Outdoor Facts

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GUIDELINES FOR EVALUATION OF MOUNTAIN GOAT TRANSPLANT SITES IN COLORADO[a]

The high mountain country of Colorado contains an abundance of potential habitat for the mountain goat *(Oreamnos americanus)*. The fact that the non-native mountain goat could be a desirable big game mammal in the state was recognized more than 25 years ago, and has led to the successful establishment of the species through introductions. Since about 1950, general experience with introductions of exotic species in the United States has indicated that potential habitat for any proposed plant should be examined in a most critical manner.

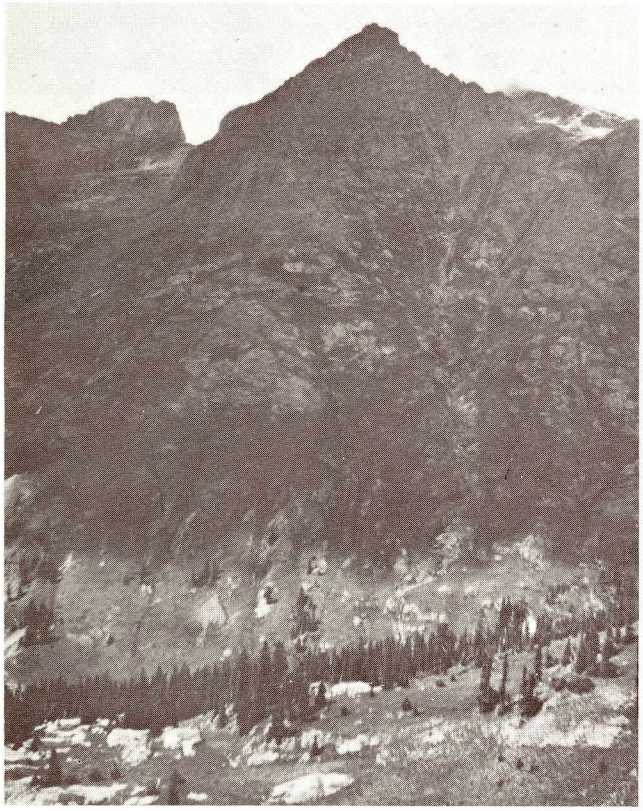

Fig. 1. Mount Eolus, at the head of Chicago Basin in the Needles Mountains. This is the general location where goats were first found in the Needles Mountains, and where a transplant was made in 1971. (Photo by W. H. Rutherford)

Because most of the potential goat habitat in Colorado remains unoccupied, and because of considerable interest on the part of various individuals and citizen groups toward increasing the distribution and abundance of goats, the Division of Game, Fish and Parks was faced with the necessity for developing standards, not only of physical site evaluation but philosophical as well, for transplanting the species. This paper deals with the development of such standards and offers guidelines for proposed goat transplants in the state.

PHILOSOPHY OF GOAT TRANSPLANTING

The basic position of the purist who contends that "foreign" species should not be introduced is already untenable. In any event, the goats are here, and firmly established in Colorado. The main objection to the introduction of exotics, whether purposeful or accidental, is that they frequently invade or take over an ecological niche already occupied by a native species, to the detriment of that species. Gordon (1967) discussed this problem with respect to the Barbary sheep; and deVos et al. (1956), and Craighead and Dasmann (1965), discussed it with respect to exotics in general. In Colorado, the effect of non-native rainbow and brook trout introduction on the native cutthroat trout is history — in great measure, usurping the habitat of the native species.

It is known that the habitats of mountain goats and bighorn sheep are so similar that they can be said to be identical, and it is also known that bighorns now appear only infrequently, if at all, in those areas occupied by goats; but the intricacies of the relationship between these two species are so imperfectly understood that they cannot be assessed as to what happened as a result of previous goat transplants. One can only say that, of all wild bighorn competitors, the

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mountain goat, given the opportunity, is likely to be the most competitive.

Mindful of these considerations, the Division has no alternative but to adopt a conservative approach toward mountain goat transplanting. Any proposal for introducing goats into a specific area must be evaluated in terms of possible, but unknown, effects upon indigenous bighorn populations. In practice, this emphasizes that goats should not be released in any habitat where bighorns exist, or where bighorn introductions may be expected to be successful.

The last consideration might seem to be an argument against any further goat transplanting for, on the surface, it may imply that any area proposed for goats should instead be used to expand bighorn sheep. Such is not necessarily true. If the criterion, "may be expected to be successful," is applied to proposals for bighorn transplants, it is immediately apparent that some historic bighorn range is no longer suitable for bighorns. Human encroachment, conversion of former bighorn winter range to other uses, highway building and general habitat alteration have insured that re-introduction of bighorns into some of these historic areas will not be successful.

Fig. 2. Goats were transported to the Chicago Basin transplant site in crates suspended from a helicopter on June 19, 1971. (Photo by Harold E. Burdick)

Generally, habitats of mountain goats and bighorn sheep are the same, but their winter range requirements have subtle differences. Sheep, wherever possible, do seek out winter range at lower elevations, but continue to exhibit very narrow tolerance limits on what is acceptable. This characteristic is largely responsible for the great degree to which human encroachment has influenced bighorn herds. Thus far, goats in Colorado have not particularly sought out winter range removed from summer range, but seem able to subsist wherever snow conditions allow foraging in winter. Their tolerance limits appear to be wider than those of bighorn sheep.

Thus, it appears that Colorado does have potential mountain goat habitat, where goat introductions could be made without fear of conflict with bighorn sheep populations. If such areas are written off as potential bighorn sites, attempts to use them for expansion of goat populations may be the wisest course of action. Should goats become established in any of these places a gain will have been realized; should the transplant be a failure the only loss incurred would be the investment in transplant stock.

It should be remembered, too, that mountain goats may thrive on at least some ranges inhospitable, or even intolerable, to bighorn sheep. Identifying such ranges and stocking them with goats would apparently insure a choice big game trophy species on more of the alpine and subalpine range in Colorado.

To a great extent, the validity of this thinking hinges on a supposed characteristic of goats: namely, that they will stay where put. The fact that they cannot be depended on to do so in all cases places further restrictions on the selection of transplant sites. Types of terrain that serve as barriers to wide goat movements are not known, nor is it known what degree of habitat isolation is necessary to prevent dispersion. The goats which appeared in the Gore Range in 1966 could have come from either Mount Evans or the Collegiate Range; in either case, their travel necessitated crossing major stream valleys and highways. In this instance, the topographic features encountered were not barriers. To what extent such pioneering migrations will occur in the future is unknown, but it is predicted that goats will appear with increasing frequency in Colorado mountain areas now devoid of them. It may be that only very extensive areas of inhospitable terrain will serve as barriers, and the

Fig. 3. A mountain goat after release from the carrying crate, Chicago Basin, Needles Mountains, June 19, 1971. (Photo by Harold E. Burdick)

fact that goats are now present in Colorado means that much of the high mountain country will eventually be occupied regardless of transplanting programs.

PHYSICAL SITE EVALUATION

All field work involved in the actual evaluation of proposed transplant sites must be done in close cooperation with the land management agency responsible. In nearly all cases this agency is the U. S. Forest Service.

Within the philosophical limitations set forth in the preceding section, proposed goat transplant sites must still meet certain physical criteria. The features of terrain that were considered by Hibbs et al. (1969) as ideal goat habitat have been corroborated by follow-up studies, showing that a combination of exposed, windswept, alpine terrain above timberline, sheer rock outcroppings and talus slides interspersed with steep grassy slopes, and precipitous cliffs on southern exposures are absolutely necessary. Alpine tundra areas without rough topographical features in juxtaposition are little used by goats, and then only as travel routes. The rough, precipitous cliff type is also necessary as a feature of subalpine habitat, such as that preferred by goats in the Mount Evans area.

Hibbs (1967) found that grasses and grass-like plants compose the greater part of the diet of goats through the year, again corroborated by more recent follow-up observations. Thus, alpine areas in general offer the type of forage that goats prefer, and vegetative species composition is not a particularly critical item of consideration in recommending transplant sites in alpine situations. If subalpine areas are to be at all attractive to goats, there must be correct juxtapositioning of grazing areas with rocks and cliffs. This combination exists in the upper Bear Creek area on the east side of Mount Evans as a result of forest fires in a particularly rocky and rugged location. Without the fires, followed by the grass-forb plant succession now present, this area would be uninhabitable for goats in spite of the favorable topography.

With proper kinds and interspersion of terrain and vegetation, probably the most important localized feature of good mountain goat habitat is snow-free winter range. This is not critical in most of the Front Range area of Colorado, since this is not deep snow country. There appears to be an abundance of wind-blown ridge tops above timberline, and stream drainages are generally oriented to provide a maximum amount of south-facing exposure. However, in the heavy snowfall areas of western Colorado, and particularly in the San Juan Mountains, suitable winter range may be only a small fraction of the total range available to goats. Persistent snow cover will limit, to a greater degree than any other site characteristic, the expansion of goat populations in these mountains. Aerial reconnaissance in late winter (late February and March), when snow depth and coverage are likely to be maximum, will provide information on this habitat feature. Generally, any proposed site that does not show a few snow-free vegetated areas (not bare rock) of at least 100 contiguous acres should be rejected.

Domestic sheep use of alpine areas proposed as goat release sites should be cause for immediate rejection. It is unlikely that the U. S. Forest Service would approve a transplant in any area having a grazing use permit; therefore, this problem can be resolved before the site evaluation becomes a serious consideration.

Finally, the possible conflict of human influence must be considered in evaluating potential goat transplant sites. Unfortunately, definite standards for the degree of human activity that goats will tolerate are almost non-existent, as it varies so widely from one area to another. There has been no opportunity to observe goat reactions to humans in enough different situations to set down definite guidelines. There is evidence suggesting that backpackers and hikers forced goats out of Needle Creek into more remote locations in the Needles Mountains during summer; yet goats can be observed in the cliffs overlooking Cottonwood Lake in the Collegiate Range at all seasons of the year. This particular spot is subjected to heavy, summer human density and recreational use.

In the absence of specific standards for predicting what effect human activity will have on the success of any goat introduction, it must suffice to say that it should be considered in the evaluation. It would probably be unwise to release goats in the immediate vicinity of a developed ski area, for example, but it is impossible to draw a line between what is and is not a good transplant site with regard to the human factor. If stringent standards on terrain, interspersion of cliffs and grazing areas, and available winter range are met, ordinary human activity will probably be of only minor importance.

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