ALASKA DEPARTMENT OF FISH AND GAME

JUNEAU, ALASKA

STATE OF ALASKA
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ANNUAL REPORT OF SURVEY-INVENTORY ACTIVITIES

PART II. SHEEP

Edited and Compiled by
Alma Seward, Publications Technician

Volume XV

Federal Aid in Wildlife Restoration

(Printed November 1984)

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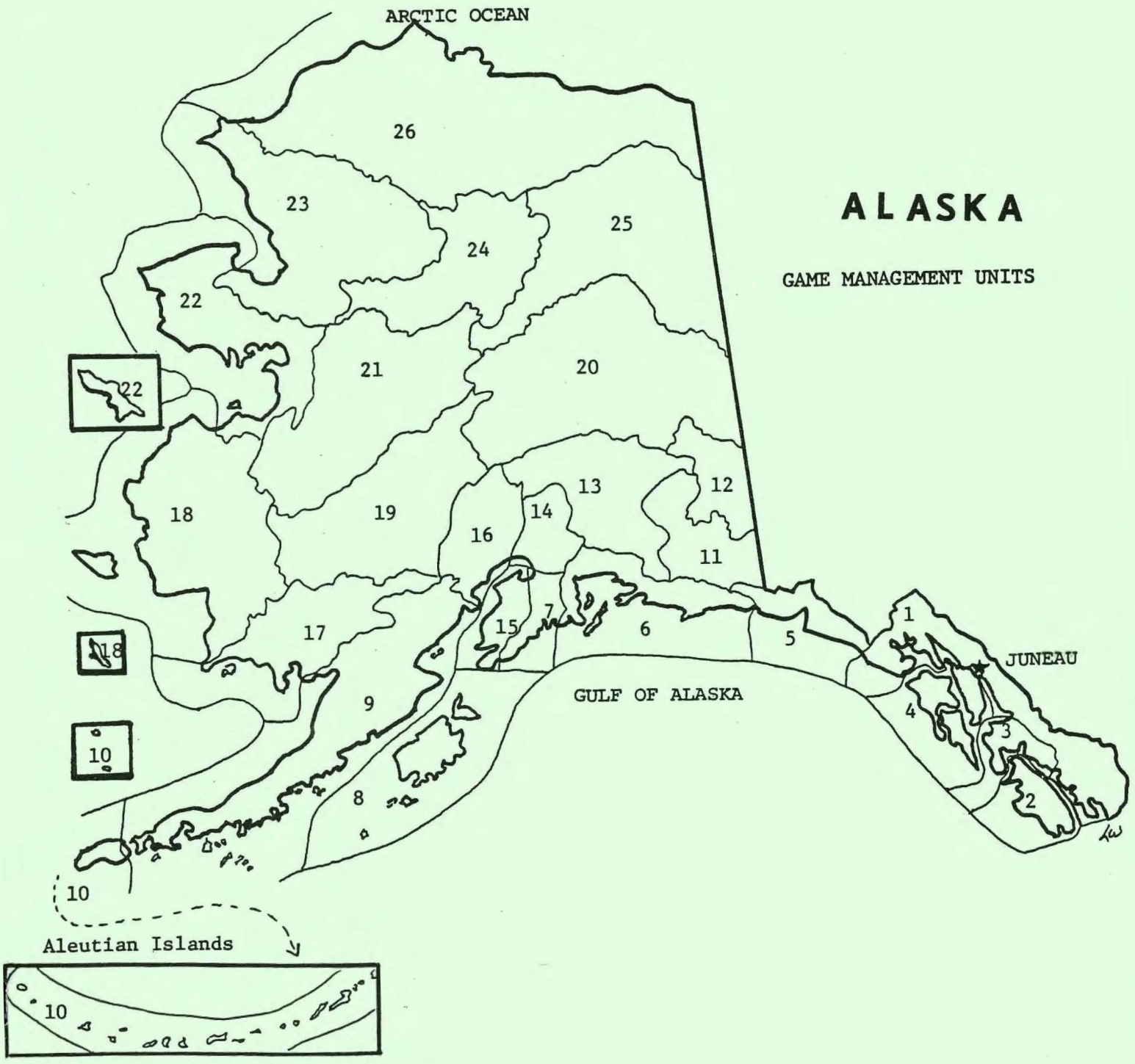
CONTENTS


ARCTIC OCEAN
ALASKA
GAME MANAGEMENT UNITS
26
23
25
24
22
21
20
22
18
19
16
14
13
12
11
18
17
15
7
6
5
1
JUNEAU
GULF OF ALASKA
9
4
3
10
8
2
10
Aleutian Islands
10

Statewide Harvest and Population Status

Dall sheep populations are generally stable and at relatively high levels, although variations exist between mountain ranges. In several areas, a lower-than-average recruitment was noted, caused by poor survival of the 1982 cohort.

These reports document a statewide harvest of 829 rams and 6 ewes, not including harvest by subsistence users in several areas of the Brooks Range. Harvests of rams by mountain range are as follows:

Kenai Mountains	26
Alaska Range West	90
Chugach Mountains	75
Mentasta-Nutzotin-North Wrangells	200
Tok Management Area	39
Talkeetna Mountains-Chulitna/Watana	58
Delta Controlled Use Area	30
Tanana Hills-White Mountains	17
Alaska Range East	121
Brooks Range	173

Robert A. Hinman
Deputy Director

SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 7 and 15

GEOGRAPHICAL DESCRIPTION: Kenai Mountains

PERIOD COVERED: 1 July 1983-30 June 1984

Season and Bag Limit

See Hunting Regulations No. 24.

Population Status and Trend

A comparison of sheep survey data for the past 6 years suggests an increase in the sheep population in the Kenai Mountains. This comparison also suggests a trend toward increasing percentages of lambs and legal rams.

Population Composition

There were 557 sheep classified during aerial surveys conducted during July and August. The sample included 33 (6%) legal rams, 75 (14%) sublegal rams, 124 (22%) lambs, and 325 (58%) ewes and unidentified sheep.

Mortality

Twenty-six rams were killed during the 1983 season. Harvest data indicate a slight increase in mortality when compared to the previous year (23); however, this was well below the average kill for the past 10 years (42). One hundred and fifty-eight hunters spent an average of 4 days each hunting sheep. Their success rate was 16%. Horn length of rams killed averaged 34 inches, and ranged from 23 to 41 inches. Mean age of harvested rams was 7.5 years with a standard deviation of 1.4 years of age.

Management Summary and Recommendations

Hunting pressure and harvest of sheep in the Kenai Mountains has shown a slight increase since 1981. Excellent weather during the fall hunting season contributed to the increased effort and harvest. Although the sheep population is well below the densities reported for the early 1970's, the population has increased and hunting opportunities should continue to improve.

PREPARED BY:

Ted H. Spraker
Game Biologist III

SUBMITTED BY:

Leland P. Glenn
Survey-Inventory Coordinator

SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 11, 13, and 14

GEORGRAPHICAL DESCRIPTION: Chugach Mountains

PERIOD COVERED: 1 July 1983-30 June 1984

Season and Bag Limit

See Hunting Regulations No. 24.

Population Status and Trend

Sheep surveys conducted within Subunit 14C indicated the population has increased 16% per year since 1978. In contrast, the sheep population within Unit 13 has remained relatively stable since 1981. A total of 1,705 sheep were observed in Subunit 14C, and 703 in Unit 13. No surveys were conducted in Unit 11.

The Chugach Mountains contain portions of 4 game management units (11 and 13) or subunits (14A and 14B), extending 350 miles from Anchorage to the Yukon border. Approximately half of the sheep population is located within the 2 areas (Unit 13 and Subunit 14C) surveyed in 1983.

Population Composition

The composition of sheep observed in Subunit 14C was 7% legal rams (7/8 horn-curl), 17% young rams, and 17% lambs. These data indicate a young, growing population which will experience a substantial increase in the percentage of legal rams over the next 2-3 years.

Unit 13 survey data suggest that only 4% of the sheep population were legal rams, a 50% decline from that observed during the late 1970's. Although annual survey data are sometimes difficult to compare, it appears that the reduced percentage of legal rams can be attributed to poor lamb production and survival during the late 1970's. Hunting pressure has not increased. It is not known if this low percentage of legal rams is detrimental to the population.

Mortality

Two hundred thirty hunters killed 75 legal rams (a success rate of 33%) in 1983, 13 less than in 1982 and 36 less than the mean harevst from 1977-1982. Of those sheep taken in 1983, 6 were killed in Unit 11, 37 in Unit 13, 5 in Subunit 14A, and 17 in Subunit 14C. Mean horn size was 35.3 inches, nearly identical to the previous 4 years. One ewe was killed by a permit holder

within the Subunit 14A portion of the Chugach Mountains. The reduced take reflects a substantial harvest decline in Unit 13 (61 taken in 1982) as a result of the diminished availability of legal rams.

Management Summary and Recommendations

The sheep population within Subunit 14C continues to increase. In contrast, population information collected within Unit 13 suggests a stable population with a declining number of legal rams. We recommend that annual surveys be flown in Unit 13 between the Nelchina and Klutina Glaciers to monitor the status of rams and lambs in that area. Should the percentage of legal rams continue to decline, a regulation to reduce the level of harvest should be implemented.

PREPARED BY:

David B. Harkness

Game Biologist III

SUBMITTED BY:

Leland P. Glenn

Survey-Inventory Coordinator

SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 12

GEOGRAPHICAL DESCRIPTION: Mentasta, Nutzotin, and North Wrangell Mountains

PERIOD COVERED: 1 July 1983-30 June 1984

Season and Bag Limit

See Hunting Regulations No. 24.

Population Status and Trend

No aerial surveys were conducted in Unit 12 during this reporting period. However, reports from guides in the eastern half of Unit 12 indicate that sheep numbers may have declined further during winter 1982-83. The Unit 12 population was estimated to contain approximately 12,000 sheep in 1981, but very likely contains fewer than 10,000 at this time.

Mortality

As stated, winter 1982-83 reportedly resulted in declines in the sheep population. Guides reported seeing fewer rams during the 1983 season than were present during the 1982 season. Increased incidence of both wolf and coyote predation on sheep was also reported in the Chisana area.

The total reported 1983 harvest was 200 rams, down 12% from the 1982 and 1981 harvests of 227 and 228 rams, respectively. Hunting pressure did not change significantly from 1982; 440 hunters reported hunting in Unit 12 in 1983 compared to 431 the previous season. Hunter success was 46% in 1983 compared to 53% in 1982.

Hunter success varied in 4 locations which corresponded roughly to 1981 survey areas. Hunting pressure was heaviest in the North Wrangells south of Copper and Tanada Lakes and the upper Nabesna and White River areas, with 161 hunters reportedly taking 85 rams for a success rate of 53%. In the northeast Nutzotin block east of Chisana, 104 hunters took 55 rams for a success rate of 53%. In the northwest Nutzotin block between the Nabesna and Chisana Rivers, 38 hunters took 22 rams for a success rate of 58%. In the Mentasta Mountain area accessible by highway vehicles, 110 hunters reported taking 35 rams for a hunter success rate of 32%. Twenty-seven hunters did not list a hunt location.

Average horn length for the Mentasta-Nutzotin-North Wrangell Mountains was 33.9 inches, approximately 1 inch longer than averages prior to implementation of the 7/8-curl regulation in 1979.

The northwest Nutzotins had the greatest average horn length at 34.7 inches followed by the North Wrangells at 34.0 inches, the Mentastas at 32.8 inches, and the northeast Nutzotins at 32.7 inches. Only 4 of the 200 rams taken had horns longer than 40 inches; this reflects the inherently small-horned rams characteristic of the area.

Management Summary and Recommendations

Sheep populations in the Mentasta-Nutzotin-North Wrangell Mountains remained relatively dense despite losses during winters of 1981-82 and 1982-83. Winter 1983-84 was mild in terms of snow cover and depth. While hunting pressure did not change significantly from that of 1982, the harvest declined 12%.

A change from a 7/8-curl minimum legal horn to a full or 4/4-curl minimum might be expected to result in a lowered harvest for 1 or 2 seasons. Harvests would be expected to return to approximately 200-225 rams within 3 years with an increase of 0.5 to 1.0 inch in mean horn length throughout the area. This should increase hunter satisfaction and serve to increase the life expectancy of rams in the area by 1 or 2 years.

PREPARED BY:

David G. Kelleyhouse
Game Biologist III

SUBMITTED BY:

Jerry D. McGowan
Survey-Inventory Coordinator

SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 12, 13, and 20

GEOGRAPHICAL DESCRIPTION: Tok Management Area

PERIOD COVERED: 1 July 1983-30 June 1984

Season and Bag Limit

See Hunting Regulations No. 24.

Population Status and Trend

Limited aerial surveys of the area north of the Tok River were conducted by research personnel during July 1983. Based upon observations of collared sheep, sheep density is approximately the same as it was in 1980. Thus, the sheep population in the Tok Management Area (TMA) numbers approximately 2,000.

Population Composition

A total of 2,278 sheep was classified at the Sheep Creek mineral lick during late June 1983. (Because of the nature of mineral lick observations, many sheep were classified multiple times.) Of the sheep classified, 156 (7%) were yearlings and 511 (22%) were lambs. There were 13 yearlings/100 ewes and 43 lambs/100 ewes. Forty-five percent of the lambs born in 1982 survived to an age of 13 months.

Mortality

Of 120 permittees, only 81 hunted, according to permit reports. Thirty-nine rams were taken, which represents a 48% hunter success rate. Mean horn size reported (36.8 inches) was not significantly different from recent years. The effectiveness of trophy management in the TMA is apparent because horns from sheep shot in the TMA averaged 3.0 inches longer than the average (33.8 inches) for the remainder of Unit 12. Of the 39 rams taken, 7 (18%) had horn lengths $\geq$39 inches, compared to only 3 in 1982.

Only 5 ewe sheep were reported taken. Hunting success for ewes is generally low because of poor weather conditions. An additional 2 ewes were taken illegally for a total known take of 7 ewes during 1983.

Management Summary and Recommendations

The TMA continues to meet the management objective of producing large-horned Dall sheep. Hunter success is also good, and interest in the hunt continues to increase. The sheep population is judged to be stable and production is good. No changes in seasons and bag limits are recommended.

PREPARED BY:

David G. Kelleyhouse
Game Biologist III

SUBMITTED BY:

Jerry D. McGowan
Survey-Inventory Coordinator

SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 13 and 14

GEOGRAPHICAL DESCRIPTION: Talkeetna Mountains and Chulitna/Watana Hills (TCW)

PERIOD COVERED: 1 July 1983-30 June 1984

Season and Bag Limit

See Hunting Regulations No. 24.

Population Status and Trend

Sheep population data collected in portions of the Talkeetna Mountains suggested there were 14% fewer sheep than were observed during similar surveys conducted in 1981. When comparing these data the major differences were in the number of sheep observed (538 in 1983 and 628 in 1981) and the percent of lambs (14% in 1983 and 21% in 1981).

Sheep surveys conducted the same years in the Watana Hills portion of the Chulitna/Watana range have indicated a similar decrease in the total number of sheep observed and percentage of lambs (149 sheep and 13% lambs in 1983 vs. 209 sheep and 21% lambs in 1981).

Population Composition

There were 739 sheep classified in the Talkeetna Mountains and Chulitna/Watana Hills (TCW) sheep ranges. In the Subunits 14A and 14B portions of the Talkeetna Mountains, 538 sheep were classified. The composition within Subunit 14A was 32 legal rams, 85 sublegal rams, 45 lambs, and 208 unspecified sheep. Within Subunit 14B, it was 11 legal rams, 18 sublegal rams, 30 lambs and 109 unspecified sheep. In the Chulitna Hills and Watana Hills (Subunit 13E), 52 and 149 sheep were classified, respectively; the composition was 2 and 10 legal rams, 5 and 24 sublegal rams, 2 and 19 lambs, and 43 and 96 unspecified sheep, respectively.

Mortality

A total of 241 hunters reported killing 58 rams. Of these rams, 29 (50%) were taken in Subunit 13A, 7 (12%) were taken in Subunit 13E, 17 (29%) were taken in Subunit 14A, and 5 (9%) were taken in Subunit 14B. The sport harvest declined 30% from the previous 4-year average. Hunter success (24%) remained low relative to the previous 10 year average (30%). Twenty-seven guided non-resident hunters killed 17 rams for a success rate of 63%.

Management Summary and Recommendations

The population of adult sheep in the TCW appeared to be stable, with small fluctuations in sample size attributed to differences in survey conditions. The decline in the number of sheep observed was attributed to the decrease in the number of lambs. No explanation for the low lamb crop is available at this time. The decline in the annual kill since 1979 may be attributed to restrictive horn size regulations which protect rams with horns under 7/8 curl.

No changes in season or bag limits were recommended.

PREPARED BY:

Jack C. Didrickson
Game Biologist III

Nicholas C. Steen
Game Biologist II

SUBMITTED BY:

Leland P. Glenn
Survey-Inventory Coordinator

SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 13 and 20

GEOGRAPHICAL DESCRIPTION: Delta Controlled Use Area

PERIOD COVERED: 1 July 1983-30 June 1984

Season and Bag Limit

See Hunting Regulations No. 24.

Population Status and Trend

The Dall sheep population in the Delta Controlled Use Area (DCUA) was estimated to number 1,500 in 1980. No estimates have been made since that time. The trend of the population is uncertain, but is believed to be stable.

Population Composition

Sex and age composition of sheep using the Granite Creek mineral lick were determined by ground observations on 14, 15, and 16 July 1983. A total of 232 sheep was classified. Lambs composed 14% of the sample, and 29 lambs:100 ewes and 21 yearlings:100 ewes were observed. This yearling ratio was the lowest recorded since observations began at this lick in 1972. Likewise, the proportion of lambs was lower than any year except 1974, when 29 lambs:100 ewes were observed.

Mortality

Five hundred forty-eight hunters applied for the 150 sheep permits in the DCUA. Of the 150 hunters receiving permits for the 1983 season, 78 (52%) reported hunting. These hunters harvested 30 rams, which is a 38% success rate. The unexpected low success rate was possibly a result of poor weather during hunting season. Average horn size reported by hunters was 34.8 inches.

Among successful hunters, 60% walked in, 23% flew into the area, and 17% used all-terrain vehicles (ATVs). The percentage of successful hunters using ATVs has been increasing since 1981. Hunters during the 1st part of the season are restricted to walk-in access only.

Management Summary and Recommendations

An aerial survey should be done in 1984 to confirm population status.

PREPARED BY:

David M. Johnson
Game Biologist III

SUBMITTED BY:

Jerry D. McGowan
Survey-Inventory Coordinator

SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 9, 16, 17, and 19

GEOGRAPHIC DESCRIPTION: Alaska Range west of Denali National Park

PERIOD COVERED: 1 July 1983-30 June 1984

Season and Bag Limit

See Hunting Regulations No. 24.

Population Status and Trend

The National Park Service surveyed sheep in the Lake Clark National Park and Preserve during September 1981. Their survey, utilizing a helicopter, was more extensive and thorough than previous surveys. The total number of sheep counted and the ratio of rams in the population were up considerably, but the percentage of lambs was down slightly (Table 1).

Mortality

One hundred seventy-six hunters reported hunting in the western Alaska Range in 1983. This reversed a 5-year trend of decreasing numbers of hunters and was only slightly less than the 16-year average of 186 hunters. The greatest number of hunters recorded in western Alaska Range was 297 in 1977. Most of the increased hunting pressure was in the Post River, Sheep Creek, and Tonzona River drainages. Hunter success was 51%, down slightly from the 16-year average of 58%. The success rate of 65% among non-residents was down from previous years but exceeded the 41% success reported by resident hunters.

The reported harvest of 90 sheep was down slightly from the 16-year average of 100 sheep, but up from the 71 reported taken in 1982. The reported horn length of sheep taken in 1983 averaged 35.6 inches. This is the longest average annual horn length reported in the western Alaska Range, and 1.2 inches more than the 16-year average. The South and Windy Forks of the Kuskokwim, Post River, and Sheep Creek continue to produce the largest number of sheep in the harvest (40%).

Management Summary and Recommendations

Sheep populations in the extreme western portions of the Alaska Range are larger than previously estimated. The Lake Clark National Park and Preserve population consists of about 1,000 sheep; nearly 250 are in the Preserve portion of the area which was open to hunting during sheep season. Still, only 2-7 hunters

have reported hunting in the Preserve during each of the last 5 years. Hunting pressure continues to be heaviest in the Tonzona drainage. The decline in hunters in the western Alaska Range apparently has stopped.

PREPARED BY:

Robert E. Pegau
Game Biologist III

SUBMITTED BY:

Jerry D. McGowan
Survey-Inventory Coordinator

Table 1. Sheep composition in the western Alaska Range.

Area surveyed	Date	Total sheep	Rams (%)	3/4 curl rams (%)	Lambs (%)	Survey time (hours)
Twin Lake-Lake Clark	6/67	258	17	7	ND	ND
Telaquana Lake-Lake Clark	7/74	178	2	1	30	3.0
Telaquana Lake-Lake Clark	9/81	805	21	12	24	18.5

SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 20

GEOGRAPHICAL DESCRIPTION: Alaska Range east of Denali Park, excluding the Tok Management Area and the Delta Controlled Use Area

PERIOD COVERED: 1 July 1983-30 June 1984

Season and Bag Limit

See Hunting Regulations No. 24.

Population Status and Trend

The central Alaska Range contains a dense sheep population that probably declined because of poor recruitment from the 1982 cohort. Mortality may have increased as wolves became reestablished following termination of wolf reduction programs in the area.

Population Composition

Composition and productivity data obtained at the Dry Creek mineral lick during June revealed initial production of 55 lambs:100 ewes and recruitment of 9 yearlings:100 ewes. These figures indicate good lamb production but poor recruitment. Survival of the 1982 cohort through June 1983 was 29%.

Mortality

Harvest data indicated 121 sheep were taken in 1983, a slight increase over 1981 and 1982 harvests and a 20% increase over the average since 1980, when minimum horn size was increased to 7/8-curl. The mean horn size was 33.7 inches, somewhat lower than in recent years.

Successful hunts averaged 5.6 days compared to 5.2 days in 1982. Hunter success was 35% for residents and 74% for nonresidents, a decline of approximately 10% in both cases.

The Wood River drainage produced the area's largest harvest (Table 1), while Delta Creek produced sheep with the largest average horn size.

Transportation patterns were similar to those of recent years. Hunters using horses experienced the highest success rate, but those using aircraft harvested the most sheep.

Management Summary and Recommendations

Because of poor recruitment from the 1982 production, populations may have decreased somewhat in 1983. This is not cause for alarm because variations in production and survival are normal in wildlife populations. Most ewes in this population exhibit alternate year reproduction and, therefore, recruitment may be relatively low even when lamb survival is normal.

The central Alaska Range continues to be a popular hunting area for residents despite low numbers of large-horned rams and mediocre hunting success.

PREPARED BY:

Larry B. Jennings
Game Biologist III

SUBMITTED BY:

Jerry D. McGowan
Survey-Inventory Coordinator

Table 1. Sheep hunter success for the eastern Alaska Range, 1983.

Area	No. successful	No. unsuccessful	Total	% successful	Mean horn size
Nenana	21	56	77	27	33.5
Yanert	9	6	15	60	34.2
Totatlanika	1	8	9	11	36.5
Tatlanika	13	14	27	48	32.7
Wood	42	51	93	45	34.0
Neuman	5	2	7	71	31.4
Little Delta	21	21	42	50	33.3
Delta Creek	5	5	10	50	36.1
Unknown	4	10	14	29	35.9
Total	121	173	294	41	33.7

SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 20

GEOGRAPHICAL DESCRIPTION: Tanana Hills and White Mountains

PERIOD COVERED: 1 July 1983-30 June 1984

Season and Bag Limit

See Hunting Regulations No. 24.

Population Status and Trend

No distribution and abundance surveys were conducted during 1983, but surveys in 1982 indicated that a minimum of 419 sheep inhabited the Tanana Hills and White Mountains. Sheep in this area are characterized by disjunct, low-density populations which are probably slowly declining because of low production and survival and continuing predator pressure.

Mortality

Hunters reported taking 17 sheep in 1983, a slight increase from the 1982 harvest of 14. During the past 5 years, annual harvests have averaged 8 sheep. Number of hunters increased from 35 in 1982 to 45 in 1983. The hunter success rate was 38%, about the same as the previous year. Mean horn length was 33.7 (range 30-38.5) inches, a decline from the 1982 average of 36.7 inches. Residents comprised 96% of all hunters and 88% of successful hunters. Two nonresident hunters were successful.

The number of successful hunters using various transportation modes was as follows: aircraft, 10; on foot from highway vehicle, 4; and horse, 3.

The number of sheep taken in various areas was as follows: Glacier Mountain-North Peak, 6; Mt. Harper, 6; Tatonduk River, 2; and Mt. Schwatka, 3.

Six ewe sheep were radio-collared in April 1983 (3 at Lime Peak and 3 at Victoria Mountain) to help determine movements, migration routes, seasonal use areas, and sources and rates of mortality. The 3 sheep collared on Victoria Mountain moved to Mt. Schwatka in June and used the Jefferson Creek mineral lick. They had returned to Victoria Mountain by fall. The 3 collared sheep from the Lime Peak area moved to the Mt. Prindle-Preacher Creek area during the summer and returned to Lime Peak in the fall. One of the collared sheep from Lime Peak produced a lamb. In mid-December this collared ewe was found dead in the vicinity of Lime Peak, apparently the victim of wolf predation.

Management Summary and Recommendations

Low density sheep populations exist in the Tanana Hills-White Mountains in areas of suitable habitat. The harvest of 8-17 rams is high because of the limited sheep resource present. Both hunting pressure and harvest are increasing.

The biggest potential threat to the population is displacement and habitat loss caused by development activity associated with mining. Several significant mineral discoveries are located in the area, but plans for future development have not been publicized. Should development occur, it is imperative that the Department work closely with land management agencies to minimize impacts on important sheep range.

PREPARED BY:

Larry B. Jennings
Game Biologist III

SUBMITTED BY:

Jerry D. McGowan
Survey-Inventory Coordinator

SHEEP

SURVEY-INVENTORY REPORT

GAME MANAGEMENT UNIT: 23

GEOGRAPHIC DESCRIPTION: Kotzebue Sound

PERIOD COVERED: 1 July 1983-30 June 1984

Season and Bag Limit

See Hunting Regulations No. 24.

Population Status and Trend

All areas of Unit 23 open to sport hunting were surveyed in 1983 except the drainages of the Wulik and Kivalina Rivers, which were surveyed in 1982. The total area surveyed in both years contains a minimum of 1,690 sheep (Table 1). The upper portions of the Noatak and Kobuk River drainages within Gates of the Arctic National Park were surveyed also by the National Park Service in 1983. Singer (1984) estimated the Noatak drainage population, which includes most of the sheep in Unit 23, to be 2,700 animals. The population estimate for the entire Unit is 3,000-3,500 sheep.

Sheep population increases have been noted in both the 1981 and 1982 Survey-Inventory Reports and are apparent when the 1983 surveys are compared to the "baseline" surveys conducted in 1977 by Tony Smith. In 1977, intensive surveys were flown in fixed-wing aircraft with an experienced pilot and observer. The 1983 surveys were done mostly by helicopter using 2 experienced observers; therefore, results of the 2 efforts may not be totally comparable.

The mean of the 1983 surveys was 54% greater than that of the 1977 baseline surveys (Table 2). The sheep population has increased significantly over a 6-year period but not as dramatically as the Western Arctic Caribou Herd. A series of very mild winters, wolf reduction following the caribou decline, better law enforcement, and improved compliance by hunters are probably responsible for increases in sheep and caribou.

Population Composition

Sheep surveys were classified by northern and southern subregions, a useful distinction for management purposes. The 1982 Wulik and Kivalina survey was presented separately, but normally would be included in the northern subregion. Singer (1984) provides a more detailed classification of sheep observed by helicopter or spotting scope, including a breakdown of the "ewe" category into adult ewes, 2-year-old ewes, and yearlings, and "rams" into yearlings, 1/4, 1/2, 3/4, 7/8 and 4/4 curl.

Mortality

Twenty rams were reported taken during the fall season: 8 from the northern subregion and 12 from the southern subregion. The ram harvest has been 13-25 animals and has averaged 19 since the 7/8 curl regulation was adopted in 1979. The 1982 and 1983 surveys revealed 148 legal rams (Table 1) of which 14% were harvested, assuming that all legal rams were observed, and that the entire harvest was reported. The reported take from the southern subregion was 19% of the legal rams observed, while 10% of the legal rams were taken from the northern subregion. These harvest rates are low, and the percentage of legal rams (8.8%) in the herd is indicative of a lightly hunted population. Horn size range in 1983 was 32.0-37.5 in with a mean of 34.8 inches, a modest increase over 1982.

Thirty-seven people reported hunting sheep in Unit 23; 54% of these were successful. With 1 exception, all hunters gained access to sheep hunting via aircraft. Hunters reported spending a total of 220 man-days in the field; the range was 1-21 days and the mean was slightly less than 6 days/hunter.

The subsistence hunt was still in progress at the time of writing, and no harvest information was available.

Management Summary and Recommendations

The cooperative sheep study resulted in the 1st comprehensive estimate of sheep numbers in Unit 23 and provided reliable information on population composition and distribution. We now have the basic information needed to manage sheep for the benefit of the citizens and the resource. My 1st recommendation is that the Department formally express its appreciation to the NPS for its significant contribution to management of this resource.

The primary reason the surveys were conducted was the concern among state and federal sheep biologists over the establishment of the special subsistence sheep season in 1982. The Unit 23 subsistence hunt is open to people residing north and west of the Noatak River; this includes residents of Sheshalik, Noatak, Kivalina, Point Hope, 2 or 3 families living in cabins, residents employed at the Lick and Red Dog mines, and state employees at the Sikusuilaq Springs hatchery. During the 1982-83 season Subsistence Division personnel documented a harvest of 9 sheep, 3 of which were taken illegally by ineligible Unit 23 residents.

The population to which the general and subsistence hunts apply consists of about 1,690 sheep, 963 of which are "ewes" (Table 1). Furthermore, the Unit 23 sheep population has apparently increased by at least 50% since 1977, and ram harvests both north and south of the Noatak River are low. These considerations suggest that the population is easily capable of sustaining existing harvest levels. However, the 50-sheep subsistence quota

now in effect is excessive, particularly if the harvest were ever directed at a small local population such as that occurring in the Wulik-Kivalina area.

Based on Heimer's (1982) estimate of maximum harvest rates for recovering populations, we believe that sheep in Unit 23 (west of longitude 160° west) can sustain the annual removal of 30 "ewes." Based on the 1982-83 subsistence harvest, this "ewe" surplus is large enough to accommodate the existing subsistence take, as well as a liberalization in the eligibility requirement for participation in the subsistence hunt. There is currently no need to exclude from the special hunt residents south and east of the Noatak who have traditionally used the resource, as long as a reasonable quota is retained.

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PREPARED BY:

Roland L. Quimby
Game Biologist III

SUBMITTED BY:

David A. Anderson
Survey-Inventory Coordinator

Table 1. Unit 23 aerial sheep composition surveys, 1982 and 1983.[a]

Survey area	Rams				Legal rams (%)	"Ewes"	Lambs		Total	Sheep/hr
	Legal	Sublegal	Unident.	Total			No.	%		
South of the Noatak	63	155	2	220	8.1	432	126	16.2	778	24.6
North of Noatak	81	108	0	189	10.4	439	149	19.2	777	23.2
Wuluk and Kivalina survey area 1982	4	19	1	24	3.0	92	19	14.1	135	39.3
Totals	148	282	3	433	8.8	963	294	17.4	1,690	24.6

[a] Covers total area and population of sheep open to sport and subsistence hunting by Unit 23 residents.

Table 2. Comparison of Unit 23 Dall sheep surveys, 1977 and 1983.

Survey area	Sheep counted		
	1977	1983	% increase
Kivalina-Wulik	78	135[a]	73
Wulik-Wrench Cr.	42	84[b]	100
Wrench Cr.-Kelly R.	34	54[b]	59
Kelly R.-Avon R.	42	49[b]	17
Kugururok R.	214	311[b]	45
Totals	410	633	54

[a] Counted by Super Cub, 1982.

[b] Counted by helicopter.

SHEEP

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 23 through 26

GEOGRAPHICAL DESCRIPTION: Brooks Range

PERIOD COVERED: 1 July 1983-30 June 1984

Season and Bag Limit

See Hunting Regulations No. 24.

Population Status and Trend

Sheep populations in the Brooks Range vary in density. Numbers are relatively low in Unit 23, the central portion of Unit 24, and in Unit 25. Western portions of Unit 24 support moderate sheep numbers, and higher numbers exist in eastern Unit 24. Populations in Unit 26 are sparse in the far western Brooks Range. High densities occur just east of the Canning River, and sparse numbers exist near the Canadian border.

The National Park Service and the Department of Fish and Game jointly surveyed the sheep habitat in the western Brooks Range. They reported a minimum estimate of 2,700 sheep in the Noatak drainage and Wulik Peaks. About half of these sheep were in Gates of the Arctic National Park. The National Park Service completed a population count in Gates of the Arctic National Park in 1983. Outside the Noatak drainage, they reported counting 9,057 sheep in 118 hours of helicopter survey time. This gives an average of 77 sheep seen per hour surveyed, and an approximate survey intensity of 1.4 min/mi^2, resulting in an overall density of about 1 $sheep/mi^2$ of surveyed habitat. The best estimate of sheep numbers in Gates of the Arctic National Park is 15,000.

Past estimates of the Brooks Range sheep population were probably low. With more recent surveys, the population is now estimated at 30,000. The trend of the population is unknown.

Population Composition

Composition data gathered from helicopter by the National Park Service indicated a mean lamb:ewe ratio of 42:100. This figure may be somewhat higher than comparable aerial classification ratios because the observers attempted to classify yearlings and 2-year-old ewes, and the ratios were reported on this basis. It is questionable whether these categories can be accurately identified during aerial surveys. The observed lamb production

is probably adequate to maintain the population unless an unusually high amount of predation occurs. Aerial surveys during July in the Noatak drainage indicated low yearling recruitment during 1983. Inherent biases in classification of yearlings from the air at this time of year tend to underestimate yearling numbers.

Mortality

Two approaches to harvest of Dall sheep are currently being practiced in the Brooks Range. An early (fall) season for 7/8-curl or larger rams occurs from 10 August through 20 September. A longer season opens in Units 23 and 24 on 1 August and extends through 30 April. The extended season in Subunit 26C opens 1 October. These late seasons are designed to provide the opportunity for local residents to hunt Dall sheep for local use. Aircraft transportation of sheep meat or sheep hunters is forbidden during the late season.

During the early season, 320 hunters took 173 Dall rams. Resident hunters took 102, nonresidents took 64, and 7 were taken by hunters of unreported residency. Overall success was 54%, compared to 58% during the 1982 season. Success among nonresidents was 74%, compared to 46% for residents.

Between 27 and 32 sheep were reported taken by subsistence hunters in Gates of the Arctic National Park. Most of these were young rams; 3 mature rams were harvested. This is similar to last year's harvest. Proposed changes in regulations relating to hunting in Gates of the Arctic (if adopted by the Board of Game) will probably allow the subsistence harvest to increase. In Unit 23, only 9 sheep were reported killed in the late, extended season. This is apparently little different from past years.

Management Summary and Recommendations

Sheep populations in the Brooks Range tend to be stable. Data collected from Gates of the Arctic and the Noatak River indicate that previous estimates in these unsurveyed areas were probably low. The Brooks Range sheep population is now thought to number about 30,000 sheep. The late season subsistence hunts, with bag limits of 3 sheep of either sex, must be considered higher risk management schemes than the traditional early season harvest of mature rams. For this reason, areas of localized harvest during the late season should be identified and populations in these areas monitored annually. The localized hunting patterns of Anaktuvuk Pass residents should also be closely monitored. The relative abundance of sheep and the proportional size of the subsistence harvest from Anaktuvuk Pass appear to differ greatly from those of the subsistence users in Subunit 26C. It is possible that the subsistence hunt in Gates of the Arctic National Park may threaten the sheep population. If regulations

expanding hunting opportunity in Gates of the Arctic National Park are adopted, harvest location, composition of the kill, and population status must be monitored to assure the welfare of sheep populations.

PREPARED BY:

Wayne E. Heimer
Game Biologist III

SUBMITTED BY:

Jerry D. McGowan
Survey-Inventory Coordinator