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ALASKA DEPARTMENT OF FISH AND GAME
JUNEAU, ALASKA

STATE OF ALASKA
Jay S. Hammond, Governor

DEPARTMENT OF FISH AND GAME
James W. Brooks, Commissioner

DIVISION OF GAME
Frank Jones, Director

ANNUAL REPORT OF SURVEY-INVENTORY ACTIVITIES
PART I. DEER, BROWN/GRIZZLY BEAR, SHEEP, BISON, ELK AND MUSKOXEN

Edited and compiled by
Donald E. McKnight, Research Chief

Volume V
Federal Aid in Wildlife Restoration
Project W-17-6, (July 1, 1973-June 30, 1974), Jobs No. 2,4,6,9,13,16 and 22

(Printed December 1974)

MEMORANDUM OF TRANSMITTAL

December 1974

TO: James W. Brooks, Commissioner
Alaska Department of Fish and Game

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

SUBJECT: Annual Report of Survey-Inventory Activities

Surveys and inventories include all routine data collections directed toward assessment of the status of game populations and the determination of allowable annual game harvests. These reports, which are written primarily by Area Management Biologists, provide information on the current status of Alaska's game populations and include, when applicable, recommended hunting regulation changes. Reported harvest data for most species are obtained from computerized analyses of harvest tickets (Job 22.0), and continuing aerial surveys provide the basis for assessment of population trends for most populations.

Information in these reports is presented by game species and management units in most instances. A brief summary of statewide harvests and population trends is provided. A map showing Alaska Game Management Unit boundaries has been included for those unfamiliar with these units.

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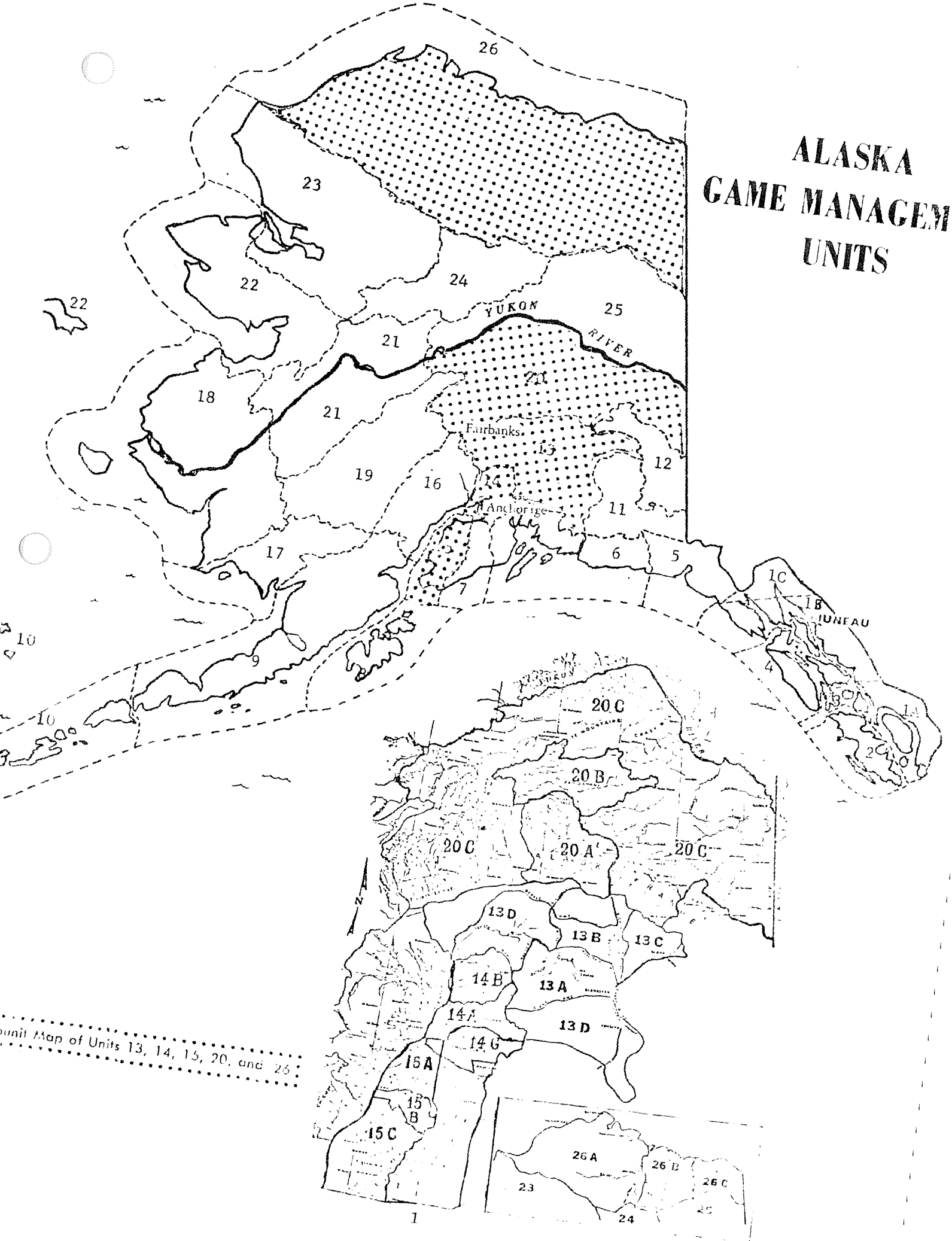
ALASKA GAME MANAGEMENT UNITS



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

STATEWIDE HARVESTS AND POPULATION STATUS

Brown/Grizzly Bear

The 1973 legal sport harvest of 913 brown/grizzly bears was the highest ever reported in Alaska and was 32 percent greater than the average harvest of the previous 10 years (692 bears/year). Guided nonresident hunters took 557 bears or 61 percent of the total harvest. The spring 1973 take was 366 bears, with the remaining 547 being harvested during the fall season. During 1973, 99 bears were harvested in Game Management Unit 4 (Admiralty, Baranof and Chichagof Islands), 155 were taken in GMU 8 (Kodiak and Afognak Islands) and 240 were harvested in GMU 9 (Alaska Peninsula). Collectively these three units contributed 54 percent of the total 1973 statewide brown/grizzly bear sport harvest. The 1973 Brooks Range (GMUs 23-26) sport harvest of 89 bears was 27 percent higher that the previous record high of 70 bears in 1970 and 48 percent higher than the 60-bear average for the 5-year period 1968-1972.

Alaska's brown/grizzly bear populations remained stable or showed moderate increases in 1973, despite increased harvests in some units.

Dall Sheep

The 1973 reported harvest of 1,119 Dall sheep was only slightly lower than the all-time high of 1,170 sheep taken in 1972. Overall hunting success was 35 percent, with 26 percent of resident hunters taking sheep and 69 percent of guided nonresidents being successful. Nonresident hunters took 464 sheep or 42 percent of the 1,092 animals for which residency of the hunter was known. The 1973 harvest in the Brooks Range was 242 sheep, a record high for that area although approximately the same as the 236 sheep taken in 1972. The Alaska Range west of McKinley Park, with a harvest of 119 animals, and the Wrangell-Mentasta-Nutzotin Mountains (363 sheep harvested) also produced record harvests during 1973. The recorded kill in the Chugach Mountains of 81 sheep was the lowest in the past seven years.

Statewide Dall sheep populations remained stable through 1973.

Sitka black-tailed deer

The 1973 deer harvest in Alaska, as determined from personal interviews of a sample of deer hunters, was approximately 9,700 animals. As in 1972, over half of the statewide harvest came from Game Management Unit 4 (Admiralty, Baranof and Chichagof Islands). Although Alaska's harvest was over twice as great in 1973 as it was in 1972 (4,500 animals), low deer populations and decreased hunting effort in parts of the state contributed to an annual harvest which was considerably lower than the long-term average.

Relatively mild winters (in terms of snow accumulation) in 1972-73 and 1973-74 resulted in major increases in deer herds on Kodiak Island and in portions of Southeastern Alaska. Populations in Prince William Sound and Game Management Unit 3 (Petersburg-Wrangell area) remained at low levels.

Elk

The 1973 harvest of only 18 elk was the same as the all-time low in 1972; refelcting light hunting pressure, low elk numbers and closures of several traditional hunting areas.

Relatively snow-free winters for several consecutive years have apparently reversed a downward trend in herd numbers.

Bison

In 1973 a registration hunt was held on the Copper River herd. Some 101 hunters registered for this hunt, harvesting 16 bison (7 bulls and 9 cows). No other herd was hunted during 1973.

The Copper River herd has apparently stabilized, but with no hunting in 1973 both the Delta and Farewell herds are showing upward trends in numbers. Twenty calves were born to the Farewell herd in 1972, bringing its size to about 75 animals. Aerial counts of the Delta herd indicated a population approaching 325 bison.

Muskoxen

Observations on the North Slope in 1973 indicated that muskoxen numbers there were approximately the same as in 1972 (35 animals). There were 6 calves in the area in 1973.

A group of 17 adult and 6 calf muskoxen was seen on the Seward Peninsula in June 1973 and another group of 11 adults and 2 calves was seen near Cape Dyer. These two bands have remained in the same general area for several years, and are beginning to produce more calves.

No new information was obtained from the Nunivak Island and Nelson Island herds.

DEM

1973

BROWN - GRIZZLY BEAR HARVEST

UNIT	RESIDENT			NON-RESIDENT			TOTAL						
	♂	♀	Unk	♂	♀	Unk	♂	♀	Unk	Total	% of Total	% Male	% Non-Res.
1	5	4	0	0	2	0	5	6	0	11	1.2	45	18
4	37	22	0	30	10	0	67	32	0	99	10.8	68	40
5	11	7	0	3	1	0	14	8	0	22	2.4	64	18
6	4	5	1	14	2	0	18	7	1	26	2.8	72	62
7	1	1	0	0	0	0	1	1	0	2	.2	50	0
8	38	27	0	48	42	0	86	69	0	155	17.0	55	58
9	33	26	0	104	72	5	137	98	5	240	26.3	58	75
10	1	2	0	0	0	0	1	2	0	3	.3	33	0
11	5	1	0	7	6	0	12	7	0	19	2.1	63	68
12	5	4	0	8	9	0	13	13	0	26	2.8	50	65
13	8	6	1	17	9	0	25	15	1	41	4.5	63	63
14	1	0	0	0	0	0	1	0	0	1	.1	100	0
15	1	2	0	2	1	0	3	3	0	6	.7	50	50
16	9	8	2	15	8	1	24	16	3	43	4.7	60	56
17	4	4	0	26	6	1	30	10	1	41	4.5	75	80
18	0	0	1	0	0	0	0	0	1	1	.1	0	0
19	5	5	2	35	10	1	40	15	3	58	6.4	73	79
20	16	7	0	3	2	1	19	9	1	29	3.2	68	21
21	0	0	0	0	0	0	0	0	0	0	0	0	0
22	1	0	0	0	0	0	1	0	0	1	.1	100	0
23	8	2	0	10	8	0	18	10	0	28	3.0	64	64
24	7	3	0	16	7	0	23	10	0	33	3.6	70	70
25	7	2	0	5	2	0	12	4	0	16	1.8	75	44
26	3	1	0	6	2	0	9	3	0	12	1.3	75	67
TOTAL	210	139	7	349	199	9	559	338	16	913	100	62	61

REPORTED KILL OF DALL SHEEP RAMS, NUMBERS OF HUNTERS AND SUCCESS OF HUNTERS FOR EIGHT MOUNTAIN AREAS IN ALASKA, 1971 THROUGH 1973, AS DERIVED FROM HARVEST REPORTS.

* "All Hunters" category is higher than resident/nonresident added due to inclusion of reports from those who did not note residency.

		ALL HUNTERS			RESIDENTS			NONRESIDENTS		
AREA	YEAR	Kill No.	Hunters	Success	Kill No.	Hunters	Success	Kill No.	Hunters	Success
Alaska Range E. of McKinley Pk. (ARE)	1971	230	712	32%	128	539	24%	90	129	70%
	1972	241	800	30%	155	638	24%	77	132	58%
	1973	187	622	30%	121	498	24%	64	100	64%
Alaska Range W. of McKinley Pk. (ARW)	1971	71	156	46%	28	80	35%	39	69	57%
	1972	71	124	57%	32	68	47%	34	50	68%
	1973	119	211	56%	53	112	47%	63	94	67%
Brooks Range (BRR)	1971	168	275	61%	84	165	51%	78	102	76%
	1972	236	347	68%	111	205	54%	114	127	90%
	1973	242	405	60%	135	258	52%	102	135	76%
Chugach Range (CRR)	1971	109	586	19%	70	518	14%	35	53	66%
	1972	112	470	24%	79	378	21%	25	43	58%
	1973	81	426	19%	49	362	13%	26	50	52%
Kenai Mountains (KMR)	1971	34	272	13%	31	251	12%	3	16	19%
	1972	36	221	16%	31	192	16%	5	15	33%
	1973	59	292	20%	52	268	19%	3	12	25%
Talkeetna-Chulitna Mtns. - Watana Cr. Hills (TCW)	1971	85	240	35%	39	178	22%	44	59	75%
	1972	81	304	27%	41	227	18%	34	61	56%
	1973	61	277	27%	39	232	17%	21	31	68%
Tanana Hills-White Mtns. (THW)	1971	15	43	35%	13	39	33%	1	2	50%
	1972	5	23	22%	4	20	20%	0	2	0%
	1973	3	33	9%	3	29	10%	0	3	0%
Wrangell-Mentasta-Nutzotin Mtns. (WMN)	1971	356	717	50%	200	498	40%	143	186	77%
	1972	350	684	51%	170	445	38%	162	198	82%
	1973	363	840	43%	175	569	31%	182	240	76%
Unknown (UNK)	1971	11	104	11%	4	78	5%	6	24	25%
	1972	3	103	3%	0	81	0%	1	15	6%
	1973	4	66	6%	1	50	2%	3	8	38%
All of Alaska (TOT)	1971	1,079	3,111	35%	597	2,350	25%	439	641	68%
	1972	1,170	3,125	37%	641	2,284	28%	468	660	71%
	1973	1,119	3,172	35%	628	2,378	26%	464	675	69%
Percent Return	1971	78%*								
	1972	75%*								
	1973	76%*								

* These figures would be higher if the cut-off date for receipt of reminder letters was extended; such action is not warranted since successful sheep hunters tend to report early.

Submitted by: Chuck Irvine, Game Biologist II

DEER

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Subunits 1A and 1B - Southeast Mainland, South from Cape Fanshaw

Seasons and Bag Limits

Subunit 1A	Sept. 1 - Nov. 30	Three deer, provided that only one may be antlerless and that antlerless deer may be taken only from Nov. 1 - Nov. 30
Subunit 1B	Sept. 1 - Nov. 30	One antlered deer

Harvest and Hunting Pressure

Hunter and harvest information was obtained from a personal hunter survey of 10 percent of the hunting license holders in Ketchikan, Petersburg and Wrangell. Ketchikan hunters took 100 percent of the deer killed in Subunit 1A and a Petersburg hunter took the one deer reported killed in Subunit 1B.

Seventy-six percent of the 200 license holders contacted in Ketchikan indicated they had hunted deer during the 1973 season and 32 percent of them reported killing one or more deer. The Subunit 1A harvest was calculated to be 828 deer, which is 81 percent of the 1,022 deer taken by all Ketchikan hunters. The average number of deer taken per hunter was 0.46.

Sex ratio of the kill was 28 percent does and 72 percent bucks.

Hunter success figures indicate a better deer population than was present in 1972. Hunting license sales for Ketchikan rose 10 percent from 1972 and the percentage of people who actually hunted deer rose from 64 percent in 1972 to 76 percent for 1973. The number of hunter days required to bag a deer dropped 50 percent from 13.6 in 1972 to 6.8 in 1973. The number of deer taken per hunter increased 49 percent over 1972.

Distribution of the harvest by month for Subunit 1A showed 9 percent occurred in September, 8 percent in October and 83 percent in November. The large percentage of the kill that occurred in November was due to the either-sex season and also a fairly heavy snowfall that moved the deer down to low elevations.

Composition and Productivity

Discussions with hunters and general observations indicated almost no yearling deer were taken during the 1973 hunting season. This supports a lack of fawns noted during the 1972 season. Hunters this year reported seeing many more fawns than during the previous year and fawn survival appears greatly improved over 1972.

Management Summary and Recommendations

Eight deer mortality transects were walked in April 1973 and only one dead deer was found. The winter of 1972-73 was mild, winter range was in excellent condition, deer numbers were low and the lack of winter mortality was predictable. These factors should have allowed good fawn survival, but the almost total absence of yearling deer taken during the 1973 season, and the fact that few fawns were seen during the 1972 season, indicated the fawn crop of 1972 either wasn't produced or suffered a high, early mortality. The winter of 1971-72 was quite severe and possibly the does were not capable of caring for newborn fawns in the spring of 1972.

Many fawns were reported during the 1973 season indicating a more normal production year and mortality transects walked in the spring of 1974 showed no significant winter kill. Range conditions were excellent on almost all winter range and prospects for a better deer population looked good.

Much of the better hunting during 1973 resulted from the excellent deer population on Gravina Island and the good hunting weather that occurred in November during the either-sex season. The better deer population and the ease of access caused a large shift in pressure from much of the area normally hunted and as a result, over half the deer taken in Subunit 1A came from Gravina Island.

PREPARED BY:

Robert E. Wood
Game Biologist III

SUBMITTED BY:

Harry Merriam
Regional Research/Management Coordinator

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Units 1C and 5 - Southeast Mainland, south from Cape Fairweather to Cape Fanshaw

Seasons and Bag Limits

Unit 1C	Aug. 1 - Nov. 30*	Four deer, provided that antlerless deer may be taken only from Nov. 1 - Nov. 30.
Unit 5	Aug. 1 - Dec. 31	Four deer, provided that antlerless deer may be taken only from Sept. 15- Dec. 31.

* The 1973 season was extended to Dec. 15 by emergency announcement.

Harvest and Hunting Pressure

Harvest data were obtained from a post-season personal interview of a 10 percent sample of Juneau hunting license holders. This method of obtaining harvest statistics has been used since 1959.

The 1973 Juneau survey revealed that of 257 license holders, 150 (58.4%) actually hunted for deer with 58 (38.7%) hunters bagging 116 deer. Extrapolated, these figures indicate there were 2,367 Juneau hunters harvesting 1,823 deer. Of the total estimated harvest, Unit 1C accounted for 337 deer (20.7%), while Unit 4 accounted for the remainder.

Sex ratio of the Juneau harvest, according to interviews, was 48 percent does and 52 percent bucks.

Juneau interview data indicate the 1973 deer populations were higher than during the 1972 season. Juneau hunters bagged more deer per hunter (.77) and spent fewer days in the field per deer killed (7.0) in 1973 than in 1972. Juneau hunters spent 12,761 days in pursuit of deer. Successful hunters, on the average, spent more days in the field (5.4) than did unsuccessful hunters (2.9).

General harvest statistics and chronology of the kill for Juneau hunters are depicted in Appendix I. Previous chronology data have indicated the kill dates are partially dependent upon late season snows which tend to concentrate deer at lower elevations. The 1973 season was apparently no different as 80.1 percent of the harvest occurred during November and December.

Specific harvest information for Unit 5 is not available. Harvest ticket returns for 1972 indicated that there were 19 hunters harvesting two deer. The 1973 harvest was probably similar.

Natural Mortality

An indication of deer winter mortality for Southeast Alaska is obtained annually by searching a large number of one-mile, beach fringe transects for deer kills. Unit 1C contains one such transect and although it represents an extremely small sample, it probably does indicate trends. Beach counts for the springs of 1973 and 1974 indicated one dead deer per mile for 1972-73 and two dead deer per mile for 1973-74. Examination of the carcasses indicated that the animals were old (6+ age class) but in fair physical condition. Total snowfall for 1972-73 was 131.4 inches while in 1973-74 it was 118.9 inches. These data indicate that mortality for the past two seasons has been relatively mild and deer populations should increase or at least remain stable for the 1974-75 season.

Management Summary and Recommendations

Deer populations in Southeast Alaska are regulated primarily by weather. Hunting, except in local areas, does not appear to be an important factor. Harvest figures indicate a higher deer population in 1973 than in 1972. Mortality and weather data suggest the 1974 deer populations will be equal to, or larger than, those of 1973. Since deer populations fluctuate with weather, and hunter harvest has no noticeable effect on population size, seasons and bag limits should be as liberal as is biologically feasible. In this regard, the 1974-75 season for Unit 1C was liberalized by the Fish and Game Board to run from August 1 to December 31 with taking of antlerless deer to be permitted only from September 16 to December 31. Unit 5 has had a liberal season for a number of years, therefore no changes are recommended at this time.

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APPENDIX I

1973 Juneau Deer Harvest Statistics
as Derived from Hunter Interviews

Year - 1973
Town - Juneau
Sample Size - 257
Total Actual Hunters = 150
Total Males Killed = 59
Total Females Killed = 57
Total Hunter Days = 812
Successful Hunter Day = 423
No. of Individual
Successful Hunters = 58

Chronology of Kill

Sex	Date of Kill													
	Aug.		Sept.		Oct.		Nov.		Dec.		Unk.		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Male	3	2.6	-	-	-	-	34	29.3	12	10.3	10	8.6	59	50.9
Female	-	-	-	-	6	5.2	34	29.3	13	11.2	4	3.5	57	49.1
Both Sexes	3	2.6	-	-	6	5.2	68	58.6	25	21.5	14	12.1	116	100.0

Prepared by: Warren Ballard, Game Biologist II

DEER

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 2 - Prince of Wales Island

Seasons and Bag Limits

Sept. 1 - Nov. 30	Three deer, provided that only one may be antlerless and that antlerless deer may be taken only from Nov. 1 - Nov. 30

Harvest and Hunting Pressure

Data concerning the deer harvest in Unit 2 are obtained from hunter contact surveys in towns outside the unit. None of the small villages and logging camps located within Unit 2 were surveyed, but all indications point to a low harvest in 1973. Ketchikan hunters took all of the 62 deer reported taken from Prince of Wales Island in 1973, which amounted to six percent of the deer taken by hunters from Ketchikan. Had all the Unit 2 villages and camps been surveyed, the reported kill would have been much higher.

Composition and Productivity

Both the winters of 1972-73 and 1973-74 were mild with no significant winter loss occurring. Fifteen one-mile-long beach transects were walked in the spring of 1973 and again in 1974. No dead deer were found following the 1972-73 winter and only one was found following the past winter. The deer population is low, range is in excellent condition and the wolf population appears to have declined considerably. These factors, coupled with light snow conditions, have led to essentially no winter mortality during the past two years.

Management Summary and Recommendations

Unit 2 has received fairly heavy hunting pressure in past years from Ketchikan hunters (when deer populations were high), but for the past few years, with the lowered number of deer, hunting effort expended on Prince of Wales Island has decreased. Hunting effort by people living in the unit probably remains fairly constant from year-to-year.

The 1974 season will once again allow August hunting and while this will provide opportunities to hunt the excellent alpine areas in Unit 2, it should not significantly change the hunting pressure or harvest.

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

PREPARED BY:

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Harry Merriam
Regional Research/Management Coordinator

DEER

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 3 - Petersburg, Wrangell area

Seasons and Bag Limits

Sept. 1 - Nov. 30	One antlered deer

Harvest and Hunting Pressure

Data on deer harvest and hunting pressure in Unit 3 were obtained from personal interviews of 10 percent of the licensed hunters in Wrangell and Petersburg.

Wrangell hunters killed a calculated 31 deer in Unit 3 in 1973, which was 25 percent of the total harvest by Wrangell hunters. None of the 80 hunters contacted in Petersburg took a deer in Unit 3. Both figures indicate the very low level of the deer population in this unit.

Thirty-five percent of the license holders from Wrangell and 58 percent of those from Petersburg actually hunted deer. Sixty-one percent of the hunting effort of Wrangell hunters was spent in Unit 3 while 23 percent of Petersburg's hunting effort was in Unit 3. Petersburg is relatively close to Admiralty Island, in Unit 4, which has a good deer population and more liberal season, and 96 percent of the deer taken by hunters from Petersburg came from Unit 4. Fifty-five percent of the hunting effort of Petersburg hunters was in Unit 4.

Composition and Productivity

Sixteen one-mile winter mortality transects were walked in the spring of 1973 and again in the spring of 1974. One wolf-killed but no winter-killed deer were found each year. Observations of browse use and other signs indicated a very low population in almost all areas.

Management Summary and Recommendations

Deer numbers in Unit 3 remained at a probable all-time low. Hunter success was very low and most hunters residing in Unit 3 were going to adjacent units with better deer populations for their hunting.

The 1974 season will be the same as 1973, and it will probably be several years before the people of Wrangell and Petersburg will consider any liberalization in seasons or bag limits.

PREPARED BY:

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SUBMITTED BY:

Harry Merriam
Regional Research/Management Coordinator

DEER

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 4 - Admiralty, Baranof, Chichagof and adjacent islands

Seasons and Bag Limits

Admiralty Island only	Aug. 1 - Nov. 30*	Four deer; provided that antlerless deer may be taken only from Nov. 1 - Nov. 30
Remainder of Unit 4	Aug. 1 - Nov. 30*	Four deer; provided that antlerless deer may be taken only from Oct. 1 - Nov. 30

*Season extended to December 15, 1973, except for Baranof Island, by Board action on November 30, 1973.

Harvest and Hunting Pressure

The annual, post-season hunter interviews conducted by contacting a random sample of hunting license holders indicated that Unit 4 deer hunters had excellent success in 1973. There were 1,206 hunting licenses sold in Sitka in 1973, the interviewers contacted 126 licensees for a 10.5 percent sample.

The sport/subsistence kill for Unit 4 was calculated to be about 7,000 animals. Kill by communities is shown in Appendix I. No hunter interviews were conducted in Hoonah, Tenakee, Elfin Cove, Port Alexander, Excursion Inlet, Hawk Inlet, Gustavus or the six active logging camps. Residents of Hoonah, Tenakee and the logging camps are known to be very active deer hunters, so the estimated kill from these communities is probably conservative. As a reflection of the importance of deer to the economy of some of the outlying communities, villagers of Angoon normally harvest 600-800 deer annually for their subsistence needs.

Sitka residents hunt primarily on Chichagof, Baranof and Kruzof Islands. Based on the 1973 hunter interview, the "average" Sitka hunter expended 3.5 days hunting effort per deer bagged. Of the 1,206 persons licensed to hunt in 1973, 1,014 or 84 percent actually hunted, hunter success was 68 percent. The average kill was 2.45 deer per hunter. Female deer accounted for 43 percent of the harvest. Fifty-nine percent of the harvest occurred during November when the weather was most favorable for hunting. As previously noted, the Fish and Game Board added a two-week extension to the regularly scheduled season. This was suggested by petitions from residents of Hoonah, Angoon and Juneau. Thirty-five percent of the 1973 harvest occured during this extension.

Juneau based hunters, who do most of their hunting in Unit 4, took 79.5 percent of their deer from Admiralty Island. They expended 7.0 days of hunting effort per deer bagged, averaged 0.77 deer per hunter and had 38.7 percent hunting success. The majority of their kill (58.6 %) occurred during November. Forty-nine percent of the harvest was females.

It should be noted that hunters from Juneau and Ketchikan have to expend considerable time and money to hunt on Admiralty Island. Such hunts would primarily be for sporting or recreational considerations with meat being a secondary consideration. Resident hunters in Unit 4, with ready access to good deer populations, frequently can, and do, pursue deer with meat being the primary object of the hunt.

With these thoughts in mind, when doing the Sitka survey, I asked the interviewees to give factual and correct answers. As a result, 14 percent of the successful hunters admitted having taken in excess of four deer. In fact, one hunter admitted having taken 27 deer.

Pelican residents, who also look upon deer as being a readily available food source, took an average of 4.3 deer per hunter. Ironically, Pelican hunters do not favor a December season as they traditionally take their desired number of deer earlier.

A Forest Service employee who has intimate acquaintances in Angoon queried those people on the magnitude of their deer hunting activities. Poor weather in October and November prevented them from hunting in their favored areas (Baranof, Chichagof and Catherine Island) and their kill was estimated to be 500 (405 deer actually reported) animals. Seventy-five percent of that harvest occurred in November and during the December extension. Considerable numbers of deer are reportedly taken after the season closure. Admiralty Island from Parker Point south to Wilson Cove produced about 65 percent of the Angoon kill.

No survey was made in Hoonah. Because of the lack of mobility imposed by its location, I doubt that the take of deer for subsistence by Hoonah residents is of as great a magnitude as that of Angoon. Regardless, deer probably constitute the primary source of red meat to most Hoonah residents.

Thus, through interviews, contacts and speculation, the estimated take of deer from Unit 4 during 1973 exceeded 7,000.

A review of license sales during the past 12 years (Appendix II) suggested that hunting pressures have not significantly increased during that time.

As has been noted in previous reports, deer harvests are largely controlled by weather. Large harvests typically occur when snow drives the deer to the beaches. In 1973 the only significant snowfall occurred

during the third week of November. Faced with the prospect of a November 30 closure, as originally adopted by the Fish and Game Board, most hunters took advantage of that productive period and harvested their deer. This year for the first time in several years, many hunters took advantage of the good hunting conditions to hunt the deer on the northwest portion of Chichagof Island. That area contributed about 25 percent of the harvest taken by Sitka hunters in 1973 as compared to about 10-15 percent in previous years. Hunters from Pelican traditionally take most of their deer from the northwest portion of Chichagof.

While conducting the 1973 hunter interviews, questions were asked of interviewees to sample their opinion, impressions and desires on a number of topics. These interview data are given in Appendix III. Briefly, most respondents felt hunting was as good or better in 1973 than in 1972. Most hunters favored a December 31 season closure and there was a slight preference for being able to hunt deer the same day airborn.

Composition and Productivity

Surveys to measure the effect of the 1973-74 winter were conducted in April 1974 covering 23 miles of beach. A total of 18 incidences of winter mortality were found for an average of 0.78 per mile. As usual, Admiralty Island showed the greatest mortality. The winter of 1973-74 was quite mild in terms of snow accumulation. Historic winter mortality data are shown in Appendix IV. As noted in the 1972 report, winter mortality in Unit 4 is probably an annual phenomenon regardless of the severity of the winter.

While doing the winter mortality surveys, casual observations are made of range condition and current year use. In 1973, these observations indicated that in most of Unit 4, the accessible *Vaccinium* in the critical beach fringe areas showed very heavy use and most plants were suffering from loss of vigor becasue of repeated heavy use. During the 1974 surveys use was again heavy but there did appear to be some recovery of plant vigor, at least on Baranof and Chichagof Islands.

Management Summary, Conclusions and Recommendations

Antlerless deer hunting, wolf problems and other emotional issues continue to dominate discussions of deer management. Based on these considerations, the 1973-74 regulatory season was scheduled to terminate November 30, however, public opposition to the early closure in the form of petitions and public testimony at the fall 1973 Alaska Board of Fish and Game meeting resulted in the Board granting a two-week extension for all of Unit 4 except Baranof Island.

As previously stated, most area residents favor a December 31 closure. The data available suggest the deer population has recovered nicely from the suspected lows produced by the severe winters of 1968-69 and 1971-72.

It is therefore recommended that the season and bag limits for Unit 4 remain as they traditionally have been: August 1 - December 31 with the antlerless season opening on September 15 and a bag limit of four deer.

PREPARED BY:

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SUBMITTED BY:

Harry Merriam
Regional Research/Management Coordinator

APPENDIX I

ESTIMATED DEER HARVEST
FROM GAME MANAGEMENT UNIT 4 - 1973

Community	Deer Kill	Source
Sitka	2,489	Hunter Interview (9.7%)
Angoon	500	Local Source
Hoonah	400	Estimate
Pelican	390	Hunter Interview (6.6%)
Tenakee	250	Estimate
Other Unit 4 Communities	100	Estimate
Logging Camps (6)	300	Estimate
Petersburg	425	Hunter Interview (12%)
Ketchikan	126	Hunter Inverview (10%)
Wrangell	83	Hunter Interview (10%)
Juneau	1,449	Hunter Interview (6%)
Other	100	Estimate
TOTAL	6,612	

APPENDIX II

HISTORIC HARVEST DATA
GAME MANAGEMENT UNIT 4. SITKA HUNTERS ONLY
DATA FROM POST SEASON HUNTER INTERVIEWS

Calendar Year	Kill	License Sales	Interview Sample Size	Deer Per Hunter
1973	2,489	1,206	126	2.5
1972	1,058	879	125	1.4
1971	1,411	1,025	151	1.7
1970	1,720	1,080	150	2.1
1969	490	810	100	0.8
1968	2,540	1,200	100	2.7
1967	1,750	1,200	100	1.8
1966	1,740	1,200	100	2.0
1965	1,400	1,030	100	1.6
1964	1,980	1,100	100	2.0
1963	2,090	1,500	110	1.9
1962	1,940	1,111	105	2.0
1961	1,609	1,022	97	1.8
1960	2,050	1,051	100	2.3

APPENDIX III

1973 HUNTER INTERVIEW OPINIONS. SITKA

Hunting Compared to 1972

	Number	Percent
Better	38	31.9
Worse	13	10.9
Same	23	19.3
No Comment	45	37.8

Preferred Season Closing Date

	Number	Percent
11/30	20	16.6
12/15	8	6.6
12/31	82	67.8
Other	11	9.1

"Are you for or against being able to hunt the same day you are airborne for":

	Deer Number	Black Bear Number	Goat Number	Moose Number
For	64	26	42	20
Against	51	74	69	91

Appendix IV

WINTER MORTALITY DATA, GAME MANAGEMENT UNIT 4

Year	Admiralty			Baranof			Chichagof			Kruzof			Unit Total		
	No Trans	Tot Mort	Per/ Mile	No Trans	Tot Mort	Per/ Mile	No Trans	Tot Mort	Per/ Mile	No Trans	Tot Mort	Per/ Mile	No Trans	Tot Mort	Per/ Mile
1973-74	11	11	1.00	3	2	.67	8	5	.63	1	0	0	23	18	.78
1972-73	11	8	.72	3	0	--	7	5	.71	1	1	1.0	22	14	.64
1971-72[1]	11	13	1.18	0	0	0	7	7	1.00	0	--	0	18	20	1.11
1970-71[2]	11	12	1.09	4	4	1.00	7	21	3.00	1	0	0	23	37	1.61
1969-70	10	0	0	4	0	0	5	0	0	0	--	0	19	0	0
1968-69	11	49	8.90	4	19	9.50	6	13	4.34	1	4	8.0	22	85	7.72
1967-68	11	2	0.36	4	3	1.50	5	1	0.40	1	0	0	21	6	0.58
1966-67	11	0	0	4	1	0.50	6	0	0	1	0	0	22	1	0.10
1965-66	11	12	2.18	4	3	1.50	6	4	1.34	1	0	0	22	19	1.72
1964-65	11	24	4.36	4	2	1.00	6	3	1.00	1	0	0	22	29	2.64
1963-64	11	6	1.08	4	10	5.00	6	2	0.66	1	0	0	22	18	1.64
1962-63	11	1	0.18	4	0	0	6	2	0.66	1	0	0	22	3	0.28

[1]Data known to be of questionable veracity.

[2]All transects prior to 1970-71 were 1/2 mile in length. Figures are expanded to represent mortality/mile. After 1971 all transects have been 1 mile long.

DEER

SURVEY-INVENTORY PROGRESS REPORT - 1973

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 Sept. 15 - December 31.

Harvest and Hunting Pressure

General harvest data obtained by interviewing 100 Cordova hunters revealed an indicated harvest of 720 deer (Cordova hunters only). Realistically, the local harvest was probably close to 1,000 deer, as local hunters would only report the legal limit when interviewed. Comparison of the 1973 harvest (Appendix I) with past data indicates that the 1973 harvest was about average, but higher than the past two seasons combined. It should also be noted that 68 percent of this year's harvest occurred during the first half of December and that over 50 percent of the harvest was taken from Hinchinbrook Island.

Deer harvest reports were required but it is believed that hunter interviews give a more accurate indication of actual harvest.

Composition and Productivity

Age data were obtained from 59 deer taken by local hunters. Although the sample is small it does reflect the basic composition of the deer population.

TABLE 1

	Fawn	Yrlg.	2	3	4	5+	Total
Number	14	12	0	2	6	25	59
Percent	24	20	0	3	10	42	99
Born in Spring of	1973	1972	1971	1970	1969	1968	

An alpine deer survey was flown over Hawkins and Hinchinbrook Islands but comparable counts could not be obtained.

Browse utilization transects were not read this spring. The transects have proven to be of little value and will not be read in the future.

* Season closed December 16, 1973 by Field Announcement.

Management Summary and Conclusions

The relatively large harvest this fall, compared to the past two seasons, was primarily the result of snow depth, not a higher deer population. Basically the deer population has been relatively low the past three years. Deep snow forced the deer onto the beaches the last week of November and held them there through mid-December. Thus, hunters had high success during this period until the season was closed December 16,1973 by Field Announcement.

Composition of the deer population, as indicated by the tooth age data, indicates almost no recruitment to the population during 1970-71 and very little recruitment during 1972. Yearlings normally constitute 45+ percent of the harvest.

Normally hunting has very little effect upon the deer population, however given the right set of circumstances, sport hunting could produce a larger than desired harvest. These circumstances are: (1) a series of severe winters which result in low recruitment; (2) a low deer population; (3) deep snow that concentrates deer along the beach fringe early in the deer season and (4) favorable weather that allows hunting.

Recommendations

Retain the present season and bag limits.

PREPARED BY:

Julius Reynolds
Game Biologist III

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

APPENDIX I

Cordova Deer Hunter Harvest Data

	1973*	1972	1971	1970	1969	1968	1967	1966	1965
Licensees interviewed 1/	100	100	100	100		100	100	100	100
Hunting license sales 2/	600	600	600	600		600	600	600	600
Estimated harvest 3/	720	180	450	744		1062	678	858	882
Males harvested 4/	47%	43%	52%	59%	Z	57%	59%	62%	66%
Days hunted 5/	1800	942	1320	1836		2124	2196	1962	1818
Deer per hunter 6/	1.2	0.3	0.8	1.2	E	1.8	1.1	1.4	1.5
Day per deer 7/	2.5	5.2	2.9	2.5		2.0	3.2	2.3	2.1
Lic. that did not hunt 8/	24%	51%	41%	26%	R	24%	23%	17%	19%
Hunted but took no deer 9/	26%	33%	26%	20%		13%	31%	26%	20%
Hunter success 10/	66%	33%	56%	73%	O	83%	60%	69%	75%
Success Ratio: 11/	50%	16%	33%	54%		63%	46%	57%	61%
Taking 1 deer 12/	19%	7%	13%	17%		12%	13%	16%	21%
Taking 2 deer 13/	7%	5%	7%	16%		15%	12%	11%	9%
Taking 3 deer 14/	9%	3%	3%	9%		9%	8%	15%	16%
Taking 4 deer 15/	15%	1%	10%	12%		27%	13%	15%	15%
Harvest location:					D				
Mainland 16/	6%	0	3%	8%		6%	10%	9%	4%
Hawkins Island 17/	24%	70%	77%	31%	A	36%	35%	48%	53%
Hinchinbrook Island 18/	54%	13%	15%	28%		37%	39%	38%	27%
Montague Island 19/	14%	10%	0%	26%	T	19%	13%	1%	12%
Other 20/	2%	7%	5%	7%		2%	3%	4%	4%
Harvest period:					A				
August 21/	1%	3%	5%	4%		5%	9%	6%	12%
September 22/	8%	30%	12%	21%		7%	12%	11%	8%
October 23/	10%	3%	24%	40%		26%	12%	38%	22%
November 24/	13%	20%	8%	29%		24%	17%	21%	23%
December 25/	68%	43%	51%	6%		38%	50%	24%	35%

* Season closed December 16, 1973 by Field Announcement.

1/ Sample size: random sample of persons in Cordova that bought a hunting license. Sample is 1/6 of licenses.
2/ Approximate number of Cordova residents that obtained a hunting license.
3/ Number of deer reported taken by the hunters interviewed (100) projected by 6 (approximate number of Cordova hunters).
4/ Percent of males in the harvest.
5/ Sample projected by 6.
6/ Average number of deer taken per licensee.
7/ Average number of days hunted per deer taken by licensees.
8/ Percent of licensees that did not hunt.
9/ Percent of licensees that hunted but were unsuccessful.
10/ Percent of licensees that hunted that were successful. (Success ratio of persons that actually hunted.)
11/ Percent of licensees that were successful.
12/ Percent of licensees taking one deer.
13/ Percent of licensees taking two deer.
14/ Percent of licensees taking three deer.
15/ Percent of licensees taking four deer.

Appendix I (Cont).

16/ Percent of harvest from Mainland.
17/ Percent of harvest from Hawkins Island.
18/ Percent of harvest from Hinchinbrook Island.
19/ Percent of harvest from Montaque Island.
20/ Percent of harvest from other islands (Green, Latouche, etc.).
21/ Percent of harvest occurring in August.
22/ Percent of harvest occurring in September.
23/ Percent of harvest occurring in October.
24/ Percent of harvest occurring in November.
25/ Percent of harvest occurring in December.

PREPARED BY: Julius Reynolds, Game Biologist III

DEER

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 8 - Kodiak and Adjacent Islands.

Seasons and Bag Limits

Unit 8, that portion of Kodiak Island which lies east of a line from the mouth of Saltery Creek to Crag Point.	Aug. 1-Nov. 1	One deer; provided that antlerless deer may be taken only from Oct. 1 - Nov. 1.
Remainder of Unit 8.	Aug. 1-Dec. 31	Four deer; provided that antlerless deer may be taken only from Sept. 15 - Dec. 31.

Harvest and Hunting Pressure

Harvest information was obtained by telephone and personal interviews with 10 percent of persons purchasing resident hunting licenses in Kodiak and purchasers of nonresident licenses with Kodiak addresses (Appendix I). Hunting license purchases increased 22 percent over the 1972 level. The number of hunters afield was the highest since 1969 (Appendix II). Hunting effort increased approximately 90 percent, rising from 3035 hunter days in 1972 to 5802 hunter days in 1973, but hunter success was similar to previous years. The total projected kill was 1166 animals, almost double the 587 deer harvested in 1972. Males comprised 70 percent of the kill (Appendix I). Sixty-five percent of the kill occurred during November and December.

Harvest Subunit 4 (Appendix III), which includes the area from Sharatin Bay to Viekoda Bay, registered 27 percent of the kill. Uganik Island continues to account for a high proportion of the kill, with 20 percent in 1973. Less than 15 percent of the kill occurred south of Uganik Passage in Subunits 8 and 12. Subunits 1, 2, 3, 5 and 6, which are accessible by road, accounted for less than 12 percent of the harvest.

An attempt was made to monitor hunting pressure in subunits 3 and 5 during the 1973 season. Both areas previously had a four deer bag limit and have traditionally been hunted during November and December when vegetative cover was reduced. In 1973 they were subject to a one deer limit and a Nov. 1 closing. Subunit 5, which includes the drainages into Ugak Bay from Pasagshak Bay to Saltery Creek, registered no kills. Subunit 3, which includes the south slope of the Marin Range to Narrow Cape, received heavier hunting pressure than did 5, and recorded 3.4 percent of the kill.

Composition and Productivity

No sex or age composition data were collected in 1973.

Winter mortality was investigated by walking 22 3/4 miles of coastal transects during April and May. No winter-killed deer were found. One doe killed by dogs near Kodiak in March, was in good condition.

Periodic flights were made during February and March to monitor winter conditions and deer distribution. Deer seen on these flights appeared to be in excellent condition. Deer were able to range widely, as snow rarely persisted more than a few days below 300-foot elevations. During almost 12 hours of flying, 577 deer were tallied. Flights covered the east side of Kodiak Island south to Old Harbor and the west side of the Island to Larsen Bay.

Management Summary and Recommendations

Deer numbers appear to be increasing in Unit 8 in response to the relatively mild 1972-1973 winter. Hunting effort and kill nearly doubled in 1973 over the previous year. The sex composition of the kill favors males heavily and hunting is a minor factor affecting population trends over most of the unit. Hunter harvest was low in the road system area, reflecting the early closure in much of the area and low deer populations.

The relatively light hunting pressure and harvest in Subunits 3 and 5 indicate that the season in these subunits could be extended. However, the bag limit should remain at one deer since these areas are accessible by road.

PREPARED BY:

Roger B. Smith
Game Biologist III

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

APPENDIX I

Unit 8 - Deer Harvest Statistics, 1973*

	No.	Percent
License Buyers	1,796	
*Licensee Interviews	179	9.97 %
License Buyers Not Hunting	658	37.0 %
Hunters Afield	1,127	63.0 %
Females Harvested	349	30.0 %
Males Harvested	817	70.0 %
Total Deer Harvested	1,166	
Sucessful Hunters	528	47.0 %
Days Hunted Per Deer (all hunters)	4.97 days	
Days Hunted Per Successful Hunter	2.8 days	
Deer Per Hunter (all hunters)	1.03 deer	
Deer Per Successful Hunter	2.21 deer	
Total Days Hunted	5,802	
Number and Percent Hunters Taking:		
One deer	63	12 %
Two deer	216	41 %
Three deer	69	13 %
Four deer	180	34 %
Total	528	100 %

* From telephone hunter interview; projected figures obtained by multiplying sample figures by ratio of license buyers to hunter interviews.

PREPARED BY: Roger B. Smith, Game Biologist III

APPENDIX II

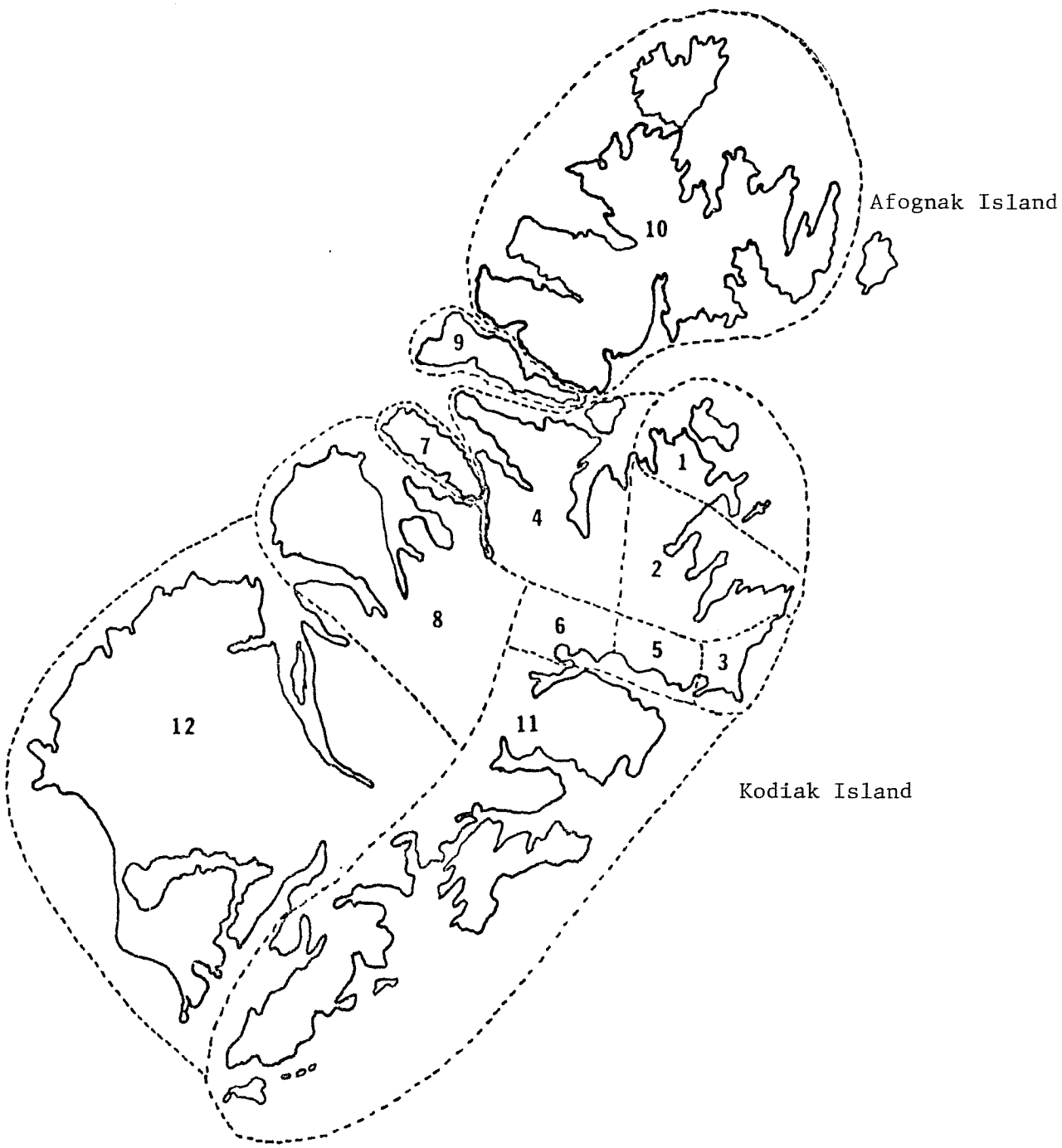
Unit 8 - Deer Harvest Statistics, 1966 - 1973.

	1966	1967	1968	1969	1970	1971	1972	1973
Number of Hunters:	1,180	1,800	2,300	1,441	658	925	689	1,127
Number of Deer Harvested:	720	1,500	2,100	1,420	870	915	587	1,166
% Hunter Success:	42	48	74	43	55	45	46	47
Number of Deer per Hunter:	.6	.8	.9	1.0	1.3	1.0	.85	1.0
Number of Hunting Days per Deer:	9.3	5.7	5.0	6.3	2.4	4.5	5.2	5.0

PREPARED BY: Roger B. Smith, Game Biologist III

APPENDIX III

Unit 8 - Deer Harvest Subunits, 1973



PREPARED BY: Roger B. Smith, Game Biologist III

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 1 - Southeast Mainland

Seasons and Bag Limits

Sept. 1 - June 10	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited

Harvest and Hunting Pressure

The harvest of brown bears in Unit 1 during 1973 was 11 animals (5 males and 6 females). This is a decrease from the 17 taken the previous year, but within the limits of variation over the previous 12 years (7-27) and below the average for that period (15.1).

A summary of Unit 1 brown bear harvests since 1961 is presented in Appendix I.

The number of bears taken is too small to give significant parameters which might indicate overharvesting (percent males taken, average male skull size and average age) on an annual basis. In 1973, the five male skulls averaged 24.7 inches in length plus width. This was five inches more than the previous year and 4.2 inches more than the mean of the previous six years.

The average age of three male bears taken in Unit 1 in 1972 was 5.7 years and the average for four male bears taken in 1973 was 12.3 years. Because of the small sample, these averages cannot be considered as a trend.

Composition and Productivity

No data are available. The sex composition of the harvest probably does not indicate the true composition of the population.

Management Summary and Conclusions

The Unit 1 brown bear harvest is small. There is no indication that present levels of harvest are detrimental to bear populations.

Recommendations

No regulatory changes are recommended on the basis of information currently available.

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APPENDIX I

Brown/Grizzly Bear Sport Harvest, Calendar Years 1961 Through 1973. By: Year, Ttal Kill, Number of Males, % of Males, No. of Nonresidents, % of Nonresidents, Mean Hide Size of Males, Mean Skull Size of Males, Mean Cementum Lines of Males and Calendar Year Seasons.

Calendar Year	Total Kill	No. Males	% Males1/	No. Nonres.	% Nonres.	Mean Hide Size Male2/	Mean Skull Size Male3/	Mean Cem. Lines Male4/	Calendar Year Seasons
1961	13	9	69	1	8	11.1			11/1-6/30 & 9/1-12/31
1962	14	9	64	4	29	14.0			Same
1963	7	5	71	2	29	13.9			Same
1964	20	16	84	2	10	13.9			Same
1965	8	6	75	1	13	13.8			Same
1966	13	9	69	4	31	13.3			Same
1967	27	12	44	8	30	13.8	18.5		1/1-6/20 & 9/1-12/31
1968	18	11	61	4	22	12.9	20.9		1/1-6/10 & 9/1-12/31
1969	21	13	65	1	5	14.0	22.2	3.8(4)	1/1-6/10 & 9/1-11/30
1970	13	6	46	4	31	13.6	20.2	4.7(6)	4/1-6/10 & 9/1-11/30
1971	10	7	70	4	40	13.4	21.0	5.4(7)	4/1-6/10 & 9/1-12/31
1972	17	8	50	4	24	12.9	19.7	5.7(3)	1/1-6/10 & 9/1-12/31
1973	11	5	45	2	18	15.6	24.7	12.3(4)	1/1-6/10 & 9/1-12/31

1/ All male % based on known-sex bears.
2/ Length plus width given in feet.
3/ Length plus width given in inches.
4/ Tooth sample size in parenthesis.

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 4 - Admiralty, Baranof, Chichagof and adjacent islands

Seasons and Bag Limits

September 1 - June 10	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited

Harvest and Hunting pressure

Analysis of sealing documents shows the 1973 harvest of brown bears from Unit 4 to be the highest ever recorded. There were 99 sport kills and four defense of life/property kills. The sport kill of 99 animals is an increase of 30 percent over the 1971 and 1972 kills of 77 animals (the previous highs for the unit) and an increase of about 70 percent over the 1962-1971 average of 58.8.

Composition of the harvest has remained very stable since about 1965. These data for 1973 are within the "standard" for the 1965-72 period, but because of the increased harvest, and hence the chance of taking small bears, some of the pertinent harvest and related data are down somewhat from the 1972 figures. These data are presented in Appendix I.

The pattern of increased harvests coming from Chichagof Island continued in 1973. The 1973 Chichagof kill was 40 percent greater than the previous high (1972) from that island. Southern Admiralty, that part of Admiralty south of about 57° 30' north latitude, again in 1973 contributed the bulk of the Admiralty Island kill. Twenty-two bears or 49 percent of the Admiralty kill and 22 percent of the entire Unit 4 kill came from four bays; Pybus, Gambier, Chiak and Hood.

Reasons for the significant increase in the harvest are not known. There was a rather sharp increase in the number of bears taken by resident hunters. Several of these were taken by employees of logging camps. One reason often expressed by residents for taking a bear in 1973 was their fear of a possible federal prohibition of sport hunting of brown/grizzly bears. This apprehension was triggered by the Marine Mammal Act of 1972. Inexperienced hunters often take the first legal bear they see, which may also account for the number of smaller, younger bears taken.

Composition and Productivity

There have been numerous attempts to determine productivity of brown bears on Admiralty Island. Klein (1958) observed litter size in cubs-of-the-year to be 2.1 (6.6 % of the population) for all Admiralty Island and yearling and older litter size to be 2.0 (12.3 % of the population). Perensovich (1966), for the period 1960-66, observed litter size in cubs-of-the-year to be 2.2 and for cubs yearling and older to be 1.9.

Beach observations of bears on Admiralty Island at Hood Bay in conjunction with research project W-17-5, Job 4.7 (Wood 1974), indicated that cubs-of-the-year had a mean litter size of 1.75 (8 sows with 14 cubs), while cubs two years old or older had a mean litter size of 2.0 (9 sows with 18 cubs). During the three-year period that the Hood Bay project has been conducted, there have been 169 observations of 279 bears of which 63 were cubs. In these observations, cubs represent 22.6 percent of all bears seen. These figures are in rather close agreement with those reported by Lentfer et al. (1969) for southwest Admiralty Island.

The significance of productivity data showing 22.6 percent young or immature animals is not known. It would appear to be low when compared to other species, but when one considers the density of bears present, it would appear to be adequate. Certainly the number of cubs observed is sufficient to at least maintain the population by replacing those bears removed through hunting.

Variables affecting bear censusing (Rausch 1958, Erickson and Siniff 1963, Lentfer et al. 1969) must be considered in reviewing these data. However, the productivity data collected during the 1971-73 period do not appear to be greatly different than figures reported by earlier observers.

Management Summary and Conclusions

Even though the 1973 kill from Unit 4 was considerably higher than the average for previous years, pertinent parameters of age, hide size and skull size did not appear to change significantly. The trend of increased harvest from Chichagof Island was again apparent, but there did not appear to be any significant changes in pertinent harvest data.

Because of restrictive seasons elsewhere in the state and the opportunity of operating in rather unrestricted and uncrowded conditions, it is anticipated that Unit 4 will continue to receive increasing hunter interest, especially for guided hunts. Harvest data must be carefully reviewed to determine if this unit can continue to support a harvest in the magnitude of that occurring in 1973.

Recommendations

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

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Brown/Grizzly Bear Sport Harvest, Calendar Years 1961 Through 1973. By: Year, Total Kill, Number of Males, % of Males, No. of Nonresidents, % Nonresidents, Mean Hide Size of Males, Mean Skull Size of Males, Mean Cementum Lines of Males and Calendar Year Seasons. These Data Compiled by Lee Miller.

GAME MANAGEMENT UNIT 4

Calendar Year	Total Kill	No. Males	% Males1/	No. Nonres.	% Nonres.	Mean Hide Size Male2/	Mean Skull Size Male3/	Mean Cem. Lines Male4/	Calendar Year Seasons
1961	39	31	80	23	59	15.1			1/1-6/30 9/1-12/31
1962	44	29	67	29	66	14.6			Same
1963	27	20	74	15	56	14.4			Same
1964	55	37	69	24	44	14.2			Same
1965	64	43	68	33	52	13.7			Same
1966	75	47	67	50	67	13.1			Same
1967	62	43	72	30	48	13.2	22.7		1/1-6/20 9/1-12/31
1968	50	38	78	18	35	12.7	22.3	8.0(10)	1/1-6/10 9/1-12/31
1969	66	51	77	34	52	13.7	22.7	7.1(32)	1/1-6/10 9/1-11/30
1970	66	48	73	36	55	13.7	22.0	7.8(40)	4/1-6/10 9/1-11/30
1971	77	49	74	40	52	14.1	22.7	8.3(44)	4/1-6/10 9/1-12/31
1972	77	58	75	41	53	14.3	22.5	8.8(55)	1/1-6/10 9/1-12/31
1973	99	67	68	40	40	13.6	21.6	7.7(63)	Same

1/ All male % based on known-sex bears.
2/ Length plus width given in feet.
3/ Length plus width given in inches.
4/ Tooth sample size given in parenthesis.

APPENDIX II

BROWN/GRIZZLY BEAR - GMU - 4 - ADMIRALTY, BARANOF AND CHICHAGOF ISLANDS

Brown Bear Harvest, S. Admiralty and ABC Totals (legal sport kill only)

Location	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
South Admiralty Island										
Pybus Bay	3	4	16	7	5	3	10	8	8	8
Gambier Bay	9	7	3	1	4	3	7	4	3	4
Chiak Bay	3	5	3	3	2	4	2	1	2	7
Hood Bay	1	1	2	6	0	4	0	0	0	3
	16	17	24	17	11	14	19	13	13	22
% of Adm. Total	48%	51%	53%	53%	38%	45%	49%	33%	46%	49%
% of S. Adm. Total	84%	89%	69%	72%	69%	56%	73%	43%	68%	67%
Kootznahoo Inlet Area	0	1	2	2	2	2	2	3	1	4
Eliza Harbor	0	0	3	0	1	3	0	6	2	4
Little Pybus Bay	1	0	1	1	0	4	0	1	1	0
	1	1	6	3	3	9	2	10	4	8
% of Adm. Total	3%	3%	13%	9%	10%	29%	5%	26%	14%	18%
% of S. Adm. Total	5%	5%	17%	14%	19%	36%	8%	33%	21%	24%
Whitewater Bay	1	0	2	0	0	2	1	2	2	0
Tyee Area	0	1	2	1	1	0	1	2	0	1
Wilson Cove	1	0	1	1	1	0	2	3	0	2
	2	1	5	2	2	2	4	7	2	3
% of Adm. Total	6%	3%	11%	6%	7%	6%	10%	18%	7%	7%
% of S. Adm. Total	11%	5%	14%	19%	13%	8%	15%	23%	10%	9%
S. Adm. Total	19	19	35	22	16	25	26	30	19	33
% of Adm. Total	58%	58%	78%	69%	55%	81%	67%	73%	68%	73%
All Admiralty Total	33	33	45	32	29	31	39	39	28	45
% of Unit 4	65%	52%	62%	51%	57%	47%	54%	51%	36%	46%
All Baranof Total	5	14	12	14	6	11	12	13	17	9
% of Unit 4	10%	22%	16%	22%	12%	17%	17%	17%	23%	9%
All Chichagof Total	13	16	16	17	16	24	21	25	32	45
% of Unit 4	25%	25%	22%	27%	31%	36%	29%	32%	43%	46%
Unit 4 Total	51	63	73	63	51	66	72	77	77	99

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 5 - Yakutat

Seasons and Bag Limits

Oct. 10 - Nov. 30 May 10 - May 25	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited

Harvest and Hunting Pressure

The sport kill of brown bears in Unit 5 during the 1973 season was 22 animals, consisting of 14 males and 8 females (Appendix I). Three males were taken in the 1973 spring season and 8 males and 7 females were taken in the fall. In 1972 the sport kill was 21 bears (12 males and 9 females). Nonresidents took 18 percent of the 1973 harvest and 57 percent of the 1972 harvest. The nonsport kill for 1973 was 6 bears.

The mean male hide size, skull size and cementum age in 1973 were 14.5 feet (length plus width), 22.6 inches (length plus width) and 8.0 years (sample size 12), respectively. The 1972 mean age of 6 bears was 5.0 years. The mean age of 18 brown bears (both sexes) harvested in Unit 5 in 1973 was 8.4 years. In 1972 mean age of 13 bears (both sexes) was 4.9 years. Unit 5 contributed 16.7 percent of the total brown bear harvest from Southeastern Alaska (Units 1-5) and 2.4 percent of the statewide harvest (Units 1-26) in 1973.

Composition and Productivity

No composition data, other than those resulting from harvest information, are available.

Management Summary and Recommendations

The 1973 harvest of 22 brown bears was higher than the 1961-72 average of 14 bears, but similar to previous harvests in 1966, 1969, 1971 and 1972. The present annual harvest level is not adversely affecting the brown bear population in Unit 5 as indicated by data in Appendix I.

PREPARED BY:

David A. Johnson
Game Biologist III

SUBMITTED BY:

Harry Merriam
Regional Research/Management Coordinator

APPENDIX I

Brown/Grizzly Bear Sport Harvest, Calendar Years 1961 Through 1973. By: Year, Total Kill, Number of Males, % of Males, No. of Nonresidents, % of Nonresidents, Mean Hide Size of Males, Mean Skull Size of Males, Mean Cementum Lines of Males and Calendar Year Seasons.

Calendar Year	Total Kill	No. Males	% Males1/	No. Nonres.	% Nonres.	Mean Hide Size Male2/	Mean Skull Size Male3/	Mean Cem. Lines Male4/	Calendar Year Seasons
1961	9	6	75	5	63	13.6			1/1-6/30 & 9/1-12/31
1962	7	4	57	0	0	15.5			Same
1963	4	4	100	0	0	15.5			Same
1964	11	4	36	5	45	14.5			Same
1965	15	12	80	4	27	14.5			Same
1966	22	11	55	16	73	15.2			Same
1967	15	8	53	10	67	14.5	23.7		1/1-6/20 & 9/1-12/31
1968	18	13	72	7	39	14.0	23.4	7.8(5)	1/1-6/10 & 9/1-12/31
1969	20	10	50	9	45	13.8	21.8	7.0(6)	1/1-6/10 & 9/15-11/30
1970	7	4	57	4	57	13.3	24.0	9.0(3)	4/1-5/31 & 10/10-11/30
1971	21	12	63	7	33	14.0	22.1	5.8(8)	5/10-5/25 & 10/10-11/30
1972	21	12	57	8	38	14.1	22.2	5.0(6)	5/10-5/25 & 10/10-11/30
1973	22	14	64	4	18	14.5	22.6	8.0(12)	5/10-5/25 & 9/1-11/30

1/ All male % based on known-sex bears.
2/ Length plus width given in feet.
3/ Length plus width given in inches.
4/ Tooth sample size in parenthesis.

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 6 - Prince William Sound

Seasons and Bag Limits

May 10 - May 25 Oct. 10 - Nov. 30	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited.

Harvest and Hunting Pressure

The Unit 6 brown bear harvest for 1973 was 26 bears: 18 males, 7 females and 1 unknown sex (two additional males were taken during the spring season near Cape Yakataga but recorded as part of the Game Management Unit 5 harvest). The 1973 harvest was moderate as compared to those of the past nine years (Appendix I).

The actual hunting pressure exerted in Unit 6 is unknown. Sealing data indicate that a major change in kill location occurred. During 1973, 5 bears were taken in Prince William Sound and 21 along the Gulf coast. During 1972, 24 bears were taken in Prince William Sound and 14 along the Gulf coast (Appendix II). This is probably the result of a shift in guiding pressure.

The chronology of the fall harvest was similar to past seasons; the majority of bears were taken in October (79%) rather than November.

Composition and Productivity

At present there are no means of obtaining good composition or productivity data in Unit 6.

Management Summary and Conclusions

Analysis of the available data reveals several things: (1) the 1973 harvest was moderate, (2) a major change in kill location occurred and (3) the spring harvest was below average (primarily in the female segment), whereas the fall harvest was normal.

Since Statehood there have been considerable fluctuations in seasons and harvests. Thus, the population indicators (hide size, skull size and age data) do not indicate a clear population trend (Appendix III).

Recommendations

Retain the current seasons and bag limit.

PREPARED BY:

Julius Reynolds
Game Biologist III

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

APPENDIX I

BROWN BEAR HARVEST BY SEASON AND SEX

Game Management Unit 6

Year	SPRING				FALL				SPRING AND FALL			
	M	F	UNK	Total	M	F	UNK	Total	M	F	UNK	Total
1965	12	11	0	23	6	5	0	11	18	16	0	34
1966	14	9	1	24	6	8	0	14	20	17	1	38
1967	22	7	3	32	13	8	3	24	35	15	6	56
1968	21	12	4	37	18	7	1	26	39	19	5	63
1969	8	5	1	14	4	5	0	9	12	10	1	23
1970	8	10	0	18	4	4	1	9	12	14	1	27
1971	10	2	0	12	3	4	0	7	13	6	0	19
1972	14	5	0	19	6	13	0	19	20	18	0	38
1973	10	2	0	12	8	5	1	14	18	7	1	26
Average	13.2	7.0	1.0	21.2	7.6	6.6	0.7	14.8	20.8	13.6	1.7	36.0

Submitted by: Julius Reynolds, Game biologist III

APPENDIX II

BROWN BEAR HARVEST BY AREA FOR 1972 and 1973

Game Management Unit 6

Location	1972	1973
Montague Island	11	1*
Hinchinbrook Island	6	2
Mainland, West of Cordova	7	2
Mainleand, East of Cordova	14	21
TOTAL	38	26

* Dan France, Protection officer, claims he has knowledge of 4 each illegal (nonsealed) brown bear taken from Montague Island during the fall, 1973 season.

PREPARED BY:

Julius Reynolds
Game Biologist III

APPENDIX III

Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1973: Participation by Non-residents in the Bear Harvest with Mean Hide, Skull Size and Cementum Lines of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 6

Calendar Year	Total Kill	No. Males	% Males 1/	No. Nonres.	% Nonres.	Mean Hide Size Male 2/	Mean Skull Size Male 3/	Mean Cem. Lines Male 4/	Calendar Year Seasons
1961	13	8	62	3	23	13.2	---	---	1/1-6/30 9/1-12/31
1962	24	17	71	9	38	13.3	---	---	Same
1963	32	16	53	5	16	14.0	---	---	Same
1964	32	22	76	9	28	14.6	---	---	Same
1965	34	18	53	8	24	15.4	---	---	Same
1966	38	20	53	7	18	14.6	---	---	Same
1967	56	35	70	26	46	14.2	22.4	---	1/1-6/20 9/1-12/31
1968	63	39	67	33	52	14.4	23.5	7.1 (26)	1/1-6/10 9/1-12/31
1969	23	12	55	8	35	14.7	23.4	9.3 (10)	1/1-6/10 9/15-11/30
1970	27	12	46	9	33	14.5	23.6	5.9 (8)	4/1-5/31 10/10-11/30
1971	19	13	68	10	53	14.9	24.1	9.2 (12)	5/10-5/25 10/10-11/30
1972	38	20	53	19	50	13.7	22.3	6.1 (20)	5/10-5/25 10/10-11/30
1973*	26	18	72	16	62	14.1	22.6	5.9 (14)	5/10-5/25 10/10-11/30

1/ All male % based on known-sex bears. 2/ Length plus width given in feet. 3/ Length plus width given in inches.
4/ Tooth sample size in parenthesis.
* Data does not include 2 males that were incorrectly coded to GMU 5.

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 7 - Seward

Seasons and Bag Limits

Sept. 10 - Oct. 10	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited.

Harvest and Hunting Pressure

Brown/grizzly bear sealing records indicate a harvest of two bears, one male and one female, in Unit 7 during the 1973-74 season (Appendix I). Both bears were taken by resident hunters.

Interest in bear hunting is low in this unit because bears are not particularly vulnerable to hunting and are abundant only in rather inaccessible areas. Most bears are probably taken incidental to other hunting.

Composition and Productivity

Hide and skull size data are too limited to be analyzed with any degree of confidence.

Management Summary and Conclusions

The bear harvest in 1973-74 was one male and one female. In the past 13 years 11 bears have been harvested from Unit 7; of these six were males and five were females. Bears are fairly abundant in the Chickaloon River drainages and Upper Russian River drainages, but few hunters pursue them because heavy timber and brush makes hunting difficult and chances for success rather poor.

Recommendations

No changes in seasons or bag limits are recommended.

PREPARED BY:

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Game Biologist III

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

Appendix

BROWN/GRIZZLY BEAR - GMU 7

Table 1. Harvest and hunting pressure, Unit 7.

Calendar Year	Total Kill	No. Males	% Males 1/	No. Nonres.	% Nonres.	Mean Hide Size Male 2/	Mean Skull Size Male 3/	Mean Cem Age Male 4/	Calendar Year Seasons
1961	1	0	0	0	0	0	---	---	9/ 1 - 9/30
1962	1	0	0	0	0	0	---	---	Same
1963	1	0	0	1	100	0	---	---	Same
1964	0	0	0	0	0	0	---	---	Same
1965	0	0	0	0	0	0	---	---	10/15 - 11/ 15
1966	0	0	0	0	0	0	---	---	9/ 1 - 9/30
1967	1	1	100	1	100	0	24.2	---	10/15 - 11/ 15
1968	0	0	0	0	0	0	---	---	Same
1969	2	2	100	1	50	15.2	24.3	7.5(2)	Same
1970	2	2	100	0	0	13.3	18.9	3.2(2)	9/20 - 10/15
1971	0	0	0	0	0	0	---	---	9/20 - 10/15
1972	1	0	0	1	100	0	0	0	9/10 - 10/10
1973	2	1	50	0	0	13.3	---	---	9/10 - 10/10

1/ All male % based on known-sex bears
2/ Length plus width given in feet
3/ Length plus width given in inches
4/ Tooth sample size in parentheses

PREPARED BY:

Leo H. Miller, Game Technician V

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 8 - Kodiak and Adjacent Islands

Seasons and Bag Limits

Unit 8, that portion of Kodiak Island south and west of a line from the mouth of Hidden Basin Creek to the mouth of Kizhuyak Bay and including Uganik Island.	Oct. 20 Dec. 31 March 1 - May 15	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited.
Unit 8, remainder of Kodiak Island.	Sept. 1 - July	
Unit 8, Afognak, Shuyak and Raspberry Islands.	Oct. 1 - Dec. 31 March 1 - May 20	

Harvest and Hunting Pressure

The 1973 sport harvest was 155 bears (Appendix I). Eighty-six males and 69 females were taken. Seven non-sport kills were recorded in 1973. The sport harvest was 17.4 percent greater than the 1972 harvest and 44.3 percent greater than the average harvest during the previous five years. The spring season accounted for 93 animals, including 62 males (66.7 percent) and 31 females (33.3 percent). The fall harvest produced 24 males (38.7 percent) and 38 females (61.3 percent), for a total of 62 bears.

Records obtained from U. S. Fish and Wildlife Service show that 262 land use permits for bear hunting were used by hunters on Kodiak National Wildlife Refuge in 1973 (Appendix II). This is a 29 percent increase over the number of permits used in 1972. Hunters took 127 bears on the Refuge in 1973, about 81 percent of the Unit 8 total harvest. One hundred and forty-two resident hunters took 42 bears for a 29.6 percent success ratio on the Refuge. Nonresident hunters were 70.8 percent successful with 120 nonresidents taking 85 bears. The success ratio for all hunters was 48.5 percent.

The proportion of males in the harvest was the lowest since 1966 (Appendix I). Females comprised 61.3 percent of the 1973 fall kill. The sex ratio of the fall kill has approached parity in previous years, but this year's fall harvest was unusually heavy toward females.

The mean skull size for males was up from 24.0 inches in 1972 to 24.5 inches in 1973 (Appendix I). The average size for the previous

five years was 23.9 inches. Average male hide size was up slightly from 15.2 feet in 1972 to 15.6 feet in 1973. The male harvest was composed predominantly of adults, with 67 percent in the 6-11 plus cementum age classes. Fifty-six percent of the females taken were in these age classes.

Management Summary and Conclusions

Both average skull size and average age data for male brown bears indicate a slight improvement in trophy size in 1973. Average trophy size appears to have stabilized after following a downward trend in the 1950's and early 1960's. The 1973 harvest of 155 bears is approaching the sustainable level if present trophy size is to be maintained. Since 1971 the annual harvest has increased at an average rate of 17 percent annually. A proportional increase in 1974 would bring the harvest to near the sustainable level under current hunting patterns. An increase in hunting effort in less heavily hunted areas such as Afognak and Shuyak Islands could alter this level slightly. However, most of the hunting effort and subsequent harvest occurs on the Kodiak National Wildlife Refuge and this pattern is not expected to change markedly.

The high proportion of females killed in the fall season may be partly a chance occurrence since single females comprise a larger component of the legally available bears than they do during the spring season. However, hunters appear increasingly nonselective in trophy judging and are more willing to accept something less than the "10-footer." Some guides are emphasizing maximum production hunts and trophy size is less a consideration than formerly.

Season restrictions in Game Management Unit 9 (Alaska Peninsula) are forcing additional resident and nonresident hunting pressure into Unit 8. As hunting opportunity is restricted, more hunters are crowding into adjacent open areas and increasing competition for bears makes trophy size a lesser consideration.

Recommendations

The fall season in the area south and west of a line from Kizhuyak Bay to Hidden Basin Creek should be curtailed to reduce the take of females during the period when they are most susceptible to hunting. If the 1974 harvest appreciably exceeds that recorded in 1973, the 1975 season should be shortened or a limit should be placed on the number of hunters. Present seasons will not permit the desired kill to be maintained if season restrictions in other parts of the state continue to force additional pressure into Unit 8.

PREPARED BY:

Roger B. Smith
Game Biologist III

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

APPENDIX I

Brown-Grizzly Bear Sport Harvest, Calendar Year 1961 through 1973: Participation by Nonresident in the Bear Harvest with Mean Hide, Skull Size and Cementum Lines of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 8

Calendar Year	Total Kill	No. Males	% Males 1/	No. Nonres.	% Nonres.	Mean Hide Size Male 2/	Mean Skull Size Male 3/	Mean Cem. Lines Male 4/	Calendar Year Seasons
1961	118	78	66	72	61	16.9			1/1-5/31
1962	131	91	78	84	64	16.5			Same
1963	112	77	69	55	49	16.2			Same
1964	118	72	63	62	53	15.2			Same
1965	186	111	60	90	48	15.7			Same
1966	199	106	54	96	48	15.7			Same
1967	184	107	58	91	49	15.3	23.6	5.0 (14) Fall	1/1-5/20 10/1-12/31
1968	104	61	59	62	60	15.6	23.9	6.2 (52)	Same
1969	97	62	64	53	55	15.9	24.2	6.2 (53)	1/1-5/20 11/1-12/31
1970	91	62	68	45	49	15.3	23.6	6.0 (57)	3/1-5/10 10/20-12/31
1971	113	63	60	51	45	15.1	24.0	6.8 (59)	3/1-5/10 10/20-12/31
1972	132	79	61	72	55	15.2	24.0	6.7 (76)	3/1-5/15 10/20-12/31
1973	155	86	55	90	58	15.6	24.5	7.7(82)	3/1-5/15 10/20-12/31

1/ All male % based on known-sex bears.
2/ Length plus width given in feet.
3/ Length plus width given in inches.
4/ Tooth sample size in parenthesis.
5/ Kodiak National Wildlife Refuge only.

PREPARED BY: Leo H. Miller, Game Tech. V

APPENDIX II

Bear hunting land use permit system statistics

Kodiak National Wildlife Refuge, 1968-1973

Year	No. permits issued	No. permits used	Percent permit use	No. bears killed	Percent hunter success
1968	249	203	81.5%	86	42.4%
1969	254	168	66.1%	71	42.3%
1970	228	170	74.6%	63	37.1%
1971	255	142	55.7%	70	49.3%
1972	295	202	68.5%	92	45.5%
1973	356	262	73.6%	127	48.5%

PREPARED BY: Roger B. Smith, Game Biologist III

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 9 - Alaska Peninsula

Seasons and Bag Limits

May 10 - May 25 Oct. 7 - Oct. 21	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited.

Harvest and Hunting Pressure

The reported harvest of 240 brown bears during the 1973 season was the second largest recorded in Unit 9 history (Appendix I). In 1972, 228 bears were taken south of Katmai, and, in 1973, 197 were reported taken. The spring season produced 98 bears and the fall, 142. Overall, the sex ratio of the harvest for both seasons was only slightly biased towards males (58%). The sex ratio of the fall harvest was equally divided between males and females (69 males, 69 females, and 4 of undetermined sex). Nonresident hunters took 75 percent of the harvest. The slight increase in male hide size and skull size is not considered significant (Appendices I and II). Aging by means of the cementum lines present in premolar teeth collected at the time of sealing indicated the youngest mean male age since such data have been available.

Composition and Productivity

Data on the mean litter size of brown bears in Unit 9 in 1973 are available only from McNeil River. This summer's average of 1.8 cubs per litter is lower than the sanctuary's 5-year average of 2.1 cubs. No observations were made in 1973 in the Chignik-Black Lake study area, but past data provided by the brown bear research project have shown that this area has a consistently higher mean litter size than observed at McNeil River. The 7-year average for the Chignik-Black Lake area was 2.3 cubs per litter. The differences between the two areas may reflect a reproductive response of the bear population in the Chignik-Black Lake area to heavy hunting pressure.

Management Summary and Conclusions

Although the unit's fall season had been reduced from 31 days to 15 days, 1973 produced the unit's second highest recorded harvest. This high level of harvest was a direct result of the increased hunting pressure being placed on the species. The spring kill of 98 bears was

exceeded only during years with more liberal seasons. The fall take of 142 bears occurred in spite of extremely poor weather conditions and the most restrictive fall season on record. Hunting pressure on the Alaska Peninsula now is great enough to harvest a large number of bears in a relatively short period of time. The record 1972 harvest of 278 bears averaged 5.9 bears per day of season, while the 1973 season averaged 7.7 bears per day.

For the last two years, 82 percent of the harvest has occurred in the area of the Peninsula south of Katmai National Monument. The management objective of 150 bears annually for this area was exceeded by 78 bears in 1972 and 47 bears in 1973. Although the mean male hide size and skull size were comparable to 1972, the mean cementum age for males declined nearly a year in 1973. The most notable decline in male age occurred in the spring harvest which normally maintains a high mean age (Appendix III). Coupled with a harvest sex ratio of nearly 50% females, the data indicate excessive harvests are occurring.

The 50-50 sex ratio which has occurred during the fall harvest in recent years places excessive pressure on the mature female segment of the population. The highest reproductive potential would occur with a population composition of one mature male for each three mature females. Mature females normally breed every third year so such composition would result in a one-to-one ratio between mature males and receptive females. A sex ratio of 65 to 70 percent males in the harvest would maintain this desired population composition. If harvests continually exceeded 75 percent males annually, there would eventually not be adequate mature males to breed available females and lowered reproduction could occur.

Further indications of excessive harvest can be found in the data provided by the brown bear research project. Seventeen percent of the bears tagged in the Chignik-Black Lake area in 1972 have already been recovered in the sport harvest. Of the 229 bears tagged since 1970, 63 (28%) have been recovered in the harvest. Many of these bears were tagged as cubs or yearlings and had experienced only one or two hunting seasons as legal bears. The total harvest should be reduced in numbers or redistributed into the more lightly hunted northern portion of the unit.

Recommendations

Management efforts should attempt to maintain both the spring and fall seasons since the harvest characteristic of each are different (Appendices II and III). The desired harvest level and sex ratios could be obtained by manipulation of season lengths, dates or through a system of alternating season closures. Reduction in season length to less than two weeks could allow inclement weather during either season to eliminate any reasonable hunting opportunity. Placing the seasons closer to the normal denning period would increase the probability of inclement weather and could mean a smaller percentage of the population would be available to hunters. A system of alternating closures could result in more liberal season dates and a higher harvest for any given season without endangering long-term management objectives.

PREPARED BY:

James B. Faro
Game Biologist III

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

APPENDIX I
GAME MANAGEMENT UNIT 9

Brown/Grizzly Bear Sport Harvest, Calendar Years 1961 through 1973: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

Calendar Year	Total Kill	No. Males	%1/ Males	No. Nonres.	% Nonres.	Mean Hide Size Male 2/	Mean Skull Size Male 3/	Mean Cem Age Male 4/	Calendar Year Season
1961	120	85	73	71	59	16.4			1/1-5/31, All of 9; 10/1-12/31 S. of Egegik Puale Bay, Rem. Unit 9/10-12/31
1962	155	109	70	97	63	16.4			Same
1963	164	100	65	114	70	16.1			1/1-5/31, 9/1-12/31
1964	155	103	70	108	70	16.1			Same
1965	208	136	67	137	66	15.7			1/1-5/31, All 9 N. of Meshik 9/1-12/31 S. of Meshik 9/15-12/31
1966	230	157	71	173	75	15.7			N. of Meshik 1/1-5/31, 9/1-12/31 S. of Meshik 1/1-5/31 & 9/15-12/31
1967	211	143	68	163	77	15.8	23.5	6.6(30)	1/1-5/20, 9/15-12/31
1968	158	111	73	134	85	15.5	24.3	7.6(48)	1/1-5/10, 9/15-12/31
1969	91	67	75	67	74	15.8	24.5	8.0(57)	1/1-5/10 All of 9&9/15-10/31 N. of Park, 10/1-11/30 S. of Park
1970	156	102	66	116	74	15.1	24.0	7.8(90)	S. of Park 5/1-5/15 N. of Park 5/1-5/25, All of 9 10/1-10/31
1971	190	118	65	135	71	15.1	23.7	7.1(109)	5/10-5/25, 10/1-10/31
1972	278	154	57	204	73	14.7	23.4	7.1(146)	Same
1973	240	137	57	179	75	14.9	23.6	6.3(131)	5/10-5/25, 10/7-10/21

1/ Based upon known sex individuals 2/ Length plus width given in feet. 3/ Length plus width given in inches.
4/ Tooth sample size in parenthesis.

Prepared by; Lee Miller, Game Technician V

APPENDIX II

Average Male Brown/Grizzly Skull Size Recorded in Inches, and by Year, Season, and Residency of Hunter for Unit 9.

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Sample Size %
1967	-	-	-	-	6	23.9	44	23.5	50	23.5	93
1968	5	23.5	49	25.5	9	23.3	40	23.0	103	23.5	93
1969	10	23.9	36	25.5	5	22.5	15	23.2	66	24.5	99
1970	10	24.4	43	25.5	14	21.0	32	23.2	99	24.0	97
1971	4	26.2	37	24.8	22	22.3	50	23.2	113	23.7	96
1972	12	24.5	29	25.0	28	22.7	78	23.0	145	23.4	94
1973	17	23.4	51	24.7	15	22.3	50	22.8	133	23.6	97

Prepared by: Lee Miller, Game Technician V

APPENDIX III

Comparison of Spring and Fall Harvest Data, GMU 9, 1963-1973

Year	Male Cementum Lines 1/		Percent Males	
	Spring Season	Fall Season	Spring Season	Fall Season
1963	Not Available		83	51
1964	Not Available		84	59
1965	Not Available		80	54
1966	Not Available		89	58
1967	Not Available		81	58
1968	Not Available		82	66
1969	Not Available		87	57
1970	9.3 (48)	6.0 (42)	76	59
1971	9.4 (38)	5.8 (69)	83	60
1972	8.9 (41)	6.4 (105)	71	52
1973	6.9 (68)	5.7 (64)	69	50

1/ Tooth sample size in parenthesis.

Prepared by: James B. Faro, Game Biologist III

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 10 - Aleutian Islands

Seasons and Bag Limits

May 10 - May 25 Oct. 1 - Oct. 31	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited.

Harvest and Hunting Pressure

The reported harvest for Unimak Island was three bears during the fall season (Appendix I). No bears were taken during the spring season. The sex ratio of the harvest was two females and one male. For the fifth straight year, all animals were taken by Alaskan residents. Due to the small sample size, no conclusions can be made concerning skull size, hide size, or age of harvest.

Composition and Productivity

No information is available.

Management Summary and Conclusions

Only Unimak Island in the Aleutian Islands is populated by brown bears. The island is part of the Federal Aleutian Island Refuge System. Bear hunter access to the island is controlled by a restrictive permit system regulated by the U.S. Fish and Wildlife Service. The level of harvest allowed under the permit system is conservative.

Recommendations

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

PREPARED BY:

James B. Faro
Game Biologist III

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

APPENDIX I
GAME MANAGEMENT UNIT 10

Brown/Grizzly Bear Sport Harvest, Calendar Years 1961 through 1973: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

Calendar Year	Total Kill	No. Males	%1/ Males	No. Nonres.	% Nonres.	Mean Hide Size Male 2/	Mean Skull Size Male 3/	Mean Cem Age Male 4/	Calendar Year Season
1961	1	1	100	0	0	18.1	---	---	1/1-5/31 10/1-12/31
1962	3	2	67	0	0	16.6	---	---	Same
1963	0	0	0	0	0	0	---	---	1/1-5/31 9/1-12/31
1964	15	9	60	5	33	16.4	---	---	Same
1965	10	7	70	1	10	15.9	---	---	1/1-5/31 9/15-12/31
1966	6	4	67	1	17	16.1	---	---	Same
1967	8	3	38	0	0	13.4	23.5	---	1/1-5/20 9/15-12/31
1968	4	2	50	4	100	14.9	23.2	5.0 (2)	Same
1969	4	3	75	0	0	19.4	27.3	15.0 (1)	1/1-5/10 10/1-11/30
1970	5	4	80	0	0	12.5	19.9	3.0 (4)	5/1-5/15 10/1-10/31
1971	4	1	25	0	0	15.4	23.4	4.0 (1)	5/10-5/25 10/1-10/31
1972	5	3	60	0	0	14.1	19.9	4.0(2)	Same
1973	3	1	33	0	0	11.3	22.3	5.0 (1)	Same

1/ All male % based on known sex bears.
2/ Length plus width given in feet.
3/ Length plus width given in inches.
4/ Tooth sample size in parenthesis.

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 11 - Wrangell Mountains, Chitina River.

Seasons and Bag Limits

Sept. 10 - Oct. 10 May 15 - May 31	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited.

Harvest and Hunting Pressure

Tabulated data on brown/grizzly bear harvests from 1961 through 1973 are presented in Appendix I. Except for the upper Chitina River Valley, where nine bears were harvested, the 1973 Unit 11 kill (19 bears - 3-spring, 16-fall) was fairly well dispersed. Overall trend data of male percentage in the harvest, hide sizes, skull sizes, and cementum ages indicate that excessive harvesting is not presently a problem.

Composition and Productivity

No data are available.

Management Summary and Conclusions

All presently-used indices show that brown/grizzly bears in Unit 11 are harvested at a relatively low level. It is believed that the harvest would have to be substantially increased before it would be reflected in bear abundance or male skull size.

Recommendations

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

PREPARED BY:

Carl McIlroy
Game Biologist III

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

Appendix I

Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1973: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Lines of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 11

alendar Year	Total Kill	No. Males	% Males 1/	No. Nonres.	% Nonres.	Mean Hide Size Male 2/	Mean Skull Size Male 3/	Mean Cem. Lines Male 4/	Calendar Year Seasons
1961	5	3	75	2	40	11.8			5/15-6/15 9/1-12/31
1962	14	6	43	11	79	12.4			Same
1963	9	6	67	7	78	12.6			Same
1964	22	13	65	16	73	13.2			Same
1965	18	8	47	14	78	13.3			Same
1966	12	10	91	9	75	12.4			Same
1967	20	10	50	15	75	12.4	23.2		Same
1968	15	8	53	7	47	12.0	20.9	6.8(4)	Same
1969	9	6	67	2	22	15.3	22.8	7.2(5)	5/15-6/15 9/1-9/30
1970	16	10	63	7	44	13.5	22.0	8.9(9)	5/15-6/10 9/15-10/5
1971	17	9	64	15	88	13.9	23.5	8.8(9)	9/15-10/5
1972	13	7	54	9	69	12.8	22.2	8.6(7)	9/10-10/1(
1973	19	12	63	13	68	12.2	20.4	6.6(12)	5/15-5/31 9/10-10/10

1/ All male % based on known-sex bears.
2/ Length plus width given in feet.
3/ Length plus width given in inches.
4/ Tooth sample size in parenthesis.

PREPARED BY:

Lee Miller
Game Technician V

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 12 - Upper Tanana - White River

Seasons and Bag Limits

May 15 - May 31 September 10 - October 10	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited.

Harvest and Hunting Pressure

Appendix I summarizes the past 13 years of Unit 12 harvest data. A record sport harvest of 26 grizzly bears occurred in Unit 12 during 1973. This harvest compares with the 1972 harvest of 9 animals and the past 12-year average of 15.4 animals. The harvest consisted of 13 males and 13 females. Four were taken during the spring season. In addition to the sport harvest of 26, one female bear was taken in defense of life.

Reported kill locations for the 1973 harvest are as follows:

Area	Spring Harvest	Fall Harvest	Total Harvest
Nabesna River	3	5	8
White River/Ptarmigan Creek	1	6	7
Chisana River	0	2	2
Mentasta Mountains (Little Tok and Tetlin Rivers)	0	4	4
Alaska Range	0	5	5
Total	4	22	26

Average male skull size was 19.9 inches. Along with the 1969 harvest this represents the smallest average size recorded since these figures were first gathered in 1967. Average female skulls measured 20.1 inches. Hide size for males and females combined averaged 11.7 feet; males averaged 11.5 feet, slightly below the 12-year average of 12.2 feet.

Average age of male bears was 6.6 years compared with a 7.2-year average for the past 5 years. Females, however, averaged 10.1 years in 1973. Ages for both sexes ranged from 2 to 23 years.

The harvest was equally divided between resident and nonresident hunters with each group taking 13 bears.

There are no means available at present to accurately measure grizzly bear hunting pressure, although tag sales may represent nonresident effort. Residents tend to be opportunistic hunters, taking bears when given the chance but exerting little effort specifically toward grizzly hunting.

Composition and Productivity

No data are available.

Management Summary and Recommendations

Unit 12 is large and contains considerable high quality grizzly bear habitat. Casual observations indicate a moderate bear population that may be increasing in size. In recent years the harvest has been small and probably well below the number that could be safely taken. The 1973 harvest of 26 animals is the maximum that should be taken considering our present dearth of knowledge about the bear population. An excessive harvest may have occurred in 1973 in the Nabesna and possibly White River drainages with eight and six bears, respectively, reported taken. Based on estimated productivity and recruitment rates it is unlikely that these areas contain a population of 100 to 200 bears which could sustain that harvest.

Because of small sample sizes for hide size, skull size and age trends, only gross changes in the populations can be measured. Efforts to obtain population size and trend information should be initiated. Until better data are available, liberalization of seasons or bag limits cannot be advised. No changes in seasons or bag limits are recommended at this time.

PREPARED BY:

Larry Jennings
Game Biologist III

SUBMITTED BY:

Oliver E. Burris
Regional Management Coordinator

Appendix I. Characteristics of the brown/grizzly bear sport harvest in Unit 12.

Calendar Year	Total Kill	No. Males	% Males[1]	No. Nonres.	% Nonres.	Mean Hide Size Male[2]	Mean Skull Size Male[3]	Mean Cem. Lines Male[4]	Calendar Year Seasons
1961	15	8	53	9	60	11.8	-	-	5/15 - 6/15 9/1 - 12/31
1962	19	9	47	6	32	11.8	-	-	Same
1963	23	13	59	17	74	12.0	-	-	Same
1964	15	9	60	4	27	13.1	-	-	Same
1965	19	8	44	4	21	12.5	-	-	Same
1966	12	6	50	5	42	12.7	-	-	Same
1967	16	7	50	10	63	11.4	20.5	-	Same
1968	16	7	47	9	56	11.8	20.4	5.0(1)	Same
1969	13	8	62	8	62	11.6	19.9	7.6(7)	5/15 - 6/15 9/1 - 9/30
1970	15	9	60	10	67	12.0	21.9	6.3(8)	5/15 - 6/10 9/15 - 10/5
1971	13	9	69	7	54	12.0	20.7	4.1(9)	9/15 - 10/5
1972	9	3	33	7	78	13.6	23.0	12.7(3)	No spring 9/10 - 10/10
1973	26	13	50	17	65	11.5	19.9	6.6(13)	5/15 - 5/31 9/10 - 10/10
13 year average	16	8.3	52	9	53				

1 All male % based on known sex bears
2 Length plus width given in feet
3 Length plus width given in inches
4 Tooth sample size in parenthesis

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 13 - Nelchina Basin

Seasons and Bag Limits

Sept. 10 - Oct. 10	One bear every four regulatory years, provided that the taking of cubs or females accompanied by cubs is prohibited.

Harvest and Hunting Pressure

Bear harvests have fluctuated since 1961 with peaks occurring in 1966 (63 bears) and 1971 (72 bears) (Appendix I). During most years the kill is markedly affected by the opening date of the season; earlier openings result in greater harvests. Mean age of male bears, mean skull size of males and percentage of males in the harvest have all shown slight increases over the past three or four years. Harvests have generally been well dispersed as shown by Fig. 1 depicting kill sites of 153 bears taken since 1969.

Composition and Productivity

No data are available.

Management Summary and Conclusions

Harvest data indicate that past harvests have been well dispersed. Hunters and guides have reported that grizzly bears in Unit 13 appear to be more abundant than previously remembered. It is believed that the harvest can be increased to the highs of former years without detrimental effects on the population. As indicated by former years, this could be accomplished by earlier opening dates.

Recommendations

The season should run from Sept. 1 through Oct. 10.

PREPARED BY:

Carl McIlroy
Game Biologist III

SUBMITTED BY:

John S.Vania
Regional Management Coordinator

Appendix I

Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1973: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Lines of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 13

Calendar Year	Total Kill	No. Males	% Males 1/	No. Nonres.	% Nonres.	Mean Hide Size Male 2/	Mean Skull Size Male 3/	Mean Cem. Lines Male 4/	Calendar Year Seasons
1961	42	20	50	26	62	13.0			9/1-9/30
1962	34	22	65	19	56	13.8			Same
1963	42	22	54	27	64	12.6			Same
1964	35	14	41	22	63	12.8			Same
1965	44	25	58	21	48	12.9			Same
1966	63	33	56	41	65	13.2			Same
1967	29	16	57	13	45	12.8	21.5	6.5 (15) Fall	9/15-10/5
1968	38	18	49	19	50	12.9	22.0	5.9 (9)	Same
1969	17	15	88	9	53	13.4	22.5	6.9 (12)	9/20-10/20
1970	27	18	69	15	56	12.7	20.6	5.3 (16)	9/15-10/5
1971	72	32	48	43	60	12.3	20.6	5.2 (24)	9/1-10/5
1972	47	27	57	24	51	13.1	21.3	7.1 (27)	9/10-10/10
1973	41	25	63	26	63	13.3	21.7	7.0(23)	9/10-10/10

1/ All male % based on known-sex bears.
2/ Length plus width given in feet.
3/ Length plus width given in inches.
4/ Tooth sample size in parenthesis.

PREPARED BY:

Lee Miller
Game Technician V

FIGURE 1

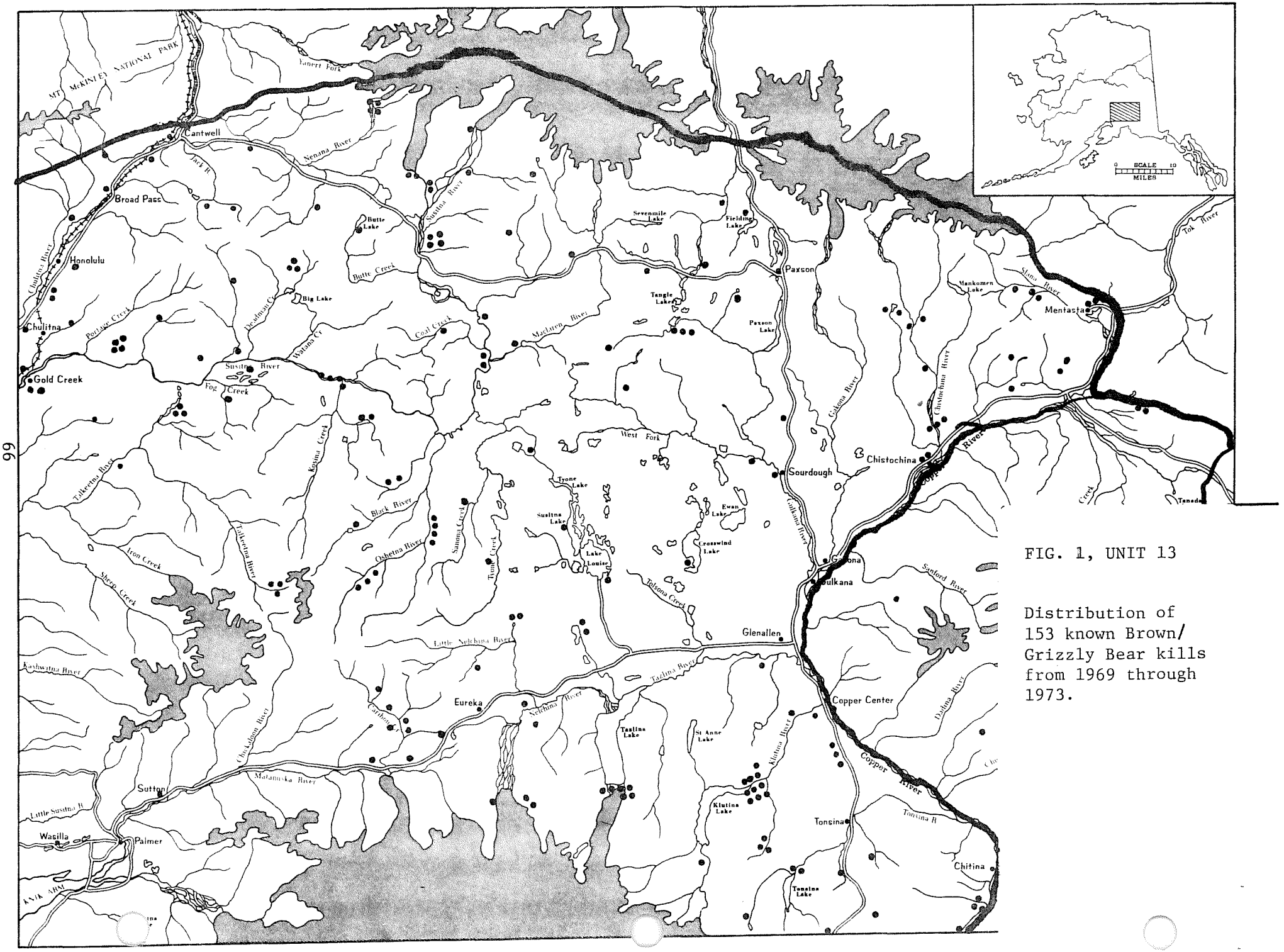

FIG. 1, UNIT 13

Distribution of 153 known Brown/ Grizzly Bear kills from 1969 through 1973.

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 14 - Upper Cook Inlet

Seasons and Bag Limits

Unit 14 Except that portion of Unit 14C in Chugach State Park.	Sept. 10 - Oct. 10	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited.
Unit 14C in Chugach State Park.	No Open Season	

Harvest and Hunting Pressure

The 1973 brown/grizzly bear harvest in Unit 14 was one bear (Appendix 1). This represents a reduction of 3 bears from the 1972 harvest and a reduction of 15 bears from the 1971 harvest. No reported non-sport kills were recorded in Unit 14 in 1973. The previous 10-year average (1963-1972) was 9.7 bear taken per year; thus this season had the lowest reported sport harvest since 1961 when compilation of harvest data was initiated.

No bears were taken by nonresident hunters during 1973, the one bear having been taking by a resident. Nineteen seventy-three marks the second year in a row when nonresident hunters did not harvest brown/grizzly bears in Unit 14. During the ten years prior to 1972 nonresidents took an average of 3.1 brown/grizzly bears from the unit each year.

The one bear taken was killed in the 14A portion of the Chugach Mountain Range.

Composition and Productivity

The bear was a 3-year-old male with a squared hide size of 10.8 feet. Skull measurements were not taken. No statements can be made on age or hide size trends with a sample of only one bear.

Management Summary and Conclusions

The 1973 brown/grizzly bear sport harvest in Unit 14 was the lowest recorded since 1961 when the Alaska Department of Fish and Game began collecting harvest data on brown/grizzly bears.

As reported in the past, it is believed that most bears taken from Unit 14 are taken incidental to other hunting. In 1973 the closing date of the September moose season in Subunit 14A was changed from September 20 to September 10. In Subunit 14B it was changed from September 30 to September 20. In 14C the opening date was changed from August 20 to September 4. In addition, Chugach State Park in its entirety was closed to brown/grizzly bear hunting. Thus the area open to brown/grizzly bear hunting was reduced as was the overlap of moose and bear seasons. In Subunit 14A the overlap was reduced to one day.

If most bear taken in Unit 14 are taken incidental to other hunting, an expected result of shortened September seasons for other species in Unit 14 (particularly moose and sheep) would be a reduced brown/grizzly bear harvest. This situation probably occurred in 1973.

Recommendations

A proposal is currently before the Board of Fish and Game to extend the September moose season in Subunit 14A to September 20; this would, in effect, increase the length of time that the moose hunters might encounter a bear. If this does not bring about an increase in the bear harvest the Department should consider opening the bear season on an earlier date.

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Don Cornelius
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SUBMITTED BY:

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Regional Management Coordinator

Appendix 1.

Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1973: Participation by Nonresident in the Bear Harvest with Mean Hide, Skull Size and Cementum Lines of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 14

Calendar Year	Total Kill	No. Males	% Males 1/	No. Nonres.	% Nonres.	Mean Hide Size Male 2/	Mean Skull Size Male 3/	Mean Cem. Lines Male 4/	Calendar Year Seasons
1961	14	6	43	7	50	12.6			9/1-9/30
1962	8	4	50	0	0	13.1			Same
1963	13	8	67	5	38.4	12.9			Same
1964	12	9	75	1	8	12.9			Same
1965	15	7	47	7	47	12.7			9/1-10/15
1966	5	2	40	2	40	13.5			9/1-9/30
1967	12	6	55	6	50	12.0	21.2		Same
1968	11	3	30	6	55	14.5	22.0	5.7 (3)	Same
1969	3	3	100	0	0	11.7	18.7	2.0 (3)	9/20-10/20
1970	6	1	17	0	0	11.6	-	2.0 (1)	9/15-10/5
1971	16	6	38	4	25	11.9	20.1	3.2 (6)	9/1-10/5
1972	4	2	50	0	0	12.6	22.2	5.0 (2)	9/10-10/10
1973	1	1	100	0	0	10.8	0	3.0(1)	9/10-10/10

1/ All male % based on known-sex bears.
2/ Length plus width given in feet.
3/ Length plus width given in inches.
4/ Tooth sample size in parenthesis.

PREPARED BY:

Leo H. Miller
Game Tech V

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 15 - Western Kenai Peninsula

Seasons and Bag Limits

Sept. 10 - Oct. 10	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited.

Harvest and Hunting Pressure

Brown/grizzly bear sealing reports indicate that 6 brown bears were taken in Unit 15 during the 1973 season (Appendix I). The harvest was composed of 3 males and 3 females. Three of the bears were taken by nonresident hunters.

Composition and Productivity

Hide and skull size data are too limited to be statistically analyzed.

Management Summary and Conclusions

The 1973 harvest of 6 bears was equal to the second highest (1969) recorded harvest. This harvest followed a 3-year declining trend; there is no apparent cause for this year's increase other than normal fluctuation. There is no reason to believe that changes in the harvest level reflect changes in abundance. Most bears are taken incidental to other hunting. It appears that the level of harvest is determined at least in part by the amount of overlapping of moose and brown bear seasons. Availability of food, berry crops and salmon runs also no doubt influence the location of bears and therefore the harvest.

Although there is presently no method of surveying or censusing brown bears in Unit 15, it is felt that the population is expanding. This feeling is based on increased human/brown bear conflicts and increased reports of bears observed.

Recommendations

No changes in seasons or bag limits are recommended.

Additional information should be obtained when bears are sealed to determine what percentage of bears are taken incidental to hunting for another species and the amount and kind of selectivity practiced by hunters.

PREPARED BY:

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SUBMITTED BY:

John S. Vania
Regional Management Coordinator

APPENDIX I

Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1972. Participation by Nonresidents in the bear harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 15

Calendar Year	Total Kill	No. Males	% Males1/	No. Nonres.	% Nonres.	Mean Hide Size Male2/	Mean Skull Size Male3/	Mean Cem Age Male4/	Calendar Year Seasons
1961	4	2	50	0	0	18.6			9/1-9/30
1962	5	2	40	3	60	11.5			Same
1963	4	2	50	0	0	12.8			Same
1964	2	2	100	2	100	12.9			Same
1965	3	1	33	1	33	13.2			Same
1966	4	1	25	1	25	17.3			Same
1967	4	2	50	1	25	15.5	24.5		Same
1968	11	7	64	1	9	14.5	25.1	2.0 (2)	Same
1969	6	4	67	0	0	14.3	24.8	7.0 (2)	Same
1970	3	2	67	1	33	15.3	26.3	8.0 (1)	9/20-10/15
1971	3	2	67	0	0	12.4	19.6	3.0 (1)	9/20-10/15
1972	2	1	50	0	0	--	23.7	4.0 (1)	9/10-10/10
1973	6	3	50	3	50	13.8	21.0	5.0 (3)	9/10-10/10

1/ All male percent based on known-sex bears.
2/ Length plus width given in feet.
3/ Length plus width given in inches.
4/ Tooth sample size in parenthesis.

PREPARED BY: Lee Miller, Game Tech V

BROWN/GRIZZLY BEAR

SURVEY -INVENTORY PROGRESS REPORT - 1973

Game Management Unit 16 - West Side of Cook Inlet

Seasons and Bag Limits

May 10 - May 25 Sept. 1 - Oct. 10	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited.

Harvest and Hunting Pressure

The brown/grizzly bear sport harvest in Unit 16 was 43 animals (Appendix 1). This is the greatest harvest reported from Unit 16 since the Alaska Department of Fish and Game began collecting brown/grizzly bear harvest data in 1961. The previous high was 42 bears taken in 1971. The previous 10-year average (1963-1972) was 30.4 bears harvested per year. Four (9.3 percent) of the 1973 bears were harvested during the spring season. The remaining 39 or 90.7 percent were taken during the fall season.

The percentage of nonresidents participating in the harvest (56 percent) is similar to the previous 10-year average of 54 percent.

Composition and Productivity

Sixty percent of the brown/grizzly bears taken from Unit 16 during 1973 were males. This is equal to the previous 10-year average of 60 percent males in the harvest.

Mean hide and skull sizes and ages of male bears taken in 1973 decreased slightly from averages of previous years. The mean hide size of male bears in 1973 was 13.0 feet. The previous 10-year average was 13.6 feet. The mean skull size of male bears was 22.0 inches compared to the previous 6-year average of 22.7 inches. The mean age from cementum lines in 1973 was 6.9 from a sample of 23 bears. This compares with an average age of 7.3 during the previous 6 years.

Management Summary and Conclusions

The harvest of 43 brown/grizzly bears from Unit 16 in 1973 was the greatest recorded in this Unit since 1961 when these data first became available. The increased take may partially be a response to a lengthened fall season plus a side effect of increased moose and sheep hunting pressure in the unit.

The percentage of mean hide and skull sizes, and ages of the male bears in the harvest are only slightly below the averages of previous years. Ninety-one percent of the harvest in 1973 took place during the fall season.

Recommendations

No changes in seasons or bag limits appear necessary at this time. However, more restrictive regulations in other Game Management Units (particularly Unit 9) may necessitate regulation changes in the near future.

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Appendix 1.

Brown-Grizzly Bear Sport Harvest, Calendar Years 1961 through 1973.: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Lines of Male Bears Presented for Sealing.

GAME MANAGEMENT UNIT 16

Calendar Year	Total Kill	No. Males	% Males 1/	No. Nonres.	% Nonres.	Mean Hide Size Male 2/	Mean Skull Size Male 3/	Mean Cem. Lines Male 4/	Calendar Year Seasons
1961	28	12	43	18	64	13.0			5/15-6/15 9/1-12/31
1962	18	9	50	10	83	12.1			Same
1963	27	18	69	11	41	13.0			Same
1964	20	13	65	9	45	12.7			Same
1965	37	22	73	19	51	13.5			Same
1966	27	11	42	14	52	13.3			Same
1967	28	13	50	19	68	14.4	23.1	8.1(10)(Fall)	Same
1968	23	16	70	16	70	14.5	23.3	8.1(14)	Same
1969	37	23	62	17	46	14.2	22.7	7.0(21)	5/15-6/15 9/1-10/15
1970	40	31	79	27	68	13.6	22.6	7.5(28)	5/15-6/10 9/1-10/15
1971	42	21	53	20	48	12.7	21.0	5.3(19)	5/15-6/10 9/1-10/15
1972	23	13	59	11	48	13.7	23.6	9.3(12)	5/15-6/10 9/10-10/10
1973	**43**	**24**	**60**	**24**	**56**	**13.0**	**22.0**	**6.9(23)**	**5/10-5/25 9/1-10/10**

1/ All male % based on known-sex bears.
2/ Length plus width given in feet.
3/ Length plus width given in inches.
4/ Tooth sample size in parenthesis.

PREPARED BY:

Leo H. Miller
Game Tech V

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 17 - Bristol Bay

Seasons and Bag Limits

May 15 - June 10 Oct. 7 - Oct. 21	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited.

Harvest and Hunting Pressure

The trend toward increased harvests in Unit 17 continued in 1973 (Appendix I). A record 23 bears were taken during the spring season and 18 during the fall season. Of the 41 bears, 30 were males, 10 females and one sex unknown. Nonresident hunters took 33 bears and residents 8. The male hide size, skull size and mean age all increased in 1973 (Appendices I and II).

Composition and Productivity

No information is available.

Management Summary and Conclusions

The pattern of increasing harvests in Unit 17 will require close management scrutiny. The spring harvest of 23 bears represents better than a four-fold increase over the mean spring harvest for the previous five years (1968-1972: 4.0 bears). In 1973, the unit's fall season was reduced from 45 to 15 days to coincide with the season dates for the heavily-hunted Alaska Peninsula (Unit 9). The fall harvest of 18 bears was less than the record fall harvest of 30 bears recorded in 1972. However, the fall 1973 harvest averaged 1.2 bears per day of season length as compared to 0.7 bears per day during the more liberal 1972 fall season. The 1973 fall harvest occurred in spite of inclement weather and late season dates that some guides claimed would find most of the bears in hibernation and unavailable. The increases in male hide size, skull size, and cementum age probably represent hunter selectivity that has resulted from the expanding guiding industry in the area.

No liberalization in season lengths or dates should be considered at this time. The fall season should continue to coincide with that of Unit 9 to prevent violators from using Unit 17 as a "dump" unit for illegally taken Unit 9 bears. If similar problems develop with the spring season, it should also be adjusted to coincide with that of Unit 9.

Recommendations

No changes in the hunting seasons or bag limits are recommended.

PREPARED BY:

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SUBMITTED BY:

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Regional Management Coordinator

APPENDIX I

GAME MANAGEMENT UNIT 17

Brown/Grizzly Bear Sport Harvest, Calendar Years 1961 through 1973: Participation by Nonresidents in the Bear Harvest with Mean Hide, Skull Size and Cementum Age of Male Bears Presented for Sealing.

Calendar Year	Total Kill	No. Males	%1/ Males	No. Nonres.	% Nonres.	Mean Hide Size Male 2/	Mean Skull Size Male 3/	Mean Cem Age Male 4/	Calendar Year Season
1961	2	1	50	0	0	13.7	---	---	5/15-6/15 9/1-12/31
1962	2	2	100	0	0	15.5	---	---	Same
1963	3	1	33	0	0	16.3	---	---	Same
1964	5	2	40	4	80	11.5	---	---	Same
1965	6	2	33	5	83	13.3	---	---	Same
1966	9	4	50	4	44	14.1	---	---	Same
1967	11	3	27	10	91	14.8	22.5	---	Same
1968	10	7	70	6	60	13.6	23.4	7.3(3)	Same
1969	5	2	40	3	60	15.3	23.2	8.5(2)	5/15-6/15 9/1-10/15
1970	23	12	55	20	87	14.7	23.0	6.4(11)	5/15-6/10 9/1-10/15
1971	33	21	66	26	79	14.1	23.2	6.4(17)	5/15-6/10 9/1-10/15
1972	35	22	63	27	77	13.9	22.1	8.2(21)	Same
1973	41	30	75	33	80	15.0	24.0	10.1(26)	5/15-6/10 10/7-10/21

1/ All male % based on known-sex bears
2/ Length plus width given in feet.
3/ Length plus width given in inches.
4/ Tooth sample size in parenthesis.

Prepared by: Lee Miller, Game Technician V

APPENDIX II

Average Male Brown/Grizzly Skull Size Recorded in Inches, and by Year, Season, and Residency of Hunter fo Unit 17.

YEAR	SPRING				FALL				TOTAL		
	RES.		NONRES.		RES.		NONRES.				
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	Sample Size%
1967	-	-	-	-	-	-	2	22.5	2	22.5	100
1968	2	23.5	-	-	1	20.8	2	24.6	5	23.4	71
1969	1	23.5	-	-	-	-	1	22.8	2	23.2	100
70	0	0	4	25.4	1	19.6	7	22.1	12	23.0	100
1971	0	0	5	25.6	3	21.4	10	22.6	18	23.2	86
1972	1	24.1	2	24.6	5	20.3	13	22.3	21	22.1	95
1973	3	23.8	14	24.3	1	23.5	11	24.2	29	24.2	97

Prepared by: Lee Miller, Game Technician V

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 18 - Yukon-Kuskokwim Delta

Seasons and Bag Limits

Sept. 1 - Nov. 30 May 15 - May 31	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited.

Harvest and Hunting Pressure

One grizzly bear was reported taken in Unit 18 during 1973. This does not reflect the true picture of the grizzly harvest in the unit, however. Grizzly bears are being taken in several of the drainages flowing west into the lower Kuskokwim River. It was rumored that several grizzly bears were taken in 1973 near the headwaters of the Kisaralik and Kwithluk Rivers. These bears were not sealed and reported for Unit 18. Closure of spring bear seasons in the heavier hunted units may divert further pressure to this unit in 1974.

Composition and Productivity

No scheduled surveys were made in Unit 18 during 1973.

Management Summary and Recommendations

Fall and spring opening and closure dates should be brought in line with adjacent units.

PREPARED BY:

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SUBMITTED BY:

Oliver E. Burris
Regional Management Coordinator

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 19 - McGrath

Seasons and Bag Limits

Sept. 1 - Oct. 15 May 15 - June 10	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited.

Harvest and Hunting Pressure

The reported sport harvest of grizzly bears in Unit 19 during 1973 was 58 bears (Appendix I), an increase of 12 bears over the 1972 harvest, and representing a large increase over a 12-year average of nearly 19 bears. This dramatic change is partially in response to high bear numbers, and increased exploitation of this species by guided and resident hunters from other units. In addition, most of this effort is directed toward the Alaska Range portion of Unit 19.

Nonresident hunters continued to take over three-fourths of the bears harvested. Since these hunters are all guided, one may surmise that hunting pressure could continue to increase as guides expand operations. Despite the increasing bear harvests since 1971 the parameters of overharvest estimation (hide size, skull size and age) suggest the bear population is capable of supporting the current level of harvest. In fact, age determinations from 39 bear teeth collected in 1973 revealed an average age of 9.3 years. This is an older average age than represented in any previous sample.

Table 1 is a comparison of fall and spring harvest data from 1961 through 1973. Until recently the spring bear harvest has been relatively insignificant, but with increasing pressure for grizzly hunts a trend toward more spring hunting has developed. Closure of other units to spring hunting may direct considerable pressure to Unit 19.

Table 1. Game Management Unit 19 grizzly bear sport harvest by season.

Year	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Spring	-	-	-	-	1	1	1	2	1	1	9	8	6
Fall	13	11	11	19	17	17	16	13	9	19	19	38	52

Composition and Productivity

No surveys were conducted in Unit 19 during 1973. Only two grizzly bears were observed in the unit while flying other counts. Both bears were seen along the South Fork of the Kuskokwim River.

Management Summary and Recommendations

Grizzly bear harvests have increased dramatically since 1971. This increase in harvest is partially due to high number of bears and a resultant extension of guided and resident hunters into this unit. No overharvest is reflected in the statistical data available. However, nearly the entire grizzly harvest is supported by bears found in the Alaska Range. This area supports roughly half the grizzly bear population of Unit 19. Continued or increasing harvest may depress this population segment beyond its annual recruitment capabilities. Firmer control and better distribution of the grizzly bear harvest will be necessary if the bear kill continues at its current rate of increase.

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Appendix I. Characteristics of the Brown/Grizzly bear sport harvest in Unit 19.

Calendar Year	Total Kill	No. Males	% Males[1]	No. Nonres.	% Nonres.	Mean Hide Size Male[2]	Mean Skull Size Male[3]	Mean Cem. Lines Male[4]	Calendar Year Seasons
1961	13	6	50	9	69	11.4	-	-	5/15 - 6/15 9/1 - 12/31
1962	11	7	64	3	27	13.3	-	-	Same
1963	11	5	56	8	73	13.2	-	-	Same
1964	19	12	63	13	68	12.3	-	-	Same
1965	18	6	35	15	83	12.4	-	-	Same
1966	18	5	29	14	78	12.7	-	-	Same
1967	17	7	44	13	76	13.5	22.6	-	Same
1968	15	6	50	10	67	12.1	21.1	4.7(3)	Same
1969	10	6	67	8	80	11.5	20.3	5.3 (7)	5/15 - 6/15 9/1 - 10/15
1970	20	12	71	16	80	11.5	19.5	6.5 (11)	5/15 - 6/10 9/1 - 10/15
1971	28	18	72	22	79	14.0 (14)	22.8	7.3 (14)	5/15 - 6/10 9/1 - 10/15
1972	48	27	64	31	67	13.2	21.5	7.1 (26)	5/15 - 6/10 9/1 - 10/15
1973	58	40	73	46	79	-	-	-	Same
13 year average	21.8	14.1	55.3	16.0	73.2				

[1] All male % based on known sex bears
[2] Length plus width given in feet
[3] Length plus width given in inches
[4] Tooth sample size in parenthesis

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 20 - Fairbanks, Central Tanana

Seasons and Bag Limits

Subunit 20A	Sept. 10 - Oct. 10	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited.
Subunits 20B, C, D	May 15 - May 31 Sept. 10 - Oct. 10	

Harvest and Hunting Pressure

The legally reported sport harvest of grizzly bears for calendar year 1973 in Unit 20 was 29 bears, a decrease of 7 animals over the 1972 harvest, and 1 bear higher than the 5-year (1968-1972) average harvest of 28. An additional 4 bears were shot in defense of life or property in 1973.

Fall season dates were the same as 1972, but 10 days longer than the 1971 season. A spring season in Subunits 20B, C, and D was 10 days shorter than the 1970 season, the last year in which portions of the unit had a spring season. Eighty-six percent of the harvest occurred in fall, while 14 percent of the bears were taken in spring (Appendix 1).

Harvest chronology data for the fall 1972 and 1973 seasons (Table 1) reflect a more uniform distribution of the harvest throughout the four-week season than occurred during 1972. Reasons for this trend are unknown, although the high proportion of bears taken by residents (76% resident fall kill) may reflect the intensity of hunting pressure for moose during September and October, while the presence of a spring season increased the potential resident harvest; guided, nonresident hunts rarely occur during the spring seasons in Unit 20.

Table 1. Unit 20 fall season harvest chronology by week, 1972, 1973.

Date of kill	Number killed		% of Unit 20 fall harvest	
	1972	1973	1972	1973
Sept. 10 - 16	15	9	42	36
Sept. 17 - 23	8	5	22	20
Sept. 24 - 30	10	6	28	24
Oct. 1 - 10	3	5	8	20
Total	36	25	100	100

Male bears comprised 68 percent of the harvest in 1973, an increase of 8 percent over the 5-year (1968-1972) average of 60 percent.

Data on hide size, skull size and mean age of male bears harvested in 1973 are presented in Appendix I. Skull size declined by 1.2 inches from the 1972 harvest (21.6" vs. 20.4"), mean age decreased by 1.1 years (7.4 years vs. 6.3 years), while hide size remained similar (12.7' vs. 12.4'). Five-year average (1968-1972) mean ages, skull sizes and hide sizes were 8.9 years. 20.9 inches, and 12.8 feet, respectively.

Analysis of kill locations obtained from sealing certificates indicates the central and western portions of the Alaska Range, occupying a relatively small portion of bear habitat lying within Unit 20, continued to furnish the majority of the harvest during the past 5 years (1969-1973). Twenty bears, or 69 percent of the spring/fall harvest, were taken between the Toklat River on the west and the Delta River on the east. It is not known whether this is a reflection of higher bear density or more intensive fall hunting pressure in these areas.

Summarized below are spring and fall 1973 harvest data for 29 known-location kills.

Table 2. Unit 20 spring and fall 1973 grizzly bear harvest by drainage.

Location	Number taken	Percent of unit harvest
Toklat, Savage River	7	24
Yanert River	1	3
Totatlanika, Wood River, Dry Creek	6	21
Little Delta, Delta River	6	21
Johnson, Robertson River	2	7
Salcha River	2	7
Upper Yukon	2	7
Beaver Creek	2	7
Birch Creek	1	3

Composition and Productivity

No formal surveys were undertaken. However, observations made by Department personnel in May and June in conjunction with other management and research studies in the central Alaska Range between Dry Creek and the Delta River revealed a minimum of 8 adults and 7 cubs, and a maximum of 19 adults and 10 cubs (assuming these were not resightings).

Management Summary and Recommendations

The Unit 20 bear harvest has stabilized the past five years despite variations in length and frequency of spring and fall seasons. Younger, smaller bears have comprised the sport harvest since 1969. However, the major portion of the harvest during this period has occurred from a

limited area, which may partially account for younger age cohorts in the sample.

A large number of bear sightings continues to occur within areas receiving heavy fall hunting pressure for other big game species. In addition, there has been no reduction in the percent of male bears in the harvest the past four years (which may indicate a sufficient rate of recruitment of adult bears to the huntable population). Consequently, based on the limited information available, the unit appears capable of supporting the current level of harvest. If the harvest from Subunit 20A exceeds 10 bears annually, restrictions aimed at reducing the harvest from this area may be necessary.

There is presently no method of evaluating hunting pressure for grizzly bears in Unit 20. Considering the low nonresident harvest (6 bears), and spring take by residents (4 bears) in 1973, it appears that most bears are taken incidental to other hunting. Uniform spring and fall seasons for the entire unit should be established to favor harvest of bears by residents.

Appendix I. Characteristics of Unit 20 grizzly bear harvest, calendar year 1973.

Total Sport Kill	M	F	Unk.	Non-sport Kill	Harvest by Nonresidents No.	%	Spring harvest	Fall harvest
29	19	9	1	4	6	21	4	25

Mean Hide Size Male	Mean Skull Size Male	Mean Cem. Age Male	Subunit Harvest 20A	20B	20C	20D
12.4	20.4	6.3	10	-	15	4

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 21 - Middle Yukon

Seasons and Bag Limits

Sept. 1 - Nov. 30 May 15 - May 31	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited.

Harvest and Hunting Pressure

No bears were reported taken by sport hunters in Unit 21 during 1973 for the second consecutive year (refer to the 1972 report for the reported harvest since 1961), despite the fact that professional guides were operating in Unit 21. One guide reported hunting on the Anvik River, but taking no grizzlies. Hunting pressure can be expected to increase slightly due to expansion of guiding activities. However, the remoteness of this unit and the distribution of grizzlies may tend to discourage other than incidental harvest of bears.

Composition and Productivity

Aerial surveys, during early May 1973, of the Upper Nowitna River and Beaver Mountain areas resulted in only one grizzly sighting. Several dens were found and tracks of nine individual bears were recorded. Lack of success on these surveys was a result of poor tracking conditions and early dispersal of the bears into heavily forested river valleys.

Management Summary and Recommendations

Unreported, unsealed bear kills remain a problem in this unit. Efforts should be continued to determine the magnitude of this harvest. In addition, seasons should be concurrent with those in adjacent units.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 22 - Seward Peninsula

Seasons and Bag Limits

May 25 - June 10 Sept. 1 - Oct. 31	One bear every four regulatory years; provided that the taking of cubs or females accompanied by cubs is prohibited.

Harvest and Hunting Pressure

The sport harvest in Unit 22 has always been very low. The reported take was one bear in the fall of 1973. The unreported take is believed to be considerably higher, possibly as high as 15 bears. Few people specifically hunt bears in Unit 22.

Composition and Productivity

No composition surveys were conducted.

Management Summary and Recommendations

The grizzly harvest continues to be minimal, probably well below what the population could support. There was little hunting pressure in the spring because the season was open at the height of spring breakup making travel difficult. An earlier spring season would be more appropriate.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Units 23 through 26 - Brooks Range

Seasons and Bag Limits

Unit 23	May 25 - June 10 Sept. 1 - Oct. 31	One bear every four regulatory years; provided that the taking of cubs or
Unit 24	May 25 - June 10 Sept. 1 - Sept. 30	females accompanied by cubs is prohibited.
Unit 25	May 25 - June 10 Sept. 1 - Sept. 30	
Unit 26	May 25 - June 10 No fall season	

Harvest and Hunting Pressure

The 1973 Brooks Range sport harvest of 89 bears was 27 percent higher than the previous record high of 70 bears in 1970 and 48 percent higher than the 60-bear average for the 5-year period 1968-1972. It was 112 percent higher than the 1972 harvest of 42 bears. However, all Brooks Range Units in 1972 only had either a spring or a fall season. In 1973 only Unit 26 did not have both a spring and fall season. I estimate the total kill from all sources (including defense of life and unreported kills) was approximately 120 bears in 1973.

It is very difficult to establish trends in hunting pressure or harvest due to the high variability in season lengths and timing of the seasons. In the past several years only the 1970 and 1973 seasons are relatively comparable. There was no fall season in Unit 26 in 1973 as there was in 1970, however.

Percent males and percent nonresident harvest did not deviate greatly from the 5-year average or the 1970 comparison year. Average 1973 male age, skull size, and hide size, have decreased from 1970 and the 5-year average, and these decreases appear significant. Skull size has decreased more than one full inch, average age has decreased one year and the hide size has decreased 0.5 feet when compared to the 5-year average. I believe these decreases lend support to inconclusive evidence from other sources that the level of maximum sustained harvest is being approached in the Brooks Range. The age structure of the harvest still appears good, however, with old bears comprising a sizable proportion of the harvest.

Unit 24, particularly, sustained more than one-third of the entire harvest, even though it is the smallest Brooks Range unit in size and amount of grizzly habitat. The greatest decrease in average age of any Brooks Range unit occurred in Unit 24 also (see Appendix I). Even considering that 5 to 10 bears may have been illegally taken in Unit 26

in the fall and reported from Unit 24 the 1973 harvest level in Unit 24 may be relatively the highest of all Brooks Range units and therefore the greatest cause for concern.

"Operation Grizzly" was an effort to assess grizzly bear hunting conditions in the Brooks Range in 1973. Five biologists were deployed throughout the area at various locations from May 15 to June 10. The basic objectives of the operation were as follows: 1) to determine the characteristics of the spring break-up and its relationship to the spring season; 2) to evaluate the effectiveness of enforcement effort and provide additional enforcement effort by the game biologists involved in the operation; 3) to assess the hunting pressure and the distribution of hunting effort throughout the Brooks Range; 4) to determine the condition of bear pelts relative to the spring season; 5) to conduct interviews designed to determine the attitudes of guides, hunters and residents of the area relative to the seasons and management programs and 6) to conduct surveys of bear distribution and abundance. The results of Operation Grizzly are as follows:

(1) Spring breakup in Units 24 and 25 occurred about the third week of May in 1973. Unit 23 was 7 to 10 days later, and Unit 26 was 14 to 21 days later than Units 24 and 25.

(2) There appeared to be no time during breakup when skilled aircraft operators couldn't land either on skis or wheels. Setting seasons to coincide with poor landing conditions and thus reduce illegal take the same day airborne is not feasible. Illegal operators tend to be skilled pilots and such seasons appear strongly discriminatory in restricting access for legitimate hunters. Almost all hunters, guides and area residents wanted a return to earlier season dates, from May 25th to June 10th, held in 1973. May 31 should be the latest date for the season to end on the south side of the Brooks Range.

(3) Given either a spring or a fall season, guides preferred a fall season so mixed bag hunts could be booked. Area residents were divided on the issue.

(4) An estimated 50 hunters took 37 grizzlies in Units 23-26 About one-third of these were probably taken illegally, mostly the same day airborne and mostly by a few people. Forty-nine percent of the kill was nonresident.

(5) Thirty-two grizzly hides were examined and, other than one hide which appeared to come from an animal in poor health, only one hide, taken in Unit 24 on June 8, appeared to be shedding. Of several bears examined during the concurrent grizzly research project in the Canning River the first bear with a deteriorating hide was a female captured June 3 whose hide was rubbed. On July 28 another female was captured which was shedding large quantities of underfur.

(6) Most hunting pressure existed in the central portion of the Brooks Range.

(7) Despite the obvious conclusion that aerial surveys appear too variable to provide meaningful trend information, there was general agreement among the biologists participating in Operation Grizzly that bears were abundant and are not presently overhunted. Though aerial surveys were too variable to establish trend counts it may be significant that bears were consistently observed in some drainages and not at all in others.

The autumn portion of "Operation Grizzly" was a small operation centered in the central Brooks Range. Two biologists participated in the autumn "Operation Grizzly" from September 1 to 17. The scope of the fall operation was considerably reduced from that of the previous spring. Objectives were primarily to contact as many hunters as possible and to determine the extent of hunting pressure duing the fall season. The following is some of the information obtained from approximately 100 hunters and guides contacted.

(1) Fifty-five percent of 90 hunters were residents; 75 percent from Fairbanks.

(2) Four percent of the resident hunters came north specifically to hunt grizzlies, 9 percent had a high interest in hunting grizzlies, 49 percent an incidental interest, 16 percent no interest, 16 percent an unknown interest and 7 percent were not legally able to take a grizzly this year.

(3) For 36 percent of the nonresidents grizzlies were the primary species sought, 44 percent had a high interest, no one was only incidentally interested, 6 percent had no interest, 3 percent had an unknown interst, and 9 percent were not legally able to take a bear.

(4) Two percent of the residents and 13 percent of the nonresidents were on single species hunts for grizzly only, 73 percent of the fall kill of 52 bears was by nonresidents. This compares with a 49 percent nonresident kill of 37 bears in the spring.

(5) There appeared to be much more nonresident than resident interest in hunting grizzlies, but the air taxi operator at Bettles admitted that he intentionally discouraged many resident inquiries about bear hunting. This could have had a significant effect since there is essentially only one air taxi for the central Brooks Range.

(6) Many residents did not know the season or bag limit on grizzlies although they admitted they would take one if the opportunity arose. Some even told of specific plans to hunt grizzlies in closed areas. This ignorance extended too often even to the species (moose) they were primarily seeking.

(7) A September 1 - 30 season was universally acceptable to both guides and hunters.

Additional information was obtained indirectly from contact with hunters and guides. Hunters and guides generally thought grizzlies were abundant and no overharvest was occuring. In some instances, especially for some guides, this may have been a manifestation of a sentiment or rationalization to get as much as possible now before the Brooks Range becomes a national park. Hunters expressed few opinions about Brooks Range grizzly seasons and regulations, therefore, confirming the findings in (7) above. Bear hides were examined for quality and none of the hides examined were rubbed though the hair was relatively short. Hide quality appeared acceptable to hunters taking them.

Composition and Productivity

Extensive aerial surveys were conducted May 15 - June 10 over most of the Brooks Range. These surveys seemed to confirm past indications of later emergence of sows with cubs and the necessity for a large number of replicate surveys to produce useful results.

On Operation Grizzly Bob Pegau saw his first sow with cubs on May 22 and John Trent his first June 4. Single bears were out in mid-April in the eastern Brooks Range and the first sow with cubs was seen there in mid-June by personnel of the grizzly research project.

The John River had the largest number of replicate surveys during Operation Grizzly. John Trent flew it at least a dozen times and saw no bears. Bill Griffin flew it 12 times, saw no bears 7 times, and from 1 to 3 bears on the other 5 trips, for a minimum of 8 distinct bears.

Some useful composition and productivity information was obtained during the grizzly research project on the Canning and East Fork Chandalar Rivers from April to October (Table 1).

Table 1. Population composition of marked grizzly bears in the Canning and East Fork Chandalar Rivers, Brooks Range.

Class	No.	Percent of Population
Males	21	54
Single females	14	36
Females with 2 cubs	2	5
Females with 2 yearlings	2	5
Total Adults	39	

By capturing and marking every bear which could be located on the Canning and East Fork Chandalar Rivers a total of 39 adult bears were captured. Fifty-four percent were males, but of the 23 captured on the north side of the Brooks Range 70 percent were males, while only 31 percent of those captured on the south side were males.

Average age of males was 13.0 years with a range of 2.5 - 23.5 years. Females averaged 9.6 years with a 4.5 - 19.5 year range.

Paired adults were observed during the mating season from May 26 to July 9. A 4.5-year-old female was observed copulating on June 16, 1973 but had no cubs when seen in the company of a boar in May 1974. Very preliminary indications from this observation and a study of size, coloration and condition of mammae in the other females captured suggest that females may not whelp until nearly 10 years old.

Captured females which did not display incidence of rearing young according to mammae condition included one 4.5-year-old, three 5.5-year-olds, two 6.5-year-olds, one each 7.5- and 8.5-year-olds, and two 9.5-year-olds. Those females which did have cubs or yearlings were 16.5, 11.5, 19.5 and 11.5 years old.

Average litter size was 1.8, compared to 2.3 on the Alaska Peninsula and 2.36 on Kodiak Island.

Management Summary and Recommendations

The 1973 reported kill of 89 bears in Units 23-26 (and estimated total mortality by humans of 120) is probably at or near the maximum sustained yield for the Brooks Range as a whole. Most of the harvest, however, comes from the central Brooks and the upper half of the Noatak River. Pressure appears lightest in the eastern third of the Range.

A conservative management approach based on limited information of population density, productivity, distribution and usable habitat would suggest that future harvests should not exceed the 1973 harvest. With an expected gradual increase in sport hunting pressure, and an anticipated increase in defense of life and property mortality associated with Trans-Alaska Pipeline construction, modest restrictions in the existing seasons should be adopted. Uniform spring and fall seasons should be employed in all Brooks Range Units and the spring season should end no later than May 31.

Arctic grizzlies are not presently endangered, nor will they be in the foreseeable future. They are generally abundant and little or no overharvest occurred even during the record harvest of 1973. With our limited knowledge, however, we cannot afford to exceed the 1973 harvest.

Several conditions complicate regulation of the harvest by the season length only: 1) the relatively small allowable harvest from such a large geographic area, 2) the potential for concentrating hunters and guides and 3) the difficulty of adequately enforcing some restrictive regulations. Because of these complications it is recommended that the sport harvest in all Brooks Range units be regulated by permit commencing with the fall 1975 season.

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Appendix I. Brooks Range Game Management Units 23-26.

Calendar Year	Total Kill	% Male	% Bears Taken By Nonresident Hunting	Average Male Hide Size	Average Male Skull Size	Average Male Age
UNITS 23-26						
1970	70	69	63	13.1	21.9	9.1
1972	42	73	73	13.6	21.8	11.4
1973	89	70	63	12.7	20.8	8.4
5 yr. avg.	60	75	62	13.2	21.9	-
UNIT 23						
1970	26	73	58	13.9	22.0	6.9
1972	27	76	81	13.8	22.0	11.8
1973	28	64	64	13.5	21.6	8.9
5 yr. avg.	22	81	64	13.6	22.2	10.2
UNIT 24						
1970	17	65	65	12.1	21.2	11.7
1972	9	67	44	13.2	21.4	12.0
1973	33	70	70	12.2	20.2	7.7
5 yr. avg.	10	68	56	13.0	21.6	10.3
UNIT 25						
1970	13	69	62	12.9	21.6	8.7
1972	6	67	50	12.9	21.6	19.3
1973	16	75	44	11.8	20.6	8.5
5 yr. avg.	10	69	62	12.9	21.2	8.0
UNIT 25						
1970	14	77	79	12.9	22.8	14.1
1972	-	-	-	-	-	-
1973	12	75	67	12.3	21.2	9.4
5 yr. avg.	17	76	63	12.9	22.0	8.4

SHEEP

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 7 - Seward - Kenai Mountains

Seasons and Bag Limits

Unit 7 that portion bounded on the northwest by the Sterling Highway, on the northeast and east by the Anchorage-Seward Highway, on the south and southwest by Kenai Lake.	To be announced	Closed except that one sheep with 1/2 curl horn or less may be taken by permit only. Date and conditions of the hunt to be described by Commissioner's announcement.
Remainder of Unit 7	Aug. 10 - Sept. 20	One ram with 3/4 curl horn or larger.

Harvest and Hunting Pressure

Based on harvest report returns the harvest of rams in GMU 7 since 1962 has been as follows:

1962 - 15*	1968 - 52
1963 - 25	1969 - 42
1964 - 8	1970 - 25**
1965 - 22	1971 - 9
1966 - 18	1972 - 18
1967 - 21	1973 - 26***

* 1962 was the first year of the harvest ticket regulation. Coverage is known to have been incomplete.
** Includes 2 sheep taken in the Chugach Mountains.
*** Includes 1 sheep taken in the Chugach Mountains.

One hundred and seventy-four hunters reported hunting sheep in Unit 7 during the 1973 season. Twenty-six resident hunters took rams for a success rate of 14.9 percent (Appendix I). Hunters afield increased by 54.0 percent and hunter success declined by 6.3 percent from 1972. Hunters afield declined between 1969 and 1972 but increased sharply in 1973.

The average horn length of sheep taken in Unit 7 in 1973 was 30.8 inches (Appendix I).

Composition and Productivity;

Sheep numbers declined by 30 percent on Cooper Mountain between 1968 and 1972. In 1973 sheep numbers were up 6.1 percent over 1972 (Appendix II). Since this is the first increase in numbers since 1967 the downward trend seems to have ended, however, more than one year's data will be needed to confirm this.

On Crescent Lake Mountains sheep numbers increased from 224 in 1972 to 268 in 1973, an increase of 19.6 percent (Appendix II). No hunting was allowed on this herd in 1971 and 1972. A limited hunt for 1/2 curl or less sheep was held Sept. 1. to Sept. 20 in 1973. Seventy-five permits were issued. The hunt was divided into 5 time periods of 3 days each, with one day of no hunting allowed between each period. Seventeen hunters were successful. This hunt was conducted as part of a research program and will be reported in detail under sheep research.

Surveys were not conducted in the Grant Lake Mountains in 1973.

Management Summary and Conclusions

The hunting effort for sheep in Unit 7 increased 54.0 percent over 1972. The cause of this increase is not known but generally all hunting effort appears to be due at least in part to high meat prices. Although the hunting effort in 1973 was high it is still well below the level of 268 hunters in 1969.

Trend surveys indicate that sheep populations over most of Unit 7 increased steadily from the early 50's through 1968. Between 1968 and 1972 most populations ceased to expand and one (on Cooper Mountain) declined significantly. The sheep population on Cooper Mountain expanded by 6.1 percent between 1972 and 1973 and the Crescent Lake Mountains herd expanded by 19.6 percent.

Recommendations

No changes are recommended at this time.

PREPARED BY:

Paul A. LeRoux
Game Biologist III

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

APPENDIX I

Harvest and Hunter Success, Unit 7 - Kenai Mountains

Year	Mountain Range	Number Successful	Percent Successful	Number Unsuccessful	Percent Unsuccessful	Total Sample*	Ave. Horn Length
1969	Kenai	42	15.7	226	84.3	268	
	Chugach	0	0	18	100.0	18	
1970	Kenai	23	13.8	143	86.1	166	
	Chugach	2	15.4	11	84.6	13	
1971	Kenai	9	7.8	107	92.2	116	
	Chugach	0	0	13	100.0	13	
1972	Kenai	18	17.3	86	82.6	104	
	Chugach	0	0	9	100.0	9	
1973	Kenai	25	16.1	130	83.9	155	30.6
	Chugach	1	5.3	18	94.7	19	36.0

* Does not include hunters who did not give zip code (less than 1%).

PREPARED BY: Paul A. LeRoux, Game Biologist III

APPENDIX II

Sheep trend count data, portions of Unit 7 - Kenai Mountains

COOPER MOUNTAIN

Date	Total Adults	Lambs	Total Sheep
7/56	39	11	50
6/63	47	10	57
5/68	97	20	117
9/72	70	12	82
7/73	--	--	87

CRESCENT LAKE MOUNTAINS

Date	Total Adults	Lambs	Total Sheep
6/56	101	35	136
6/68	228*	68	296
7/70	243	44	287
6/71	208*	20	228*
6/72	194	30	224
6/73	218	50	268

GRANT LAKE MOUNTAINS

Date	Total Adults	Lambs	Total Sheep
8/68	30	13	43
8/69	41	16	57
8/70	48	14	62
9/71	43	8	51
7/72	49	4	53
/73	No Survey Conducted		

* Corrected figure.

PREPARED BY: Paul A. LeRoux, Game Biologist III

SHEEP

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 15 - Kenai Mountains

Seasons and Bag Limits

Aug. 10 - Sept. 20	One ram with 3/4 curl horn or larger.

Harvest and Hunting Pressure

Based on harvest report returns the harvest of rams since 1962 has been as follows:

1962 - 35*	1968 - 52
1963 - 93	1969 - 31
1964 - 26	1970 - 92
1965 - 35	1971 - 25
1966 - 48	1972 - 18
1967 - 47	1973 - 34

*1962 was the first year of the harvest ticket regulation. Coverage is known to have been incomplete.

One hundred and thirty-seven hunters reported hunting sheep in Unit 15 during the 1973 season. Thirty-four hunters (27 residents, 3 nonresidents and 4 unspecified) were successful for a success rate of 24.8 percent (Appendix I). Hunters afield increased by 17.1 percent over 1972 and hunter success increased by 62.1 percent.

The average horn length of sheep taken in Unit 15 during the 1973 season was 30.8 inches (Appendix I).

Hunters afield over the past five seasons have varied from 115 to 156 while hunter success has varied from 15.4 percent to 31.6 percent.

Composition and Productivity

No new data available.

Management Summary and Conclusions

Hunters afield increased by 17.1 percent between 1972 and 1973 and hunter success improved from 15.4 percent to 24.8 percent (Appendix I).

The ram harvest from Unit 15 over the past 10 years has fluctuated but has not followed a trend. There are very few rams over full curl in the population and therefore very few living long enough to succumb to old age. It is therefore apparent that rams are being harvested at about the same rate that they are recruited into the population.

With this situation it appears that the annual harvest is largely dependent upon the strength of the 3/4 curl ram class and weather during the hunting season.

The average harvest over the past 6 years has been 33.6 rams per annum. Since the population of sheep in Unit 15 numbers about 1,150 the recruitment and harvest rates for rams are about 2.9 percent. With sheep being produced at a ratio of about 50 percent males and 50 percent females this figure can be doubled to get the annual recruitment rate of about 5.8 percent. This rate of increase is low and could probably be improved considerably by more intensive harvests of this sheep population.

Recommendations

Upon completion of the present sheep research program, information gained should be utilized to establish an intensive management plan for sheep in Unit 15.

No changes are recommended at this time.

PREPARED BY:

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Game Biologist III

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

Appendix I

Sheep harvest and hunting pressure, Unit 15 - Kenai Mountains

Year	Mountain Range	Number Successful	Percent Successful	Number Unsuccessful	Percent Unsuccessful	Total Sample*	Average Horn Length
1969	Kenai	31	27.0	84	73.0	115	
1970	Kenai	42	31.6	91	68.4	133	
1971	Kenai	25	16.0	131	84.0	156	
1972	Kenai	18	15.4	99	84.6	117	
1973	Kenai	34	24.8	103	75.2	137	30.8

* Does not include hunters who did not give zip code (less than 1%).

PREPARED BY: Paul A. LeRoux, Game Biologist III

Sheep - Game Management Unit 15 - Western Kenai Peninsula

Appendix II

Sheep trend count data Unit 15, 1950-1972

Date	Area	Total Adults	Lambs	Total Sheep
6/19/68	Surprise Mountain	207	68	275
6/13/72	Surprise Mountain	156	45	201
6/ /73	Surprise Mountain	167	46	213
7/16/68	Skilak Glacier to Killey River	46	9	55
8/8/72	Skilak Glacier to Killey River	66	10	76
1950	Killey River to Tustumena Glacier			123
1951	Killey River to Tustumena Glacier			157
1962	Killey River to Tustumena Glacier	251	38	289
1966	Killey River to Tustumena Glacier	426	100	526
7/68	Killey River to Tustumena Glacier	594	162	756
8/7-8/72	Killey River to Tustumena Glacier	444	127	597*
7/17-18/68	Tustumena Glacier to Bradley Lake	158	22	180
7/26-27/72	Tustumena Glacier to Bradley Lake	126	17	143
7/18/68	Bradley Lake South	1	0	1
7/28/72	Bradley Lake South	0	0	0
1968	All of Unit 15 except Round Mtn.	1006	261	1267
1972	All of Unit 15 except Round Mtn.	792	199	1017*

* Includes 26 unclassified sheep.

PREPARED BY:

Paul A. LeRoux
Game Biologist III

SHEEP

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 9 - Alaska Peninsula

Season and Bag Limits

August 10 - September 20	One ram with 3/4 curl horn or larger.

Harvest and Hunting Pressure

The reported sheep harvest in 1973 for Unit 9 was three rams. The historic harvest for the unit, as reported by the harvest report program, is presented below:

Year	Kill	Year	Kill
1962	0	1968	10
1963	1	1969	7
1964	2	1970	2
1965	0	1971	2
1966	0	1972	3
1967	6	1973	3

Composition and Productivity

No data are available.

Management Summary and Conclusions

Sheep on the Alaska Peninsula are restricted to that portion of the Alaska Range east of Lake Clark. Hunting pressure is light.

Recommendations

No changes in hunting season or bag limits are recommended.

PREPARED BY:

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SUBMITTED BY:

John S. Vania
Regional Management Coordinator

SHEEP

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 11 - South and west portions of the Wrangell Mountains and the northern portion of the eastern Chugach Range.

Seasons and Bag Limits

Aug. 10 - Sept. 20	One ram with 3/4 curl horns or larger.

Harvest and Hunting Pressure

Ram harvests from Unit 11, statewide ram harvests, and the percentage of statewide harvests from Unit 11 are given in Appendix I. These data illustrate gradually increasing ram harvests both statewide and from Unit 11. The percentage of the statewide harvest from Unit 11 has fluctuated around 16 percent.

A comparison of hunter success between statewide hunters and hunters within the Wrangell-Mentasta-Nutzotin (WMN) Mountains during 1973 is made in Appendix II. In the WMN Mountains, hunters were generally more successful but there was a larger percentage of nonresident hunters. Although only 30 percent of the hunters were nonresidents in the WMN Mountains, they killed 51 percent of the sheep and individually had 2.5 times greater success than resident hunters.

A comparison of transportation means and the relative success of hunters shows that aircraft were the most popular and most successful transportation means. Thirty-three percent of the hunters, mainly residents, used transportation means other than aircraft and horses and had a low degree of success. Guided nonresidents mainly used aircraft and horses and had relatively high success. A regulation suggested in the Wrangell-St. Elias National Park proposal was to allow hunter transportation by aircraft only. If the 1973 hunting pattern within the Unit 11 portion of the proposed National park boundary remained unchanged, hunting by aircraft only could theoretically cause a decrease in the total harvest and a decrease in resident hunters.

Harvest and hunting pressure data are provided in Appendix III for the two mountain ranges within Unit 11. Sample sizes for the eastern Chugach Range are small, and this accounts for much of the fluctuation seen in the annual harvest data. Harvests, hunting pressure, and percentage of resident hunters were generally low in the eastern Chugach Mountains. The mean horn length of harvested rams was surprisingly low considering the low harvests from that area. Ram harvests, numbers of hunters, and mean horn length of harvested rams from the Wrangell

Mountains have generally increased from 1967 through 1973. Hunter success has fluctuated without apparent trend. Changes in harvest data of this nature may be expected; (1) where the annual production of legal rams equals or exceeds the losses, (2) where hunters continually move into local areas previously unexploited, or (3) where both factors are occurring.

A subgrouping of harvest data to isolate selected areas in the Unit 11 portion of the Wrangell Mountains reveals a changing pattern of hunting pressure (Appendix IV). In the Chitistone Canyon-Chitina Glacier vicinity, ram harvests and numbers of hunters have increased substantially from 1968 through 1973, and these increases were accompanied by gradual reductions in the mean horn length of harvested rams. Hunter success has fluctuated with decreasing percentages of resident hunters during recent years. Harvest statistics from the remainder of the Unit 11 portion of the Wrangell Mountains have fluctuated without apparent increasing or decreasing trends until 1973 when there was an increase in harvest and hunting pressure. This picture of a relative increase of hunting pressure in the eastern end of the Chitina Valley with a subsequent reduction in trophy rams is complicated by a decreasing trend apparent in harvest and hunting pressure from the location unknown category. It seems probable that much of the reported increase in harvests from specified drainages was due to increased precision in reporting and coding locations of hunting. The annual harvests from unspecified locations were allocated by calculation to the Chitistone Canyon-Chitina Glacier vicinity and to the remainder of the Unit 11 portion of the Wrangell Mountains proportionately to each known annual harvest distribution (calculations are not shown), and the results suggested a doubling of harvests in the eastern end of the Chitina Valley and an approximate halving of harvests from the remainder of Unit 11 during the past 6-year period. Two of the more active guides hunting in the eastern end of the Chitina Valley reported that ram harvests and hunting pressure have greatly increased since 1970 (Ken Bunch and Dennis Harms, personal communications).

Composition and Productivity

Composition data obtained from various areas in the southern Wrangell Mountains by Department of Fish and Game personnel are shown in Appendix V. These data illustrate stable or increasing percentages of legal rams found within specified areas during sequential counts. Where boundaries of specific areas were the same during sequential counts, sample sizes have been larger in more recent surveys. In some cases, however, larger counts were possibly the result of variable counting conditions.

Management Summary and Conclusions

Harvest data from Unit 11, primarily obtained from the southern Wrangell Mountain sheep populations, typify those of a top quality hunting area. Although ram harvests and hunting pressure have been increasing, the rate of increase of harvests is comparable to the

increase statewide. Sheep hunters in the Wrangell Mountains had a higher success ratio than statewide hunters, but a larger percentage of hunters in the Wrangell Mountains were nonresidents. Individually, nonresidents had a 2.5 times greater probability of killing a sheep than resident hunters, and, collectively, they killed 51 percent of the sheep although they comprised only 30 percent of the hunters. Guided nonresidents mainly used horses and aircraft for transportation means, whereas other types of transportation were used mainly by residents with much lower success ratios. A negative effect of the proposed Wrangell-St. Elias National Park under suggested regulations on transportation means may be discrimination against resident sheep hunters in favor of nonresidents. Harvest data and reports by guides suggest an increase in hunting pressure in the eastern end of the Chitina Valley with a consequent reduction in trophy ram size. Composition data covering various areas in the southern Wrangell Mountains, however, suggest that the percentage of legal rams is stable or increasing. The combined information indicates that hunting pressure is shifting to reduce differences in trophy quality presently found in the Wrangell Mountains, although production of legal rams in most areas equals or exceeds losses.

Recommendations

Plans should be prepared in the near future to preserve and enhance trophy quality and quality hunting in selected areas of the Wrangell Mountains. The eastern portion of the Chitina Valley is a potential area for selection.

Composition counts should be made annually in selected areas. Harvest data coupled with field reports and annual composition counts in selected areas are minimal sources of information necessary to formulate management plans and manage populations.

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

PREPARED BY:

Carl McIlroy
Game Biologist III

SUBMITTED BY:

John S. Vania
Regional Management Coordinator

APPENDIX I

A Comparison of Unit 11 and Statewide Annual Ram Harvests and the Percentage of Statewide Ram Harvests from Unit 11

	Ram Harvests				Ram Harvests		
Year	Statewide	Unit 11	Percent	Year	Statewide	Unit 11	Percent
1962*	667	117	17.5	1968	1122	215	19.2
1963	970	131	13.5	1969	955	157	16.4
1964	919	151	16.4	1970	998	171	17.1
1965	885	131	14.8	1971	1079	178	16.5
1966	955	125	13.1	1972	1170	173	14.8
1967**	922	149	16.2	1973	1119	194	17.3

* 1962 was the first year of harvest ticket report. Coverage may have been incomplete.

** Reported kill by 15 January 1968.

Prepared by: Carl W. McIlroy, Game Biologist III

APPENDIX II

A Comparison of Hunter Success between Statewide Hunters and Hunters in the Wrangell-Mentasta - Nutzotin Mountains during 1973.

	Statewide	Wrangell - Mentasta - Nutzotin Mountains
Percent Hunter Success:	35%	43%
Total Successful Hunters:	1119	363
Total Hunters:	3172	840
Percent Success Among Residents:	26%	31%
Successful Residents:	628	175
Total Residents:	2378	569
Percent Success Among Nonresidents:	69%	76%
Successful Nonresidents:	464	182
Total Nonresidents:	675	240
Ratio Nonresident/Resident Success	2.7/1	2.5/1
Percent of Nonresidents Among All Hunters:	22%	30%
Total Nonresidents	675	240
Total Residents & Nonresidents:	3053	809
Percent of Sheep Killed by Nonresidents:	69%	51%
Nonresident Kill:	464	182
Resident & Nonresident Kill:	1092	357

Prepared by: Carl W. McIlroy, Game Biologist III

APPENDIX III

A Comparison of Annual Harvest Data from Portions of Mountain Ranges within Unit 11.

	1967	1968	1969	1970	1971	1972	1973
Unit 11 Portion of Eastern Chugach Range							
Ram Harvest*:	0	8	7	10	4	1	9
Number of Resident and Non-resident Hunters:	0	12	12	22	7	3	22
Percent Hunter Success:	-	67%	58%	45%	57%	33%	41%
Percent of All Hunters that Were Residents:	-	66%	42%	52%	29%	33%	28%
Mean Horn Length, inches**:	-	31.6	37.4	33.9	30.9	30.0	34.8
Unit 11 Portion of Wrangell Mountains							
Ram Harvest*:	149	199	150	161	174	171	185
Number of Resident and Non-resident Hunters:	246	303	329	308	376	344	418
Percent Hunter Success:	61%	66%	46%	52%	46%	50%	44%
Percent of All Hunters that Were Residents:	63%	69%	71%	75%	69%	64%	65%
Mean Horn Length, Inches**:	34.6	34.1	34.6	35.1	35.1	35.3	34.9

* The summed ram harvests from the eastern Chugach Range and the Wrangell Mountains do not equal the Unit 11 total harvest because of rams not included in this table whose specific kill location is unknown.

** Mean horn length from the 1967 harvest is based on rams harvested by resident hunters only. Mean horn length data during subsequent years is based on rams harvested by both resident and nonresident hunters.

Prepared by: Carl W. McIlroy, Game Biologist III

APPENDIX IV

A Comparison of Annual Harvest Data from Selected Areas in the Unit 11 Portion of the Wrangell Mountains.

	1968	1969	1970	1971	1972	1973
Chitistone Canyon-Chitina Glacier Vicinity						
Ram Harvest:	20	18	26	44	48	85
Number of Hunters:	35	34	62	86	97	154
Percent Hunter Success:	57%	53%	42%	51%	49%	55%
Percent Resident Hunters:	89%	72%	91%	82%	74%	59%
Mean Horn Length, Inches*:	37.7	36.7	36.2	36.5	36.2	35.8
Remainder of Unit 11 Portion of Wrangell Mtns.						
Ram Harvest:	64	57	69	66	55	78
Number of Hunters:	83	107	99	122	108	177
Percent Hunter Success:	77%	53%	70%	54%	51%	44%
Percent Resident Hunters:	67%	74%	66%	58%	59%	73%
Mean Horn Length, inches*:	33.2	34.5	33.8	35.2	34.8	33.5
Unknown Drainages within Unit 11 Portion of Wrangell Mountains.						
Ram Harvest:	122	71	55	47	65	22
Number of Hunters:	253	174	122	137	122	87
Percent Hunter Success:	48%	41%	45%	34%	53%	25%
Percent Resident Hunters:	66%	66%	71%	75%	60%	61%
Mean Horn Length, inches*:	33.9	34.0	35.3	34.9	35.6	35.4

* Mean Horn Length data is based on rams harvested by both resident and non-resident hunters.

Prepared by: Carl W. McIlroy, Game Biologist III

APPENDIX V

A Comparison of Composition Data Obtained from Various Areas in the Southern Wrangell Mountains.*

Year	Area	Legal Rams	Lambs	Unid.	Total	Percent Rams	Percent Lambs
1962	Nadina River to Kennicott Glacier	87	109	445	641	13.6	17.0
1963	Nadina River to Kennicott Glacier	91	149	527	767	11.9	19.4
1967	Nadina River to Kennicott Glacier	62	127	469	658	9.4	19.3
1973	Dadina River to Kennicott Glacier	141	160	756	1057	13.3	15.1
1967	Dadina River to Kluvesna River	48	---	254	302	15.8	----
1973	Dadina River to Cheshnina River	35	23	150	208	16.8	11.1
1970	MacColl Ridge	26	60	134	220	11.8	27.3
1973	MacColl Ridge	28	45	171	244	11.5	18.4
1970	Chitistone River to Canyon Creek	14	35	94	143	9.8	24.5
1973	Chitistone River to Canyon Creek	17	28	105	150	11.3	18.7

* The following data are grouped into areas with the same or similar boundaries. Counting conditions were dissimilar between surveys, and comparisons of data obtained from these surveys, as shown, should be made with caution.

Prepared by: Carl W. McIlroy, Game Biologist III

SHEEP

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 12 - Mentasta Mountains and the north slope of the Wrangell Mountains

Seasons and Bag Limits

Aug. 10 - Sept. 20 — One ram with 3/4 curl horns or larger

Harvest and Hunting Pressure

The reported harvests, numbers of hunters, success percentages, average horn sizes and resident-nonresident breakdowns by hunters, harvest and success for the 1967-1973 period are given in Table 1.

Table 1. Harvest statistics, Unit 12, 1967-1973.

Year	Harvest	Hunters	Percent Success	Average Horn Size (inches)	Percent Hunters		Percent Harvest		Percent Success	
					Resident	Nonresident	Resident	Nonresident	Resident	Nonresident
1967	119	-	-	31.9	-	-	-	-	-	-
1968	107	246	43	34.5	68	32	49	51	31	70
1969	122	235	52	33.6	69	31	46	54	34	87
1970	124	247	50	34.4	78	22	66	34	43	79
1971	182	341	53	35.6	78	22	63	37	42	88
1972	199	402	49	34.6	79	21	60	40	27	73
1973	170	376	45	34.1	70	30	51	49	33	73

An analysis of the harvest and hunter information by drainage does not show any major changes in recent years. The Rock Lake-Ptarmigan Lake-White River area and the Nabesna River drainage annually support the majority of the Unit 12 harvest (32% and 45%, respectively).

Composition and Productivity

Aerial sheep surveys were conducted in Unit 12 during July 1973. A major portion of the sheep habitat was covered including the Mentasta Mountains, Nabesna River drainage and the Rock Lake-Ptarmigan Lake area. The Chisana River drainage, Snag Creek drainage and that area east of Snag Creek to the US-Canadian border were not surveyed.

Survey results are given in Table 2.

Table 2. Unit 12 sheep surveys, 1973.

	Total sheep observed	Lamb:ewe ratio	Percent legal rams in herd
Mentasta Mountains	1002	8:100	14
Nabesna River drainage	1887	33:100	15
Rock Lake-Ptarmigan Lake Area	765	-	8
Unit 12 Totals	3654	-	11

During an aerial survey of the Mentasta Mountains in 1972, 1014 sheep with a lamb:ewe ratio of 24:100 were observed. In 1973 the survey showed 1002 sheep with a lamb:ewe ratio of 8:100. The difference between surveys, as far as total sheep observed, is not significant. The decrease in the lamb:ewe ratio may be significant, indicating low productivity or early lamb mortality. Mineral lick observations on Lost Creek by Spencer Linderman showed a lamb:ewe ratio of 11:100 and a yearling:ewe ratio of 11:100. Reasons for the low number of lambs in the Mentasta Mountains during 1973 are unknown.

The Nabesna River drainage supports a population in excess of 1900 sheep. The aerial survey indicated relatively good productivity and the percent of legal rams in the herd remains high. Signs of hunter pressure were abundant, however, and observers noted a scarcity of large rams during the survey.

The Rock Lake-Ptarmigan Lake area supports a dense sheep population numbering in excess of 800 sheep. The survey time needed to cover this area was one hour and 40 minutes, with the observer tallying more than 480 sheep per hour. The percentage of legal rams within the area was the lowest of those areas in Unit 12 that were surveyed. Productivity of these sheep was not determined.

Management Summary and Recommendations

The sheep populations of Unit 12 are high, dense in terms of sheep/sq. mile and vary greatly in terms of productivity and percent legal rams in the herd. Whether these populations are increasing or decreasing is unknown but it is unlikely that the sheep habitat in most areas can support present numbers indefinitely. Populations are not expected to increase. The percent of legal rams in the herd is expected to decrease in most areas.

No changes in regulations regarding trophy rams are recommended.

It is recommended that both the Mentasta Mountains and the Rock Lake-Ptarmigan Lake area be considered trend count areas and that composition and productivity information be gathered there annually.

It is further recommended that consideration be given to regulations that would allow the harvest of a limited number of ewe sheep. Regulations providing for a harvest of ewes should be directed specifically at the ewe segment, thus protecting the younger rams.

PREPARED BY:

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Game Biologist II

SUBMITTED BY:

Oliver E. Burris
Regional Management Coordinator

SHEEP

SURVEY-INVENTORY PROGRESS REPORT - 1973

Parts of GMU's 9, 16, 17 and 19 - Alaska Range West of McKinley Park (ARW)

Seasons and Bag Limits

Aug. 10 - Sept. 20	One ram with 3/4 curl horns or larger

Harvest and Hunting Pressure

The reported harvests, numbers of hunters, success percentages, average horn sizes and resident-nonresident breakdowns by hunters, harvest and success for the period 1967-1973 are given in Table 1.

Table 1. Harvest Statistics, Alaska Range West, 1967-1973.

Year	Harvest	Hunters	Percent Success	Average Horn Size (inches)	Percent Hunters		Percent Harvest		Percent Success	
					Resident	Nonresident	Resident	Nonresident	Resident	Nonresident
1967	65	97	67	-	48	52	42	58	52	76
1968	95	151	63	34.7	66	34	55	45	53	83
1969	104	154	68	35.0	60	40	51	49	57	82
1970	84	162	52	34.0	49	51	40	60	43	68
1971	71	156	46	34.1	51	49	39	61	35	57
1972	69	124	56	33.8	55	45	45	55	47	68
1973	119	211	56	34.4	53	47	45	55	47	67

The number of sheep harvested and the number of sheep hunters in the Alaska Range West did not reflect any marked long-term trends from 1967-1972. In 1973 there were significant increases in the numbers of hunters and the harvest of Dall rams. Examination of the harvest information on a drainage basis indicated that there have been no major shifts in pressure within this range. A few areas support the major portion of the kill and many areas are lightly hunted.

Composition and Productivity

During June 1972 a distribution and abundance survey was flown in the South Fork of the Kuskokwim and associated drainages. Eight hundred and fifty-seven sheep were counted. A low lamb:ewe ratio of 25:100 was indicated. Bad weather, in terms of a late breakup and rainy weather early in the summer, may have accounted for the scarcity of lambs.

During July 1973 the Sheep Creek and Windy Fork drainages were surveyed. A total of 353 sheep were observed including 55 rams (37 legal), 101 ewes, 82 lambs, 9 yearlings and 108 unidentified sheep. The high calculated lamb:ewe ratio of 81:100 may have reflected a mild 1972-73 winter. The low yearling:ewe ratio of 9:100 does not indicate low winter survival but rather is a reflection of the low lamb:ewe ratio (25:100) from June 1972.

Management Summary and Conclusions

With present harvest levels it is not likely that any major changes will occur in sheep populations in the ARW as a result of hunting. With increasing pressure the number of legal rams in most areas will decrease and regulations limiting the harvest may be necessary.

Information on sheep composition and productivity should be gathered on an annual basis and it is recommended that a trend count area be established.

The greatest present use of this sheep population is as a source of trophy sheep. No changes in the regulations regarding trophy rams are recommended.

At present there is no biological justification for regulations that prohibit the harvesting of ewe sheep. Regulations should be considered that would allow the harvest of ewe sheep and thereby increase hunting and recreational opportunities. The sheep population in this area has probably not undergone the severe composition changes that have occurred on other ranges, and management techniques should be initiated to prevent these undesirable changes. In the mean time regulations should allow for the continued harvest of trophy rams.

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SHEEP

SURVEY-INVENTORY PROGRESS REPORT - 1973

Parts of GMU's 12, 13, and 20 - Alaska Range East of McKinley Park (ARE)

Seasons and Bag Limits

Unit 20 - that portion known as the Delta Management Area	Aug. 10 Sept. 20*	One ram with 3/4 curl horns or larger
Unit 12, 13 and the remainder of Unit 20 in ARE	Aug. 10 - Sept. 20	One ram with 3/4 curl horns or larger

*From 12:01 a.m., August 5 to 12:01 a.m., August 26 neither motorized vehicles nor pack animals may be used to transport hunters, hunting gear or game within the Delta Management Area.

Due to a different management plan in the Delta Management Area, the survey and inventory report for this area follows the ARE report.

Harvest and Hunting Pressure

The reported harvests, numbers of hunters, success percentages, average horn sizes, average ages, and resident-nonresident breakdowns by hunters, harvest and success for the period 1967-1973 are given in Table 1.

Table 1. Harvest Statistics, Alaska Range East, 1967-1973.

						Percent Hunters		Percent Harvest		Percent Success	
Year	Harvest	Hunters	Percent Success	Average Horn Size (inches)	Mean Age (yrs)	Resident	Nonresident	Resident	Nonresident	Resident	Nonresident
1967	120	310	39	-	-	73	27	60	40	32	59
1968	195	578	34	33.9	-	82	18	73	27	30	52
1969	163	478	34	33.6	7.7	81	19	68	32	26	52
1970	211	515	41	33.9	-	85	18	78	22	36	56
1971	230	712	32	33.9	-	81	19	69	41	24	70
1972	241	800	30	33.2	7.3	83	17	67	33	24	58
1973	187	622	30	33.3	7.2	83	17	65	35	24	64

The reported harvest and number of hunters within the Alaska Range East decreased during the 1973 season. The percent of success remained at a low of 30 percent.

Analysis of the harvest ticket information on a drainage basis shows that the decrease in hunting pressure and harvest occurred basically in the western drainages of the mountain range. The eastern-most part of the ARE continued to sustain an increase in the number of hunters. Table 2 shows the distribution of all ARE hunters by area.

Table 2. Distribution of Hunters (percent using each area), Alaska Range East.

	1968	1969	1970	1971	1972	1973
Healy Creek Yanert Creek Moody Creek	28	23	20	27	22	17
Wood River Dry Creek West Fork	17	20	24	20	20	15
East Fork Delta Creek Trident Glacier	3	3	2	1	1	5
Delta Management Area	42	40	40	37	33	31
Johnson River Robertson River Tok River	10	14	14	16	24	32
Total Hunters	578	478	515	712	800	622

The continued shift of hunters to the eastern-most portion of the ARE, with the subsequent increased harvest in that area has maintained the mountain range average horn size of 33.3 inches. As explained in the 1972 S & I report, the average size of the rams from this eastern area and the horn growth rates for these rams are significantly higher than elsewhere in the ARE. Consequently the increased harvest from this area boosts mountain range average horn size and gives one the false impression that sheep hunting conditions within the ARE are not deteriorating. Reviewing the harvest statistics for the five areas described in Table 2 we see that in four of the five areas average horn size is decreasing. In two of the five areas (Healy Creek and East Fork of the Delta) the average horn size has dropped to 29.5 and 29.6 inches, respectively. The one exception to this trend of decreasing horn size has occurred in the Delta Management Area where horn size increased from 31.8 inches to 33.0 inches. Factors contributing to this increase will be discussed in the Delta Management Area S & I report.

Composition and Productivity

Lamb:ewe and yearling:ewe ratios for the central ARE are shown in Table 3.

Table 3. Lamb:ewe and yearling:ewe ratios, ARE (Dry Creek Area)

Year	Lamb:ewe	Yearling:ewe
1962	49:100	41:100
1963	58:100	39:100
1964	-	-
1965	39:100	37:100
1966	-	-
1967	42:100	11:100
1968	63:100	13:100
1969	64:100	31:100
1970	55:100	31:100
1971	50:100	51:100
1972	35:100	19:100
1973	34:100	13:100

Production of lambs and survival of lambs to yearling age decreased in 1973. Although the drop between 1972 and 1973 is probably not significant both ratios are considerably lower than the five-year average of 55 lambs:100 ewes and 27 yearlings:100 ewes preceding 1972. Reasons for the lowered production and survival are unknown. Weather (particularly in the early spring) definitely plays an important role in success of lamb production. Weather during the spring of 1973 was slightly colder and wetter than in previous years but it is not known if this adversely affected production and survival.

Production and survival in other areas of the ARE were apparently better than in the Dry Creek area. In the Granite Mountains lamb:ewe and yearling:ewe ratios were 47:100 and 43:100, respectively. In the eastern portion of the ARE (Johnson, Robertson and Tok Rivers) the lamb:ewe ratio was approximately 46:100. The lamb:ewe and yearling:ewe ratios in Mt. McKinley National Park, just west of the Dry Creek - Wood River area, have fluctuated greatly in the past but in 1973 were reported at 45:100 and 13:100, respectively. The low yearling:ewe ratio of 13:100 does not represent poor survival but rather reflects the poor initial production for 1972 of only 27 lambs per 100 ewes.

The percentages of legal rams in the herd for sheep populations throughout the ARE vary considerably from one area to another. Factors responsible for this variation include past hunting pressures, differences in horn growth rates and annual variations in success of production and survival. The highest percentage of legal rams (16-18%) in the ARE occurs in the eastern drainages of the range (Robertson, Johnson and Tok Rivers area). The lowest percentages of legal rams (3-4%) occur in the western-most drainages including Healy Creek, Moody Creek and the Wood River-Dry Creek area. No major changes in the percentage of legal rams in any area have occurred during this report period.

Management Summary and Conclusions

From 1968 to 1972 there was a steady increase in the number of hunters and the harvests of sheep within the ARE. During this period hunting pressure within the ARE shifted to the eastern drainages (Johnson, Robertson, Tok Rivers). Average horn size from all areas, with one exception, has been decreasing. Average horn size in the Delta Management Area, an area with special restrictions, increased slightly from 1972 to 1973.

Harvest statistics for the 1973 season show a decrease in the number of hunters within the ARE (800 to 622). The shift in hunting pressure to the eastern drainages continued and this area now supports approximately 32 percent of the total ARE hunters.

Trends in the number of hunters and the harvests of sheep in most areas of ARE point to the need for restrictive regulations if trophy hunting is to continue without further deterioration.

Production and survival of lambs to yearling age in the central ARE were low and have decreased for the past five seasons. The Wood River-Dry Creek sheep populations are too large even though mortality from all sources may have exceeded recruitment and the total number of sheep on the range may have decreased in recent years. To reduce the population to a more desirable level 250 ewes of breeding age should be selectively removed from the control ARE sheep populations in 1975. Surveys will be conducted in 1974 in this area. Higher lamb:ewe and yearling:ewe ratios were found in drainages east of the Richardson Highway.

Almost all indicators point to deteriorating sheep range in the Dry Creek-Wood River area. Corrective action must be initiated soon to reverse the trend.

Part of Game Management Unit 20 - Delta Management Area

Seasons and Bag Limits

Unit 20 (that portion known as the Delta Management Area)	Aug. 10 - Sept. 20*	One ram with 3/4 curl horns or larger

*From 12:01 a.m., August 5 to 12:01 a.m., August 26 neither motorized vehicles nor pack animals may be used to transport hunters, hunting gear or game within the Delta Management Area (DMA).

Harvest and Hunting Pressure

The reported sheep harvests, numbers of hunters, success percentages and mean horn lengths in inches for the DMA from 1968-1973 are given in Table 4.

Table 4. Delta Management Area harvest statistics 1968-1973.

Year	Harvest	No. of Hunters	Percent Success	Percent ARE Hunters	Average Horn Size (inches)
1968	45	201	22	27	35.2(n=41)*
1969	47	195	24	36	34.8(n=47)
1970	67	207	32	35	33.8(n=67)
1971	59	241	24	29	33.0(n=47)
1972	49	239	21	31	31.8(n=42)
1973	35	177	20	29	33.0(n=34)

*n = number of sets in sample.

A regulation prohibiting the use of vehicular transport methods during the first portion of the sheep season was adopted for initiation during the 1971 hunting season. The regulation was an attempt to set up a high quality hunting area for hunters willing to walk into the sheep mountains. The impact of this regulation can be seen in several of the above figures.

In 1973 the harvest of 35 rams from the Delta Management Area was slightly below the calculated sustainable harvest for the area. The decrease in the harvest (25%) was expected and corresponded with the 26 percent decrease in the number of hunters utilizing the area.

Success percentage remained low due to hunters being restricted to the least efficient transport means during the early portion of the season.

The average horn size showed a slight increase from 31.8 inches to 33.0 inches.

The percent of hunters by transport methods used, based on all reporting hunters, is shown in Table 5.

Table 5. Percent of hunters by transport methods.

	Walk-in	Airplane	Off-road Vehicle	Motorbike	Horse	Boat
1971	63	12	15	6	1	2
1972	61	12	13	3	3	8
1973	72	10	13	2	1	1

The transport information shows an increasing percentage of walk-in hunters. This is particularly interesting because with this increase in hunters using the least efficient means of transport there was not a corresponding decrease in the success percentage.

Composition and Productivity

Mineral lick observations were conducted by Oliver Burris at the Granite Creek lick from 27 June to 4 July 1973. Five hundred and eighteen sheep were classified as they entered the mineral lick. A lamb:ewe

ratio of 47:100 and a yearling:ewe ratio of 43:100 were observed. If figures are similar for other populations in the DMA, production is high and survival from June 1972 was close to 100 percent.

Information on the percentage of legal rams in the herd was not gathered in 1973.

Management Summary and Recommendations

There are several indications that hunting conditions in the DMA are presently improving.

If productivity and survival remain high and the number of hunters using the area remains between 150-200, hunting conditions will continue to improve.

No regulation changes are recommended for the ram segment of the population.

At the present time there is no biological justification for regulations that prohibit the harvesting of ewe sheep. It is recommended that regulations be adopted that would give the hunters utilizing this area the opportunity to harvest a ewe sheep if they desire. Regulations providing for this harvest should not allow the harvest of all sex and age classes of sheep, but should be directed specifically at the ewe segment, thus protecting the younger rams.

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SHEEP

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 13 - Central portion of the Chugach Mountains and the eastern portion of the Talkeetna Mountains.

Seasons and Bag Limits

Aug. 10 - Sept. 20	One ram with 3/4 curl horns or larger.

Harvest and Hunting Pressure

Ram harvests from Unit 13, ram harvests statewide, and the percentages of statewide harvests from Unit 13 are tabulated in Appendix I. Harvests from Unit 13 reached peak levels in the mid-to-late 1960's but have declined during the 1970's. By contrast, statewide ram harvests have increased since the mid-1960's. These relative changes are reflected by the decreasing percentages of statewide harvests from Unit 13.

Harvest data for two mountain ranges in Unit 13 are presented in Appendix II. Ram harvests from the Unit 13 portion of the eastern Talkeetna Mountains apparently reached a peak during 1968 through 1970 and have subsequently declined. Numbers of hunters have fluctuated without apparent trend, and hunter success has declined since 1970. Mean horn length of harvested rams has not changed substantially, suggesting that mean horn lengths have approached minimum values for legal rams. The increasing percentage of resident hunters since 1970 (and decreasing number of nonresident hunters) is inversely correlated with the decreasing harvest. Examination of the 1973 harvest data from the Talkeetna Mountains on a drainage basis (Appendix III) reveals a change in patterns existing prior to 1973.

The Chickaloon River-Boulder Creek drainages showed a trend of decreasing annual harvests, decreasing hunter success, and generally decreasing horn size prior to 1973. The 1973 harvest data revealed a marked increase in harvest, hunters, and hunter success. Percentages of resident hunters have increased since 1971. Changes in compilation of harvest data would not account for this changing pattern (Pat Crow, personal communication). Conversations with local guides and hunters that participated in the 1973 harvest indicated that they generally saw many sheep, few legal rams, but many young rams.

Harvest data from drainages in the remainder of the Talkeetna Mountains revealed decreasing annual harvests and hunter success since 1970 with a sharp drop in these indices during 1973. Numbers of hunters have fluctuated, but the percentage of resident hunters has increased.

The number of nonresidents ranged between 25 and 37 until 1973 when there were only 6 nonresidents. There was also a sharp decrease in the number of active guides and assistant guides in the Talkeetna-Cantwell-Susitna Lodge vicinity from 1972 to 1973. The reduced 1973 harvest may have been largely due to the reduction in guided nonresidents. A frequent comment heard from guides in this area was that legal rams were less commonly seen in recent years (Art Paul, personal communications).

Ram harvests, hunter success, and mean horn length have decreased in the central Chugach Range (Appendix II). The percentage of resident hunters does not show a trend. No other recent information is available for this area.

Composition and Productivity

Sheep composition data for specific areas in Unit 13 are given in Appendix IV. Data for the Boulder Creek drainage suggest that sheep numbers increased rapidly during the early-1950's (as they did in McKinley Park) to high levels in the late 1960's. Data from the Watana Hills count area suggest a decline in sheep numbers since the late 1960's. Percentages of legal rams in both count areas were relatively low.

Management Summary and Conclusions

The harvest data indicate that fewer rams have been available for harvesting from Unit 13 in recent years. This is suggested by the combination of declining harvests, declining hunter success, and small or declining horn size of harvested rams. The Talkeetna Mountains have experienced most of this decrease. The cause(s) of the reduced availability of rams is unknown. Poor lamb survival several years ago, resulting in small cohorts entering the legal ram age classes, or poor ram survival during recent years are possibilities. There were fewer nonresident hunters in recent years in the Talkeetna Mountains, and this was probably another factor contributing to reduced harvests.

The benefits of amassing knowledge of relative sheep abundance and composition in Unit 13 through annual trend counts of selected areas would probably justify the costs. Harvest data coupled with guide and hunter interviews indicate that changes have been occurring in Unit 13 sheep populations. However, our knowledge of the nature and magnitude of these changes is imprecise because we have not been using population monitoring techniques for Unit 13 sheep during recent years. It will become necessary in the future to monitor sheep population and harvest data if we hope to realistically specify and obtain diverse objectives associated with the species management plans.

Recommendations

Trend count areas such as the Watana Creek Hills and Boulder Creek drainages should be surveyed annually for trend information on sheep abundance and composition.

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

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APPENDIX I

A Comparison of Unit 13 and Statewide Annual Ram Harvest and the Percentage of Statewide Ram Harvests from Unit 13.

Ram Harvests				Ram Harvests			
Year	Statewide	Unit 13	Percent	Year	Statewide	Unit 13	Percent
1962*	667	107	16.1	1968	1122	159	14.1
1963	970	132	13.6	1969	955	155	16.2
1964	919	156	17.0	1970	998	134	13.4
1965	885	143	16.2	1971	1079	139	12.9
1966	955	154	16.1	1972	1170	125	10.7
1967	922	152	16.4	1973	1119	101	9.0

* 1962 was the first year of harvest ticket reporting. Coverage may have been incomplete.

APPENDIX II

A Comparison of Harvest Data from Portions of Mountain Ranges within Unit 13.

Unit 13 Portion of the Eastern Talkeetna Mountains	1967	1968	1969	1970	1971	1972	1973
Ram Harvest*:	71	87	95	91	71	64	52
Number of Hunters:	218	221	267	229	193	248	217
Percent Hunter Success:	33%	39%	36%	40%	37%	26%	24%
Percent Resident Hunters:	83%	77%	77%	72%	74%	84%	88%
Mean Horn Length, inches**:	31.1	31.9	31.5	32.3	31.4	30.2	31.0
Unit 13 Portion of the Central Chugach Range							
Ram Harvest*:	60	58	60	41	60	54	45
Number of Hunters:	121	112	158	124	156	128	163
Percent Hunter Success:	50%	52%	38%	33%	38%	42%	28%
Percent Resident Hunters:	64%	74%	79%	81%	74%	78%	79%
Mean Horn Length, inches**:	33.1	35.5	36.2	34.1	35.1	33.8	33.8

* The summed ram harvests from the eastern Talkeetna Mountains and the central Chugach Range do not equal the Unit 13 total harvest because of rams not included whose specific kill location is unknown and because of small number of rams killed in Unit 13 from the Alaska Range east of McKinley.

** Mean horn length for the 1967 harvest is based on rams harvested by resident hunters only. Mean horn length data during subsequent years is based on rams harvested by both resident and nonresident hunters.

Submitted by: Carl W. McIlroy, Game Biologist III

APPENDIX III

A Comparison of Harvest Data from Drainages in the Unit 13 Portion of the Talkeetna Mountains.

Chickaloon River-Boulder Creek	1967	1968	1969	1970	1971	1972	1973
Ram Harvest*:	30	34	24	13	9	11	35
Number of Hunters:	78	86	76	49	40	47	76
Percent Hunter Success:	38%	40%	32%	27%	23%	23%	46%
Percent Resident Hunters:	85%	85%	89%	81%	88%	98%	100%
Mean Horn Length, inches**:	31.3	31.1	28.4	29.4	30.6	27.3	30.1
Remainder of Unit 13 Portion of eastern Talkeetna Mountains							
Ram Harvest*:	41	48	57	57	38	40	16
Number of Hunters:	140	153	144	131	97	157	104
Percent Hunter Success:	29%	31%	40%	44%	39%	25%	15%
Percent Resident Hunters:	81%	78%	80%	72%	74%	79%	94%
Mean Horn Length, inches**:	29.0	32.1	30.6	32.9	31.5	31.0	31.2

* The sum of rams harvested from the Chickaloon River-Boulder Creek vicinity and the remainder of the Talkeetna Mountains does not equal the total Talkeetna Mountain harvest (Appendix II) because of rams whose specific kill location is unknown.

** The mean horn length of the 1967 harvest is based on rams harvested by resident hunters only. Mean horn length data during subsequent years is based on rams harvested by both resident and nonresident hunters.

APPENDIX IV

A Comparison of Sheep Composition Data for Selected Areas.

		Percent		
Trend Count Area	Date*	Legal Rams	Lambs	Total
Boulder Creek drainages:	1949	--	--	45
	1951	--	--	115
	Sept. 1967	--	--	430
	May/June 1968	6%	10%	404
	July 1968	--	--	460
Watana Hills vicinity:	1950	--	--	0
	Sept. 1967	--	--	220
	Aug. 1968	--	18%	183
	Aug. 1973	6%	23%	176

* Months during which some surveys were conducted.

Submitted by: Carl W. McIlroy, Game Biologist III

SHEEP

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 14 - Upper Cook Inlet

Seasons and Bag Limits

Subunits 14A and 14B	Aug. 10 - Sept. 20	One ram with 3/4 curl horn or larger.
Subunit 14C	Sept. 4 - Sept. 20	One ram with 3/4 curl horn or larger.

In Game Management Subunit 14C the entire Eklutna drainage, except for Thunderbird Creek, was closed to hunting according to regulations promulgated by the Alaska Board of Fish and Game.

Harvest and Hunting Pressure

The 1973 reported harvest in Unit 14 was 32 rams (Appendix I). The average annual harvest for the previous 10 years (1963 through 1972) was 73 rams, with harvests varying from a high of 110 in 1963 to a low of 49 in 1966.

When Game Management Unit 14 is broken down into four fairly discreet areas for which the harvest could be determined from harvest report data (Appendix II), the areas with the greatest decrease in harvest become evident. In the Game Management Subunit 14C portion of the Chugach Mountain Range the 1973 reported harvest of 11 rams was only 29.7 percent of the 1968-1972 average of 37 sheep per year. In the Game Management Subunit 14A portion of the Talkeetna Mountains the 1973 reported harvest of 5 rams was 41.7 percent of the 1968-1972 annual average of 12 sheep. In the remaining areas in Game Management Unit 14, harvests were only slightly below the 1968-1972 averages.

To obtain an index of hunter success, data for the entire Chugach Mountain Range and the entire Talkeetna Mountain Range have been utilized due to the IBM harvest program design.

The Chugach Mountain data include portions of the mountain range in Units 7, 11, 13, and 14. In the entire Chugach Range 426 hunters took 81 sheep for a 19 percent success ratio (Appendix III). Success ratios during the period 1967 through 1972 have varied from 19 percent to 22 percent with numbers of hunters varying from 470 to 655. The 1973 resident hunter success ratio of 13 percent and nonresident hunter success ratio of 52 percent in the Chugach Mountains are the lowest recorded since these data became available.

In the Talkeetna Mountains, of which the harvest data from the Chulitna Mountains and Watana Creek Hills are a part, the range includes portions of Units 13 and 14. Two hundred and seventy-seven hunters harvested 61 sheep for a 27 percent success ratio in the entire Talkeetna

Mountain Range (Appendix IV). Success ratios during the 1967 through 1972 period have varied between 27 and 37 percent annually, while the number of hunters has varied from 240 to 343. Success ratios of resident hunters declined to the lowest level (17%) since these data have been recorded. Nonresident hunter success has rebounded from a low of 56 percent in 1972 to 68 percent in 1973, but the number of nonresident hunters has declined almost 50 percent from 61 in 1972 to 31 in 1973.

Composition and Productivity

A sheep survey of the portion of Game Management Subunit 14A between the Matanuska and Knik Rivers in June 1973 revealed a minimum population of 475 sheep (Appendix V). Of these 137 were classified as rams, at least 71 of which were legal rams. Not all observers attempted to separate sub-legal rams from ewes. Eighty-one (17%) of the sheep were lambs.

The only previous survey data for this area include the entire area between the Knik River and the Matanuska Glacier. In 1951, Scott (U.S.F.W.S.) counted 185 sheep in this portion of Units 13 and 14, and in 1968 Erickson (ADF&G) tallied 475 sheep in the same area.

Management Summary and Conclusions

The reported harvest of 32 rams in Game Managment Unit 14 was 43.8 percent of the previous 10-year average of 73 sheep per year. Normally over 50 percent of the Unit 14 harvest comes from the 14C portion of the Unit. Thus an extremely low take of 11 rams from Subunit 14C (29.7% of the 1968-1972 average) contributed heavily to the decrease.

Primary factors which decreased harvest in Subunit 14C were the reduction of the season in 14C from 42 days to 17 days (from August 10 through September 20 to September 4 through September 20), and the closure of the Eklutna River drainage to hunting. From 1968 through 1972 the Eklutna drainage contributed an annual average of 10 rams to the Subunit 14C harvest.

The harvest in the Subunit 14A portion of the Talkeetna Mountains was also considerably below the previous 5-year average. Harvests in the remainder of Unit 14 were only slightly below normal.

Of interest is the reported harvest of 10 rams in the portion of Subunit 14A between the Matanuska and Knik Rivers with the possibility of several other sheep having been taken in the area for which the specific Subunit could not be determined. This is the same area in which a minimum of 71 legal rams were counted in June prior to the hunting season.

The 1973 total Chugach Mountain harvest of 81 rams was 69.8 percent of the 1967-1972 average of 116 per year. As mentioned earlier, this was the result of a greatly decreased season in Subunit 14C and the closure of the Eklutna drainage to hunting. Both resident and nonresident hunters experienced lower success ratios in the Chugach Mountains.

The total Talkeetna Mountains sheep harvest of 61 rams was 63.4 percent of the 1967-1972 average of 96 per year. The harvest in this mountain range has been declining since 1969. The resident hunter success ratio (17%) was at the lowest level recorded since these data have become available, while the nonresident hunter success ratio (68%) has improved and is comparable to 1967-1972 levels. However, the number of nonresidents who reported hunting sheep in the Talkeetna Mountains (31) is the lowest recorded since these data have become available and represents only 50 percent of the 1967-1972 average of 63 hunters. This suggests that in response to poorer sheep hunting or smaller rams, guides who formerly utilized the Talkeetna Mountains are taking their clients to different areas.

An aerial survey of the portion of Subunit 14A between the Matanuska and Knik Rivers suggests that the sheep population in this area is at least as high or higher than the 1968 level and definitely higher than the 1951 level. Good numbers of legal rams are available but difficult terrain and limited access undoubtedly serve to protect this ram population.

Recommendations

To obtain basic background information, sheep surveys in portions of Subunit 14A and 14B should be conducted.

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

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Appendix I. Reported Harvest of Dall Sheep Rams in Alaska's Game Management Unit 14 for the Years 1963 through 1973*.

1963	1964	1965	1966	1967[1]	1968	1969	1970	1971	1972	1973	1963-1972 Average
110	67	62	49	72	76	94	63	59	77	32	73

* In a few cases hunters only report mountain range in which they hunted. When they fail to indicate the Game Management Unit, they are arbitrarily placed in certain Game Management Units.

1. Reported kill as of January 15, 1968.

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Don Cornelius, Game Biologist II.

Appendix II. Reported Harvest of Dall Sheep Rams in Portions of the Two Mountain Ranges in Alaska's Game Management Unit 14 for the Years 1968 through 1973.

	1968	1969	1970	1971	1972	1973	1968-1972 Average
Chugach Mtns. Portion in GMU 14A (between Knik R. Glacier and Matanuska R.)	16	11	9	8	14	10	12
Chugach Mtns. Portion in GMU 14C (between Knik R., Knik Glacier, Knik Arm and Turnagain Arm).	31	40	44	34	35	11	37
Talkeetna Mtns. Portion in GMU 14A (South-East slope of Talkeetna Mtns.).	13	22	3	11	13	5	12
Talkeetna Mtns. Portion in GMU 14B (Western slope of Talkeetna Mtns.).	3	1	5	3	7	3	4
Total reported sheep harvest for which specific areas could be determined.	63	74	61	56	69	29	65
Total reported sheep harvest for GMU 14	76	94	63	59	77	32	74

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Appendix III. Reported Harvest of Dall Sheep Rams, Numbers of Hunters, and Success of Hunters for Alaska's Chugach Mountain Range, in Game Management Units 7, 11, 13 and 14, 1967 through 1973.

	All Hunters*			Residents			Non-residents		
Year	Kill No.	Hunters	Success	Kill No.	Hunters	Success	Kill No.	Hunters	Success
1967	115	521	22%	67	455	15%	48	66	73%
1968	113	630	21%	99	570	17%	34	60	57%
1969	138	655	21%	102	593	17%	33	51	65%
1970	108	503	21%	67	404	17%	22	37	59%
1971	109	586	19%	70	518	14%	35	53	66%
1972	112	470	24%	79	378	21%	25	43	58%
1973	81	426	19%	49	362	13%	26	50	52%

* All Hunters category is higher than resident plus non-resident categories combined. This is due to the inclusion of reports from hunters who did not note residency.

Submitted by: Jack C. Didrickson, Game Biologist III.
Don Cornelius, Game Biologist II.

Appendix IV. Reported Kill of Dall Sheep Rams, Numbers of Hunters, and Success of Hunters for Alaska's Talkeetna Mountain Range, Chulitna Mountains, and Watana Creek Hills, 1967 through 1973.

Year	All Hunters*			Residents			Non-residents		
	Kill No.	Hunters	Success	Kill No.	Hunters	Success	Kill No.	Hunters	Success
1967	84	272	31%	50	224	22%	34	48	71%
1968	110	343	32%	64	273	23%	46	70	66%
1969	118	318	37%	64	235	27%	51	76	67%
1970	99	268	37%	45	175	26%	43	62	69%
1971	85	240	35%	39	178	22%	44	59	75%
1972	81	304	27%	41	227	18%	34	61	56%
1973	61	277	27%	39	232	17%	21	31	68%

* All Hunters category is higher than resident plus non-resident categories combined. This is due to the inclusion of reports from hunters who did not note residency.

Submitted by: Jack C. Didrickson, Game Biologist III.
Don Cornelius, Game Biologist II.

Appendix V. Number of Sheep Counted in Portion of Alaska's Game Management Units 13 and 14 Between the Matanuska and Knik Rivers

Year	Legal Males	Mixed Females and Sublegal Males	Lambs	Total	Source
1951*	--	---	--	185	Scott (USFWS)
1968*	--	---	--	475	Erickson (ADF&G)
1973**	71	323	81	475	ADF&G

* Includes entire Matanuska River drainage to Matanuska Glacier.
** Includes Matanuska River drainage west of Coal Creek.

Submitted by: Jack C. Didrickson, Game Biologist III.
Don Cornelius, Game Biologist II.

SHEEP

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 16 - West Side of Cook Inlet

Seasons and Bag Limits

Aug. 10 - Sept. 20	One ram with 3/4 curl horn or larger.

Harvest and Hunting Pressure

Based on harvest report returns, the harvest of rams from 1963 through 1973 is presented below:

1963	1964	1965	1966	1967*	1968	1969	1970	1971	1972	1973
15	20	16	6	4	9	14	11	8	11	29

* Reported kill by January 15, 1968.

Of the 29 sheep reported taken in Game Management Unit 16 in 1973, eight were taken in the Yentna River - Mt. Dall area where the harvest from 1968-1972 has ranged from 1 through 4. An additional 13 sheep came from the Rainy Pass vicinity where harvests from 1968 through 1972 ranged from 4 to 12 with an average of 8. An additional 4 sheep were harvested in areas where no sheep have been reported harvested since 1968 when these data first became available. The harvest of 29 rams is more than double the previous 10-year average of 11.

Appendix I reveals hunting pressure trends in the Alaska Range west of McKinley Park. Game Management Unit 16 is included in this area. From 1967 through 1972 an average of 141 hunters utilized this area each year. In 1973, 211 hunters reported hunting sheep in the Alaska Range west of McKinley Park. This is a 50 percent increase in hunting pressure.

Composition and Productivity

No sheep counts were conducted in Unit 16 during 1973.

Management Summary and Conclusions

The 1973 sheep harvest in Game Management Unit 16 was the highest recorded since these data became available in 1962. The harvest of 29 rams is more than double the previous 10-year average of 11. Sheep were also taken in areas which have received no reported harvest since 1968 when areas of harvest information first became available. Sheep hunting pressure in the Alaska Range west of McKinley Park has increased by 50 percent over the 1967-1972 average.

Recommendations

Increased harvest of sheep in Game Management Unit 16 requires that more basic background information be obtained. An aerial survey in portions of Unit 16 that may sustain sheep populations is needed as soon as funds and manpower permit.

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

PREPARED BY:

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SUBMITTED BY:

John S. Vania
Regional Management Coordinator

Appendix I. Reported Kill of Dall Sheep Rams, Number of Hunters, and Success of Hunters for the Alaska Range West of McKinley Park, 1967 through 1973, as Derived from Harvest Reports.

Year	All Hunters*			Residents			Non-residents		
	Kill No.	Hunters	Success	Kill No.	Hunters	Success	Kill No.	Hunters	Success
1967	65	97	67%	27	47	52%	38	50	76%
1968	95	151	63%	52	99	53%	43	52	83%
1969	104	154	68%	53	93	57%	45	55	82%
1970	84	162	52%	34	80	43%	26	38	68%
1971	71	156	46%	28	80	35%	39	69	57%
1972	71	124	57%	32	68	47%	34	50	68%
1973	119	211	56%	53	112	47%	63	94	67%

* All Hunters category is higher than resident/non-resident added. This is due to inclusion of reports from hunters who did not note residency.

Submitted by: Jack C. Didrickson, Game Biologist III.
Don Cornelius, Game Biologist II.

SHEEP

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 17 - Bristol Bay

Season and Bag Limits

August 10 - September 20	One ram with 3/4 curl horn or larger.

Harvest and Hunting Pressure

The reported sheep harvest for Unit 17 in 1973 was five rams. The historic harvest for the unit, as reported in the harvest report program, is presented below:

Year	Harvest	Year	Harvest
1962	9	1968	17
1963	1	1969	9
1964	12	1970	6
1965	11	1971	6
1966	9	1972	2
1967	7	1973	5

Composition and Productivity

No data are available.

Management Summary and Conclusions

Hunting pressure in Unit 17 for sheep is light.

Recommendations

No changes in hunting season or bag limits are recommended.

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SHEEP

SURVEY-INVENTORY PROGRESS REPORT - 1973

Parts of GMU's 20 and 25 - Tanana Hills - White Mountains

Seasons and Bag Limits

Unit 20 - that portion known as Glacier Mountain Management Area	Aug. 10 - Sept. 20*	One ram with 3/4 curl horns or larger
Remainder of Unit 20	Aug. 10 - Sept. 20	One ram with 3/4 curl horns or larger
Unit 25	Aug. 1 - Sept. 20	One ram with 3/4 curl horns or larger

*From 12:01 a.m., August 5 to 12:01 a.m., September 21 neither motorized vehicles nor pack animals may be used to transport hunters, hunting gear or game within the Glacier Mountain Management Area.

Harvest and Hunting Pressure

The reported sheep harvests, numbers of hunters, success percentages, average horn sizes, resident-nonresident breakdowns by hunters, harvest and success for the period 1967-1973 are given in Table 1.

Table 1. Harvest Statistics, Tanana Hills-White Mountains, 1967-1973.

					Percent Hunters		Percent Harvest		Percent Success	
Year	Harvest	Hunters	Percent Success	Average Horn Size (inches)	Resident	Nonresident	Resident	Nonresident	Resident	Nonresident
1967	8	23	35	-	-	-	-	-	-	-
1968	21	68	31	32.4	92	8	97	3	35	25
1969	1	16	6	27.5	83	17	100	0	7	0
1970	11	28	39	34.4	95	5	100	0	47	0
1971	15	43	35	35.6	87	13	93	7	36	25
1972	5	23	22	32.6	91	9	100	0	24	0
1973	7	48	15	28.6	94	6	100	0	15	0

The number of hunters and the harvest of sheep from the Tanana Hills-White Mountains has varied significantly in recent years but no trend is apparent. The percent of success has decreased for the past four hunting seasons. Average horn size shows no apparent trend. The majority of the hunters have traditionally been residents and 90-100 percent of the harvest is take by residents.

In 1971 the Board of Fish and Game set up a walk-in hunting area defined as the Glacier Mountain Management Area within the Tanana Hills-White Mountains. Traditionally this area supports only a few sheep hunters each year and in 1973 four unsuccessful resident hunters reported using the area.

Composition and Productivity

Composition and productivity information was gathered at a mineral lick on the north side of Schwatka Mountain July 22-25. Only 65 sheep were observed. The area does not contain a large sheep population and ratios observed may be representative of the population even though the sample is small. The lamb:ewe ratio and the yearling:ewe ratio are reported to be 33:100 and 8:100, respectively. Aerial surveys of Glacier Mountain showed a lamb:ewe ratio of 13:100. The percent of legal rams in the herds at Schwatka Mountain and Glacier Mountain was 7.6 and 7.8, respectively.

Management Summary and Recommendations

The sheep in the Tanana Hills-White Mountains complex are in small, widely scattered groups throughout the range. Specific information on movement patterns is lacking, however, available evidence indicates that movements may occur over long distances and sheep may not remain in a particular range on an annual basis. This possibility may explain some of the variations observed in the harvest and the percent of success of the hunters.

Hunting pressure in localized areas has reduced the percent of legal rams in the herd. On specific mountains (i.e. Twin Mountain) most legal rams have been harvested.

Production of lambs in the Glacier Mountain area and in the Mount Schwatka area, at least, was low. Information on productivity throughout the range is not available and should be gathered on an annual basis.

At the present time there is no biological justification for regulations that prohibit the harvesting of ewe sheep. It is recommended that consideration be given to regulations that would allow the harvesting of limited numbers of ewe sheep from accessible areas.

No further changes in regulations regarding trophy rams are recommended.

PREPARED BY:

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SUBMITTED BY:

Oliver E. Burris
Regional Management Coordinator

SHEEP

SURVEY-INVENTORY PROGRESS REPORT - 1973

Parts of GMU's 23, 24, 25 and 26 - Brooks Range

Seasons and Bag Limits

Aug. 1 - Sept. 20 — One ram with 3/4 curl horns or larger

Harvest and Hunting Pressure

The reported harvests, numbers of hunters, success percentages, average horn sizes, average ages and resident-nonresident breakdowns by hunters, harvest and success for the 1967-1973 period are given in Table 1.

Table 1. Harvest Statistics, Brooks Range, 1967-1973.

						Percent Hunters		Percent Harvest		Percent Success	
Year	Harvest	Hunters	Percent Success	Average Horn Size (inches)	Mean Age (yrs)	Resident	Nonresident	Resident	Nonresident	Resident	Nonresident
1967	105	156	67	-	-	64	36	53	47	56	88
1968	144	201	72	32.6	-	56	44	44	56	57	90
1969	68	121	56	33.4	8.9	50	50	44	56	50	62
1970	121	171	71	34.2	8.5	52	48	39	61	53	95
1971	168	275	61	34.2	8.7	60	40	50	50	51	76
1972	236	347	68	33.4	9.6	59	41	47	53	54	90
1973	242	405	60	34.0	9.1	64	36	56	44	52	76

The 1973 harvest of sheep in the Brooks Range increased slightly from 1972. The number of hunters also increased but, perhaps due to the reported poor weather during the early part of the hunting season, hunters were less successful. Horn size, average age and resident-nonresident statistics did not change significantly in 1973.

Analysis of the harvest data on a Unit basis showed a slight shift in pressure from Unit 26 on the north side of the range to Unit 25 on the south. Bad weather may also have influenced this shift. The percent of harvest by Unit is presented in Table 2.

Table 2. Percent of Brooks Range harvest by Unit

	Unit 23	Unit 24	Unit 25	Unit 26	Total Harvest
1968	10	23	10	57	144
1969	3	31	12	54	68
1970	14	36	11	39	121
1971	9	38	19	33	168
1972	11	35	19	36	236
1973	5	35	23	37	242

Analysis of the harvest on a drainage basis showed a slight shift in pressure on both the north and south slopes to the eastern drainages. The Canning and Hulahula Rivers on the north slope and the North Fork of the Koyukuk, Chandalar and Wind Rivers on the south slope experienced increased hunting pressure and harvest.

Composition and Productivity

Composition and productivity information is not gathered on a regular basis in the Brooks Range. On several occasions work by other agencies or organizations has given us some idea of productivity.

Renewable Resources, an ecological consulting firm, had biologists in the Canning River drainage investigating various aspects of Dall sheep populations. Their observations at mineral licks along the Canning River yielded a lamb:ewe ratio of 47:100. Aerial surveys showed a lower ratio and the biologists' best estimate of the actual lamb:ewe ratio was 38:100. Yearling:ewe ratios were estimated at 31:100.

Further east in the Atigun Canyon off the Sagavanirktok River the University of Alaska has been conducting a Dall sheep study since 1970. Lamb:ewe ratios gathered during the study in the canyon are shown in Table 3.

Table 3. Lamb:ewe ratios, Atigun Canyon, Brooks Range.

Year	Lamb:ewe ratio
1970	55:100
1971	20:100
1972	no data
1973	10:100

Management Summary and Conclusions

The number of hunters and the harvest of sheep from the Brooks Range have increased by more than 100 percent since 1970. Without additional restrictions all indications are that the pressure on the resource in this area will continue to increase.

The Department's knowledge of the Dall sheep resource in the Brooks Range is extremely limited. It may well be that these sheep populations can easily support present harvest levels. However, until the Department has more concrete information supporting this idea I recommend that we attempt to hold the harvest at or below that of 1973.

Plans for determining the status of the sheep population in the Brooks Range are underway and initial surveys of abundance and distribution will begin in the summer of 1974.

In addition to abundance and distribution surveys, it is recommended that trend count areas be established and that data on composition and productivity be gathered on an annual basis.

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SUBMITTED BY:

Oliver E. Burris
Regional Management Coordinator

BISON

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 11 - Wrangell Mountains, Chitina River.

Seasons and Bag Limits

To be announced	One bison every five regulatory years by permit only.

Harvest and Hunting Pressure

Copper River Herd. A registration hunt for the Copper River bison herd was held from October 16 through October 19. One hundred and one hunters registered for the hunt, and 16 bison were killed (Appendix I). Forty-four percent of the harvest was composed of bulls. Most of the bison harvested were relatively old with only 25 percent being four-years-old or younger. Most of the hunters were from Anchorage (Appendix II). The distribution of residency was proportionately the same among all hunters and among only successful hunters. Most hunters used boats or aircraft for transportation, but hunters using aircraft had the higher probability of success.

Chitina River Herd. No hunt was authorized.

Composition and Productivity

Copper River Herd. A classification survey was made from the ground during the summer migration up the Dadina River. Seventy-two bison were classified as follows: 37 adult cows (51 percent), 7 adult bulls (10 percent), 7 yearling cows (10 percent), 8 yearling bulls (11 percent), and 13 calves (18 percent). A maximum count of 104 bison was made during an aerial survey. Another aerial survey of 97 bison was partially classified revealing 18 calves and 79 adults (Appendix III). Trend data for this herd indicate that periodic harvesting and natural mortality have essentially stabilized this herd since the early 1960's

Chitina River Herd. Aerial surveys have been made to obtain partial classifications and total counts since 1962 (Appendix III). A severe winter during 1963-64 sharply reduced this newly transplanted herd. From 1965 through 1973, however, the observed rate of increase of the adult segment has been high (r= .17: the maximum rate of increase is assumed to be .22, the rate observed in the Delta Bison herd from 1929 through 1940).

Management Summary and Conclusions

Copper River Herd. This herd has been stabilized by periodic harvests and natural mortality since the early 1960's.

Cursory examination of the critical winter range of the Copper River bison herd from the air and ground revealed signs of marked range deterioration due to trampling. Erosion, succession to trees, and possibly overgrazing may also be reducing the range. Comparative examination of plant composition and utilization between heavily-used and lightly-used portions of the range should be made to more accurately assess the magnitude of damage to the range.

An albino calf was observed several times during 1973, and the Department of Fish and Game agreed to try to locate and capture this animal for the benefit of a zoo in Anchorage. The Copper River herd dispersed into timber during the bison hunt, and bison were subsequently difficult to locate. The albino calf has not been seen during aerial surveys since October.

Chitina Herd. This herd was markedly reduced during the winter of 1963-64, but has increased rapidly since 1965. The winter range of this herd is limited, and assessments of range utilization should be made periodically.

Recommendations

Conduct a hunt for the Copper River bison herd during 1974 if warranted by adequate yearling survival and low adult mortality.

Make reconnaissance type assessments of plant composition and utilization of the Copper River and Chitina herds for the purpose of providing information relative to optimum herd numbers.

Literature Cited

Fuller, W.A. 1959. The horns and teeth as indicator of age in bison. Journal of Wildlife Management, 23(3):342-344.

PREPARED BY:

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SUBMITTED BY:

John S. Vania
Regional Management Coordinator

APPENDIX I

Harvest Data for the Copper River Bison Herd.

Regulatory Year	Number of Registered Hunters	Harvest		Percent Males in Harvest	Number (percent) Bison 1 through 4 Years Old*		
		Total	Males		Males	Females	Sample
1964-65	43	14	10	71%			
1965-66	42	11	9	82%			
1966-67	No Season						
1967-68	No Season						
1968-69	74	13	6	46%			
1969-70	74	16	7	44%	4(27%)	4(27%)	15
1970-71	96	13	6	46%	1(14%)	4(57%)	7
1971-72	No Season						
1972-73	No Season						
1973-74	101	16	7	44%	1(6%)	3(19%)	16

* Bison ages were determined by tooth replacement (Fuller, 1959). Age data for several hunts are not available.

Prepared By: Nick Steen, Game Biologist II and

Carl McIlroy, Game Biologist III

APPENDIX II

Residence and Transportation Means Used by Hunters during the 1973 Copper River Bison Hunt.

	All Hunters		Successful Hunters	
	Number	Percent	Number	Percent
Residence,				
Anchorage Vicinity:	68	67%	11	69%
Fairbanks Vicinity:	8	8%	2	13%
Copper River Valley:	19	19%	3	19%
Other Locations:	6	6%	0	0%
Transportation Means, *				
Aircraft:	52	55%	12	75%
Boat:	40	42%	4	25%
Off-Road Vehicle:	3	3%	0	0%

* A few hunters used more than one transportation means. Seven hunters had unknown transportation means.

Prepared By: Nick Steen, Game Biologist II and

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APPENDIX III

Maximum Number of Bison Observed during Aerial Surveys of the Copper River Bison Herd and Chitina Bison Herd.

	Copper River Bison Herd			Chitina Bison Herd		
Year	Total	Calves	Adults*	Total	Calves	Adults*
1950**	17	0	17			
1961	29	--	--			
1962**	74	13	61	35	0	35
1963	----- No Data ------			28	--	--
1964	97	17	80	12	5	7
1965	84	19	65	6	1	5
1966	79	7	72	9	0	9
1967	51	14	37	12	2	10
1968	102	19	83	16	2	14
1969	100	18	82	15	0	15
1970	119	21	98	16	2	14
1971	87	11	76	16	3	13
1972	82	12	70	------ No Data ------		
1973	97	18	79	23	4	19

* The adult category includes yearling and older bison.

** The Copper River Herd resulted from a transplant of seventeen bison during 1950, and the Chitina Bison Herd resulted from a transplant of 35 animals during 1962.

PREPARED BY: Nick Steen, Game Biologist II and

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BISON

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 19 - McGrath (Farewell Herd)

Seasons and Bag Limits

No open season

Harvest and Hunting Pressure

No permit hunt was held in 1973.

Herd Size, Composition, and Productivity

Aerial counts of the Farewell bison herd are tabulated in Appendix I. Calf production in 1973 was the best since introduction of bison into the Farewell area. A count on July 16, 1973 revealed a total of 20 calves. The first two calves were seen April 27, 1973 and more calves were observed on each subsequent flight until the mid-July count. These counts suggested the late summer bison population was composed of approximately 55 adults and 20 calves.

Range and Habitat

The winter of 1972-73 was mild with little cold weather and a light snow pack. River bottom habitat and adjacent areas were mostly clear of snow for the entire winter. Bison movements were not restricted and utilization of available range was felt to be quite diverse.

Management Summary and Recommendations

Counts of the Farewell bison herd in the spring of 1974 should indicate the feasibility of initiating a hunt in the fall of 1974. Continued good productivity and reasonable survival of the 1973 calf crop would warrant a harvest of 10 adults.

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Appendix I. Bison observations, South Fork Kuskokwim River, 1973.

Date	Observer	Bison Seen				Survey Conditions
		Adult	Yearling	Calves	Total	
3/1/73	Shepherd	55	0	0	55	excellent, but no snow
4/27/73	Shepherd	21	0	2	23	excellent
5/5/73	Griffin	16	0	6	22	good, clear moderate wind
5/7/73	Shepherd	10	0	5	15	good
5/16/73	Shepherd	52	0	13	65	excellent
6/13/73	Shepherd	54	0	15	69	good
7/16/73	Shepherd	53	0	20	73	excellent
11/16/73	Shepherd	18	0	7	25	very turbulent

BISON

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 20 - Fairbanks, Central Tanana (Big Delta Herd)

Seasons and Bag Limits

To be announced	One bison every five regulatory years by permit only.

Harvest and Hunting Pressure

There was no 1973 hunt on the Delta Bison Herd due to a shortage of funds and personnel.

Herd Size, Composition and Productivity

Aerial counts were conducted on the primary calving grounds of the Delta Bison Herd on June 5 and August 2, 1973. These surveys showed 46 (17.6%) and 51 (22%) calves, respectively. The percent of calves in the herd in August has been relatively stable in recent years ranging from 19 to 24 percent. The highest percentage of calves is counted during late summer and early fall due to the lengthy parturition period of the bison.

The Delta Bison Herd shows an upward population trend. In 1970 the herd was estimated at 250, 1971 estimates ranged up to 262. In 1973 an aerial count in the Delta-Clearwater farming area showed 267 bison, suggesting a population approaching 325 animals.

Management Summary and Recommendations

To maintain a wild, free-ranging, huntable population; conflicts with political, agricultural and other human interests should be considered. There are indications such conflicts are on the increase.

Mortality (other than hunting mortality) does not appear to limit the herd to manageable numbers. A reduction of the herd to about 250 animals is recommended until range evaluations are initiated. Artificial fertilization of the summer calving grounds may increase forage production and delay bison movements into the farming area. A better understanding of natural mid-winter dispersal of bison from the Clearwater area may lead to better management. A controlled bison hunt after the fall grain harvest appears most appropriate and would help insure landowner cooperation.

A cooperative agreement with the Army to produce a buffer zone for bison moving into the farming area should be initiated. Manipulation of bison movements using salt may favorably influence depredations during critical periods.

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ELK

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 8 - Kodiak and Adjacent Islands

Seasons and Bag Limits

Unit 8, Raspberry Island and that portion of Afognak Island west and south of a line from the head of Malina Bay to the head of Back Bay.	No open season	
Remainder of Unit 8.	Aug. 1 - Dec. 31	One elk by permit only.

Harvest and Hunting Pressure

Hunter harvest reports indicate 18 elk, eight males and ten females were taken in 1973. This matches last year's low harvest and reflects light hunter effort, low elk numbers, and closure of traditional hunting areas in Raspberry Straits and Raspberry Island. One-hundred and sixteen permit holders hunted for a 15.5 percent success ratio. Twelve animals came from Tonki Peninsula, an area where weather and rough seas make access difficult, but elk are easy to locate due to the abundance of open, non-forested country. Nine animals were killed during August, the first month of the season.

Composition and Productivity

The 1973 composition counts (Appendix I) indicated no apparent upward population trends. The total of 362 animals was slightly greater than the 355 recorded in 1972, but several known groups of animals could not be located during the surveys. The Duck Mountain, Kitoi Lakes and parts of the Raspberry Island, Raspberry Straits and Paramanof Peninsula herds were not located during surveys in August and September. The calf:cow ratio dropped from 37:100 in 1972 to 32:100 in 1973. Total calf production was 80 animals, relatively unchanged from the 88 recorded in 1972. The bull:cow ratio was 13:100 in 1973.

Snowfall was apparently not a limiting factor on overwinter survival during the 1972-73 winter. Snow depth did not exceed five inches at Kitoi Bay during the January through March winter period and no winter mortality could be documented. High survival may be reflected in the lowered calf:cow ratio assuming that a portion of the cows recorded were yearling animals. The Raspberry Island herd exhibited an apparent drop in numbers despite excellent calf production in 1972 (90 calves/100 cows). However, the fact that one group of animals was not located may account for this discrepancy.

Management Summary and Recommendations

The relatively snow-free 1972-73 winter improved survival and halted the downward population trend brought on by two consecutive winters with heavy snows and below normal temperatures. Hunting effort is light and exerts little impact on the elk population. No changes in seasons or bag limits are recommended.

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APPENDIX I

Unit 8 - Elk Composition Counts, 1973

Herd	Count Date	Bulls No.	Bulls %	Cows No.	Cows %	Calves No.	Calves %	Calves/ 100 Cows	Total No. Animals
Raspberry Island	8/6; 8/23	10	28.6	17	48.6	8	22.9	47:100	35
Raspberry Straits	8/6	5	11.6	31	72.1	7	16.3	23:100	43
Waterfall Lake	8/6	3	4.4	45	66.1	20	29.4	44:100	68
Paramanof Peninsula	8/6	2	5.3	22	57.9	14	36.8	64:100	38
Paramanof Mountain	8/6	5	14.7	22	64.7	7	20.6	32:100	34
Tonki Peninsula	8/3; 8/27	7	4.9	113	78.5	24	16.7	21:100	144
Combined Herds		32	8.8	250	69.1	80	22.1	32:100	362

Submitted by: Roger B. Smith, Game Biologist III

MUSKOXEN

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 18 - Yukon-Kuskokwim Delta

Seasons and Bag Limits

No open season

Herd Size, Composition, Productivity and Mortality

Nunivak Herd

No data received as of April 18, 1974.

Nelson Island Herd

On May 4, 1973 an aerial survey in a PA-18 aircraft by Griffin and Shepherd revealed a total of 44 muskoxen on Nelson Island. The animals were in three separate groups. One group, consisting of three adult males, was on the coast 9 1/2 miles northeast of the village of Tanunak. A second group, consisting of 11 adults and 6 short yearlings, was found on a ridge 8 miles northeast of Tanunak. The third group, consisting of 24 adults, was observed approximately 20 miles northeast of Tanunak (see attached map).

Mortality

No mortality was reported.

Range Conditions

No range observations have been made on Nelson Island. All animals originally released were calves and the sex ratio was 11 males and 11 females. Considering the age and number of females released, and because the population has doubled in five years, suitable range conditions evidently exist for at least a small number of animals.

Management Summary and Recommendations

The serious mismanagement of the Nunivak muskox herd and range makes it imperative to determine the seasonal movements of the Nelson Island herd and to identify preferred ranges so range condition trends surveys can be established. Up-to-date surveys and estimates of the population should be maintained. Of utmost importance is an agreement between the State and Federal Government covering the eventual management and utilization of the herd if the lands remain in federal ownership as a wildlife refuge, national park, or national monument. Considering the recent increase in herd size the following is recommended pending more precise information:

Until the extent and condition of the range are determined, limit the herd to 75 to 100 animals including calves.

Maintain a sex ratio of approximately five breeding females per adult male.

Initiate procedures, agreements, etc. to allow hunting or consumptive utilization to adjust sex and age ratios and to stabilize the herd.

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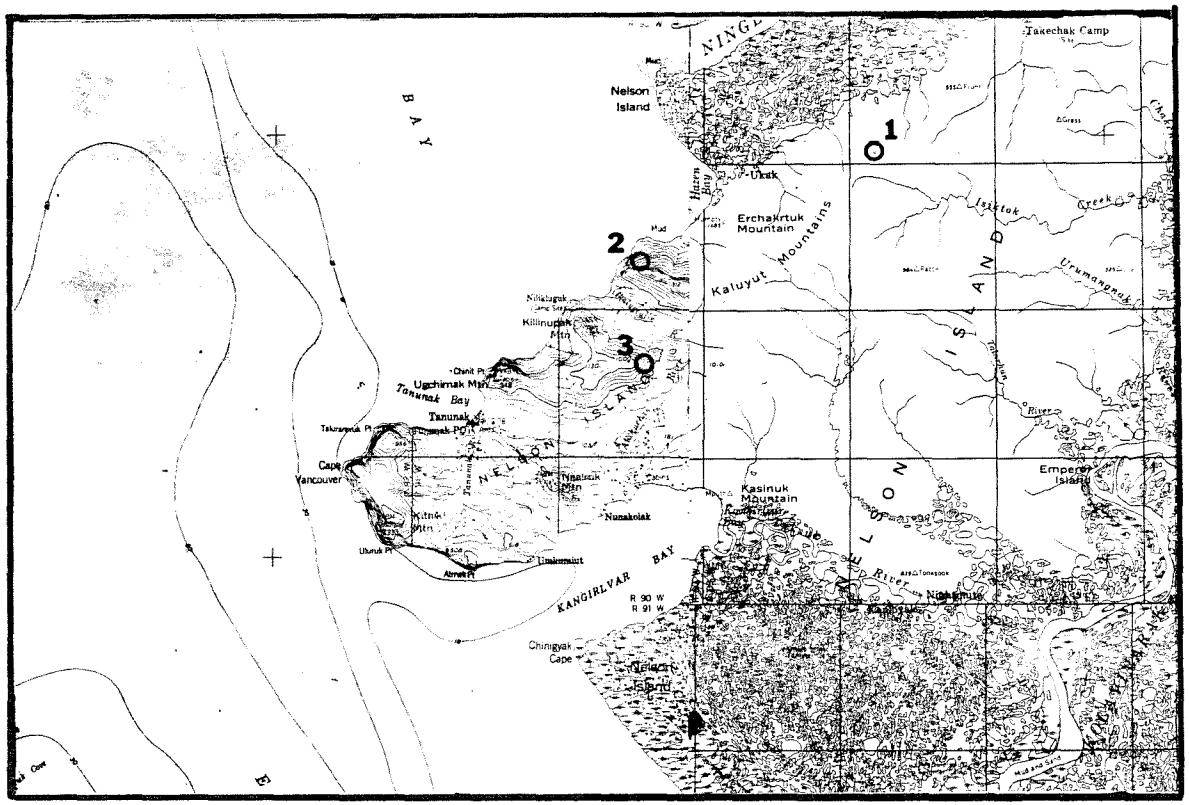
APPENDIX I. Aerial survey muskoxen observations on Nelson Island, May 4, 1973.



Legend: 1 - 24 adult muskox

2 - 3 adult male muskox

3 - 17 muskox sighted, including 6 calves from 1972

MUSKOXEN

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 22 - Seward Peninsula

Seasons and Bag Limits

No open season

Herd Size, Composition, Productivity and Mortality

Three muskoxen that wintered two years in the hills near Teller apparently moved to a new area during the summer of 1973, and were not resighted during the winter of 1973. A group of 17 adult muskoxen and 6 calves were together in June.

This is the first year that a large number of calves have been produced, so apparently most of the muskoxen were four years old when they first calved. In July this group split into two herds of 6 adults with 2 calves and 11 adults with 4 calves. Subsequently, these groups fragmented with most staying in the general area of the Agiapuk River to Wales and Ear Mountain.

There were no reported mortalities from this herd in 1973.

Management Summary and Recommendations

These muskoxen have regularly used the same general area for over two years. It is not known why they broke up into several smaller groups this year. Most of them apparently are remaining in the same general area. Any future transplants should be released near Brevig Mission or Wales.

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MUSKOXEN

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 23 - Kotzebue Sound

Seasons and Bag Limits

No open season

Herd Size, Composition, Productivity and Mortality

A group of 11 muskoxen was regularly sighted near Cape Dyer during the first half of 1973. These 11 muskoxen produced two calves during June. They remained near the Kukpuk River most of the summer and fall and then moved towards Cape Dyer in the late fall.

Another group of three muskoxen was seen several times during the first half of 1973 in the hills between Noatak and Kivalina.

Management Summary and Recommendations

The group of 11 muskoxen has remained together in the same area for over two years. They produced two calves this year. Any future transplants should be placed with this group of 11 adults and 2 calves.

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MUSKOXEN

SURVEY-INVENTORY PROGRESS REPORT - 1973

Game Management Unit 26 - North Slope

Seasons and Bag Limits

No open season

Herd Size, Composition, Productivity and Mortality

Biologists of the Renewable Resources Consulting Service Ltd., Alaska Department of Fish and Game and the U.S. Bureau of Sport Fisheries and Wildlife flew several hundred hours on the North Slope between the Kavik River on the west, and the Canadian border on the east. Most of these flights were made to observe other species of game, and muskox observations were incidental. A total of 32 observations of muskoxen were recorded (Appendix I). The first observation was made on April 13 and the last on November 11. All observations were made between the west bank of the Canning River and the Canadian border. Several observations of a single male muskox were made in Canada near the border but this animal is not included in the 32 observations.

From analyzing these observations it is apparent that a minimum of 29 adults and 6 calves were observed, with a possibility that more muskoxen are present (Appendix II). As reported in 1972 these muskoxen have apparently divided into three separate groups (Appendix III). One group of about 11 animals ranges along the Canning River vicinity. A second group of about 11 animals ranges along the Sadlerochit River vicinity. The third group of about 13 animals ranges along the Okerokovik and Aichilik Rivers with an occasional observation of one adult male on the Kongakut River.

Management Summary and Recommendations

A total of 32 observations of muskoxen were made in 1973 between April 13 and November 11. All muskoxen were observed between the west bank of the Canning River and the Canadian border. One male muskox was observed near the border in Canada. This observation is not included in the 32 observations in this report. It is apparent that a minimum of 29 adults and 6 calves were observed with a possibility of additional animals. The muskoxen have divided into three separate groups which range in three separate areas as indicated on the attached map. The first observation of a newborn calf was made May 26.

The total number of muskoxen observed in 1973 was the same as the number observed in 1972. The number of calves observed was 6 in 1973 as compared to 7 in 1972. There were possibly 4 yearlings present in 1973.

Efforts should be continued to obtain as many observations as possible over a full 12-month period.

Negotiations should be initiated with the Fish and Wildlife Service to establish an agreement on the management of the herd on the Arctic Wildlife Range.

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Appendix I. Muskox sightings, eastern North Slope Unit 26, 1973

Date	Number of Animals	Approximate Coordinates Latitude	Longitude
	GROUP I (AREA I)		
May 26	7 or 8 adults ?	69° 54'	145° 44'
May 28	8 adults, 2 yearlings	69° 52'	145° 50'
July 3	8 adults, 2 yearlings	69° 51'	145° 39'
July 25	small group of muskox	69° 42'	145° 54'
July 25	8 adults, 2 yearlings, 1 calf	69° 39'	145° 49'
Sept. 8	1 adult	69° 27'	146° 15'
Sept. 13	1 adult male	70° 01'	145° 50'
Nov. 5	8 adults, 1 calf	69° 57'	145° 35'
Nov. 5	2 yearlings or bulls ?	69° 57'	145° 39'
Nov. 7	8 adults, 1 calf	69° 57'	145° 35'
Nov. 7	2 yearlings or 2 bulls ?	69° 56'	146° 14'
	GROUP II (AREA II)		
Sept. 30	9 muskox	69° 43'	144° 25'
Oct. 15	8 adults, 2 yearlings, 1 calf	69° 44'	144° 29'
Oct. 17	11 muskox (8 adults, 2 yrlgs., 1 calf or 8 adults, 3 yrlgs. ?)	69° 44'	144° 25'
Nov. 11	8 adults (3 calves or 4 yrlgs. ?)	69° 46'	144° 21'
	GROUP III (AREA III)		
April 13	9 adults	69° 42'	143° 22'
May 26	4 adults, 2 calves	69° 48'	143° 05'
May 26	5 adults	69° 55'	143° 05'
June 24	4 adults, 2 calves	69° 55'	142° 29'
July 1	3 adults, 2 calves	69° 55'	142° 25'
July 3	5 adults, 2 calves	69° 55'	142° 27'
July 9	5 adults	69° 67'	142° 30'
July 18	3 adults, 2 calves	69° 42'	142° 54'
Aug. 4	2 adults	69° 49'	142° 40'
Aug. 11	5 adults, 2 calves	69° 43'	142° 55'
Aug. 11	1 adult male	69° 43'	143° 00
Aug. 14	5 adults, 3 calves	69° 43'	142° 55'
Aug. 15	1 adult male	69° 39'	141° 52'
Sept. 30	7 adults, 4 calves	69° 43'	143° 16'
Oct. 4	1 adult male	69° 33'	141° 56'
Oct. 15	2 adult males	69° 42'	143° 16'
Nov. 7	5 adults, 4 calves	69° 44'	143° 16'

Appendix II. Summary of muskoxen in each group or area.

Area or Group	No. of observations	Min. no. of calves	Min. no. of noncalves	Min. no. of muskox	Probable no. of muskox	Probable no. of yrlgs.
I	11	1	10	11	13	2
II	4	1	10	11	11	2
III	17	4	9	13	14	-
Totals	32	6	29	35	38	4

earliest observation 4/13/73
latest observation 11/7/73
earliest observation of newborn calf 5/26/73

No muskox mortality was observed in 1973 in Unit 26.

Appendix III. MUSKOX DISTRIBUTION AND AREAS OF UTILIZATION - 1973