was nearly equal to the 68 counted in March 1976. The percentage of calves in the herd (15 percent) was low and similar to the 10 percent recorded in March 1976.

Of 17 bulls in Subunit 1B of which the age was determined, 35

percent were yearlings. In 1975, a sample of eight bulls indicated 50 percent were yearlings.

Specimens were collected from 11 moose in Subunit 1B and examined for the presence of Sarcocystis. Cysts of the parasite were found only in one heart muscle sample collected from a Stikine moose.

Management Summary and Conclusions

The 1976 harvest in Subunit 1A indicated no significant change in harvest trends. Since surveys are not conducted regularly in the Unuk River area, the effects of the current harvest level are not known. No adverse effects have been noted to date.

While hunting pressure in Subunit 1B remained static in comparison with 1975, the take increased significantly. This was mainly attributed to harvest of 14 moose in Thomas Bay, a 75 percent increase over 1975. The harvest in the Stikine area for 1975 and 1976 was similar. Occurrence of yearling bulls in the 1976 harvest (35 percent) was the lowest on record.

For the second consecutive year, total moose numbers was about 30 percent less than the average of 1972-1975.

Recommendations

No seasons or bag limit changes are recommended for Subunit 1A or 1B.

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MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Subunit 1(C) - Juneau

Seasons and Bag Limits

Unit 1(C) except Berner's Bay	Sept. 15 - Sept. 30	One bull.
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Unit 1(C), Berner's Bay drainages only	No open season.
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Harvest and Hunting Pressure

Six moose, all males, were harvested from subunit 1(C) in 1976. Five of the animals were taken along the Taku River and one from St. James Bay. The harvests for the past two seasons have been far below the average of approximately 18 moose per year taken during the 10-year period after 1965.

Analysis of harvest reports shows that all six moose were taken by Alaskan residents. Harvest tickets also show that an additional 65 persons hunted moose unsuccessfully in subunit 1(C) in 1976. Only one nonresident hunter pursued moose in 1(C), but two persons failed to report their residency status. Of the 68 resident hunters who hunted in 1(C) in 1976, 67 were from Juneau. Retired Division Director Frank Jones was hired as a Fish and Game Technician to monitor the harvest along the Taku River. His reports also indicate that five male moose were taken from that river.

Hunter success for the 71 hunters reporting hunting in subunit 1(C) in 1976 was 8.45 percent. Interestingly, there were also 71 hunters reporting in 1975.

There was no open season in Berner's Bay in 1976.

Composition and Productivity

No data were collected during 1976 because there was a complete lack of snow cover during the normal survey period. Aerial surveys over small, isolated moose populations have proven rather unreliable in the absence of snow cover. Transfer of personnel further complicated survey efforts.

Management Summary and Conclusions

An absence of survey data for 1976 and two successive years of very low hunter success suggests a conservative approach is still indicated. Careful watch should be made of the reported increase in wolf predation on moose on the Taku River.

Recommendations

No changes in seasons or bag limits are recommended.

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MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Unit 1(D) - Haines

Seasons and Bag Limits

Unit 1(D)

Sept. 15 - Sept. 30

One moose, by registration hunt, provided that antlerless moose may be taken only on September 15 and 16.

Harvest and Hunting Pressure

Analysis of harvest ticket returns showed that a total of 430 persons hunted moose in the Haines area, Subunit 1(D), during the 1976 season. These persons took 36 males, 18 females and on sexually unidentified moose. Of the successful hunters, 53 were Alaska residents and two were nonresidents. Three hundred sixty-two of the unsuccessful hunters were residents, nine were nonresidents, and nine failed to list their residency. Of the successful Alaska resident hunters, Haines-Skagway residents took 79 percent of the harvest, other southeast Alaska residents took 19 percent and other Alaskans took the remaining 2 percent. Haines-Skagway residents comprised 80 percent of the unsuccessful hunters, other southeast Alaskans comprised 19 percent, and other Alaskans represented 1 percent.

This hunt was controlled through a mandatory checkin-checkout procedure. Under this procedure, supposedly all hunters were contacted by Department personnel. In addition to the public relations aspect of individual hunter contacts, such a procedure enables the game manager to maintain a daily tally of the harvest and to compare the reliability of this harvest measuring procedure with the mandatory harvest ticket system.

Analysis of the check station data shows the contrasting results: 537 persons registered for the Haines hunt. Though thirty-five (6.8%) did not hunt; 58 moose (40 male and 18 female) were checked through. Haines-Skagway residents took 83.3 percent of the Haines area harvest, while residents of other southeastern Alaska communities took the remaining 16.7 percent; Haines-Skagway hunters made up 76 percent of the unsuccessful hunters while residents of other southeastern Alaska communities made up 21.3 percent, nonresidents represented 2.3 percent and Alaskans from northern communities made up the remaining 0.4 percent.

A comparison of the two harvest measuring techniques are presented in Tables 1 and 2. With the exception of total hunters, there is a very close agreement between the two systems. The check station data showed 20 percent more participants than did the harvest ticket data. It should

be remembered that statewide, about 32 percent of the harvest ticket holders do not return their tickets. In a small, localized situation such as occurs at Haines, where there has been a good deal of public relations effort, the return rate is considerably above the 68 percent statewide figure. Then, too, a harvest ticket holder who does not hunt cannot be coded to a specific location. If these two factors were known, it is very likely that the total number of hunters at Haines, as indicated by harvest ticket returns, would be closer to the number of hunters, as indicated by the check station. There were 449 harvest tickets issued by Haines vendors. Since Haines-Skagway residents made up about 80 percent of the hunters, the remaining 20 percent of this hunt's participants would bring the theoretical harvest ticket number of hunters to about 550, or very close to the check station number.

Harvests and hunting pressure for this herd have remained fairly consistent for the past several years. Seasons and bag limits were curtailed during 1974 and 1975.

Composition and Productivity

Lack of an adequate snow cover and transfer of personnel precluded aerial surveys during this reporting period.

The age structure of the Haines moose herd, as indicated by examination of 32 males and 13 females in the 1976 harvest, shows that the herd is relatively young. Yearling age class animals constituted 45.5 percent (n=15) of the males and 53.9 (n=7) of the females. Two-year-olds constituted 24.2 percent (n=8) of the male population and 23 percent of the female population. Three-and-four-year-olds combined represented 27.2 percent of the males harvested (n=9) and 23 percent of the females (n=3). The only other age classes represented were an eight-year-old bull and a nine-year-old cow.

The apparent young age structure would suggest a growing and expanding herd or, more likely, a heavily exploited one. It would also suggest a low predation rate.

An interesting observation is that the greater antler spreads of three-year-old bulls were 38, 39, and 44 inches; three of bulls, age 4-years, were 33, 42.5, and 45 inches. The eight-year-old had an antler spread of only 40.5 inches.

Management Summary and Conclusions

The apparent young age structure of this herd, combined with no sex and age composition data for 1976, suggests that a conservative approach should be continued. The harvest of antlerless animals should not exceed 20-25. The regulations in effect for the 1976-1977 regulatory year seem appropriate. For management purposes, harvest ticket returns provide adequate data. The mandatory checkin-checkout procedure is necessary to maintain a daily record of the harvest to insure that the harvest is held to the desired number.

Recommendations

No changes in seasons or bag limits are recommended.

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Table 1. Comparison of agreement between check station and harvest ticket data among the 60 successful hunters, GMU 1(D), 1976.

Discrepancy	Number of Discrepancy	Percent Agreement
Total hunters	107	80
Location of kill	2	96
Date of kill	2	96
Number of days hunted	3	95
Sex of kill	1	98
Failed to secure permit	1	98
Took moose after returning permit	1	98
Checked moose but no harvest ticket submitted	5	92
Total kill* **	3	95

*Based on 55 kills via harvest ticket and 58 by check station.

**Check station data showed 58 successful hunters. However, one hunter took a moose after checking out and one hunter submitted a harvest ticket and a moose jaw but did not check in or out during the hunt. Harvest ticket returns show a total of 55 successful hunters. Check station data shows 5 additional kills not reported by harvest tickets. Thus a combination of harvest ticket returns and check station data indicates a kill of 60 moose.

Table 2. Comparison of hunter residency and success as measured by check station data and harvest ticket analysis.

Successful			Unsuccessful	
Harvest Ticket	Check Station		Harvest Ticket	Check Station
96.3%	100.0%	Alaskan resident	95.3%	97.7%
3.6	--	Nonresident	2.4	2.3
0.0	--	Unknown	2.4	--
79.0	83.3	Haines-Skagway	80.0	77.8
19.0	16.7	Other Southeast	19.0	21.8
2.0	--	Other Alaska	1.0	4.0

Residency at the time of issuance of the harvest ticket may be different than at the time of a hunt. Therefore, though either might be correct there would be a discrepancy when trying to interpret the data.

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Unit 5 - Yakutat

Seasons and Bag Limits

Unit 5, that portion lying north of Nunatak and Russell Fjord from East Nunatak Glacier and including the area west of Yakutat Bay	Sept. 15 - Oct. 15	One bull
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Remainder of Unit 5	No open season
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Harvest and Hunting Pressure

Hunting pressure was moderate during the first week of the season and light throughout the remainder. Weather conditions and the expense of aircraft charters for moose hunting deterred many hunters. During the season, 17 days were unsuitable or marginal for flying.

Fifteen bull moose were taken during the 1976 season, 2 less than in 1975. Fourteen were taken from the Malaspina Forelands and one from the Nunatak Fjord area. Eight (53%) were taken by residents of Yakutat.

Composition and Productivity

Weather conditions hampered composition surveys. Suitable conditions did not occur until December 17; from December 17 to December 20, approximately 60% of the Yakutat Forelands was surveyed. Subsequently, survey conditions deteriorated and remained poor until March 14 when the remainder of the Yakutat Forelands was surveyed. The Nunatak Fjord area was surveyed on January 18 and portions of the Malaspina Forelands on January 18 and March 22.

- A. Yakutat Forelands (Dec. 17-20). A total of 141 moose were counted and provided the following population statistics: 16 calves, 40 bulls, and 4.6 small bulls per 100 cows.
- B. Entire Yakutat Forelands. A total of 208 moose were counted in 6.1 hours (20.5 moose/hour). Calves comprised 10.6% of the herd.
- C. Nunatak Fjord. A total of 37 moose were counted in 32 minutes (69 moose/hour), comprised of 29 adults and 8 calves (21.6% calves).
- D. Malaspina Forelands. A total of 64 moose were observed and 3 (4.7%) were calves.

The number of moose counted on the Yakutat Forelands (208) in winter 1976-77 was 38% less than the previous year. This difference is probably due

to weather and survey conditions rather than to an actual decrease in the number of moose; moose were dispersed throughout the Forelands in small groups rather than concentrated in larger aggregations near the beach fringe as in winter 1975-76.

Management Summary and Conclusions

The Yakutat Forelands moose population has not changed noticeably, even though the hunting season has been closed for 3 consecutive years. Adverse wintering conditions and predation by wolves and brown bears appear to be the principal contributing factors. It is recommended that the season remain closed for at least one more year.

Data collected on the Malaspina Forelands moose herd during winter 1976-77 were insufficient to evaluate its current state. Although productivity appears to be low, hunting effort and harvest have also been light and it is recommended that no change in seasons or bag limits be made at this time.

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MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Unit 6 - East of Copper River (Martin River area plus
Controller Bay area)

Seasons and Bag Limits

Aug. 20 - Nov.30*

One moose by permit; up to 10
antlerless moose may be taken.
Conditions and number of
permits will be described by
Commissioner's Announcement.

* Season subject to closure by field announcement.

The conditions of this hunt were: (1) permits could be obtained at the Cordova Fish and Game office from August 2 throughout the season; (2) the harvest would be restricted to 20 bulls from the Martin River area and 10 bulls and 10 cows from Controller Bay; (3) successful hunters would be required to report their kill to the Cordova Fish and Game office.

Harvest and Hunting Pressure

The 1976 harvest east of the Copper River was 23 moose: 20 bulls from the Martin River area and three bulls from the Controller Bay area. No cows were taken, even though 10 from Controller Bay were authorized.

The Martin River moose season was closed August 27 after the desired harvest was obtained. The Controller Bay area was open the full three and one-half month season.

Airboats were the major method of transportation used by successful hunters. Seventeen moose (74%) were taken with the aid of an airboat, five by airplane and one by riverboat.

Actual hunting pressure in each area is unknown, but 214 permits were issued. Residents of Cordova received 90 percent of the permits.

Composition and Productivity

Moose composition and ratio data obtained from aerial surveys are shown in Appendix I.

In the Martin River area, 104 calves per 100 cows were observed on June 2, 1976, which was probably the peak of calving. A February 1977 survey revealed 187 moose in the Martin River area, the largest number of animals observed in this area since the severe winter of 1971-1972. An April 1977 survey showed good winter survival. Calves or short yearlings comprised 24 percent of the herd.

The only survey flown in the Bering River-Controller Bay area was in the spring (June 2, 1976). Although the sample size was small, it indicated a good calf crop (92 per 100 cows).

The age composition of the harvest from the Martin River area was eight yearlings (42%), five - 2 1/2, two - 3 1/2, one - 5 1/2 and one - 6 1/2 years old.

Management Summary and Conclusions

The Martin River herd has gradually increased since the severe winter of 1971-1972, and is now at the desired level. Calf production in 1976, and winter survival through the winter of 1976-1977 were excellent. Survey conditions were not suitable in the fall to obtain bull:cow or cow:calf ratios. The winter of 1976-1977 was very mild with little snow. The February 1977 survey revealed moose scattered over most of the summer range.

Little is known about the Controller Bay herd other than it appears to be growing rapidly and that the harvest is minimal. The three and one-half month either-sex season netted a harvest of only three bulls, but hunters are starting to show more interest in the area.

Recommendations

Subdivide the area east of the Copper River into two management areas: Martin River area and Controller Bay area.

Martin River area - 1) retain the current season and 2) allow for a harvest of approximately 20 bulls and 20 cows.

Controller Bay area - retain the current season and bag limit (10 bulls and 10 cows) to stimulate hunter interest in the area.

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APPENDIX I

Moose Sex and Age Ratios - Unit 6

East of Copper River

<u>Area</u>	<u>Date</u>	<u>FF/100 Females</u>	<u>Yrlg % in herd</u>	<u>Calves/ 100 FF</u>	<u>Calf % in herd</u>	<u>Twins/100 FF w/calf</u>	<u>Total Sample</u>
Controller Bay	6/2/76	69.2	10.5	92.3	31.6	50.0	38
Martin River	6/2/76	63.0	14.3	103.7	33.3	80.0	84
Martin River	2/28/77				16.6	8.0	187
Martin River	4/26/77				24.2	0	91

Moose Sex and Age Composition - Unit 6

East of Copper River

<u>Area</u>	<u>Date</u>	<u>Total Males</u>	<u>FF/0</u>	<u>FF/1</u>	<u>FF/2</u>	<u>Total FF</u>	<u>Total Adults</u>	<u>Lone Calves</u>	<u>Total Calves</u>	<u>Yrlgs.</u>	<u>Unid. Sex</u>	<u>Total Sample</u>
Controller Bay	6/2/76	9	5	4	4	13	22		12	4		38
Martin River	6/2/76	17	12	3	12*	27	44		28	12		84
Martin River	2/28/77			25	2		156	2	31		129	187
Martin River	4/26/77	8		22			69				39	91

* One cow with triplets.

Prepared by: Julius Reynolds, Game Biologist III

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Unit 6 - West of Copper River

Seasons and Bag Limits

Sept. 10-25

One moose by permit; up to 20 antlerless moose may be taken. Conditions and number of permits will be described by Commissioner's Announcement.

The conditions of this hunt were: 1) any person could apply for a permit at the Cordova Fish and Game office during August 1976; 2) a public drawing for 40 moose permits was to be held September 3, 1976; 3) a maximum of 20 antlerless moose could be taken; and 4) successful hunters were required to report their kill within 48 hours.

Harvest and Hunting Pressure

During the 1976 season, 39 moose were taken by 38 permit holders. One permittee mistakenly took two moose. The harvest, 20 bulls and 19 cows, is similar to previous either-sex harvests from the west side (Appendix I).

During August, 608 hunters applied for the 40 permits. All but one of the permit holders reported hunting. Permittee success was 95 percent.

Weather during the 16-day season varied from good to miserable, but it did not impede hunting except for two or three days.

Composition and Productivity

Moose survey data are shown in Appendix II. The June 3, 1976 survey revealed an excellent calf crop (70 calves per 100 cows) and excellent winter survival (24 percent yearlings in herd). A good fall composition count was not obtained because of poor flying weather and lack of snow. A February survey gave little useful composition data but did show distribution of moose throughout their summer range. An April 1977 survey revealed 31 percent short yearlings in the herd, indicating excellent overwinter survival.

Management Summary and Conclusions

The moose herd on the west side of the Copper River Delta is a healthy population presently meeting management objectives. Unfortunately, weather conditions did not permit a fall composition count to determine the bull:cow ratio or cow:calf ratio. Judging from calf production in June 1976, and calf percent in the herd in June 1976 as compared to April 1977, reproduction and survival were excellent. Winter 1976-1977

was extremely warm and wet; this herd should be in excellent condition going into spring 1977.

Recommendations

Retain the present season and bag limits.

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APPENDIX I
Moose Harvest - Unit 6
West of the Copper River

<u>Year</u>	<u>Bulls</u>	<u>Cows</u>	<u>Unid.</u>	<u>Total</u>
1960*	25	0	0	25
1961	NO OPEN SEASON			
1962	25	0	0	25
1963	15	2	0	17
1964	15	0	0	15
1965	20	0	0	20
1966	20	1	0	21
1967	23	0	0	23
1968	28	8	0	36
1969	30**	12	0	42**
1970	14	32	0	46
1971	12	27	0	39
1972	24	23	0	47
1973	18	0	0	18
1974	12	28	0	40
1975	16	0	0	16
1976	20	19	0	39

* First harvest since introduction of moose to Unit 6.

** Estimated.

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APPENDIX II

Moose Sex and Age Ratios - Unit 6

West of Copper River

<u>Date</u>	<u>Male/100 FF</u>	<u>Yrlg. % in herd</u>	<u>Calves/ 100 FF</u>	<u>Calf % in herd</u>	<u>Twins/100 FF w/calves</u>	<u>Total Sample</u>
6/3/76	39.5	24.4	69.8	25.2	66.7	119
2/25/77				16.6	8.0	112
4/25/77				31.3	10.0	96

Moose Sex and Age Composition - Unit 6

West of Copper River

<u>Date</u>	<u>Total Males</u>	<u>FF/0</u>	<u>FF/1</u>	<u>FF/2</u>	<u>Total FF</u>	<u>Total Adults</u>	<u>Lone Calves</u>	<u>Total Calves</u>	<u>Yrlgs.</u>	<u>Unid. Sex</u>	<u>Total Sample</u>
6/3/76	17	21	6	12	43	60		30	29	0	119
2/25/77	10		13	2		95		17		70	112
4/25/77	4		18	2		66	8	30		42	96

Prepared by: Julius Reynolds, Game Biologist III

MOOSE

SURVEY-INVENTORY PROGRESS REPORT FOR REGULATORY YEAR 1976-77

Game Management Unit 7 - Seward

Seasons and Bag Limits

Unit 7

Sept. 1 - Sept. 10

One bull

Harvest and Hunting Pressure

Harvest reports show that 490 hunters killed 77 moose during the 1976 season for a success rate of 16 percent (Appendix I). Hunters afield changed little from 492 in 1974 and 462 in 1975. Hunter success rates have remained about constant in the past three years. The 1976 take of 77 was up 17 percent from 1975 (n=66) and 1974 (n=64). Seasons prior to 1974 were 20 days or more in length so comparison with pre-1974 data is inappropriate.

Sixty-seven moose comprising 87 percent of the harvest were taken by resident hunters, 5 (6.5%) were killed by nonresidents and 5 hunters (6.5%) were of unknown residency. The success rate for nonresidents was 31 percent, for residents 15 percent. Relatively few nonresidents hunted Unit 7, presumably because of the limited number of trophy bulls available.

Fish and Wildlife Protection Division data show that a minimum of 21 moose were killed by automobiles in Unit 7 in 1976.

Composition and Productivity

Sex and age composition counts (Appendices II-V) were conducted in Count Areas 10 (Resurrection Creek) and 12 (Juneau Creek). These areas were last surveyed in 1973.

In Count Area 10, the bull/cow ratio of 15/100 showed little change from 1972 (13/100) and 1973 (16/100) figures. Productivity appeared high with 36 calves/100 cows, up 92 percent from the 1970-73 mean of 10/100. Calves comprised 24 percent of the herd. The small bull/cow ratio of 7/100 suggests better than average calf survival through the preceding winter.

Productivity was also high in Count Area 12. The ratio of 35 calves/100 cows was up 27 percent over the 1970-73 mean of 27/100. Calves made up 25 percent of this herd. The bull/cow ratio of 6/100 was down from the 1970-73 mean of 11 bulls/100 cows. The total Unit's bull/cow ratio of 11/100 was the lowest recorded in the 1970's.

Twenty-one moose were killed in highway accidents; 13 bulls, 16 cows and 2 of unknown sex. Of these, there were 12 calves, 2 yearlings, 1 two-year-old and 5 adults.

Management Summary and Conclusions

The limited areas surveyed demonstrated high productivity compared to 1970-73 levels. This high calf survival to fall may be a result of the mild winter weather of the past two years. High precipitation and warm temperatures in the winter of 1976-77 led to near record snowfall at higher elevations, yet very little snow in bottomland moose wintering areas.

The mild winters of 1975-76 and 1976-77 allowed cows to bear healthy and vigorous young. Besides providing a good crop of yearling and two-year bulls for hunters, the influx of young cows into the population augurs well for future productivity.

Despite a relatively constant hunting pressure, hunter success has slowly increased since 1974. This trend is expected to continue through the coming fall.

Recommendations

No changes in seasons or bag limits are recommended at this time.

PREPARED BY:

Paul LeRoux
Game Biologist III

SUBMITTED BY:

John Vania
Regional Management Coordinator

MOOSE - GMU 7 - SEWARD

APPENDIX I

Harvest and Hunting Pressure - Unit 7

<u>Year</u>	<u>Season</u>	<u>Bulls</u>	<u>Cows</u>	<u>Unid.</u>	<u>Total</u>	<u>Hunters</u>	<u>Percent Success</u>
1965	1st	*	*	*	*	*	*
	2nd	*	*	*	*		
	Comb.	60	1	0	61	*	*
1966	1st	*	*	0	*		
	2nd	*	*	0	*		
	Comb.	112	1	0	113	445	25
1967	1st	*	*	*	*		
	2nd	*	*	*	*		
	Comb.	123	1	1	125	414	30
1968	1st	140	1	0	141		
	2nd	19 ²	0	0	19 ²		
	Comb.	160 ²	1	3	164 ²	481	34
1969	Comb.	174	4	1	179	557	32
1970	1st	104	0	1	105		
	2nd	23	0	1	24		
	Ant. ¹	0	14 ³	0	14 ²		
	Comb.	152 ²	14 ³	2	168 ²	520	32
1971	1st	110	14	2	126		
	2nd	25 ²	0	0	25 ²		
	Comb.	153 ²	14	2	169 ²	563	30
1972	1st	111	19	0	130		
	2nd	16	0	0	16 ²		
	Comb.	154 ²	22 ²	0	176 ²	780	23
1973		114	47 ³	0	161	779	21 ⁴
1974		59	2	3	64	492	13
1975		66	0	0	66	462	14
1976		71	0	6	77	490	16

* Data not available.

¹ Antlerless season held December 2-6.

² Total exceeds summation of various seasons because of kills for which data were not given.

³ Data from permit returns.

⁴ Computed using four additional cows shown from permit returns.

Prepared By: Paul A. LeRoux, Game Biologist III

MOOSE - GMU 7

APPENDIX II

Sex and Age Ratios, Survey Area 10, Resurrection Creek

<u>Year</u>	<u>Total MM per 100 FF</u>	<u>Sm.MM per 100FF</u>	<u>Sm.MM per 100 Lg.MM</u>	<u>Sm.MM % in Herd</u>	<u>Sm.MM per 100 MM Calves</u>	<u>Calves per 100 FF</u>	<u>Twins per Calf 100 FF W/Calf</u>	<u>% in Herd</u>	<u>Hours</u>	<u>Animals per Hour</u>	<u>Total Animal</u>
1/30/64	--	--	--	--	--	--	7	20	6	27	174
11/16/66	26	2	10	2	80	6	0	4	--	--	110
	24	4	18	2	25	29	3	19	5	35	168
11/23/70	29	10	53	7	89	18	5	13	4	92	350
11/3/71	37	**	**	**	**	16	3	10	5	81	386
11/29/72	13	1	10	1	11	22	3	16	4	55	218
11/30/73	16	4	28	3	35	20	6	15	4	70	273
1974	No surveys for one-half of drainage only.										
	All bulls not properly identified on survey.										
10/29/76	15	7	82	4	38	36	2	24	3	65	201

Prepared By: Paul LeRoux, Game Biologist III

MOOSE - GMU 7

APPENDIX III

Sex and Age Ratios, Survey Area 12, Juneau Creek

<u>Year</u>	<u>Total MM per 100 FF</u>	<u>Sm.MM per 100FF</u>	<u>Sm.MM per 100 Lg.MM</u>	<u>Sm.MM % in Herd</u>	<u>Sm.MM per 100 MM Calves</u>	<u>Calves per 100 FF</u>	<u>Twins per Calf 100 FF W/Calf</u>	<u>% in Herd</u>	<u>Hours</u>	<u>Animals per Hour</u>	<u>Total Animals</u>
11/61	11	5	75	3	23	39	9	26	--	--	96
12/62	23	15	192	10	54	29	23	19	--	--	229
1&2/64	--	--	--	--	--	--	9	25	--	96	256
1/11/66	--	--	--	--	--	--	0	10	2	87	192
11/16/66	16	3	22	2	26	23	3	16	--	--	237
11/19/70	15	9	128	6	67	26	2	18	3	88	296
11/3/71	10	4	60	3	25	31	4	22		107	222
11/29/72	7	4	120	3	28	27	2	20	3	67	200
11/28/73	12	2	21	2	17	25	0	18	2	80	195
1974	No surveys										
10/29/76	6	3	100	1	18	35	0	25	2	105	176

Prepared By: Paul A. LeRoux, Game Biologist III

MOOSE - GMU 7

APPENDIX IV

Sex and Age Ratios, Unit 7 Total.

<u>Year</u>	<u>Total MM per 100 FF</u>	<u>Sm.MM per 100FF</u>	<u>Sm.MM per 100 Lg. MM</u>	<u>Sm.MM % in Herd</u>	<u>Sm.MM per 100 MM Calves</u>	<u>Calves per 100 FF</u>	<u>Twins per 100 FF W/Calf</u>	<u>Calf % in Herd</u>	<u>Animals per Hour</u>	<u>Total Animal</u>
11/1- 4/71*	22	9	64	6	82	21	9	15	88	1393
1972*										
11/29-12/2	12	2	23	2	15	29	8	21	64	942
11/27,28 30/73*	14	3	23	2	19	28	4	20	63	866
12/4/73**	14	3	32	2	24	29	4	20	59	1321
10/29/76***	11	5	87	3	28	36	1	24	79	377

Remarks: *Count areas 5,6,8,9,10,12,20, & 21

**Count areas 5,6,8,9,10,12,20,21,1,11,13,14,15,16,17,18

***Count areas 10 and 12 only.

Prepared By: Paul A. LeRoux, Game Biologist III

MOOSE - GMU 7

APPENDIX V

Moose Sex and Age Composition, Unit 7 Totals.

<u>Year</u>	<u>Lg. MM</u>	<u>Sm. MM</u>	<u>Total MM</u>	<u>FF W/O</u>	<u>FF W/1</u>	<u>FF W/2</u>	<u>Total FF</u>	<u>Total Ad.</u>	<u>Lone Calves</u>	<u>Total Calves</u>	<u>Unid. Sex & Age</u>	<u>Total Sample</u>	<u>Count Time (Hrs.)</u>	<u>Moose Per Hour</u>
1967	32	19	51	122	50	7	179	230	0	64	3	297	3.4	87
1968														
11/12/68														
2/8/69	45	27	72	346	156	8	510	582	3	175	35	792	14.8	54
11/12 & 12/13/69														
1/2/70	22	9	31	217	67	15	299	330	3	100	0	430	8.2	52
1970														
11/19-24														
12/1-2	94	56	150	586	160	11	757	907	1	183	0	1090	12.4	88
1971														
11/1-4	132	84	216	782	163	17*	962	1178	6	204	11	1393	15.7	89
1972														
11/29- 12/2	66	15	81	487	165	14	666	747	2	195	0	942	14.8	64
1973a	69	16	85	455	149	6	610	695	8	169	2	866	13.7	63
1974	--	--	--	--	6	2	8	8	0	10	11	29	--	--
1975	1	1	2	39	27	1	67	69	0	29	0	98	2.0	49
1976	15	13	28	170	86	1	257	285	4	92	0	377	4.8	79

* Includes one set of triplets.

PREPARED BY: Paul A. LeRoux, Game Biologist III

MOOSE

SURVEY-INVENTORY PROGRESS REPORT FOR REGULATORY YEAR 1976-77

Game Management Unit 9 - Alaska Peninsula

Season and Bag Limits

Unit 9, that portion south and west of a line drawn from the head of Port Moller Bay to the head of American Bay.	No open season	
Unit 9, that portion which drains into Shelikof Straits and Cook Inlet between Unit 16 and Katmai National Monument.	Sept. 10-Sept. 30	One antlered moose
Unit 9, that portion which drains into Bristol Bay north of the King Salmon River which flows into Egegik Bay.	Sept. 10-Sept. 30 Dec. 1-Dec. 31	One moose, provided that antlerless moose may be taken only from Dec. 1-Dec. 31.
Remainder of Unit 9	Sept. 10-Oct. 10 Dec. 1-Dec. 31	One moose, provided that antlerless moose may be taken only from Dec. 1-Dec. 31. Antlered moose must have a minimum antler spread of 50 inches or three brow tines on one side of the antlers.

Harvest and Hunting Pressure

The total reported harvest for 1976 was 248 moose (Appendix I). Bulls comprised 78 percent of the total (194 bulls) with an additional 44 cow moose taken during the December antlerless seasons. Residents took 55 percent of the harvest and the overall hunter success was 47 percent. Cook Inlet drainages produced 8 moose, the area to the north of the King Salmon River (Egegik Bay) produced 129, and the portion of the unit open to hunting under antler size restrictions, 95 moose, according to harvest report data. Location of kill was not specified for 16 moose. The early season produced 73 percent of the harvest and 87 percent of the bull harvest.

Composition and Productivity

June calving surveys provided data on calf production and survival in the Mother Goose Lake area following parturition (Appendix II). Results indicate poor calf production with a maximum of only 18 newborn calves per 100 cows. Fall sex and age composition surveys (Appendices III and IV) substantiate the poor reproductive success observed in the spring. The fall calf-cow ratios for individual trend areas varied from a low of 5 calves per 100 cows to a high of 25 calves per 100 cows with a mean for fall data of 14 calves per 100 cows. For the seventh successive year, the moose population in the central portion of the Alaska Peninsula experienced poor reproductive success (Appendix V).

Management Summary and Conclusions

The numbers of moose west of the King Salmon River (Egegik Bay) has declined significantly since the late 1960's. The area has been popular with recreational hunters and has historically produced about 60 percent of the Unit's annual harvest. In 1976, as part of a study initiated to evaluate trophy management techniques, hunting for antlered bulls was restricted to those with a minimum antler spread of 50 inches or with three brow tines on one side of the antlers. This regulation protected younger age class bulls with sub-legal antlers and thereby reduced the total number of bulls legally available to hunters. Under the minimum antler size standards, the study area produced only 38 percent of the total harvest. The reduced harvest level was the result of several factors; a declining moose population, fewer legal bulls due to younger bulls possessing sub-legal antlers, and a shift in hunting pressure to areas with more liberal regulations. In the Branch (Alagnak) River-Naknek River drainages of the unit that have averaged 55 moose harvested annually in the past, harvest increased to 90 moose.

As a part of the study was the requirement that all antlers from the central portion of the Alaska Peninsula be sealed and that the lower jaw be surrendered for age determination. A combination of harvest reports and sealing data, places the study area harvest at a minimum of 102 moose (94 sealed, 3 unsealed, and 5 antlerless moose). This first year's data suggests that the public is capable of using minimal antler standards to identify a legal moose under field conditions. From 94 moose sealed, accurate antler spread data were obtained from 84 and only five of these failed to meet legal minimums. The mean spread for the 84 antlers was 55 1/2 inches, and the mean age of 82 bulls where age data were available was 5.6 years. The minimal size antler standards imposed by the study apparently discouraged Alaskan residents from hunting the area with the result that harvest figures from the study area are significantly different from those of the remainder of the unit. Of the moose sealed, Alaskan residents harvested 22 percent from the study area, compared to unit wide harvest report data of 55 percent resident success. No significant differences were noted between the mean antler size or age of moose sealed by residents vs. nonresidents, or guided vs. un-guided hunters. Data for the first year of the study (Appendices VI and VII) are insufficient to fully evaluate the study, and additional years of data are necessary.

The effect of sport hunting on the sex composition of the moose population remains evident in the fall survey data (Appendices III and IV). The bull:cow ratios for heavily hunted areas apparently did not decline further in the past year. The mean ratio for all survey areas open to hunting was 17 bulls per 100 cows as compared to data from the unhunted Katmai Trend area of 58 bulls per 100 cows. Data for some individual trend areas indicated a slight improvement, but because of small sample sizes, the increases could be the result of sampling bias rather than actual improvements. In all areas the existing bull:cow ratios are biologically adequate to maintain a high incidence of pregnancy in mature cows. Higher bull:cow ratios, however, are desirable if management of bulls in the central portion of the unit is to continue to emphasize recreational-trophy hunting. The restrictions included in the trophy management study should raise the bull:cow ratio by protecting younger age class (sub-legal) bulls from sport hunting.

Reproductive success for moose in the central portion of the Alaska Peninsula has been poor since 1970 (Appendix V). The low recruitment indicated by both spring (Appendix II) and fall survey data (Appendix III and IV) suggest that recruitment has not been sufficient to replace hunting and natural mortalities. As a result, the population has declined and is now estimated at about half that present in the late 1960's. The decline is substantiated by historical data for individual survey areas (Appendix VIII).

The causes of the poor reproductive success are undetermined, but probably related to range abuse associated with high moose numbers in the 1960's. Data needs to be obtained on pregnancy rates and condition of cows in late winter to assess their reproductive capabilities. In addition, mortality factors for calves following parturition need to be identified. Until data are available to accurately assess existing problems, management must be based upon conservative biological parameters.

The major part of the harvest in GMU 9 is by nonresidents and Alaskan residents living in other areas of the State. Therefore, the overall trend of the hunt has appeared to be recreational rather than "subsistence" oriented. However, use by local residents, as derived from harvest reports, has been increasing. In 1976, the local resident harvest increased to 27 percent (67 moose) of those reported. The actual harvest by local residents is not accurately reflected by harvest report data, however; village residents submit harvest reports, so actual local harvest is higher. In outlying areas, moose provide a major portion of winter meat needs for local residents. The December antlerless moose season is important in providing for these needs. The cold early winter weather following freeze-up allows snow machine travel along frozen waterways as well as providing long term storage for the meat without need of modern refrigeration or freezer systems. The use of moose to provide for local domestic needs shall continue to have the highest priority among competing resource uses. Attempts must be continued to obtain accurate harvest data from local residents in order to properly assess their level of use and dependency on the resource.

Recommendations

To properly manage moose, we must recognize that different priorities of use have become established in different sections of the Alaska Peninsula. Much of the protein needs of local residents can be provided for with a late antlerless season which is approximately timed to coincide with early winter weather which facilitates snow machine travel. Also, this time period normally attracts minimal numbers of recreational hunters which reduces competition with local residents. A short September bulls-only season for the northern portion of the unit would provide both recreational hunting and early meat hunts by local residents. In the central portion of the unit, complementing the early bull season, the 50-inch-three-brow-tines antler regulation is needed to evaluate the trophy management study and to maintain a reduced harvest level. The tip of the Alaska Peninsula south and west of Port Moller-American Bay should remain closed to hunting until a viable population has been established.

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SUBMITTED BY:

John S. Vania
Regional Management Coordinator

MOOSE - GMU 9 - Alaska Peninsula

APPENDIX I

Moose Harvest and Hunting Pressure - Unit 9

Year	Bulls	Cows	Unid.	Total	Hunters	Percent Success
1964	185	64	0	249	-	-
1965	213	68	4	285	-	-
1966	240	75	8	323	519	62.2
1967	301	68	9	378	509	74.3
1968	366	72	5	443	583	76.0
1969	317	70	6	393	527	74.6
1970	266	84	2	352	457	77.0
1971	317	116	7	440	591	74.5
1972	454	91	11	556	773	71.9
1973	607	206	26	839	1175	71.4
1974	520	167	18	705	1072	65.8
1975	222	0	10	232	436	53.2
1976	194	44	10	248	533	46.5

PREPARED BY: James B. Faro, Game Biologist III

MOOSE - GMU 9 - Alaska Peninsula

Mother Goose to Dog Salmon

APPENDIX II

Moose Productivity, Unit 9 - Alaska Peninsula 1976

Date	Calves per 100 FF	Calves per 100 FF and Yearlings	Percent FF with Calves	Twins per 100 FF with Calf	Total Sample
June 1	18	15	13	39	126
June 11	14	12	11	25	115
June 22	15	14	13	14	167

Date	Total Calves	Total Cows & Yearlings	Total Cows	Total Cows w/Twins
June 1	18	117	100	5
June 11	10	83	74	2
June 22	17	123	112	2*

* One cow observed with triplets

PREPARED BY: James B. Faro, Game Biologist III

MOOSE - GMU 9 - Alaska Peninsula

APPENDIX III

Moose Sex and Age Ratios, 1976 - Alaska Peninsula - Unit 9

Trend Area	Total MM per 100 FF	Small MM per 100 FF	Small MM per 100 Large MM	Sm. MM % in Herd	Small MM per 100 MM Calves	Calves per 100 FF	Twins per 100 FF w/calf	Calf % in Herd	Moose per Hour	Total Sample
Mother Goose	14	1	11	1	20	14	0	11	57	91
Flats A	11	1	14	1	57	5	0	4	202	168
Flats B	12	0	0	0	0	9	12	8	140	116
Dog Salmon	34	11	50	7	117	20	9	13	57	94
Ugashik Lakes	50	10	25	6	80	25	0	14	25	35
Katmai *	58	13	28	7	118	22	6	12	94	282
Totals	29	6	25	4	82	14	6	10	85.8	786

* Trend area within Katmai National Monument, no hunting allowed.

PREPARED BY: James B. Faro, Game Biologist III

MOOSE - GMU 9 - Alaska Peninsula

APPENDIX IV

Moose Sex and Age Composition - Unit 9 - 1976

Trend Area	Date	Lg. MM	Sm. MM	Total MM	FF W/0	FF W/1	FF W/2	Total FF	Total Adults	Total Calves	Unid. Sex & Age	Total Sample
Mother Goose	Nov. 2	9	1	10	62	9	0	71	81	10	0	91
Flats A	Nov. 2	14	2	16	138	7	0	145	161	7	0	168
Flats B	Nov. 2	11	0	11	88	7	1	96	107	9	0	116
Dog Salmon	Nov. 3	14	7	21	50	10	1	61	82	12	0	94
Ugashik Lakes	Nov. 3	8	2	10	15	5	0	20	30	5	0	35
Katmai *	Nov. 4	71	20	91	125	30	2	157	248	34	0	282
Totals		127	32	159	478	68	4	550	709	77	0	786

* Trend area within Katmai National Monument, no hunting allowed.

PREPARED BY: James B. Faro, Game Biologist III

MOOSE - GMU 9 - Alaska Peninsula

APPENDIX V

Moose Sex and Age Ratios - Unit 9, 1962-1976

Year	Total MM per 100 FF	Small MM per 100 FF	Sm. MM per 100 Lg. MM	Sm. MM % in Herd	Sm. MM per 100 MM Calves	Calves per 100 FF	Twins per 100 FF w/calf	Calf % in Herd	Moose per Hour	Total Sample
Nov., 1962	99	19	24	8	115	33	24	14	91	1,113
Nov., 1963	62	12	24	6	98	24	18	13	104	1,852
Nov., 1964	68	12	21	6	138	17	10	9	146	1,312
1965*	-	-	-	-	-	-	-	-	-	-
Nov., 1966	74	14	23	7	86	32	16	15	96	786
Oct., 1967	73	14	23	7	121	24	30	12	89	1,447
Oct., 1968	63	9	16	5	85	21	19	11	164	1,619
Nov., 1969	54	19	53	10	149	25	14	14	65	620
Nov. & Dec., 1970	45	15	49	9	119	12	11	8	93	1,016
Oct., & Nov., 1971	47	11	32	7	220	10	5	7	106	1,091
Nov., & Dec., 1972	51	12	30	7	170	14	7	8	91	954
Dec., 1973	31	5	20	4	119	9	11	6	65	677
Nov., 1974	23	6	33	4	84	14	5	10	91	1,402
Nov., 1975	36	8	27	5	116	13	14	9	72	938
Nov., 1976	29	6	25	4	83	14	6	10	85	786

*Sex and age composition counts were not conducted in 1965

PREPARED BY: James B. Faro, Game Biologist III

MOOSE - GMU 9 - Alaska Peninsula

APPENDIX VI

Moose Antler-Age Relationship, 1972-1976

Year	Antler Spread			Mean Age	Sample Size
	% Less than 50"	% Greater than 50"	% Greater than 60"		
1972	0	100	76	6.9	25
1973	8	92	63	6.4	48
1974	6	94	46	7.5	78
1975	40	61	16	5.4	38
1976 *	11	89	30	5.6	84

*Moose antler sealing data

APPENDIX VII

Moose Antler Sealing Data, Alaska Peninsula, 1976

	Resident	Nonresident	Guided	Non-guided	Total Sample
No. sealed	21	73	61	33	94
Mean antler spread (inches)	55 (19)	56 (65)	57 (54)	55 (30)	84
Mean age (years)	5.1 (17)	5.7 (65)	5.8 (56)	5.1 (26)	82
Sub-legal antlers	3	2	2	3	5

PREPARED BY: James B. Faro, Game Biologist III

APPENDIX VIII

Fall Sex and Age Composition Trend Area Data, Moose
Individual Trend Area Sample Size, 1962-1976.

Trend Area	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Mother Goose	486	255	597	--	94	844	691	242	216	348	278	238	254	123	91
Cinder River	265	82	424	--	270	11	373	--	338	--	--	--	142	--	--
Ugashik Lakes	124	--	--	--	147	18	--	93	--	--	--	69	--	--	35
Dog Salmon River	238	213	291	--	275	72	--	--	324	241	--	--	139	--	94
Chekok	--	--	--	--	--	--	--	34	--	7	--	--	--	--	--
Katmai	--	--	--	--	--	--	--	251	--	260	350	178	362	339	282
Patch	--	--	--	--	--	--	--	--	41	147	113	135	155	71	90
Meshik	--	--	--	--	--	--	--	--	97	88	87	57	49	--	--
Pacific	--	--	--	--	--	--	--	--	--	--	126	--	108	--	--
Savonoski	--	--	--	--	--	--	--	--	--	--	--	--	--	193	--
Flats A	--	--	--	--	--	--	--	--	--	--	--	--	209	161	168
Flats B	--	--	--	--	--	--	--	--	--	--	--	--	139	122	116

PREPARED BY: James B. Faro, Game Biologist III

MOOSE

SURVEY-INVENTORY PROGRESS REPORT FOR REGULATORY YEAR 1976-77

Game Management Unit 11 - Chitina Valley and the eastern half of
Copper River Basin

Season and Bag Limits

Unit 11	Sept. 1-Sept. 20	One bull
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Harvest and Hunting Pressure

Forty-eight moose were reported harvested in Unit 11 during the 1976 season by 196 hunters. This is the second lowest harvest since harvest report information became available in 1963. The lowest harvest was in 1975. Since the elimination of the November season in 1975, and the corresponding initiation of bull-only seasons, harvest, hunting pressure and hunter success have been significantly reduced (Appendix I).

Prior to 1975, the moose harvest averaged 164 animals (123-242). In the last two years an average of 44 moose was taken (40-48).

Between 1966 and 1974 an average of 431 hunters reported in Unit 11. In the last two years reporting has fallen to an average of only 180 hunters, a 58 percent decline. Hunter success has been consistent at 24 percent in the last two years, the lowest percentages since 1966.

Composition and Productivity

Moose sex and age composition surveys have been conducted periodically since 1955 in count area 11 (Mount Drum), and in count area 18 (Nabesna Road) since 1965. The Hanagita-Bremner count (11-09) was surveyed during 1976 and results are shown in Appendix II. In recent years, the numbers of moose observed in these count areas have been insufficient to permit conclusions about the trend in sex and age ratios. In 1974, new count areas were designed which would yield a larger sample of moose and which would sample moose in previously uncounted areas. These count areas correspond to moose harvest units and will be useful in developing management strategies for specific areas within Unit 11.

Management Summary and Conclusions

Moose populations in Unit 11 declined during the early 1970's, and the number of moose observed in recent surveys is too low to demonstrate trends in the sex or age ratio of the population. Recently established count areas have not been in existence long enough or counted often enough to show population trends. Harvests have been markedly reduced in Unit 11, primarily due to hunting season and bag limit restrictions initiated in 1975. Although these seasons seem excessively restrictive, before they can be altered, further information is needed to accurately assess trends within the moose population.

Recommendations

1. Additional areas within Unit 11 should be flown to obtain population information over more of the moose habitat in Unit 11.
2. Moose count areas established in 1974 should be surveyed annually to determine trends in the moose population.
3. Until additional information is available, the season in Unit 11 should conform with adjacent units.
4. Collection of data should be discontinued in areas within the proposed national parks if management authority of game is withdrawn from the state.

PREPARED BY:

Ted Spraker
Game Biologist II

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

APPENDIX I. Moose Harvest and Hunting Pressure - Unit 11
Based on harvest report data.

Year	Harvest				Hunters	Percentage Success
	Male	Female	Unid.	Total		
1963	86	37	0	123		
1964	89	38	0	127		
1965	116	70	2	188		
1966	89	69	5	163	263	62%
1967	108	70	2	180	317	57%
1968	99	34	8	141	293	48%
1969	101	59	2	162	378	43%
1970	126	115	1	242	562	43%
1971	90	89	2	181	546	33%
1972	86	55	5	146	525	28%
1973	105	77	5	187	594	32%
1974	79	43	1	123	397	31%
1975	38	0	2	40	164	24%
1976	48	0	0	48	196	24%

PREPARED BY: Ted Spraker, Game Biologist II

Appendix II. A Comparison of Moose Sex and Age Composition Data, Unit 11.

<u>Year</u>	<u>Large Males per 100 Females</u>	<u>Small Males per 100 Females</u>	<u>Calves per 100 Females</u>	<u>Moose per Hour</u>	<u>Sample Size</u>
<u>Mt. Drum Count Area</u>					
1955*	116	29	36	75	300
1956*	130	15	30	55	55
1957*	64	7	39	92	92
1958*	128	12	34	94	291
1960*	64	16	36	48	110
1961-64	NO DATA				
1965*	55	25	19	81	268
1966	NO DATA				
1967	62	10	29	117	456
1968	NO DATA				
1969	54	11	28	85	299
1970*	46	15	14	59	199
1972	47	5	10	69	250
1973	73	6	12	25	97
1974	53	5	13	16	65
1975	39	7	14	16	70
1976	NO DATA				
<u>Nabesna Road Count Area</u>					
1965*	22	20	39	52	83
1968*	14	5	12	44	140
1971	11	0	24	20	50
1972	0	6	20	16	39
1973	---**	---**	---**	5	15
1974	23	8	69	7	52
1975	NO DATA				
1976	NO DATA				
<u>Hanagita-Bremner Count Area (MMU 11-09)</u>					
1976	42	7	54	32	83

* Area boundary change.

** Data of no value because of small sample size.

PREAPRED BY: Ted Spraker, Game Biologist II

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Unit 12 - Upper Tanana-White River

Period Covered: January 1, 1976 - June 30, 1977

Seasons and Bag Limits

Unit 12 Sept. 1 - Sept. 20 One bull

Harvest and Hunting Pressure

Data obtained from harvest tickets indicated that 70 moose were taken from Unit 12 during the 1976 season. During the past 10 years, annual harvests averaged 140 moose. Slightly more than half of the 1976 harvest occurred during the first half of the season. Twenty-eight moose (40% of the 1976 harvest) were taken in the Tok-Little Tok River drainage. Harvest figures from other drainages were as follows: Tanana 14 (20%), Nabesna 10 (14%), Chisana 9 (13%) and the White 6 (9%). The location of the remaining three moose (4%) was not reported or could not be determined from harvest tickets.

Of the successful hunters, 60 percent were residents and 38 percent were nonresidents. Residency was unspecified on two percent of the harvest tickets. Among unsuccessful hunters 213 (96%) were residents and 6 (3%) were nonresidents. Residency status on three harvest tickets could not be determined.

Composition and Productivity

The calf to cow ratio of 19:100 derived from aerial surveys in Unit 12 during November 1976 was approximately the same as that for the eight year (1968-75) average. The 1976 bull to cow ratio of 11:100 was considerably below the nine year (1967-75) average. These ratios, in themselves, are not cause for alarm, but the marked decline from the nine year average in total number of moose warrants serious concern. This decline reflected in part extremely low survival of the 1975 calf crop.

During 1976, the calf to cow ratio in the Little Tok drainage was 17:100, up slightly from the 14:100 observed in 1975. The bull to cow ratio in this drainage declined to 18:100 which indicated that the harvest had again exceeded recruitment. A total of 204 moose (64 per hour) were observed in the Little Tok drainage during the 1976 fall surveys. During the period 1972-75, an average of 732 moose (83 per hour) were observed during such surveys.

During an aerial survey of the Tok River valley on February 7, 1977, 128 moose (107 per hour) were observed. Based on this sample calves comprised 25 percent of the herd. This was the first time such surveys were conducted, hence comparative data are not available.

Range and Habitat

Snow depth and browse utilization was monitored during the winter of 1976-77 (see 1975 Unit 12 Moose Survey and Inventory Report for procedures).

Snowfall was moderate during the winter of 1976-77, and after late December, snow cover was approximately 24 inches in depth. The majority of moose occupying the Tok River moved to the valley floor in late December. Browse utilization on critical winter range was moderate and showed about 80 percent utilization in areas examined.

Population Trends

Moose populations remained very low in the Nabesna Road area as evidenced by aerial surveys conducted there during December 1976. Abundance of moose in this area has shown little change despite a total closure to hunting since 1974.

Recruitment remained low in the portions of Unit 12 surveyed, and despite relatively good calf production in 1974 (32 calves per 100 cows during fall) it is believed that the adult moose population in the unit declined during 1976. Moose appeared to be less abundant than during previous years except in the Little Tok River drainage where total numbers probably remained unchanged from recent years.

Moose were so sparse in the foothills on the north of the Alaska Range between Tok and the Robertson River that it was impossible to obtain a sample of adequate size to determine trends. Until recruitment increases significantly throughout the unit, little or no increase in the population is possible.

Management Summary and Recommendations

Because of continued low recruitment, it is recommended that short, bulls-only seasons be allowed in Unit 12. If the bull to cow ratio continues to decline, further season restrictions may be necessary. Presently, however, no changes in the season or bag limit are recommended.

PREPARED BY:

SUBMITTED BY:

Larry B. Jennings
Game Biologist III

Oliver E. Burris
Regional Management Coordinator

MOOSE

SURVEY-INVENTORY PROGRESS REPORT REGULATORY YEAR 1976-77

Game Management Unit 13 - Upper Susitna, Nenana, Delta, Copper and Matanuska River drainages.

Seasons and Bag Limits

Unit 13	Sept. 1-Sept. 20	One bull
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Moose hunting regulations in Unit 13 remain unchanged since 1975. The 20 day season is the result of progressively more restrictive regulations designed to stop declining bull ratios. Female moose have not been legally hunted since 1971.

Harvest and Hunting Pressure

The reported harvest for GMU 13 totaled 732 moose. Appendix I shows that both moose harvest and hunting pressure increased in 1976 while success ratios dropped slightly for the second consecutive year. Unit 13 contributed 18 percent of the statewide moose harvest, which is a decrease from recent years.

Appendix II shows the method of transportation used by successful moose hunters in Game Management Unit 13. The percentage of successful hunters using off-road vehicles continued to increase while the percentage of successful hunters using aircraft decreased slightly.

Composition and Productivity

Sex and age composition data since 1954 are shown in Appendix III. Both bull:cow ratios and calf:cow ratios increased slightly over the 1975 level although they remain substantially lower than levels recorded during 1950's and 1960's. Increases in ratios were not recorded in every count area; some count areas continued to decline. The cause of poor calf survival is being studied, but the study is not complete and findings are inconclusive.

Management Summary and Conclusions

Unit 13 apparently suffered a severe decline in moose population during the winter of 1971. This decline resulted in a 39 percent reduction in total harvest, a reduction in bull:cow ratios and a reduction in calf:cow ratios. Subsequently, moose seasons have been shortened to protect the smaller numbers and ratios of bulls remaining. Since 1971,

there is no clear trend towards a continuing decline, but both bull and calf ratios have remained low. Present harvest levels are apparently not further depressing bull ratios, but low calf survival is not allowing bull ratios to increase. Major efforts to determine calf mortalities are now in progress and are needed for management purposes.

Recommendations

- 1) Retain present season for the 1977 regulatory year.
- 2) Continue monitoring harvests and sex and age composition.
- 3) Obtain results of intensive research effort as they become available and utilize these findings to increase moose populations to optimum levels.
- 4) If declines in population levels and bull:cow ratios occur, implement appropriate restrictions to reduce harvest levels.

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Game Biologist III

SUBMITTED BY:

James B. Faro
Regional Management Coordinator

MOOSE - GMU 13 - Nelchina Basin

APPENDIX I

A Comparison of Annual Moose Harvest and Hunting Pressure

Year	Season	Male	Female	Unknown	Total	Hunters	Percent Success
1963	Total	1385	343	7	1735		
1964	Total	1213	394	0	1607		
1965	Total	1318	3	10	1331		
1966	Total	1336	181	36	1553	4163	37%
1967	1st	1009	319				
	2nd	112	0				
	Total	1217*	319	16	1552	4027	38%
1968	1st	1013	243				
	2nd	171	0				
	Total	1240*	243	29	1512	4476	34%
1969	1st	817	0				
	2nd	87	7	8			
	Total	1204	7	8	1219	3381	36%
1970	1st	746	56	14			
	2nd	271	58	8			
	Total	1141*,**	158*	30*	1329	3585	37%
1971	1st	703	333				
	2nd	205	338				
	Total	1126*	671***	18	1815	4881	37%
1972	1st	559	5	7			
	2nd	39	2	1			
	Total	689*	7*	16*	712	3199	22%
1973	Total	604	4	10	618	2513	24%
1974	Total	768	3	23	794	2770	29%
1975	Total	690	2	23	715	2978	24%
1976	Total	708	1	23	732	3122	23%

* Moose whose date of kill is unknown are included in the total.

** Adult, antlerless bulls killed during the late antlerless season are included.

*** Data from antlerless permit returns. Harvest ticket returns indicated a female kill of 614.

PREPARED BY: Sterling Eide, Game Biologist III

MOOSE - GMU 13 - Nelchina Basin

APPENDIX II

Transportation Trends of Successful Hunters Since 1967^a.

TRANSPORTATION TYPE

Year	Airplane	Horse	Boat	Motorbike	Snowmachine	Off-road Vehicle	Highway Vehicle And Afoot	Sample Size
1967, %:	22%	2%	4%	—	1%	34%	37%	
No.:	310	26	57	—	21	475	525	1414
1968, %:	19%	3%	6%	—	3%	34%	34%	
No.:	288	39	85	—	52	515	517	1496
1969, %:	22%	2%	5%	<1%	2%	30%	39%	
No.:	260	18	55	9	26	357	470	1195
1970, %:	20%	2%	4%	<1%	10%	25%	39%	
No.:	259	24	52	5	131	323	505	1299
1971, %:	19%	3%	8%	<1%	11%	24%	33%	
No.:	349	57	141	12	206	436	596	1797
1972, %:	34%	7%	8%	<1%	5%	28%	18%	
No.:	252	51	57	5	37	210	132	744
1973, %:	36%	3%	8%	<1%	<1%	32%	20%	
No.:	229	21	50	4	1	201	123	629
1974, %:	24%	3%	10%	1%	<1%	38%	23%	
No.:	201	29	82	11	1	320	190	834
1975, %:	26%	4%	8%	1%	<1%	41%	19%	
No.:	186	26	61	8	1	297	139	718
1976, %:	23%	5%	9%	<1%	<1%	43%	20%	
No.:	160	32	64	3	1	301	141	702

a. Because of hunters using more than one transportation type or not reporting any transportation types, the numbers and percentages used should be interpreted as levels rather than as absolute values.

PREPARED BY: Sterling Eide, Game Biologist III

MOOSE - GMU 13 - Nelchina Basin

APPENDIX III

Moose Population Composition Counts, Nelchina Basin, 1952 - 1976

Date	Tot. MM per 100 FF	Sm MM per 100 FF	Sm MM Per 100 Lg. MM	Sm MM % in Herd	Sm MM Per 100 M calves	Calves per 100 FF	Incidence of twins per 100 FFw/calf	Calf % in herd	Animals per hour	Total sample
1952	61	14	29	7	68	40	17	20	N/A	683
1953	107	38	56	12	86	90	17	29	N/A	1100
1954	109	28	35	10	72	79	16	27	N/A	1700
1955	93	29	45	12	107	54	10	22	N/A	2146
1956	64	12	24	7	95	26	1	14	37	1099
1957	69	16	31	8	78	42	6	20	N/A	2295
1958	66	11	20	6	60	38	4	18	115	3490
1959	NO DATA									
1960	84	20	32	8	73	56	12	23	56	1367
1961	67	22	49	10	96	46	11	22	76	2764
1962	66	18	43	9	128	27	5	14	92	2534
1963	55	14	34	7	68	40	6	21	124	2059
1964	LATE COUNT--SEX COMPOSITION NOT USABLE									
1965	46	12	36	7	93	26	2	15	82	5931
1966	40	6	19	4	48	27	2	16	60	4534
1967	38	8	29	5	61	28	3	17	68	5338
1968	30	5	19	3	29	33	4	20	63	3042
1969	27	10	60	6	61	33	5	20	57	4096
1970	30	8	38	5	60	28	8	17	52	4549
1971	24	7	41	5	61	23	7	16	53	5256
1972	18	4	26	3	41	18	3	13	45	3994
1973	20	7	50	5	80	16	4	12	43	4830
1974	17	6	53	4	41	29	7	20	42	4297
1975	15	5	42	4	61	15	5	12	41	3105
1976	16	6	54	4	56	20	5	15	41	4424

PREPARED BY: Sterling Eide, Game Biologist III

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Subunit 14A - Palmer

Seasons and Bag Limits

Sept.1-Sept.20

One bull

The local advisory committee rejected the Game Division's antlerless moose hunt proposal for 1976.

Harvest and Hunting Pressure

The reported harvest for Subunit 14A totaled 211 moose: 208 males, 0 females and 3 unknown (Appendix I). The 1974, 1975 and 1976 moose harvests are the lowest recorded in 14A since 1965. Antlerless moose hunts proposed by Game Division during the past four years have been cancelled or have not been endorsed by advisory committees. The bull harvest increased from 166 in 1975 to 208 in 1976, but the number of hunters also increased, resulting in a decrease in hunter success from 19 percent in 1975 to 15 percent in 1976.

Moose mortality from causes other than hunting is presented in Appendix II. Although 1976-77 was not a severe winter, the number of road kills was great and was probably due to increased traffic on the Parks Highway between Fairbanks and Anchorage. Our efforts to tally moose mortality from illegal kills and incidental kills was reduced in 1976-77. The Alaska Railroad tracks were not checked for train kills for the second consecutive year. Most information on moose road kills was provided by the Fish and Wildlife Protection Division of the Department of Public Safety.

The total of 56 moose killed by autos in the winter of 1976-77 was twice as high as in 1975-76, although less effort to obtain that information was made. Twenty-seven females and 7 males killed by vehicles were aged by tooth sectioning; the average ages of road-killed moose was 9 years for females and 4 years for males. The age of the female segment has increased in the absence of antlerless seasons.

Composition and Productivity

In Game Management Subunit 14A, 880 moose were tallied during the annual sex and age composition surveys on November 3 and 4, 1976 (Appendix III). Only three of eight count areas were flown. Bull:cow ratios increased slightly from 15 males:100 females in 1975 to 18 males:100 females in 1976. The lower bull:cow ratio in 1975 was probably because the surveys were conducted in December after some males had already dropped antlers.

The calf:cow ratio in 1976 is the same - 44 calves:100 females recorded in 1975. Calf:cow ratios may decrease in the future if antlerless hunts are not reinstituted to relieve overbrowsing of winter range.

Management Summary and Conclusions

The moose population in Subunit 14A is increasing. Mild winters, the lack of antlerless moose harvests, and the restricted seasons on bulls have contributed to the increment. Concurrently, much human encroachment has taken place, which has decreased available habitat for moose, particularly winter range. Although calf:cow ratios are high and survival appears excellent, reduced winter range and increase in numbers will lead to browse deterioration, which will reduce numbers of moose that can be supported. At that time, we may expect extensive winter kills.

Animal population dynamics are poorly understood by advisory committees and some members of the public, and maintaining appropriate sex ratios and keeping the herd within habitat carrying capacity has proven difficult.

Range rehabilitation would improve moose habitat, but high property values and the expense of rehabilitation nearly preclude these solutions.

Recommendations

Antlerless moose seasons should be initiated as soon as possible, and the present bull season should be continued. Critical winter range has been identified, and a program of browse rehabilitation should be initiated in selected state land areas.

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SUBMITTED BY:

John S. Vania
Regional Management Coordinator

Appendix I. Moose Harvest and Hunting Pressure in Alaska's Game Management Subunit 14A, 1971-1976.

<u>Year</u>	<u>Date</u>	<u>Bulls</u>	<u>Cows</u>	<u>Unid.</u>	<u>Total</u>	<u>Number of Hunters</u>	<u>Percent Success</u>
1971	8/20-9/20	177	0	1	178		
	11/1-11/20	225	0	0	225		
	9/1-9/20 Antlerless	0	101	0	101		
	11/1-11/14 Antlerless	0	233	0	233		
	Unknown Date	127	145	9	281		
	TOTAL	529	479	10	1018	2090	49
1972	8/20-9/20	83	1	1	85		
	11/1-11/20	100	1	0	101		
	9/1-9/20 Antlerless	0	75	0	75		
	To be announced Antlerless	Season Cancelled					
	Unknown Date	29	17	2	48		
	TOTAL	212	94	3	309	No Data	No Data
1973	8/20-9/10	136	0	2	138		
	11/1-11/10	167	0	3	170		
	To be announced Antlerless	Season Cancelled					
	Unknown Date	34	1	3	38*		
	TOTAL	337	1	8	346	1506	23
1974	8/20-9/20	164	0	3	167		
	To be announced Antlerless	Season Cancelled					
	TOTAL	164	0	3	167	1225	14
1975	9/1-9/20	166	1	0	167		
	To be announced Antlerless	Season Cancelled					
	TOTAL	166	1	0	167	893	19
1976	9/1-9/20 One Bull	208	0	3	211	1395	15

* Includes 4 males, 1 female, and 1 moose of unknown sex reportedly taken in October, December, January or February.

PREPARED BY: Jack C. Didrickson, Game Biologist III

Appendix II. Verified Moose Mortality (Excluding Hunting) in Alaska's Game Management Subunit 14A during the Period June 1 - May 31, 1971 to 1977.

Road Kill						Incidental/Train Kill					Illegal Kill					Winter Kill				
*Ad.	Ad.	Calf	?	Tot.		Ad.	Ad.	Calf	?	Tot.	Ad.	Ad.	Calf	?	Tot.	Ad.	Ad.	Calf	?	Tot.
M.	F.	M	F			M.	F.	M	F		M.	F.	M	F		M.	F.	M	F	
<u>1971-72</u>																				
8	35	27	28	11	109	8	17	2	6	11	44	3	30	0	4	8	45	0	6	8
<u>1972-73</u>																				
4	20	6	4	2	36	0	2	0	2	1	5	3	31	2	6	7	49	0	0	0
<u>1973-74</u>																				
2	17	7	5	2	33	1	4	2	6	1	14	1	37	2	2	7	49	1	1	2
<u>1974-75</u>																				
8	28	10	13	4	63	5	16	6	7	1	35	5	24	3	3	5	40	0	0	3
<u>1975-76^{a/}</u>																				
0	20	5	3	1	29	1	2	0	1	1	5	1	8	1	0	3	13	0	1	0
<u>1976-77^{a/}</u>																				
7	28	6	15	0	56	1	4	0	1	1	7	9	6	0	0	0	15	0	1	0

Total Confirmed Non-Hunting Kill

	<u>1971-72</u>	<u>1972-73</u>	<u>1973-74</u>	<u>1974-75</u>	<u>1975-76</u>	<u>1976-77</u>
Adult Male	19	7	5	18	2	17
Adult Female	88	53	59	68	31	39
Calf Male	37	8	13	22	6	6
Calf Female	48	12	16	27	4	17
? Sex &/or Age	<u>31</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>5</u>	<u>1</u>
Total	223	90	103	145	48	80

* Ad.M=Adult Male;Ad.F=Adult Female;Calf M=Calf Male;Calf F=Calf Female; ?=Unknown Sex or Age;Tot.=Total
^{a/} A reduced effort was made to document moose mortality these years. Mortality along the Alaska Railroad Tracks was not tallied during the springs of 1976 and 1977. PREPARED BY: Jack C. Didrickson

Appendix III. Moose Sex and Age Ratios, Game Management Subunit 14A, 1968-1976.

Year	Total MM per 100 FF	Small MM per 100 FF	Small MM per 100 Large MM	Small MM % in Herd	Small MM per 100 MM Calves	Calves per 100 FF	Twins per 100 cows w/Calf	Calf % in Herd	Moose per Hour	Total Moose
1968	16	7	71	4	28	48	6	29	54	2378
1969	Sex and age composition counts were not conducted due to unfavorable weather conditions.									
1970	9	4	72	2	18	42	8	28	49	2362
1971	10	6	134	4	28	40	3	26	35	2063
1972	9	5	153	4	36	29	2	21	28	1395
1973	6	3	144	2	16	42	6	28	46	1982
1974	12	8	196	5	38	42	7	27	38	1932
1975 ^{a/}	15	11	250	6	50	44	6	26	49	682
1976 ^{a/}	18	9	96	6	41	44	6	27	51	880

^{a/} Only count areas 1, 8 and 5 of 8 count areas in Subunit 14A were surveyed.

PREPARED BY: Jack C. Didrickson, Game Biologist III

MOOSE

SURVEY-INVENTORY PROGRESS REPORT FOR REGULATORY YEAR - 1976-77

Game Management Subunit 14B - Willow to Talkeetna

Seasons and Bag Limits

Sept. 1-Sept. 20

One bull

Harvest and Hunting Pressure

The final reported moose harvest in Subunit 14B totaled 40 moose, 38 bulls and 2 unidentified (Appendix I). Harvest and hunter success values have increased from the previous year. Reduced harvest since 1971 resulted from cancelled antlerless hunts, elimination of the November season and shortening of the early season. The September moose season was shortened during 1975 to conform with seasons in adjacent units, and remained restricted in 1976.

Verified non-hunting mortality of moose in Subunit 14B is shown in Appendix II. Less effort was made to document non-hunting moose mortality during 1976-77 and the information is not comparable to prior years. Mortality due to road and train kills and winter starvation has been higher during severe winters (1970-71 and 1971-72) than during mild winters, such as the winter of 1976-77.

Composition and Productivity

Total bull:cow ratios declined to a low of 11 bulls per 100 cows in 1973 but have apparently recovered (Appendix III). Low bull:cow ratios have been relatively consistent during the 1970's, whereas calf:cow ratios have varied within a normal range. This implies substantial overwinter calf mortality on the over browsed winter range. However, errors in classification of yearling bulls may occur to a larger extent than expected; these may be classified as adult bulls (due to rapid antler growth) or as cows (due to decreased visibility of smaller antlers in timbered areas). Prior to 1976, calf:cow and twin:cow ratios have been high relative to values in interior Alaska. There has been evident biological cause for the subsequent decline in calf:cow values, but counting conditions have been less than ideal in several areas. Considering the decline in hunting mortality and the lack of correlation between this mortality and the population data, it is possible that variations in the composition data may reflect a sampling error caused by selection of noncomparable count areas during each of the past four years. Count areas are determined by factors such as snow cover, turbulence and numbers of moose available. Sex and age composition counts were not conducted in 14B during 1976.

Management Summary and Conclusions

Moose harvests have declined during the 1970's. Cancellation of antlerless hunts, elimination of the late season, and shortening of the early season have contributed to the declining harvest. Season restrictions have occurred primarily in response to public pressure rather than on biological considerations.

Moose abundance is uncertain because of variation in counting conditions. The apparent poor condition of browse on the valley floor does not limit moose during mild winters because moose can utilize areas of higher elevation. Moose in Subunit 14B are clearly food limited during winters with deep snows but the population appears to be increasing in response to recent mild winters. Available browse has been reduced by past overuse and is decreasing further due to seral changes. Management plans should include creation of additional browse by range rehabilitation programs. Increased harvesting of both sexes of moose should be an additional factor of management. This would permit utilization by humans of many of those moose that would otherwise probably starve during severe winters. Of interest is the construction of a new power line across Subunit 14A from near Willow on the south to Sunshine on the north. Habitat disturbance along the right-of-way should create a considerable amount of browse in the future. Since the power line will be one mile to two miles from the highway this browse may have a tendency to hold moose away from the roadway and thereby decrease the number of winter road kills.

Recommendations

Public acceptance needs to be gained for a substantial harvest of both sexes of moose. The local advisory committee has proposed a permit antlerless moose hunt for 1978-79.

Obtain, through dedication or public ownership, lands that can be used for range rehabilitation. Planning will have to evaluate the benefit:cost ratios of various types of range rehabilitation efforts. Accessible lands in large tracts will be more beneficial to hunters than remote lands in small or scattered tracts. This land should be acquired or dedicated far in advance of the spread of substantial human settlement.

PREPARED BY:

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Game Biologist III

SUBMITTED BY:

James B. Faro
Regional Management Coordinator

Appendix I. Moose Harvest and Hunting Pressure in Alaska's Game Management Subunit 14B, 1970-1976.

Season	Bulls	Cows	Unid.	Total	Hunter	Percent Success
<u>1970</u>						
8/20-9/30	34	0	0	34		
11/1-11/20	21	0	1	22		
To be announced Antlerless	Cancelled					
Unknown Date	26	0	0	26		
TOTAL	81	0	1	82	264	31
<u>1971</u>						
8/20-9/30	36	0	4	40		
11/1-11/20	48	0	1	49		
9/1-9/30 Antlerless	0	39	0	39		
11/1-12/15 Antlerless	0	101	0	101		
Unknown Date	40	103*	0	143*		
TOTAL	124	243*	5	372	950**	39**
<u>1972</u>						
8/20-9/30	13	0	0	13		
11/1-11/30	12	0	0	12		
9/1-9/30 Antlerless	0	16	0	16		
Unknown Date	10	0	0	10		
TOTAL	35	16*	0	51	289**	18**
<u>1973</u>						
8/20-9/20	28	0	1	29		
11/1-11/20	59	0	1	60		
To be announced Antlerless	Cancelled					
Unknown Date	6	0	1	7		
TOTAL	93	0	3	96	395	24
<u>1974</u>						
8/20-9/20	36	0	0	36		
8/20-9/20 Antlerless	0	18	0	18		
Unknown Date	5	0	0	5		
TOTAL	41	18	0	59	355	17
<u>1975</u>						
9/1-9/20	24	0	0	24	203	12
<u>1976</u>						
9/1-9/20	38	0	2	40	226	18

* Using antlerless permit returns rather than harvest report returns.

** Using harvest report returns plus additional successful permit returnees who did not submit harvest report.

PREPARED BY: Jack C. Didrickson, Game Biologist III

Appendix II. Verified moose mortality (excluding hunting) in Alaska's Game Management Subunit 14B,
June 1-May 31, 1971-72 through 1976-77.

June 1-12, 51, 1971-72 through 1976-77.

Road kill						Incidental/train kill						Illegal kill						Winter kill					
*Ad.	Ad.	Calf	?	Tot.		Ad.	Ad.	Calf	?	Tot.		Ad.	Ad.	Calf	?	Tot.		Ad.	Ad.	Calf	?	Tot.	
M.	F.	M	F	—	—	M.	F.	M	F	—	—	M.	F.	M	F	—	—	M.	F.	M	F	—	—
<u>1971-72</u>																							
2	1	2	1	1	7	16	18	7	7	30	78	3	3	0	0	0	6	3	4	8	4	0	19
<u>1972-73</u>																							
1	0	0	0	2	3	0	4	2	1	3	10	0	0	0	0	1	1	0	0	0	1	0	1
<u>1973-74^{a/}</u>																							
1	3	0	1	1	6	0	1	0	0	0	1	1	1	0	0	0	2	0	0	0	0	0	0
<u>1974-75</u>																							
1	0	2	0	2	5	4	16	2	8	19	49	0	1	0	1	0	2	0	0	1	1	0	2
<u>1975-76^{a/}</u>																							
				1				0				1		0				0		0	0	0	
<u>1976-77</u>																							
1	2	3	0	1	7	0	1	0	0	1	2	0	2	0	0	0	2	0	0	0	0	0	0

Total Confirmed Non-Hunting Kill

	<u>1971-72</u>	<u>1972-73</u>	<u>1973-74</u>	<u>1974-75</u>	<u>1975-76</u>	<u>1976-77</u>
Adult male	24	1	4	5		1
Adult female	26	4	5	17		5
Calf male	17	2	0	5		3
Calf female	12	2	1	10		0
? sex &/or age	<u>31</u>	<u>6</u>	<u>1</u>	<u>21</u>	—	<u>2</u>
Total	110	15	9	58		11

^{a/} A reduced effort was made to document moose mortality this period; moose mortality along the Alaska railroad tracks was not tallied during the spring, 1973, 1975 and 1976.

* Adult F=Adult female; Adult M=Adult male; Calf M=Calf male; Calf F=Calf female; ? = Unknown sex or age; Tot.=Total.

PREPARED BY: Jack C. Didrickson, Game Biologist III

Appendix III. Moose Sex and Age Composition and Ratios, Alaska's Game Management Subunit 14B, 1970 through 1976.

Year	Total MM per 100 FF	Small MM per 100 FF	Small MM per 100 Large MM	Small MM % in Herd	Small MM per 100 MM Calves	Calves per 100 FF	Twins per 100 cows w/Calf	Calf % in Herd	Moose per Hour	Total Moose
1970	29	10	48	6	46	41	7	24	--	1,942
1971	25	8	50	5	57	30	4	19	52	1,810
1972	22	2	13	2	18	28	2	19	32	1,142
1973	11	3	38	2	16	36	6	25	33	1,075
1974 ^{a/}	14	6	71	4	39	29	9	20	49	550
1975 ^{b/}	32	4	15	3	43	20	2	13	27	426
1976	Not Flown									

^{a/} Only the portion of Subunit 14B between Willow Creek and Sheep Creek was flown in 1974.

^{b/} Only portions of Subunit 14B were flown in 1975.

PREPARED BY: Jack C. Didrickson, Game Biologist III

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Subunit 14C - Anchorage

Seasons and Bag Limits

Unit 14(C)

Sept. 7 - Sept. 20

One bull

Harvest and Hunting Pressure

Subunit 14C reported moose harvest totaled 41 bulls for 1976 (Appendix I, 1965-76). The harvest of 41 bulls in 1976 is identical to the 1974 harvest and represents 65 percent of the previous five year average of 63 bulls. The Fort Richardson moose hunt was not held during the past report period.

Hunter success increased to 22 percent in 1976, slightly higher than the 1973-75 average of 17 percent (Appendix II).

Appendix III enumerates the nonhunting mortality of moose from June 1, 1976, through May 31, 1977. Eighty moose were killed during this period compared to 81 from June 1, 1975 through May 31, 1976. The number of poachings decreased from 20 to 11, but automobile kills increased from 44 to 59. The increase in road kills in 1976-77 was perhaps attributable to more traffic and greater concentrations of moose in lowland areas during January, February and March.

Composition and Productivity

Aerial survey data indicate a large percentage of yearling moose in the population. Surveys during November 1976 found 11 yearling bulls and 27 total bulls per 100 cows (Appendix IV). Both ratios are higher than any recorded in recent years. The age structure of sport and incidental kills also shows a large percentage of yearlings (Appendix V). Ten of 20 road-killed cows (excluding calves) were yearlings. The cows averaged 5.5 years of age with only 2 animals between two and six years of age. The lack of moose in those age classes clearly illustrates very poor recruitment over the years 1971-1974. Antler measurements show that approximately 25 percent of all bull moose taken during 1976 were yearlings.

Management Summary and Conclusions

The 14C moose population appears to have stabilized or increased slightly during the past 2 years. The total number of animals seen and the number of moose seen per hour of survey increased in 1976 over 1975, reversing the downward trend recorded between 1971 and 1975. Few "winter killed" moose were reported during the relatively mild winter of 1975-76 and 1976-77. Despite an increased harvest in 1976,

and no antlerless hunts since 1974, the overall bull:cow ratio has increased to 27 bulls per 100 cows. This ratio is higher than the proposed management goal of 25 bulls per 100 cows.

Recommendations

Weather permitting, late fall aerial surveys of the entire subunit should be continued. If road kills and the attendant occurrence of human injury continue to increase, an antlerless hunt in the Ftl Richardson area should be considered in January or February 1979. Present harvest levels should not depress the bull ratio below 25 per 100 cows if over-winter calf survival remains high.

Additional browse rehabilitation on Fort Richardson should be encouraged. Thirty-six acres were rehabilitated in 1976 and more work is planned for summer 1977.

No changes in seasons or bag limits are recommended at this time.

PREPARED BY:

David Harkness
Game Biologist II

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

APPENDIX I

MOOSE HARVEST - UNIT 14C

Year	Bulls	Cows	Unknown Sex	Totals
1965	246	249	2	497
1966	134	77	4	215
1967	55	1	5	61
1968	90	38	0	128
1969	92	14	2	108
1970	65	5	6	76
1971	98	44	1	143
1972	55	36	3	94
1973	93	40	4	137
1974	41	4	1	46
1975	29	0	0	29
1976	41	0	0	41

APPENDIX II

Comparison of success among persons hunting bull moose, excluding airport and Fort Richardson hunts.

Year	Bull Kill	No. Hunters	Percent Success
1969	92	215	43
1970	65	181	36
1971	93	226	41
1972	41	137	30
1973	78	388	20
1974	41	265	15
1975	29	197	15
1976	41	184	22

PREPARED BY: David Harkness, Game Biologist II

APPENDIX III

14C Moose Road Kill-Poaching Fatalities June 1976-May 1977.

<u>Date</u>	<u>Automobile</u>	<u>Poached</u>	<u>Other (Train Winter)</u>	<u>Total</u>
June 1976	3	0	0	3
July	1	0	0	1
August	6	0	1	7
September	5	5	1	11
October	7	0	2	9
November	4	0	0	4
December	0	1	1	2
Jan. 1977	12	3	0	15
February	6	2	0	8
March	10	0	2	12
April	3	0	1	4
May	<u>2</u>	<u>0</u>	<u>2</u>	<u>4</u>
	59	11	10	80

PREPARED BY: David Harkness, Game Biologist II

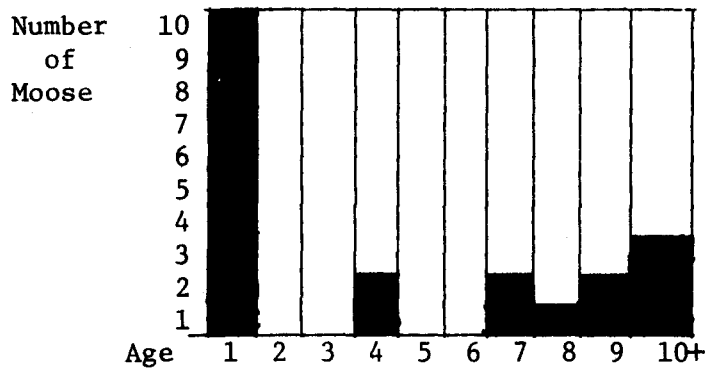
APPENDIX IV. Moose Sex and Age Ratios 1966-1975 - 14C.

Date	Tot. ♂ per 100♀	Sm. ♂ per 100♀	Sm. ♂ per 100 Lg. ♂	Sm. ♂ % in Herd	Sm. ♂ per 100 ♂ calves	Calves per 100♀	Incidence of twins per 100♀ w/calf	Calf % herd	Animals per hour	Total sample
1966	18.2	9.9	118.8	6.3	53.5	37.0	4.5	23.7	43	300
1967	22.1	14.7	200.0	7.8	57.1	51.5	3.1	27.3	25	128
1968	22.9	8.4	58.3	5.6	60.9	27.7	11.5	18.4	74	376
1970	23.7	9.5	66.7	5.3	40.0	47.4	6.4	26.4	46	757
1971	21.3	11.2	112.1	7.5	86.7	26.0	2.8	17.2	61	870
1972	21.9	6.0	37.9	3.9	37.9	31.7	6.7	20.6	36	639
1973	15.8	6.2	63.6	4.0	35.2	34.9	6.2	22.9	36.5	694
1974	--	--	--	--	--	--	--	22.9	31.0	528
1975	22.3	7.2	47.7	4.6	44.7	32.2	7.0	20.8	27.1	452
1976	27.0	11.3	72.0	6.9	63.2	35.8	6.8	22.0	36.5	518

PREPARED BY: David Harkness, Game Biologist II

APPENDIX V

Age Structure of Road Killed Cow Moose - 14C - June 1, 1976-May 31, 1977.



PREPARED BY: David Harkness, Game Biologist II

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Unit 15(A) - Kenai

Seasons and Bag Limits

Unit 15(A)

Sept. 1-Sept. 20

One bull

Harvest and Hunting Pressure

Harvest reports indicate that hunters took 164 moose during the 1976 season (Appendix I). The harvest was up 63 percent from the record-low harvest of 101 in 1975. The 1976 bull harvest was the highest since the elimination of the November season and was the highest early season bull harvest since 1968.

Nine hundred ninety-three hunters reported hunting Subunit 15(A) during the 1976 season. Hunter success was 17 percent, up from the 1976 level of 14 percent. The number of hunters afield increased by 57 percent from the 1975 level of 695.

The increased harvest is attributed to excellent calf survival through the winter of 1975-76.

Composition and Productivity

Surveys were conducted in only four count areas of 15(A) because restrictive seasons and bull-only harvest placed this unit on a low priority. The four areas surveyed, 12A, 12B, 18A and 18B typically produced one-half to two-thirds of the moose seen on survey and are thought to be representative of the unit for purposes of obtaining sex and age composition data. Composition surveys were flown October 27-29 and showed 11 bulls and 27 calves per 100 cows (Appendix III). The bull-per-100-cows ratio was up slightly from the 1974 level of 9:100. Calf production was down to 27:100, compared to 41:100 in 1974. Part of the decline can be attributed to the high incidence of non-producing yearling cows in the herd.

A spring survival survey was flown on May 12, 1977 (Appendix IV). Calf survival was 67 percent over the winter of 1976-77. The yearling percent of herd was 13 percent, compared to 19 percent for 1976. The decline in the percent of yearlings again can be at least partly accounted for by the high incidence of non-breeding yearling cows in the herd, resulting from high overwinter calf survival the previous year.

The winter of 1976-77 was one of the mildest ever recorded. The average snow depth, obtained from two stations in the unit, was 6.5 inches for the period November through March. Snow accumulations were so light that virtually all browse was available and moose movements were unrestricted.

Management Summary and Conclusions

The 1976 harvest of 164 moose in the 20-day September season was the best early season bull harvest since 1968. The degree of improvement is even more meaningful when considering that the early season was 40 days in 1974, and 32 days in the years prior to 1974.

The improved bull harvest was the result of high calf survival through the winter of 1976-77, and was predicted on the basis of the 1976 spring survival survey. The 1977 spring survival survey showed similarly high overwinter survival of calves. Bull hunting in the fall of 1977 should be at least as good as it was in 1976.

High calf survival over the past two winters has set the stage for a rapid build-up of the Subunit 15(A) moose population. The large 1975 female cohort will begin producing calves in 1978 and will be followed by the similarly large 1976 cohort in 1979.

Given favorable environmental conditions, sound management may dictate the harvesting of some females in the not too distant future.

Recommendations

No changes are recommended.

PREPARED BY:

Paul A. LeRoux
Game Biologist III

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

APPENDIX I

Moose Harvest and Hunting Pressure - Subunit 15 (A) (Harvest Ticket Return Data)

<u>Year</u>	<u>Season</u>	<u>Bulls</u>	<u>Cows</u>	<u>Unid.</u>	<u>Total</u>	<u>Hunters</u>	<u>Percent Success</u>
1965	1st	*	0	0	*		
	2nd	*	299	0	*		
	Combined	365	299	0	664	*	*
1966	1st	211	185	0	396		
	2nd	137	0	0	137		
	Combined	382 ^{1/}	185	0	567 ^{1/}	*	*
1967	1st	185	0	0	185		
	2nd	62	0	0	62		
	Combined	247	0	0	247	1036	24
1968	1st	166	1	0	166		
	2nd	91	0	0	91		
	Combined	268 ^{1/}	1	0	269 ^{1/}	1092	25
1969	1st	*	*	*	*		
	2nd	*	*	*	*		
	Antlerless		NOT HELD				
	Combined	287	*	7	294		
1970	1st	134	0	3	137	*	*
	2nd	69	0	1	70	*	*
	Antlerless	16	191	3	209	*	*
	Combined	291 ^{1/2/}	191	11 ^{1/}	493	918	54
1971	1st	153	223 ^{2/}	1	376		
	2nd	141	261 ^{2/}	0	402		
	Antlerless						
	Combined	369 ^{1/}	484 ^{2/}	4	897	1637	52
1972	1st	106	145 ^{2/}	1	236		
	2nd	54	0 ^{2/}	0	54		
	Combined	193 ^{1/2/}	145 ^{2/}	1	339 ^{1/}	1518	22
1973	1st	156	4	2	162		19
	2nd	82	2	1	85		
	Combined	259 ^{1/}	7 ^{1/}	4 ^{1/}	270 ^{1/}	1427	
1974		141	6	5	152	801	19
1975		101	0	0	101	695	14
1976		161	0	3	164	993	17

* Data not available

^{1/} Total of 1st and 2nd season may be less than for combined season because of inclusion of animals for which date of kill was not given.^{2/} These data from permit returns. Numbers include both male and female calves.

PREPARED BY: Paul A. LeRoux, Game Biologist III

MOOSE - GMU 15(A) - Kenai

APPENDIX II

Moose Sex and Age Composition - Subunit 15(A)

Year	Large MM	Small MM	Total MM	FF W/0	FF W/1	FF W/2	Total FF	Total Adults	Lone Calves	Total Calves	Unid. Sex & Age	Total Sample
12/3- 21/62	85	76	161	597	317	52	966	1,127	2	423	18	1,568
1/1964	--	--	--	--	284	19	--	1,160	--	511	--	2,171
12/1- 12/64	145	66	211	1,254	470	25	1,740	1,951	--	520	--	2,471
6/1965 ^{1/}	--	--	298	475	188	17	680	978	--	222	--	1,200
6/1966 ^{1/}	--	--	230	345	104	4	453	683	--	112	--	795
10/3- 16/67 ^{1/}	29	17	46	280	96	18	394	440	--	135	--	575
12/1968 ^{1/}	148	125	273	945	598	32	1,575	1,848	14	676	137	2,661
11/18- 20/69	40	17	57	243	181	14	438	495	1	210	--	705
11/30- 12/2/70	98	58	156	756	305	19	1,080	1,236	4	343	6	1,586
11/8- 16/71	185	98	283	940	367	17	1,324	1,607	14	415	5	2,027

^{1/} Lowlands only.^{2/} CA's 19C, 19D, 19E, and 19F omitted.

PREPARED BY: Paul A. LeRoux, Game Biologist III

Appendix II.(cont.)Moose Sex and Age Composition - Subunit 15(A)

Year	Large MM	Small MM	Total MM	FF W/O	FF W/1	FF W/2	Total FF	Total Adults	Lone Calves	Total Calves	Unid. Sex & Age	Total Sample
11/27- 12/5/72	136	35	171	678	399	19	1,096	1,267	14	451	5	1,723
11-21 27/73	89	17	106	752	367	21	1,140	1,246	15	424	7	1,677
11/20- 24/74 <u>2/</u>	41	21	62	440	254	18	712	774	3	293	0	1,067
1975	No Surveys Conducted											
1976	26	22	48	323	110	5	438	486	0	120	0	606

3/ CA's 12A, 12B, 18A, and 18B.

PREPARED BY: Paul A. LeRoux, Game Biologist III

APPENDIX III

Moose Sex and Age Ratios - Subunit 15 (A)

Year	Total MM Per 100 FF	Small MM Per 100 FF	Sm. MM Per 100 Lg. MM	Sm. MM % in Herd	Sm. MM Per 100 MM Calves	Calves Per 100 FF	Twins Per 100 FF W/Calf	Calf % in Herd	Animals Per Hour	Total Sample
1962 ^{1/}	17	8	89	5	36	44	15	27	--	1568
1963 ^{1/}	--	-	--	-	--	--	6	24	--	2171
1964	12	4	46	3	25	30	5	21	--	2471
1965 ^{2/}	44	-	--	-	--	33	8	19	--	1200
1966 ^{2/}	51	-	--	-	--	25	4	14	--	795
1967 ^{2/}	12	4	59	3	25	34	16	24	--	575
1968	20	9	83	5	39	47	5	27	--	2661
1969 ^{3/}	17	-	--	-	--	43	--	30	--	705
1970	14	5	59	4	33	32	6	22	58	1586
1971	21	7	53	5	47	32	4	21	50	2027
1972	16	3	26	2	16	41	5	26	39	1723
1973	9	2	19	1	8	37	5	25	45	1677
1974 ^{4/}	9	3	51	2	14	41	7	28	42	1067
1975	No Surveys Conducted									
1976 ^{5/}	11	5	85	4	37	27	4	20	34	606

1/ Varied count areas.

2/ Lowlands only.

3/ Count areas 9A, 11, 12A, 12B, 18A, 18B.

4/ CA's 19C, 19D, 19E, and 19F omitted.

5/ CA's 12A, 12B, 18A, and 18B.

PREPARED BY: Paul LeRoux, Game Biologist III

MOOSE - GMU 15 (A) - Kenai

APPENDIX IV

Productivity (Spring-Fall survival) Ratios and Percents

<u>Date</u>	<u>Bulls/* 100 Cows</u>	<u>Yearlings/* 100 Cows</u>	<u>Calves/ 100 Cows in Fall</u>	<u>Yrlg. % of Herd</u>	<u>Calf % of Fall Herd</u>	<u>% Calf Winter Mortality</u>	<u>Total Sample</u>
4/14-5/4/70 ^{1/}	21	25	43	16	30	45	744 ^{2/}
5/14/71 ^{3/}	16	14	32	11	22	50	245
5/15/72 ^{4/}	17	5	32	4	21	81	302
5/10/73	--	--	41	7	26	72	142
5/7/74 ^{5/}	--	--	37	7	25	74	277
5/3/75 ^{6/}	--	--	42	4	28	87	195
5/10/76	--	25	--	19	--	--	182
5/12/77	--	--	27	13	20	33	210

* Use only if survey is conducted late enough to distinguish bulls, if not, work with calf % in herd.

^{1/} From data compiled on tagging recon flights. Data compiled by Bob LeResche.

^{2/} Includes 30 antlerless long yearlings. Data compiled by Bob LeResche.

^{3/} Area surveyed included only Moose River Flats.

^{4/} Area surveyed included Moose River Flats and area between Kenai River and Skilak Loop, Sterling Highway.

^{5/} Area surveyed Beaver Creek, Swanson River, Moose River Flats and area between Skilak Loop Road and Kenai River.

^{6/} Area surveyed included Moose River Flats, Swanson River and Swan Lake Road rehab area.

PREPARED BY: Paul A. LeRoux, Game Biologist III

MOOSE - GMU 15 (A) - Kenai

APPENDIX V

Moose Population levels of Subunits 15 (A) and 15 (B) combined as determined by the random stratified sampling technique.

<u>Year</u>	<u>Population Estimate</u>	<u>Confidence Limit</u>
1964	8279 $\pm$ 1556	90%
1965	7432 $\pm$ 1561	90%
1966	7152 $\pm$ 1262	90%
1967	6732 $\pm$ 1413	90%
1971	7904 $\pm$ 1461	90%
1973	5692 $\pm$ 1348	90%
1974	4850 $\pm$ 1045	90%
1975	3374 $\pm$ 985	90%
1976	3782 $\pm$ 605	90%
1977	No Survey	

PREPARED BY: Paul A. LeRoux, Game Biologist III

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Unit 15(B) Soldotna

Seasons and Bag Limits

Unit 15(B) East, that portion of Subunit 15(B) east of a straight line from the mouth of the Shantatalik Creek, on Tustumena Lake, to the head of the westernmost fork of Funny River; east of Funny River from the head of its westernmost fork to the Kenai National Moose Range boundary, and south of the Kenai National Moose Range boundary eastward from Funny River to the Kenai River.	No open season
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Unit 15(B) West	Sept.1-Sept.20	One bull
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Harvest and Hunting Pressure

Harvest reports indicate that 167 hunters took 38 bulls in Subunit 15(B) West during the 1976 season (Appendix I). Hunter success was 23 percent compared to 13 percent in 1975. The number of hunters who reported hunting in Subunit 15(B) West was 167 compared to 182 in 1975. Subunit 15(B) East was closed to hunting, as it was in 1975.

Composition and Productivity

Sex and age composition surveys conducted October 29 to November 1, 1976 showed 48 bulls and 28 calves per 100 cows (Appendices III and IV). The bull:cow ratio showed a 107 percent increase over that observed in 1974 and calf production shows a decline of 20 percent from 1974. Part of the change in the bull:cow ratio is sampling bias due to the omission of most count areas in 15(B) West where bull:cow ratios are typically lower. The decline in the calf:cow ratio is, at least in part, due to the high number of non-producing yearling cows that resulted from high calf survival over the winter of 1975-76.

Spring survival surveys were conducted on May 12, 1977. Results of the survey indicate high calf survival through the winter of 1976-77 (Appendices III and VI). The observation of 17 percent yearlings in the spring, but only 16 percent calves in the fall, is the result of error due to the small spring sample size (107).

Management Summary and Conclusions

Harvest reports indicate that the bull harvest was up 67 percent from 1975 in Subunit 15(B) West. Hunter success increased from 13 percent in 1975 to 23 percent in 1976.

The 48 bulls per 100 cows observed on sex and age composition surveys was the highest observed since surveys were initiated in 1962. Of the 175 bulls observed on the survey, 95 were judged to have antler spreads over 45 inches (Appendix II). These observations were the basis for the department proposal that established a permit hunt in this subunit for the 1977-78 season.

Spring survival surveys indicate that survival of calves through the winter of 1976-77 was excellent. This should result in another good harvest of bulls in Subunit 15(B) West during the 1977 season.

Recommendations

No changes are recommended.

PREPARED BY:

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Game Biologist III

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

MOOSE - GMU 15 (B) - SOLDOTNA

Appendix I

Moose Harvest and Hunting Pressure - Subunit 15 (B) - Soldotna

<u>Year</u>	<u>Bulls</u>	<u>Cows</u>	<u>Unk. Sex</u>	<u>Totals</u>	<u>No. Hunters</u>	<u>Percent Success</u>
1965	183 ¹	193 ¹	1 ¹	377		
1966	119 ¹	26 ¹	4 ¹	149		
1967	69 ¹	0	1 ¹	70		
1968	108 ¹	6 ¹	2 ¹	116		
1969	119 ¹	55 ³	2 ¹	176		
1970	69 ¹	75 ¹	2 ¹	146		
		*(15BE=50, 15BW=18) (Unk.=7)				
1971	128 ¹	79 ² (15BE)	5 ¹	212		
1972	73 ¹	11 ² (15BE)	1 ¹	85		
1973	145 ¹ 15BE=82 15BW=63	116 ¹ (15BE)	6 ¹	267	877	30
1974	95 ¹	1 ¹	1 ¹	97	313	31
1975	24 ¹	-	-	24	182	13
1976	38	0	0	38	167	23

¹ Data derived from harvest reports.

² Data derived from registration permit returns.

³ Data derived from field observations.

PREPARED BY: Paul A. LeRoux, Game Biologist III

MOOSE - GMU 15 (B) EAST - SOLDOTNA

Appendix II

Summary of Moose Population Composition - Subunit 15 (B) East

Area	Date	Bulls		Small Bulls	TLT Bulls	Cows			TLT Cows	Calves		TLT Moose	Count Time	Moose Per Hour
		+45"	-45"			W/O	W/1	W/2		Lone	TLT			
5	10/29-31/76	51	22	8	81	125	34	2	161	3	41	283	3.0	94
10	10/31/76	9	12	7	28	38	13	1	52	1	16	96	2.0	48
17	10/30-11/1/76	1	1	0	2	6	1	0	7	0	1	10	0.6	17
15A	10/30-1/1/76	0	0	0	0	6	6	0	12	0	6	18	0.9	20
15B	10/29-11/1/76	12	13	3	28	39	5	0	44	0	5	77	2.2	35
15C	10/29/76	22	10	4	36	47	15	1	63	0	17	116	2.0	58
All 15BE		95	58	22	175	261	74	4	339	4	86	600	10.7	57

PREPARED BY: Paul A. LeRoux, Game Biologist III

MOOSE - GMU 15 (B) - SOLDOTNA

Appendix III

Moose Sex and Age Composition - Subunit 15 (B)

Year	Large MM	Small MM	Total MM	FF W/O	FF W/1	FF W/2	Total FF	Total Adults	Lone Calves	Total Calves	Unid. Sex & Age	Total Sample	Count Time (Hrs.)	Moose Per Hour
1962	377	61	438	673	317	28	1018	1456	2	375	1	1832	-	-
1963	NO COUNTS MADE													
1964	337	46	383	690	166	10	866	1249	1	187	0	1437	22	65
1965	NO COUNTS MADE													
1966	NO COUNTS MADE													
1967	NOT AVAILABLE													
1968	NO COUNTS MADE													
1969	NO COUNTS MADE													
1970	184	17	201	455	75	2	531	732	0	77	5	817	10	79
1971	NO COUNTS MADE													
1972	200	14	214	515	174	4	693	907	4	186	0	1093	18	61
1973	188	28	216	436	166	7	609	825	4	184	1	1010	23	43
1974	102	14	116	338	147	10	495	611	6	173	0	784	13	58
1975	NO COUNTS MADE													
1976	155	22	177	273	89	4	366	543	4	101	0	644	12	52

PREPARED BY: Paul A. LeRoux, Game Biologist III

MOOSE - GMU 15 (B) - SOLDOTNA

Appendix IV

Moose Sex and Age Ratios - Subunit 15 (B)

<u>Year</u>	<u>Total MM per 100 FF</u>	<u>Small MM per 100 FF</u>	<u>Sm. MM per 100 Lg. MM</u>	<u>Sm. MM % in Herd</u>	<u>Sm. MM per 100 MM Calves</u>	<u>Calves per 100 FF</u>	<u>Twins per 100 FF w/calf</u>	<u>Calf % in Herd</u>	<u>Animals Per Hour</u>	<u>Total Sample</u>
1962	43	6	16	3	33	37	8	20	-	1832
1963	NO COUNTS MADE									
1964	44	5	14	3	52	22	6	13	65	1437
1965	NO COUNTS MADE									
1966	NO COUNTS MADE									
1967	29	4	14	2	44	16	2	11	-	457
1968	NO COUNTS MADE									
1969	NO COUNTS MADE									
1970	38	3	9	2	47	15	3	9	79	817
1971	NO COUNTS MADE									
1972	31	2	7	1	15	27	2	17	61	1093
1973	36	5	15	3	30	30	4	18	43	1010
1974	23	3	14	2	16	35	6	22	59	784
1975	NO COUNTS MADE									
1976	48	6	14	3	44	28	4	16	53	644

PREPARED BY: Paul A. LeRoux, Game Biologist III

MOOSE - GMU 15 (B) - SOLDOTNA

Appendix V

Moose Productivity (spring-fall survival) Composition

<u>Date</u>	<u>Cows W/1 Ylgs.</u>	<u>Cows W/2 Ylgs.</u>	<u>Total Cows</u>	<u>Unid. Adults</u>	<u>Total Adults</u>	<u>Lone Ylgs.</u>	<u>Total Ylgs.</u>	<u>Unid. Sex & Age</u>	<u>Total Sample</u>
5/11/73	10	0	10	67	77	5	15	0	92
5/ 8/74	16	0	16	92	108 ¹	3	19	0	127
5/ 6/75	2	0	54	0	60 ²	0	2	0	62
5/11/76	31	1	100	0	125	1	34	0	159
5/12/77	15	1	80	0	89	1	18	0	107

¹ Includes 9 bulls

² Includes 6 bulls

³ Includes 25 bulls

PREPARED BY: Paul A. LeRoux, Game Biologist III

MOOSE - GMU 15 (B) - SOLDOTNA

Appendix VI

Moose (spring-fall survival) ratios and percents

<u>Date</u>	<u>Calves/ 100 cows in fall</u>	<u>Yrlg. % of herd</u>	<u>Calf % of fall herd</u>	<u>% Calf winter mortality</u>	<u>Total Sample</u>
5/11/73	27	16	17	4	92
5/ 8/74	30	15	18	21	127
5/ 6/75	35	3	22	86	62
5/11/76	-	21	-	-	159
5/12/77	28	17	16	0	107

PREPARED BY: Paul A. LeRoux, Game Biologist III

MOOSE

SURVEY-INVENTORY PROGRESS REPORT FOR REGULATORY YEAR 1976-77

Game Management Unit 15(C) - Homer

Season and Bag Limits

Unit 15(C)

Sept. 1-Sept. 20

One bull

Harvest and Hunting Pressure

Harvest reports indicated that 638 hunters killed 113 moose in Subunit 15(C) during the 1976 season (Appendix I). Hunters afield declined 3 percent from 658 in 1975. The decline was probably greater than the figures shown since 1976 enforcement efforts on delinquent permittees generated increased return of harvest reports. Despite lower hunter numbers, the harvest increased 20 percent from the 94 moose taken in 1975. Similarly, hunter success rose to 18 percent from 14 percent in 1975.

Residents comprised 97 percent (n=608) of the 638 hunters, nonresidents 2 percent (n=12), and 1 percent unspecified (n=8). Residents achieved an 18 percent success rate, while nonresidents attained 25 percent.

During 1976, a minimum of 8 moose were killed by automobiles in Subunit 15(C) according to Fish and Wildlife Protection Division data.

Composition and Productivity

In 1976, sex and age composition counts were conducted in the following count areas: Ninilchik Dome, Caribou Hills, Count Area 3, Homer and Anchor Point. The average bull ratio of 15 bulls per 100 cows (Appendix II) was not evenly distributed. The lowest bull ratios were observed in Homer and Count Area 3 where 5 and 0 bulls per 100 cows respectively were recorded. The bull ratio at Homer is little changed from 1964 to present, averaging 5.1 bulls per 100 cows over the last 5 years (Appendix IV). In Count Area 3 the sample size was too low to be meaningful (n=35). Twenty-four bulls per 100 cows were recorded for Caribou Hills in 1976, the highest bull ratio recorded and equivalent to the average of 22 bulls per 100 cows recorded in this area since 1972 (range 16-28) (Appendix III).

An increase in calf:cow ratios was also evident at Caribou Hills where 17 calves per 100 cows were observed in the fall of 1976. The fall mean for the previous 5 years is 11 calves per 100 cows (range 7-18, Appendix III). Previously these ratios were much higher, averaging 36 calves per 100 cows between 1964 and 1971. It may be that predation from bears and wolves has depressed calf:cow ratios in this area. It is interesting to note that those areas with the lowest bull:cow ratios (Homer and Count Area 3) showed the highest calf:cow ratios, respectively 48 and 52 calves per 100 cows. This pattern has been evident at Homer since 1964 (Appendix IV) and may indicate sex-related fall movement patterns.

Data show a gradual increase in calf:cow ratios from 1960 to 1968 followed by a decline to 1971 for GMU 15(C) as a whole. The low was 18.7/100 cows in 1971. The mean for 1972-1976 is 28/100, equal to the 1976 figure.

A spring survival count was conducted in late May 1977. This count indicated a calf mortality of 20 percent in the winter of 1976-77, based on the small sample of 113 moose. Although little confidence can be placed on this mortality figure, it is evident that some mortality occurred during this winter, one of the mildest on record. Femurs of three moose were examined (2 calves and 1 yearling) and all had the gelatinous marrow characteristic of malnutrition.

Management Summary and Conclusions

Harvest reports indicate a modest increase over the 1975 take which was the lowest on record.

Fall and spring surveys suggest adequate calf production and survival through the mild winter of 1976-77. This may generate increased numbers of harvestable bulls in subsequent years. Excellent summer weather has permitted lush growths of fireweed and blue joint grass, good cover for moose, so the 1977 harvest may not demonstrate any increase.

Wolf surveys in the winter of 1976-77 generated an estimate of 40-50 wolves in 15(C). If, as Mech postulated, a pack of 10 wolves can consume 2 moose per week, then conceivably 400-500 moose may be eaten by wolves in 15(C) over the course of a year. Such predation would mitigate against resumption of antlerless seasons in 15(C), but no data to support this possibility are presently available.

Recommendations

No changes in season or bag limit are warranted at this time.

PREPARED BY:

David Hardy
Game Biologist II

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

Appendix I. Moose harvest and hunting pressure, Subunit 15(C), Homer.

<u>Year</u>	<u>Bulls</u>	<u>Cows</u>	<u>Unk. Sex</u>	<u>Total</u>	<u>Hunters</u>	<u>Percent Success</u>
1961	-	106 ²	-	-	-	-
1962	-	100 ²	-	-	-	-
1963	349 ¹	147 ¹	-	496	-	-
1964	470 ¹	337 ¹	-	807	-	-
1965	263 ¹	229 ¹	-	492	-	-
1966	278 ¹	72 ¹	-	350	-	-
1967	294 ¹	-	-	294	643	46
1968	404 ¹	20 ¹	5 ¹	429	972	44
1969	420 ¹	109 ³	4 ¹	533	-	-
1970	319 ¹	68 ¹	7 ¹	394	775	51
1971	263 ¹	146 ²	4 ¹	413	836	49
1972	170 ¹	114 ²	0 ¹	284	1,041	27
1973	152 ¹	143 ²	5 ¹	300	1,111	27
1974	230 ¹	133 ²	3 ¹	366	1,240	30
1975	94 ¹	-	-	94	658	14
1976	112 ¹	-	1	113	638	18

- 1 Data derived from harvest reports.
- 2 Data derived from permit hunt reports.
- 3 Data derived from field observations.

PREPARED BY: David Hardy, Game Biologist II

Appendix II. Moose sex and age ratios, Subunit 15C totals.

<u>Year</u>	<u>Total MM Per 100 FF</u>	<u>Sm MM Per 100 FF</u>	<u>Sm MM Per 100 Lg. MM</u>	<u>Sm MM % in Herd</u>	<u>Sm MM Per 100 MM Calves</u>	<u>Calves Per 100 FF</u>	<u>Twins Per 100 FF w/calf</u>	<u>Calf % in Herd</u>	<u>Animals Per Hour</u>	<u>Total Sample</u>
1964	22	8	54	5	6	24	2	30	52	1848
1965	33	10	42	6	61	32	6	19	57	1889
1966	17	6	60	4	41	31	5	20	62	794
1967	21	7	46	4	34	40	7	25	160	3038
1968	21	6	42	4	30	40	7	25	61	1883
1969	14	7	88	5	47	28	6	19	54	1636
1970	20	3	19	2	27	24	4	17	151	1992
1971	26	8	42	5	83	19	8	13	48	1436
1972	10	1	9	1	6	25	2	19	73	2073
1973	19	7	60	5	51	28	4	19	63	1833
1974	14	5	57	4	33	32	7	22	31	960
1975	NO COUNTS MADE									
1976	15	6	65	4	42	28	5	20	57	869

PREPARED BY: Dave Hardy, Game Biologist II

Appendix III. Moose sex and age ratios, Subunit 15C, Caribou Hills Count Area.

<u>Year</u>	<u>Total MM Per 100 FF</u>	<u>Sm MM Per 100 FF</u>	<u>Sm MM Per 100 Lg. MM</u>	<u>Sm MM % in Herd</u>	<u>Sm MM Per 100 MM Calves</u>	<u>Calves Per 100 FF</u>	<u>Twins Per 100 FF w/calf</u>	<u>Calf % in Herd</u>	<u>Animals Per Hour</u>	<u>Total Sample</u>
1964	165	23	16	2	46	100	0	10	80	259
1965	161	28	21	10	255	22	4	8	122	378
1966	--	--	--	--	--	--	--	--	--	--
1967	36	6	21	4	42	29	6	18	232	1042
1968	48	12	32	7	94	25	6	14	163	506
1969	26	5	26	4	108	10	0	7	56	180
1970	30	3	11	2	35	17	3	12	174	972
1971	45	11	33	7	272	8	0	5	70	470
1972	16	2	13	1	21	18	3	13	98	746
1973	28	8	39	6	123	13	2	9	75	634
1974	23	3	18	3	100	7	0	5	50	114
1975	18	1	5	1	25	7	0	5	60	304
1976	24	9	67	7	100	17	0	12	100	267

PREPARED BY: Dave Hardy, Game Biologist II

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Unit 16 - West Side of Cook Inlet

Seasons and Bag Limits

Unit 16(A), that portion lying east of Peters Creek, south of Petersburg Road, and west of the Parks Highway.	Sept.1-Sept.30	One moose, provided that antlerless moose may be taken only from Sept.1-Sept.20.*
Remainder of Unit 16(A)	Sept.1-Sept.20	One bull.
Unit 16(B)	Sept.1-Sept.30	One moose, provided that antlerless moose may be taken only from Sept.1-Sept.20.

- * A five mile closure to the taking of antlerless moose in the lower portion of Subunit 16(A) along the road system was established by emergency order.

Harvest and Hunting Pressure

The reported moose harvest in Unit 16 totaled 456 in 1976: 310 bulls, 143 cows and 3 of unknown sex. The substantial increase over the 1975 harvest of 244 is due primarily to the increase in hunting pressure resulting from the open antlerless season throughout most of the unit. The number of hunters nearly doubled from 879 in 1975 to 1,690 in 1976. Hunter success declined slightly to 27 percent. This decline is attributed to the increased hunting pressure and the deletion of the late season in Subunit 16(B) (Appendix I).

The harvest chronology indicates that the moose harvest was evenly distributed throughout the season with a slight preponderance of animals taken early in the season. Antler measurement data indicate that the harvest of trophy bulls was evenly distributed throughout the season.

Transportation means used by hunters are shown in Appendix III. Aircraft remained the primary means of transportation, although a shift to an increasing use of boats and offroad vehicles has been occurring during the past four years. The use of boats increased from 11 to 19 percent in 1976, when the season for the lower portion of Subunit 16(A) was made identical to that of 16(B), opening the area to the taking of antlerless moose and extending it for 10 days.

A check station was established opening weekend at the Susitna River Bridge to monitor the harvest along the road system in Subunit 16A. Because of light hunter pressure resulting from the road closure to antlerless hunting, the check station was removed after five days.

Subunit 16B was surveyed September 2 (before opening weekend) and September 30 (the last day of the season) in an attempt to determine the extent of hunting pressure in the area. Results of both surveys indicated light to moderate pressure in most areas except along the Yentna and Kahiltna Rivers where hunter pressure appeared considerably higher.

Composition and Productivity

Lack of adequate snow cover throughout a major portion of Unit 16 during fall 1976 precluded aerial sex and age composition counts in all areas except Mt. Yenlo and a portion of Sunflower Basin. The Mt. Yenlo area has been surveyed annually since 1974 (Appendix IV). The bull:cow ratio has remained stable at 49:100. The 1976 calf:cow ratio of 40:100 was very close to that of 1974 (39:100) but a substantial increase over the 8:100 recorded in the fall of 1975.

The trend in Sunflower Basin has been towards a steadily increasing bull:cow ratio (30:100 in 1973 to 38:100 in 1975) and a steadily decreasing calf:cow ratio (34:100 in 1973 to 18:100 in 1975). Although the 1976 survey data were incomplete, indications were that both trends are continuing (Appendix V).

Until 1976 the trends in the Peters Hills moose population were similar to those exhibited in Sunflower Basin with a declining calf:cow ratio and an increasing bull:cow ratio (Appendix VI). Although no composition counts were flown in fall 1976 in this area, some data are available from a collared moose study initiated in fall 1975 in the Peters Hills. Fourteen radio-collared cows gave birth to 19 calves in spring 1976. Three additional radio-collared females were either barren or their calves died before they were initially located. Five sets of twins were born. Ten calves died between May 27 and August 15, 8 of which died within the first 20 days. Eight calves out of the five sets of twins were dead by July 30. Two other calves were lost from the sample when their mothers were found dead September 13. No mortality occurred between October 1976 and April 1977. Although the sample size is very small, the calf:cow ratio in November (47:100) might indicate a reversal in the downward trend of calf survival to fall in this area. The incidence of twins per 100 females with calves in November was zero.

No composition data are available for 1976 in the Susitna-Beluga area. Sex and age ratios prior to 1976 are presented in Appendix VII.

Management Summary and Conclusions

Although substantially lower than the average harvest (632) during the 1970's, the 1976 harvest of 456 moose in Unit 16 was almost double the 1975 harvest of 244 when antlerless seasons were disallowed by legislative action.

Aircraft use remains the most popular method of access, although it is declining in proportion to other uses. Use of boats increased considerably as a result of opening the lower portion of 16A to the taking of antlerless moose and extending the season. Boat use in

combination with aircraft was fairly common along the Yentna River. Some use of ATV's in conjunction with aircraft was noted west of Chelatna Lake and north of Mt. Yenlo. ATV use in Unit 16 has shown an upward trend since 1972 and is expected to continue.

A road closure in Subunit 16A to the taking of antlerless moose in all areas within 5 miles of the Parks Highway, the Petersville Road, and the Oilwell Road was established by Emergency Order shortly before the season opened. This effectively reduced the number of hunters using highway vehicles as a method of access into 16A.

Hunting pressure in Unit 16 was nearly double that of 1975 and was 15 percent higher than the average (1467 hunters) for the past 8 years. Much of this pressure can be attributed to the short and restricted moose seasons throughout most of the rest of southcentral Alaska. Unit 16 was the only area in the southcentral region to have unrestricted either-sex seasons in September.

Sex and age composition counts reveal an increasing bull:cow ratio throughout most of Unit 16, reflecting the low bull harvest and the mild winters over the past two years. Calf:cow ratios in most areas are either stable or declining. The low survival rate of twins and the high mortality rate of calves during the first month of life as revealed by the Peters Hills telemetry study may be indicative of deteriorating range quality or predation. The mild winter of 1975 probably had little or no detrimental effects on the condition of the cows prior to parturition.

Recommendations

Proposed wildlife management plans identify the area of Unit 16B between the Kahiltna and the Yentna Rivers as an area suitable for trophy bull management. Access to this area is difficult during the September season, and the feasibility of having a November permit hunt for bulls only should be explored.

ATV use is expected to increase substantially in this area. The detrimental effects of an extended trail network on the environment may outweigh the benefits derived from increasing hunter distribution. Alternative zoning restrictions on ATV use may have to be considered in the future.

Browse conditions in all major wintering areas should be checked, and the possibilities for browse rehabilitation should be investigated.

PREPARED BY:

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Game Biologist III and Game Biologist II

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

Appendix I. Moose Harvest and Hunting Pressure in Alaska's Game Management Unit 16,
West Side of Cook Inlet, 1971-1976.

Year	Season	Bulls	Cows	Unid.	Total	Hunters	Percent Success
1971	8/20-9/30	174	0	0	174		
	Yentna 8/20-12/31	9	-	1	10		
	11/1-11/30	249	-	4	253		
	11/21-11/30 Antlerless	0	174	2	176		
	Unknown Date	153	61	8	222		
	Total	585	235	15	835	1648	51
1972	8/20-9/30	142	0	1	143		
	Yentna 8/20-11/30	11	-	0	11		
	11/1-11/30	236	-	0	236		
16A -	8/20-9/30 Antlerless and	0	119	0	119		
16B -	8/20-9/30 & 11/1-11/30						
	Unknown Date	69	25	4	98		
	Total	458	144	5	607	1413	43
1973	8/20-9/20	303	128	10	441		
	Yentna 8/20-11/30	9	8	0	17		
16A -	11/1-11/10 and	265	143	5	413		
16B -	11/1-11/20						
16A -	Antlerless	Cancelled					
	Unknown Date	32	18	4	54		
	Total	609	297	19	925	1995	46
1974							
16A -	8/20-9/20 and	266	95	6	367		
16B -	8/20-9/30						
16B -	11/1-11/20	49	49	1	99		
16A -	8/20-9/20 Antlerless	0	30	0	30		
	Unknown Date	21	11	0	32		
	Total	336	185	7	528	1580	33
1975							
16A -	9/1-9/20	43	0	0	43		
16B -	9/1-9/20	110	0	2	112		
	11/1-11/10	83	0	0	83		
	Antlerless	Cancelled					
	Unknown Date	6	0	0	6		
	Total	242	0	2	244	879	28
1976							
16A -	Upper 9/1-9/20 and	65	32	1	98		
	Lower 9/1-9/30						
16B -	9/1-9/30	245	111	2	358		
	Total	310	143	3	456	1690	27

Appendix II. Chronology of Moose Harvest from Harvest Reports in Alaska's Game Management Unit 16, 1976

	<u>August</u> <u>20-31</u>	<u>1-7</u>	<u>8-13</u>	<u>September</u> <u>16-23</u>	<u>24-30</u>	<u>October</u>	<u>November</u>	<u>NoDate</u>	<u>Total</u>
Male	1	108	52	73	63	1	0	10	310
Female	1	58	52	31	--	--	--	--	143
Unknown	--	1	--	1	--	--	--	1	3
Total	2	167	104	105	63	1	1	11	456

Appendix III. Hunter Success vs. Transport Means from Harvest Reports in Alaska's Game Management Unit 16, 1976.

<u>Transport Means</u>	<u>Successful Means of Transport</u>				<u>Unsuccessful Means of Transport</u>				<u>Total Methods of Transport Reported</u>
	<u>Res.</u>	<u>NR</u>	<u>Unk.</u>	<u>Total</u>	<u>Res.</u>	<u>NR</u>	<u>Unk.</u>	<u>Total</u>	
1. Aircraft	202	43	9	254	453	36	11	500	754
2. Horse	4	8	0	12	3	1	0	4	16
3. Boat	84	1	2	87	185	4	2	191	278
4. Motorbike	2	0	0	2	1	0	0	1	3
5. Snowmachine	2	0	0	2	2	0	0	2	4
6. Off-road Vehicle	36	1	0	37	96	6	0	102	139
7. Highway Vehicle	44	3	1	48	241	2	5	248	296
No Means Reported	14	0	0	14	175	7	4	186	200
TOTAL	388	56	12	456	1,156	56	22	1,234	1,690

Prepared by: Jack Didrickson and Kenton Taylor, Game Biologist II
and Game Biologist III

Appendix IV. Moose Sex and Age Ratios in Alaska's Game Management Unit 16, Mt. Yenlo Count Area, Subunit 16B, 1974-76.

Year	Total M per 100 F	Small M per 100 F	Small M per 100 Large M	Small M % in Herd	Small M per 100 M Calves	Calves per 100 F	Incidence of Twins per 100 F w/calf	Calf % in Herd	Animals per Hour	Total Sample
1974	50	22	78	12	112	39	4	21	86	121
1975	46	8	22	5	200	8	0	5	163	130
1976	49	13	37	7	67	40	0	21	59	100

PREPARED BY: Jack C Didrickson, Game Biologist III and Kenton P. Taylor, Game Biologist II

Appendix V. Moose Sex and Age Ratios in Alaska's Game Management Unit 16, Sunflower Basin Count Area, Subunit 16B, 1973-75.

Year	Total M per 100 F	Small M per 100 F	Small M per 100 Large M	Small M % in Herd	Small M per 100 M Calves	Calves per 100 F	Incidence of Twins per 100 F w/calf	Calf % in Herd	Animals per Hour	Total Sample
1973	30	8	39	5	49	34	7	21	85	494
1974	34	10	43	6	78	27	4	17	59	328
1975	38	13	52	8	140	19	5	12	62	363

PREPARED BY: Jack C. Didrickson, Game Biologist III and Kenton P. Taylor, Game Biologist II

Appendix VI. Moose Sex and Age Ratios in Alaska's Game Management Unit 16, Peters Hills Count Area, Subunit 16A, 1967-76.

Year	Total M per 100 F	Small M per 100 F	Small M per 100 Large M	Small M % in Herd	Small M per 100 M Calves	Calves per 100 F	Incidence of Twins per 100 F w/calf	Calf % in Herd	Animals per Hour	Total Sample
1967	25	8	43	4	39	40	13	24	126	1121
1968	26	9	53	5	46	40	8	24	58	587
1970	33	13	65	7	50	51	12	28	--	602
1971	26	8	42	5	49	32	3	20	42	815
1972	19	2	15	2	16	30	9	20	40	742
1973	21	6	42	4	27	46	11	27	41	858
1974	18	11	147	7	46	48	7	29	44	757
1975	30	11	55	7	88	24	1	16	34	478
1976	NOT FLOWN									

PREPARED BY: Jack C. Didrickson, Game Biologist III and Kenton P. Taylor, Game Biologist II

Appendix VII. Moose Sex and Age Ratios in Alaska's Game Management Subunit 16B, Mt. Susitna-Mt. Beluga Count Area, 1968-76.

Year	Total M per 100 F	Small M per 100 F	Small M per 100 Large M	Small M % in Herd	Small M per 100 M Calves	Calves per 100 F	Incidence of Twins per 100 F w/calf	Calf % in Herd	Animals per Hour	Total Sample
1968	48	7	18	4	54	27	4	15	54	457
1969	NOT FLOWN									
1970	65	10	18	5	64	31	12	16	83	175
1971	48	10	27	6	66	31	4	17	62	1139
1972	21	1	5	1	11	18	1	13	40	557
1973	34	7	24	4	30	44	11	24	33	324
1974	34	10	40	6	51	38	9	22	51	730
1975	NOT FLOWN									
1976	NOT FLOWN									

PREPARED BY: Jack C. Didrickson, Game Biologist III and Kenton P. Taylor, Game Biologist II

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Unit 17 - Bristol Bay

Season and Bag Limits

Sept 1-Sept. 20
Dec. 10-Dec. 31

One bull

Harvest and Hunting Pressure

The 1976 reported harvest was 49 moose, with a hunter success of 29 percent (Appendix I). Alaskan residents took 73 percent of the reported harvest. The December season produced 24 percent of the reported harvest.

Composition and Productivity

No data are available.

Management Summary and Conclusions

Historically, Unit 17 has been hunted by local residents seeking recreation and meat. The trend in recent years has been for increased harvest and hunting pressure by both nonresidents and non-local Alaskan residents. In spite of the low abundance of moose with few areas of concentration, liberal season lengths made the unit attractive to hunt when compared to restrictive season lengths elsewhere in the State. Harvest peaked in 1975 when 115 moose were reported taken (Appendix I) and a nearly 50-50 split between Alaskan residents and nonresidents. The reduction of season length from 122 days in 1975 to only 41 days in 1976 made the unit's season comparable to other units and less attractive to hunters from outside the area. The harvest was reduced from 115 in 1975 to 49 moose and Alaskan residents took 73 percent of the reported harvest. Hunter success was, however, the lowest for any season since 1966.

Many of the moose killed by local residents, particularly village residents, are unreported and not reflected in harvest data. Much of this hunting occurs in late winter or early spring and the magnitude of the harvest has been such to deplete moose numbers near settlements. Moose are now abundant only in the remote areas of the unit. The existing numbers of moose within the unit appear to be less than available habitat could support.

The reduced level of sport harvest should be beneficial in allowing the moose numbers to increase. However, unless the late winter illegal hunting can also be curtailed, it is doubtful that increases in the number of moose will occur. Efforts to eliminate the illegal hunting of moose and to gain public support for sound management practices are a high priority for the Department.

Recommendations

No changes in existing season dates and bag limits are recommended at this time.

PREPARED BY:

James B. Faro
Game Biologist III

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

MOOSE - GMU 17 - BRISTOL BAY

APPENDIX I

Moose Harvest and Hunting Pressure - Unit 17

Year	Bulls	Cows*	Unid.	Total	Hunters	Percent Success
1964	31	1	-	32	-	-
1965	41	1	-	42	-	-
1966	25	1	-	26	90	28.9
1967	37	0	1	38	77	49.4
1968	45	0	1	46	66	69.7
1969	11	1	3	15	31	48.4
1970	23	0	2	25	35	71.4
1971	36	0	1	37	63	58.7
1972	35	0	3	38	74	51.4
1973	39	2	1	42	94	44.7
1974	65	2	2	69	119	58.0
1975	113	0	2	115	207	55.6
1976	48	0	1	49	168	29.1

* No legal cow season has been held.

PREPARED BY: James B. Faro, Game Biologist III

MOOSE

SURVEY-INVENTORY PROGRESS REPORT

Game Management Unit 18 - Yukon-Kuskokwim Delta

Period Covered: July 1, 1976 - June 30, 1977

Seasons and Bag Limits

Unit 18, that portion north and west of a line from Cape Romanzof to Mountain Village; and west of (but not including) the drainage of the Andreafsky River	Sept. 1 - Sept. 30	One bull
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Remainder of Unit 18	Sept. 1 - Dec. 31	One bull
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Harvest and Hunting Pressure

The 1976 reported harvest in Unit 18 totaled 12 moose, 11 adult bulls and 1 cow. One moose was taken with the use of an airplane, one by hunters using snow machines and the remaining 10 by hunters utilizing boats.

Recorded harvests for the previous 14 years have ranged from 7 to 78 with an average of slightly more than 22 being taken annually. During the past five years the reported moose harvest has been relatively stable, although the 1976 harvest was slightly lower than that of the previous year (16 moose).

Management Summary and Recommendations

Moose are hunted in Unit 18 throughout the year. Until there is better compliance with the existing seasons and bag limits there is little chance that the population will increase to any great extent. In fact, moose numbers may decline even more. It should also be noted that the reported harvest is a very poor index of the actual take. A good share of the hunters in Unit 18 fail to return their harvest ticket, particularly when the moose are taken out of season.

No changes in the seasons or bag limits are recommended at this time.

PREPARED BY:

SUBMITTED BY:

DeeDee A. S. Jonrowe
Game Biologist I

Oliver E. Burris
Regional Management Coordinator

MOOSE

SURVEY-INVENTORY PROGRESS REPORT

Game Management Unit 19 - McGrath Area

Period Covered: July 1, 1976 - June 30, 1977

Seasons and Bag Limits

Unit 19	Sept. 1 - Nov. 30 *Feb. 1 - Feb. 28	One moose; antlerless moose may not be taken prior to Oct. 1. Moose may be taken by permit only from Feb. 1-Feb. 28. Conditions of the permit will be described by commissioner's announcement
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* permit hunt was cancelled

Harvest and Hunting Pressure

During 1976 the reported moose harvest of 309 animals was comprised of 284 bulls, 23 cows, and 2 of unspecified sex. This was the largest harvest on record for Unit 19. Most of the increased kill can be attributed to movement of hunters into Unit 19 from adjacent units where low moose populations prevailed or restrictive seasons were in effect. In addition, pressure from Unit 18 hunters was intense, especially on the Holitna, Hoholitna, and Middle Kuskokwim drainages. Approximately one-half of the reported bull take was from the Alaska Range foothills region. Most of the hunters in this area used aircraft for transportation. Roughly one-fourth of the remaining take occurred in the Kuskokwim valley upstream from Stony River. The balance of the harvest occurred on the main Kuskokwim and its tributaries below Stony River. During the fall of 1976 most of the pressure by hunters using boats occurred on the Middle Kuskokwim and was confined to the main river and deeper tributaries, such as the Holitna River. This shift in pressure was caused by dry conditions throughout the Interior in the late summer, which left many tributaries impassable to boats. The estimated take for Unit 19, including the unreported harvest, was probably in excess of 500 moose.

Composition and Productivity

Aerial surveys of moose conducted in Game Management Unit 19 in early December 1976 (Table 1) confirmed that moose in this area were low to moderate in number, but generally stable. In Unit 19 calf to cow ratios ranged from a high of 50 calves:100 cows (Hoholitna Valley) to 24 calves:100 cows (Alaska Range). The percentage of calves in the population, according to fall counts, averaged approximately 18 percent.

During 1977 late winter surveys on major concentration areas (Table 2) revealed herds comprised of roughly 21 percent calves. Although some winter mortality probably occurred, it appeared that overall the mild winter enhanced calf survival.

Range and Habitat

Snowfall during the winter of 1976-77 ranged from moderate to heavy. Very deep snow cover (4-5 feet) occurred in the Holitna watershed and may have caused some mortality in headwater streams. In addition, this extraordinary snowpack created floodwaters which persisted nearly all summer in many of the prime calving areas along this drainage. Elsewhere, conditions were not as severe, consequently winter survival was good.

Population Trends

Considering the low to moderate abundance of moose and the low overall calf survival in some portions of Unit 19, moose populations in this area are probably stable or decreasing slightly. In southwestern Unit 19 and in the Alaska Range foothills region heavy hunting pressure, climatic conditions, and wolf predation are the primary factors controlling growth of moose populations. In light of these conditions, more conservative hunting regulations appear necessary to compensate for the rapidly increasing hunting pressure throughout Unit 19.

Management Summary and Recommendations

Continued increases in hunting pressure and harvest are expected unless more restrictive moose hunting regulations are adopted. This is especially true in the Alaska Range and Holitna River areas.

PREPARED BY:

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SUBMITTED BY:

Oliver E. Burris
Regional Management Coordinator

Table 1. Summary of Unit 19 fall moose composition counts, 1976.

Area	Date	Bulls			Total bulls	Cows			Total cows	Total adults	Lone calves	Total calves	Unid. sex & age	Total moose	Count time (hr.)	Moose per hr.
		Lge	Med	Sm		w/o	w/1	w/2								
Unit 19																
Alaska Range Foothills Stony River to Swift River	12/8/76	21	9	4	34	25	8	0	33	77	0	8	0	85	1:05	78
Alaska Range Pingston Creek to Farewell	12/9/76	37	7	4	48	55	18	0	73	121	0	18	0	139	1:45	69
Hoholitna River	12/8/76	11	2	4	17	21	11	3	35	52	0	17	0	69	1:30	46
Kuskokwim River, Vinasale Mountain to Wilson's Slough	12/7/76	9	6	7	22	27	13	0	40	66	0	13	0	75	1:30	52

Table 2. Summary of Unit 19 late winter moose composition counts, 1977.

Area	Date	Adults			Total adults	Lone calves	Total calves	Total moose	Calf % in herd	Count time (hr.)	Moose per hr.
		w/o	w/1	w/2							
Holitna River	3/8/77	74	15	0	89	0	15	104	14.4	1.7	61
Hoholitna River	3/8/77	40	12	0	52	1	13	65	20.0	.9	74
Aniak River	2/9/77	53	15	5	73	0	25	98	25.6	50 min	114
Upper Kuskokwim (Stony River to Big River)	2/8/77	135	23	2	160	0	27	187	14.4	3.2	56
Takotna River	3/12/77	48	6	1	55	0	8	63	12.7	2.0	32

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Unit 20A - Tanana Flats, North Slope of Alaska Range

Period Covered: July 1, 1976 - June 30, 1977

Seasons and Bag Limits

Unit 20(A) Sept. 1 - Sept. 10 One bull

Harvest and Hunting Pressure

A 10-day, early September season for bull moose only was held in Unit 20A during 1976. The reported legal sport kill of 38 animals was virtually unchanged from that of the previous year. Current regulations are intended to minimize harvest while the moose population recovers from the recent decline in numbers.

Although there were 55 percent fewer hunters afield in 1976 than in 1975, hunter success was greater (Table 1) which resulted in a harvest little changed from that of 1975. The harvest was distributed among traditional access points throughout the subunit (Table 2). Aircraft and boat transportation were the favored methods of access (Table 3). Forty-five percent of the hunters utilizing aircraft were successful and accounted for 71 percent of the harvest. Success of hunters utilizing other transportation modes ranged from 9 to 25 percent.

Table 1. Unit 20A moose hunting pressure and success, 1976.

Total Hunters	<u>Successful Hunters</u>			<u>Percent Success</u>
	<u>Resident</u>	<u>Nonresident</u>	<u>Unknown</u>	
132	31	6	1	29

Table 2. Unit 20A moose harvest distribution, 1976.

<u>Location</u>	<u>Number of Moose</u>	<u>Percent of Harvest</u>
Tanana Flats	12	32
Wood River	7	19
Delta River, Delta Creek and Little Delta River	6	16
Yanert River	5	14
Dry Creek	3	8
Gold King, Japan Hills	2	5

Table 3. Comparison of transportation methods used by moose hunters in Unit 20A, 1976.

<u>Mode of transportation</u>	<u>Number of hunters</u>	<u>Moose harvested</u>
Aircraft	60	27
Horse	4	1
Boat	28	5
Off-road vehicle	15	3
Highway vehicle	11	1

Composition and Productivity

Fall composition counts (Table 4) were only partially completed in Unit 20A during 1976 due to an unusual scarcity of snow at the period when surveys are normally conducted. Inadequate snow cover precluded surveys along standardized transects on the Tanana Flats, but data comparable to those from 1975 were obtained for the foothills of the Alaska Range where better snow conditions existed. Information from a moose research project on the Tanana Flats partially offset the lack of transect survey data. Although collected in a different manner, the research project data provided a sample sufficient for comparative purposes. Calf survival to six months of age was vastly improved over the previous year (47% as compared to 16% in 1975). Likewise, an increase in the bull to cow ratio was evident; in 1976 a ratio of 59 bulls per 100 cows was observed as compared to 43 per 100 in 1975.

Table 4. Summary of Unit 20A fall moose count data, 1976.

<u>Males per 100 females</u>	<u>Calves per 100 females</u>	<u>Percent calves</u>	<u>Percent yrlyg bulls</u>	<u>Percent large bulls</u>
59	44	22	7	33

To assess overwinter survival of moose, pre-calving surveys have been conducted annually in standardized count areas on the Tanana Flats during May. In 1976 only count area #1 was surveyed, but in 1977 all three areas were completed (Table 5). Calf survival was excellent during both the winters of 1975-76 and 1976-77.

Table 5. Age and sex composition of moose observed during pre-calving surveys on the Tanana Flats, 1976-77.

	<u>Yearlings per 100 cows</u>	<u>% yearlings in herd</u>	<u>Bulls per 100 cows</u>	<u>% bulls in herd</u>
5/20/76*	42	22	33	17
5/20-21/77*	53	29	33	18
5/17-21/77**	38	23	27	16

* Count area #1 only.

** Totals for all count areas, including area #1.

Thirty-eight yearlings per 100 cows, as observed on the Tanana Flats in spring of 1977, represented the highest recruitment ever recorded for that area. The population suffered extremely poor recruitment during the period 1970-1975. For example, only 8 yearlings per 100 females were recorded during 1975 surveys. The improved survival during 1976 can probably be attributed to reduced levels of predation and mild winters.

Population Trends

The improved yearling to cow ratios indicated that survival of moose calves increased greatly in subunit 20A. However, since the reproductive base is relatively small, several years will be required for the population to increase substantially. The increased recruitment to this population appeared to be a direct result of reduced predator density and mild winters. Therefore, continued increase in moose numbers will probably be contingent on the extent to which these conditions prevail in the future.

The bull to cow ratio has also improved and this was most likely the result of decreased hunter harvest. Current restrictive regulations have greatly reduced both hunting pressure and total take.

Management Summary and Recommendations

A restrictive season and bag limit was retained for subunit 20A during 1976 which resulted in a low harvest for the second consecutive year. While fewer hunters were afield in 1976, hunter success was greater. Consequently, the harvest remained virtually unchanged from that recorded in 1975. Hunters who utilized aircraft transportation had the greatest success and accounted for the majority of the harvest.

Reduced predator density and mild winters resulted in improved calf survival, and this should bring about a sizable increase in moose numbers if favorable conditions persist for several more years. Likewise, the reduced harvest has resulted in much improved bull to cow ratios.

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SUBMITTED BY:

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Regional Management Coordinator

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Unit 20B - Fairbanks, Central Tanana Valley

Period Covered: July 1, 1976 - June 30, 1977

Seasons and Bag Limits

Fairbanks Metropolitan Area No open season

Portions of the East and Sept. 1 - Sept. 20 One bull
South Forks of the Chena River

Remainder of Unit 20(B) Sept. 1 - Sept. 10 One bull

Harvest and Hunting Pressure

The number of moose hunters utilizing Unit 20B declined by nearly eight percent in 1976. The reported legal sport kill of moose (Table 1) was 35 bulls, a decrease of 27 percent from the harvest reported for 1975. Hunter success dropped to an all-time low of six percent. The lack of interest in hunting Unit 20B and the low rate of success can probably be attributed to the reduced availability of moose.

Table 1. Unit 20B moose hunting pressure and success, 1976.

<u>Year</u>	<u>Total Hunters</u>	<u>Successful Hunters</u>			<u>Percent Success</u>
		<u>Res.</u>	<u>Nonres.</u>	<u>Unk.</u>	
1976	554	26	8	1	6

Harvest in Unit 20B was concentrated in areas accessible by road vehicles (Table 2). The highly accessible training site behind Eielson Air Force Base continued to be a popular hunting spot and the harvest from this area accounted for 57 percent of the total kill. However, the actual number of animals taken from the training site has declined, probably in response to the decreased availability of moose.

Table 2. Areas contributing the majority of the Unit 20B moose harvest, 1976.

<u>Location</u>	<u>Number of moose</u>	<u>Percent of harvest</u>
South Fork Chena River	11	31
Chena Flats, Eielson AFB	9	26
Chena Hot Springs Road	8	23

Analyses of transportation types utilized by hunters in 1976 revealed considerable hunting effort by road hunters (Table 3). Forty-seven percent of the hunters used highway vehicles, and an additional 23 percent used off-road vehicles, but these methods were the least successful. Only seven percent of the hunters using highway vehicles and nine percent of those using ATV's took moose. Because of the large number of hunters utilizing highway and off-road vehicles, most of the moose were taken by hunters utilizing these modes. The early season precluded use of snow machines.

Table 3. Comparison of transportation methods used by hunters in Unit 20B, 1976.

<u>Mode of transportation</u>	<u>Number of hunters utilizing mode</u>	<u>Number of moose harvested</u>
Aircraft	13	2
Horse	6	3
Boat	33	1
Motorbike	10	0
Off-road vehicle	129	11
Highway vehicle	259	18

Composition and Productivity

No production data were gathered for Unit 20B during 1976. Calf survival has been poor since 1970, hence recruitment has generally been insufficient to offset losses to the adult segment of the population. Bull to cow ratios have also been declining in areas of intensive hunting, and the bulls-only season is expected to further depress this ratio.

Population Trends

No surveys were conducted in Unit 20B during 1976, but past surveys revealed declining moose numbers due to low recruitment. Surveys planned for 1977 will probably include the Chena Flats to evaluate the effect of the present closure to hunting, and the South Fork of the Chena River to evaluate effects of the bulls-only season on the bull to cow ratio.

Management Summary and Recommendations

The number of hunters afield in Unit 20B declined in 1976, presumably due to the reduced availability of moose. Hunter success reached an all-time low which resulted in a harvest of only 35 bulls. Most of the hunting effort was from hunters using motorized vehicles along roads and trails. No new data on composition and productivity were gathered.

PREPARED BY:

SUBMITTED BY:

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Oliver E. Burris
Regional Management Coordinator

MOOSE

SURVEY-INVENTORY PROGRESS REPORT

Game Management Unit 20C - Tok, Tanana, Upper Yukon

Period Covered: July 1, 1976 - June 30, 1977

Seasons and Bag Limits

Unit 20(C) that portion draining into the south bank of the Tanana River from the confluence of the Tanana and Kantishna Rivers, and all drainages of the Toklat River to the western boundary of Unit 20(A)	Sept. 1 - Sept. 10	One bull
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Remainder of 20(C)	Sept. 1 - Sept. 20	One bull
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Harvest and Hunting Pressure

The reported sport harvest of moose during the 1976 hunting season in Unit 20C consisted of 231 animals, a slight increase over the previous year's take of 223. Hunting pressure declined six percent which represented the lowest hunting effort in this unit since the formation of Unit 20D in 1971. The area now comprising Unit 20D had a history of relatively heavy hunting pressure prior to 1971. Table 1 indicates the relatively low success and low number of nonresident hunters utilizing the area during the 1976 season.

Table 1. Unit 20C moose hunting pressure, success and total harvest, 1976.

Year	Total hunters	Harvest	Successful Hunters			% Success
			res.	nonres.	unk.	
1976	1211	231	205	21	5	19

The 1976 harvest is summarized by area in Appendix I. With three exceptions there was little difference between the 1975 and 1976 harvests with regard to distribution. The moose harvest from the Circle-Central area and Birch Creek drainage increased from 13 to 29, while harvests in Beaver Creek drainage and Minchumina area rose slightly to 14 and 10 moose, respectively. Since moose do not appear to be particularly abundant in these areas, this trend was probably a reflection of increasing hunting pressure.

Revised moose harvest tickets on which hunters were asked to provide a measurement of antler spread were used during the 1977 season. This information, when used in conjunction with aerial survey and hunting pressure data, may be useful in determining the status and welfare of specific moose populations. It must be assumed that: 1) hunters are reasonably accurate in measuring antler spread, and 2) that most yearling bulls have antler spreads of less than 30 inches. Providing these assumptions are true, antler spread data reveal the proportion of yearling bulls in the harvest. This proportion can aid in determining the intensity of harvests or the status of specific moose populations.

Analysis of antler spread data for the 1976 season from areas within Unit 20C where adequate sample sizes were obtained indicated a high level of exploitation in traditional hunting areas. For example, yearlings comprised 43 percent (75 yearlings per 100 adults) of the 28 bulls harvested in the Salcha drainage. Although 1976 survey data were lacking for this area, moderate levels of production and survival have been noted recently. A lower level of exploitation may be occurring in the more remote, extreme western portions of the unit. Unfortunately, surveys in the Kantishna, Cosna, Chitanana, Minchumina, and Muddy drainages have not been conducted. However, combined antler data for these areas (n=21) suggested that local populations may be lightly hunted, since the harvest was comprised of 14 percent yearlings (17 yearling bulls per 100 adult males).

In the Fortymile and Seventymile drainages and the eastern drainages of the Nenana River (Nenana to Cantwell), antler spread data from the harvest substantiated survey data which indicated low populations comprised of relatively few yearlings. The harvest (30 bulls) from the Fortymile-Seventymile area was comprised of only seven percent yearlings (7 yearlings per 100 adults). Similarly, the harvest (17 bulls) from the eastern Nenana drainages contained six percent yearlings (6 yearlings per 100 adults).

Composition and Productivity

Poor snow conditions prevented fall surveys in most of Unit 20C during 1976. Only the Fortymile drainage and portions of Mount McKinley National Park were surveyed (Table 2). Department personnel using a Helio Courier aircraft classified 124 moose in eastern Unit 20C during a 6.7 hour survey. At McKinley Park, National Park Service personnel used a Piper Super Cub to classify 576 moose in 16.2 hours of survey time.

Table 2. Sex and age ratios of moose surveyed in Unit 20C during November 1976.

Area	Small Bulls per 100 cows	Total Bulls per 100 cows	Calves per 100 cows	% Calves in herd	Moose per hour
Fortymile drainage	3.4	40.2	2.3	1.6	18.5
McKinley Park	5.8	36.6	16.2	10.6	35.5

In the eastern portion of Unit 20C calf to cow ratios remained below 10:100 for the third consecutive year and yearling bulls were nearly nonexistent. Bull to cow ratios remained high, but in terms of actual numbers the bull population was low. Moose abundance appeared to have declined since 1975.

In the Park moose appeared to be faring slightly better than elsewhere in Unit 20C, but the population trend is unknown since comparable surveys were not flown in prior years. The 1976 calf to cow and yearling bull to cow figures are too low to expect much, if any, increase in moose numbers. The bull to cow ratio remained high in the Park, but was little different from that observed in other areas where hunting of bulls occurred. The amount of seasonal moose movement across Park boundaries is unknown. Based on what is known about moose movements in Unit 20A, it is likely that some moose occurring in the Park during November reside outside the Park (in areas subject to hunting) earlier in the fall.

Management Summary and Recommendations

Calf survival through November remained poor in eastern 20C despite a modest harvest and mild winter during 1975-76. The continued poor calf survival was believed to be caused by wolf and bear predation. Grizzly and black bear populations appeared to be moderately abundant throughout much of the unit. The decline in moose numbers will not be arrested until calf survival improves and recruitment exceeds losses due to hunting, predation, and other causes. The current level of human harvest is accelerating the rate of decline in accessible, heavily hunted areas. Since losses to hunting are the only mortality factors subject to control at this time, it is recommended that the hunting season be closed in eastern Unit 20C during the 1977 season. While this action will not add moose to the population, it will eliminate losses due to hunting and, hence, provide predators with a larger prey base. By leaving bulls, which otherwise would be lost to hunting, in the population, predation on cows and calves may be reduced. In turn, this should serve to slow the population decline.

Studies should be initiated to determine the reasons and relative importance of factors, including predation, responsible for poor calf survival. Attempts should also be made to determine the relative abundance of predators in eastern Unit 20C.

Calf survival in western 20C (McKinley Park) also appeared poor. An estimated 81 percent of the calves were lost between the time of birth and November moose surveys. Recruitment did not appear sufficient to offset natural losses, thus it is doubtful that any increase in numbers will occur. Since this population is frequently referred to as "unhunted" and used for comparison with hunted populations, it is important to assess the seasonal movement of "Park moose" to areas outside the Park where hunting occurs.

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Larry Jennings
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Dale Haggstrom
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SUBMITTED BY:

Oliver E. Burris
Regional Management Coordinator

Appendix I. Areas contributing to the moose harvest in Unit 20C, 1976.

Locality	Number Harvested
Eastern 20C	
Fortymile, Seventymile Drainage (includes Taylor Highway)	32
Charley River	2
Central 20C	
Healy Lake	2
Macomb Plateau	2
Robertson River, Dot Lake	6
Goodpaster River	18
Shaw Creek, Quartz Lake	7
Salcha River	32
Northern 20C	
Steese Highway, Circle-Central	18
Birch Creek	11
Beaver Creek	14
Hess Creek	5
Western 20C	
Elliott Highway, Livengood	6
Kantishna River	8
Minchumina, Muddy River	10
Cosna, Chitanana Rivers	5
Southwestern 20C	
Nenana-Clear	2
Rex Dome, Healy-Lignite	7
Yanert River	9
Savage, Toklat Rivers; Stampede Trail	9
Unknown Location 20C	20

MOOSE

SURVEY-INVENTORY PROGRESS REPORT

Game Management Unit 20D

Period Covered: January 1, 1976 - June 30, 1977

Seasons and Bag Limits

Unit 20(D) east, that portion of Subunit 20(D) east of the west bank of the Gerstle River	Sept. 1 - Sept. 20	One bull
Unit 20(D)* west, the remainder of Subunit 20(D)	Sept. 1 - Sept. 20	One bull by permit; 15 antlered moose may be taken. Conditions of the permit will be described by Commissioner's announcement

Harvest and Hunting Pressure

The total moose kill in Unit 20D during the 1976 season was 15 bulls. Most of the harvest (10 bulls) occurred in the western portion of the unit. Seven percent of the 221 hunters were successful.

The registration type permit hunt was successful in terms of controlling and determining the harvest. There was a 74 percent return on the permits issued.

Composition and Productivity

November composition counts in 1976 were not completed due to almost a total lack of snow. Data that were obtained, however, indicated a marked improvement in calf production over that of 1975 (Table 1). The figure of 29 calves per 100 cows exceeded the six-year (1970-75) average of 20 calves per 100 cows. The number of bulls per 100 cows was down substantially from that of 1975 and was somewhat below the six-year average of 21 per 100. The number of moose observed per hour during the 1976 counts was also considerably lower than that in 1975, but this may have resulted from lack of snow and relatively poor visibility of moose.

Table 1. Fall moose composition counts in Unit 20D, 1975-76.

Numbers	Year	
	1975	1976
Bulls/100 cows	29.2	19.0
Calves/100 cows	9.0	29.4
Calf percentage in herd	6.5	22.3
Moose per hour	28.9	20.0

Snow conditions were very mild during the record breaking winter of 1977. Such a mild winter would normally result in excellent calf survival, but if predation remains at the level observed during recent years, this is not expected to occur.

Population Trends

The long-term trend of moose habitat in Unit 20D under current land management practices can only be downward. Major burns in the area are past their prime, and browse production is declining.

Moose numbers have generally been declining since 1971. Hunting is not thought to be a major factor responsible for this decline. Since 1971, only 115 moose have been taken by hunters and annual estimates of moose numbers have ranged between 600 and 750. Calf production in 1976 was the highest in six years. Observations during the spring of 1977 also indicated a good calf crop with a high incidence of twins. During 1976 and 1977 there were signs of a decrease in wolf predation. Nevertheless, predation is still limiting the moose population despite the long-term decline in quality of moose habitat. It is too early to determine if the survival of calves produced during 1976 and 1977 will result in increased moose abundance.

Management Summary and Recommendations

The Unit 20D moose population is probably in a long-term decline because moose habitat is deteriorating. Predation may be decreasing, but it is still limiting moose population growth.

In recent years the bull harvest has not substantially reduced the bull to cow ratio, and a limited bull harvest is recommended for next season. During 1976 a somewhat better distribution of hunting pressure was achieved.

The predator population must be reduced through hunting, trapping or other means to obtain a larger harvest from the existing moose population. A habitat improvement program should be initiated to prevent a long-term decline in moose numbers.

PREPARED BY:

SUBMITTED BY:

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Game Biologist II

Oliver E. Burris
Regional Management Coordinator

MOOSE

SURVEY-INVENTORY PROGRESS REPORT

Game Management Unit 21 - Middle Yukon

Period Covered: July 1, 1976 - June 30, 1977

Seasons and Bag Limits

Unit 21, that portion below Sept. 1 - Nov. 30
Eagle Island on the Yukon *Feb. 1 - Feb. 28
(above Grayling) downstream
to the Unit 18 boundary and
upstream on the Innoko River
to the mouth of the Iditarod
River

One moose; antlerless
moose may not be taken
prior to Oct. 1. Moose
may be taken by permit
only from Feb. 1-Feb. 28.
Conditions of the hunt
will be described by
commissioner's announcement.

* Season closed by emergency order

Remainder of Unit 21 Sept. 1 - Nov. 30

One moose; antlerless
moose may not be taken
prior to Oct. 1.

Harvest and Hunting Pressure

During 1976 the reported moose harvest of 305 animals was comprised of 272 bulls, 28 cows, and 5 of unspecified sex. This was the largest harvest on record for Unit 21 and reflected increased hunting pressure on the Innoko and Koyukuk Rivers. As reported in 1975, sport and guided hunters were responsible for much of the increased harvest. The availability of large-antlered bulls, which are becoming scarce elsewhere, has contributed greatly to hunter interest in this area. Conflict between area residents and "fly-in" hunters has reached serious proportions on the Koyukuk and lower portions of the Middle Yukon drainages. In addition, many residents of the Lower Yukon region are boating into lower Unit 19 to hunt moose. This activity has created social conflicts. The presence of Swedish moose and bear hunters in the Innoko River and Paimiut Slough areas further compounded this problem.

Fall aerial surveys were made only on the Upper Innoko drainage of Unit 21 during 1976 (Table 1). These surveys indicated low calf survival (18 calves per 100 cows) and a reduced bull to cow ratio (25 bulls:100 cows). The low bull to cow ratio was expected, considering the heavy hunting pressure on bulls over the past two years. Poor calf survival may be attributable to the high wolf population which has been present in this area for many years. Although some wolves were removed from the area during March 1976, several large packs still remain.

Late winter surveys of the Middle Yukon valley during 1977 (Table 2) showed increased calf survival (combined count from Old Paimiut to

Galena was 18% calves in herd), especially in the Paimiut-Holy Cross area (28% calves). In 1976, only 250 moose were observed in this area and calves comprised less than 10 percent calves of the population. In 1977, 285 moose were observed and calves accounted for 27 percent of the population. Although the current population is lower than that of five years ago, moose in Unit 21 are moderately abundant, and the population appears to be increasing slowly. The reported harvest for 1975 was only 48 moose, which is probably not a true representation of the actual kill. Similarly, 1976 data indicated a kill of 34 moose in Unit 21.

Range and Habitat

Snowfall in 1976-77 was moderate throughout Unit 21, but in flat areas snow depth rarely exceeded three feet. Some winter and spring concentration areas along the Middle Koyukuk valley were heavily browsed. The mild winter and moderate snow cover should not have caused significant winter mortality.

Population Trends

Despite heavy hunting pressure and the presence of a large wolf population, moose in the Nowitna drainage appear to be moderately abundant (Table 2). There were indications that the population may be increasing. The percentage of calves in the Nowitna population was 21 and 28 percent during the last two years, respectively.

Moose populations along the Koyukuk River in Unit 21 were in as good condition as those in other sections of the unit (Table 2). Moose occupied areas away from the main Koyukuk valley during early February 1977, thereby giving an impression of a vastly reduced population. However, in comparison to past surveys, the Koyukuk moose herd had declined moderately as a result of low calf survival. Causes for the decline of the Koyukuk moose herd are not known. A cursory look at wolf activity along this drainage suggests that wolves were abundant and highly dependent on moose for prey. While hunting pressure has increased every year, these harvests did not affect the calf survival. To help offset the decline, more restrictive regulations are suggested.

Other sections of Unit 21 (Table 2), such as the Yukon River downstream to Galena, have higher rates of calf survival and greater moose densities. An exception is that portion of the Yukon River from the Nowitna River upstream to Tanana. This section rarely has any concentrations of moose during the spring months.

Management Summary and Recommendations

Moose populations in Unit 21 are in fair to good condition, but hunting pressure is increasing. The hunting pressure is affecting bull to cow ratios on the Innoko and perhaps other drainages. Additionally, wolves may be influencing calf survival on the Koyukuk and portions of the Innoko and Middle Yukon drainages. A severe winter followed by widespread flooding could reduce moose populations drastically in the

broad floodplains of the Yukon and Koyukuk. Consequently, a conservative approach to hunting seasons seems advisable at present.

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Table 1. Summary of fall Unit 21 moose population composition counts, 1976.

Area	Date	Bulls			Total bulls	Cows			Total cows	Total adults	Lone calves	Total calves	Unid.	Total moose	Count time	Moose per hr.
		Lge	Med	Sm		w/o	w/1	w/2					sex & age			
Innoko River Dishna River to mouth of Iditarod River	12/6/76	22	7	11	40	133	22	3	158	196	0	28	0	224	3:00	74.0

Table 2. Summary of Unit 21 winter moose composition counts, 1977.

Area	Date	Adults			Total adults	Lone calves	Total calves	Total moose	Calf % in herd	Count time (hr.)	Moose per hr.
		w/o	w/1	w/2							
<u>Unit 21</u>											
Old Paimiut to Anvik	3/9/77	127	55	10	192	0	75	267	28.1	1.5	178
Anvik to Kaltag	3/9/77	264	25	6	295	0	37	332	11.1	2.6	128
Kaltag to Galena	3/9/77	71	12	0	83	0	12	95	12.6	1.5	63
Combined Middle Yukon		462	92	16	570	0	124	694	17.9	5.6	124
Nowitna River	3/10/77	90	27	3	120	0	33	153	27.5	3.5	44
Innoko River	3/10-11/77	188	19	3	210	0	25	235	10.6	4.8	49
Yukon River (Tanana to Novi River)	2/16/77	28	5	0	33	0	5	38	12.9	1.4	22.8
Novi River to Galena	2/16/77	69	17	3	89	0	23	112	20.5	1.4	67.2
Huslia to Gisasa River	2/16/77	223	25	3	251	0	31	282	10.9	2.1	132

MOOSE

SURVEY-INVENTORY PROGRESS REPORT

Game Management Unit 22 - Seward Peninsula

Period Covered: January 1, 1976 - June 30, 1977

Seasons and Bag Limits

Unit 22

Aug. 1 - Jan. 31

One moose; antlerless moose may be taken by permit only from Sept. 1-Jan. 31. Conditions of the permit will be described by commissioner's announcement

Harvest and Hunting Pressure

Favorable weather, reestablishment of the antlerless season after a one-year postponement, and an overall increase in the number of hunters, contributed to the highest recorded annual moose kill in Unit 22 since records have been kept. During the six-month season, the reported harvest was 240 moose; 186 bulls (77%), 51 cows (21%) and 3 moose of unspecified sex. Nome residents took 61 percent (146 moose) of the reported harvest. Of the 611 hunters who returned harvest tickets, 593 were Alaska residents. They harvested 231 moose for a success rate of 39 percent. Nonresidents experienced a 56 percent rate of success.

Rural residents consistently failed to report the taking of moose. The total reported harvest from rural villages was only 78 moose (30% of the Unit 22 harvest). Although compliance with regulations was probably the highest to date, residents from certain communities probably reported less than one-half the actual harvest. Considering the inaccuracies of harvest ticket data, the total kill during the 1976-1977 season was estimated to be 275-300 moose.

Based on the reported harvest, 47 percent of the total kill occurred in the central Seward Peninsula, principally in the Kuzitrin, Kougarok and Pilgrim drainages. These areas are collectively referred to as the Kuzitrin area. In most cases access to the area was by way of the Nome-Taylor Road, and during the season hundreds of man-days were spent driving the road system. Road hunters using highway and off-road vehicles accounted for 70 percent of the harvest in the Kuzitrin area. The remaining 30 percent of the successful hunters used aircraft, boats, and snow machines. Road hunters accounted for 54 percent of the known take, boat hunters took 28 percent, and the remainder of the kill was distributed among snow machine and aircraft users. Among the 611 hunters returning harvest tickets, highway vehicles and boats were the modes of transportation most often used.

During the 20-week antlerless season, a total of 494 permits were issued. Most of the permits were issued during the first two weeks of the season (September 1 - September 15). Considering the relatively small number of people in the area, this was an enthusiastic response by the hunting public. This situation was probably prompted by five factors: the sudden cancellation of the 1975 antlerless season; an inflationary spiral of meat prices; a general shift away from the dependence on marine mammals; the sighting of numerous moose along the road system; and knowledge that the expanding moose population contained a sizable surplus of harvestable animals. Although the public showed considerable interest in cow hunting, only 51 cows were reported to have been taken. Fifty-nine hunters held antlerless permits, but chose to take bulls. Although the antlerless season was lengthy, most of the harvest occurred during the first six weeks. Weather became a significant limiting factor in October when drifting snow closed much of the road system and, as a result, hunting pressure and success dropped sharply.

Eighty-two percent of the total kill (196 moose) occurred during the first 10 weeks of the general season. The month of September was the most productive for hunters, and 48 percent of the take (115 moose) occurred during this period. In contrast, only 18 percent of the harvest (44 moose) occurred after October 16.

From 1973 through 1976 incisor teeth were collected from moose to assess changes in the age structure of the population. Age data by year and by sex from a sample of 478 bulls and cows appear in Table 1. During the four-year period (1973-1976), yearling bulls, on the average, comprised 30 percent of the harvests. During the 1975 and 1976 seasons, yearlings comprised 23 percent and 24 percent of the harvests, respectively. This suggests that the rate of recruitment had declined. In the total sample, only two percent of the bulls were over eight years of age, and among males taken during the 1976 season, only three percent were over eight years of age. Sixteen percent of the cows harvested were eight or more years of age. Despite the smaller sample size, it appears that the recruitment rate of females may be somewhat lower than that for males. In general, however, age data suggest that the Seward Peninsula moose population is relatively young and maintaining relatively high rates of production and survival.

Composition and Productivity

Aerial surveys were conducted in March and April 1977 when animals were concentrated in major river valleys. During the 1976 counts, 26 percent of the 340 moose observed were short yearlings. Similar counts during 1977 in a slightly different area revealed 20 percent (n=717) short yearlings. Although the two counts are not directly comparable, some decrease in yearling recruitment was suggested. Comparable counts in the Kuzitrin drainage did, however, show a decline from 25 to 21 percent short yearlings between 1976 and 1977.

The percentages of short yearlings observed in the spring aerial counts were remarkably close to the age figures obtained from the fall harvest. For example, spring aerial surveys in 1976 revealed 27 percent short yearlings and the subsequent fall harvest was comprised of 24 percent yearlings.

Aerial surveys were conducted in November of 1976 to determine fall sex composition. In a sample of 426 moose, 66 bulls per 100 cows were observed. The highest ratio, 77 bulls per 100 cows, was observed in Niukluk River drainages where hunting pressure was relatively light. As expected, the heavily hunted Kuzitrin drainages had the lowest bull ratio (56 per 100 cows). Despite variations, favorable bull to cow ratios were recorded in all count areas. Based on the spring and fall surveys during 1976 and 1977, the total moose population in Unit 22 was estimated to be in excess of 2000 animals.

Management Summary and Recommendations

Aerial surveys during the past six years have shown that there has been a substantial increase in the Seward Peninsula moose population. Annual recruitment has been relatively high and, although seasons have been liberal, harvests in many areas have been well below the number of animals that were added to the population annually. In some wintering areas the density of moose has exceeded 10 animals per square mile during the period from February-April. Spring surveys as well as the age composition of moose harvested suggest there has been a gradual decline in annual recruitment. Winter browse is limited on the Seward Peninsula and in some areas this decline may in part be related to overcrowding and excessive competition for food.

The current moose population in the drainages of the Kuzitrin is estimated to be 800 animals. Survey data indicated an annual recruitment rate of 21 percent and a potential surplus of approximately 170 moose is available annually. The Kuzitrin is the most heavily hunted area in Unit 22 and the reported harvest from this area was 126 moose. Hence, it appeared that hunters were removing most, if not all, the annual increment from the Kuzitrin area. In the remainder of Unit 22 harvests have been well below annual recruitment. Therefore, it is recommended that the season throughout the Kuzitrin area be shortened by three months and run from August 1 to October 31. To attain a harvest near the annual increment and to maintain high bull ratios, it is recommended that antlerless moose permits be issued only from September 15 to the end of the season. When a desired harvest is obtained in a specific drainage, the antlerless season should be terminated by field announcements.

PREPARED BY:

SUBMITTED BY:

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Table 1. Percentages of moose in various age classes comprising annual harvests, Unit 22.

Year/Sex	Age in Years								Sample Size
	1	2	3	4	5	6	7	8+	
1973 (Bulls only)	44	4	15	23	7	3	4	0	73
1974 (Bulls only)	33	26	15	8	10	2	4	2	94
1975 (Bulls only)	23	32	10	17	7	5	4	2	87
1976 (Bulls only)	24	37	20	9	3	3	1	3	124
TOTAL MALES (1972-1976)	30	27	15	14	6	3	3	2	378
TOTAL FEMALES (1974 & 1976)	22	13	18	14	7	6	4	16	100
TOTAL MALES-FEMALES	28	24	16	14	6	4	3	5	478

MOOSE

SURVEY-INVENTORY PROGRESS REPORT

Game Management Unit 23 - Kotzebue Sound

Period Covered: January 1, 1976 - June 30, 1977

Seasons and Bag Limits

Unit 23

Aug. 1 - Dec. 31

One moose; antlerless moose may be taken by permit only from Sept. 1-Dec. 31. Conditions of the permit will be described by commissioner's announcement.

Harvest and Hunting Pressure

The reported Unit 23 moose harvest increased to 149 animals during 1976. The previous high (104 moose) occurred during 1974, but during the period 1963-1972 annual harvests averaged only 75 moose. The cow harvest during 1976 was 16 animals compared to 20 in 1974 and the earlier high of 24 in 1970.

During 1976, a total of 274 moose hunters hunted in Unit 23 compared to a previous high of 178 hunters (1974). Among hunters completing harvest tickets, 54 percent were successful. During the 1976 season, there was a substantial increase in the number of hunters utilizing aircraft, and this was the first year hunters using aircraft reported a larger take (60 moose) than those using boats (46 moose).

Composition and Productivity

Aerial surveys were conducted along major river systems during the springs of 1976 and 1977 and in the fall of 1976. Spring counts provide general trends in moose densities, and fall counts yield sex and age data. The 1976 spring survey was performed by Carl Grauvogel, and the surveys during the fall 1976 and spring of 1977 were conducted by Dave Johnson. Change of observers and survey vehicles may have been partially responsible for variations in the data obtained.

The number of moose observed per hour declined from 58 (spring 1976) to 48 (fall 1976) and to 26 (spring 1977). While the different surveys may not be entirely comparable, as mentioned previously, these figures were nevertheless thought to reflect an actual decline in moose abundance. There was a slight reduction in the percentage of calves comprising the herd between spring 1976 (23% calves) and spring 1977 (18% calves).

Comparison of 1976 and 1977 survey data for the Kobuk River between the delta and Kiana further revealed a reduction in moose densities. During spring 1976, 55 moose were observed during a 0.9 hour survey. The following spring only 29 moose were seen in this area during 3.5 hours of surveying. Similarly, in the middle Noatak valley 217 moose were observed during the 1976 spring survey (1.8 hours) compared to 150 moose in that area during the spring 1977 survey (3.4 hours).

Fall sex and age composition counts in 1976 in the Noatak and Kobuk valleys gave the following results: 71 males per 100 females; 102 yearling bulls per 100 male calves; 47 calves per 100 cows; and 21 sets of twins per 100 females with calf. Despite relatively high production and recruitment rates, the trend in moose abundance has been downward. Wolf densities were high throughout Unit 23, and grizzly and black bears were locally abundant. The impact these predators will have on future trends in moose abundance is unknown.

Management Summary and Recommendations

The actual rates of recruitment and loss to predators among moose in Unit 23 are unknown. The Unit 23 moose population was estimated at a minimum of 2000 animals (Grauvogel, 1975 S&I Report, Part III, p.125). If this estimate was accurate, the 1976 harvest (149 moose) may have been excessive. Future harvests should be restricted to bulls and should not exceed five percent of the total population. Therefore, it is recommended that: 1) the current five-month bull season remain unchanged, and 2) that the cow season be eliminated.

To obtain a better understanding of population trends, spring moose surveys should be continued in Unit 23.

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MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Unit 24 - Koyukuk drainage

Period Covered: July 1, 1976 - June 30, 1977

Seasons and Bag Limits

Unit 24	Sept. 10 - Nov. 30	One moose; antlerless moose may not be taken prior to Oct. 1.
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Harvest and Hunting Pressure

Sixty-seven moose (63 bulls, 3 cows and 1 of unknown sex) were reported taken in Unit 24 during the 1976 season. One hundred and ten hunters (86 residents, 23 nonresidents and 1 unknown) participated in the hunt of which 61 percent were successful. After October 1, a number of unreported cows were probably taken by native residents. Therefore, the overall reported harvest of 67 moose must be considered a minimal estimate of the 1976 take.

The 1976 reported kill of 67 moose was 6 percent above the 1975 harvest of 63 moose, and 13 percent below the reported 1974 take of 77 moose. In 1976 the season was 10 days shorter than in 1975. Sixty-six percent of the reported kill in 1976 occurred during the first two weeks of the season.

Composition and Productivity

No surveys were conducted in Unit 24 in 1976. The most recent spring data were collected during 1975 and appeared in the 1975 Survey and Inventory Report.

Late winter surveys were conducted during March 1977 on the Alatna, Koyukuk, Tinayaguk, Clear, Glacier and Hammond Rivers. A total of 225 moose, including 37 calves, were classified. Calves comprised only 16 percent of this sample.

Management Summary and Recommendations

The 1976 moose season in Unit 24 was shortened by 10 days, but the reported harvest of moose was six percent greater than that reported in 1975. Hunting pressure in this area appeared to be increasing, but noncompliance with harvest ticket regulations prevented precise determination of trends in hunting pressure.

It is recommended that spring surveys be conducted at least semi-annually. Effort should also be directed toward gaining compliance with harvest ticket regulations.

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MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Unit 25 - Chandalar and eastern Yukon drainages

Period Covered: July 1, 1976 - June 30, 1977

Seasons and Bag Limits

Unit 25, that portion draining into the north bank of the Yukon River upstream from Fort Yukon	Sept. 1 - Sept. 20	One bull
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Remainder of Unit 25	Sept. 1 - Dec. 31	One bull
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Harvest and Hunting Pressure

Only four moose (all bulls) were reported taken upstream from Fort Yukon during the 20-day, 1976 season in that area. Seventy-six moose (74 bulls, 2 of unspecified sex) were reported to have been taken in the remainder of Unit 25 during the longer season. Hence, a total of 80 moose (78 bulls, 2 of unspecified sex) were reported taken during the 1976 season in Unit 25. This represented a 19 percent increase over the reported 1975 take (67 moose). Based upon moose harvest ticket data, it appeared that the harvest in Unit 25 increased, but it must be noted that local residents are not in the habit of using moose harvest tickets. During 1976, only 20 percent of the successful hunters reported living in villages in Unit 25. While this figure seemed low, it nevertheless appeared that hunting pressure by hunters residing outside the unit increased.

Composition and Productivity

No surveys were done in Unit 25 during 1976; however, late winter surveys were conducted during March 1977 along the Coleen and Sheenjek Rivers. A total of 63 moose, including 11 calves, were classified. Calves comprised 17 percent of this sample. Survey conditions were judged poor to fair because of strong winds.

Management Summary and Recommendations

In spite of more restrictive regulations regarding season length and sex of legal animals, the harvest increased in Unit 25 during 1976. Of the successful hunters reporting, approximately 80 percent resided outside of Unit 25. Local residents are not in the habit of using moose harvest tickets, and the take by Unit 25 hunters was probably higher than reported here. Therefore, the 1976 harvest figure of 80 moose must be considered a minimal estimate.

No surveys were conducted in Unit 25 during 1976, although surveys were carried out in late winter 1977. It is recommended that annual or semi-annual spring surveys be conducted to estimate survival of calves in selected areas within Unit 25.

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MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1976

Game Management Unit 26 - Arctic Slope

Period Covered: January 1, 1976 - June 30, 1977

Seasons and Bag Limits

Unit 26	Aug. 30-Dec. 31	One moose; antlerless moose may not be taken prior to Sept. 1.
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Harvest and Hunting Pressure

During 1976, 66 moose were killed and reported in Unit 26 by sport hunters. This represented an increase of 83 percent over the average for the previous six seasons, but only a 16 percent increase over the harvest reported in 1974. Additional moose were probably taken but not reported by residents of the unit. The harvest consisted of 43 bulls, 19 cows and 4 moose of unknown sex.

Composition and Productivity

Surveys were conducted during April and November 1976 and April 1977 to determine numbers and productivity of moose in the Anaktuvuk, Chandler, Killik, and Colville river valleys. Of 743 moose observed in April 1976, 574 were adults and 169 were calves born in 1975. These calves (short yearlings) comprised 23 percent of the sample. No sexual distinction between adults was made since most bulls were without antlers. Although the total number of moose observed in each area was greater in 1976 than in 1975, the percent of short yearlings in the herd was slightly lower than that observed in 1975. However, survival of the 1975 cohort of calves counted in October 1975 (56 calves per 100 cows observed) and April 1976 (42 yearlings per 100 cows calculated) was good.

Sex and age composition counts were conducted in the Anaktuvuk, Chandler and Colville drainages during November 1976. A total of 232 moose were classified including 56 bulls (43 bulls per 100 cows), 46 calves (35 calves per 100 cows) and 130 cows.

Surveys of the same river valleys conducted during April 1977 resulted in the classification of 709 moose including 555 adults and 154 short yearlings. Calves comprised 21.7 percent of the sample. If the sex ratio observed during fall 1976 (43 bulls per 100 cows) is applied to the April 1977 data, the composition of the 555 adults was 167 bulls and 388 cows. Based upon these calculations, the short yearling per cow ratio was 40:100. The apparent increase in the calf per cow ratio from 35:100 in November to 40 short yearlings per 100 cows in April is insignificant and reflected problems inherent in survey techniques. The implications, however, are obvious; overwinter calf mortality was low in this region.

In addition to the surveys of the Anaktuvuk, Chandler and lower Colville drainages during April 1977, extensive surveys were conducted in other major drainages on the North Slope. A total of 1,254 moose were classified including the 709 moose mentioned previously. Such extensive surveys had not been conducted in this region since 1970. Late winter surveys between 1970 and 1977 suggested that population size on the Colville, Anaktuvuk, and Chandler valleys may have decreased slightly between 1970 and 1974. Between 1975 and 1977 population size appeared to have increased, particularly in the Chandler and Anaktuvuk valleys. Percent calves in the herd during late winter has varied between 15 and 37 percent, but it has remained high compared to most other areas of Alaska.

Management Summary and Recommendations

Based on available data, the moose population on the North Slope remains healthy and productive. The population appeared to be stable or increasing slightly as evidenced by: 1) the excellent yearling recruitment observed during the springs of 1976 and 1977 and 2) the increased number of moose observed in certain drainages.

The present population size should be maintained because of limited winter habitat and a desirable moose-range relationship. This population could probably stand a slightly higher level of harvest to compensate for the high yearling recruitment.

No changes in season or bag limit are recommended.

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