ALASKA DEPARTMENT OF FISH AND GAME
JUNEAU, ALASKA

STATE OF ALASKA
William A. Egan, Governor

DEPARTMENT OF FISH AND GAME
Wallace H. Noerenberg, Commissioner

DIVISION OF GAME
Frank Jones, Acting Director

ANNUAL REPORT OF SURVEY-INVENTORY ACTIVITIES
PART I, MOOSE, DEER, AND ELK

Edited and compiled by
Donald E. McKnight, Research Chief

Volume II
Federal Aid in Wildlife Restoration
Project W-17-3, Jobs No. 1, 2, and 13

(Printed October 1971)

MEMORANDUM OF TRANSMITTAL

October 8, 1971

TO: Wallace H. Noerenberg, Commissioner
Alaska Department of Fish and Game

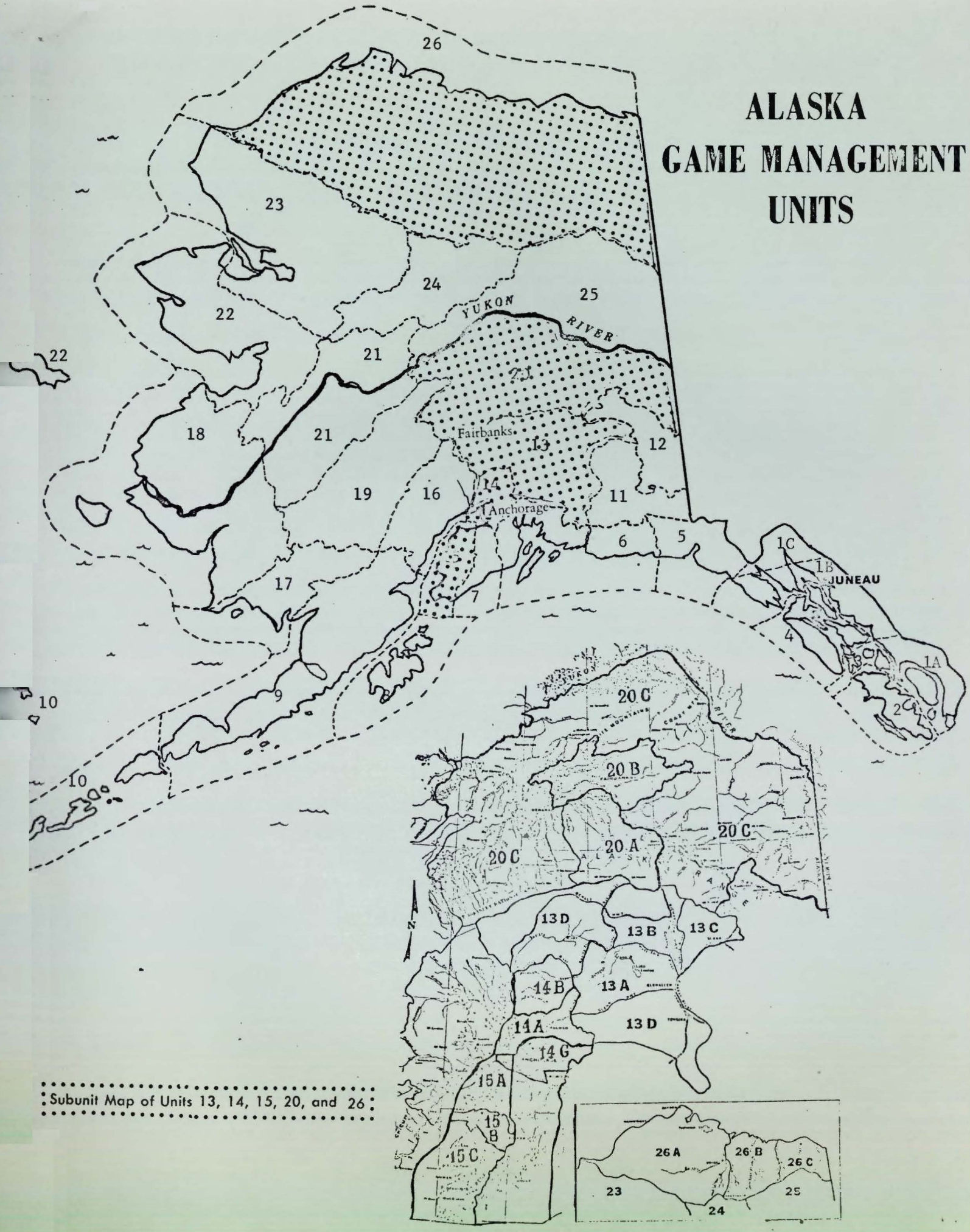
FROM: Frank F. Jones, Acting Director
Division of Game
Alaska Department of Fish and Game
Juneau

SUBJECT: Annual Report of Survey-Inventory Activities

In 1969 the Game Division initiated a series of annual reports relating specifically to survey and inventory activities conducted by staff biologists each year. Surveys and inventories include all routine data collections directed toward assessment of the status of game populations and toward the determination of annual game harvests. These reports include study results and conclusions and, when applicable, recommended hunting regulation changes.

Several improvements have been incorporated into the 1970 reports. Because experience has shown that these reports are of interest to citizens unfamiliar with Game Management Unit boundaries, a map of Alaska showing these boundaries is included in each report this year. Also, even though 1969 reports were organized by game species and Management Units, for easy reference a table of contents has been added to the 1970 reports to provide easier access to specific information.

ALASKA GAME MANAGEMENT UNITS



Subunit Map of Units 13, 14, 15, 20, and 26

CONTENTS

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 1A - Southeast Mainland - Stikine

Seasons and Bag Limits

Sept. 15 - Oct. 15* One bull

* Closed by Commissioner's announcement on September 30, 1970.

Harvest and Hunting Pressure

Two small moose herds, located in the Stikine River drainage and Thomas Bay, support most of the moose hunting in Unit 1A. In 1970, approximately 28 moose were taken in the Stikine drainage and 12 from Thomas Bay. Hunting effort was high in both areas.

Composition and Productivity

Seven aerial counts (fixed-wing aircraft) were made between June 12 and August 27, 1970. In all counts, 168 moose were observed. The observed calf:cow ratio was 26:100 and the bull:cow ratio 5:100. On January 20, 1971, the Stikine area was surveyed by helicopter. Seventy-one moose were identified. The bull:cow ratio was again 5:100 but the calf:cow ratio had dropped to 18:100. The calf:cow ratio was 5:100 on the lower river and 45:100 on the upper river.

Management Summary and Recommendations

The Stikine River is one of the few river systems along the mainland of Southeast Alaska which originates on the east side of the Coast Range in British Columbia. It is also one of the few locations in Southeast which supports an indigenous moose population. The mouth of this large river system is only a few miles north of the town of Wrangell and the river was an important travel route during the gold rush in the late 1800's and early 1900's. The river is navigable by large river boat for more than 100 miles from its mouth to the small trading post of Telegraph Creek. Only about 30 miles of the lower river are within Alaska.

Few moose were noted in the lower river area during the early 1900's. Records of kill statistics date back to the early 1950's. On the American side of the boundary are about 50 square miles of moose habitat. Since the early '50s this area has received heavy hunting pressure each fall by sportsmen, primarily from the towns of Petersburg and Wrangell. The portion of the river on the Canadian side of the boundary receives little hunting pressure and it is remote from any Canadian community.

Since 1952, the Stikine area has been open to bulls-only hunting. For this entire period, the season has been open one month each year

(September 15 - October 15) with the exception of 1953 when it was open for five weeks and from 1954-1956 when a three-week season was held. From 1957 through 1969 the season remainded at one month and the kill each year was remarkably consistent, ranging from a low of 20 bulls in 1968 to 40 in 1957 but averaging about 30 bulls per year.

Hunting pressure has always been high in the American portion of the river and most bulls are cropped while they are still young animals. Jaw collections were initiated in 1952 and have been continued since that time. Most bulls are yearlings or two-year-olds and it is rare to take a bull three years of age.

During the past few years, hunters have noted large numbers of cows without calves in the fall. The question was whether the cows were producing calves and losing them through natural mortality factors or whether the bull:cow ratio was so low that some cows were not breeding. During the spring and summer of 1970, the Department of Fish and Game made seven surveys, beginning in June at peak of calving. Surveys were continued through August. During the course of the surveys, 168 moose were observed but only 24 were cows with calves and only six bulls were seen in all the counts. It appeared that the bull:cow ratio was low and perhaps some adult cows were not breeding as the calf:cow ratio was low during the entire period.

In view of the observed low bull:cow ratio, the 1970 fall season was reduced by two weeks, remaining open from September 15 through September 30. This did not effectively reduce the kill of bulls and about 28 animals were taken in the two-week period. Two things were apparent, that many bulls were not being seen during counts and that a reduction in season length increased the hunting pressure during the two weeks the season was open.

In January, 1971, an intensive survey was made utilizing a helicopter. In spite of better coverage, it is felt that only about one-third of the population was observed, but that the calf:adult ratios obtained were more accurate than during the summer because the entire population was located on the flats along the river as snow depths restricted movements at higher elevation. In the upper portion of the river, where American and Canadian moose intermingle, the calf:adult ratio was approximately 45:100, whereas, on the lower portion of the river the ratio was only about 5:100. These ratios may be exaggerated by unknown factors, but it is evident that a much larger proportion of the cows on the upper river have calves than do those on the lower river. This is reasonable, as cows on the upper section of the river intermingle with the Canadian moose herd which has a much higher bull:cow ratio.

It appears that many cows on the lower river are not breeding. How, then, can this small herd be managed to its greatest potential? The total number of moose in the area is probably about in balance with the habitat, but if production were better many more moose could be taken by hunters each year. The obvious answer is to improve the bull:cow ratio by either-sex hunting. This is more difficult than it may sound. A

permit hunt would limit the number of hunters to about one-fourth of what it has been in the past. Permits must be issued statewide and only a few of the local residents who have historically hunted the area would probably receive permits. Many local residents hunt the Stikine area for a recreational outing without really expecting to take a moose. A permit hunt would deprive most local hunters of this recreation. Is it better to allow fewer people to take more animals or to allow a much larger number the recreational opportunity?

An either-sex open season could be held, but in such a small area and with intensive effort, it would be extremely difficult to prevent an over-kill of cows. It would be quite possible to take up to 50 cows in a one or two-day hunt. This would also greatly reduce the recreational opportunity, from the present month to only a few days, and the hunting effort during those few days would be very high.

A third alternative is alternate year openings, allowing more bulls to attain breeding age. This, however, is not the answer, for it would probably result in twice the take, every other year.

Another alternative would be to retain the existing season and limit. About the same number of bulls have been taken each year for 13 years and the population is apparently stable.

The last suggestion is to retain the bull-only season, but to set it late enough so that rut is well underway before the season opens. Many bulls would breed which under previous September 15 openings were taken before the rut commenced. In addition, an early permit hunt could be held for cows, to aid in bringing the bull:cow ratio in better balance. The recommended seasons would be:

Sept. 15 - Sept. 30	One antlerless moose by permit only; 40 permits will be issued.
Oct. 15 - Oct. 31	One bull

Submitted by: Harry R. Merriam, Game Biologist IV

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 1B - Southeast Mainland - Juneau

Seasons and Bag Limits

Sept. 15 - Oct. 15 One bull

Harvest and Hunting Pressure

Unit 1B moose herds are located in the Taku River and Berners Bay drainages. The estimated 1970 kill (based on harvest ticket returns) was 24 bulls, 15 from the Taku area and seven from Berners Bay. The site of the two other kills is unknown.

Composition and Productivity

Composition counts at Berners Bay showed a calf:cow ratio of 14:100 and a bull:cow ratio of 6:100. Seventy-six moose were observed. In the Taku River drainage the calf:cow ratio was 60:100 and bull:cow ratio 6:100. Fifty moose were observed.

Management Summary and Recommendations

Herd composition information for the Berners Bay (Subunit 1B) area indicates an unbalanced sex ratio and poor calf production under the existing bull-only bag limit. Because of this situation, and expected increases in hunting pressure resulting from the completion of the Echo Cove road (now in construction), it is imperative that further restrictions be placed on the bull harvest and the taking of a limited number of cows be initiated. A permit system should be initiated in the Berners Bay area for the 1971 season which would allow the harvest of 25 animals of either sex. This would improve calf production relative to the carrying capacity of the range and provide maximum recreational opportunity without detriment to the herd.

No changes in seasons and bag limits are recommended for the remainder of Subunit 1B except that an emergency closure should be announced for the Gustavus area to protect the few moose there.

Submitted by: David W. Zimmerman, Game Biologist II

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 1C - Southeast Mainland - Haines

Seasons and Bag Limits

Sept. 1 - Oct. 15	One moose; antlerless season will be closed by Commissioner's announcement after 50 antlerless moose have been taken.

Harvest and Hunting Pressure

Unit 1C includes the Haines area. The reported moose harvest in 1970 was 96 animals (48 bulls and 48 cows). Mean age of bulls was 3.2 years (23 jaws) and of cows 3.8 years (18 jaws). Age range for bulls was 1-9 years and for cows, 1-15 years. Seventy-five percent of the moose were taken during the first nine days of the season (Appendix I).

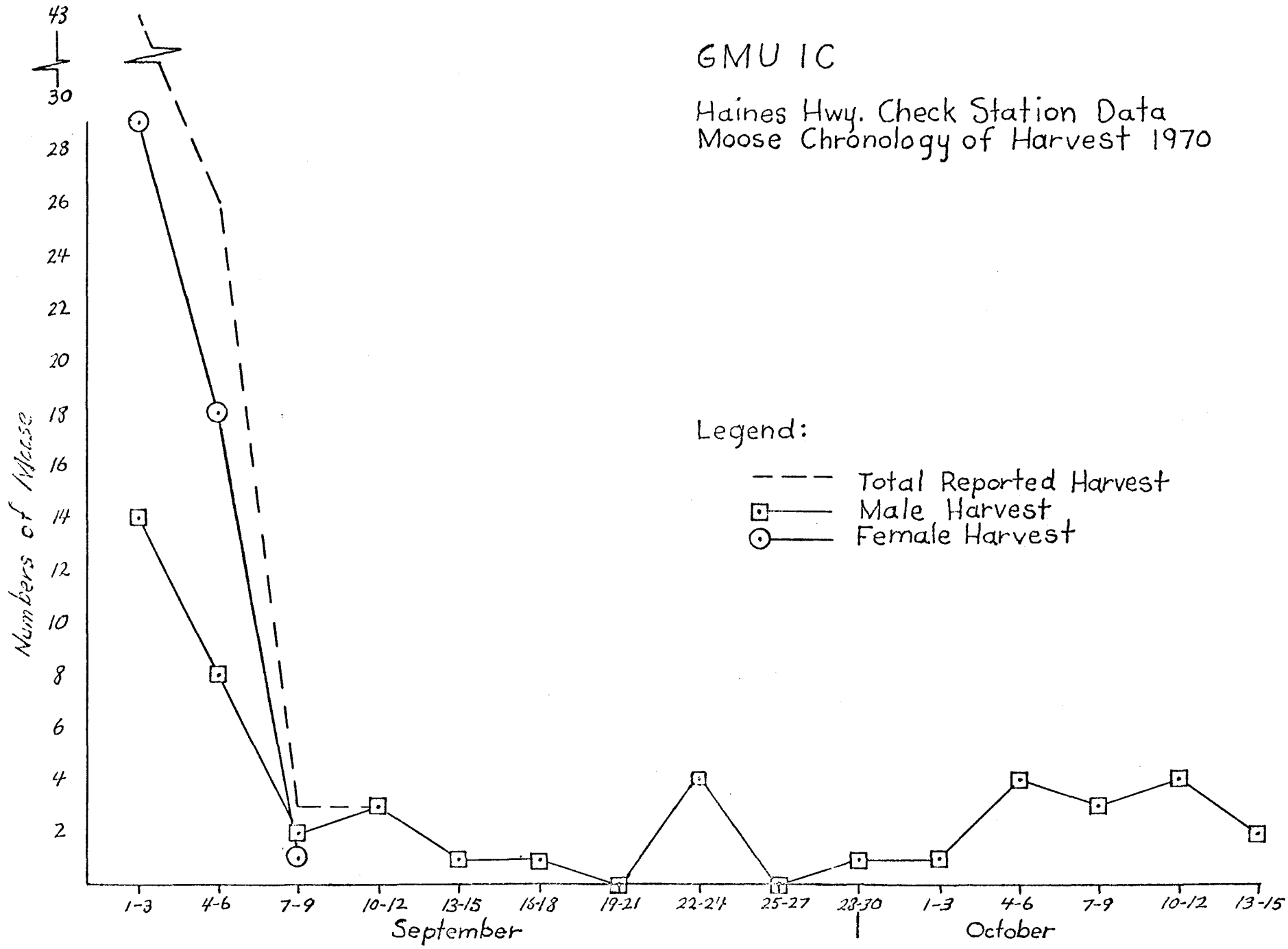
Composition and Productivity

Composition counts made in February, 1971 showed a calf:adult ratio of 28:100 (sample size - 159).

Management Summary and Recommendations

Herd composition information for Subunit 1C indicates that populations are remaining relatively stable. Age structure of the harvest, however, suggests the possible signs of heavy harvesting and that additional restrictions may be necessary in the near future.

Submitted by: David W. Zimmerman, Game Biologist II


GMU 1C
Haines Hwy. Check Station Data
Moose Chronology of Harvest 1970
Legend:
Total Reported Harvest
Male Harvest
Female Harvest
Numbers of Moose
43
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
1-3
4-6
7-9
10-12
13-15
16-18
19-21
22-24
25-27
28-30
1-3
4-6
7-9
10-12
13-15
September
October

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 5 - Yakutat

Seasons and Bag Limits

Aug. 10 - Nov. 30 One moose

Harvest and Hunting Pressure

Return of 74% of the 1970 harvest tickets indicated that 288 moose were killed in this area. The harvest consisted of 141 bulls (49.0%), 140 cows (48.6%) and 7 unknown (2.4%). The 1969 harvest was 324 animals, (163 bulls and 161 cows). The five-year harvest average (1965-1969) was 279 animals. Harvest data from 1963-1970 are summarized in Appendix I.

The mean cementum age of 171 moose (excluding calves) harvested in 1970 was 5.1 years. The mean age of 89 bulls and 82 cows was 4.4 years and 5.9 years, respectively. This compares to the 1969 mean cementum age of 4.5 years for 83 bulls and 6.7 years for 86 cows.

Hunting pressure, analysis reflecting chronology of the harvest (information from harvest ticket returns), revealed that 70.1% of 208 moose were taken from September 8 to October 31 in 1970. In 1969, 74.0% of 242 moose were taken during the same period.

Eleven U. S. Forest Service cabins are located throughout the Yakutat foreland. The number of individuals using these cabins has increased from 282 in 1964 to 838 in 1970. (U.S.F.S. records)

Composition and Productivity

Late fall 1970 herd composition information collected in the Yakutat foreland area (counts were not conducted in the Dangerous River-Alsek River area) revealed 25 bulls and 44 calves per 100 cows. Of 286 identified animals (total counted - 290) 39% were calves. Late winter herd composition counts conducted in March 1971 showed a calf:adult ratio of 26:100.

The late fall herd composition information collected in all of Game Management Unit 5 (Yakutat foreland and the Malaspina Glacier foreland) revealed 52 bulls and 43 calves per 100 cows. Of 560 identified moose (total counted - 566) 23% were calves.

Management Summary and Recommendations

Herd composition and harvest information indicate that the moose population in GMU 5 is relatively stable. In light of this information it is recommended that seasons and bag limits remain unchanged.

Submitted by: David W. Zimmerman, Game Biologist II

MOOSE - GMU 5 - YAKUTAT

Appendix I. Moose harvest in Game Management Unit 5, Yakutat, 1963-1970.

Year	Male	Female	Sex Unknown	Total
1963	189	111	2	302
1964	154	111	-	265
1965	153	125	4	282
1966	116	90	6	212
1967	154	108	1	263
1968	177	133	3	313
1969	163	161	-	324
1970	141	140	7	288*

* Incomplete

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 6 - Prince William Sound - West of the Copper River

Seasons and Bag Limits

Aug. 20 - Sept. 30*	One moose; up to 40 moose may be taken by permit only.

* Season subject to closure by field announcement.

The conditions of this permit hunt were: (1) a permit was issued at the Cordova Fish and Game Office to any hunter with a valid hunting license and harvest ticket; (2) hunting was permitted only from midnight until noon of each day until the season was closed; (3) successful hunters had to report their kill to a check station prior to 6:00 p.m. on the day the animal was taken.

Harvest and Hunting Pressure

The 1970 harvest of 46 moose, comprised of 14 bulls and 32 cows, compared favorably with the 1969 harvest of 42 moose. The major difference, as intended, was the reversal of the number of bulls and cows taken (Appendix I).

The season was closed by field announcement after two half-days of hunting: Twenty-four were taken opening morning and 22 were taken the second morning.

Some were issued but because of heavy rain only one-third of the permittees actually hunted.

Composition and Productivity

An aerial survey west of the Copper River was flown November 27, 1970. General counting conditions were good and 199 moose were observed. Composition of the herd was 11.4 bulls per 100 cows which is adequate and 39.4 calves per 100 cows which is considered good (Appendix II).

Cementum age data were obtained for 33 of the 46 animals harvested. The cows showed a normal distribution of age classes whereas 80 percent of the bulls were yearlings or younger reflecting a closely cropped male segment of the herd (Appendix III).

Management Summary and Conclusions

The short either-sex season this fall accomplished the desired management objectives of reducing the number of bulls harvested and maintaining the overall number of animals harvested. The major drawbacks to the

present regulations are: (1) poor control of the number of animals taken because of intense hunting pressure; (2) the desired harvest could be obtained in one half-day of hunting and become a "slaughter" in the public's eye; (3) hunters were forced to hunt in adverse weather which affected quality of the hunt and possibly quality of the meat; and, (4) August calves appeared "too small" to the public.

Recommendations

To obtain the desired management objectives and to alleviate the shortcomings experienced this fall the following are suggested: (1) limit the number of hunters by means of a drawing for permits; and, (2) allow a one-week season in September.

It is also recommended that the present area west of the Copper River be divided into two management sections: Copper River Delta and Prince William Sound. This would allow for management of a small moose herd in the Lowe River drainage near Valdez which has been ignored in the past. Hunting of this small herd occurs along the Richardson Highway (Keystone Canyon to Thompson Pass) and is incidental to traveling the highway. Since most of the area along the highway is subject to Unit 13D regulations, it is suggested the season and bag limit should be set to coincide with the first season of Unit 13D. This would allow a limited harvest and prevent confusion to the public. Inclusion of a November season might result in an over harvest if snow depth made this herd readily accessible to road hunters.

Recommended season for 1971, Unit 6 - West of the Copper River to read as follows:

Unit 6 - West of the Copper River	Open Season	Bag Limits
That portion of Unit 6 lying west of Rude River and Orca Inlet.	Aug. 20 - Sept. 20	One Bull
That portion of Unit 6 lying east of Rude River and Orca Inlet and west of the west bank of the Copper River including that area west of Castle Island Slough.	Sept. 10 - Sept. 15	One moose by permit; conditions and number of permits will be described by Commissioner's announcement.

Submitted by: Julius L. Reynolds, Game Biologist III

MOOSE - GMU 6 - Prince William Sound - West of the Copper River

APPENDIX I

Moose Harvest, Unit 6 - West of the Copper River.

Year	Bulls	Cows	Unid.	Total
1960*	25	0	0	25
1961		N O O P E N S E A S O N		
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

* First harvest since introduction of moose to Unit 6.

** Estimated

APPENDIX II

Moose Sex and Age Ratios - Unit 6 - West of the Copper River.

Year	Total MM per 100 FF	Sm. 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	Survey Conditions	Total Sample
1962-63							10.0	32.8	UNK	67
1963-64	Z E R O	D A T A								
1964-65							18.8	31.0	UNK	121
1965-66	Z E R O	D A T A								
1966-67	Z E R O	D A T A								
1967-68	13.5	6.8	100.0	4.5	33.3	39.0	7.1	25.6	Excellent	117
1968-69							21.9	26.3	Excellent	156
1969-70							26.3	24.9	Good	193
1970-71	11.4	3.0	36.4	2.0	15.4	39.4	31.6	26.1	Good	199

Moose Sex and Age Compositions - Unit 6 - West of Copper River.

Date	Lg. MM	Sm. 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	Count Time (hrs.)	Moose Per Hour
3/15/63	1	0	1	0	18	20	20	21	0	22	24	67	2.3	NA
1963-64	Z E R O	D A T A												
12/9-10 1964	5	6	11	9	26	6	41	52	0	38	31	121	4.7	NA
1965-66	Z E R O	D A T A												
1966-67	Z E R O	D A T A												
12/7/67	5	5	10	49	26	2	77	87	0	30	0	117	4.8	NA
1/15-16 1969	2	2	4	0	25	7*	33	37	1	43	76	156	UNK	NA
1/17/70	4	5	9	0	28	10	38	47	1	49	97	193	3.1	NA
11/27/70	11	4	15	94	26	12	132	147	1	52	0	199	3.4	NA

* Plus 1 female with 3

MOOSE - GMU 6 - Prince William Sound - West of the Copper River

APPENDIX III

1969 & 1970 Cementum Age Data, Unit 6 - West of the Copper River

1970

MALES			FEMALES		
Age	Number	Percent	Age	Number	Percent
Calf	1	10.0	Calf	0	0
1	7	70.0	1	5	21.8
2	1	10.0	2	2	8.7
3	1	10.0	3	4	17.4
4			4	2	8.7
5			5	1	4.3
6			6	3	13.1
7			7	0	0
8			8	1	4.3
9			9	3	13.1
10			10	1	4.3
11			11	1	4.3
TOTAL	10	100	TOTAL	23	100

1969

MALES			FEMALES		
Age	Number	Percent	Age	Number	Percent
Calf	0	0	Calf	0	0
1	19	86.4	1	2	18.2
2	1	4.5	2	2	18.2
3	2	9.1	3	0	0
4			4	1	9.1
5			5	1	9.1
6			6	1	9.1
7			7	1	9.1
8			8	1	9.1
9			9	1	9.1
10			10	0	0
11			11	0	0
12			12	1	9.1
TOTAL	22	100	TOTAL	11	100

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 6 - Prince William Sound - East of the Copper River

Seasons and Bag Limits

August 20-September 30	One moose; provided that up to 25 antlerless moose may be taken by permit only. Dates, conditions and number of permits to be described by Commissioner's announcement.
November 1-November 30	

An antlerless moose permit was issued at the Cordova Fish and Game Office to any hunter with the proper license and harvest ticket. The season was opened August 20 and continued until closed by field announcement. Successful hunters were required to report their antlerless kill within 48 hours.

Harvest and Hunting Pressure

An estimated 100 moose were taken East of the Copper River in the Martin River area during the 1970 season. Twenty-six cows and approximately 75 bulls comprised the harvest which is more than double any previous harvest (Appendix I). The opportunity to hunt either-sex (with an antlerless permit) and the high degree of success of early hunters encouraged more hunters to charter aircraft to reach this remote herd.

A total of 241 antlerless moose permits was issued for the quota of 25 cows. The antlerless season ran nearly 12 weeks, from August 20 through November 10. The major reason the season lasted so long was that bulls were readily available and most hunters preferred to take a bull early in the season.

Composition and Productivity

A sex and age composition survey was flown over the Martin River area December 8, 1970. Overall survey conditions were good and 235 moose were observed. Composition of the herd appeared good as illustrated by ratios of 41 bulls per 100 cows and 38 calves per 100 cows (Appendix II).

Age analysis of 22 hunter-killed moose taken from the Martin River area (Appendix III) indicated a balanced distribution of age classes for both sexes.

A survey of the Bering River-Controller Bay area was flown December 16, 1970 but general survey conditions were poor. A total of 30 moose was observed which represents an increase from the 19 moose observed in a January 1969 survey. Because of poor count conditions during the 1970 survey, single animals and cows with calves were difficult to see, thus the data are biased towards grouped animals.

MOOSE - GMU 6 - Prince William Sound - East of the Copper River

Management Summary and Conclusions

Martin River Herd: Analysis of the available data indicates a healthy herd. Comparison of sex and age data from 1964 through 1970 (Appendix II) suggests that the initial reproductive boom is almost over and that the herd is leveling off at the range's carrying capacity. It also indicates that hunting pressure can be used to manipulate herd composition. This should allow controlled management of the herd. As displayed this fall, either-sex hunting encourages hunters to utilize this resource and is necessary to obtain a proper harvest.

Bering River Herd: The limited data available on this herd indicate that it is increasing, and that within a few years the area will support a sizeable moose herd. The major problem will be to obtain an adequate harvest.

Recommendations

To properly manage the Martin River moose herd either-sex hunting is needed to entice hunters into the area. It will also be necessary to require permittees to report their kill to the Cordova Fish and Game Office so that the hunt can be monitored. As the harvest approached desired limits the season could be closed by field announcement.

At present the Bering River herd is not being utilized by hunters. The permit hunt suggested below would allow for proper management as utilization of this herd develops.

It is recommended that the moose season in this area be changed to read as follows:

Open Season	Bag Limits
August 20-September 30 November 1-November 30*	One moose by permit; condition of the permits will be described by Commissioner's announcement.

* Season subject to closure by field announcement.

Submitted by: Julius Reynolds, Game Biologist III

MOOSE - GMU 6 - Prince William Sound - East of the Copper River

APPENDIX I

Moose Harvest, Unit 6 - East of the Copper River.

Year	Bulls	Cows	Unid.	Total
1965	8	0	0	8
1966	3	0	0	3
1967	14	0	0	14
1968	15	0	0	15
1969	27	7*	0	34
1970	75**	26*	0	101

* Number reported to Cordova Fish and Game Office by permit hunters.

** Estimated harvest; harvest ticket results not yet available.

MOOSE - GMU 6 - Prince William Sound - East of the Copper River

APPENDIX II

Moose Sex and Age Ratios - Unit 6 - East of the Copper River.

Date	Total MM per 100 FF	Sm. 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	Survey Conditions	Animals per Hour	Total Sample
1964-65							36.4	26.0	UNK	NA	52
1965-66							20.8	31.0	UNK	NA	93
1966-67	Z E R O	D A T A									
1967-68	76.1	37.0	93.9	15.0	103.3	70.2	25.5	28.5	UNK	NA	207
1968-69							25.0	21.4	UNK	NA	201
1969-70							17.4	20.3	Poor	NA	138
1970-71	41.2	14.5	54.3	8.1	76.0	38.2	6.4	21.3	Good	NA	235

Moose Sex and Age Composition - Unit 6 - East of the Copper River.

Date	Lg. MM	Sm. 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	Count Time (hrs.)	Moose per Hour
12/17/64	8	6	14	0	7	4	11	25	0	15	12	52	UNK	NA
1/27/66	8	8	16	1	19	5	25	41	0	29	23	93	2.6	NA
1966-67	Z E R O	D A T A												
12/11/67	33	31	64	37	35	12	84	148	0	59	0	207	3.1	NA
1/18/69	4	3	7	24	8	0	32	39	0	43	118	201	UNK	NA
2/13/70	1	0	1	0	19	4	23	110	1	28	86	138	4.7	NA
12/8/70	35	19	54	84	44	3	131	185	0	50	0	235	2.8	NA

MOOSE - GMU 6 - Prince William Sound - East of the Copper River

APPENDIX III

1969 & 1970 Moose Cementum Age Data, Unit 6 - East of the Copper River

1970

MALES			FEMALES		
Age	Number	Percent	Age	Number	Percent
Calf	0	0	Calf	0	0
1	5	50.0	1	2	16.7
2	1	10.0	2	1	8.3
3	1	10.0	3	6	50.0
4	1	10.0	4	0	0
5	0	0	5	1	8.3
6	2	20.0	6	0	0
7	0	0	7	1	8.3
8	0	0	8	0	0
9	0	0	9	1	8.3
TOTAL	10	100	TOTAL	12	99.9

1969

MALES			FEMALES		
Age	Number	Percent	Age	Number	Percent
Calf	0	0	Calf	0	0
1	4	44.4	1	1	25.0
2	2	22.2	2	0	0
3	2	22.2	3	0	0
4	0	0	4	0	0
5	1	11.1	5	0	0
6	0	0	6	1	25.5
7	0	0	7	1	25.5
TOTAL	9	99.9	TOTAL	4	100

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 7 - Seward

Seasons and Bag Limits

Unit 7; only that portion which includes the drainages of Resurrection, Little Indian, Big Indian, Juneau Creek and all Chickaloon River drainages.	August 20-September 30 November 1-November 20	One moose; antlerless moose may be taken by permit only (50 permits will be issued; 30 permits for all of the Juneau Creek drainages lying in Unit 7; 20 permits for all of Resurrection Creek drainage upstream from the confluence of Highland Creek and Resurrection Creek): dates and conditions of the hunt will be described by Commissioner's announcement.
Remainder of Unit 7	August 20-September 30	One bull

Harvest and Hunting Pressure

Harvest report returns indicate that during the 1969 season, 556 hunters harvested 179 bull moose for a hunter success of 32.2 percent. Hunting pressure has increased over the past 3 years from 414 hunters in 1967 to 556 in 1969. Part of the increased hunting pressure in 1969 may have resulted from postponing the opening in Unit 15 because of the Swanson River fire. Hunter success during the same period has been relatively stable ranging from 30 to 34 percent (Appendix I).

The harvest of bulls has increased annually from 60 in 1965 to 179 in 1969. The 1969 bull harvest was 9 percent higher than in 1968 and 41 percent above the five year average of 127.

During the 1970 season, 30 permits for antlerless moose were issued in the Juneau Creek drainage and 20 in the Resurrection Creek drainage. The antlerless season was open from December 2-6. Eighteen hunters harvested 15 cows in the Juneau Creek drainage. Hunters holding permits for Resurrection Creek were unable to hunt because access was not available due to a bridge washout. Data for the 1970 general hunt are not yet available.

Composition and Productivity

Because of limited funds and personnel, moose surveys were conducted in only a portion of Unit 7 in 1970 (Appendices II, III, IV, V). A reliable Unit trend is not available from this data. Generally, the areas surveyed that received heavy hunting pressure, such as Juneau Creek (Count area 12); Twenty Mile River (Count area 6), and Placer River (Count area 5), had low bull:cow ratios and fair to good calf production. The areas surveyed that received light hunting pressure, such as Resurrection Creek (Count area 10) and the drainages into the Chickaloon River (Count areas 8, 9, 20 and 21)

had relatively high bull:cow ratios and low calf production. Twentymile River had 2.1 bulls/100 cows and 32 calves/100 cows while Resurrection Creek had 29.2 bulls/100 cows and 18 calves/100 cows.

Age data for 14 cows harvested in the Juneau Creek drainage show that 11 (79%) were over 8 years old (Appendix VI). Because the sample size is small (14), only limited conclusions can be drawn. It is, however, safe to state that this population is weighted heavily with old animals, indicating that this herd is not growing and that recruitment is low.

Management Summary and Conclusions

Hunting pressure increased again in 1969 and hunter success dropped slightly. Calf production continues to be fair to good but survival may be low, as small bull:cow ratios are low.

The increasing harvest may be the result of more hunters reaching relatively unhunted areas via aircraft, horses and other off-road transportation. If this is the case, the increasing harvest may not be a sign of either a growing herd or good production and the higher level of bull harvest will not be maintained.

Range data supplied by the U. S. Forest Service continue to show high levels of utilization particularly on Juneau Creek and Sixmile Creek. Heavy range use, despite a good bull harvest, demonstrates the need to harvest cows and reduce pressure on the range. Harvesting of cows will help to balance bull:cow ratios also, although, except for the Twentymile River area, they are not critical.

Recommendations

Moose hunting in the Twentymile River should be opened to either-sex hunting by registration permit. A harvest of 40 moose should be allowed.

Regulation wording for the Juneau Creek-Resurrection Creek antlerless hunt, should be changed to allow 50 antlerless moose to be taken in an early season registration permit hunt.

Submitted by: Paul A. LeRoux, Game Biologist III

MOOSE - GMU 7 - Seward

APPENDIX I

Moose Harvest and Hunting Pressure - Unit 7.

Year	Season	Bulls	Cows	Unid.	Total	Hunters	Percent Success
1965	1st	*	*	0	*		
	2nd	*	*	0	*		
	Comb.**	60	1	0	61	*	*
1966	1st	*	*	0	*		
	2nd	*	*	9	*		
	Comb.	12	1	0	113	445	25.4
1967	1st	*	*	*	*		
	2nd	*	*	*	*		
	Comb.	123	1	1	125	414	30.0
1968	1st	140	1	0	141		
	2nd	19	0	0	19		
	Comb.	159	1	5	165	481	34.0
1969	Comb.	179	0	0	179	556	32.2

* Data not available
** Combined

MOOSE - GMU 7 - Seward

APPENDIX II

Moose Sex and Age Composition - Unit 7

Year	Large MM	Small MM	Total MM	FF W/0	FF W/1	FF W/2	Total FF	Total Adults	Lone Adults	Total Calves	Unid. Sex & Age	Total Sample	Count Time (hrs.)	Moose per Hour
1966*														
1967	32	19	51	122	50	7	179	230	0	64	3	297	3.40	87
1968 11 & 12/68 2/8/69	45	27	72	346	156	8	510	582	3	175	35	792	14.75	74
1969 11/12 12/13 1/2/70	22	9	31	217	67	15	299	330	3	100	0	430	8.15	53
1970 11/19-24 12/1-2	94	56	150	586	160	11	757	907	1	183	0	1090	12.50	87

* Not available

MOOSE - GMU 7 - Seward

APPENDIX III

Moose Sex and Age Ratios - Unit 7

Year	Tot. MM per 100 FF	Sm. MM per 100 FF	Sm. MM per 100 Lg. MM	Sm. MM % in Herd	Sm. MM per 100 of Calves	Calves per 100 FF	Twins per 100 FF w/calf	Calf % in Herd	Count Areas	Animals per Hour	Total Sample
1966	16.4	5.6	220.2	3.7	67.8	32.0	7.8	18.7	All	--	740
1967	28.5	10.6	59.4	6.4	59.4	35.8	12.3	21.5	10 & 6	87.0	297
1968	14.4	5.4	60.0	3.7	32.9	32.7	4.0	22.2	1,4,5,6,8,9 10,13,14,20	54.9	792
1969	10.3	3.0	40.9	2.1	18.0	33.3	18.3	23.2	5,6,8,9 12,20	51.8	430
1970	19.8	7.4	59.5	4.5	61.5	24.1	6.4	14.4	5,6,10,12 8,9,20,21	87.0	1090

MOOSE - GMU 7 - Seward

APPENDIX IV

Moose Sex and Age Composition by Trend Area for 1970 - Unit 7.

Trend Area	Year	Large MM	Small MM	Total MM	FF W/0	FF W/1	FF W/2	Total Adults	Total Calves	Lone Calves	Total Calves	Unid. Sex & Age	Total Sample	Count Time	Moose per Hour
5	11/24/70	5	1	6	58	21	5	84	90	0	31	0	121	1.2	100
6	11/24/70	1	1	2	67	27	2	96	98	0	31	0	129	1.0	129
10	11/23/70	45	24	69	194	40	2	236	305	1	45	0	350	3.8	92
12	11/19/70	14	18	32	157	52	1	210	242	0	54	0	296	3.5	85
8,9 20,21	11/2/70	29	12	41	110	20	1	131	172	0	22	0	194	3.0	65

MOOSE - GMU 7 - Seward

APPENDIX V

Moose Sex and Age Ratios by Trend Area for 1970 - Unit 7.

Year	Total MM per 100 FF	Sm. 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	Count Area	Animals per Hour	Total Sample
1970	7.1	1.2	20.0	.8	6.7	36.9	19.2	25.6	5	100	121
1970	2.1	1.05	100.0	0.8	6.7	32.3	6.9	24.0	6	129	129
1970	29.2	10.2	53.3	6.8	88.9	18.0	4.8	12.8	10	92	350
1970	15.2	8.6	128.6	6.1	66.7	25.7	1.9	18.2	12	85	296
1970	31.3	9.2	41.1	6.2	91.6	16.8	4.8	11.3	8,9, 20,21	65	194

APPENDIX VI

Female Moose Harvest Age Structure 1970-71 Season Dec. 2-6, Juneau Creek Drainage Unit 7

Age	Number	Percent
Calf	0	0
1	0	0
2	0	0
3	0	0
4	0	0
5	3	21.4
6	0	0
7	0	0
8	1	7.1
9	2	14.3
10	2	14.3
11	1	7.1
12	0	0
13	2	14.3
14	1	7.1
15	0	0
16	1	7.1
17	0	0
18	1	7.1

Sample Size - 14

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 9 - Alaska Peninsula

Seasons and Bag Limits

August 20 - December 31*	Two moose; provided that only one moose may be an antlered bull.

* Antlered moose may not be taken between October 1 - October 31.

Harvest and Hunting Pressure

Final harvest figures for 1970 are not yet available. The kill in 1969 (Appendix I) was slightly lower than in 1968 which probably reflects a leveling off or possibly a slight decline in hunting pressure. The 1970 harvest should also reflect this pattern. Since 1964, 75 percent of the harvest has been bulls despite either-sex seasons. This reflects the use of Unit 9 as a trophy hunting area.

Composition and Productivity

Spring productivity flights indicated that the peak of calving occurred during the last of May (Appendix II). Productivity at calving time was poor. Even at its peak, only 48.2% of cows had calves and the number of calves per 100 cows never exceeded 44.7. Following the calving peak, the data reflect a striking decline in abundance of calves, suggesting that many of the calves were born in poor physical condition and did not survive.

Fall sex and age composition surveys were conducted in four standardized trend areas plus one small patch of habitat located immediately between two trend areas. A sample size of 1,016 moose was obtained for all areas (Appendices III and IV). The bull-cow ratio for the Peninsula showed a continued decline, going from 99.4 in 1962 to 44.9 in 1970 (Appendices V and VI). The nine point drop between 1969 and 1970 is exaggerated because of the exclusion of the Katmai trend area which is an unhunted population. The figure of 12.4 calves per 100 cows recorded during the fall surveys confirmed the low productivity detected during spring surveys.

Management Summary and Conclusions

The Unit 9 moose population in the central portion of the Peninsula appears to be adjusting to the carrying capacity of its range by a decline in numbers. Spring productivity data and fall calf survival data lead to speculation that poor reproductive success may be the means by which this adjustment is occurring. In utero mortality and poor calf survival are probably preventing replacement of adults lost to natural or hunter mortality. Reported harvests from the Unit in past years have been of insufficient magnitude to account for even the reduction of numbers noted within the trend areas.

MOOSE - GMU 9 - Alaska Peninsula

Additional spring surveys will be necessary to determine whether this year's data represent a meaningful pattern or 1970 was an isolated year of poor production.

The population in the northern portion of the Unit around Lake Clark and Lake Iliamna remains low with only pockets of local abundance. Hunting pressure is primarily by local residents although guided hunts produce a few trophy animals each year. Moose appear to be increasing in the Pacific drainages of the central Peninsula, and, as yet, hunting pressure on these animals remains light. One cow moose was observed at Canoe Bay south of Port Moller.

The 1970 hunting season was marked by a reduced hunting effort as compared to past years. Because of restrictive brown bear regulations and a closure on antlered moose during the month of October, many guides who normally hunt in Unit 9 transferred their efforts to other Units. The "tight money" situation also contributed to reduced harvest; many nonresident hunters cancelled out anticipated Alaskan hunts. The October bull closure directly reduced the harvest as trophy hunters were forced to utilize other Units, and meat hunters were restricted to females. This regulation, originally enacted to discourage wanton waste of bulls during the rut, provided a hardship on Peninsula residents seeking meat and served to discourage the guide industry in the area. Combined efforts of protection officers and biologists revealed a minimal wanton waste problem this fall. There does not appear to be justification for maintaining the October closed period.

Recommendations

The moose season in Unit 9 should run from August 20 through December 31 without a closure on antlered moose for any portion of that season. The bag limit should remain unchanged.

Submitted by: James B. Faro, Game Biologist III

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	78	8	323	519	62.2
1967	301	68	9	378	509	67.0
1968	366	72	5	443	583	75.5
1969	317	70	6	393	527	74.6
1970	F I N A L R U N N O T A V A I L A B L E					

APPENDIX II

Moose Productivity, Unit 9, Alaska Peninsula 1970

Date	Calves per 100 FF	Calves per 100 FF and Yearlings	Percent FF with Calves	Percent FF with Twins	Total Sample
5/18	4.9	3.5	3.3	50.0	112
5/22	14.5	10.3	9.2	57.1	158
5/26	31.9	21.0	26.1	22.2	203
5/30	75.0	44.7	48.2	55.5	221
6/6	55.9	27.4	40.2	39.2	482
6/13	43.1	28.6	37.3	15.8	128

MOOSE - GMU 9 - Alaska Peninsula

APPENDIX III

Moose Sex and Age Ratios, Alaska Peninsula, Unit 9, 1970

Area	Total MM per 100 FF	Small MM per 100 FF	Small MM per 100 Large MM	Small MM per % in Herd	Small MM per 100 Calves	Calves per 100 FF	Incidence of Twins per 100 Cows w/calf	Calf % in Herd	Moose per Hour	Total Sample
Meshik River	42.6	6.6	18.2	4.1	40.0	16.4	41.9	10.3	35.9	97
Mother Goose	30.0	20.0	150.0	13.9	187.5	10.7	6.7	7.4	93.9	216
Dog Salmon	62.2	14.9	31.5	8.6	147.4	10.1	5.8	5.9	111.7	324
Cinder River	40.3	13.6	50.8	8.9	107.3	12.7	12.0	8.3	122.9	338
Patch	30.8	11.5	60.0	7.3	42.9	26.9	-	17.1	205.0	41
TOTALS	44.9	14.7	48.7	9.4	118.8	12.4	11.3	7.9	93.2	1016

MOOSE - GMU 9 - Alaska Peninsula

APPENDIX IV

Moose Sex and Age Composition - Unit 9, 1970.

Area	Date	Large MM	Small MM	Total MM	FF W/0	FF W/1	FF W/2	Total FF	Total Adults	Total Calves	Unid. Sex & Age	Total Sample
Meshik River	11/16	22	4	26	54	4	3	61	87	10	-	97
Mother Goose	11/29	20	30	50	135	14	1	150	200	16	-	216
Dog Salmon	12/5	89	28	117	171	16	1	188	305	19	-	324
Cinder River	12/6	59	30	89	196	22	3	221	310	28	-	338
Patch	12/6	5	3	8	19	7	0	26	34	7	-	41
TOTALS		195	95	290	575	63	8	646	936	80	-	1016

MOOSE - GMU 9 - Alaska Peninsula

APPENDIX V

Moose Sex and Age Ratios - Unit 9.

Date	Year	Tot. MM per 100 FF	Sm. 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	99.4	19.0	23.6	8.2	115.2	33.0	24.4	14.2	91.0	1,113
Apr.	1963*	-	-	-	-	-	-	20.0	13.1	71.0	550
Nov.	1963	62.1	11.9	23.7	6.4	97.5	24.4	17.5	13.1	104.0	1,852
Nov.	1964	67.8	11.8	21.2	6.4	137.7	17.2	9.9	9.3	146.0	1,312
	1965**	-	-	-	-	-	-	-	-	-	-
Nov.	1966	73.5	13.9	23.3	6.6	85.9	32.4	16.3	15.4	96.0	786
Oct.	1967	73.0	14.0	23.0	7.0	121.0	24.0	30.0	12.0	89.0	1,447
Oct.	1968	63.3	9.1	15.7	4.8	84.7	21.3	19.1	11.1	163.9	1,619
Nov.	1969	53.9	18.7	52.9	10.3	148.8	25.1	14.1	13.9	65.0	620
Nov. & Dec.	1970	44.9	14.7	48.7	9.4	118.8	12.4	11.3	7.9	93.2	1,016

* Survey in April; all other surveys made in the fall.
** Sex and age composition counts were not conducted in 1965.

MOOSE - GMU 9 - Alaska Peninsula

APPENDIX VI

Moose Sex and Age Composition - Unit 9

Year	Date	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	Count Time (hrs.)	Moose per Hour
1962	Nov.	385	91	476	352	96	31	479	955	-	158	-	1113	12.2	91.0
1963*	Apr.	-	-	-	-	48	12	-	478	-	96	-	550	-	71.0
1963*	Nov.	499	118	617	581	170	36	787	1610	-	242	-	1852	-	104.0
1964	Nov.	397	84	481	820	100	11	709	1190	-	122	-	1312	-	146.0
1965**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1966	Nov.	223	52	275	270	87	17	374	649	-	121	16	786	8.2	96.0
1967	Sept. 9, 10,12,13	445	104	549	580	124	22	726	1275	4	172	0	1447	16.2	89.0
1968	Oct.	469	78	547	736	125	32	893	1440	-	189	-	1629	9.8	163.9
1969	Nov. 14,15, 18,30	121	64	185	268	64	11	343	538	0	86	6	620	9.5	65.0
1970	Nov. 16&29 Dec. 5&6	195	95	290	575	63	8	646	936	0	80	0	1016	10.9	93.2

* Survey in April; all other surveys made in fall.
** Sex and age composition counts were not conducted in 1965.

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 11 - Wrangell Mountains-Chitina River

Seasons and Bag Limits

Aug. 20 - Sept. 30	One moose
Nov. 1 - Nov. 30	

Harvest and Hunting Pressure

The Nabesna Road and several "swamp buggy" trails which radiate from it continue to account for the majority of the Unit 11 moose harvest, especially the female segment. The new highway from Chitina to McCarthy will be open to traffic during the summer of 1971 and will create some access to country formerly inaccessible to road hunting. Most of this country is marginal moose habitat.

Data are not yet available on the 1970-71 harvest. Casual observations indicate that long seasons and relatively good access may be creating excessive hunting pressure adjacent to the Nabesna Road. In 1967, 1968 and 1969 about 50 percent of the bull harvest and over 70 percent of the antlerless harvest came from the Nabesna Road. Harvest data through 1969 are shown in Appendix I.

Examination of chronology of the kill shows that of 142 known date kills 34 (24 percent) were taken during the November season. Unit 11 is the only Unit in this area which has a November antlerless season.

Composition and Productivity

The western slope of Mt. Drum is the only area for which population composition data are available. These data (Appendices II and III) have always shown a high incidence of adult animals and low calf production, as would be expected in a relatively unhunted population. Time and budgetary limitations prevented establishment of a sex and age composition trend along the Nabesna Road as was initially planned.

While the overall kill of moose from this Unit is low, the effect of the disproportionate bull/cow kill can be noted in the sex and age data (Appendices II and III). The bull/cow ratio has gone from 145:100 in 1955 to 60:100 in 1970.

Management Summary and Conclusions

The effect of hunting in Unit 11 is minimal with two exceptions. The disproportionate kill of bulls is gradually reducing the bull/cow ratio, at least in the Mt. Drum count area, and the Nabesna Road area

may be receiving excessive harvest. If the latter is true, a subdivision of the Unit may be necessary to manipulate the harvest.

Recommendations

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

Submitted by: Loyal Johnson, Game Biologist III

APPENDIX I

Moose Harvest and Hunting Pressure - Unit 11.

Year	Male	Female	Unid.	Total	Hunters	Percent Success
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		D A T A N O T A V A I L A B L E				

APPENDIX II

Moose Sex and Age Ratios - Unit 11.

Year	Total MM per 100 FF	Sm. MM per 100 FF	Sm. MM per 100 Lg. MM	Sm. MM % in Herd	Sm. MM per 100 of Calves	Calves per 100 FF	Twins per 100 FF w/calf	Calf % in Herd	Animals per Hour	Total Sample
11/21/55	144.9	29.0	25.0	10.3	163.2	35.5	18.8	12.7	75	300
10/23/56	145.0	15.0	11.5	5.5	100.0	30.0	20.0	10.9	54	55
11/13/57	70.5	6.8	10.7	3.3	35.3	38.6	0.0	18.5	92	92
10/29-30/58	140.6	12.3	9.6	4.5	72.2	34.0	2.9	12.4	94	291
11959*										
11/18/60	80.0	16.0	25.0	7.3	88.9	36.0	12.5	16.4	48	110
1961*										
1962*										
1963*										
1964*										
10/25-27/65	80.6	25.4	45.9	12.7	272.0	18.7	0.0	9.3	81	269
1966*										
11/10/67	71.8	10.1	16.4	5.0	69.7	29.1	3.1	14.5	117	456
1968*										
11/12/69	65.2	11.0	20.2	5.7	75.6	27.8	4.9	14.4	85	299
10/28/70	60.3	14.9	32.7	8.5	213.0	14.0	0.0	8.0	59	199

* Sex and age composition counts not conducted.

APPENDIX III

Moose Sex and Age Composition - Unit 11.

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	Count Time (Hrs.)	Moose per Hour
1955	124	31	155	75	26	6	107	262	0	38	0	300	4.0	75
1956	26	3	29	15	4	1	20	49	0	6	0	55	1.0	54
1957	28	3	31	27	17	0	44	75	0	17	0	92	1.0	92
1958	136	13	149	71	34	1	106	255	0	36	0	291	3.1	94
1959*														
1960	32	8	40	34	14	2	50	90	0	18	2	110	2.3	48
1961*														
1962*														
1963*														
1964*														
1965	74	34	108	109	25	0	134	243	0	25	1	268	3.3	81
1966*														
1967	140	23	163	163	62	2	227	390	0	66	0	456	3.9	112
1968*														
1969	84	17	101	114	39	2	155	256	0	43	0	299	3.5	85
1970	52	17	69	98	16	0	114	183	0	16	0	199	3.2	59

* Sex and age composition not conducted.

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 12 - Upper Tanana-White River

Seasons and Bag Limits

August 20 - September 30	1 Bull
November 1 - November 30	1 Bull
September 28 - October 4	1 Antlerless moose**

** One moose regardless of sex shall constitute the bag limit for Unit 12.

Harvest and Hunting Pressure

Harvest ticket data indicate the 1969 hunter kill was 158 moose, not a significant change from the previous 5 year average of 170 moose. The kill was comprised of 125 bulls, 29 cows and 4 unknowns. Harvest figures for 1970 are not yet available, however, little significant change is expected in the overall harvest.

Hunting pressure is increasing along the highways of Unit 12, and also in the Tok River area. Increased hunting pressure in the Tok River was due to unusually low water conditions which occurred during 1969 which permitted off-the-road vehicle access to this area.

Little change in hunting pressure is believed to be occurring elsewhere in Unit 12.

Composition and Productivity

Composition counts conducted during November, 1970, revealed a calf/cow ratio of 32 calves per 100 cows. The past 5 year average has been 21 calves per 100 cows. Calf percentage in the herd during 1970 was 23%, compared with the past 5 year average of 10%.

Management Summary and Recommendations

Harvest data indicate that the Unit 12 moose kill has been fairly constant for the past five years. No significant change in the size of the population appears to be occurring. Some composition changes are puzzling, but are believed to be due to sampling error, i.e., calf percentage in herd.

No significant changes in seasons or bag limits are recommended.

Submitted by: Larry Jennings, Game Biologist III

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 13 - Nelchina Basin

Seasons and Bag Limits

Unit 13A & 13D	Aug. 20 - Sept. 20 Nov. 1 - Nov. 20	One bull
Unit 13B	Aug. 20 - Sept. 30* Nov. 1 - Nov. 20	One bull plus 400 antlerless moose (150 by early season permits plus 250 by Commissioner's announcement) except that during the special hunt, antlerless moose may not be taken east of the Gulkana-Tangle Rivers
Unit 13C	Aug. 20 - Sept. 30* Nov. 1 - Nov. 20	One bull plus 300 antlerless moose (150 by early season permit plus 150 by Commissioner's announcement)

* Antlerless moose only may be taken after September 20.

Harvest and Hunting Pressure

Harvest report figures for regulatory year 1970-71 are not yet available. The problems associated with the report packet plus loss of the tag portion have had an adverse effect on the veracity of the kill data. The permit hunt for antlerless moose in 13B produced a kill of about 60 antlerless moose by 150 permittees. An additional 13 animals were taken by 35 registrants during the Commissioner's announcement hunt which was held December 5-13. The permit hunt for 13C produced a kill of about 40 antlerless animals by 150 permittees. During the Commissioner's announcement hunt 273 registrants took an additional 102 female moose and five antlerless male moose. The total kill of antlerless moose from Unit 13 was about 220 animals.

Harvest information for the 1969-70 regulatory year which was unavailable for the 1969 S&I report showed a kill of 1205 bulls. Harvest data for recent years are shown in Appendix I. Age analysis of the 1969-70 harvest is shown in Appendix II. The specimens for this age analysis were obtained at the Denali Highway checking station. The high percentage of yearling animals, which are usually taken early in the season, is probably attributable to ingress into the vacant habitat created by the previous year's harvest which normally removes most of the resident males adjacent to the highway.

Age data for the 1970-71 harvest are shown in Appendix III. These data include the largest sample of antlerless moose ages collected from this unit. There is a high percentage of older animals; 72 percent of the antlerless moose taken in 13C were six years and older and in 13B 62 percent were six years and older. In those same two subunits, bulls six years and older comprised 15 and 43 percent of the kill, respectively, but the sample size for 13B was only 14 bulls.

Composition and Productivity

The 1970 Nelchina Basin sex and age surveys showed a slight increase in the bull:cow ratio over the 1969 low of 28.9 to 30.0. The calf:cow ratio showed a decrease from the 1969 figure of 32.4 to 29.6. The incidence of twinning continued to increase and is at its highest since 1961. Sex and age data computed from aerial surveys dating to 1955 are shown in Appendices IV and V.

Five trend areas between Talkeetna and Cantwell were flown for the first time in 1970. The trend areas include most of the new Denali State Park and areas along the new Anchorage to Fairbanks Highway. Sex and age composition data (Appendix VI) indicate a low density population with light hunting pressure.

Management Summary and Conclusions

Most count areas showed an increase in the ratio of bulls to cows. This may reflect the reduction on the bull season in late September but increases in calf production, twinning rate, and probably survival in both 1968 and 1969 also contributed. The fact that only about 100 antlerless moose out of a possible 300 were taken by permit holders indicates that the desired kill of antlerless moose will not be achieved through permit hunting. The kill can probably be achieved through registration hunting, conducted during the normal season and if not then, during late season special hunts.

The current regulations which allow for limited antlerless moose harvest in 13B and 13C were initiated in part to demonstrate that utilization of antlerless as well as antlered moose will effect the principles of the sustained yield concept of game managment. At the same time, allowing for a harvest of bull moose only from 13A and 13D purportedly will show that it is not possible to properly manage a moose herd by removal of males only. To demonstrate that the sustained yield concept does apply to a moose population, we must achieve a meaningful harvest of antlerless animals.

Recommendations

The hunting pressure exerted by those persons who held antlerless permits for the early season hunt was not adequate to achieve a kill of the magnitude necessary to alter the age structure and stimulate production. It is felt that such a kill can be achieved through registration

hunting in which only those persons who wish to hunt can participate, which is not the case during permit hunts. Therefore, it is recommended that the regulations be altered to allow for the hunting of antlerless moose in 13B and 13C, on a registration first-come first-served basis until the desired kill is achieved. If the kill is not achieved during regular seasons, then special late season hunts should be provided to get the remainder of the desired kill. To avoid confusion resulting from the antlerless season extending ten days later than the early bull season, it is also recommended that all hunting for the early season terminate on September 20.

Submitted by: Loyal J. Johnson, Game Biologist III

APPENDIX I

Moose Harvest and Hunting Pressure, Unit 13.

Year	Season	Bulls	Cows	Unid.	Total	Hunters	Percent Success
1966	First	1,271	181				
	Second	221	-				
TOTAL		1,336*	181	36	1,553	4,163	27
1967	First	1,009	319				
	Second	112	-				
TOTAL		1,217*	319	16	1,552	4,027	39
1968	First	1,013	243				
	Second	171	-				
TOTAL		1,240*	243	29	1,512	4,476	34
1969	First	817	0				
	Second	87	0				
TOTAL		1,204*	7	8	1,219		
1970	First	Not	100**				
	Second	Available	120**				
TOTAL			220				

* Includes a number of kills date not specified.
** Estimated minimum

APPENDIX II

Chronological Age of Male Moose Taken in Unit 13 During 1969-70 Regulatory Year, Specimens Collected at Denali Checking Station.

Age	Number Males	Percent
C	1	.4
1	74	34.9
2	23	10.9
3	33	15.6
4	21	9.9
5	15	7.1
6	14	6.6
7	13	6.1
8	2	.9
9	5	2.4
10	3	1.4
11	2	.9
12	3	1.4
13	1	.4
14	1	.4
15	1	.4
TOTAL	212	99.7

APPENDIX III

Age Structure of Moose, Unit 13. Source of Bull Specimens from 13B was Denali Check Station. Includes Hunter Kills and Road Kills. Nelchina Basin.

	13A		13B				13C				13D				Unk.	Total			
	MM	FF	MM		FF		MM		FF		MM		FF			MM		FF	
Class	No.	No.	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		No.	%	No.	%
Calf			3	2.8	3	4.4	4	28.6	6	4.8						7	4.0	9	4.5
1	1		24	22.6	4	5.9	3	21.4	1	0.8	15	31.3				43	24.7	5	2.5
2	3		12	11.3	7	10.3			7	5.6	2	4.2				17	9.8	14	7.0
3	1		32	30.2	6	8.8			10	7.9	15	31.3	1	-	2	48	27.6	17	8.5
4	1		10	9.4	4	5.9	1	7.1	8	6.3	5	10.4				17	9.8	12	6.0
5			9	8.5	2	3.0			7	5.6	6	12.5				15	8.6	10	5.0
6			5	4.7	5	7.4	1	7.1	16	12.7	1	2.1				7	4.0	21	10.4
7			4	3.7	8	11.8	1	7.1	12	9.5	2	4.2				7	4.0	20	10.0
8			2	1.8	5	7.4	1	7.1	5	4.0						3	1.7	10	5.0
9			2	1.8	5	7.4	1	7.1	14	11.1						3	1.7	19	9.5
10			3	2.8	6	8.8	1	7.1	13	10.3	1	2.1	1	-	1	5	2.9	20	10.0
11					2	3.0			10	7.9	1	2.1	1	-		1	0.6	13	6.5
12					1	1.5			3	2.4								4	2.0
13					2	3.0			9	7.1								11	5.5
14		1			3	4.4			3	2.4								7	3.5
15					3	4.4			1	0.8								4	2.0
16					2	1.5	1	7.1	3	2.4						1	0.6	5	2.5
Total Sample Size	6	1	106		68		14		126		48		3		3	174		201	

APPENDIX IV

Moose Sex and Age Composition - Nelchina Basin - Unit 13.

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	Count Time (hrs.)
Nov. 1952	161	46	207	224	96	20	340	547	0	136	0	683	-
Nov. 1953	243	136	379	83	223	47	353	783	0	317	0	1100	-
Nov. 1954	476	168	644	195	331	65	591	1235	4	465	0	1700	-
11/16-21/55	686	287	973	522	426	48	996	1969	0	522	0	2491	-
10/19-25/56	322	75	397	444	152	3	599	996	0	158	0	1154	30.8
11/6-15/57	605	180	785	654	394	25	1132	1917	0	470	0	2387	21.0
10/26-11/2/58	1077	206	1283	1167	622	29	1818	3101	0	680	0	3781	33.5
1959*													
11/13-18/60	384	121	505	309	260	34	593	1098	0	328	41	1467	26.6
11/11-21/61	614	289	903	830	532	60	1422	2325	0	652	0	2977	42.3
10/23-11/24-12/1/62	482	217	785	900	309	18	1227	2012	0	345	0	2357	27.0
11/3-19/63	432	145	577	657	379	23	1059	1636	0	425	0	2061	16.7
12/4-5/64, 3/17-22/65	256	103	359	660	236	11	907	1256	0	258	0	1524	20.3
10/20 to 11/4/65	1237	460	1697	2653	894	20	3567	5267	0	933	3	6150	75.5
11/6-19/66	924	174	1098	2012	683	15	2711	3809	8	721	5	4534	75.9
11/8 to 12/12/67	1079	297	1376	2520	900	28	3448	4824	3	959	11	5794	82.7
11/23 to 12/6/68	470	89	559	1282	562	24	1868	2427	3	613	2	3042	48.2
11/11-16/69	510	274	784	1880	791	43	2714	3498	3	880	19	4397	75.3
10/28-11/11/70	621	237	858	2133	676	35	2864	3753	4	790	37	4549	88.5

* Not sufficient data

APPENDIX V

Moose Sex and Age Ratios - Nelchina Basin - Unit 13.

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	Count Time (hrs.)	Animals per Hour	Total Sample
1952	60.9	13.5	28.6	6.7	67.6	40.0	17.2	19.9	-	-	683
1953	107.4	38.5	56.0	12.4	85.8	89.8	17.4	28.8	-	-	1100
1954	109.0	28.4	35.3	9.9	72.2	78.7	16.4	27.3	-	-	1700
1955	99.7	28.8	41.8	11.5	110.0	52.4	10.1	21.0	-	-	2491
1956	66.3	12.5	23.3	6.5	94.9	26.4	1.9	13.7	30.8	38	1154
1957	69.3	15.9	29.8	7.5	76.6	41.5	6.0	19.7	21.0	104	2387
1958	70.6	11.4	19.2	5.5	60.9	37.4	4.4	18.0	33.5	113	3781
1959*											
1960	85.2	20.4	31.5	8.2	73.8	55.3	11.6	22.4	26.6	55	1467
1961	63.5	20.3	47.1	9.7	88.7	45.9	10.1	21.9	42.3	70	2977
1962	64.0	20.3	45.0	10.5	147.1	28.1	5.5	14.6	27.0	87	2357
1963	54.5	13.7	33.6	7.0	68.2	40.1	5.7	20.6	16.7	123	2061
1964	39.6	11.4	40.2	6.8	79.8	28.4	4.5	16.9	20.3	73	1524
1965	47.6	12.9	37.2	7.5	98.7	26.2	2.2	15.2	75.5	82	6150
1966	40.5	6.4	18.8	3.8	48.3	26.6	2.1	15.9	75.9	60	4534
1967	39.9	8.6	27.5	5.1	62.1	27.8	3.0	16.6	82.7	71	5794
1968	29.9	4.8	18.9	2.9	29.0	32.8	4.1	20.2	48.2	63	3042
1969	28.9	10.1	53.7	6.2	62.3	32.4	5.2	20.0	75.3	58	4397
1970	29.96	9.4	38.9	5.7	63.6	29.6	8.6	18.0	88.5	51	4549

* Not sufficient data.

APPENDIX VI

Moose Sex and Age Composition and Ratios - Talkeetna-Cantwell - Unit 13.

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	Moose per Hour
10/27-11/13 1970	129	55	184	134	92	17	243	427	2	128	3	558	12.2

Year	Total MM per 100 FF	Total MM per 100 FF	Sm. MM per 100 Lg. MM	Sm. MM % in Herd	Sm. MM per 100 MM Calves	Calves per 100 FF	Incidence of Twins per 100 FF w/calf	Calf % in Herd	Animals per Hour	Total Animals
1970	76.5	23.4	44.2	10.2	89.0	52.6	15.5	22.8	12.2	558

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 14 - Upper Cook Inlet

Seasons and Bag Limits

The seasons and bag limits in this unit are presented by subunit in separate reports.

Harvest and Hunting Pressure

The total 1970 moose harvest in Unit 14 is not yet known due to the late requirement for harvest report submission. The total bull harvest for 1969 was 709 animals, representing an increase from the 1968 harvest of 680 animals (Appendix I). The total bull harvest for 1967 was 482 animals.

Antlerless seasons were not held in Unit 14 during 1970. The moose became available in large numbers after the December 31 deadline set by the Board of Fish and Game. In 1969, 203 cows were harvested according to IBM harvest report data.

Harvest data for 1966-1969 are presented in Appendix I. The increase of 201 animals from 1968 to 1969 is due to the antlerless season harvest that took place in Subunits 14A and 14B in 1969. Since Appendix I includes data from individuals who did not indicate the subunit in which they hunted, totals shown will be higher than the sum of the harvest from each subunit.

Composition and Productivity

Herd composition and productivity will be taken up in each subunit of Unit 14 in the attached reports.

Management Summary and Conclusions

The management summary and conclusions derived from the information presented will be treated by subunit in the attached reports.

Recommendations

Recommendations are presented separately by subunit in the attached reports.

Submitted by: Jack C. Didrickson, Game Biologist III

APPENDIX I

Moose Harvest and Hunting Pressure - Unit 14.

Year	Season	Bulls	Cows	Unid.	Total	Hunters	Percent Success
1966	First	307	15	0	322		
	Second	220	7	0	227		
	Antlerless	0	171	0	171		
	Unk. Date	38	9	9	56		
	TOTAL	565	202	9	776	NA	NA
1967	First	296	0	0	296		
	Second	0	0	0	165		
	Antlerless	0	0	0	0		
	Unk. Date	21	4	9	34		
	TOTAL	482	4	9	495	2,968	17.0
1968	First	330	0	0	330		
	Second	306	0	0	306		
	Antlerlesss	14	37	0	51		
	Unk. Date	30	1	5	36		
	TOTAL	608	38	5	723	3,191	23.0
1969	First	331	0	5	336		
	Second	133	1	3	137		
	Antlerless	58	135	3	196		
	Unk. Date	187	67	1	225		
	TOTAL	709	203	12	924	3,181	29.5
1970	First Second Antlerless Unk. Date	F I N A L R U N N O T A V A I L A B L E					
	TOTAL						

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 14(A) - Palmer

Seasons and Bag Limits

Aug. 20 - Sept. 20 Nov. 1 - Nov. 20	One moose; antlerless moose may be taken by permit only (500 permits will be issued); dates and conditions of the hunt will be described by Commissioner's announcement.

Harvest and Hunting Pressure

The final 1970 harvest report run is not available because of the late requirement for harvest report submission. Appendix I presents harvest data from 1966 through 1969. The increase in harvest from 1968 to 1969 is directly related to the 1969 antlerless season. Late antlerless seasons tend to increase annual bull harvests; a minimum of 39 antlerless males were taken during the January 28 - February 5, 1970 antlerless hunt.

Accurate data on hunting pressure and hunting success are not available on the subunit level for 1969.

Harvest reports for the 1969 antlerless hunt (January 28 - February 5, 1970) showed 124 moose taken: 93 cows, 28 bulls and 3 unknown sex. However biologists in the field recorded a minimum harvest of 153 females and 39 males. The 1970 antlerless season was not held because upland moose populations did not become available prior to the December 31 deadline established by the Board of Fish and Game.

Composition and Productivity

A sample trend count of 2,360 animals was obtained in 1970 (Appendix II) indicating sex ratios of 9.2 bulls/100 cows, 42 calves/100 cows and a calf percentage of 27.9.

The most striking ratio change is in the bull/100 cow column. After a generally steady rise from 1966 to 1968 (no count in 1969), the bull/cow ratio decreased to 9.2 from a high of 16.4 in 1968. The continuous bull harvest coupled with cancelled antlerless seasons in 1967 and 1968 and a minimal cow harvest in 1969 has resulted in a decreased bull/cow ratio. A problem formerly encountered in Subunit 14A when bull/cow ratios dropped below 10 bulls/100 cows was an extended period of breeding, causing many cow moose to be impregnated late in the fall, and resulting in late births in the spring. As a consequence, it is believed the smaller

calves are not able to survive the winter period. If antlerless seasons are not implemented soon, a reduction in the bull harvest is in order to prevent delayed breeding. The calf/cow ratio decreased slightly from 48.4 in 1968 to 42.0 in 1970 but indicates that productivity is remaining fairly constant.

Data collected during the 1969 antlerless hunt reveal that 87 percent of the 122 cow moose from which specimens were collected were pregnant and 13 percent were not. Sixty-eight percent of the cow moose in the sample were five years of age or older (Appendix II) indicating a high percentage of older age class animals in the cow segment of the population.

Management Summary and Conclusions

As mentioned in the S & I Report for 1969, it is probable that the moose population in this subunit is again approaching the upper limit of the capability of the range to support it in a difficult winter (deep snow, etc.). Antlerless seasons, which could alter the sex ratios to bring the bull segment back up in the total population as well as providing a utilization of a harvestable surplus of cow moose, have been cancelled three times in the past four years. The results are reflected in the bull/cow ratios and in the age structure of the cow segment of the population. A reiteration of the proposal that management of this herd is not possible when the cow segment is not harvested is in order. With the 9.2 bulls/100 cow ratio, a move to protect bulls through the rut period is needed, but this would further aggrevate the situation by further increasing the size of the population.

Recommendations

A proposed regulation change allowing five hundred antlerless moose to be taken by permit only is recommended.

Submitted by: Jack C. Didrickson, Game Biologist III

APPENDIX I

Moose Harvest and Hunting Pressure - Subunit 14(A).

Year	Season	Bulls	Cows	Unid.	Total	Hunters	Percent Success
1966	First	144	4	0	148		
	Second	129	5	1	135		
	Antlerless	0	80	0	80		
	Unk. Date	9	3	2	14		
	TOTAL	282	92	3	377		
1967	First	127	0	0	127		
	Second	62	0	0	62		
	Antlerless*	0	0	0	0		
	Unk. Date	11	0	0	11		
	TOTAL	200	0	0	200	1,111	18.4
1968	First	187	0	0	187		
	Second	209	0	0	209		
	Antlerless*	0	0	0	0		
	Unk. Date	15	0	3	18		
	TOTAL	411	0	3	414	1,773	23.4
1969	First	213	0	4	217		
	Second	84	1	2	87		
	Antlerless**	28	93	3	124		
	Unk. Date	109	47	0	156		
	TOTAL	434	141	9	584		
1970	First Second Antlerless*	F I N A L R U N N O T A V A I L A B L E					
	TOTAL						

* Cancelled
** To be announced

APPENDIX II

Moose Sex and Age Composition and Ratios - Subunit 14(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	Count Time (hrs.)	Moose per Hour
1966 12/8-17,21	31	89	120	446	312	19	797	917	5	355	7	1277	33.5	38
1967 12/4-20	73	131	204	861	608	40	1509	1713	13	701	10	2424	46.3	52
1968 12/2-6,14	188	98	236	793	603	42	1438	1674	9	696	8	2378	43.7	54
1969*														
1970 11/24-27	83	60	143	957	543	48	1548	1694	13	652	19	2360	48.1	49

* Sex and age composition counts were not conducted in 1969 due to unfavorable weather conditions.

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
1966	15.1	11.2				44.5	5.7	27.8	38	1277
1967	13.5	8.7	64.2	5.4	37.4	46.4	6.2	28.9	52	2424
1968	16.4	6.8	72.6	4.1	28.1	48.4	6.5	29.3	54	2378
1969*										
1970	9.2	3.9	72.3	2.6	18.4	42.1	8.1	27.6	49	2360

* Sex and age composition counts were not conducted in 1969 due to unfavorable weather conditions.

APPENDIX III

Number and Percentage of Moose in Each Age Class, 1969 Antlerless Harvest - Subunit 14(A).

Age	Female		Male	
	Number	Percent	Number	Percent
Calf	5	3.8	9	25.0
1	7	5.3	3	8.3
2	5	3.8	5	13.9
3	13	9.9	5	13.9
4	12	9.2	3	8.3
5	20	15.3	4	11.1
6	11	8.4	3	8.3
7	11	8.4	2	5.6
8	10	7.6	-	-
9	7	5.3	-	-
10	11	8.4	-	-
11	5	3.8	-	-
12	5	3.8	1	2.8
13	4	3.1	-	-
14	3	2.3	-	-
15	1	.8	1	2.8
16	1	.8	-	-
TOTAL	131	100.0	36	100.0

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 14(B) - Talkeetna

Seasons and Bag Limits

Aug. 20 - Sept. 30 Nov. 1 - Nov. 20	One moose; 200 antlerless moose may be taken by permit only. Dates and conditions of the hunt will be described by Commissioner's announcement.

Harvest and Hunting Pressure

Harvest data for the fall of 1970 are not yet available because of the late requirement for harvest report submission. The average bull harvest in Subunit 14B over the past three years has been 148 moose. In 1969, the reported harvest was 121 bulls. Accurate data for hunter success and pressure on a subunit level are not available for the 1969 harvest, however.

Antlerless seasons in this subunit were cancelled in 1967, 1968 and 1970 (Appendix I). In 1969, 46 females were recorded harvested according to harvest report data, but biologists collecting specimens in the field from January 28 - February 5, 1970 found that 54 adult females, 39 adult bulls, and 18 male calves were taken. Both the female and male segments of Subunit 14B are under-harvested due to restricted access and poor hunting conditions (no snow) in most years. With 1,942 moose being observed during the 1970 sex and age composition counts, and recent studies indicating that only 50-60 percent of the animals are seen, it is doubtful that hunting has any effect on this herd except for the relatively accessible Peters-Purchase Creek area.

Composition and Productivity

The 1966 to 1970 sex and age composition counts for Subunit 14B are presented in Appendices II and III. Nineteen hundred and forty-two moose were tallied during the 1970 survey. There was a downward trend in the bull/cow ratio from 1968 (34.8 bulls/100 cows) to 27.8/100 in 1970. Counts were not conducted in 1969 due to a lack of snow cover. The calf/cow ratio has not decreased significantly (41.5 in 1968, 41.2 in 1970) and it indicates productivity is good.

Age data for animals taken during the 1969 antlerless hunt are shown in Appendix IV. Reproductive tracts were collected from 29 females and all but the three calves were pregnant. Twins occurred in 42.3 percent of the pregnancies, indicating good productivity. Analysis of reproductive tracts showed that the 16, 17 and 18 year-old cows were not only pregnant but that a 17 and an 18 year-old were both carrying twins.

Management Summary and Conclusions

Composition surveys coupled with harvest information reveal that Subunit 14B is under-harvested; this is generally due to a lack of hunter access. Access by most means should be encouraged to harvest moose in the subunit. Snowmachines are not usable because the season usually ends prior to snow cover. With the antlerless seasons cancelled in this subunit three years out of the last four, it is doubtful that the limited antlerless season now in existence will have any desirable effect on the bull/cow ratio, which is declining slowly.

Recommendations

Raise the recommended antlerless take to 350 animals from the present 200.

Submitted by: Jack C. Didrickson, Game Biologist III

APPENDIX I

Moose Harvest and Hunting Pressure - Subunit 14(B).

Year	Season	Bulls	Cows	Unid.	Total	Hunters	Percent Success
1966	First	51	11	1	63		
	Second	60	1	0	61		
	Antlerless	0	12	0	12		
	Unk. Date	9	1	0	10		
	TOTAL	120	25	1	146	NA	NA
1967	First	100	0	0	67		
	Second	75	0	0	75		
	Antlerless*	0	0	0	0		
	Unk. Date	6	0	1	7		
	TOTAL	181	0	1	181	732	17.1
1968	First	67	0	0	67		
	Second	67	0	0	67		
	Antlerless*	0	0	0	0		
	Unk. Date	9	0	0	9		
	TOTAL	143	0	0	143	473	30.2
1969	First	37	0	0	37		
	Second	25	0	0	25		
	Antlerless**	29	30	0	59		
	Unk. Date	30	16	0	46		
	TOTAL	121	46	0	167	NA	NA
1970	First Second Antlerless* Unk. Date	F I N A L R U N N O T A V A I L A B L E					
	TOTAL						

* Cancelled
** To be announced

APPENDIX II

Moose Sex and Age Composition - Subunit 14(B).

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	Time (Hrs.)	Moose per Hour
1966 12/5-10	94	24	118	147	199	6	352	470	1	212	14	696	14.4	51.0
1967 12/6	39	23	62	139	76	5	220	282	3	89	-	371	5.25	70.0
1968 11/26-27	190	85	275	498	262	31	791	1066	4	328	-	1394	24.9	55.9
1969*														
1970 11/20-23	214	104	318	671	390	28	1143	1461	5	471	64	1942	-	-

* Sex and age composition counts were not conducted in 1969 due to unfavorable weather conditions.

APPENDIX III

Moose Sex and Age Ratios - Subunit 14(B).

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 FF w/calf	Calf % in Herd	Moose per Hour	Total Sample
1966 12/5-10	35.3	6.7	26.5	3.2	26.2	59.2	2.8	30.6	51	696
1967 12/6	28.2	10.5	59	6.2	51.7	40.5	6.2	24.0	70.9	371
1968 11/26-27	34.8	10.7	44.7	6.1	51.8	41.5	10.6	23.5	55.9	1394
1969*										
1970 11/20-23	27.8	9.1	48.5	5.5	44.0	41.2	6.7	25.0	-	-

* Sex and age composition counts were not conducted in 1969 due to unfavorable weather conditions.

APPENDIX IV

Numbers and Percentages of Moose in Each Age Class - 1969 Antlerless Hunt (28 January - 5 February, 1970) - Subunit 14(B).

Age	Female		Male	
	Number	Percent	Number	Percent
Calf	3	8.8	11	29.7
1	-	-	-	-
2	-	-	5	13.5
3	3	8.8	3	8.1
4	2	5.9	2	5.4
5	1	2.9	3	8.1
6	2	5.9	4	10.8
7	1	2.9	4	10.8
8	4	11.8	3	8.1
9	3	8.8	-	-
10	3	8.8	1	2.7
11	5	14.7	1	2.7
12	2	5.9	-	-
13	-	-	-	-
14	1	2.9	-	-
15	-	-	-	-
16	1	2.9	-	-
17	1	2.9	-	-
18	2	5.9	-	-
TOTAL	34	99.8	37	99.9

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 14(C) - Anchorage

Seasons and Bag Limits

Aug. 20 - Sept. 30 Nov. 1 - Nov. 20	One moose; antlerless moose may be taken by permit on the Fort Richardson Military Reservation (50 permits will be issued); dates and conditions of the hunt will be described by Commissioner's announcement.

Harvest and Hunting Pressure

The final IBM moose harvest data for 1970 are not yet available. Appendix I depicts the 1969 harvest, which was 92 bulls, 14 cows and 2 unidentified for a 108 moose total. It is interesting to compare the 86 moose killed by automobiles in Subunit 14C for 1970 with the 1969 harvest, which is only slightly higher. The Fort Richardson antlerless season for Subunit 14C was cancelled in 1970 because the moose were not available prior to the deadline of December 31 set by the Board of Fish and Game. The 1969 antlerless harvest in Subunit 14C was restricted to 14 cow moose taken by archers on Anchorage International Airport.

Accurate data for hunting pressure and hunter success are not available on the subunit level for the 1969 harvest.

Extremely restrictive regulations in this subunit have caused the harvest to decrease. Instrumental in the decrease this past year was the ruling in the Chugach State Park whereby hunters must be one mile off the road before discharging a firearm.

Composition and Productivity

Sex and age composition counts for Subunit 14C are shown in Appendices II and III. Hunter Creek is the area where the bull/cow ratio is highest and it is completely unhunted due to restrictive regulations (ie: no vehicles allowed; walk-in only). The bull/cow ratio in Hunter Creek is 35.6/100. Fort Richardson has a bull/cow ratio of 26.5/100, which is the second highest bull/cow ratio in Subunit 14C; this is presumably due to having limited antlerless hunts and to the high percentage of cows killed by automobiles on or near its environs.

The overall calf/cow ratio in Subunit 14C is good at 46.4/calves/100 cows. It appears low only in Peters Creek where the bull/cow ratio is also low, but the sample size is too small to allow interpretation.

Some 757 moose were tallied during the 1970 surveys, indicating that portions of Subunit 14C do contain a considerable number of animals. The subunit is undoubtedly capable of supporting a larger harvest than it presently sustains, particularly when other mortality factors such as road kills are taken into consideration.

Productivity is high in this subunit only in those areas where the moose are harvested by one or another means (Fort Richardson, 60.9 calves/100 cows, 8.7 twins/100 cows w/calves, and Eagle River, 58.6 calves/100 cows, 6.4 twins/100 cows w/calves).

Management Summary and Conclusions

As predicted in the 1969 report, the primary factor in reducing hunter harvest in Subunit 14C was the creation of the Chugach State Park. Although hunting is allowed in the park, one must be a mile from the road before discharging a firearm. This, for all practical purposes, eliminates moose hunting within the confines of the park.

Last year, in this section of the report, a management summary stated that the antlerless hunt on Fort Richardson should be held when moose are available to permit holders. The moose were unavailable until after December 31, and as a result the hunt was cancelled. It is strongly recommended that the time limit on antlerless hunts in this and all other subunits be removed in order to achieve a more effective management program.

Recommendations

No changes are recommended in seasons or bag limits.

Submitted by: Jack C. Didrickson, Game Biologist III

APPENDIX I

Moose Harvest and Hunting Pressure - Subunit 14(C).

Year	Season	Bulls	Cows	Unid.	Total	Hunters	Percent Success
1966	First	94	0	2	96		
	Second	31	1	1	33		
	Antlerless	0	72	0	72		
	Unk. Date	9	4	1	14		
	TOTAL	134	77	4	215	NA	NA
1967	First	43	0	0	43		
	Second	11	0	0	11		
	Antlerless	0	1	0	1		
	Unk. Date	1	0	5	6		
	TOTAL	55	1	5	61	403	29.8
1968	First	60	0	0	60		
	Second	14	0	0	14		
	Antlerless	14	37	0	51		
	Unk. Date	2	1	0	3		
	TOTAL	90	38	0	128	368	35.0
1969	First	49	9	1	50		
	Second	20	0	1	21		
	Antlerless	0	10	0	10		
	Unk. Date	23	4	0	27		
	TOTAL	92	14	2	108	NA	NA
1970	First Second Antlerless Unk. Date	F I N A L R U N N O T A V A I L A B L E					
	TOTAL						

* Fort Richardson antlerless hunt.
** Cancelled.

APPENDIX II

Moose Sex and Age Composition - Subunit 14(C).

Year	Area	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	Count Time (hrs.)	Moose per Hour
1966															
11/66	E.A.F.B.	2	1	3	2	9	0	11	14	0	9	2	25	0.8	31
11/66	Ft. Rich	11	12	23	75	41	3	119	142	0	47	2	191	5.8	33
11/66	Campbell Cr.	1	0	1	8	5	0	13	14	0	5	0	19	0.4	48
11/66	Ship Cr.	4	7	11	42	18	0	60	71	1	19	0	90	0.8	113
11/66 TOTALS 14C		18	20	38	127	73	3	203	241	1	80	4	325	7.7	42
1967															
12/20-21	Eagle River	5	10	15	36	31	1	68	83	2	35	10	128	5.2	24
1968															
12/11-12	Ft. Rich.	36	21	57	188	54	7	249	306	1	69	1	376	5.1	73.7
1969*															
1970															
11/19-20	Ft. Rich.	31	17	48	81	94	9	184	232	0	112	30	374	5.25	71.2
10/27	Eagle River	3	10	13	40	44	3	87	100	1	51	0	151	3.8	39.7
11/18	Eklutna	9	4	13	33	18	0	51	64	0	18	4	86	3.9	22.0
11/18	Peters Cr.	4	1	5	36	5	0	41	46	0	5	1	52	1.45	35.9
11/18	Hunter Cr.	13	8	21	45	14	0	59	80	0	14	0	94	2.1	45.1
TOTALS 14C		60	40	100	235	175	12	422	522	1	195	35	757	16.5	45.9

* Sex and age composition counts not conducted in 1967 due to unfavorable weather conditions.

APPENDIX III

Moose Sex and Age Ratios - Subunit 14(C).

Year	Area	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 FF w/calf	Calf % in Herd	Moose per Hour	Total Sample
1966											
11/66	E.A.F.B.	27.3	9.1	50.0	4.0	22.2	81.8	0.0	36.0	31.0	25
11/66	Ft. Rich.	19.3	10.1	109.1	6.3	51.1	39.5	6.8	24.6	33.0	191
11/66	Campbell Cr.	7.7	0.0	0.0	0.0	0.0	38.5	0.0	26.3	48.0	19
11/66	Ship Cr.	18.3	11.7	175.0	7.8	73.7	31.7	0.0	21.1	113.0	90
2/11/67	Eagle R.*										
11/66	TOTALS 14C	18.7	9.8	111.1	6.2	50.0	39.4	3.9	24.6	42.0	325
1967											
12/20-21	Eagle R.	22.1	14.7	200.0	7.8	57.1	51.5	3.1	27.3	24.4	123
1968											
12/11	Ft. Rich.	22.9	8.4	58.3	5.5	61.8	27.7	11.5	18.3	73.7	376
1969*											
1970											
11/19-20	Ft. Rich.	26.1	9.2	54.8	4.9	30.4	60.9	8.7	32.6	71.2	374
10/27	Eagle River	14.9	11.5	33.3	6.6	39.2	58.6	6.4	33.8	39.7	151
11/18	Eklutna	25.5	7.8	44.4	4.9	44.4	35.3	0.0	21.95	22.0	86
11/18	Peters Cr.	12.2	2.4	25.0	1.96	40.0	12.1	0.0	9.6	35.9	52
11/18	Hunter Cr.	35.6	13.6	61.5	8.5	114.3	23.7	0.0	14.9	45.1	94
	TOTALS 14C	23.7	9.5	66.7	5.5	41.0	46.2	6.4	27.0	45.9	757

* Sex and age composition counts not conducted in 1969 due to unfavorable weather conditions.

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 15(A) - Kenai

Seasons and Bag Limits

Aug. 20 - Sept. 20 Nov. 1 - Nov. 20	One moose; 700 antlerless moose may be taken by permit only; dates and conditions of the hunt will be described by Commissioner's announcement only if conditions warrant.

Harvest and Hunting Pressure

Harvest ticket returns indicate that hunters harvested 287 bull moose in 1969 (Appendix I). The bull harvest has shown an increase for the second straight year, being up seven percent from 1968 and up 16 percent from 1967.

During the 1970 antlerless hunt held December 16-20, 1970, specimens were collected from 181 kills, including 159 cows, 21 bulls and 1 unknown. The maximum estimated antlerless harvest for Subunit 15(A) was 250. Recorded antlerless harvest by area was: 15(A) East - 39 cows including 2 calves, 3 bulls; 15(A) West - 37 cows including 3 calves, 8 bulls including 6 calves; 15(A) South - 64 cows including 3 calves, 7 bulls including 4 calves. The maximum estimated kill by area was: 15(A) East - 60; 15(A) West - 90; 15(A) South - 100. Data from the 1970 general hunt are not available at this time.

Composition and Productivity

Sex and age composition counts conducted in 1970 showed 14.1 bulls/100 cows and 32.1 calves/100 cows (Appendices II, III). The bull-cow ratio appears to be declining, as does the number of calves/100 cows. Comparison of these data with past data is questionable because of variation of areas surveyed and timing of surveys. However, production appears to be fairly good and the bull-cow ratio is adequate.

One hundred and thirty-one adult cows were aged by cementum annuli (Appendix IV). Of these, 28 percent were over 10 years old, and 58 percent were over six years old.

Management Summary and Conclusions

A downward trend in the bull-cow ratio, as indicated by composition count data, may be occurring. Regardless, this ratio is adequate to insure that all cows are bred. Sex and age composition counts also indicate a downward trend in calf production. As with the bull-cow ratio, interpretation is complicated by inconsistencies in the data. Current production of 32.1 calves/100 cows is fair.

With 58 percent of the harvested cows in this subunit being over six years old, it is apparent that this is an old age herd and that the cow segment has been unaffected by hunting.

Over the past two years, there has been a slight increase in the harvest. This increase may not reflect an actual increase in the number of bulls produced since the bull-cow ratio appears to be declining.

Considering the size of Subunit 15(A) and its moose population, the harvest is light. Continued utilization of females should stabilize this herd, relieve pressure on the winter range, stimulate calf production and survival and provide more animals for harvest.

Recommendations

No changes are recommended.

Submitted by: Paul LeRoux, Game Biologist III

APPENDIX I

Moose Harvest and Hunting Pressure - Subunit 15(A).

Year	Season	Bulls	Cows	Unid.	Total	Hunters	Percent Success
1965	1st	*	0	0	*		
	2nd	*	267	0	*		
	Comb.**	513	267	0	780	*	*
1966	1st	211	185	0	396		
	2nd	137	0	0	137		
	Comb.	382	185	0	567	*	*
1967	1st	185	0	0	185		
	2nd	62	0	0	62		
	Comb.	247	0	0	247	1,036	24
1968	1st	166	1	0	166		
	2nd	91	0	0	91		
	Comb.	268	1	0	274	1,092	25
1969	1st	*	*	*	*		
	2nd	*	*	*	*		
	Antlerless		N O T	H E L D			
	Comb.	287	*	7	294		
1970	1st	*	*	*	*	*	*
	2nd	*	*	*	*	*	*
	Antlerless	25	225	*	250***	*	*
	Comb.	*	*	*	*	*	*

* Data not available.
** Combined.
*** Estimated maximum based on 181 known kills.

Totals of first and second seasons may be less than for combined seasons because of the inclusion of animals for which date of kill was not given.

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	Count Time	Moose per Hour
12/3-21/62	85	76	161	597	317	52	966	1127	2	423	18	1568	-	-
1/1964	-	-	-	-	284	19	-	1660	-	511	-	2171	-	-
12/1-12/64	145	66	211	1254	470	25	1740	1951	-	520	-	2471	-	-
6/1965*	-	-	298	475	188	17	680	978	-	222	-	1200	-	-
6/1966*	-	-	230	345	104	4	453	683	-	112	-	795	-	-
10/3-16/67*	29	17	46	280	96	18	394	440	-	135	-	575	-	-
12/1968	148	125	273	945	598	32	1575	1848	14	676	137	2661	29	92
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	1080	1236	4	343	6	1586	27.4	58

* Lowlands only.

APPENDIX III

Moose Sex and Age Ratios - Subunit 15(A).

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 FF w/calf	Calf % in Herd	Animals per Hour	Total Sample
* 1962	16.7	7.9	89.4	4.8	35.8	43.8	14.9	27.0	--	1568
* 1964	--	--	--	--	--	--	6.3	23.6	--	2171
* 1964	12.0	3.8	46.0	2.7	25.4	29.9	5.1	21.0	--	2471
** 1965	43.8	--	--	--	--	32.6	8.3	18.5	--	1200
** 1966	50.8	--	--	--	--	24.7	3.7	14.1	--	795
** 1967	11.7	4.3	58.6	3.3	25.0	34.3	15.8	23.5	--	575
1968	20.0	9.0	82.8	5.1	38.6	46.9	5.1	26.7	--	2661
*** 1969	17.4	--	--	--	--	42.8	--	29.7	--	705
1970	14.1	5.4	59.2	3.6	32.9	32.1	5.9	21.9	58	1586

* Varied count areas
** Lowlands only
*** 9A, 11, 12A, 12B, 18A, 18B

APPENDIX IV

Moose Harvest Age Structure of Female 1969-70 Season
February 19-22, 1970 - Subunit 15(A)

Age	Number	Percent
Calves	10	7.0
1	14	9.9
2	11	7.7
3	7	4.9
4	9	6.3
5	13	9.2
6	13	9.2
7	11	7.7
8	6	4.2
9	9	6.3
10	10	7.0
11	9	6.3
12	8	5.6
13	6	4.2
14	2	1.4
15	2	1.4
16	0	0.0
17	2	1.4
Sample size - 142		

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 15(B) - Soldotna

Seasons and Bag Limits

Aug. 20 - Sept. 30 Nov. 1 - Nov. 20	One moose; 200 antlerless moose may be taken by permit only. Dates and conditions of the hunt will be described by Commissioner's announcement.

Harvest and Hunting Pressure

Harvest report returns indicate that during the regular 1969 season 119 bulls and 35 cows were taken in Subunit 15(B)(Appendix I). The known cow harvest during the February 19-22, 1970 hunt was 57. The minimum total harvest was therefore 176 moose.

Harvest data from the 1970 general hunt are not available at this time. Antlerless hunts were held in 15(B) East and 15(B) West December 16-20. Fifty-five cows, eight antlerless bulls and five female calves were taken in 15(B) East and 17 cows, five antlerless bulls and one female calf were taken in 15(B) West. Total harvest from 15(B) during this special season was 76 cows, 13 antlerless bulls and three female calves. Sixty-seven of the harvested cows were aged by the cementum annuli method; 29 percent were over 10 years old and 60 percent over six years old (Appendix II).

Composition and Productivity

Sex and age composition counts conducted in 1970 continued to show a relatively high bull/cow ratio, 37.8 bulls/100 cows, and very low calf production, 14.5 calves/100 cows (Appendices IV, V). Survival as indicated by small bulls/100 cows was low at 3.2.

Age structure of the cow segment of the population as determined from teeth collected in the 1969 and 1970 antlerless hunts is presented in Appendices II and III. These data show a high percentage of animals in the older age categories, indicating a low rate of exploitation and a low rate of recruitment.

Management Summary and Conclusions

The level of harvest in 15(B) continues to be low although there is an upward trend. The bull/cow ratio appears to be relatively stable, while production and survival are low and show a downward trend.

Low production and survival along with a preponderance of old animals indicate this herd is not growing and may be decreasing. With only 9.4 percent of the herd in December being calves, it is improbable that survival is high enough to maintain the present population. With this low level of reproduction, a bull-only harvest could very rapidly change the bull/cow ratio in this unit. To maintain the trophy status of this population, it will be necessary to harvest as many cows as bulls.

Recommendations

It is recommended that 150 cows be harvested from 15(B) East and 50 cows from 15(B) West during a registration hunt coinciding with the regular bull season. A second special antlerless hunt should be held if the full quota is not approached during the regular season. These changes can be made administratively, with no changes in the regulations.

Submitted by: Paul A. LeRoux, Game Biologist III

APPENDIX I

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

Year	Season	Bulls	Cows	Unid.	Total	Hunters	Percent Success
1965	1st	*	0	0	*		
	2nd	*	193	0	*		
	Comb.**	183	193	0	376	*	*
1966	1st	60	26	0	86		
	2nd	56	0	0	56		
	Comb.	119	26	0	145	*	*
1967	1st	51	0	0	51		
	2nd	18	0	0	18		
	Comb.	69	0	0	69	233	30
1968	1st	67	5	0	72		
	2nd	35	0	0	35		
	Comb.	108	6	2	116	282	41
1969	1st	*	*	*	*		
	2nd	*	*	*	*		
	Ant.***	28	54	0	82		
	Comb.	119	57	0	176	*	*
1970	1st	*	*	*	*	*	*
	2nd	*	*	*	*	*	*
	Ant.***	13	76	0	89	*	*
	Comb.	*	*	*	*	*	*

* Data not available
** Combined
*** Antlerless

Total of first and second seasons may be less than for combined seasons because of inclusion of animals for which date of kill was not given.

APPENDIX II

Cow Moose Harvest Age Structure 1970-71 Season December 16-20 - Subunit 15(B).

Age	Number	Percent
Calf	7	10.5
1	7	10.5
2	7	10.5
3	4	6.0
4	1	1.5
5	5	7.5
6	3	4.5
7	8	12.0
8	4	6.0
9	3	4.5
10	3	4.5
11	3	4.5
12	1	1.5
13	4	6.0
14	5	7.5
15	1	1.5
16	1	1.5
Sample size - 67		

APPENDIX III

Cow Moose Age Structure 1969-70 Season February 19-22, 1970 - Subunit 15(B).

Age	Number	Percent
Calf	5	10
1	5	10
2	6	12
3	5	10
4	6	12
5	4	8
6	0	0
7	0	0
8	1	2
9	3	6
10	3	6
11	5	10
12	1	2
13	1	2
14	1	2
15	2	4
16	1	2
17	1	2
Sample size - 50		

APPENDIX IV

Moose Sex and Age Composition - Subunit 15(B).

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	Count Time Hours	Moose per Hour
12/3-21/62	377	61	438	673	317	28	1018	1456	2	375	1	1832	-	-
1963	NO COUNTS MADE													
12/64	337	46	383	690	166	10	866	1249	1	187	0	1437	22	65
1965	NO COUNTS MADE													
1966	NO COUNTS MADE													
1967	NO COUNTS MADE													
1968	NO COUNTS MADE													
1969	NO COUNTS MADE													
12/2-4/70 & 12/12/70	184	17	201	455	75	2	531	732	0	77	5	817	10.4	78.6

APPENDIX V

Moose Sex and Age Ratios - Subunit 15(B).

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 FF w/calf	Calf % in Herd	Animals per Hour	Total Sample
1962	43.0	6.0	16.2	3.3	32.5	36.9	8.1	20.4	--	1832
1963	NO COUNTS MADE									
1964	44.2	5.3	13.7	3.2	52.0	21.6	5.7	13.0	65	1437
1965	NO COUNTS MADE									
1966	NO COUNTS MADE									
1967	28.8	3.5	13.8	2.4	44.0	15.8	2.0	10.9	--	457
1968	NO COUNTS MADE									
1969	NO COUNTS MADE									
1970	37.8	3.2	9.2	2.1	47.2	14.5	2.6	9.4	78.6	817

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 15(C) - Homer

Seasons and Bag Limits

Aug. 20 - Sept. 30 Nov. 1 - Nov. 20	One moose; 250 antlerless moose may be taken by permit only. Dates and conditions of the hunt will be described by Commissioner's announcement.

Harvest and Hunting Pressure

Harvest data for the 1970 general hunt are not available at this time. Harvest report returns from 1969 indicate a harvest of 420 bulls and 98 cows (Appendix I). The known cow harvest is 109 and the bull kill is believed to be higher than indicated by harvest report returns due to a waiver of the harvest report requirement during the first week of the season. The 1969 male harvest as indicated by harvest report returns, was the highest since 1964.

During the 1970 antlerless season, held from August 20 to September 30, 250 permit holders harvested approximately 65 antlerless moose. The low level of harvest was expected because of the limited number of hunters and the early season.

Age structures of the 1969 and 1970 female harvests were very similar (Appendix II). Approximately 40 percent of the cows in both years were over 8 years old while in contrast, none of the bulls in the 1970 sample were over 8 years old.

Composition and Productivity

Sex and age composition counts conducted in 1970 prior to the November season, showed 20.4 bulls/100 cows and 24.3 calves/100 cows. The bull:cow ratio outside of the Kenai National Moose Range was 8.6 bulls/100 cows. Calf production has declined from 40.1 calves/100 cows in 1968 to 27.9 in 1969 and to 24.3 in 1970.

Management Summary and Conclusions

The 1969 bull harvest, one of the best on record, followed a trend of increasing harvest, which started in 1965. The increased bull harvest paralleled a similar trend of increased calf production that appears to have ended in 1968. A decline in the bull harvest in 1970 should result from lower calf production in 1969. Another drop in the bull harvest should appear in 1971 as the result of another decline in calf production in 1970. Because yearlings comprise a large part of the bull harvest (25 percent in 1970) changes in production are reflected in the following year's bull harvest.

Bull:cow ratios appear to have remained relatively stable over the past five years, although ratios outside the Kenai National Moose Range are low. An effort should be made to raise the bull:cow ratio.

Since declines in calf production and survival are signs of excessive competition on the winter range, an increased harvest is indicated; and since the maximum number of bulls is already being harvested annually, an increase in the harvest of females is needed. A harvest of both males and females, in numbers equal to the annual increment, should improve production.

The female age data (Appendix II) show an outstanding cohort, the 4-year class in 1969 and the 5-year age class in 1970. This cohort is from calves born in 1965 and represents the expected response to the large 1964 harvest of 807 moose (of which 337 were cows).

Recommendations

The full quota of 250 antlerless moose should be harvested in 1971. To assure this harvest, the hunt should be managed on a registration permit basis. The season should coincide with the regular bull season and be closed by field announcement when 250 antlerless moose have been taken. Should the full quota not be taken during the regular season a special second season should be held.

Submitted by: Paul A. LeRoux, Game Biologist III

APPENDIX I

Moose Harvest and Hunting Pressure - Subunit 15(C).

Year	Season	Bulls	Cows	Unid.	Total	Hunters	Percent Success
1965	1st	*	2	0	*		
	2nd	*	2	0	*		
	Comb.**	248	224	0	472	*	*
1966	1st	156	68	0	224		
	2nd	**	0	0	88		
	Comb.	248	68	0	316	*	*
1967	1st	187	0	0	187		
	2nd	81	0	0	81		
	Comb.	268	0	0	268	643	42
1968	1st	227	19	0	246		
	2nd	157	0	0	157		
	Comb.	404	20	5	429	972	44
1969	1st	*	*	*	*		
	2nd	*	*	*	*		
	Ant.***	19	109	0	128	*	*
	Comb.	420	109	0	529	*	*
1970	1st	*	*	*	*	*	*
	2nd	*	*	*	*	*	*
	Ant.***	0	65****	0	65****	*	26
	Comb.	*	*	*	*	*	*
5 year average 1965-1970							

* Data not available
** Combined
*** Antlerless Season
**** Preliminary Data

Total of first and second seasons may be less than for combined seasons because of inclusions of animals for which date of kill was not given.

APPENDIX II

Age Structure of Moose Harvest, 1969 and 1970 - Subunit 15(C).

1969 Antlerless Harvest - February 19-22, 1970

Age	Female Number	Percent
Calf	4	3.9
1	9	8.8
2	5	4.9
3	7	6.9
4	16	15.7
5	8	7.8
6	7	6.9
7	8	7.8
8	8	7.8
9	6	5.9
10	6	5.9
11	3	2.9
12	2	2.0
13	3	2.9
14	4	3.9
15	3	2.9
16	3	2.9

Sample size - 102

1970 Harvest - August 20 - September 30, 1970

Male			Female		
Age	Number	Percent	Age	Number	Percent
Calf	1	2.3	Calf	0	0
1	11	25.0	1	6	11.5
2	9	20.5	2	2	3.8
3	6	13.6	3	2	3.8
4	10	22.7	4	3	5.8
5	4	9.1	5	10	19.2
6	0	0	6	6	11.5
7	1	2.3	7	3	5.8
8	2	4.5	8	2	3.8
9	0	0	9	1	1.9
10	0	0	10	5	9.6
11	0	0	11	3	5.8
12	0	0	12	3	5.8
13	0	0	13	4	7.7
14	0	0	14	2	3.8
15	0	0	15	0	0

Sample size - 44

Sample size - 52

APPENDIX III

Moose Sex and Age Composition - Subunit 15(C).

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	Count Time (Hrs.)	Moose per Hour
12/8-17/64	97	52	149	323	336	7	665	1487	-	361	673	1848	-	52
11/30/65 12/17/65	265	112	377	824	313	20	1158	1538	12	361	3	1899	33.08	57
12/20-29/66	57	34	91	384	147	7	538	629	4	165	13	794	13.0	64
10/24-28/67	277	127	404	1196	641	50	1887	2291	6	747	0	3038	19.0	160
11/68	170	71	241	738	404	30	1172	1413	6	470	0	1883	31.0	
12/11-13/69	83	73	156	826	278	17	1121	1277	1	313	46	1636	30.3	53.6
11/1-3/70	235	45	280	1051	306	13	1370	1650	1	333	9	1992	13.2	150

APPENDIX IV

Moose Sex and Age Ratios - Subunit 15(C).

Year	Total MM per 100 FF	Sm. 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
1964	22.4	7.8	53.6	2.8	5.6	24.3	2.1	19.5	52.0	1848
1965	32.6	9.7	42.3	5.9	62.5	31.2	6.0	19.0	57.0	1889
1966	16.9	6.3	59.6	4.3	41.0	30.7	4.5	20.8	61.0	794
1967	21.0	6.6	46.0	4.2	34.0	40.0	14.0	25.6	150.0	3038
1968	20.5	6.1	41.8	3.8	30.2	40.1	6.9	25.0	60.5	1883
1969	13.9	6.5	88.0	4.5	46.5	27.9	5.8	19.1	53.6	1636
1970	20.4	3.3	25.1	2.3	27.1	24.3	4.1	16.8	150.0	1992

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 16 - West Side of Cook Inlet

Seasons and Bag Limits

Aug. 20 - Sept. 30	One moose; provided that
Nov. 1 - Nov. 30	antlerless moose may be taken only from Nov. 21 - Nov. 30.

Harvest and Hunting Pressure

Harvest report data from 1970 are not available. The 1969 IBM data are presented in Appendix I, and show that 252 bulls were taken during the first season and 183 bulls were taken during the second season.

When kill locations are plotted on a map of Unit 16 they show that hunting pressure is uniformly distributed throughout the lowlands of the unit. The most frequently used hunting technique is aircraft, and the areas utilized most heavily include lakes and bush airstrips. The only exception to this hunter distribution is in the Petersville area, which can be entered by road vehicles via the new highway to Fairbanks and the gravel road to Peters Creek and Petersville.

The antlerless season which took place between November 21 and November 30, 1969 produced a total of 167 female moose according to harvest report returns. In 1970 the Petersville area was monitored by a hunter checking station located at the Big Susitna River Bridge on the border of Unit 16. A total of 212 moose was checked through the station, 138 of these were females and 74 were males. Of the 29 calves taken, 17 were females and 12 were males.

Composition and Productivity

The age structure of moose taken during the 1970 antlerless hunt is presented in Appendix II. Twenty-eight percent of the total female harvest examined for age was six years old or older. If calves are excluded, 47% of the adult female harvest was six years old or older, indicating the harvest has not attained proportions detrimental to herd security. In the 1969 Petersville hunt, 44% of the total female harvest were six years old or older, and 48% of the adult females (excluding calves) harvested were six years old or older.

Poor weather prevented completion of composition counts in Unit 16. The Mt. Susitna-Mt. Beluga trend area produced 175 moose before weather forced participants to terminate the survey (Appendix III). Comparison of results of this survey with those of the 1968 survey (Appendix IV)

shows an increase in the bull ratio from 48 bulls/100 cows to 65 bulls/100 cows and an elevated calf ratio from 18 calves/100 cows to 31 calves/100 cows. The small sample size must be considered when interpreting these data.

Weather prevented completion of the composition count in the Kahiltna-Peters Hills area in 1970 and only the Kahiltna portion was surveyed. In 1967, the bulls/100 cows ratio was 26, in 1968 it was 27, and in 1970 the ratio was 25, indicating very little change. The calf/cow ratio in the same area has gone from 40/100 in 1967 to 53/100 in 1970, presumably due in part to increased harvest of both sexes which reduced competition on the range and resulted in higher survival.

Management Summary and Conclusions

Harvest and herd composition data reveal that Unit 16 is capable of sustaining a larger moose harvest. Lack of road access restricts hunting to aircraft for the most part, and the harvest is generally well spread out. An exception is the Petersville Road area which is monitored during the antlerless season by a hunter check station. Data collected at this station reveal little cause to be restrictive in a regulatory sense at this time. Current regulations are adequate, but the Petersville Road area must be monitored closely in the future.

Recommendations

No change in season or bag limits at this time.

Submitted by: Jack C. Didrickson, Game Biologist III

APPENDIX I

Moose Harvest and Hunting Pressure - Unit 16 - West Side of Cook Inlet.

Year	Season	Bulls	Cows	Unid.	Total	Hunters	Percent Success
1966	First	162	1	3	166		
	Second	210	0	14	224		
	Antlerless	0	134	0	134		
	Unk. Date	21	9	1	31		
TOTAL		393	144	18	555	826	67.2
1967	First	168	0	1	169		
	Second	97	0	0	97		
	Antlerless*	0	0	0	0		
	Unk. Date	16	0	0	16		
TOTAL		281	0	1	282	505	56.0
1968	First	227	0	0	227		
	Second	183	0	0	183		
	Antlerless	0	39	0	39		
	Unk. Date	22	7	9	38		
TOTAL		432	46	9	487	860	57.0
1969	First	252	0	5	257		
	Second	183	0	1	184		
	Antlerless	0	123	0	123		
	Unk. Date	180	44	1	225		
TOTAL		615	167	7	789	1366	58.0
1970	First						
	Second						
	Antlerless	F I N A L R U N N O T A V A I L A B L E					
	Unk. Date						
TOTAL							

* Cancelled

APPENDIX II

Game Management Unit 16 - West Side of Cook Inlet

Numbers and Percentages of Animals in Each Age Class, Petersville Road Check Station, November 21 - 30, 1970.

Age	Number Females	% Sample	Number Males	% Sample
Calf	12	10.7	17	32.3
1+	8	7.1	5	9.5
2+	20	17.8	12	22.8
3+	13	11.6	5	9.5
4+	6	5.3	4	7.6
5+	5	4.5	4	7.6
6+	7	6.2	2	3.8
7+	6	5.3	1	1.9
8+	4	3.6	1	1.9
9+	7	6.2	0	0
10+	4	3.6	1	1.9
11+	5	4.5	0	0
12+	2	1.8	0	0
13+	4	3.6	0	0
14+	1	.9	0	0
15+	5	4.5	0	0
16+	0	0	0	0
17+	2	1.8	0	0
18+	1	.9	0	0
19+	0	0	0	0
Known Age	112	99.9%	52	98.8%
Unknown Age	26			
Total	138		74 = Combined Total	212

APPENDIX III

Moose Sex and Age Composition - Unit 16.

Year	Area	Large MM	Small MM	Total MM	FF W/0	FF W/1	FF W/2	Total FF	Total FF	Lone Calves	Total Calves	Unid. Sex & Age	Total Sample	Count Time (hrs.)	Moose Per Hour
12/4-6 1967	#6 Peters Hills to Kahiltna	121	52	173	443	205	31	679	852	2	269	0	1121	8.9	126.0
	Yentna	34	15	49	41	10	7	58	107	0	24	0	131	1.1	119.1
1967 TOTAL		155	67	222	484	215	38	737	959	2	293	0	1252	10.0	125.2
12/9-20 1967	Mt. Susitna Mt. Beluga	105	19	124	191	64	3	258	382	0	70	5	457	8.5	60
	Peters Hills	55	27	82	198	94	7	299	381	5	113	2	496	6.4	77
	Petersville Road	5	5	10	27	21	3	51	61	0	27	3	91	3.7	25
1968 TOTAL		165	51	216	416	179	13	608	824	5	210	10	1044	18.6	56
1970 12/11	Mt. Susitna Mt. Beluga	49	9	58	64	22	3	89	147	0	28	0	175	2.05	85.4
11/22-23	Kahiltna	39	28	67	142	115	16	273	340	0	147	0	488	7.4	65.9
1970 TOTAL		88	37	125	206	137	19	362	487	0	175	0	663	9.45	70.15

APPENDIX IV

Moose Sex and Age Ratios - Unit 16.

Year	Area	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 FF w/calf	Calf % in Herd	Moose per Hour	Total Sample
12/4-6 1967	#6 Peters Hill to Kahiltna	25.5	7.7	43.0	4.6	38.7	39.6	13.1	24.0	126	1121
	Yentna	84.5	25.9	44.1	11.5	125.0	41.4	41.2	18.3	119	131
1967 TOTAL		30.1	9.1	43.2	5.4	45.9	39.8	15.0	23.4	125.2	1252
12/9-20 1968	Mt. Susitna-Mt. Beluga	48.1	7.4	18.1	4.2	54.3	18.3	4.5	15.3	60	4
	Peters Hills	27.4	9.0	49.1	5.4	47.8	37.8	6.9	22.8	77	496
	Petersville Road	19.6	9.8	100.0	5.5	37.0	52.9	12.5	29.7	25	91
1968 TOTAL		35.5	8.4	30.9	4.9	48.6	34.5	6.8	20.1	56	1044
1970 12/1	Mt. Susitna-Mt. Beluga	65.2	10.1	18.4	5.1	64.3	31.5	12.0	16.0	85.4	175
11/22-23	Kahitna	24.5	10.3	71.8	5.7	38.0	53.8	12.2	30.1	65.9	488
1970 TOTAL		34.5	10.2	42.0	5.6	42.3	48.3	12.17	26.4	70.15	663

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 17 - Bristol Bay

Seasons and Bag Limits

Aug. 20 - Dec. 31 One bull

Harvest and Hunting Pressure

Final harvest data for 1970 are not yet available. The reported 1969 harvest was 15 moose, down significantly from previous years (Appendix I). Whether this represents an actual decrease in kill or is due to nonreporting is not known. It is believed many animals are not reported by native hunters.

Management Summary and Conclusions

To date, no work has been directed at the moose in Unit 17. Moose are not abundant in the area, and those animals near outlying villages are subjected to heavy hunting pressure. The reported taking of a new number one Boone and Crockett record moose in 1970 may direct additional trophy hunting into the unit in the future.

Recommendations

No changes in season or bag limits are recommended.

Submitted by: James B. Faro, Game Biologist III

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	1		38	77	49.0
1968	45	1		46	66	69.7
1969	11	1	3	15	31	48.4
1970	F I N A L R U N N O T A V A I L A B L E					

* No legal cow season has been held.

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 18 - Yukon - Kuskokwim Delta

Seasons and Bag Limits

Aug. 20 - Sept. 30	One bull

Harvest and Hunting Pressure

The reported harvest in Unit 18 was seven moose in 1970. Compliance with the harvest ticket program remains at a low level. No effort has been expended to encourage increased use of harvest tickets in Unit 18. Moose hunting in most of Unit 18 is incidental subsistence hunting. However, varying numbers of people on the Kuskokwim River and Yukon River travel upstream by boat to hunt moose. Aircraft hunting in Units 19 and 21 or the upper part of Unit 18 by hunters from Bethel remains popular. The actual harvest in Unit 18 is probably between 100 and 150 animals annually.

Composition and Productivity

No data have been gathered. Incidental reports of distribution have been recorded.

Management Summary and Conclusions

Voluntary reporting of harvest via harvest tickets appears to be at a low ebb. Personal contact is needed to aid the situation.

No change in present regulations has been proposed. The distribution of moose varies somewhat from year to year, and the pattern of incidental use varies correspondingly. The pattern of use is not considered to be detrimental to the moose populations.

Submitted by: Richard H. Bishop, Game Biologist

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 19 - McGrath

Seasons and Bag Limits

August 20 - February 28	Two moose, only one of which may be antlerless (antlerless moose may not be taken prior to October 1).

Harvest and Hunting Pressure

The preliminary reported 1970-71 moose harvest for Unit 19 was 120 males, 24 females, or a total of 148 moose.

Hunting pressure, in general, was light, except in the vicinity of villages. Throughout most of Unit 19 the winter snowfall was unusually deep (three to four feet). Approximately two feet fell in late November and early December, which precipitated an early movement of moose from the hills to the river habitat. The moose stayed on the rivers until late March when they began to drift back into timbered areas. As a result, moose were accessible and the harvest during the winter season was considerably greater than it has been in many years.

The harvest in the McGrath area was approximately 65 to 75 moose. Among 56 jaws collected the sex ratio was essentially 50:50. There may have been a bias favoring collection of jaws from females, but the kill was more nearly equal in proportion than in most areas.

Although the harvest was about twice the usual harvest in the McGrath area it was not sufficient to be detrimental to the population.

With the possible exception of McGrath and Nikolai, the use of harvest tickets has not improved in Unit 19.

Composition and Productivity

Moose composition counts were made in the Takotna River drainage and along the Kuskokwim River near McGrath.

In the Takotna drainage the bull:cow ratio (35:100) reflected the heavy local hunting pressure the area receives, although the beginning of antler drop may have depressed the ratio slightly. Calves composed a healthy 25 percent of the sample of 117 moose.

The Kuskokwim River count was done later, when antler loss was common. Therefore, the bull:cow ratio was not usable. Calves composed 17 percent of the sample of 201 moose, which is within the observed range of values for other lightly hunted populations.

Snow depths reached 24 inches by early December, 36 to 40 inches by early February, and depths of 24 to 36 inches persisted into early April. Some winter mortality occurred as a result. Additional mortality occurred due to a high population of wolves in most of Unit 19 and at least part of Unit 21. The moose population in both these areas was quite high and the combined effect of these mortality factors was probably beneficial.

Management Summary and Recommendations

The present season and bag limit is adequate for most families to obtain their meat supply. Most hunting in Unit 19 is for meat.

The extension of the season to February 28 adopted this year has been well received. The restriction on antlerless moose hunting could be removed with little effect except in a few local areas.

Submitted by: Richard H. Bishop, Game Biologist

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 20A - Tanana Flats

Seasons and Bag Limits

August 20 - November 30	One moose; bull moose may not be taken from October 1 - October 31

Harvest and Hunting Pressure

Based on harvest ticket returns, the 1969 moose harvest in 20A was 255 animals (181 males and 74 females), compared to a kill of 258 the previous season. Heavy hunting pressure early in the season is indicated by a harvest of 155 moose in the first 6 weeks of the season. Despite the establishment of a large airstrip by the military, access continues to be the main factor affecting the low harvest in this sub-unit. Early season hunting is limited to aircraft and river boat, preventing harvest of moose away from these access routes.

Composition and Productivity

Parturition counts conducted at the end of May 1970 indicated improved yearling survival (14-18% yearlings in the herd) compared to 11% in spring 1969. This upward trend in yearling survival is also indicated by a ratio of 34 yearlings:100 females. Fall composition counts revealed 29 calves: 100 females and a calf crop of 18%, compared to 42 calves:100 females and 21% calves in the herd in 1969. These data suggest that population growth may be leveling off despite good yearling survival the past 2 winters. The bull:cow ratio of 26 males per 100 females showed a marked decrease over the previous fall when 57 males per 100 females were found. This depressed bull:cow ratio appears to be a reflection of counting conditions rather than hunting pressure. Lateness of the survey could also have biased the yearling cohort data of the herd, as indicated by 4.5% of small bulls in the herd as compared to 6.9% in 1969.

Heavy losses to the calf crop during the winter of 1970-71 will undoubtedly affect calf survival in the moose herd in most of sub-unit 20A.

Management Summary and Recommendations

Harvest and composition data indicate the moose population in 20A is underharvested. Current data indicate the population may stabilize at the current level or even decrease under the effect of current severe winter weather. However, lack of road access has prevented increased harvest of the female segment of the population to the extent that the population has been close to the upper limits of range carrying capacity. Consequently, no changes in season or bag limits are recommended.

Submitted by: Mel Buchholtz, Game Biologist

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 20B - Fairbanks, Central Tanana

Seasons and Bag Limits

August 20 - September 30
November 1 - November 30 One bull

Harvest and Hunting Pressure

Harvest ticket returns indicate that 144 moose (133 males and 11 females) were taken in 1969. This compares to a harvest of 141 in 1968 and 94 in 1967. Extensive road systems (portions of the Steese, Elliott, and Nenana Highways) as well as rivers (Chena and Chatanika) provide easy access to most of this sub-unit surrounding Fairbanks.

Composition and Productivity

Extensive surveys in the Chena and Chatanika drainages were initiated in the fall of 1970. These counts reveal the effect of hunting an easily accessible area on the bull:cow ratio (18 males per 100 females) compared to the ratio (44 males per 100 females) in an inaccessible portion of 20B. However, productivity and survival on both areas indicate a healthy moose population. Yearling survival is good, as indicated by a 9% yearling bull segment of the herd in the accessible portion, and 10% in the inaccessible areas. Calf production was also adequate, as indicated by a calf crop of 24% in the accessible areas, and 20% in the inaccessible, combined with 34-36 calves per 100 females.

Management Summary and Recommendations

The depressed bull:cow ratio in portions of 20B indicates moderate hunting pressure on the male segment of the herd. However, the current level of harvest has not affected production in the accessible areas. The large bull:cow ratio in the remote areas of 20B reflects the under-harvest of moose in the area. Access into these areas would be desirable to increase the moose harvest and maintain productivity. Utilization of the female segment of the herd should be encouraged, possibly to the issuance of antlerless permits, or a limited cow season.

Submitted by: Mel Buchholtz, Game Biologist

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 20C - Tok, Upper Tanana

Seasons and Bag Limits

Aug. 20 - Sept. 30	One bull
Nov. 1 - Nov. 30	
Sept. 28 - Oct. 4	One anterless moose

Harvest and Hunting Pressure

Harvest ticket returns indicate 692 moose (553 males, 136 females, 3 unknown) were harvested in 1969. This figure shows a slight increase over the 1968 harvest of 585, and 533 in 1967. Hunting pressure is concentrated along major road systems in the area, namely Nenana, Steese and Taylor highways. Some areas receive a fair amount of pressure from river boat and off-road vehicles; however, much of the subunit is inaccessible and difficult to hunt.

Composition and Productivity

Sex and age composition counts conducted along the Taylor Highway during November, 1970, revealed a calf:cow ratio of 25:100 females. This compares with the past four-year average of 17 calves:100 females. Calf percentage in the herd has increased to 15% from the four-year average of 9%. Total population figures appear to be substantially unchanged.

Data collected in the Healy area in western 20C indicate a bull:cow ratio of 28:100, 23 calves per 100 females, and a 15% calf crop in the herd. These data represent a lower bull:cow ratio than revealed in 1966 surveys (65 males per 100 females), reflecting either a depressed bull: cow ratio due to excessive hunting of males, or errors inherent in late season counting. Productivity is adequate and shows an increase from 1966 counts which reflected heavy calf losses from a severe winter.

Composition counts conducted in the Delta area in central 20C indicate a bull:cow ratio of 22 males per 100 females, 20 calves per 100 females, and a calf crop of 14%. Despite the rather low calf production figure of 20:100 females, a relatively high incidence of yearling age-class bulls (9 males per 100 females) appeared in the survey, indicating good survival of the 1969 cohort.

Management Summary and Recommendations

Although road and river systems provide hunter access near population centers, it is of a limited nature in terms of total area in the Delta and Tok areas. In addition, much of central and eastern 20C is marginal moose habitat characterized by climax spruce forest, and low moose densities. These factors, combined with the low bull:cow ratios indicate that continued harvest of the female segment is necessary for proper herd management. No changes in seasons or bag limits are recommended except in the immediate Delta Junction area.

Submitted by: Mel Buchholtz, Game Biologist
Larry Jennings, Game Biologist

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 21 - Middle Yukon

Seasons and Bag Limits

August 20 - February 28	Two moose, only one of which may be antlerless

Harvest and Hunting Pressure

The preliminary reported harvest was 81 males, 26 females and five sex unknown moose, a total of 112 moose. The actual harvest probably was on the order of two to three times this figure.

Aside from a few areas receiving pressure from Bethel hunters, most hunting is subsistence hunting by residents of villages. Much of the unit is unhunted. A marked increase in the number of Fairbanks hunters traveling to the Nowitna River was reported by residents of Ruby.

Composition and Productivity

No surveys were done in Unit 21 this year. Moose were generally abundant according to casual observations and reports. Very deep snow, from three to five feet, caused considerable winter mortality in the Koyukuk to Tanana area, and to some extent downriver as well, according to reports from residents on the Yukon.

Management Summary and Recommendations

The extension of the moose season to end February 28 was generally well received, although as in Unit 19, it did not materially affect voluntary reporting. The present restriction on antlerless moose could be removed without ill effect.

Submitted by: Richard H. Bishop, Game Biologist

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 22 - Seward Peninsula

Seasons and Bag Limits

That portion consisting of the drainage of the Kuzitrin and Kruzgamepa (Pilgrim) River	Aug. 20 - Sept. 14	One bull
Remainder of Unit 22	Aug. 20 - Dec. 31	One bull

Harvest and Hunting Pressure

There were at least 30 bull moose taken from the Kuzitrin and Pilgrim River area during the short season. These bulls ranged from one five-year-old to 12 yearlings. Hunting pressure was relatively heavy, primarily concentrated along the local road systems. Harvest in the rest of the unit appeared to remain near normal.

Composition and Productivity

The first good winter moose counts were obtained this year in this unit. In March 1971, on the Kougarok River a total of 50 moose was counted, the Kuzirin had 56 moose and on the Pilgrim there were 36 moose, six of which were calves. Goodhope River contained 21 moose, seven of which were calves. There were possibly more than normal numbers of moose wintering on the major rivers due to the relatively heavy snow. Winter kill appears low.

In April a count on the Koyuk River from the junction of the East Fork to the junction of First Chance Creek revealed a total of 109 moose; 78 adults and 31 calves. Snow conditions in this segment of the river were relatively heavy (3 feet), but the animals appeared to be wintering in good condition. There have been no previous reliable counts conducted in this unit so that these counts will provide a basis for future surveys.

Management Summary and Recommendations

It appears that the moose in this unit have survived the winter in good condition. It is recommended that the bag limit and seasons remain unchanged.

Submitted by: Robert E. Pegau, Game Biologist

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 23 - Kotzebue Sound

Seasons and Bag Limits

Aug. 20 - Dec. 31 One moose

Harvest and Hunting Pressure

The annual reported harvest from 1963 to 1968 has been from 34 to 77 moose in this unit. Harvest tickets have not been a suitable means of determining the total harvest as several of the residents still have difficulty in accurately completing the harvest ticket. There was an early freezeup of most of the rivers in this unit and very likely the total moose harvest is down this year since it is in late fall that most of the residents like to obtain their moose with the aid of boats.

Composition and Productivity

No composition and productivity counts have been made in this unit. However, reports from air taxi operators and Departmental personnel indicate a sizable population of moose on the major river systems. Most people are reporting that there are more moose on the river systems than normally.

Management Summary and Recommendations

It appears that the moose population in this unit has managed to survive the winter in good condition. There have been several requests for an earlier opening of the bull season to allow the taking of a source of meat when traditionally fresh meat is available. It is recommended that the bull season open on August 1 and the cow season open September 1. The bag limit should remain one moose.

Submitted by: Robert E. Pegau, Game Biologist

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 24 - Koyukuk

Seasons and Bag Limits

August 20 - December 31	2 Moose; only one of which may be antlerless

Harvest and Hunting Pressure

Harvest ticket returns for the 1969 season indicate that the moose harvest increased from 44 in 1968 to 71 (59 males and 12 females) in 1969. Harvest ticket returns in this remote unit are not a reliable measure of the moose harvest; however, the small reported kill is well below the annual increment of the moose herd in this unit.

Composition and Productivity

No composition or productivity data are available for the moose population in Game Management Unit 24.

Management Summary and Recommendations

The reported harvest of moose in Game Management Unit 24 is not adversely affecting the moose population. No changes in season or bag limit are recommended.

Submitted by: Mel Buchholtz, Game Biologist

MOOSE

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 25 - Fort Yukon

Seasons and Bag Limits

August 20 - December 31	2 Moose; only one of which may be antlerless

Harvest and Hunting Pressure

Harvest ticket returns for the 1969 season indicate that the moose harvest increased from 72 in 1968 to 108 (77 males and 31 females) in 1969. Harvest ticket returns in this remote unit are not a reliable measure of the moose harvest; however, the small reported kill is well below the annual increment of the moose herd in this unit.

Composition and Productivity

No composition or productivity information is available for the moose population in Game Management Unit 25.

Management Summary and Recommendations

The reported harvest of moose in Game Management Unit 25 is not adversely influencing the moose population. No changes in season or bag limit are recommended.

Submitted by: Mel Buchholtz, Game Biologist

ELK

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 8 - Kodiak and Adjacent Islands

Seasons and Bag Limits

Unit 8, Raspberry Island and that portion of Afognak Island southwest of a straight line between Cape Paramanof and Cape Kazakof	No open season
Remainder of Unit 8	One elk, by permit

Harvest and Hunting Pressure

Harvest statistics were obtained through a 73 percent return of 720 elk harvest permits issued to hunters during the 1970 season. Permits returned indicated a harvest of 15 females and 40 males. Seven additional unreported animals (3 males and 4 females) were located in the field. The reported number of hunters going afield (184) and the harvest (62) are the lowest since 1956. Hunter success was 34 percent with hunter effort averaging 7.5 days per elk. Sixty-five percent of the reporting permit holders did not hunt.

Composition and Productivity

The elk herds occupying the Malina Lake area, the Afognak Lake area and Raspberry Island increased slightly in numbers since 1969. The Afognak Lake area was opened to hunting in November when an additional 60 animals were found to be in the area. The Malina herd numbered 36 animals during August, which is a decline of 60 from the previous year. It is possible that an exchange of animals occurred between these two herds.

Reproduction was highest on Raspberry Island and lowest on Tonki Cape (Appendix I). The apparent low calf crop in the Afognak Lake herd is the result of counting the animals in November when calves were difficult to distinguish from adults.

Management Summary and Conclusions

Trend counts indicate slight increases in the Raspberry, Malina and Afognak herds. The Tonki herd appears near the 1969 level. A considerable portion of the Interior herd was missed during the 1969 survey. Trend information now indicates Interior elk numbers are continuing to increase.

Recommendations

Raspberry Island and the Malina Lake area should remain closed to hunting. Elk permit forms provide essential harvest information and their use should continue.

Submitted by: Jack E. Alexander, Game Biologist II

APPENDIX I

Elk Composition Counts Afognak Island, August, 1970

Herd	MM	%	FF	%	Calves No.	Calves %	Calves/ 100 Cow	Yearlings No.	Yearlings %	Yearlings /100 Cow	Total
Raspberry I.	8	21	9	24	7	18	88:100	14	37	--	38
Afognak Lake	6	6	48	49	18	19	38:100	24	25	50:100	96
Malina Lake	3	8	13	36	12	33	92:100	8	22	62:100	36
Duck Mt.	5	1	52	38	37	27	71:100	46	33	88:100	140
Interior	88	21	232	57	91	22	--	--	--	--	411
Tonki	15	14	67	65	21	20	--	--	--	--	103
	125	15	421	51	186	23	--	--	--	--	824
										Observed in Afognak Lake herd 11/70	60
										TOTAL	884

DEER

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 1 - Southeast Mainland

Seasons and Bag Limits

Aug. 1 - Dec. 31	Four deer; provided that antlerless deer may be taken only from Oct. 1 - Dec. 31.

Harvest and Hunting Pressure

Most deer in Unit 1 are found in Subunit 1A near Ketchikan. Few deer are taken in Subunit 1B near Juneau. The reported 1970 deer kill in Subunit 1A was 1520 (35% female) and in Subunit 1B, 320 (42% female). About 29 percent of the Southeastern deer harvest was taken in Unit 1. Ketchikan hunters averaged 52 percent success. The average hunter took 1.1 deer with an effort of 5.1 days per deer.

Composition and Productivity

Only one dead deer was located on eleven mortality transects. Its condition did not indicate death was from starving.

Fifty-five percent of the deer taken by hunters in Unit 1 were less than three years old. Fawns and three-year-olds were the dominant age classes.

Browse utilization indicated by surveys in eleven areas of Unit 1 averaged 35 percent; only about half of that observed in 1969.

Management Summary and Recommendations

The winter of 1969-70 was very mild, resulting in few winter deer losses in Unit 1. Winter losses in 1968-69 were lower in Unit 1A than most other units and the deer population appears rather stable. Hunter success and effort in 1970 were similar to those in 1969. No changes in seasons or bag limits are recommended.

Submitted by: Harry R. Merriam, Game Biologist IV

DEER

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 2 - Prince of Wales Island

Seasons and Bag Limits

Aug. 1 - Dec. 31	Four deer; provided that antlerless deer may be taken only from Oct. 1 - Dec. 31.

Harvest and Hunting Pressure

No large centers of population are in Unit 2; consequently few deer are taken by hunters. Most hunters are residents of Ketchikan or reside in logging camps and small villages within Unit 2. The reported 1970 deer kill in Unit 2 was 210 (40% female). Twelve percent of the deer taken by Ketchikan hunters were killed in Unit 2. The actual kill in Unit 2 was probably much higher than reported as residents are scattered and difficult to survey.

Composition and Productivity

No winter losses were observed on 16 mortality transects in Unit 2. No age composition data are available.

Browse use averaged 22 percent for the winter of 1969-70, ranging from a low of zero percent to a high of 48 percent. This use is much lower than average.

Management Summary and Recommendations

Unit 2 has always received little hunting pressure. Deer populations appear in good balance with habitat. Predation by wolves appears to control deer at a reasonable level. Winters are usually milder than in other units of Southeast Alaska and predation by wolves is a healthy influence. Liberal seasons and bag limits are recommended.

Submitted by: Harry R. Merriam, Game Biologist IV

DEER

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 3 - Petersburg-Wrangell Area

Seasons and Bag Limits

Mitkof Island only	Aug. 1 - Nov. 30	Two antlered deer
Remainder of Unit 3	Aug. 1 - Dec. 15	Four deer; provided antlerless deer may be taken only from Nov. 1 - Nov. 30.

Harvest and Hunting Pressure

Unit 3 is centrally located in Southeast Alaska. It attracts hunters from all areas, but the majority of deer are taken by Petersburg and Wrangell hunters. The reported 1970 deer kill in Unit 3 was only 350 deer, much lower than average. Hunter success was about 40 percent, the average hunter taking one deer with an effort of eight days per deer. Approximately 34 percent of the kill was female.

Composition and Productivity

Four dead deer were located on nine mortality transects in the Petersburg area; eight deer on eight transects near Wrangell. In every instance where long bones were available, the marrow was white-solid. The winter of 1969-70 was very mild and most losses cannot be attributed to starvation.

Fifty-four percent of the deer taken by hunters in Unit 3 were less than three years old. Yearlings were the dominant age class.

Winter deer use of browse species averaged only 13 percent in 1969-70, the lowest for many years. The highest uses were at St. John Bay on Zarembo Island (31%) and at Totem Bay on Kupreanof Island (30%).

Management Summary and Recommendations

The deer population in Unit 3 remains relatively low, but is slowly increasing. The low population is primarily the result of several rather severe winters which reached a climax in 1968-69, one of the most severe winters on record. Many residents feel both hunting and predation by wolves were major factors in reducing deer populations, but analyses of past records and current mortality data indicate the controlling factor on deer populations is winter weather condition. Hunting has never been a controlling factor on deer in Unit 3; however, public sentiment has prompted unnecessarily restrictive seasons and bag limits. The present

low deer population is giving over-utilized deer range the much needed opportunity to recover. A slow build-up of deer numbers would be beneficial. An August 1 - December 31 season with antlerless deer opening on October 1 is recommended for the entire unit. For the first time in many years, yearlings were the dominant age class in the deer harvest, indicating good fawn survival during the winter of 1969-70.

Submitted by: Harry R. Merriam, Game Biologist IV

DEER

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 4 - Admiralty, Baranof, Chichagof and Adjacent Islands

Seasons and Bag Limits

Aug. 1 - Dec. 31	Four deer; provided that antlerless deer may be taken only from Oct. 1 - Dec. 31.

Harvest and Hunting Pressure

There is more hunting pressure on deer in Unit 4 than in any other unit. Residents of Sitka and Juneau, as well as those in the smaller villages of Hoonah, Angoon, Pelican, and Tenakee (plus a few very small settlements and several logging camps) do most of their deer hunting in this area.

As usual, hunter success in Unit 4 in 1970 varied by location, with the lowest success rate (51%) occurring among Juneau hunters, Sitkans much higher at 78%, and the residents of small villages apparently enjoying the highest success ratio of all (in Hoonah, the only village sampled this year, 94% of hunters interviewed took at least one deer; on the basis of past results, it's almost certain that other villages did at least as well). The success rate for Juneau hunters actually is for all units in which they hunted; the ratio for those who hunted in Unit 4 may well be somewhat higher than the 51% given above.

The total calculated deer kill by Sitka and Juneau hunters in Unit 4 during 1970 was 4040 deer, of which 44% were females.

Composition and Productivity

No deer losses were recorded in Unit 4 during 1970.

Winter browse use in Unit 4 averaged a very low 12.3% in 1969-70. Plants in eleven plots on Admiralty Island showed an average use of 13.7%, five plots on Chichagof Island averaged 12.4%, and four plots on Baranof Island showed an average use of only 9.0%. The low utilization was a result of an extremely open winter, aided by winter deer losses a year previous which were the highest on record.

Management Summary and Recommendations

Deer populations in Unit 4, judging from hunter success figures, have made a good recovery from the high winter losses of 1968-69. The open winter of 1969-70 allowed a high proportion of fawns to survive, as is

attested by the fact that Sitka hunters took about 26% yearlings during the 1970 season. From the standpoint of range recovery, a slower population growth would be preferable. While hunting pressure is insufficient to do much toward slowing down an increase in the population, certainly the situation warrants making the seasons and bag limits as liberal as possible. An earlier opening of the doe season is recommended (preferably Sept. 1), and thought should be given to leaving some more inaccessible areas open through much of the winter and having the bag limit removed. The taking of additional deer from such areas would be beneficial. At least 75% of Unit 4 is rarely or never hunted. Sitka hunters, for example, took 55% of their deer within 25 miles of town, and over 75% from protected areas within easy small boat range.

Submitted by: Alan Courtright, Game Biologist III

DEER

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 6 - Prince William Sound

Seasons and Bag Limits

August 1 - December 31	Four deer; provided that antlerless deer may be taken only from September 15 - December 31.

Harvest and Hunting Pressure

1969 was the first year of harvest report data on deer. The indicated harvest for Unit 6 of 259 deer (58% males) by 314 reporting hunters was considerably lower than anticipated. The harvest report results for 1970 are not available at this time.

General harvest information obtained from interviewing 100 Cordova hunters indicated that the average hunter for 1970 took 1.2 deer with an effort of 2.5 days hunted for each deer taken (Appendix I). The general hunter success ratio was 54 percent. An estimated harvest of 744 deer (59 percent bucks) was taken during an estimated 1,836 days of hunting by local sportsmen. Estimated harvests since 1964 are presented in Appendix II.

Composition and Productivity

Age data from hunter harvested deer indicate fawn and yearling survival through the winter of 1969-70 was excellent. It also confirmed the belief that a large die-off occurred, especially in fawns and older animals, during the severe winter of 1968-69 (Appendix III).

Alpine deer surveys were not completed this year because of weather, time and aircraft problems.

Winter browse utilization on Vaccinium from 10 range transects revealed mild usage, 30.2% for the winter of 1969-70. The average utilization is 61.2% for Prince William Sound.

Management Summary and Conclusions

Data collected during 1970 indicate that the Prince William Sound deer population is rebuilding nicely after the 1968-69 winter die-off. The lowered deer population allowed the range to build up but still provided fairly good hunting during 1970.

The present liberal hunting season and bag limits have not affected the recovery of this deer herd.

Recommendations

No change in the regulations is recommended.

Submitted by: Julius L. Reynolds, Game Biologist III

Appendix I. Questionnaire Results for Cordova Deer Harvest for 1970

	Sample	Estimate	Percentage
Sample	100	600	100%
Didn't Hunt	26	156	26%
Unsuccessful	20	120	20%
Successful Hunters	54	324	54%
Took 1 Deer	17	102	31.5%
Took 2 Deer	16	96	29.6%
Took 3 Deer	9	54	16.7%
Took 4 Deer	12	72	22.2%
Number of Males Taken	73	438	58.9%
Number of Females Taken	51	306	41.1%
Number Crippled and Lost	7	42	5.3%
Total Taken	124	744	100%
Number Taken on Mainland	10	60	8.1%
Number Taken on Hawkins Island	38	228	30.6%
Number Taken on Hinchinbrook Island	35	210	28.2%
Number Taken on Montague Island	32	192	25.8%
Other	9	54	7.3%
Number Taken in August	5	30	4.0%
Number Taken in September	26	156	21.0%
Number Taken in October	49	294	39.5%
Number Taken in November	36	216	29.0%
Number Taken in December	8	48	6.5%
Number of Days Hunted	306	1,836	100%

* There are approximately 600 license holders in Cordova, thus the sample of 100 was projected by 6.

Appendix II. Estimated Deer Harvest for Cordova, 1964-1970*

	Hunters	Total Harvest	Males	Females	Days per Deer
1964	580	870	496	374	2.6
1965	650	1,170	772	398	2.1
1966	600	858	534	324	2.3
1967	600	678	402	276	2.7
1968	600	1,062	606	456	2.0
1969		Interviews not conducted			
1970	600	744	438	306	2.5

* Data projected from Cordova hunter interviews.

APPENDIX III

1970 Sex and Age Composition of Hunter Harvested Deer - Unit 6.

Age	Males		Females	
	Number	Percent	Number	Percent
Fawn	3	6.7	4	14.8
1	33	73.3	13	48.2
2	1	2.2	1	3.7
3	4	8.9	5	18.5
4	3	6.7	1	3.7
5+	1	2.2	3	11.1
TOTAL	45	100	27	100

DEER

SURVEY-INVENTORY PROGRESS REPORT - 1970

Game Management Unit 8 - Kodiak and Adjacent Islands

Seasons and Bag Limits

Unit 8, drainages of Chiniak Bay and from Cape Chiniak to Sequel Point	August 1 - November 1 1 deer, either sex after October 1
Remainder of Unit 8	August 1 - December 31 4 deer

Harvest and Hunting Pressure

Deer harvest statistics were obtained through interviews with 20 percent of the 1970 license holders from Kodiak. The projected deer harvest from Unit 8 was 870 ± 112. Confidence intervals were computed at the 95 percent level. Hunters averaged 1.6 deer with an effort of 2.4 days per deer. Hunter success was 55 percent. Thirty-four percent of the total harvest came from Uganik Island and 32 percent from the Kodiak road system.

Composition and Productivity

No information available.

Management Summary and Conclusions

Deer populations appear higher than in 1969. This may be due in part to the mild nature of the previous winter.

The number of license holders in Unit 8 decreased 48 percent from the previous two seasons. A corresponding decrease in the number of hunters going afield was also noted. This factor probably contributed significantly to the annual decline in harvest levels.

Recommendations

No change in season or bag limit is recommended.

Submitted by: Jack E. Alexander, Game Biologist II