

STATUS AND MANAGEMENT OF  
MOUNTAIN GOATS IN COLORADO<sup>1</sup>

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**Abstract:** Colorado's mountain goat population of approximately 600 animals is the result of importation and release in suitable habitats. The first release was in 1948, and the first open season was in 1964. During 10 seasons 2,148 hunters have applied for 202 authorized licenses, harvesting 158 animals for an 80 percent success ratio. The overall harvest sex ratio is 172 males per 100 females, with a minimum horn length of 15cm (6 in). Kids and adults accompanied by a kid are not harvested. Only Colorado residents are eligible for a license. Management problems pertain to limited licenses, some potential habitat impacts, possible competition with bighorn sheep, hunter questionnaire compliance, and obtaining adequate and reliable counts. Loss of goat habitat and poaching are not significant problems at this time.

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HISTORY OF TRANSLOCATIONS

Mountain goats have never occurred naturally in Colorado, although Armstrong (1972) cited Coues and Yarrow (1875) as reporting one "seen in Colorado by Lieutenant Marshall's party," and Trippe (1874) as listing the mountain goat among the mammals of Clear Creek and Gilpin counties. Armstrong assumed that these early sightings were of bighorn sheep ewes.

The history of the mountain goat in Colorado is one of introductions (Table 1). The present distribution of mountain goats in Colorado is a reflection of the success of the translocation program. The details of the Collegiate Range (= Sawatch Range) herd (Fig. 1) are treated in depth by Bailey and Johnson elsewhere in these proceedings. Briefly, the introduction of the mountain goat in Colorado was initiated with the release of nine animals (four billies and five nannies) on the east slopes of Mt. Shavano in the Collegiate Range on May 24, 1948. These animals were flown in from Montana. One adult male died a few days after release.

The Mt. Evans herd (Fig. 1) originated from a release of six billies and nine nannies (total of 15 animals) from Idaho and South Dakota in July, 1961. A young adult male died shortly after release.

The Needle Mountains herd (Fig. 1) stems from two releases of goats. The first was in the Lake San Cristobal area on Cottonwood Creek, Lake Fort of the Gunnison River, in June, 1964. It was comprised of 10 animals from South Dakota (four billies and six nannies). Two adult females were found dead shortly after release. A supplemental plant of one billy and three nannies from British Columbia was made on June 19, 1971, in the Chicago Basin area.

The Gore Range goat herd (Fig. 1) originated with a release of two billies and three nannies from South Dakota on June 13, 1968, on Black Creek, which supplemented the two goats observed by Division personnel in the area in 1967. These two were presumably pioneering migrants from the Collegiate or Mt. Evans. Subsequently, on July 8 and 9, 1970, two males and two females from British Columbia were released in the same site, and on August 5, 1970, one additional nanny was released from British Columbia. On June 4, 1971, a billy was released from British Columbia. During June 27 and August 18 and 20, 1972, a total of one billy and four nannies was released on Black Creek from the Mt. Shavano herd. Thus, a total of 16 goats has been released on the Gore. This total is comprised of six billies and 10 nannies, one of which (a yearling male from the 1970 release) was found dead in 1971.

Six mountain goats (two billies, four nannies) were released in three phases on Marcellina Mountain in the West Elk Mountains (Fig. 1) in July and August, 1975. They were translocated there from the Collegiate herd on Sheep Mountain on Cottonwood Creek.

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<sup>1</sup>Editor's note. Paper not part of Symposium.

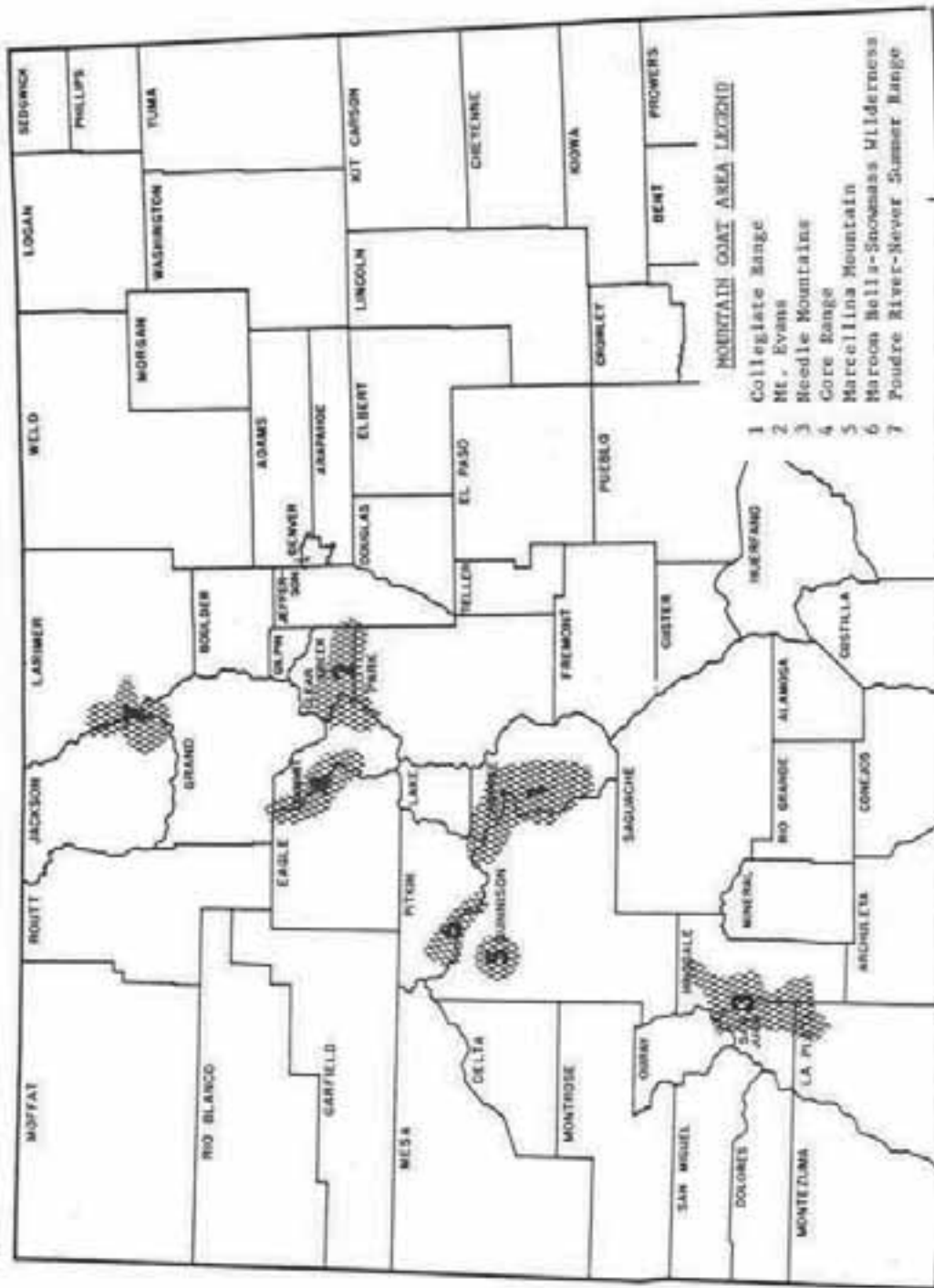


Figure 1. Mountain Goat Distribution in Colorado.

Table 1. Mountain goat translocation data in Colorado, 1948 - 1975. \*

Date	Release Area	Male	Female	Total	Source
May 24, 1948	Mt. Shavano	4	5	9	Montana
June 30, 1950	Sheep Mtn. (Collegiates)	2	4	6	Montana
July, 1961	Mt. Evans	6	9	15	Idaho and South Dakota
June, 1964	San Cristobal, Lake Fork	4	6	10	South Dakota
June 13, 1968	Gore Range	2	3	5	South Dakota
July 8, 9, 1970	Gore Range	2	2	4	British Columbia
Aug. 5, 1970	Gore Range		1	1	British Columbia
June 4, 1971	Gore Range	1		1	British Columbia
June 19, 1971	Chicago Basin, Needles	1	3	4	British Columbia
June 27, 1972	Gore Range	1		1	Mt. Shavano
Aug. 18, 1972	Gore Range		2	2	Mt. Shavano
Aug. 20, 1972	Gore Range	2		2	Mt. Shavano
July, 1975	Marcellina Mtn.	2	2	4	Sheep Mtn., Collegiates
Totals	7 sites	27	37	64	

\*Known mortality following release: Shavano, 1 adult male; Mt. Evans, 1 young adult male; San Cristobal, 2 adult females; Gore Range, 1 yearling male from 1970 release (total 5).

There are at least two goats in the Maroon Bells-Snowmass Wilderness area (Fig. 1), presumably representing a pioneering migration from the Collegiate Range herd.

In the Poudre River-Never Summer Range area of north central Colorado (Fig. 1), mountain goats have been reported for a number of years north of Rocky Mountain National Park but have never been observed in the Park itself. Early reports of goat sightings on the Poudre River are now considered to have been of female bighorn sheep in moult. During the summer of 1976, however, verified sightings of a young nanny were confirmed by Division personnel. She escaped as a kid from holding facilities at Colorado State University in the early summer, apparently traveled up the Poudre River, and survived. Beginning in 1972, a bighorn sheep hunter reported seeing 13 goats in the Never Summer Range. That same year a temporary employee of the Forest Service reported a nanny and kid in a volcanic outcrop above Zimmerman Lake. In 1973 a sheep hunter reported three goats on Mt. Cindy, and in 1974 a bighorn hunter reported six goats just south of Long Draw. In 1975 two sheep hunters reported watching eight goats on Mt. Cindy for several days; then the goats abruptly departed. Division personnel have not been able to observe or confirm any of these goats. It is logical that the goats could have come from the Mt. Evans herd.

#### PRESENT STATUS

The herd in the Collegiate Range area apparently is static at this point after a long period of increase. Approximately 320 animals live in this area, based on counts and hunter reports. This area is hunted, except for a small closed area, and is divided into three goat management areas.

The Mt. Evans herd is basically static at this time at around 100 head, after a period of increase. Though the population estimates do not indicate it, fieldmen feel that the population might be increasing slowly. It constitutes one goat management area for hunting.

The Needle Mountains herd is apparently still increasing, and is currently estimated at 75 animals. This area was opened for the first time to hunting (archery) in 1976. The Gore herd is also increasing. A total of 33 goats was counted in 1976, and the estimated population is 75. This unit has not been hunted, but may be open to five or six licenses in the near future, possibly for archery only.

Little data are available on the Marcellina Mountain herd, though it has been verified that some goats still remain in the area. This area is closed to goat hunting.

The Maroon Bells-Snowmass Wilderness area represents an early pioneering attempt from the Collegiate Range. Only two goats have been observed in this area, and the current status is not known. It is also closed to goat hunting.

#### CENSUS TECHNIQUES

The majority of Colorado's mountain goat counts are made during the summer when their coloration against a snowless and many times a vegetative background can facilitate their location and accurate enumeration. However, on one wind-swept alpine ridge in the Gore Range, counts have been conducted in the winter.

Most counts are from a helicopter, but limited ground surveys are conducted in portions of the Collegiate Range, Mt. Evans and the Gore Range. In addition, data are compiled from questionnaires collected from goat hunters in goat management units open to hunting.

The accuracy of goat counts and classification to adults, yearlings and kids is high on those components of populations counted, but admittedly represent only minimums. In selected herd areas these counts may represent the entire population, but generally in extensive or rough terrain the counts represent an undetermined portion of the population. The propensity of goats to hide under rock outcrops and in timber further reduces the accuracy of the counts, particularly the aerial counts.

#### MANAGEMENT

Non-hunted Populations - The herds of mountain goats in the Gore Range, Marcellina Mountains, the Maroon Bells-Snowmass Wilderness, and the Poudre River-Never Summer Range (Fig. 1) have not been hunted. The introduced goats and the pioneering migrants in these areas may serve as a nucleus for the development of viable herds.

The goats in unhunted, as well as hunted, areas are of aesthetic interest and value to the public for viewing, study and wildlife photography. The presence of the goats brings a certain amount of income to local communities whether or not the herds increase to a huntable population.

Other than protection through closure to goat hunting, no special management is generally applied to these unhunted herd areas. Supplemental releases are made on occasion to stimulate or bolster marginal populations. On selected areas, such as the Gore Range, supplemental salt and essential mineral licks are placed to attract or hold the goats in a specific habitat area. All of Colorado's mountain goat release and management financing have been derived from Federal Aid in wildlife restoration and the Division's Wildlife Cash Fund.

Hunted Populations - The estimated population which is hunted is approximately 470 animals distributed in five management units totalling 5,242km<sup>2</sup>. The Collegiate Range goat area is divided into three management units: G1, the Mt. Shavano area with about 125 goats in 440km<sup>2</sup>; G2, the Antero-Princeton area with 75 goats in 440km<sup>2</sup>; and G3, the Gladstone Ridge area with 120 animals in 769km<sup>2</sup>. Mt. Evans is G4, with an estimated population of 100 goats in 1502km<sup>2</sup>. G5 is the West Needles unit of approximately 75 animals in 2,090km<sup>2</sup>. Figure 2 outlines the various goat management units which are open to hunting during selected mountain goat seasons.

Hunting season data - The season dates and lengths by years, by areas or goat management units are listed in Table 2. In general, seasons have been open in late August through early September, except in 1976 when the basic season began on September 18th and ran through October 10th. These later season dates may become the rule in the future, to ensure better condition of the pelage from a trophy standpoint. Season lengths have ranged from 23 days to 51 days, the latter in one unit in 1976, with a mean of about 29 days. Seasons were closed from 1970 through 1972.

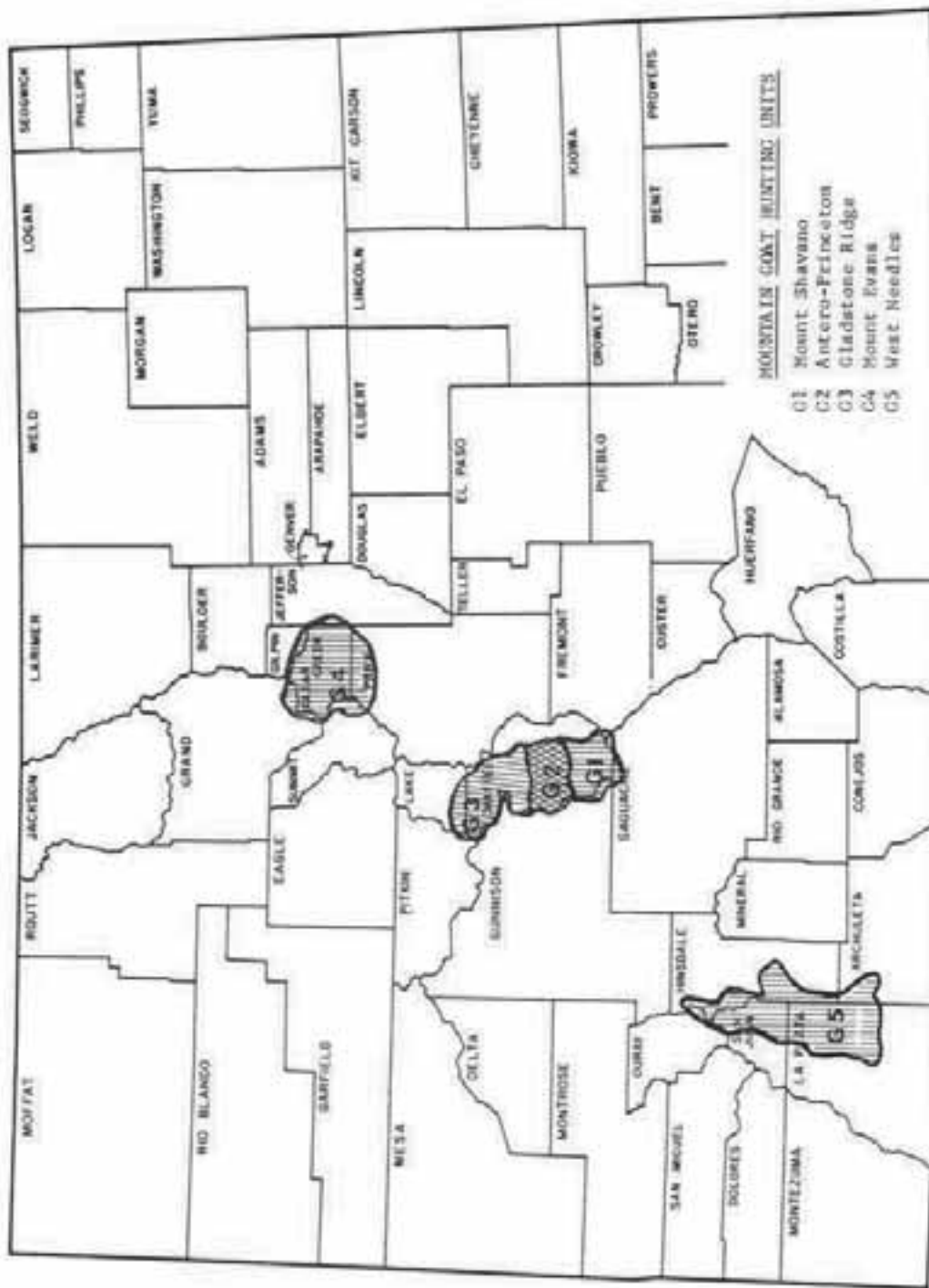


Figure 2.

Table 2. Summary of Rocky Mountain goat hunting seasons, dates and areas or units, 1964 - 1976.

YEAR	DATES	DAYS	SEX	AREAS OR UNITS	NO. AREAS OR UNITS
1964	Aug. 22-Sept. 27	37	E.S.	Collegiate Range W. of Salida	1
1965	Aug. 28-Sept. 19	23	E.S.	Collegiate Range W. of Salida	1
1966	Aug. 27-Sept. 18	23	E.S.	Collegiate Range W. of Salida	1
1967	Aug. 26-Sept. 17	23	E.S.	Mt. Shavano, Mt. Evans, Sheep Mtn., Antero-Princeton	4
1968	Aug. 17-Sept. 8	23	E.S.	Collegiates and Mt. Evans	4
1969	Aug. 16-Sept. 7	23	E.S.	Collegiates and Mt. Evans	4
1970-1972			NO OPEN SEASON		
1973	Aug. 16-Sept. 7	23	E.S.	Collegiates and Mt. Evans	4
1974	Aug. 17-Sept. 8	23	E.S.	G1, G2, G3, G4	4
1975	Aug. 16-Sept. 20	36	E.S.	G1, G2, G3, G4	4
1976	Aug. 21-Oct. 10	51	E.S.	G4	1)
	Aug. 21-Sept. 26	37	E.S.	G3 (archery)	1) 5
	Sept. 18-Oct. 10	23	E.S.	G1, G2, G3	3)

The number of hunters in Colorado is determined by the number of licenses authorized by unit each year by the Wildlife Commission, based on field recommendations. These licenses in total have ranged from six in 1964 to 48 in 1976. Part of the increase in license numbers has been due to the addition of new units open to hunting, such as in 1967, and one new unit in 1976 (Tables 2 and 3).

Table 3. Colorado mountain goat harvest data, 1964 - 1976.

Year	Applications Received	Licenses Issued	Number of Hunters	Total Harvest	Percent Success
1964	87	6	6	4	67
1965	84	6	6	3	50
1966	85	7	7	3	43
1967	127	18	18	14	78
1968	166	20	19	15	79
1969	107	22	21	20	95
1970 - 1972		NO OPEN SEASON			
1973	255	14	14	12	86
1974	267	20	20	18	90
1975	532	41	40	35	88
1976	438	48	46	34	74
Totals	2,148	202	197	158	80

The annual harvest has varied from three during two seasons (1965 and 1966) to 35 in 1975, and hunter success rates have ranged from 43 percent in 1966 to 95 percent in 1969. The overall success ratio has averaged 80 percent over 10 seasons.

Sex ratios of harvested goats have ranged from 67:100 in 1968 to all males in 1964, 1965 and 1966, but the overall sex ratio has been 172:100. Efforts have been made through goat hunter orientation classes to school them in field sex identification and to place the emphasis on the harvest of males (Table 4). Though there has not been a regulation prohibiting the taking of nannies with kids, we have tried to instill the concept in hunters of not taking an adult goat accompanied by a kid. Kids are not taken because our regulations specify a minimum horn length of 15cm (6 in). The wounding loss on mountain goats is so low as to be insignificant, and no cases of irretrievable kills have been documented or are known.

Table 4. Colorado mountain goat harvest by sex and unit or area, 1967 - 1976.

Year	G-1 Mount Shavano			G-2 Antero- Princeton <sup>1/</sup>			Sheep Mountain <sup>2/</sup>			G-3 Gladstone Ridge			G-4 Mount Evans			G-5 West Needles <sup>3/</sup>			Total Harvest		
	M	F	Tot.	M	F	Tot.	M	F	Tot.	M	F	Tot.	M	F	Tot.	M	F	Tot.	M	F	Tot.
1964				4	0	4										4	0	4			
1965				3	0	3										3	0	3			
1966				3	0	3										3	0	3			
1967	3	1	4	3	0	3	1	2	3				1	3	4				8	6	14
1968	1	1	2	4	0	4	1	2	3				0	6	6				6	9	15
1969	4	1	5	6	0	6	2	3	5				1	3	4				13	7	20
1970-72	NO OPEN SEASON																				
1973	1	2	3	4	0	4				4	0	4	1	0	1				10	2	12
1974	2	2	4	4	2	6	CLOSED			5	1	6	2	0	2				13	3	18
1975	7	4	11	6	3	9	-	-	-	5	6	11	2	2	4				20	15	34
1976	3	6	9	5	2	7	-	-	-	6	6	12	6	0	6	0	0	0	20	14	34
Totals	21	17	38	42	7	49	4	7	11	20	13	33	13	14	27	0	0	0	100	58	158

<sup>1/</sup> Antero-Princeton and Sheep Mountain were one area prior to 1967.

<sup>2/</sup> Sheep Mountain, formerly part of G-3, closed to hunting in 1974.

<sup>3/</sup> G-5 opened to archery hunting in 1976.

Each successful mountain goat license applicant is sent a map of the hunting unit for which he has been issued a license, and a questionnaire to be completed after the season and returned to the Division of Wildlife. The information requested is whether they actually did hunt; the dates hunted; whether or not they were successful, and if so, what sex, relative age (young or fully adult), and the horn lengths; how many goats they observed while hunting (sex, age, unclassified, total), and marking the map with sighting locations; if they observed any dead goats other than those taken by hunters (and the relative date of any mortality); and other comments.

#### MANAGEMENT PROBLEMS

Obtaining a License - During the past 10 seasons, 2,148 applications were received for 202 licenses, representing 10.6 applications per available license. Beginning in 1974 applicants who were not successful in obtaining a license were issued a rejection slip indicating a preference point for next season. This practice was stopped in 1977 so that new applicants would have an



opportunity to obtain a license. However, it was decided to honor existing preference points for the next three years, beginning in 1977, after which, in 1980, obtaining a goat license will be subject to the chances of computer selection with an equal opportunity for every applicant.

After 1980 it is reasonable to assume that successful license holders, if they do not kill a goat, may be restricted to applying for a license every second or third year after obtaining one. Prior to the beginning of preference points in 1974, and starting with the first goat season in 1964, a hunter was eligible to apply for a license only every other year. Beginning in 1969 a successful goat hunter has not been allowed to apply for any further goat licenses, as mountain goats were declared a once-in-a-lifetime trophy. Mountain goat licenses are only available to Colorado residents.

Loss of Habitat - In occupied mountain goat ranges in Colorado there have not been any habitat losses due to highway construction or logging practices. In fact, there is as much or more area of potential goat range as is already occupied. In time, through immigration or translocation, several of the potential ranges will become occupied, particularly those near or adjacent to occupied ranges. The kinds and extent of competition between gibbon sheep and mountain goat are not known, but are a matter of concern and controversy. At this time it appears that a conflict does not exist, at least not on winter ranges, because of the seeming lack of mountain goat seasonal movement.

A potential habitat loss problem, or at least an impact, may develop in relation to weather modification programs. Cloud seeding could result in heavy snowfall and drifting over of critical or essential winter habitats. Similarly, the extensive use of large, permanent snow fences could result in heavier drift accumulations if not sited with reference to mountain goat winter ranges.

High altitude mining in subalpine and alpine zones, such as has occurred in the Collegiate Range and is developing in the San Juan Mountains, could have a significant impact on goat herds and the habitats if developed or expanded extensively.

Poaching - Except for one unconfirmed possibility, illegal killing of mountain goats is not known or thought to be a problem in Colorado. Generally goat winter ranges are relatively inaccessible to man, and summer ranges are usually distant from fishing and backpacking activities. People pressure in itself may be a deleterious factor, although its impact appears to be extremely variable. An example is Mt. Evans, where high vehicle traffic and recreational uses do not appear to affect the goats adversely. Similarly, on Sheep Mountain (Cottonwood Creek) of the Collegiate Range, the goats occur year-round, even with high camper and fishing use in the area. On Needle Creek, however, backpackers are thought to be the cause of the goats moving to the more remote crags away from the trails in the valley.

Mandatory Check - Beginning in 1974 it became necessary for successful goat hunters to have their animals checked by a Division officer within 48 hours of the kill, and, ideally, near the location of the kill. Enforcing such a regulation is difficult, but under the once-in-a-lifetime trophy classification it is necessary. Similarly, getting full compliance on returning the questionnaire sent to each licensed goat hunter has not been successful. Though they could lie about it, and especially if they were not checked under the compulsory check regulation, the data from the returned questionnaires have management applications. One possible stimulation to return the survey form is to pass a regulation classifying hunters who have not responded as having filled their license and thus not being eligible to ever receive another license as a penalty for noncompliance.

Other Management Problems - An intra-Division problem is obtaining reliable counts, which is associated with priorities, limited time and restricted economic resources for inventory. Similarly, we have been particularly lax on monitoring and following up newly released animals and goats sighted or reported in previously unoccupied ranges.

#### LITERATURE CITED

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