POPULATION DYNAMICS, HABITAT UTILIZATION, RECREATIONAL IMPACTS AND TRAPPING OF INTRODUCED ROCKY MOUNTAIN GOATS IN THE EAGLES NEST WILDERNESS AREA, COLORADO

Richard W. Thompson

Department of Zoology and Physiology
University of Wyoming
Laramie, WY U.S.A. 82071

Abstract:

The ecology of introduced Rocky Mountain goats (Oreamnos americanus) was studied between 8 June, 1977 and 8 September, 1979 in the Eagles Nest Wilderness Area, Colorado. Population size increased to approximately 100 animals by 1979 (preseason) in classic sigmoid fashion since the initial transplants (15 goats; 1968-1972). The population growth rate declined in 1978 and 1979 due to increased kid mortality and decreased recruitment resulting from the severe, preceding winters. Kid mortality reached 56% and 40% over the winters of 1977-1978 and 1978-1979, respectively. Recruitment declined from 48.1 to 19.5 to 14.1 kids/100 older animals in 1977, 1978 and 1979, respectively. Severe winters also resulted in subnormal kid, yearling and two-year-old post-winter body sizes. Decreased recruitment was negatively correlated with maximum April snow depths ($r = -0.999$; $n = 3$) and total May snowfall ($r = -0.999$; $n = 3$) probably resulting from maternal food stress during late gestation. This suggests that decreased growth rate is a density independent perturbation rather than a density dependent curtailment. Using the ONEPOP computer simulation model (Gross et al. 1973) at the present harvest rate (7.5%), the preseason population in 1985 will number approximately 111 animals.

The utilization of 7 habitat parameters, elevation, slope, substrate type, vegetation type and vigor, aspect and distance to escape cover, were tested against their availability using a one-way chi-square goodness-of-fit test. The null hypothesis was rejected in all tests. Of all goats observed, 77.7% ($n = 2289$) occurred between elevations of

3688 -3749 m, 69.3% (n = 2171) utilized slopes ≤ 15°, 77% (n = 2722) occurred on fellfield-like substrata and 82.7% (n = 2586) occurred in graminoid-forb vegetation types, their principal forage. Goats utilized high and medium vigor types in 88.5% (n = 2303) of all graminoid-forb observations. Aspect use changed throughout the summers in relation to changes in the phenological growth stage of plants. Areas with no aspect were utilized in 63.1% of all observations (n = 3537) while the availability of these areas was only 4.6%. Mean distance to escape cover was <75 meters for all group types observed (n = 345). The utilization of all habitat parameters was significantly influenced by two major artificial salt licks having no aspect (i.e., flat) and located between 3688 and 3749 m elevation. Sixty-four percent of all goats observed (n = 3976) were in lick situations.

Recreational impacts, assessed by simulated disturbances and goat-recreationist interactions, had a negligible effect on mountain goat activities. Flight distance, the distance a "recreationist" could approach a goat(s) before escape behavior was initiated, was greatest in nanny-subadult groups and lowest in juvenile, male and mixed groups. Mean flight distance for all groups (n = 345) was 82.6 m. Flight intensity a measure of escape behavior intensity, was greatest in juveniles and nanny-subadult groups and lowest in male and mixed groups. Mean flight intensity for all groups (n = 345) was a slow walk away from the "recreationist."

Four mountain goats were captured with rope nooses at an artificial salt lick and equipped with telemetry collars. Painting, exhibited by 3 captured goats, lasted approximately 7 minutes, 3 minutes and <30

seconds (5-year-old male, 2-year-old male and 2-year-old female, respectively) and was characterized by "glassy" eyes (with pupillary response) and decreased, but stable heart and respiratory rates. Captured females exhibited extremely aggressive behavior characterized by high intensity weapon and rush threats (Chadwick 1977). Captured males exhibited no aggressive behavior. Trapping effort averaged 40.8 man hours per goat, but decreased to 10 man hours per goat when one person operated the rope nooses. Although selective, this method is inefficient and dangerous to the goats and researcher.

Literature Cited:

Chadwick, D. H. 1977. The influence of mountain goat social relationships on population size and distribution. Proc. Int'l Mountain Goat Symp. 1:74-91.

Gross, J. E., J. E. Roelle and G. L. Williams. 1973. Progress report: program ONEPOP and information processor: a systems modeling and communications project. Colo. Coop. Wildl. Res. Unit, Colo. State Univ. 327p.

Nike Goodson: Did you suggest that there wasn't any detrimental affect of the goats on the sheep?

Rick Thompson: We observed sheep and we observed goats and we didn't observe either of the two together. There are about 20 bighorns in the range. The density of goats in the area where bighorn occur is something like 1 goat per 10 square miles. I wouldn't think that that in itself would have any detrimental or any influence on bighorn.

Wayne Heimer: Rick, what do you do to make me feel better about the conclusion that that's a classic sigmoid growth curve. It looked to me like it could have been a straight line through there rather easily and I think if you can convince me that it's okay to make a sigmoid growth curve out of that, I might feel better about the modeling you went ahead and did.

Rick Thompson:You can probably draw a straight line through there, however, the way that population would then have to increase would probably not be as realistic as if you put that curve through there. The ONE POP model, when we ran it through; the guy that we did it with felt that it was a very good fit. There were some problems as far as getting my data to fit it. One thing, we had 56% mortality one year, 40% the next year. To get the population to run correctly so you don't have all your animals dying out, this was just kid mortality too, we had to use 22% kid mortality which is down from the 56 and 40%, and 9% yearling mortality. But, everything else, all our other data as far as number of different age classes and things like that in the population, recruitment and everything like that fit really well.

Wayne Heimer: I don't understand the answer of how your trying to convince me that that's okay to make that. You said that the population would have to increase oddly if you put a straight line through there, or what I didn't understand it all.

Rick Thompson: I don't think that you can put a straight line through there that would represent the way the population would have increased; rather than making large jumps certainly I would think that it would just gradually increase. May be I'm mistaken.

Jim Bailey: I would just like to comment that the ONE POP does not require you to assume a sigmoid or logistic growth model at all. You could put in your lamb crop every year and it will go up and down from year to year. That is one big problem with ONE POP. You don't have to assume any kind of logistic growth if you use ONE POP.

Rick Thompson: Is that what your talking about?

Wayne Heimer: Yes.

Ken Risenhoover: You mention that you didn't observe the sheep to use the same areas that goats were.

Rick Thompson: They did use the same areas as the goats.

Ken Risenhoover: And yet you said that they; I missed the point that you said.

Rick Thompson: There is two drainages that the bighorn sheep occupy, and there is something like 2 goats in those drainages. Just because such few numbers of bighorns and few numbers of goats, we didn't see any of them intermingling, but they occupied the exact same areas.

Nike Goodson: Did sheep use to use that area that is now used by goats?

Rick Thompson: Apparently the whole range was historic bighorn range. In about the 1950's they stopped hunting because the population was declining. Since about 1963, I'm not certain on these dates, the population has remained stagnant and nobody knows what has happened to the sheep; what has caused that. It's just like all these other papers given previously. The population has just stagnated and now it's about 20 animals. This was done long before the goats were introduced.