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ANNUAL REPORT OF SURVEY-INVENTORY ACTIVITIES

PART III. BISON, DEER, ELK, MUSKOXEN, AND SHEEP

EDITED AND COMPILED BY

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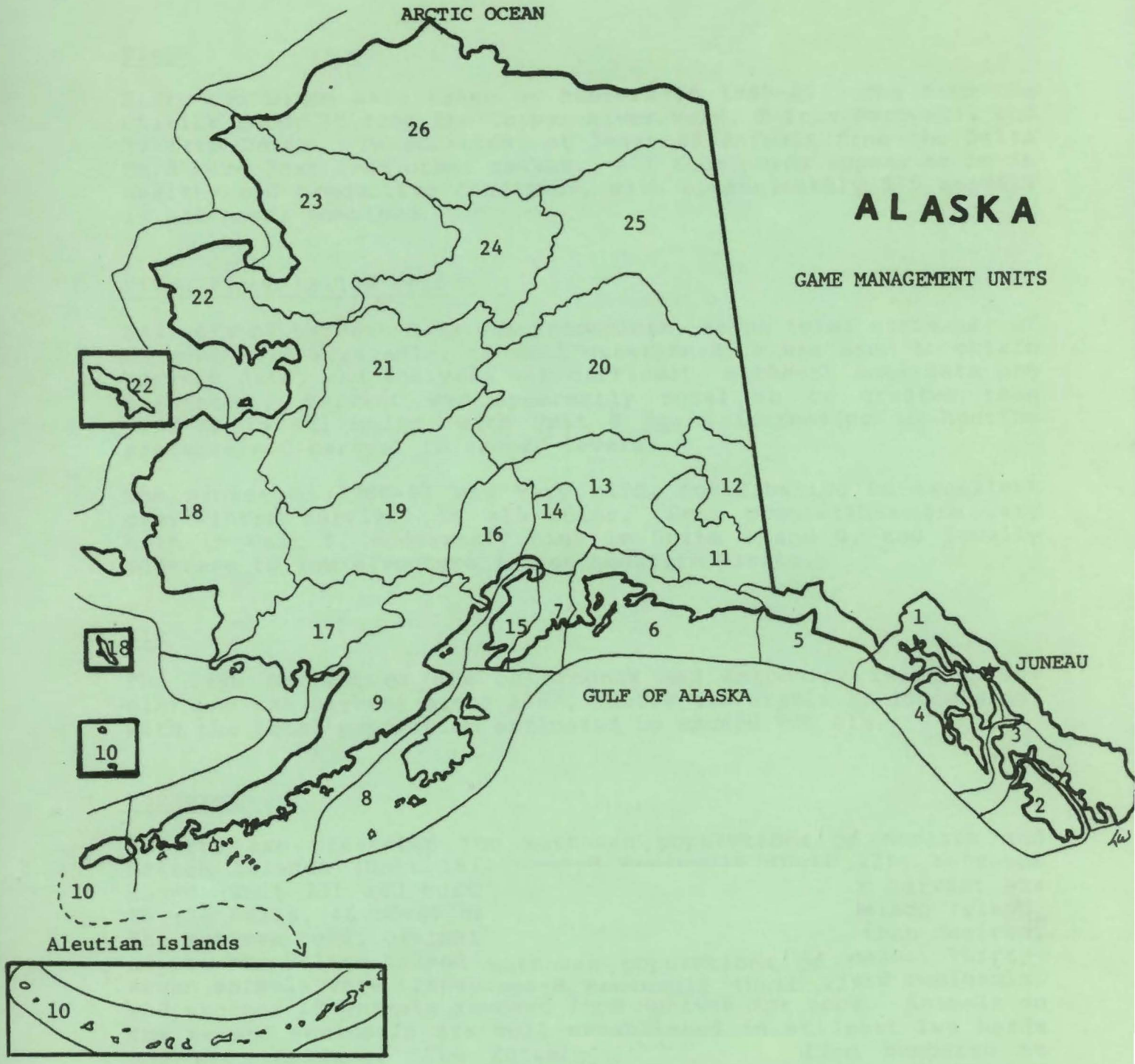
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Statewide Harvests and Population Status

Bison

Fifty-six bison were taken by hunters in 1980-81: one from the Chitina Herd, 15 from the Copper River Herd, 7 from Farewell, and 33 from Delta. In addition, at least 25 animals from the Delta Herd were lost from other causes. All four herds appear to be in healthy and productive condition, with approximately 575 animals in all herds combined.

Sitka Black-tailed Deer

Analysis of harvest data was incomplete, so no total estimates of harvest were available. A mail questionnaire was used to obtain harvest data, and analysis was difficult, although some data are presented. Harvest was apparently equal to or greater than 1979-80 in all units, with Unit 8 again increasing in hunting pressure and harvest to record levels.

The winter of 1980-81 was very mild, contributing to excellent over-winter survival in all units. Deer populations are very high in Unit 8, moderately high in Units 4 and 6, and locally moderate to low elsewhere in southeastern Alaska.

Elk

The 1980 harvest of elk on Afognak and Raspberry Islands (101 elk) was the highest since 1967. Herds are stable or increasing, with the total population estimated to exceed 800 elk.

Muskoxen

Reports are presented for muskoxen populations on Nunivak and Nelson Islands (Unit 18), Seward Peninsula (Unit 22), Kotzebue Sound (Unit 23) and North Slope (Unit 26C). Hunter harvest was 56 (10 bulls, 46 cows) on Nunivak, and 20 cows on Nelson Island. The Nunivak herd, estimated at 700 head, was larger than desired, as was the Nelson Island herd, estimated at 265 animals. Thirty-seven animals were transplanted from Nunivak to Seward Peninsula, and another 10 animals removed from Nunivak for zoos. Animals on the Seward Peninsula are well established in at least two herds and are thriving. The Kotzebue Sound population numbered at least 72 animals and appears to be established. The population on the Eastern Arctic Slope, Unit 26C, is well established in 3 major groups plus several smaller ones, and numbered at least 186 animals.

Dall Sheep

The 1980-81 statewide sheep harvest was 826 sheep, 167 of which were ewes. This total is 12 percent lower than the 1979 total of 933. Reasons for the decline varied, but included decreased hunting pressure in some areas, and adverse hunting weather. Uncertainty over status of land ownership and access and perhaps effects of the 7/8 curl law may have contributed also. Areas with largest harvests were the Brooks Range (196 sheep). Wrangell Mountains (158) and Chugach Mountains (91).

Statewide, sheep populations appear to be stable, although populations in the Delta Management Area and portions of the Brooks Range may be experiencing a slight decline, while sheep in the Mentastas may be increasing. Some concern exists for welfare of local populations in Unit 26C subjected to subsistence hunting.

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BISON

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT 11

GEOGRAPHICAL DESCRIPTION: Chitina River

PERIOD COVERED: January 1, 1980 - December 31, 1980

Season and Bag Limit

Sept. 1-Oct. 1	One bison every five regulatory years by permit only.

Population Status and Trend

The Chitina bison herd has experienced only slight variation in total population estimates over the past 5 years.

Mortality

The 1980 harvest was one adult cow. Eight permits were issued, but only three hunters participated in the hunt. This is the lowest hunter response since the hunt was initiated.

The creation of the Wrangell-St. Elias National Monument and subsequent regulations prohibiting sport hunting may have deterred permittees from hunting.

Population Composition

Forty-two bison (36 adults and 6 calves) were counted during the 1980 aerial survey. A local pilot (Mr. Ken Bunch) reported counting 45 bison in February.

Management Summary and Recommendations

Data from 1980 aerial sightings indicate the Chitina bison herd is at least 15 animals above the management guideline of 30 bison. The harvest of one bison fell short of the management goal to remove surplus animals. Federal regulations prohibiting sport hunting in the Wrangell-St. Elias National Monument may allow further population expansion. This expansion may result in range deterioration. Hunters should be allowed to remove surplus bison so that the management goal of approximately 30 bison can be maintained.

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Leland P. Glenn
Survey-Inventory Coordinator

BISON

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT 11

GEOGRAPHICAL DESCRIPTION: Copper River

PERIOD COVERED: January 1, 1980 - December 31, 1980

Season and Bag Limit

Sept. 21 - Nov. 10	One bison every five regulatory years by permit only.

Population Status and Trend

The number of bison in the Copper River herd appears stabilized near the management goal of 60 overwintering adults.

Population Composition

Eighty-six bison were counted during an aerial survey on 7 July 1980. The composition data were as follows: 60 adults, 11 yearlings and 15 calves.

Mortality

Fifteen bison were killed during the 1980 hunting season. The harvest was comprised of 9 bulls, 5 cows and 1 female calf.

A total of 132 hunters participated in the registration hunt. Copper River Valley residents killed 10 bison. Only one nonresident hunter was successful. The methods of transportation used to reach hunting areas were equally divided between aircraft and riverboats.

Management Summary and Recommendations

The number of hunters participating in the Copper River bison hunt increased by 27 percent in 1980. The hunt is especially popular among local residents.

Population size and reproductive rate indicate the allowable harvest of 15 bison was compatible with the management goal. Registration hunts should continue within the framework of existing management plans.

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BISON

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT 19C and 19D

GEOGRAPHICAL DESCRIPTION: South Fork Kuskokwim River, Farewell Herd

PERIOD COVERED: July 1, 1980 - June 30, 1981

Seasons and Bag Limits

Sept. 1	Oct. 10	One bison by drawing permit only; 20 permits will be issued.

Population Status and Trend

Surveys of the Farewell bison herd were not conducted during this report period. However, a survey flown on May 30, 1980 indicated a minimum of 98 animals in this herd. It is suspected that the population remained unchanged from the previous year when the fall (pre-hunt) herd numbered 123 bison.

Evaluation of the Bear Creek Burn (1977) indicated extensive utilization of this area by bison. Increased forage production in portions of the 345,000-acre burn area will probably increase the carrying capacity of bison range along the South Fork of the Kuskokwim River.

Population Composition

An aerial survey on May 30, 1980 indicated calves comprised 20 percent of the population, little change from prior calf production levels. Because calving occurs over a prolonged period, calf composition of the herd undoubtedly rose by the end of August 1980.

Mortality

The only documented mortality to this herd resulted from sport hunting. Seven bison (5 bulls, 2 cows) were harvested by the 16 hunters participating in the 1980 hunt. Successful hunters were able to locate animals within a 15-mile radius of the Farewell FAA Station.

Management Summary and Recommendations

Regulation of sport harvest through the issuance of a limited number of permits should be utilized to maintain population size compatible with range carrying capacity. Although improved range conditions have resulted from the Bear Creek Burn, evaluation of potential bison habitat is necessary before population levels can be adjusted upward.

Due to the difficulties encountered by many permittees utilizing aircraft for hunting, relaxation of current methods and means may be necessary to increase the harvest of this herd.

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Regional Management Coordinator

BISON

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT 20A and 20D

GEOGRAPHICAL DESCRIPTION: Delta Junction, Delta Herd

PERIOD COVERED: July 1, 1980 - June 30, 1981

Season and Bag Limits

July 1-June 30	One bison every 5 regulatory years by permit only. Up to 200 permits or an unlimited number of registration permits will be issued. See 5 AAC 81.055 and separate permit hunt supplement.

Population Status and Trend

An aerial survey in late May 1981 revealed 352 bison including 51 calves on the summer range. An additional 12 bison, including three calves, were seen near the Gerstle River, for a total of 310 adults and yearlings and 54 calves. During the period 1974-79, the wintering population ranged from 275 to 321 and averaged 289 bison. Because bison were scattered throughout the winter range during January and February, a number of animals were overlooked during winter 1981 surveys.

Since 1974, an average of 63 calves per 100 cows has survived until late fall. Analysis of recent population data suggests that an average of 9 percent of the herd perishes annually due to causes other than hunting.

Population Composition

A composition count was conducted on 16 October 1980 in which 216 bison were classified. Composition and other survey data suggest that before the fall 1980 hunt the Delta herd consisted of approximately 368 bison of which 23 percent was bulls, 37 percent cows, 16 percent yearlings, and 24 percent calves. There were 62 bulls per 100 cows, 43 yearlings per 100 cows, and 65 calves per 100 cows.

Mortality

Hunting was the largest source of mortality on the Delta herd. A total of 4,561 applications was received for 35 bison hunting

permits. The hunt for bulls was most popular, with 3,984 applicants for 25 permits. Twenty-three bulls and 10 cows were taken during the 1980 hunt (Table 1). Two hunters were unsuccessful. Nearly all of the bison were killed on the Delta Agricultural Project lands.

Table 1. Known mortality of the Delta bison herd, April 1980 through March 1981.

Mortality Source	Bull	Cow	Calf	Unknown	Total
Hunting	23	10	0	0	33
Road Kills	0	3	1	0	4
Urea	4	6	4	0	14
Wounding loss/ Poaching	3	1	0	1	5
Other	1	1	0	0	2
Totals	31	21	5	1	58

The second largest source of known mortality was ingestion of urea fertilizer stored uncovered outside the Alaska Farmer's Co-op east of Delta Junction. Fourteen bison died in mid-January 1981 after directly consuming urea or drinking water containing a high urea concentration.

Other mortality resulted from road kills, wounding loss, and illegal shooting, as summarized in Table 1.

Management Summary and Recommendations

I recommend a program to rehabilitate bison summer range. Forage on the summer range is limited and probably overused, which may account for earlier fall movement of bison into the agricultural areas. If the fall movement can be delayed by enhancing summer range, depredations and other bison-agricultural conflicts will be reduced. Summer range improvement should involve two phases: 1) herbicide treatment and selective burning to control encroachment of brush into grasslands, and 2) fertilization and seeding of preferred bison forage plants.

Currently, bison utilize a considerable amount of farmland during winter, but as cattle operations increase in the Delta area many of the farms are expected to be fenced. Therefore, during the next decade I anticipate a great reduction in the amount of bison winter range. The least expensive method of offsetting this reduction is development of low maintenance bison winter forage on the Delta Bison Range. Winter forage can be produced by forest clearing and planting perennial food crops. In addition, winter range will be improved by burning and fertilization of existing sedge and grass lands.

The importation of domestic stock is increasing in Alaska and this may soon affect bison. Unless strict import standards are developed and rigidly enforced, bison and other wildlife may

contract diseases common to domestic livestock. The solution to this problem will involve legislation to tighten import restrictions and establish an Alaska quarantine facility.

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SUBMITTED BY:

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Regional Management Coordinator

DEER

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS 1A and 2

GEOGRAPHICAL DESCRIPTION: Ketchikan Area and Prince of Wales Island

PERIOD COVERED: July 1, 1980 - June 30, 1981

Season and Bag Limit

Aug. 1 - Nov. 30	Three antlered deer

Population Status and Trend

Population levels in both GMU 1A and 2 appear similar to last year's. Moderately high deer populations exist on Gravina Island and many of the smaller islands along the west coast of Price of Wales. In addition, good deer numbers were reported in the area north of Big Salt Lake and south of Whale Pass on Prince of Wales Island. Some of these latter reports of good deer numbers are a result of new road systems that are becoming connected and open to many more deer hunters. There are still major areas on Prince of Wales and Revilla Islands where deer numbers remain at low levels.

Winter 1980-81 was exceedingly mild and general field observations indicate no winter mortality occurred. Forage conditions are generally excellent except in closed canopy second-growth stands.

Population Composition

No data were available.

Mortality

Harvest and hunting data for the 1980 season were obtained from a mail questionnaire of all harvest ticket holders. Final tabulation is incomplete, but some data from a preliminary run are usable.

The two major areas of hunter use were the Ketchikan area (including Gravina Island, George Inlet, Carroll Inlet and Thorne Arm) and the area on Prince of Wales Island north of Craig. These two areas accounted for about 66 percent of all deer hunting effort in Units 1A and 2.

The areas of highest hunter success were the islands on the west coast of Prince of Wales north of Sumez Island and the area north of Craig on the main island. These areas averaged about one deer per hunter. The best Ketchikan area averaged about 0.3 deer per

hunter. Much of the difference in success may be due to differences in hunting technique. The Prince of Wales area has an extensive road system and much of the harvest is taken by people in the logging industry who drive the roads frequently. Consequently, they have a much greater opportunity to kill deer than people who do not have road access.

The chronology of the kill changed from last year and was more evenly distributed throughout the season. In the Ketchikan area, 27 percent of the harvest was taken in August, 15 percent in September, and 29 percent each in October and November. On Prince of Wales, 28 percent of the bucks were taken in August, 24 percent in September, 31 percent in October, and 18 percent in November. Last year, 45 percent of the kill in both areas occurred in November.

Winter mortality due to weather was nonexistent during the exceedingly mild 1980-81 winter. Therefore, spring beach surveys were not conducted.

Management Summary and Recommendations

Deer populations have made no obvious changes for several years in Units 1A and 2. Range conditions in unlogged areas are excellent and winter conditions have been very favorable for deer.

Currently, deer populations are below carrying capacity, even considering habitat loss due to clearcut logging. Deer populations should be increasing, but as far as can be determined, they have not been doing so. The only reason I can propose for the continued low deer numbers is excessive predation by wolves and black bears. Good populations of both, particularly black bears, are present in this area.

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Regional Management/
Research Coordinator

DEER

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS 1B and 3

GEOGRAPHICAL DESCRIPTION: Unit 1B - Alaska Mainland from Cape Fanshaw to Lemesurier Point on Cleveland Peninsula

Unit 3 - Islands of the Petersburg, Kake, Wrangell Area in Southeast Alaska

PERIOD COVERED: July 1, 1980 - June 30, 1981

Seasons and Bag Limit

Unit 1B and Unit 3, that portion south of Sumner Strait and Eastern Passage, including Level, Vank, Sokolof, Rynda and Kadin Islands.	Aug. 1 - Nov. 30	One antlered deer
Remainder of Unit 3	No open season	

Population Status and Trend

Sitka black-tailed deer are found on most of the islands in Game Management Unit 3 and on the mainland area of Unit 1B. Populations in these units have reached peaks in the past and then crashed. The declines can be attributed to many factors, of which the most prominent are probably severe winter weather, predation by wolves, excessive or illegal hunting, and deterioration of the range from overpopulation and clearcut logging.

Population lows occurred in southeast Alaska in 1918, 1925, 1934, 1943, 1950, 1956, and 1969 with about 5 years from low to peak (Merriam, unpublished data). The 1969 low has continued throughout most of the Units 1B and 3. There was an average of 9 years between population lows, during which time the herd increased to near carrying capacity. Deer numbers did not increase appreciably on Kupreanof, Etolin, Kuiu, or Wrangell Islands between 1969 and 1980. Mitkof, Zarembo, and Woronkofski Island populations increased slightly, while the most notable increases were on islands less than 2,500 acres. These included the Level Islands, and Vank, Sokolof, Read, and High Islands, none of which are known to be frequented by predators.

The deer decline was less severe in Unit 1B. The bag limit was reduced from four deer (either-sex) to three deer (either-sex) in

1971. In 1972, the bag limit was reduced to two deer (antlered only) and in 1973 was reduced to one deer (antlered only). The season length has remained at 91 days. It is unlikely that "bucks only" hunting has a significant effect on herd size.

The season in Unit 3 was closed from 1975 through 1979. A portion of Unit 3 was opened in 1980 to antlered deer hunting (Fig. 1), since it appeared that deer populations in that area were responding favorably to a series of mild winters experienced throughout southeast Alaska.

Pellet group counts were completed on selected islands in Unit 3 during spring 1981 (Appendix I). Transects were patterned after Wallmo and Schoen (1980) and covered all habitat types. Winter 1980-81 was a mild one and it is anticipated that pellet group surveys will be repeated in these areas after the next severe winter.

Population Composition

No data were collected (see management summary and recommendations).

Mortality

No winter mortality transects were conducted during the period, but considerable time spent conducting pellet group surveys revealed only a single winter-killed deer in the Vank Island group (a fawn on Liesnoi Island). This reflects the extremely mild winter of 1980-81 in southeast Alaska. Deer on Sokolof Island and Level Islands, even though the winter was mild, were using plants which are not normally preferred by deer, notably skunk cabbage (Lysichitum americanum) and rusty menziesia (Mensiesia ferruginea). There was over-utilization of dogwood (Cornus canadensis), goldthread (Coptis aspleniifolia), trailing bramble (Rubus pedatus), and huckleberry (Vaccinium spp.) on Sokolof, Level, and Liesnoi Islands. During a severe winter with snow depths exceeding 16 inches for an extended period, mortality on these islands which have been extensively clearcut is expected to be severe.

Two instances of wolf predation on deer on Kuiu and Mitkof Island were reported by the public. The actual extend of mortality attributable to natural predators is unknown, but it is felt to be a major limiting factor on the herd in Game Management Units 1B and 3.

A questionnaire was sent to all hunters who obtained deer harvest tickets in 1980, requesting information on success, dates hunted, and location of hunting area, based on a map provided in the questionnaire (Fig. 2).

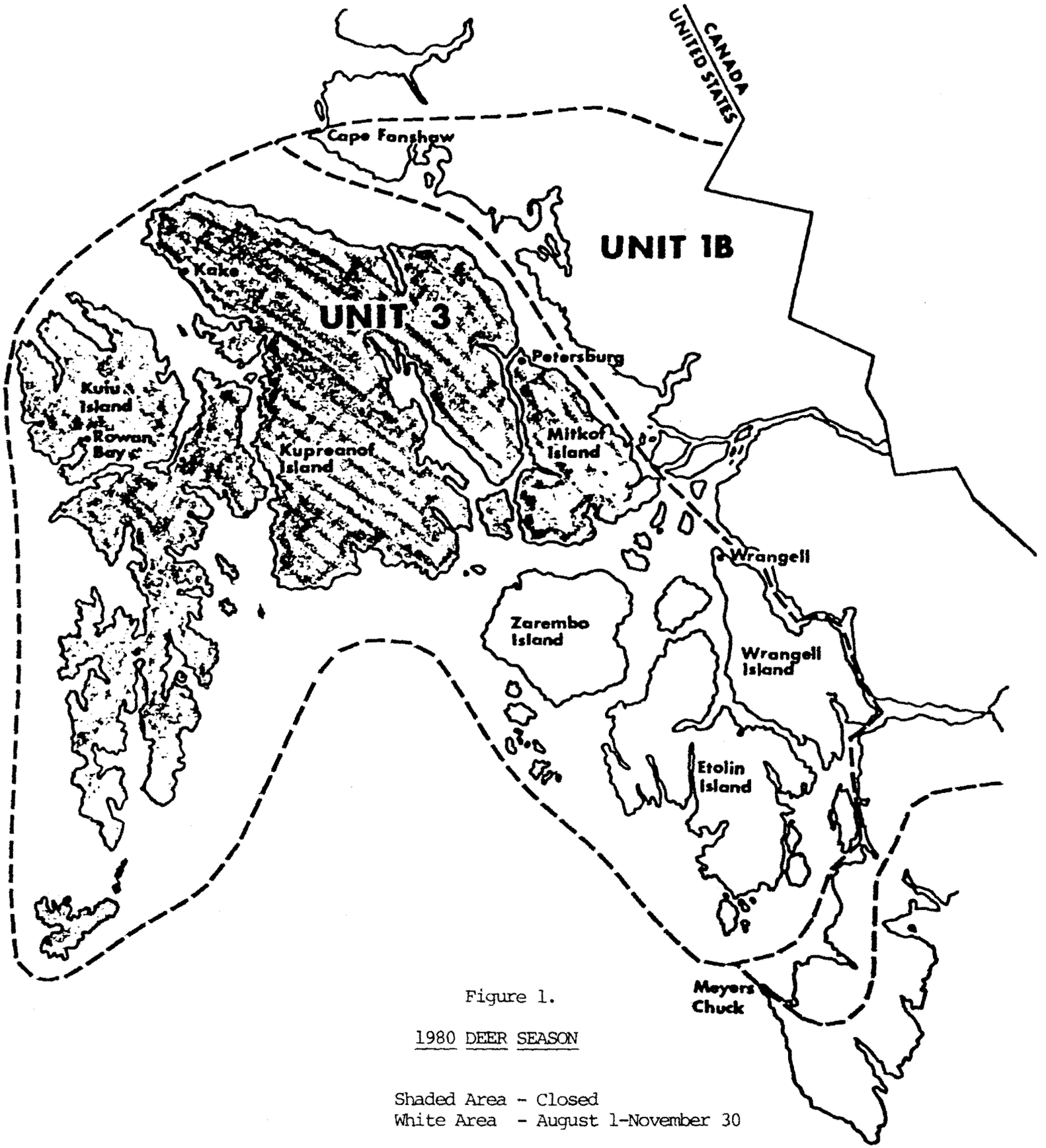

Figure 1.

1980 DEER SEASON

Shaded Area - Closed
White Area - August 1-November 30

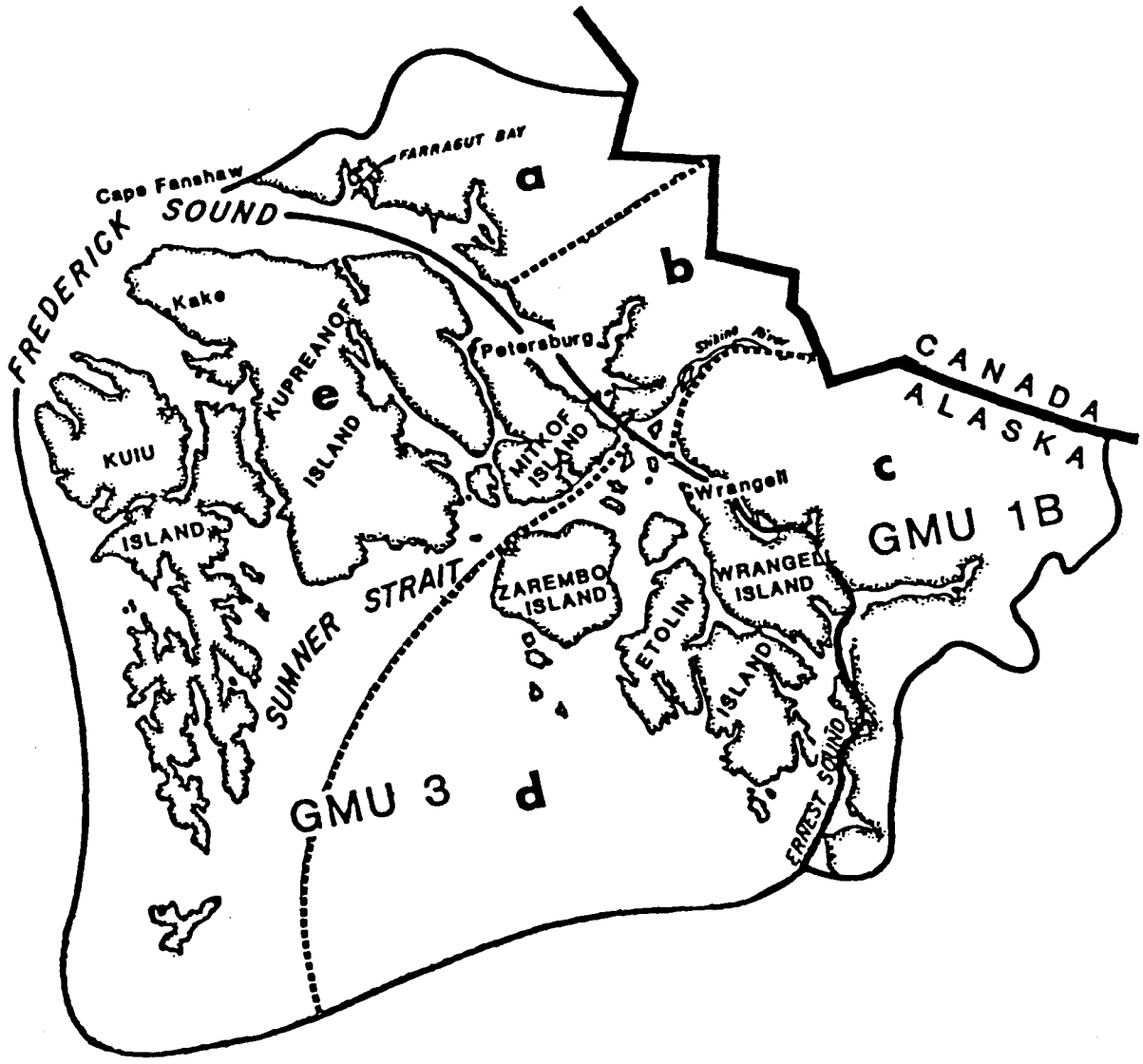

Figure 2

Sample of Map Sent to Hunters, 1980 Questionnaire

Unit 3 accounted for 78 percent of the reported deer harvest while Unit 1B accounted for 22 percent. While Unit 1B probably has more deer than Unit 3, the density of deer and thus deer hunting, is greater on selected islands (Appendix II).

A reported total of 136 days was spent hunting on (Level, Vank, Sokolof, and Woronkofski Islands) for a total of 51 bucks harvested at a 38 percent rate of success. These 4 islands accounted for 68 percent of the deer harvested in Unit 3, and for 53 percent of the reported total in Units 1B and 3.

The reported success rate for deer hunters in Unit 1B was 14 percent (13 deer harvested) in 1980. In 1979 the reported success rate was 17 percent (5 deer harvested) and in 1978 no hunters reported success. The hunter questionnaire used in 1980 appears to be more reliable than the harvest report cards used in the past and provides better information on the location of kills and hunting effort (Appendix III).

Management Summary and Recommendations

Considering the rate at which deer range is being destroyed through clearcut logging, cabin and home construction, road building, and other developments, it is essential that critical range be identified and given protection from disturbance. Notwithstanding the effects of predation and severe winters, deer are now being threatened with permanent long-term reduction in carrying capacity of their habitat over much of their range.

Population and habitat surveys should be increased in Units 1B and 3. Funds have not been available for several years to survey localized deer habitat use in Units 1B and 3. Monitoring Unit 3 islands is needed so that hunting seasons can be opened as deer populations increase. The portion of Unit 3 which was opened provided more than 688 days of hunting recreation for 197 hunters. Census of populations in the summer months and fall, while difficult, is essential for determining fawn survival and sex ratios of the herd. Additional census techniques must be attempted and evaluated. Tentative techniques could be aerial alpine surveys, walking transect lines, vehicle spotlight transects, and boat transects.

The hunter questionnaire appears to provide satisfactory information on hunting and harvest, and should be continued.

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APPENDIX I. Results of spring deer pellet group surveys, 1981.

Island	Acres	No. of Plots	Mean Groups/Acre
Big Level	864	799	307.7
Little Level	312	228	495.6
Greys	492	568	49.2
Liesnoi	156	78	311.5
Rynda	2,100	561	49.1
Sokolof	2,076	1,800	346.7

APPENDIX II. 1980 deer hunting effort and success - unit 3.

Island	No. of Hunters	No. of Days	Number Harvested	Days/ Deer	Percent Success
Levels	11	19	5	3.8	45
Vank	34	70	12	5.8	35
Sokolof	46	84	18	4.7	39
Woronofski	45	120	16	7.5	36

APPENDIX III. 1980 deer hunting effort and success - unit 1B.

Area	No. of Hunters	No. of Days	Number Harvested	Days/ Deer	Percent Success
Cape Fanshaw - Muddy River	43	181	7	25.8	16.3
Muddy River - Stikine River	30	107	4	26.8	13.3
Stikine River - Lemesurier Point	19	67	2	33.5	10.3

DEER

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT 1C

GEOGRAPHICAL DESCRIPTION: Mainland Portion of Southeastern Alaska - Cape Fanshaw to the Latitude of Eldred Rock

PERIOD COVERED: July 1, 1980 - June 30, 1981

Season and Bag Limit

Aug. 1 - Dec. 31	Four deer provided that antlerless deer may be taken only from Sept. 15 - Nov. 15.

Population Status and Trend

No data were collected. Although survival should have been good through winter 1980-81, deer populations appear to be about the same as the previous year and below overall previous highs, according to local hunters.

Population Composition

No data were collected.

Mortality

Deer hunter questionnaires were mailed to all persons issued deer harvest tickets during the 1980-81 season. The questionnaires replaced the deer harvest ticket reports used in prior years. Preliminary results (final analysis was not available at the time of reporting) indicated that 551 Unit 1C hunters (those who hunted) responded after 3 separate mailings. Of 551 hunters, 119 were successful and took 196 deer (140 males and 56 females). These Unit totals, however, included 1 hunter who reported killing 20 male deer (the legal bag limit is 4 deer) and 9 hunters who indicated hunting after the season closed. Four of these latter hunters were successful in taking 6 deer (5 males and 1 female).

In general, the preliminary results indicated that the Juneau road system, the Favorite Channel Islands (reported as Lynn Canal Islands in 1978 and 1979) and Douglas Island continue to be the most heavily hunted areas in Unit 1C.

Management Summary and Recommendations

The deer harvest in Unit 1C in 1980 was about 3 times greater than the reported harvest in 1978 or 1979. This and other hunter

data related increases are attributed mostly to differences in hunter sample levels between these years (about 30% for 1978 and 1979 and about 60% in 1980).

The loss of deer habitat in Unit 1C due to continued urbanization and logging will reduce deer population levels in those areas. The seasons and bag limits for these areas may have to be adjusted to be more in line with the resource. The season and bag limit change recommended specifically for the 1980-81 season for the Juneau Mainland Area (Zimmerman, S&I Progress Report 1979-80) was not adopted. Maintaining a concurrent season and bag limit between Unit 1C and Unit 4 was a major consideration against the proposed change.

PROPOSED BY:

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SUBMITTED BY:

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Regional Management/
Research Coordinator

DEER

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT 4

GEOGRAPHICAL DESCRIPTION: Admiralty, Baranof, Chichagof, and Adjacent Islands

PERIOD COVERED: July 1, 1980 - June 30, 1981

Seasons and Bag Limits

That portion of Admiralty Island north of a line along the divide between Woody Point on the west side and Pleasant Bay on the east side, including Pleasant Bay; and that portion of Chichagof Island east of a line running along the divide between Column Point on the north coast and Point Hayes on the southeast coast in Chatham Strait.	Aug. 1 - Dec. 31	Four deer, provided that antlerless deer may be taken only from Sept. 15 - Nov. 30.
Unit 4, remainder of Admiralty Island	Aug. 1 - Nov. 30	Three deer, provided that antlerless deer may be taken only from Oct. 15 - Nov. 10.
Remainder of Unit 4	Aug. 1 - Nov. 30	Four deer, provided that antlerless deer may be taken from Oct. 15 - Nov. 10.

Population Status and Trend

In the 1979-80 Survey and Inventory report it was stated that there appeared to have been a much greater overwinter loss of deer (during winter 1978-79) from Unit 4 than had previously been suspected. That was based on the poor success hunters had in the 1979 hunting season and observations of Department personnel. As a result, and to respond to public concerns, a conservative season was adopted. The seasons and bag limits listed above were adopted by the Alaska Board of Game and reflect a compromise

of conflicting opinions and observations presented to the Board by the public, the Department, and the involved Advisory Committees.

Subsequent to the adoption of the above regulations, attempts were made to determine the status of the Unit 4 deer population. These efforts were primarily late winter beach counts but also included extensive contacts with the hunting public. The consensus was that deer appeared to be at "normal" population levels throughout the Unit. Consequently, the suspected reduced population reported in 1979-80 appears to have been inaccurate.

Population Composition

Counts made during this reporting period resulted in classification by age of over 500 animals. Fawns represented over 30 percent of the sample, suggesting excellent reproduction. Observations of large numbers of yearling bucks during summer 1981 confirmed high fawn production and survival to age 1 year.

Mortality

Winter mortality transects were not monitored in spring 1981. Opportunistic observations in conjunction with other field activities suggested winter losses were minimal, not surprising in view of the mildness of the 1980-81 winter.

The sport harvest for the 1980 season was measured through a statewide mail-out questionnaire which was sent to every person issued a deer harvest ticket. Following one reminder, 73 percent responded. An evaluation of that sample, uncorrected for nonreport bias, shows that 2,250 persons hunted, 1,330 successfully, and harvested 3,165 deer (2,499 bucks and 666 does). The high representation of bucks was expected, as the antlerless season was open for only a short period of time. Successful hunters average 6.72, while unsuccessful hunters spent 4.03 days afield. Among all hunters the average take was 1.4 deer per hunter. The 1981 data together with historic harvests are shown in Appendix I.

The chronology of the 1980 harvest was similar to past years, in spite of the fact that there was not a uniform antlerless opening or a uniform closing. In line with past years, the three areas which contributed the majority of the harvest were Peril Strait, the immediate Sitka area, and northern Admiralty Island. The antlered-deer only bag limit in December for the northern portion of the Unit proved to be very unpopular with hunters, especially after the bucks had shed their antlers.

Parasitological Observations

Parasitological examinations were routinely made (Appendix II). The lungworm Dictyocaulus viviparus was found in 14 of 54 deer examined (26% occurrence). Nematodes of the genus Ostertagia, which occur in the abomasum, were found in 100 percent of 27 deer examined. Another nematode, Oesophagostomum venulosum, which occurs in the caecum, was observed in 8 of 23 deer examined (35% occurrence). Adult tapeworms (probably of the gensus Monizia) were observed in the small intestines of 3 of 23 deer (13% occurrence) and tapeworm cysts of an unknown genus were observed in 4 of 23 deer (17% occurrence). The only ectoparasite was the cattle louse Tricholipeurus lipeuroides that was found on 4 of 22 deer examined (18% occurrence). It is not uncommon to find lungworms, abomasum worms, and caecum worms in the same deer. In late spring those deer so infected appear to be less thrifty than a less parasitized one. Of the deer I have observed that had severe infestation of cattle lice, none were thrifty, suggesting lice are a luxury deer cannot afford. So far as is known, lice and lungworms are the only Alaskan deer parasites to have pathological significance although deer with the caecum parasite usually show a diarrhea condition. Neiland (1981) reported that 9 of 54 samples (16.6%) of deer heart muscle from southeastern Alaska were positive for Sarcocystis spp., a protozoan parasite. Twenty of those specimens came from Unit 4, of which 4 showed "light" infections. The pathological significance of Sarcocystis is unknown, but the parasite has been observed worldwide in nearly all species which have been examined.

Management Summary and Conclusion

Indications are that the Unit 4 deer population is healthy. It is perhaps somewhat irresponsible management to have a restrictive season on a healthy, viable population of ungulates such as deer. However, deer are the primary big game species in Southeastern, and regardless of the management decisions made, there will be a great deal of emotional involvement by a well meaning, but often misinformed, public. For most of Unit 4 there is no biological reason to protect does from hunting between September 15 and October 15, a time when they have traditionally been hunted. However, in the immediate Sitka vicinity, the hunting public is sufficiently large and mobile that a late season, when deep snow forces deer to lower elevations and makes them very vulnerable to hunting, is probably repugnant to most hunters and in some situations may even be biologically unsound. On the other hand, in spite of the emotional considerations, winter weather is the factor with the greatest influence on deer abundance and survival. Thus, the options the deer manager must face are: (1) attempt to control deer numbers through hunting, which is possible only during a late season, i.e. December when deer are forced down by snow, or (2) restrict hunting and let the deer die of starvation and/or malnutrition or disease. Since hunting under most circumstances cannot control deer numbers,

seasons and bag limits must thus be tempered by those ethical considerations which the majority of the public will tolerate.

Under current conditions which include: (1) a deer population that has sustained neither a serious winter kill nor a substantial sport harvest for several years; (2) a relatively large and highly mobile hunting public in the Sitka area; (3) sport/recreational hunting publics in Juneau and, to a much lesser degree, in Petersburg, Wrangell, and Ketchikan; and (5) a decreasing habitat base through clearcut logging, the most desirable deer hunting regulations would be: an August 1 opening date unitwide for male deer only, with both sexes legal after September 15 on a unitwide basis. The season should remain open until December 31. There should be a one-deer in possession limit for the southwestern portion of the Unit (Sitka area) during the month of December. The existing methods and means regulations are appropriate. An in-season closure dependent upon snow conditions is not practical.

In spite of the arguments of season lengths, bag limits, methods and means, the impact of clearcut logging is the only significant man-made influence on deer numbers.

Literature Cited

Neiland, K. A. 1981. Survey for Sarcosystis spp. in wildlife. Alaska Dept. Fish and Game, Fed. Aid Wildl. Rest. Final Rep., Projs. W-21-1 and W-21-2, Job 18.3R. 28pp.

PREPARED BY:

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SUBMITTED BY:

Nathan P. Johnson
Regional Management/
Research Coordinator

Appendix I. Deer harvest data, Game Management Unit 4.

Year	Total* Kill	% Males	Days Effort per Deer	Deer per Hunter	Winter Mortality per Mile of Beach	% Kill November & December
1969	1,756	45	8.0	0.8	0.00	--
1970	4,040	56	--	2.1	1.61	68
1971	3,040	--	3.3	1.7	1.11	79
1972	2,500	54	4.9	1.4	0.64	67
1973	7,000	67	3.5	2.5	0.78	67**
1974	7,118	57	3.1	2.3	0.41	67
1975	4,247 ***	57	2.2**	2.1**	0.96	77
1976	1,475	67	7.5	0.7	0.00	69
1977	2,945	--	1.6	1.2	0.00	79
1978	2,024	70	2.5	1.1	0.72	73
1979	950	70	4.5	1.0	0.00	--
1980****	3,165	79	4.0	1.4	Not Determined	Not Applicable

*Harvest ticket/report data 1975-1979; hunter interview through 1974.
**Data for Sitka hunters only to this year.
***Hunter interview data calculated harvest of 14,700.
****Preliminary.

PREPARED BY: Loyal Johnson, Game Biologist III

Appendix II. Parasitological observation of Sitka blacktailed deer, Game Management Unit 4, during the period April 1979-August 1981.

Cause of Death	Sex	Age	Lungworm	Abomasal Nematode	Caecum Nematode	Adult Tapeworm Small Intestine	Tapeworm Cyst	Ectoparasite	Locale
Dog kill	F	4-5	0	-	-	-	+	-	Baranof-Sitka
Hunter	F	Fawn	0	-	-	-	-	-	Krestof Island
Hunter	F	4-5	0	-	-	-	-	-	Baranof-St. John Baptist
Hunter	M	4-5	0	-	-	-	-	-	Baranof-St. John Baptist
Hunter	F	4-5	0	-	-	-	-	-	Baranof-St. John Baptist
Hunter	F	3	0	-	-	-	-	-	Krestof Island
Hunter	F	4	0	-	-	-	-	-	Krestof Island
Hunter	F	3	0	-	-	-	+	-	Krestof Island
Road Kill	M	4-5	0	-	-	-	-	-	Baranof-Sitka
Collar mortality	F	Very old	0	+	0	0	0	+	Admiralty-Hawk Inlet
Collar mortality	F	Very old	0	+	0	0	0	0	Admiralty-Hawk Inlet
Collar mortality	F	Very old	-	-	-	-	-	+	Admiralty-Hawk Inlet
Collar mortality	M	1	-	+	+	-	-	-	Kruzof Island
Road kill	M	1	0	+	-	-	-	-	Baranof-Sitka
Winter kill	F	Fawn	0	-	-	-	-	-	Baranof Island
Collection	M	Adult	0	+	0	0	0	0	Kruzof Island
Collection	M	Adult	0	+	0	0	0	0	Kruzof Island
Collection	M	Adult	0	+	0	0	0	0	Kruzof Island
Collection	M	1	0	+	0	0	0	0	Kruzof Island
Winter kill	F	Fawn	+	+	+	+	0	0	Baranof Island
Collection	M	Fawn	+	+	0	+	0	0	Admiralty-Hawk Inlet
Collection	M	1	0	+	0	0	0	0	Chichagof-Whitestone Harbor
Collection	F	3	0	+	0	0	+	0	Chichagof-Whitestone Harbor
Collection	F	5	0	+	-	-	-	-	Chichagof-Whitestone Harbor
Collection	M	Fawn	0	-	-	-	-	-	Chichagof-Whitestone Harbor
Collection	M	1	0	-	-	-	-	-	Admitalty-Hawk Inlet
Collection	M	Fawn	0	-	-	-	-	-	Chichagof-Whitestone Harbor
Collection	F	5+	0	+	0	0	-	-	Admiralty-Winning Cove
Collection	M	1	+	-	-	-	-	-	Chichagof-Tenakee Inlet
Collection	M	Fawn	+	-	-	-	-	-	Chichagof-Tenakee Inlet
Collection	F	Fawn	+	-	-	-	-	-	Chichagof-Tenakee Inlet
Collection	F	1	0	-	-	-	-	-	Chichagof-Tenakee Inlet
Collection	F	10+	+	-	-	-	-	-	Chichagof-Kadashan

Cause of Death	Sex	Age	Lungworm	Abomasal Nematode	Caecum Nematode	Adult Tapeworm Small Intestine	Tapeworm Cyst	Ectoparasite	Locale
Hunter	M	3	+	+	0	0	0	0	Halleck Island
Hunter	M	1	+	+	+	0	0	0	Baranof-Nakwasina
Hunter	M	1	+	+	+	0	0	0	Halleck Island
Hunter	M	1	+	+	+	0	0	0	Halleck Island
Hunter	M	1	0	+	+	0	+	0	Taigud Island
Hunter	M	1	0	+	+	0	0	0	Baranof-Avoss
Hunter	M	1	0	+	0	0	0	0	Kruzof Island
Hunter	M	3	0	-	-	-	-	-	Kruzof Island
Hunter	M	2	0	-	-	-	-	-	Kruzof Island
Hunter	M	1	0	+	0	+	-	-	Kruzof Island
Hunter	M	2	0	-	-	-	-	-	Kruzof Island
Hunter	M	1	0	-	-	-	-	-	Krestof Island
Collection	F	Adult	0	+	0	0	0	0	Yakobi Island
Collection	F	Adult	0	-	-	-	-	-	Hill Island
Collection	M	5+	0	-	-	-	-	-	Hogan Island
Radioed	F	Fawn	Live animal					+	Admiralty-Hawk Inlet
Hunter	M	1	+	+	0	0	0	0	Krestof Island
Hunter	M	1	0	-	-	-	-	-	Partofshikof Island
Hunter	F	3	+	-	-	-	-	-	Partofshikof Island
Hunter	M	1	0	-	-	-	-	-	Halleck Island
Hunter	M	1	+	-	-	-	-	-	Halleck Island
Hunter	M	3	+	+	-	-	-	-	Kruzof Island
Road kill	M	1	0	+	-	0	0	-	Baranof-Sitka
Hunter	F	4	0	+	0	0	0	0	Baranof-Necker Bay

+ = Positive
0 = Negative
- = Not examined

PREPARED BY: Loyal Johnson, Game Biologist III

DEER

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT 6

GEOGRAPHICAL DESCRIPTION: Prince William Sound

PERIOD COVERED: July 1, 1980 - June 30, 1981

Season and Bag Limit

Aug. 1 - Dec. 31	Four deer, provided that antlerless deer may be taken only from Sept. 15 - Dec. 31.

Population Status and Trend

Prince William Sound deer populations were at a moderate level during the mid-1970's and gradually increased to a high level through 1980 due to a series of mild winters.

Population Composition

The following age data were obtained from deer jaws collected from Cordova hunters:

Age*	F	1	2	3	4	5	Total
Number	10	29	4	16	9	13	81
Percent	12.3	35.8	4.9	19.8	11.1	16.1	100.0

*Age was determined by tooth eruption and wear.

Mortality

A deer hunter questionnaire was mailed to each hunter that obtained a harvest ticket during the 1980-81 season. The questionnaire was mailed at the end of the season with 2 follow-up reminder letters. This process was the first attempt to obtain harvest data on deer in Alaska by the use of a questionnaire. Hunter report cards which have been used to collect deer harvest data since 1969 were not used in 1980.

Information obtained from deer hunter questionnaires are shown in Appendix I. Nine hundred hunters indicated that they hunted in Unit 6 and took 962 deer; 64 percent males. Hunter success was 49 percent with an average of 1.1 deer/hunter. Montague Island received the bulk of the hunting pressure and contributed 44 percent of the harvest. Hawkins Island was second with 17 percent of the hunters and 19 percent of the harvest. Data on chronology of the harvest and residency of hunters are not available at this time.

Management Summary and Recommendations

The reported harvest of 962 deer for 1980 is double the 1979 reported harvest of 452. This discrepancy may be a function of reporting methods, i.e., questionnaire vs. hunter report card. The harvest as determined by the hunter questionnaire method was considered more accurate than the hunter report card method. The 1980 deer harvest in Prince William Sound was "average." Snow depth did not move deer into lower elevations where they are vulnerable to hunters for any extended period during the hunting season.

All aspects of the 1980 harvest data appear to be normal. Montague Island is the most popular area to hunt and consistently contributes about half of the deer harvest in Prince William Sound. The percentage of males taken and the number of deer per hunter were considered normal.

The winter of 1980-81 was relatively snow free. Deep snow moved the deer to lower elevations for about 2 weeks in late December. Mild wet weather in early January removed most of the snow at lower elevations and allowed deer to feed in snow free areas most of the winter. Winter mortality should have been minimal.

PREPARED BY:

Julius L. Reynolds
Game Biologist III

SUBMITTED BY:

Leland P. Glenn
Survey-Inventory Coordinator

Appendix I. Unit 6 Deer Hunter Questionnaire Data, 1980-81

Summary of Unit 6 Deer Hunter Questionnaire

Number of hunters responding	900
Estimated number of hunters	1,251
Number of deer reported	962
Estimated number of deer harvested	1,337
Average number of deer harvested	1.1
Percentage of males	64.3
Percentages of hunters successful	48.8
Percentage of 0 deer	57.4
1 deer	20.7
2 deer	11.1
3 deer	5.7
4 deer	5.1

Analyses of Questionnaire Data by Area

Unit/ Area No.	Area	Hunter Visits*	Success. Hunters	% Success.	No. of Deer Harvested	Aver. No. Deer/Hunters	% Males in Harvest
6-01	Montague Island	379	208	54.9	427	1.1	64.9
6-02	Hinchinbrook Island	151	73	48.3	122	0.8	63.9
6-03	Hawkins Island	202	91	45.0	180	0.9	68.3
6-04	Knight Island	93	34	36.6	52	0.6	55.8
6-05	Naked Island	70	21	30.0	35	0.5	48.6
6-06	Southwestern PWS	116	23	19.8	39	0.3	64.1
6-07	Mainland	56	12	21.4	19	0.3	42.1
6-08	Green Island	69	22	31.9	40	0.6	60.0
6-09	Northern PWS	8	1	12.5	1	0.1	100.0
6-10	PWS Unknown	22	13	59.1	47	2.1	78.7

* A hunter visit was recorded for each area hunted; however, multiple visits to the same area by one hunter were counted as one visit.

Prepared by: Julius Reynolds, Game Biologist III

DEER

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT 8

GEOGRAPHICAL DESCRIPTION: Kodiak and Adjacent Islands

PERIOD COVERED: July 1, 1980 - June 30, 1981

Season and Bag Limit

Unit 8, that portion of Kodiak Island draining into Ugak Bay east of a line from the mouth of Saltery Creek to Crag Point and west of Pasagshak River.	Aug. 1-Nov. 30	One deer, provided that antlerless deer may be taken only from Oct. 1-Oct. 31.
Unit 8, remainder of Kodiak Island east of the Saltery Creek-Crag Point line.	Aug. 1-Oct. 31	One deer, provided that antlerless deer may be taken only from Oct. 1 - Oct. 31.
Remainder of Unit 8	Aug. 1-Jan. 15	Four deer, provided that anterless deer may be taken only from Sept. 15 - Jan. 15.

Population Status and Trend

The Unit 8 deer population continued to increase despite a significant increase in hunting pressure and harvest in 1980.

Population Composition

Large groups of deer have been reported by area residents along exposed beaches in Spiridon, Zachar, and Uyak Bays during early October since 1978. Hunters reported seeing groups of more than 70 animals during October 1979. The largest concentrations were seen during the first 2 weeks of October and then diminished by late October with the onset of the rut. Previous observers stated that the herds were predominantly spike and forked-horn males and females, and that larger bucks were noticeably absent.

A survey of approximately 20 miles of shoreline in Uyak, Zachar, and Spiridon Bays was done by skiff on October 8, 9 and 10, 1980. The surveys were done between 8:00 and 11:00 a.m. at low tide. A total of 96 deer was counted in 11 observations. Group size averaged 8.7 deer and ranged from 1 deer to 34 deer in the largest group. The larger groups of deer were difficult to approach for accurate classification, but 40 deer were classified as follows:

Spike Males	(%)	Forked Males	(%)	3 Point or Larger Males	(%)	Total Males	(%)	Females	(%)	Fawn	(%)
10	(25)	4	(10)	3	(8)	17	(43)	18	(45)	5	(12)

Approximately half the deer observed appeared to be yearlings. Fourteen of the 17 bucks had spike or forked horns, indicating they were yearling and 2-year old animals. Spike bucks were conspicuously abundant in the groups which were not classified. In addition, the low ratio of 28 fawns:100 does in the classified animals suggests that most of the does were also yearlings.

The October beach surveys provided additional indications that recent mild winters have resulted in high overwinter survival. The high proportion of yearlings and relatively high numbers of bucks suggest that wintering conditions have been optimal in recent years. Seventy-three percent of the deer reported killed in the 1980 season were bucks, which indicates both a high deer population and a high selectivity for males.

Mortality

The reported 1980-81 harvest by 1,969 hunters responding to mail questionnaires was 3,825 deer, 2,806 males (73%) and 1,019 females (27%). The estimated harvest was 5,347 deer, and 2,738 hunters were estimated to have been in the field. These estimates were obtained from questionnaire results by extrapolation assuming that harvest statistics for reporting and nonreporting hunters were comparable. Analyses of the questionnaire data by area is presented in Appendix I.

The highest monthly harvest was recorded in November, followed by October and December. Seventy-nine percent of the harvest was taken during these 3 months.

The deer harvest by Alaskans from the mainland exceeded the take by residents of Kodiak Island. Mainland Alaskans took 55 percent of the reported kill and residents of Kodiak took 41 percent. Nonresident hunters took only 4 percent of the harvest.

Seventy-three percent of the reporting hunters took at least one deer. An average of two deer per hunter afield was reported taken.

The northernmost islands, Afognak, Raspberry, and Shuyak Islands, accounted for 41 percent of the kill. Kodiak Island and adjacent smaller islands accounted for 59 percent of the harvest.

Unit 8 supported 43 percent of the reported statewide harvest during the 1980-81 season.

Mortality was low during the 1979-80 winter. Hunters who killed deer in January 1981 reported that the animals were generally in good condition, although a few reports of weak appearing fawns were received from hunters on Afognak Island. Brown bear hunters and guides reported finding no evidence of significant winter mortality.

Snow accumulations at sea level were light and deer were able to range to relatively high elevations throughout the winter. Weather conditions during April and May were unusually mild which favored earlier than usual development of new vegetative growth.

Management Summary and Recommendations

The estimated 1980 harvest of 5,347 deer represented a 53 percent increase over the previous year's estimated harvest of 3,500 deer. Although hunting pressure and harvest are increasing each year, the deer population appears to be continuing to increase as well. Moderate weather conditions have favored high survival for several successive years. Except in the most accessible areas hunting pressure has been inadequate to control population growth.

Liberal seasons and bag limits should be maintained. Additional hunting pressure from mainland Alaska hunters should be encouraged by providing good news media coverage of the high deer population and opportunity for a successful hunt.

PREPARED BY:

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Game Biologist III

SUBMITTED BY:

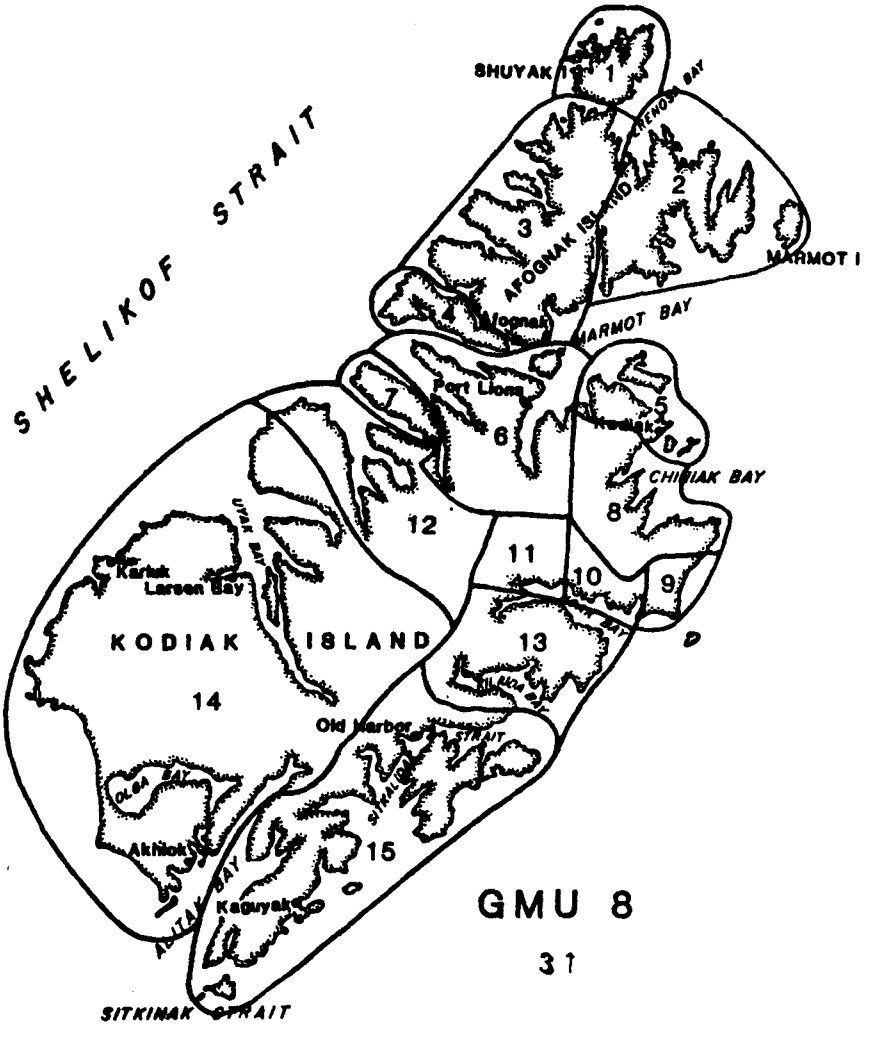
Leland P. Glenn
Survey & Inventory Coordinator

Appendix I. Analysis of Unit 8 Deer Hunter Questionnaire Data

Unit-Area	Hunter Visits*	Successful Hunters	% Success	No. of Deer Harvested	Aver. No. of Deer/Hunter	% Males in Harvest
8-01	134	103	76.9	268	2.0	73.9
8-02	339	262	77.3	631	1.9	70.8
8-03	323	204	63.2	422	1.3	70.0
8-04	232	143	61.6	249	1.1	73.5
8-05	160	46	28.8	61	0.4	78.7
8-06	495	309	62.4	631	1.3	69.7
8-07	154	113	73.4	247	1.6	68.4
8-08	307	102	33.2	127	0.4	81.9
8-09	60	16	26.7	16	0.3	87.5
8-10	89	36	40.4	54	0.6	70.4
8-11	56	31	55.4	67	1.2	67.2
8-12	126	101	80.2	218	1.7	78.0
8-13	118	90	76.3	209	1.8	76.1
8-14	270	216	80.0	540	2.0	79.8
8-15	48	34	70.8	82	1.7	80.5
8-unk	6	1	16.7	3	3.0	33.3

*A hunter visit was recorded for each area hunted; however, multiple visits to the same area by one hunter were counted as one visit.

Prepared by: William P. Taylor, Game Biologist II



ELK

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT 8

GEOGRAPHICAL DESCRIPTION: Kodiak and Adjacent Islands

PERIOD COVERED: July 1, 1980 - June 30, 1981

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	Oct. 1-Oct. 31	One elk by permit only. 125 permits will be issued. See 5 AAC 81.055 and separate permit hunt supplement.
Remainder of Unit 8	Aug. 1-Dec. 31	One elk by permit only.

Population Status and Trend

The elk herds on Afognak and Raspberry Islands are stable or slightly increasing.

Population Composition

Sex and age composition surveys were flown during August and September 1980. Six hundred and thirty-six elk (92 bulls, 380 cows and 164 calves) were classified during 10.3 hours of aerial surveys. A calf:cow ratio of 43:100 was the highest recorded in the past 15 years and a male:female ratio of 24:100 was the highest since 1971.

Ninety-four elk (12 bulls, 52 cows and 30 calves) were classified during a survey of the Raspberry Island herd. The number of calves was the highest recorded in several years.

One hundred and eighty-two elk (29 bulls, 103 cows and 50 calves) were classified in the southwest Afognak area during three surveys. The largest unduplicated count was 136 elk, including 48 calves. This was the largest number of calves observed in several years. A group of 36 elk observed in the Malina Lakes area appeared to be a separate herd from those observed near Afognak Lake.

A total of 360 elk (51 bulls, 225 cows and 84 calves) was classified on the remainder of Afognak Island. Elk herds were observed in the Waterfall Lake, Paramanof Bay, Saposa Bay, Duck

Mountain and Tonki Cape Peninsula areas. Additional observations by local pilots and hunters indicated that segments of the herds in the Waterfall Lake and Duck Mountain areas were missed during the aerial surveys.

Mortality

Hunters killed 101 elk from Afognak and Raspberry Islands in 1980. Composition of the harvest was 63 males, 36 females, and 2 animals of unknown sex. Five hundred and thirty-eight permittees reported hunting in 1980 and overall hunter success was 19 percent. Harvest characteristics of the permit hunts were as follows:

Registration Hunt 750 - Parts of Afognak Island

Seventy elk, including 38 males (54%), 31 females (44%), and 1 elk of unknown sex (1%) were killed on Afognak Island. Three hundred and forty-five permittees reported hunting and 20 percent were successful. Distribution of the elk harvest was: Tonki Bay/Peninsula--11, Izhut Bay--6, Duck Mountain/Kazakof Bay--15, Paramanof/Malina Bays--10, Waterfall Lake/Bay-10, Seal Bay--8, Perenosa Bay--8, unknown location--2.

Registration Hunt 751 - Southwest Afognak Island

Twenty-two elk, including 16 males (73%), 5 females (23%), and 1 elk of unknown sex (4%), were killed on southwest Afognak. One hundred and sixty-one hunters participated in the hunt.

A female elk, which was tagged in 1971, was killed on 10 September 1980, near Afognak Lake within 5 miles of the original capture site. This animal was at least 11 years old because it was mature when captured.

Drawing Hunt 720 - Raspberry Island

Sixty-five permits were available for the Raspberry Island hunt. Thirty-two permittees killed 9 bull elk for 28 percent hunter success.

Eleven elk mortalities resulting from illegal kills or wounding loss were recorded in 1980. Composition of these kills was 5 males, 5 females, and 1 elk of unknown sex.

No natural mortalities on Afognak and Raspberry Islands were observed or reported during the winter of 1979-80.

Management Summary and Recommendations

The 1980 harvest of 101 elk was the highest harvest since 1967, when 102 elk were killed. A record 538 permittees reported hunting, a 30 percent increase from the 375 reported in 1979. High selectivity for bull elk continued with 62 percent males in the harvest, a decrease from the 76 percent male harvest in 1979.

Hunters took 22 elk in the southwest Afognak registration hunt, a modest increase from the 14 elk killed in 1979 under a drawing hunt. The number of hunters more than doubled, from 54 in 1979 to 161 in 1980. The elk population was estimated at 175, prior to the hunting season.

For the third consecutive year, hunters took only bulls on Raspberry Island. Although the number of bulls in this herd has been reduced, calf production has remained high and the number of cows in the herd has steadily increased. The herd is estimated to number 100-125 animals.

Unusually low calf:cow ratios were recorded for elk herds in the Saposa Bay and Tonki Cape Peninsula areas. The calf:cow ratios were 18:100 and 21:100 for these two herds, respectively. Severe deterioration of winter range in the Tolstoi Point and Tonki Cape areas may be contributing to poor calf survival.

Good overwinter survival continues to allow an overall increase of the elk population on Raspberry and Afognak Islands. High calf production in the Raspberry Island and southwest Afognak herds contributed to an above average calf:cow ratio of 43:100. The highest hunting effort on record produced a harvest of 101 elk. This was the highest kill recorded in recent years. The pre-hunting season population was estimated at a minimum of 800 elk. The total mortality of 112 elk was 14 percent of the estimated population.

No changes in seasons or bag limits were recommended.

PREPARED BY:

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SUBMITTED BY:

Leland P. Glenn
Survey-Inventory Coordinator

MUSKOXEN

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT 18

GEOGRAPHICAL DESCRIPTION: Yukon-Kuskokwim Delta

PERIOD COVERED: July 1, 1980 - June 30, 1981

Population Status and Trend

Nunivak Island

The current population of approximately 700 muskoxen on Nunivak Island is the result of introduction of 31 animals in 1935 and 1936. The herd had increased to an estimated 750 animals by 1968, after which time a decrease in calf production and an increase in natural mortality reduced the size of the herd. Pre-calving censuses since 1976 have accounted for an average population of approximately 590 animals (Table 1), ranging from a low of 491 in 1978[1] to a high of 702 during the 1980-81 reporting period. Between 1976 and 1980 calves accounted for 12 to 22 percent of the total population (after spring hunts and transplants) and averaged 18 percent for these years. Hunting and transplant operations have altered the age and sex composition of the population. The 1976 ratio of adult bulls (4 years and older) to adult cows (2 years and older) was 1:3 while the spring, 1981 census indicated a bull:cow ratio of 1:1.3.

The estimated population of 700 muskoxen on Nunivak Island is well over the recommended level (Department Wildlife Management Plans suggest 400 adult muskoxen while a cooperative agreement between the Department of Fish and Game and the U.S. Fish and Wildlife Service suggests a nucleus herd of 500 muskoxen). Although spring 1981 hunts and transplants reduced the total pre-calving population on the island, the herd size is probably larger than available winter range can support on a sustained basis.

Nelson Island

In 1967 and 1968, 23 muskoxen were transplanted to Nelson Island from Nunivak Island. Surveys conducted since 1973 have shown a rapid increase in this population (Table 2). The herd appeared to expand at an annual rate of about 17 percent through 1975. After this time the herd appeared to increase at almost 23 percent annually. A pre-calving census in 1981 enumerated 265 animals with an adult bull to adult cow ratio of 1:2.1.

[1]An estimated 150 animals succumbed in early 1978 to winter mortality.

Table 1. Sex and age composition of muskoxen observed during spring surveys on Nunivak Island from 1976 through 1981.

Years	4+ Years Male	4+ Years Female	3 Year Male	3 Year Female	2 Year Male	2 Year Female	Yearlings	Unclas	Total
1976	175	89	51	64	37	27	71	40	554
1977	164	144	41	72	32	44	100	53	650
1978	94	142	34	88	19	19	92	11	491
1979	82	160	12	43	35	38	114	45	529
1980	63	215	33	42	64	54	121	9	601
1981	105	169	63	84	49	70	134	28	702

Table 2. Sex and age composition of muskoxen observed on Nelson Island from 1968 through 1981.

Year	4+ Years Male	4+ Years Female	3 Years Male	3 Years Female	2 Years Male	2 Years Female	Yearling	Unclas	Total
1968 1)									23
1973 2)									44
1975 2)									66
1977 3)									132
1978 2)									107
1980 2)									167
1981 4)	50	48	27	16	24	13	45	42	265

1) 23 subadult animals transplanted from Nunivak Island in 1967 and 1968
2) Aerial Survey
3) Ground Survey
4) 176 animals observed during ground composition and 265 animals seen during aerial survey.

As with the Nunivak Island population, the number of muskoxen on Nelson Island is believed to be above the long-term carrying capacity of the range. Department Wildlife Management Plans, written in 1976, called for maintaining a maximum population of 75 adult muskoxen until range studies proved this figure lower than necessary. 1981 spring survey and census efforts accounted for 178 adult animals in the population.

Nunivak Island

During the 1980-81 reporting period a summer aerial survey and a spring ground census were conducted. The summer survey was flown by Fish and Wildlife Service personnel on August 21 and 22 (Table 3). The entire island was surveyed with techniques identical to those employed in past efforts.

Observers during the August survey agreed that a number of animals in the population were missed. The following formula was used to estimate the total herd size at that time.

March, 1980 census level	601
Reduction in Population due to:	
1980 Spring Hunt	- 3[2]
1980 Fall Hunt	- 3
March 1980 Transplant	-11
3% natural mortality	-18
Total Population pre-calving	566
Calf Production; 24% of pre-calving population	±136
Total Population estimate August, 1980	702

Ground composition counts on Nunivak Island were conducted from February 8 to February 14, 1981 by Department of Fish and Game and Fish and Wildlife Service staff. Census efforts were hampered by wind and blowing snow, postponing efforts and later restricting travel and visibility on certain parts of the island. Biologists conducting the census concurred that many animals were not observed during the effort. The total population composition was estimated by applying the March 1981 age/sex composition of the observed 494 animals to the fall 1980 survey results (702 muskoxen). The observed and extropolated age/sex composition is on Table 4.

[2]15 animals taken prior to March census.

Table 3.

# of Groups	Total Animals	4+ Years & Bulls	Yearlings	Calves	Unclassified
66	406	14	15	79	298

Bulls were enumerated only in all-bull groups and some yearlings were not identified.

Table 4.

	4+ Years Male	4+ Years Female	3 Year Male	3 Year Female	2 Year Male	2 Year Female	Yearling	Total
			(Census Results)[1]					
	79	119	49	59	35	54	99	494
			(Extrapolated Total)[1]					
	112	176	63	91	49	70	141	702
(% of Total)	(16)	(25)	(9)	(13)	(7)	(10)	(20)	(100)

The number of 2 year olds observed in March 1981 (119) was close to the number of yearlings seen during 1980 spring censuses (121), and so overwinter yearling mortality was assumed to have been negligible.

Nelson Island

Ground censuses of muskoxen on Nelson Island were conducted by Fish and Game staff on February 10 and March 10 1981, in the Cape Vancouver and Kaluyut Mountains areas, respectively. The age and sex composition of the 1976 animals observed during these efforts was extrapolated to the 265 animals observed during a February 11 aerial survey, which gave the results on Table 5.[3]

Wind and snow storms prevented surveys during most of late winter when censuses were scheduled. During the aerial survey many animals were on steep bluffs on the western side of Nelson Island. Animals in such locations were impossible to observe during ground counts due to the precipitous nature of the terrain. Even though the percentage of unclassified animals enumerated during ground counts was high (16%), age/sex figures are considerably more accurate from ground counts than from aerial surveys.

Mortality

Nunivak Island

Forty hunters applied for the fall 1980 bull muskox hunt on Nunivak Island. Of the five permittees, three purchased tags and were successful in taking animals. One of the non-hunting permittees did not hunt because of "restrictions and cost", while the other said he did not accept the permit due to "too many problems" with the permit system. Thirty drawing permits were available for cow muskoxen in the fall. One person applied for and purchased a tag for the fall hunt, but was unable to participate due to conflicts with his work schedule. A lack of interest in hunting cows with a tag fee of $500.00 probably accounts for the low permit application rate.

Action by the Alaska Legislature on HB 878 in summer 1980 gave the Board of Game authority to reduce the tag fee on certain muskox hunts for state residents. The Board established a $25.00 tag fee for resident hunter cow permits during the December 1980 Board Meeting. Additionally, the quota on cows was increased from 40 (for both the fall and spring hunt) to 55: 45 of these were included under the resident hunt, and the remaining 10 were reserved for nonresidents ($1,000.00 tag fee). There was no change in bull permits.

[3]Unclassified animals were assigned to age/sex classes in the same proportion as the ratio of those classes in the classified population.

Table 5.

	4+ Years		3 Years		2 Years			
	Male	Female	Male	Female	Male	Female	Yearlings	Total
	58	58	32	19	29	16	53	265
(% of Total)	(22)	(22)	(12)	(7)	(11)	(6)	(20)	(100)

Fifty-nine applications (30 from nonresidents and 29 from residents) were submitted for the spring 1981 Nunivak Island bull muskox hunt. Since only three of five available permits were filled during the fall 1980 hunt, seven bull permits were issued for the spring hunt. Those seven permits were distributed to two nonresidents and five residents.

As in the past, the interest in drawing cow permits was low. Only three of the 10 available nonresident permits were applied for and filled during the spring 1981 season. As with bull hunters, all comments by cow hunters regarding hunting and guide services classed the hunt either "good" or "excellent."

Permits were issued for the February 15 to March 15 resident cow muskox season on February 13, in four locations. Ten permits were issued in Anchorage, 10 in Bethel, 5 in Fairbanks, and 17 in Mekoryuk. Because there were three unissued permits from Mekoryuk, the first persons on the alternate lists from Fairbanks, Bethel and Anchorage were subsequently issued permits. About 50 applicants were present during permit issuance at Anchorage, Bethel and Fairbanks. Two permittees notified the Department before the season closed that they would not hunt. Therefore, two additional permits were issued to bring the total number of resident cow permits to 43.[4]

Hair, teeth, ovaries and serum samples were collected during the spring hunt. From those specimens we hope to obtain ages, initial breeding age, information on exposure to infectious diseases, and baseline values for blood proteins. Additionally, the reproductive status of cows was determined. Of 46 cows taken, the reproductive status of 43 cows observed was as follows: four (9%) were not pregnant, two (4%) were of undetermined status, 18 (38%) were pregnant with male fetuses, 18 (38%) were pregnant with female fetuses and five (11%) were pregnant with fetuses of unknown sex. One cow was carrying twin female fetuses. All animals observed were in good condition and appeared to be quite fat. This may be due to the relatively mild 1980-81 winter.

Further reduction of the Nunivak muskox herd was accomplished by transplanting 47 animals during late March 1981. Thirty seven of these animals were moved to increase herd size in the Port Clarence area on the Seward Peninsula, six were shipped to the Point Defiance Zoo in Washington State, and the remaining four were relocated to the Anchorage Children's Zoo.

[4]One 3-year-old bull was killed by a resident hunter holding a cow permit and one cow permittee was unable to hunt due to illness at theend of the season.

Approximately nine animals are known to have wandered from Nunivak Island onto sea ice in late March/early April and are presumed to have drowned. Additional animals have also probably drowned. This phenomenon may be the result of high population density on the island. Total known reductions to the Nunivak herd resulted in the pre-calving structure shown on Table 6.

Nelson Island

Reduction of tag fees for resident cow muskox hunters affected Nelson Island as well as Nunivak. This action was considered an appropriate method of encouraging participation by local residents in the first Nelson Island muskox hunt.

A total of 129 applicants were present at the time of permit issuance in Toksook Bay on February 13, 1981. Twenty permits were issued, after which time a hunter orientation course was presented to instruct permittees on cow muskox identification and on how to collect required specimens.

Only 2 of the 20 cow muskoxen taken were killed prior to March 10. On that date, 13 animals were harvested from the Ikalugtulik River Valley, where a herd of 90 animals was observed during the February 11 aerial survey. The remaining 5 animals were taken on March 14 near the extreme northern end of Nelson Island. Most of the harvest occurred late in the season because weather was inclement early in the season, hunters were hesitant to be the first to mistakenly kill a bull, seal hunting was in progress, and/or hunters were unfamiliar with terrestrial mammal hunting. Hunters were very conscientious in determining sex of the animals they hunted and in presenting required samples to Department representatives who were in Toksook Bay during the open season. Hunter education courses are planned for the coming year to acquaint hunters with methods used in hunting land mammals. At least four muskoxen wandered onto sea ice southwest of Toksook Bay and drowned.

Of the twenty cows harvested, pregnancy status was determined for 18 animals. Two of these were not pregnant, one carried a fetus of undetermined sex, five were carrying female fetuses and the remaining 19 had male fetuses. All harvested cows observed by biologists appeared from external characteristics to be in the 4+ age class. All animals were fat and in apparently good condition.

The pre-calving population structure of muskoxen in the Nelson Island herd is shown on Table 7.

Management Summary and Recommendations

Nunivak Island

Action by the Board of Game in spring 1981 raised the quota on cow muskoxen to 65 animals. Ten of these were for nonresident

Table 6.

	4+ Years Male	4+ Years Female	3 Year Male	3 Year Female	2 Year Male	2 Year Female	Yearling	Unclas	Total
Feb. Census[2]	105	169	63	84	49	70	134	28	702
Minus Spring Hunt[3]	-7	-35	-1	-11					-54
Minus Transplant[4]		- 1		- 3		-1	-42		-47
Minus Winter Mort.[5]	-1	- 2	-1	- 1	-1	-1	- 2	—	- 9
Pre-calving Population	97	131	61	69	48	68	90	28	592

[1] Unclassified animals were assigned to age/sex classes in the same proportion as the ratio of those classes in the classified population

[2] 3 bulls from fall hunt subtracted from these figures

[3] Age structure of cows harvested was estimated

[4] 14 yearling bulls and 28 yearling cows were transplanted

[5] Age classes of drowned muskoxen were estimated

Table 7.

	4+ Years Male	4+ Years Female	3 Year Male	3 Year Female	2 Year Male	2 Year Female	Yearling	Unclas	Total
Spring Census	50	48	27	16	24	13	45	42	265
Minus Spring Hunt		-20							
Minus Mortality[6]	-2	- 2	—	—	—	—	—	—	—
Pre-calving Population	48	26	27	16	24	13	45	42	241

[6] Four animals known to have drowned were arbitrarily assigned to the 4+ age class.

and 55 for resident hunters. The bull quota was left at 10 animals. While the reproductive capability of the Nunivak herd was significantly reduced by the removal of 50 breeding age cows in spring 1981 and the adult bull to cow ratio is approaching 1:2.5, the total population remains high. The pre-calving population of about 600 animals exceeds the recommended level of 500 muskoxen. Following calving in spring 1982, the total population (assuming 18% recruitment) will be over 725 animals. A severe winter could result in significant winter mortality as in 1978.

Harvest quotas for 1981-82 will remove about 60 percent of the expected recruitment. The feasibility of transplants to areas where herds have been established by prior transplants and to historic ranges where muskox populations currently do not occur. Increased harvest quotas should be established to gradually reduce population size to the desired level. Winter range studies should be conducted on Nunivak Island to update infomation on range conditions.

Nelson Island

The Board of Game increased the harvest quota for cow muskoxen on Nelson Island from 20 to 30 for 1982. As on Nunivak Island, the population size probably exceeds the desired number, and may be 275 to 300 pre-calving animals in spring 1982.

The observed 1:1.2 bull to cow ratio will become skewed toward bulls if cow only hunting continues. In the very near future, the question of bull muskox hunts on Nelson Island must be addressed. The land status of Nelson Island, almost entirely selected through the Alaska Native Claims Settlement Act, and the possible reluctance of Island residents to accommodate non-local hunters will confound the situation. Solutions to potential problems should be explored with the Game Board and involved residents of Nelson Island to guarantee the integrity of the muskox population, access to a common property resource, and consideration of private property.

Range studies should be implemented on Nelson Island to determine condition of winter range.

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SUBMITTED BY:

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MUSKOXEN

SURVEY INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT 22

GEOGRAPHICAL DESCRIPTION: Seward Peninsula

PERIOD COVERED: July 1, 1980 - June 30, 1981

Season And Bag Limit

No open season

Population Status And Trends

In spring 1970, the Department of Fish and Game transplanted 36 muskoxen (19 males, 17 females) from Nunivak Island to the Seward Peninsula. Throughout the 2 years following their release at the Feather River (approximately 30 miles northwest of Nome), the muskoxen moved approximately 100 miles, split into two groups, and established two distinct home ranges near the York Mountains (located on the western end of the Seward Peninsula). The Black Mountain herd ranged northwest of Brevig Mission and the Nuluk River herd ranged southwest of Shishmaref near Ear Mountain. Since most of the animals transplanted were yearlings, growth of the herds was virtually nonexistent during the first few years; however, as cows reached breeding age, the herd slowly increased. Last year's population estimate of muskoxen on the Seward Peninsula was 104 animals (43 in the Black Mountain herd and 61 in the Nuluk River herd).

On 24 March 1981, an additional 37 animals (10 males, 27 females) were brought to the Seward Peninsula from Nunivak Island. Because the methods used on previous transplants resulted in a wide dispersal of the animals, an attempt was made to actually herd these animals over to the established Black Mountain herd. The muskoxen were flown from Mekoryuk (Nunivak Island) to the landing strip at Port Clarence. Once the animals were unloaded and uncrated, they were driven by men on snow machines and on foot approximately 13 miles in a northerly direction to the base of the mountain adjacent to Black Mountain. Although this maneuver was considered successful, it was not without complications. Shortly after the drive began, two cows (1 4-year-old and 1 3-year-old) made a stand, refused to be driven, and had to be left behind.

During the capture process, the muskoxen were placed under considerable stress and strain. Numerous animals (especially yearlings) showed signs of "capture myopathy"[1] upon release from the crates or shortly after the moving of the animals began. (One yearling female appeared to be severely injured and it was felt that she could not make the trip to the Black Mountain area.

She was flown back to Nome for further observation and treatment.) Consequently, the animals had to be moved slowly, and it was not possible to reach the Black Mountain herd before dark. When biologist and herders returned the following day, all but 10 of the animals had moved onto the mountain southeast of the resident Black Mountain herd. As a result, it was virtually impossible to move them over to the existing herd, approximately 2 miles away.

Five days after the initial transplant, an attempt was made to locate and transport the two adult cows left behind. The 3-year-old cow was observed approximately 6 miles south of Port Clarence and about 1/2 mile out on the ice. She was subdued, secured to a sled, and transported to the Black Mountain area. The other animal was not located at that time. The following day, five animals were observed on Red Mountain (north of Brevig Mission); they were subsequently driven over to the mountain adjacent to Black Mountain. Thus, except for the yearling female transported to Nome and the "missing" 4-year-old cow, all of the new animals were within a 3-mile radius of the Black Mountain herd.

Population Composition

No composition data were obtained during the reporting period on the existing Seward Peninsula muskoxen. Composition of the 36 muskoxen released during the spring of 1981 was as follows:

4+ Years Females	3 Years Females	2 Years Females	Yearlings		Total	
			Male	Female	Male	Female
1*	3*	1*	10	21	10	26

*Animals had radio and visual neck collars
(1) A build up of lactic acid in the muscle tissue which results in damage to the tissue.

Numerous surveys were conducted during April to observe movement and behavior patterns of the newly released muskoxen as well as those of the Black Mountain herd. The newly released animals formed groups of from two to eight animals, and most settled on the higher ridges and snow free areas. Within 2 weeks of their release, some of these animals had moved over to Black Mountain, and 1 week later, one yearling female was observed with the main herd. The 2-year-old cow was also observed close to the main herd, but it appeared she met resistance from some of the larger bulls when she attempted to join the herd. She was observed following the herd 1 week later. Shortly thereafter, she was observed in association with a 3-year-old cow and two yearlings

approximately 2 miles from the main herd. Within 1 month of their release, four of the yearlings had joined the main Black Mountain herd which had moved approximately 5 miles during that time. One 3-year-old female and seven yearlings left the Black Mountain area around the first week of April and traveled in an easterly direction for approximately 25 miles, stopping in the hills adjacent to the Agiapuk River.

A survey conducted during the latter part of May showed that the main herd and another group of six animals (1 2-year-old, 1 3-year-old, and 4 yearlings) were on the flats adjacent to and south of the Black Mountains. The herd of eight animals which had moved over to the Agiapuk River was located on a river bar east of the main river channel.

Mortality

Four muskox mortalities or casualties were recorded during the reporting period. Two of these were from this spring's transplanted animals. The first was the yearling female which suffered "capture myopathy." She was housed in Nome until late June in hopes that her condition would improve to the point where she could be returned to the wild. Unfortunately, this never occurred and she was sent to the University of Alaska, Fairbanks. The second was the 4-year-old cow which was left behind at Port Clarence during the herding of the other animals. The carcass of this muskox was found frozen in the ice one mile north of Pt. Spencer (approximately 3 miles from the release site). Evidently this animal wandered out onto thin ice and fell through.

Another yearling (sex unknown) was found dead by a snow machine operator from Shishmaref during the spring in the vicinity of the Nuluk herd. The cause of this death was unknown.

One adult bull was found dead in Golden Gate Creek (56 miles up the Kougarok Road) by campers in late May 1981. Cause of death was unknown.

Numerous muskoxen, especially older bulls, continued to wander off from the main herds, and quite possibly some of them fell prey to bears and wolves. As in the past, natural mortality within the two established herds was thought to have remained very low, although no data were available to substantiate this.

Management Summary And Recommendations

Since the transplant of 36 muskoxen onto the Seward Peninsula in 1970, the animals have settled into two distinct home ranges. Although herd growth was slow in the beginning, good calf production during recent years has increased the size of both herds significantly. Prior to the 1981 spring transplant, the number of muskoxen on the Seward Peninsula exceeded 100 animals. Composition work conducted in the spring of 1980 showed calf production and survival rates had been excellent. Approximately

90 percent of the breeding age females produced calves, and in the Black Mountain herd, all of the calves born in spring 1979 survived to the age of 1 year.

The 1981 spring transplant was considered a success, but numerous things should be done differently in the future. Animals should be transported to the release site in crates, and then released rather than attempting to herd them a long distance. If this method is not feasible, the animals should be held in confinement for a couple of days before attempting to herd them. This will give them a chance to rest and resorb any build up of lactic acid. Also, if the animals are allowed to calm down for a couple of days, there is a good chance they would stay together as a unit while they are being herded. As previously mentioned, two of the five animals older than yearlings refused to be herded. This presented a real problem and resulted in the death of one of the animals. Because these older animals do, to a degree, provide herd stability and leadership, losses of this nature should be avoided if at all possible. It was also learned that it is possible to have too many herders. Biologists conducting future transplants of this nature should attempt to keep the man and machine power to a minimum. The large number of machines and men did nothing but confuse the animals.

All five of the adult (i.e. greater than yearlings) muskoxen were fitted with radio and visual collars. To date these radio collars have been a valuable asset in monitoring movements of some of the newly transplanted animals. It is likely that the group of eight animals that moved to the Agiapuk River would have been "lost" if one had not had a radio collar. Because movements of the Nuluk herd and the Black Mountain herd have been so difficult to keep track of in the past, efforts should be made during the next year to radio collar several females from each herd.

Sightings of individual mature bulls throughout the peninsula over the past years indicate that they do wander off from the main herd and apparently never return. Other small groups of mature bulls are also commonly seen in close association with the main herds. It is quite possible these animals are not contributing reproductively to the herds and may be considered as excess animals. If a limited hunt of these bulls is to be considered in the next few years, their emigration from the main herds needs to be monitored closely.

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MUSKOXEN

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT 23

GEOGRAPHICAL DESCRIPTION: Kotzebue Sound

PERIOD COVERED: July 1, 1980 - June 30, 1981

Season and Bag Limit

No Open Season

Population Composition

Employees of the USFWS observed 67 muskoxen including 15 calves on July 23, 1980 on Iviagik Mountain, approximately 20 miles northeast of Point Hope. An additional group of muskoxen, (at least 5 animals), was present in the Mulgrave Hills between the Noatak and Wuluk River drainages bringing the total minimum population at that time to 72 animals.

Mortality

No information was available.

Management Summary and Recommendations

With the production of 15 calves in 1980, it appears that the transplant was successful, and additional herd growth can be expected in future years. Surveys and population composition data need to be gathered on a more regular basis, and an intensive aerial survey should be conducted to determine the number of muskoxen between the Noatak River drainage and Cape Lisburne.

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MUSKOXEN

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT 26B and 26C

GEOGRAPHICAL DESCRIPTION: Eastern Arctic Slope

PERIOD COVERED: July 1, 1979 - June 30, 1981

Season and Bag Limit

No open season

Population Status and Trend

Survey data in this report were furnished by Fish and Wildlife Service personnel.

The muskox population in the eastern Arctic continued to increase during this reporting period. Based on 1980-81 surveys and observations, the precalving population rose from a minimum of 148 (1980) to a minimum of 186 (1981). Aerial surveys conducted during spring 1980 and 1981 indicated marked growth of major "subpopulations" in the Canning, Jago, and Sadlerochit drainages (Table 1). Smaller groups of muskoxen were observed in several other drainages. Apparently, these groups resulted primarily from dispersal of adult bulls from the larger groups.

Table 1. Muskox distribution in the eastern arctic, 1980-81.

Location	Date of Observation	Number of Animals
Canning River	4/8/80	48
	4/3/81	66
Sadlerochit Springs/River	4/8/80, 5/13/80	58
	4/2/81	78
Jago River	4/8/80	27
	3/28/81, 4/2/81	33
Upper Tamayariak River	4/8/80	6
Kekiktuk River	5/3/80	7
Katakturuk River	3/28/81	6
Kongakut River	4/8/80	2
	4/3/81	3

Population Composition

Sex and age composition surveys conducted in spring 1980 indicated 100 bulls:100 cows and 67 yearlings:100 cows (25% yearling recruitment). In 1981 bull:cow ratios were 91:100 and yearling:cow ratios averaged 52:100 (21% yearling recruitment).

Because most of the 1980 and 1981 data were collected prior to calving, information on calf production was not available.

Mortality

Muskox mortality is difficult to monitor because the relatively small population ranges over a large, remote area. Furthermore, replicate surveys that would give some indication of mortality are not made.

The only documented case of mortality consisted of an adult bull found dead between Arctic and Old Woman Creeks in spring 1981. This bull was wearing eartag #35 which indicated it had been released as a calf during the original transplant in April 1969.

Management Summary and Recommendations

Original management goals for muskoxen on the Arctic Slope recommend establishing a viable population on historic ranges on the Alaska mainland. Sport hunting was to be prohibited until the population became firmly established. Based on the current rate of recruitment and the apparent small loss to poaching and natural causes, muskoxen have indeed become firmly established in the eastern portion of Unit 26. Since 1978 the annual rate of increase in the herd has ranged from 26 to 30 percent.

The desired population levels should be established and stated in the Unit 26 muskox management plan. When the population exceeds the desirable level, sport hunting will be utilized to remove excess animals. Sex ratios are currently imbalanced to the level that removal of some bulls will not adversely affect the reproductive potential of the herd. A limited harvest at this time would not conflict with existing management plans which call for sport harvest of adult bulls which are not vital to the integrity of the herd.

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SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS 7 and 15

GEOGRAPHICAL DESCRIPTION: Kenai Mountains

PERIOD COVERED: July 1, 1980 - June 30, 1981

Season and Bag Limit

Aug. 10-Sept. 20	One ram with 7/8 curl horn or larger

Population Status and Trend

Data are insufficient to establish a sheep population trend for the entire Kenai Mountains. However, aerial surveys were conducted in a portion of Unit 15 and results were compared to counts from the previous 2 years. Comparison of these data (Appendix I) suggest a stable population. Pecentage of legal rams appears normal for a hunted population.

Population Composition

Four hundred and fifty-two sheep were counted during aerial surveys conducted by the U.S. Fish and Wildlife Service in a portion of Unit 15 in 1980. The sample included 30 legal rams, 45 sublegal rams, 72 lambs and 302 ewes and unidentified sheep (Appendix I). Analyses of these data, shown in Appendix II, reveal 6.6 percent of the total sheep observed were legal rams, 10.0 percent were sublegal rams, and 24.8 percent were lambs.

Mortality

Thirty rams were harvested in the Kenai Mountains of Unit 7 and 15 during 1980. Although the 1980 harvest compared closely to the 1979 harvest (32), it was 42 percent below the average (52) for the past 10 years (Spraker 1980). The increase in minimum legal horn size was suspected to have caused the reduction in harvests during 1979 and 1980 seasons rather than an actual decline in the sheep population. Additionally, hunter participation (184) was less in 1980 when compared to previous years. Average horn length of harvested rams during 1980 was 32 inches.

Management Summary and Recommendations

Hunting pressure and harvests have shown a downward trend since 1967. More restrictive regulations, limited access on Federal lands, and the assumption that Kenai Mountain rams are generally

small, have contributed to this reduced pressure. However, restrictions on hunter access to Federal land have caused localized overcrowding in areas such as Twin Lake and Green Lake, resulting in low quality hunting. Additional access points should be opened up in order to reduce overcrowding. This will require cooperation between the Department and the U.S Fish and Wildlife Service.

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Appendix I. Unit 15 Aerial Census Summary of Sheep from Kenai River to Sheep Creek from 1978 to 1980.

Date	Rams		Lambs	Ewes and Unidentified	Total Observed	Survey Time (hour)	Observer and Pilot
	Legal	Sublegal					
7/31 and 8/2/78 *	30	58	79	250	417	13.2	Bailey-Berns (USFWS)
7/8, 8/21 and 8/26-27/79 **	46	88	77	340	551	12.2	Spraker-Lofstedt (ADF&G)
7/25, 7/30, 8/1 and 8/4/80 **	30	45	75	302	452	10.9	Bangs-Berns (USFWS)

*Minimum requirement for a legal ram was 3/4 curl.
**Minimum requirement for a legal ram was 7/8 curl.

Prepared by: Ted H. Spraker
Game Biologist III

Appendix II. Composition of Sheep observed in Unit 15 during aerial census from Kenai River to Sheep Creek from 1978 to 1980.

Date	Legal Ram % of Total Observed	Sublegal Ram % of Total Observed	Sublegal/100 Legal Rams	Lamb % of Total Observed	Lambs/100 Unclassified	Sheep/ Hour	Sample Size
1978 *	7.2	13.9	193	18.9	31.6	32	417
1979 **	8.3	16.0	191	14.0	22.6	45	551
1980 **	6.6	10.0	150	16.6	24.8	41	452

*Minimum requirement for a legal ram was 3/4 curl.
**Minumum requirement for a legal ram was 7/8 curl.

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SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS 11 and 12

GEOGRAPHICAL DESCRIPTION: Wrangell Mountains - North side (Nutzotin Mountains)

PERIOD COVERED: July 1, 1980 - June 30, 1981

Season and Bag Limit

Aug. 10 - Sept. 20	One ram with 7/8-curl horn or larger

Population Status and Trend

While no surveys were conducted in the Unit 12 (northern) portion of the area during this reporting period, casual observations and conversations with guides in the area indicate a stable or increasing sheep population.

Population Composition

No aerial or lick composition counts were conducted in the Nutzotin or northern Wrangell Mountains during this reporting period. Incidental observations of sheep during the course of an aerial caribou survey in the Chisana, White River, and Beaver Creek drainages during October 1980 left the impression that sheep were abundant and lamb production high.

Mortality

Hunting pressure declined in the area for the second consecutive year, presumably because hunters were confused about Federal land status. A total of 324 hunters reported hunting in the Wrangell-Mentasta-Nutzotin Mountains, but approximately 110 hunted in the Mentastas. Data from the Mentasta Mountains are covered in a separate report. A total of 126 rams was reportedly taken by 214 hunters during the 1980 season in the northern Wrangell-Nutzotin area. Reported hunting pressure and harvest were considerably lower than 1979 levels and were substantially below fall 1978 levels, when 787 hunters reported taking 388 sheep in this area.

Horn size averaged 34.1 inches in the northern Wrangell and Nutzotin Mountains. Average horn size remained virtually unchanged from the previous year but was somewhat greater than the 32.8-inch average reported during the 1978 season when 3/4-curl rams were legal.

Management Summary and Recommendations

Sheep populations in the Wrangell-Nutzotin Mountains appear to be productive and numbers are stable or increasing.

More trend survey areas should be established and monitored in this area because much of the land is designated National Park Preserve in which sport hunting is permitted.

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SUBMITTED BY:

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SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS 11, 12, and 13

GEOGRAPHICAL DESCRIPTION: Wrangell Mountains - North side (Mentasta Mountains, bounded by the Glenn Highway on the west, the Nabesna Road on the south, the Nabesna River on the east, and the Northway-Tetlin Flats on the north)

PERIOD COVERED: July 1, 1980 - June 30, 1981

Season and Bag Limit

Aug. 10 - Sept. 20	One ram with 7/8-curl horn or larger

Population Status and Trend

This area is estimated to contain approximately 2,000 sheep, including lambs, based upon an intensive, July 1980 survey of the main area south of Buck Creek. A total of 1,549 sheep was observed. Sheep numbers appear to be increasing in this area. However, improved survey techniques and high lamb numbers may be responsible for this impression.

Population Composition

Both an aerial survey and a ground composition count were conducted during this reporting period. Aerial survey data for the Noyes Mountain trend count area are presented in Table 1.

Table 1. A comparison of aerial survey results for the Dall sheep population on Noyes Mountain (west of Platinum Creek), Mentasta Mountains, 1973, 1978, and 1980.

	Rams							Total	Time
Year	U.I.	<3/4	>3/4	Total	Ewes*	Lambs	U.I.	Sheep	(hours)
1973	2	22	36	60	148	5	43	256	-
1978	-	44	17	61	206	80	134	481	4.2
1980	10	69	41	120	335	174	45	674	4.5

* Includes adult ewes, yearlings of both sexes, and some young rams.

A survey was also conducted in that portion of the Mentasta Mountains between Platinum Creek and the Nabesna River. Historic aerial survey data for this area are compared in Table 2.

Table 2. A comparison of aerial sheep composition data collected in the Mentasta Mountains west of the Nabesna River, north of the Nabesna Road, and south of Buck Creek/Bear Lake, GMU 11, 12, and 13, 1971, 1973, and 1980.

	Rams							Total	Time
Year	U.I.	<3/4	>3/4	Total	Ewes*	Lambs	U.I.	Sheep	(hours)
1971	22	10	78	110	555	137	0	1,014	-
1973	19	106	141	266	537	41	150	1,002	-
1980	10	185	112	307	754	356	132	1,549	7.5

* Includes adult ewes, yearlings of both sexes, and some young rams.

Mortality

A total of 32 adult rams was reportedly taken in the Mentasta Mountains during the fall 1980 season. An additional 5 to 7 sheep (1 subadult ram and 4 to 6 sheep of unknown sex) were taken illegally by hunters from Northway for a total known harvest of 37 to 39 sheep (2% of the estimated population). The Nabesna River drainage contributed 14 sheep, or 44 percent, of the legal reported harvest with the remainder of the drainages contributing fewer than four rams each. The ram harvest was well distributed.

Approximately 110 hunters used the area and experienced a 30 percent success rate. Horn size averaged 32.5 inches.

Management Summary and Recommendations

The Dall sheep population in the Mentasta Mountains may have increased in recent years. The management objective of providing maximum opportunity to participate in Dall sheep hunting is presently being met. The recent change from 3/4- to 7/8-curl horn for legal rams guarantees the continued biological protection of the sheep population.

Aerial trend surveys in the Noyes Mountain area and the Lost Creek mineral lick surveys will be continued to provide data for future management decisions.

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SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS 11, 13 and 14

GEOGRAPHICAL DESCRIPTION: Chugach Mountain Range

PERIOD COVERED: July 1,1980 - June 30, 1981

Seasons and Bag Limit

Units 11, 13 and 14A	Aug. 10-Sept. 20	One ram with 7/8 curl horn or larger
Unit 14C	Sept. 2-Sept. 20	

Population Status and Trend

Sheep surveys were conducted throughout most of the range during July and early August 1980, excluding the Unit 11 portion within the Wrangell-St. Elias National Monument. A total of 2,946 sheep was observed: 1,281 in Unit 13, 502 in Subunit 14A, and 1,163 in Subunit 14C. These data were similar to the results from surveys done in previous years, and indicated a relatively stable population throughout the entire range.

Population Composition

Classification of 1,281 sheep was as follows:

GMU	Legal Rams	Sub-legal Rams	Ewes and 1-2 Year Old Rams	Lambs	Total
13	114		921	246	1281
14A	49	97	280	76	502
14C	70	171	740	182	1163

Overall, the population contained 7.9 percent legal rams and 17.1 percent lambs. These data indicate a modest decline in the percentage of legal rams and a lamb crop comparable to past years. Sheep composition data from previous years were reported by Harkness (1980).

Mortality

Ninety-one legal rams were harvested in 1980, 29 less than during 1979 and 38 less than the 1975-79 mean of 129 sheep. Of those taken in 1980, 3 were killed in Unit 11, 39 in Unit 13, 16 in Subunit 14A, and 33 in Subunit 14C.

With the exception of 1973, when only 81 rams were reported taken, the 1980 harvest was the lowest on record and was probably the result of the regulation which increased minimum legal horn size from 3/4 to 7/8 curl. The harvest should increase in future years to near former levels as more rams reach legal horn size.

Mean ram horn size for the 1980-81 sheep harvest was 35.2 inches, a figure comparable to the horn size (35.5 inches) of the previous year (first year of the 7/8 curl horn regulation). Four hundred and six persons hunted sheep during the season, a 6 percent decline from 1979. Sheep harvest data and hunting pressure data in the Chugach Mountains from 1970-79 were previously reported (Harkness 1980).

Management Summary and Recommendations

Extensive aerial surveys of the Chugach range were completed during summer 1980. Surveys of this magnitude should be undertaken at least every 3 years in order to monitor changes in sheep population size and composition. At least five trend count areas should be established in the Chugach Mountain sheep range, and each should be surveyed annually.

The anticipated increase in hunting pressure, resulting from extensive closures within recently established National monuments and parks, did not occur in 1980. Hunting pressure in Subunit 14C increased slightly from 165 hunters in 1979 to 168 hunters in 1980. In other portions of the range, 28 fewer hunters participated in 1980 than in 1979. Hunter success declined from 28 percent in 1979 to 23 percent in 1980.

Hunting pressure and harvest levels in Subunit 14C are sufficiently high to warrant hunting by permit only. A proposal to accomplish this will be presented to the Board of Game for implementation during the fall 1982 season. Within the remainder of the Chugach range, however, current hunting pressure and harvest levels do not justify consideration of hunting by permit only.

Literature Cited

Harkness, D. 1980. Annual Report of Survey-Inventory Activities. Vol. X. In R. A. Hinman ed. Alaska Fed. Aid in Wildl. Rest. Proj. W-17-11.

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SUBMITTED BY:

Leland P. Glenn
Survey-Inventory

SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS 12, 13, and 20

GEOGRAPHICAL DESCRIPTION: Tok Management Area

PERIOD COVERED: July 1, 1980 June 30, 1981

Seasons and Bag Limits

Units 12, 13, and 20, that portion known as the Tok Management Area (see 81.229 Controlled Use Areas)	Aug. 10-Sept. 20	One ram with full-(4/4) curl horn or larger by drawing permit only. 120 permits will be issued. See 5 AAC 81.055 and separate permit hunt supplement.
	Sept. 25-Oct. 30	One ewe sheep by registration permit only; 20 ewe sheep may be taken. See 5 AAC 81.055 and separate permit hunt supplement.

Population Status and Trend

The sheep population in this area is believed to have remained approximately stable during the period 1974-80. The population is estimated to contain approximately 2,000 sheep based upon an intensive aerial survey conducted in July during which 1,698 sheep were observed. The population estimate for this area was derived by multiplying the number of sheep observed by a 1.2 sightability correction factor.

Population Composition

An extensive aerial survey was flown in the Tok Management Area July 15-31, 1980. These data (Table 1) are summarized below with data collected during a similar survey in 1974. Total numbers observed in the two surveys are not directly comparable, but the composition figures probably are (Table 2).

Table 1. A comparison of sheep composition data collected in the Tok Management Area during July 1974 and July 1980.

	Rams					Total			Total	
Year	U.I.	>3/4*	<3/4*	Total	Ewes**	Adults	Lambs	U.I.	Sheep	Time
1974	7	156	103	276	760	1,036	220	20	1,266	16.2
1980	9	151	279	439	859	1,298	394	6	1,698	23.3

Table 2. A comparison of the percentages of sheep in each sex-age category as determined by aerial surveys in the Tok Management Area during 1974 and 1980.

	Rams							
Year	U.I.	>3/4*	<3/4*	Total	Ewes**	Lambs	U.I.	Total
1974	1	12	8	22	60	17	2	100
1980	1	9	16	26	51	23	0	100

* In 1980 rams were classified as either full curl (4/4) and greater or less than full curl, as opposed to three-quarter curl (3/4) in 1974.
** Includes adult ewes, yearlings, and an unknown number of young rams.

The two most obvious changes in population composition between 1974 and 1980 were the increased lamb percentage in the 1980 population and the increased proportion of rams in the adult population (34% in 1980 and 27% in 1974). Another obvious change in population composition was an increase in the proportion of mature rams in the population. I believe that this change is directly attributable to the regulated harvest regime of full-curl rams only. The observed increase in the proportion of total rams in the adult population may be attributed to survey bias, restricted ram harvests, the harvest of ewe sheep in the area, differential survival between sexes, or combinations of these factors.

Observations of the Sheep Creek mineral lick showed a lamb: ewe ratio of 69 lambs per 100 ewes. The yearling:ewe ratio was 29 per 100, and the sample size was 821 sheep.

Mortality

A total of 134 ram permits was issued, 128 to residents and 6 to nonresidents. Of these permittees, 100 (75%) actually hunted, and a harvest of 44 rams was reported. One ram was reportedly poached for a total known harvest of 45 rams. Four (9%) rams had horns exceeding 40 inches in length and 14 (32%) had horns exceeding 38 inches in length. The average horn length was 37 inches, the greatest average horn length since the TMA was established.

The quota of 20 ewe sheep was not reached; only 11 ewes were taken and 1 wounded. Because of the 15-day late season opening, and closures of the Dry Tok, Sheep Creek, and Dry Creek drainages, hunter participation was low. A total of 84 permits was issued and 66 people actually hunted for a 79 percent permit utilization. Hunter success was 17 percent. This level of participation was the lowest recorded since this hunt was changed to a registration hunt from a drawing permit hunt.

Natural factors are responsible for most sheep mortality in the TMA. A minimum of eight wolf packs with 43 individuals was known to inhabit the eastern portion of the area during winter 1980-81. Golden eagles and wolverines have also been observed attempting to take sheep in the area. One sheep was observed at the base of a cliff and was thought to have fallen.

Management Summary and Recommendations

The sheep population in the TMA is apparently stable at a desirable level. The management objective of producing trophy Dall sheep hunting opportunities is being met.

Mining development is a potential threat to this sheep population. Exploration is currently being conducted in the heart of these sheep ranges. Further development could jeopardize subpopulations unless mitigating measures are implemented. Proposed human settlements near winter ranges and critical mineral licks near Sheep and Cathedral Creeks should be located carefully to minimize disturbance of sheep.

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SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS 13 and 14

GEOGRAPHICAL DESCRIPTION: Talkeetna Mountains

PERIOD COVERED: July 1, 1980 - June 30, 1981

Season and Bag Limit

Aug. 10-Sept. 20	One ram with 7/8 curl horn or larger

Population Status and Trend

The numbers of sheep in the Talkeetna Mountains have remained relatively stable over the past 10 years.

Population Composition

Composition surveys were flown in July in two portions of the Watana Hills (Unit 13), the Butte Creek-Coal Creek drainages and the Tsuena-Portage Creek drainages. Results from those surveys were as follows:

	Legal Rams	Lambs	Unspecified	Total
Butte Creek-Coal Creek	9	42	123	174
Tsuena Creek-Coal Creek	6	12	54	72

Mortality

Two hundred and forty-four hunters reported harvesting 80 rams (Appendix I). Of the rams harvested, 74 percent were taken in Unit 13, 11 percent in Subunit 14A, and 15 percent in Subunit 14B (Appendix II). The total number of hunters reporting declined 1.3 percent from the previous year while, the sheep kill was the highest recorded since 1976.

Management Summary and Recommendation

No changes in seasons or bag limits were recommended.

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Appendix I. Reported harvest of Dall sheep rams, numbers of hunters and success of hunters for the Talkeetna Mountain Range, 1971-1980, as derived from harvest reports.

	All Hunters			Residents			Nonresident		
Year	Harv.**	Hunt.**	Succ.**	Harv.	Hunt.	Succ.	Harv.	Hunt.	Succ.
1971	85	240	35%	39	178	22%	44	59	75%
1972	81	304	27%	41	227	18%	34	61	56%
1973	61	277	22%	39	232	17%	21	31	68%
1974	114	312	37%	83	259	32%	26	40	65%
1975	109	281	39%	75	231	32%	30	40	75%
1976	77	300	26%	55	267	21%	20	29	69%
1977***	55	203	27%	40	182	22%	14	17	82%
1978	77	302	25%	56	256	22%	19	38	50%
1979	65	269	23%	37	225	16%	27	37	73%
1980	80	244	33%	48	187	27%	31	51	61%

*Includes data from hunters of unknown residency.
**Harv. = Harvest; Hunt. = Hunter; Succ. = Successful.
***No reminder letters were sent to sheep hunters.

Appendix II. Reported harvest of Dall sheep rams from Game Management Units Talkeetna Mountain Range, 1971-80.

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Unit 13	71	64	52	93	95	58	49	71	49	5
Subunit 14A	0	0	0	0	9	11	5	3	9	9
Subunit 14B	3	7	3	8	5	11	7	3	7	12

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SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS 13 and 20

GEOGRAPHICAL DESCRIPTION: Delta Management Area (including the drainages of the Delta River from McGinnis Creek south to Castner Glacier and drainages of the Tanana River flowing into its south bank from the Delta River upstream to the west bank of the Johnson River)

PERIOD COVERED: July 1, 1980 - June 30, 1981

Season and Bag Limit

Aug. 10 - Sept. 20	One ram with 7/8-curl horn or larger by permit only (see permit hunt supplement)

Population Status and Trend

The sheep population in the Delta Management Area (DMA) is estimated to contain about 1,500 animals. Its trend is uncertain because the variability of aerial surveys flown in 1970, 1974, and in this report period, is so great that a firm conclusion cannot be drawn. However, fewer sheep per hour of flight time were seen during the 1980 survey than the previous two surveys.

Population Composition

Population composition was determined by aerial survey and ground classification counts at the Granite Creek mineral lick. The aerial surveys yielded data on ram abundance. Lamb production and yearling recruitment were gathered by classification counts on the ground. There were 51 rams per 100 ewes and 26 legal rams per 100 ewes. These figures are essentially unchanged from those gathered in 1974. Observations at the Granite Creek lick gave a lamb:ewe ratio of 39 lambs per 100 ewes, very near the average of 42 per 100 recorded over the past 9 years. This lamb production was considerably lower than the observed productivity for areas on either side of the DMA where lamb production exceeded 60 lambs per 100 ewes in 1980. The reasons for the lower figure in DMA are not known. The sample size, 274 sheep, is small for mineral lick observations and may be subject to question. Yearling recruitment at the Granite Creek lick was determined to be 27 yearlings per 100 ewes. This recruitment is the lowest since 1974 and well below the 9-year average of 34 yearlings per 100 ewes.

Mortality

Sixty-five permits were issued for the 10-25 August walk-in season, and 66 were issued for the 26 August-20 September open-access season. The harvest in 1980 was 30 rams. Seventeen rams were taken by 47 hunters during the walk-in season, and 13 rams were taken by 31 hunters during the unrestricted access season. Hunters were equally successful in both seasons (42%). Average horn size for both hunts was 34.5 inches, compared with 34.6 inches during the 1979 season.

Hunting effort was concentrated in the least accessible areas during both hunt periods. The Gerstle River drainage received the heaviest hunting pressure, followed by Jarvis and Riley Creeks. In 1979 most hunting was in the more accessible Granite Mountains and along the Richardson Highway. Harvest was also concentrated in the Gerstle and July Creek drainages during 1980.

Management Summary

The DMA sheep population may have declined somewhat in recent years. If the population is experiencing a long-term decline, it may be necessary to reduce the number of permits issued to maintain a high chance of hunter success. The present permit system should be maintained. Sources of nonhunting sheep mortality in the DMA should be studied to ascertain what factors are presently stabilizing or depressing the population.

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SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS 16, 17, and 19

GEOGRAPHICAL DESCRIPTION: Alaska Range west of Denali National Park

PERIOD COVERED: July 1, 1980 - June 30, 1981

Season and Bag Limit

Aug. 10 - Sept. 20	One ram with 7/8-curl horn or larger

Population Status and Trend

No field work or surveys were conducted in the Alaska Range west of Denali National Park during this reporting period. Observations from guides and hunters suggest good lamb production and some increases in legal ram numbers. These increases are thought to result from exceptional lamb productions of the early 1970's.

Population Composition

No data were gathered on composition during the reporting period.

Mortality

Hunters removed 78 rams from the western Alaska Range in 1980. Forty percent (31 rams) were taken by nonresidents, and 60 percent (46 rams) were taken by residents. Harvest was lower than last year in the western Alaska Range by 13 rams (14%), but hunter participation was almost identical (166 hunters reported in 1979 and 162 hunters reported in 1980). Success was lower in 1980 than in 1979 by 6 percent, well within the normal variation expected for sheep hunting success. It is notable that unsuccessful hunters averaged almost 8 days per hunt in 1980 compared with about 5 days per hunt in 1979. This increase by unsuccessful hunters resulted in 138 more man-days of hunting in 1980. It appears that hunter effort is increasing in the western Alaska Range, but hunter numbers are stable. Horn size increased slightly over the 1979 mean. The mean length in 1979 was 34.2 inches and in 1980 it averaged 34.8 inches.

Other sources of mortality in the western Alaska Range were not documented during this report period.

Management Summary

Populations appear to be stable, and the number of sheep hunters has been almost identical for the 2 years since the drastic changes in sheep management which attended the Alaska lands settlement. Apparently human harvests will remove up to 100 rams annually. Participation is expected to stabilize at about 160 to 200 hunters.

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SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT 20

GEOGRAPHICAL DESCRIPTION: Alaska Range east of Denali National Park, except the Tok and Delta Management Areas

PERIOD COVERED: July 1, 1980 June 30, 1981

Season and Bag Limit

Aug. 10 Sept. 20	One ram with 7/8-curl horn or larger

Population Status and Trend

This area contains a fairly dense sheep population which appears to be slowly increasing. During this reporting period, initial production and recruitment were above normal. Mortality from known sources appears to have decreased in recent years. Survey data indicate that adult segments of the population have experienced reduced mortality levels since 1975.

Population Composition

Composition and productivity data, obtained primarily at mineral licks throughout this area, revealed that initial production was 69 lambs per 100 ewes and that recruitment averaged 36 yearlings per 100 ewes.

Mortality

Information derived from harvest tickets indicated that 88 sheep were harvested during the 1980 season. The average harvest prior to the 7/8-curl regulation was 110 animals. Eighty-six sheep were taken in 1979, when the minimum horn size was increased from 3/4 curl to 7/8 curl.

The mean horn length was 34.3 inches, a slight decrease from the 1979 average of 34.9 inches. The mean horn size for sheep taken by nonresidents was 0.8 inches longer than those taken by residents. This portion of the Alaska Range does not produce fast-growing, large-horned sheep.

Other hunting statistics are presented below:

Reported # Hunters	Percent Success	% Hunters		% Harvest		% Success	
		Res	Nonres	Res	Nonres	Res	Nonres
214	41	83	17	64	36	31	91

Data regarding modes of hunter transport and success rates are as follows:

Transportation Mode	Successful Hunters	Unsuccessful Hunters
Aircraft	39	50
Horse	30	5
Off-road vehicle	8	21
Highway vehicle	11	32

The pattern suggested by these data is similar to that of recent years in that hunters using horses experienced the highest success (80%) while those using aircraft harvested the most sheep (39). Much of the western portion of this area is part of the Yanert-Wood River Management Area where off-road vehicles are prohibited. This should be kept in mind when considering the figures presented above.

The Wood River normally produces the area's largest harvest, and this was true in 1980 (Table 1).

Table 1. Hunter success by drainage.

Drainage	Number Successful Hunters	Number Unsuccessful Hunters	Total Hunters	Percent Success	Mean Horn Size (inches)
Yanert	13	5	18	72	34.3
Healy	17	68	85	20	32.3
Totatlanika	0	5	5	0	-
Tatlanika	0	3	3	0	-
Wood	38	24	62	61	34.6
Dry Creek	5	4	9	55	34.0
W Fk Little Delta	3	4	7	43	33.1
E Fk Little Delta	5	8	13	77	36.5
Delta Creek	7	5	12	58	32.7
Total	88	126	214	41	34.3

Successful hunters spent an average of 5.2 days afield.

Management Summary and Recommendation

The sheep population in the Central Alaska Range is continuing to slowly increase from lows in the mid-1970's. The increase appears to be related to reduced natural mortality in adult segments of the population, rather than increased production. Most ewes in this population exhibit alternate year reproduction, and therefore recruitment is relatively low. Sustainable ram harvest levels are not likely to increase significantly at the current rate of recruitment.

The Central Alaska Range continues to remain a popular area for resident hunters, despite the absence of significant numbers of large-horned sheep and only average hunting success.

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SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT 20

GEOGRAPHICAL DESCRIPTION: Tanana Hills and White Mountains

PERIOD COVERED: July 1, 1980 June 30, 1981

Season and Bag Limit

Aug. 10	Sept. 20	One ram with 7/8-curl horn or larger

Population Status and Trend

Discontinuous, low density sheep populations are found in the Tanana Hills from the White Mountains to Glacier Mountain wherever suitable habitat exists. Although distribution and abundance surveys were not conducted during the reporting period, populations are thought to have changed little in recent years.

Population Composition

Sheep classification counts conducted from the ground during late July in the Mt. Schwatka-Jefferson Creek area revealed 59 lambs per 100 ewes and 16 yearlings per 100 ewes. Although lamb production was excellent, yearling recruitment was poor. A relatively small sample (n=74) was obtained and may not be representative of the entire area.

Mortality

According to harvest ticket data, four sheep were harvested during the 1980 season. In recent years, annual harvests have averaged about six animals. One ram was taken in each of the following locations: Charley River, Mt. Sorenson, Glacier Mountain, and Mt. Harper. Aircraft and off-road vehicles were the primary means of transportation for all hunters. Fourteen individuals reported hunting unsuccessfully in the Tanana Hills during 1980 and all hunters were residents. Horn length averaged 34.3 inches. Successful hunts averaged 7 days in length, while unsuccessful ones averaged 3.8 days.

Management Summary and Recommendations

Low density, disjunct populations characterize sheep abundance and distribution in the Tanana Hills. Hunting pressure is low and is exerted primarily by residents. Most sheep habitat lies within the Yukon-Charley National Park Preserve where hunting has been closed for the past two seasons, pending settlement of the Alaska Lands Legislation. Since that issue has finally been

resolved, hunting is once again allowed. Access is generally difficult throughout the Tanana Hills, and harvests are not expected to significantly increase in the near future.

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SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT 23

GEOGRAPHICAL DESCRIPTION: Kotzebue Sound

PERIOD COVERED: July 1, 1980 - June 30, 1981

Season and Bag Limit

Aug. 10 - Sept. 20	One ram with 7/8 curl horn or larger

Population Status and Trend

The majority of the sheep range in Unit 23 was surveyed once; however, the Wulik area was surveyed in 1977 and 1980. The August 1980 survey revealed a total of 114 sheep in 5.2 hours of survey time compared to 111 sheep counted in 12.2 hours in 1977. These two surveys covered almost identical areas. Although the time spent surveying the Wulik drainage in 1977 and 1980 was quite different, the actual coverage was similar and direct comparison of results is justified.

Population Composition

The sex and age composition of the sheep observed in the 1980 survey (Wulik Peaks east to Wrench Creek) was 20 rams, 72 ewes (including yearlings and young rams), and 22 lambs. In 1977, the results were as follows: 29 rams, 55 ewes (including yearlings and young rams), and 27 lambs. Rams of three quarter curl or greater declined from 11 percent in 1977 to 5 percent in 1980 (only 4 rams were 7/8 curl or larger).

Mortalities

The reported harvest was 16 sheep, nine of which were taken by nonresidents. Several factors may have influenced the reported harvest. Reminder letters were sent to hunters prior to the receipt of 50 sheep harvest ticket overlays from a Kotzebue license vendor. In 1980, the majority of the Noatak drainage was under Federal monument status where only subsistence hunting was allowed and aircraft could not be used as a transportation method by subsistence hunters. It is doubtful that all nonsubsistence hunters moved out of familiar hunting areas in the western portion of the Noatak drainage even though they were in violation of monument regulations. It is assumed that some sheep taken in the monument were reported as being harvested outside of the monument. For instance, there was a reported harvest of 10 sheep in the Wulik drainage (a count on August 1, 1980 revealed 4 legal rams in this area). Three sheep were reported taken from the Kugururok drainage, 1 from the Eli drainage, 1 from the Agashashok drainage, and 1 from an unknown area in GMU 23.

Management Summary and Recommendations

The Wulik drainage portion of GMU 23 shows signs of excessive harvest based on sex and age composition data. Sheep hunters apparently are not accurately reporting kill sites so mortality and sex and age composition data are not necessarily comparable.

The Alaska Lands Act, P.L. 96-487, redesignated the Noatak National Monument as the Noatak National Preserve which will again open most of the Noatak drainage to sport hunting and the use of aircraft for transportation. This action may help redistribute hunting pressure and provide more accurate harvest reports.

Some residents of the villages of Kivalina and Noatak have expressed a desire to take sheep of either sex during a winter season. More information on population status is required before further liberalization of harvest can be justified.

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SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS 23 through 26

GEOGRAPHICAL DESCRIPTION: Brooks Range

PERIOD COVERED: July 1, 1980 - June 30, 1981

Seasons and Bag Limits

Unit 23	Aug. 10 - Sept. 20	One ram with 7/8-curl horn or larger
Units 25 and 26C those portions within the Arctic National Wildlife Range	Aug. 1 - Sept. 20	One ram with 7/8-curl horn or larger by permit only (see permit hunt supplement)
Remainder of Units 25 and 26C	Aug. 10 - Sept. 20	One ram with 7/8-curl horn or larger
Unit 26C	Oct. 1 - Apr. 30	Three sheep by permit only (see permit hunt supplement)

Population Status and Trend

Sheep populations in the Brooks Range vary in density. Numbers are low in Unit 23, central portions of Unit 24, and Unit 25. Western portions of Unit 24 support moderate sheep numbers, while high numbers exist in eastern Unit 24. Unit 26 populations decrease in density from high in the eastern portion to low at the western end. The population status has been established by aerial survey in much of the Brooks Range.

During this reporting period the Fish and Wildlife Service completed a report on sheep abundance in the Arctic National Wildlife Refuge east of the Canning River. Data for this report were gathered during 1976 and 1979 through joint studies with the Department of Fish and Game and consultants experienced in surveying sheep. In these surveys of the Refuge east of the Canning River, 4,796 sheep were counted. From this minimum figure, I estimated the sheep population in this area at 6,000.

There is little information available on sheep population trends on the Refuge. The 1979 surveys did, however, include some areas surveyed in 1976. No change in sheep abundance was observed in most of the areas surveyed both in 1976 and 1979. However, in the Katak Creek drainage on the lower Hulahula River duplicate

surveys revealed a decrease of 44 percent in the number of adult sheep seen in 1979 compared with 1976 (88 adults seen in 1976 and 49 adults seen in 1979). This area is immediately adjacent to the traditional camp site for villagers of Kaktovik. These villagers have hunted sheep in this area for some time. During 1979 the first legal either-sex sheep hunt was held in the area and the reported harvest was localized in this area.

No information on population trend for the remainder of the Brooks Range was gathered.

Population Composition

The following population composition data were furnished by the U. S. Fish and Wildlife Service. At the mineral lick on the Hulahula River the lamb:ewe ratio was 44 lambs per 100 ewes, and the yearling:ewe ratio was 48 yearlings per 100 ewes. Surveys conducted from the ground in the Hulahula and Canning River drainages gave lamb:ewe ratios of 27 and 68 lambs per 100 ewes and yearling:ewe ratios of 30 and 68 yearlings per 100 ewes, respectively. The inconsistency of these figures is not readily explainable. The Department of Fish and Game has never recorded variability comparable to this within similarly sampled areas in other mountain ranges of continuous sheep habitat. Composition data for the remainder of the Brooks Range were not gathered.

Mortality

Hunting in the upper portions of Unit 25 and 26C, the former Arctic National Wildlife Range, continued on a permit basis. The fall season was divided into four lottery permit hunts. The first season opened 1 August and ran through 15 August. The second season was from 16 August through 20 September. In addition to this time separation, spatial separation resulted in two separate permit hunt areas, one in the Hulahula River drainage and the other in the remainder of the Wildlife Range. Four hundred permits were available for these hunts, and all hunters applying to hunt in these areas received permits. Table 1 gives the combined results of the permit hunts.

Table 1. Reported Dall sheep hunter harvest during sport hunting season 1 August to 20 September, 1980, Arctic National Wildlife Refuge. (Figures do not include subsistence harvest for residents of Kaktovik and Arctic Village.)

Drainage	Unsuccessful Hunters	Sheep Killed	Total Hunters	Percent Success
Aichillik		4	4	100
Jago	6	7	13	54
Canning	16	6	22	27
E. Fork Chandalar	1	2	3	67
Coleen	1	2	3	67
Hulahula	10	14	24	58
Kongakut-Egakserak	19	9	28	32
Sadlerochit Mountains	5	8	13	62
Peters-Schrader Lake	10	2	12	17
Sheenjek	14	3	17	18
Unspecified ANWR	9	7	16	44
TOTAL	91	64	155	41

The winter/spring hunt for sheep in Unit 26C opened 20 October and closed 30 April. Participation in this hunt required a permit which was available upon registration at Kaktovik. The bag limit for this hunt was three sheep, and the harvest quota was set at 50 sheep. Twenty-seven permits were issued from October 1979 to April 1980. Seven hunters reported taking 17 sheep: 11 rams, 5 ewes, and 1 of unreported sex. Two were sheep reported taken from Kikikat Mountain, 2 from Esetuk Creek, and 3 from Katak Creek. Locations for the other nine sheep were not reported. The reported locations were all near the traditional camp at Old Woman Creek. Hunters appeared to hunt close to this camp, and the reported harvest was localized in the area where aerial surveys revealed a decline in adult sheep between 1976 and 1979. Cumulative human harvest during 1976-80 was probably a major factor in this apparent decline. Compliance with permit reporting requirements has been poor.

In the remainder of the Brooks Range, 214 hunters reported taking 111 rams (Table 2): 53 rams were taken by residents, and 48 were taken by nonresidents. Residency of 10 successful hunters was unreported. There were 74 unsuccessful residents, 23 unsuccessful nonresidents, and 6 unsuccessful hunters of unknown residency. Overall, success was 52 percent. This success rate is notably higher than that for the permit hunts in eastern

Unit 26. The reason for this is not known, but poor weather prevailed during much of the season in the permit areas. This probably accounted for the great reduction in harvest from the Arctic Wildlife Range (a decrease from 103 sheep in 1979 to 64 in 1980).

Table 2. Harvest and number of hunters by Game Management Unit outside the permit areas.

GMU	Successful Hunters			Unsuccessful Hunters		
	Res.	Nonres.	Unspec.	Res.	Nonres.	Unspec.
23	6	9	1	10	4	0
24	8	5	2	14	3	2
25	8	11	0	11	7	2
26	31	23	7	39	9	2

The total Brooks Range 1980 harvest involved 375 hunters who took 196 Dall sheep. Three hundred and twenty-eight hunters reported taking 227 sheep during the 1979 season. Hence, the reported number of hunters increased despite unfavorable weather, but weather was a cause of lower success.

Other sources of mortality were not investigated during the report period.

Management Summary and Recommendations

Little is known about sheep population trends in the Brooks Range. Areas where replicate surveys have been flown show stability with the notable exception of an area near the traditional Kaktovik village camp on the Hulahula River. Populations immediately adjacent to this site appear to be declining. Hunter numbers may be increasing throughout the Brooks Range, although part of this increase probably reflects changes in land status that permit sport hunting on Federal lands. Even with the increasing hunting pressure on the Wildlife Refuge, the permit system is unnecessary outside the Hulahula drainage. Sheep populations are capable of withstanding harvests expected in the foreseeable future. Therefore, I strongly recommend that the permit system be abolished. Perhaps the permit system in the Hulahula River should be maintained to comply with subsistence priorities there. The capacity for commercial utilization of sheep by guides in the Hulahula River, the defined sport harvest quota, and the subsistence priority given the Kaktovik villagers combine to make the Hulahula an area where greater inventory and monitoring efforts should be expended.

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