

STATUS AND HISTORY OF MOUNTAIN GOATS IN OREGON

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Abstract: The status and history of mountain goats (*Oreamnos americanus*) in Oregon is reviewed. Recent archeological evidence suggests goats occupied Hells Canyon prior to the influence of European settlement. Mountain goats were released in the Wallowa Mountains of northeast Oregon in 1950. The population status, influence of hunting, lack of genetic diversity, and isolation of the Wallowa Mountain goat herd is discussed. Transplants to the Elkhorn Mountains of northeast Oregon and the Columbia River Gorge are reported.

Indigenous mountain goat distribution has been described as rugged mountainous areas of western North America from southeastern Alaska to southcentral Washington, and from western Alberta as far south as central Idaho (Johnson 1977, Guenzel 1980, Wigal and Coggins 1982). Physical evidence has been lacking to establish the historical occurrence of goats in Oregon.

Mountain goats were not present in Oregon at the turn of the twentieth century (Bailey 1936); hence, goats have traditionally been considered an exotic species. In 1950, six goats were released in the Wallowa Mountains, and since that date subsequent transplants have occurred in the Wallowas, Elkhorn Mountains, and Columbia Gorge. This paper provides information on the historical occurrence of Rocky Mountain goats and a review of the current status of goat populations in Oregon.

HISTORIC EVIDENCE

Early literature reports mountain goat as an indigenous species in Oregon. Lewis and Clark describe the skins of mountain goat possessed by Indians along the Columbia River, and describe goats occurring "on the chain of mountains forming the commencement of the woody country on the coast, and passing the Columbia between the falls and the rapids" (Hosmer 1924: 180). Grant (1905) reported the mountain goat ranging as far south as Mount Jefferson, Oregon, based on the records he was able to obtain. However, Grant does not provide sources for his records. Bailey (1936) cites

Richardson (1829), Townsend (1839), Suckley and Gibbs (1860), Grinnell and Fannin (1890), Hornaday (1906), and Miller (1924) reporting mountain goat as a species native to Oregon, but disagrees with these reports. Bailey questioned whether goats were ever native to Oregon since there were no authentic records of their occurrence in recent years. He admits that it is not improbable that in earlier times, goats may have occupied Mount Hood and perhaps other peaks in the Oregon cascades, as well as the Wallowa Mountains in northeast Oregon, and the Seven Devils in Idaho. However, he suggests further evidence should be sought. Hall and Kelson (1959) describe goat distribution in North America, and include the north portion of the cascade range in Oregon.

Diary entries by Henry H. Spalding describe a meeting with the Nez Perce Indians near Wallowa Lake, Oregon, in July 1839: "Joseph proposes a sport with goats" and "goes to a lick the goats frequent, to start them out," but does not find any (Drury 1958: 271). Horner (unpublished manuscript, Origin of Wallowa County Place Names, p.120, Wallowa Library) describes a basin east of Joseph, Oregon, "named for a bunch of wild mountain goats that ranged there in the winter of the 1890s. Fred Herson killed the guard goat—they always have a guard on lookout. Their hair is different from that of the mountain sheep, also their horns grow up and back, different from the sheep." Both of these accounts have been questioned, since neither provides sufficient information differentiating between goats, bighorn sheep, or pronghorn.

These reports of mountain goats occurring in Oregon are based primarily on anecdotal accounts and have left managers with concerns as to their authenticity. However, archaeological evidence from the Bernard Creek Rock Shelter, along the Idaho side of Hells Canyon, indicates the presence of mountain goat remains in two excavation levels at that site (Randolph and Dahlstrom 1977). The goat remains (bones) were estimated to be 300 - 1000 years old (Reagan and Womack 1981). Since the goat remains were fragmented, it suggests their use as food rather than raw material for tools or religious objects (Reagan and Womack 1981). Based on this evidence, along with the current knowledge of prehistoric hunting and gathering activities, Reagan and Womack concluded goats were present in Hells canyon 300-1000 years ago. In a later archaeological investigation on Camp Creek, Oregon side of Hells Canyon, goat remains were identified and radiocarbon dated from 500-1500 years before present (Leonhardy and Thompson 1991). Corless (1990) reported Weiser Indians hunting mountain goats in the Seven Devils Mountains, which coincides with these findings.

It has been argued that goats may have occurred in the Seven Devils Mountains on the Idaho side of Hells Canyon, but that the Snake River was a barrier to the goats; therefore, they were never indigenous on the Oregon side of Hells Canyon. This same argument has been proposed along the Columbia River separating the Washington and Oregon Cascades. We refute this argument. The Snake River would commonly freeze-over during severe winters, prior to dams, and would have allowed goats easy access to either side of the Canyon. In addition, goats occur on adjacent canyon walls of large river corridors such as the Fraser in British Columbia (Macgregor 1977), and have been documented swimming across Kenai Lake, Alaska (Smith and Nichols,

1984). This suggests that river corridors such as the Snake and probably the Columbia would not have been barriers to emigrating goats.

We conclude that early anecdotal reports and references, coupled with recent archaeological findings, demonstrate that mountain goats were indigenous to the northeast corner of Oregon and most likely portions of the Oregon Cascades. Goats probably disappeared from Oregon during or prior to European settlement in the early 1800s. The northeast corner of Oregon was isolated from European settlement by rugged terrain until the 1870s; however, European influence arrived much earlier, with Nez Perce Indians acquiring horses in the early 1700s. Improved mobility and firearms greatly changed local Indian culture which influenced tribal hunting impacts on native wildlife.

STATUS OF TRANSPLANTS

Wallowa Mountains

The Wallowa Mountains encompass an area of approximately 575 km² and are situated in the very northeast corner of Oregon. The area is characterized by U-shaped glaciated valleys, alpine basins, rugged precipitous terrain, and sharp ridgetops. Elevation ranges from 1400-3000m. Dense timber stands occur below 2287m with Douglas fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), and western larch (*Larix occidentalis*) the most abundant tree species. Scattered timber stands occur above 2287m with subalpine fir (*Abies lasiocarpa*) and white-bark pine (*Pinus albicaulis*) predominating. Forbs and grasses are the most abundant plant forms on high elevation ridge tops.

The Wallowa Mountain goat herd has originated from 4 separate releases (Table 1). One adult female died the day following the 1950 release. Of the 33 goats released in the 1980s, a

Table 1. Mountain goat transplants to the Wallowa Mountains of Oregon.

Release location	Year	Number released	Male	Female	Origin of stock
Joseph Mt.	1950	5	3	2	Chopaka Mt., WA
Hurricane	1985	8	2	6	Olympic N.P., WA
Hurricane	1986	8	3	5	Misty Fiord, AK
Hurricane	1989	17	8	9	Olympic N.P., WA
Total		38	16	22	

minimum of 6 individuals, 1 male and 5 females, are known to have died within 1 year following the releases.

Survey Techniques

From 1962 through 1982, goats were counted and classified annually from fixed-wing aircraft during mid to late summer. Ground surveys occasionally were incorporated with aerial surveys from 1983-1993. Ground surveys were conducted in areas of high goat use and helped provide a more thorough count in the area surveyed; however, ground surveys are more time consuming and have not been conducted with equal effort from year to year. Tracking of radio-collared individuals, from 1980s transplants, helped to locate animals during surveys and provide information on movements.

Population Status

The Wallowa Mountain goat population grew from the original transplant of five animals to a minimum population of 29 animals by 1966 (Table 2). The population declined in the late 1960s and remained static through the 1980s, with aerial counts ranging from a low of 10 to a high of 32 animals. The estimated population never exceeded 45 animals during those years. Surveys from 1990-1993 indicated an increase with counts ranging from 25 to 37 goats. The current population estimate is 55 animals.

Kid production was highest in 1966 with an adjusted kid ratio of 61 kids per 100 adults (yearlings included with adults) (Table 2). Production decreased thereafter and remained static at low levels through the 1980s. From 1990-1993 kid production improved and remained stable with a mean kid ratio of 33 per 100 adults.

DISCUSSION

Hunting of mountain goats was initiated in 1965 and continued annually through 1968. A total of 23 tags were issued and 20 animals, including 13 males and 7 females, were harvested (Table 3). During the corresponding time period, the number of goats observed on aerial surveys decreased to a low of 10 animals. We believe that hunter harvest, particularly of adult females, was a major factor in the initial decline of this population. Similar relationships between hunter harvest and goat population declines have been reported

Table 2. Late summer mountain goat classification survey data for the Wallowa Mountains of Oregon.

Year	Total count	Adults*	Kids	Adjusted kids/100 adults
1962	12	8	4	50
1963	—	—	—	—
1964	28	18	8	44
1965	—	—	—	—
1966	29	18	11	61
1967	21	17	4	24
1968	11	9	2	22
1969	10	8	2	25
1970	17	12	5	42
1971	22	17	5	29
1972	18	17	1	6
1973	18	16	2	13
1974	15	13	2	15
1975	20	17	3	18
1976	19	17	2	12
1977	16	11	5	45
1978	22	18	4	22
1979	24	20	4	20
1980	31	23	8	33
1981	19	14	5	36
1982	15	13	2	15
1983	12	11	1	9
1984	10	8	2	25
1985	14	12	2	17
1986	—	—	—	—
1987	26	20	6	14
1988	8	8	0	0
1989	9	8	1	13
1990	31	23	8	35
1991	28	21	7	33
1992	25	19	6	32
1993	37	28	9	32

* Includes subadults.

Table 3. Hunter harvest of mountain goats in the Wallowa Mountains, Oregon, 1965-68.

Year	Tags			Total
	issued	Males	Females	
1965	5	4	1	5
1966	5	3	2	5
1967	5	3	2	5
1968	8	3	2	5
Total	23	13	7	20

(Macgregor 1977, Kuck 1977, Foster 1977, Bone 1978).

Although legal goat hunting has not been allowed since 1968, the population did not increase significantly until recently. There are various factors that may account for the lack of increase. Predation, avalanches, and accidents are mortality factors which have been observed in this population. However, we do not believe them to be major factors limiting population growth.

Low kid production or survival in the Wallowa Mountains may be directly related to a lack of suitable winter range resulting in a winter nutritional deficiency (Vaughan 1975). We believe inbreeding may have been a major factor suppressing production. The effects of inbreeding in small populations have been discussed by Farnsworth (1978), Pettus (1982), and Nash (1982). In 15 of 16 species of captive wild ungulates, inbred young were significantly less likely to survive than non inbred young (Ralls et al. 1979). Because the Wallowa goat population originated from a transplant of five individuals, of which only two were females, and outbreeding has not been possible due to the isolation of these animals from any neighboring goat herds, we believe that a lack of genetic diversity through inbreeding may have been a major factor suppressing kid survival. In 1985, 1986, and 1989 supplemental goat releases provided genetic diversity to the Wallowa Mountains population. Individuals from the supplemental transplants have been observed utilizing the established goat ranges, as well as ranges previously unoccupied by goats. We believe the improvement in kid production and survival during the past four years was directly related to the supplemental releases. Survey information suggests that these releases provided the genetic diversity, along with the pioneering of new habitats, necessary to improve population production.

ELKHORN MOUNTAINS

The Elkhorn Mountains, approximately 126 km²,

lie just west of Baker City, Oregon. Elevations range from 1400-2770m. The area is characterized by glaciated valleys and rugged alpine basins similar to the Wallowa Mountains.

From 1983-1986 a total of 21 goats were released in the Elkhorn Mountains (Table 4). Tracking of radio collared individuals provided information on movements and establishment of herd ranges post release. In 1992, aerial surveys were initiated with fixed-wing aircraft to count and classify goats during late summer.

Total number of goats observed was lower in 1993 than in 1992 (Table 5); however, this was thought to be a result of observation error and not an actual decrease in population size. Kid production has been good (Table 5), and the Elkhorn Mountains goat population is believed to be growing.

COLUMBIA RIVER GORGE

Mountain goat habitat in the Columbia Gorge encompasses the northern extension of the Cascade Mountains in Oregon and lies within the Columbia Wilderness, Bull Run Watershed, and the Mount Hood Wilderness. Elevations range from 670- 3000m. Lower elevation ranges are characterized by north facing vertical rock outcrops surrounded by stands of Douglas fir and mountain hemlock (*Tsuga mertensiana*). Upper elevations consist of primarily alpine basins near the foothills of Mount Hood.

Since 1969, 15 goats have been released in the Columbia Gorge (Table 6). Annual surveys specific to this goat herd have never been established. Miscellaneous observations of goats occurred from 1973-1990 and ranged from 1 to 4 individuals observed. Observations of 2-4 goats were reported occasionally from 1980-1985. However, since that time, observations have declined, with no goats reported since 1990.

Small transplant size, scattering of individual goats, and paucity of male goats have been major concerns and possible explanations for the failure to establish goats in the Columbia Gorge.

Table 4. Mountain goat transplants to the Elkhorn Mountains of Oregon.

Release location	Year	Number released	Male	Female	Origin of stock
Pine Cr.	1983	6	3	3	NF Clearwater, ID
Pine Cr.	1985	8	4	4	Olympic N.P., WA
Pine Cr.	1986	7	2	5	Misty Fiord, AK
Total		21	9	12	

Table 5. Late summer mountain goat classification survey data for the Elkhorn Mountains of Oregon.

Year	Total		Kids/100	
	count	Adults*	Kids	adults
1992	29	19	10	53
1993	23	14	9	64

* Includes subadults.

Table 6. Mountain goat transplants to Tanner Butte in the Columbia River Gorge of Oregon.

Year	Number released		Origin of stock	
	Male	Female		
1969-71	8	2	6	Olympic N.P., WA
1975	6	2	4	Olympic N.P., WA
1976	1	1	-	Olympic N.P., WA
Total	15	5	10	

SUMMARY

Archaeological findings presented in this manuscript demonstrate that mountain goats were indigenous to Hells Canyon prior to European settlement. Faunal remains now place goats within 48 km² of the existing Wallowa Mountains goat herd. We believe that goats also occurred in the Wallowa Mountains and probably other ranges in northeast Oregon, since rugged canyon corridors link the Wallowas to Hells Canyon. Wildlife managers typically have described the distribution of goats based on occurrence at the time of European exploration or settlement. Efforts to document the historical range of goats should continue through the identification of faunal remains recovered in archaeological excavations of human encampments and wood rat middens. We encourage wildlife managers to utilize archaeological information in conjunction with other sources of physical evidence to more accurately describe historical distribution of native wildlife. Restoration of mountain goats to native ranges should be continued, especially where priorities are to manage for ecological diversity.

The Wallowa Mountains goat population declined during the 1960s as a result of heavy hunter harvest. Legal hunter harvest was not allowed thereafter; however, the population level remained static with low kid production through the 1980s. We believe the lack of genetic diversity was a major factor affecting kid production and growth of this population. Recent supplemental goat transplants appear to have improved annual kid

production, and the Wallowa Mountains goat herd currently is increasing.

The Elkhorn Mountains goat herd appears to be established. This goat herd continued to increase since the initial transplant in 1983 and has demonstrated good kid production in recent years.

Attempts to establish goats in the Columbia Gorge have not been successful. Currently there are no goats known to be alive in this area. Failure to establish goats in the Gorge may be due to small transplant size, lack of male goats, and scattering of transplanted individuals.

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