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BIGHORNS ON THE BORDER

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We had spent the night on the edge of the bighorn country in a snake-infested tumble-down stone shack once "home on the range" for a Mexican goat-herder. It was 4:45 a.m. when we left the cabin. At 6 a.m. from the top of the range we located two small moving objects about a mile away. They might be sheep!

For six weeks, the writer, assisted at times by a local mountain man, had been hunting elusive bighorns in the San Andres Mountains of south-central New Mexico. Sheep were known to be present on the newly-created San Andres National Wildlife Refuge, but aside from a few records by local ranchers, none had been sighted for many years. Our assignment was to restore the numbers of the few remaining sheep on this refuge so that this magnificant big game animal would not disappear from another southwestern range. First, however, we had to locate this pitifully small remnant band, estimated at less than forty survivors.

After this first glimpse of moving objects, we crossed a deep canyon and climbed onto a ridge where my companion waited. I crossed another canyon and at 9:30 a.m. slipped over a rim to avoid being seen on a skyline. Rocks were heard rolling at some distance but no game could be seen. I had combed the canyon with binoculars for twenty-five minutes before a startled ewe running down a steep slope toward a rock shelf came into view. A tiny lamb scampered

close at her heels. Then came another ewe with a larger lamb. Five more sheep stood on this narrow shelf of rock backed by caves. One of this last group was an extremely large ram with massive horns. This large animal stalked into the largest cave, ducked his head belligerently, and forced a younger ram to retire. The older animal then lay down in the center of the entrance while some of the band rested to one side and in back of him, being careful not to obstruct his view across the canyon. The rest of the group lay outside of the narrow ledge. After weeks of sleeping near mountain waterholes and looking in vain for sheep, I had located them!

This never-to-be-forgotten experience marked the start, in 1941, of several years' intensive management of this band of bighorns.

Several factors had combined to decimate this herd. In order to stop the decline at least some of the evident limiting factors had to be recognized and remedies applied.

The numerous mule deer of the refuge which had been protected from hunters since 1926 were found to be utilizing the browse on the western side of the range too closely. This area would be needed by the sheep when they increased. Also bighorns feed on many of the same plants as do deer. As a result of these findings three special public deer hunts have been conducted on the refuge with the cooperation of the New Mexico Fish and Game Department. Several score deer of both sexes were thus removed by the hunting public. Thus, in one move we were able to provide good hunting

and benefit the sheep by removal of selected numbers of deer that were competing for forage and space on the range.

Through the cooperation of the U. S. Forest Service, U. S. Grazing Service (now Bureau of Land Management) and the local ranchers, the numbers of cattle and horses on the range were kept within the grazing capacity of the area. When the area was set aside as a Federal refuge the use of the range by domestic sheep and goats was wisely prohibited. It goes almost without saying that this reduction of competing forms on the range has been a factor in restoring bighorn numbers.

The amount of water available to game on the San Andres Refuge is adequate except at certain seasons. Water development work has been started on this area, but this factor is not as critical as it is on the sheep ranges of southwestern Arizona.

As previously indicated the sheep of this area were so close to the brink of extinction that all factors affecting their welfare had to be analyzed and remedies applied. Range studies indicated that coyotes and bobcats were numerous. Research into the literature revealed that bobcats and coyotes have been known to molest bighorns. Analyses of mountain lion droppings proved that these animals were preying on the sheep. As a result a predator control program was instituted to reduce the numbers of these carnivores on the range. Inasmuch as we believe that the reduction of numbers of these animals has been a potent factor in the revival of sheep numbers let us review the background of this situation.

The San Andres Mountains, a long north and south lying semi-desert range in places less than six miles wide, are extremely rough and rise sharply out of comparatively flat country that stretches for miles both to the east and to the west. During the past one hundred or more years man has introduced to the flat lands greater and greater numbers of domestic stock. Originally these "flats" were without permanent water. Man sunk wells and now permanent water is available. With water available man has been able to concentrate greater numbers of domestic stock on the plains. This stock is probably more numerous than were the antelope and deer found here before the advent of man, as the endemic game could not have occurred in large numbers over such vast waterless areas.

As the domestic stock increased, endemic carnivorous animals, which included mountain lions, bobcats, and coyotes, found abundant food literally placed at their feet in the form of increasing numbers of the young of domestic animals and increased greatly in numbers. The stock raisers became alarmed at their losses and started to eliminate this concentration. Naturally the work was done in country that was easier to reach, on the flats, with little work being done in the mountains. Thus, for years increasing numbers of predators at least drifted through the narrow San Andres Mountains.

As the domestic animals increased they climbed higher and higher into the mountains eating the choicest feed. The predators followed them. The native sheep of the area retreated before

this competition that "squeezed" them, as in a pair of pliers, from both the east and the west. Thus, when active management of the area was finally started our native sheep were found only in the highest, roughest areas where succulent foods were more available and where their native abilities made them more able to elude their natural enemies. From the foregoing it can easily be seen that active measures had to be taken to reduce range competition and to reduce the numbers of the predators. This was done. In addition, active patrol reduced the drain on the herd from illegal killing by local and transient poachers. As of the last of December 1946, it is reported that the sheep of the area number at least 85. It is apparent that the management practices herein outlined have been at least moderately successful and that the San Andres bighorns are slowly but steadily increasing in numbers.

With the possible exception of the grizzly bear, the bighorns of the border are believed to be in the most precarious position of any of our big game animals. These sheep have been among the most sought-after big game on the continent since the Canadian form was discovered in 1800 by Duncan McGillivray, an agent of the North West Fur Company. The head and horns of a large ram are conceded by many to be the finest trophy of the Western Hemisphere. The desert bighorn has so captured the imagination of outdoor people that by many it is considered the ultimate expression of the native charm of the desert wildernesses left for our enjoyment.

Small wonder, then, that nature-lovers are almost unanimous

in their determination that our native sheep shall not disappear. While deer, elk, buffalo, and antelope have increased under protection, the bighorns, particularly in the Southwest, have continued to decrease on areas that formerly held comparatively large numbers. Fortunately, the interest of the public has been aroused and, now that the post-war era has arrived, much is being planned to restore the sheep of our arid and semi-arid lands.

The two key areas in southwestern Arizona are the vast Kofa and Cabeza Prieta game ranges established by Presidential Order in 1939 and maintained by the Fish and Wildlife Service. The Kofa Game Range, which lies wholly in Yuma County, contains approximately half a million acres. The Cabeza Prieta Game Range, which contains almost a million acres, lies southeast of the City of Yuma along the Mexican border.

A study of bighorn population figures of the Kofa Game Range revealed that until 1945 but one yearling sheep (a sheep approximately one year old) for every six lambs was seen by refuge personnel. In other words, lambs were being born, but were not surviving their first year. Expressed in game management terms the lamb-yearling ratio was 1 to 0.16. Let us examine the local range conditions and attempt to ascertain the cause of this highly discouraging rate of survival of young animals.

It is evident that illegal killing by man was not the cause of this age-class deficiency in the Kofa herd as poachers would tend to kill large mature males with good trophy heads. Thus,

although poaching is a problem that cannot lightly be dismissed, we can pass over it for the time being and proceed with our analysis.

The winters in southwestern Arizona are mild so winter kill can be eliminated. The range contains lots of feed for game as compared to the number of animals present to consume it, so we can eliminate lack of proper forage on this native range that is comparatively lightly grazed by domestic stock. Careful studies of the area have shown that in years of deficient rainfall (and these years are frequent on the desert) the natural rock waterholes or rain filled "tanks" that are the main source of game water, become dry or very low and that the sheep suffer. This contention is substantiated by the fact that when most of the natural tanks or "tinajas" are dry and only a few large ones contain water, sheep concentrate at these locations. The Fish and Wildlife Service, therefore, has developed fifteen of these watering places, making them deeper and providing more shade, thus insuring more water in droughty times. In addition, certain of these tanks were deep with slippery rock sides. When the water became low the sheep slipped into them, couldn't escape, and drowned. As these death traps are found the rocks are blasted in such a way that the hazard is eliminated and water is safely available.

The remains of young sheep that were found on the range indicated that predators were securing some of them. As in New Mexico the assignment of our Service was to restore bighorn numbers. In late 1943 a predator control program was instituted and

it is being carried forward today.

We have briefly discussed here some of the factors believed to have affected herd numbers. Other factors have been and are affecting the band but space prohibits a full discussion of this lengthy subject. As a result of natural conditions plus management practices, the lamb-yearling ratio changed, in 1946, from the previous 1 to 0.16 to 1 to 0.82. In other words, game management as outlined above has produced results. Besides this ratio increase, there is an increase in the numbers of the younger age classes of both sexes. It can be stated that the decline in sheep numbers on the Kofa Game Range has been stopped and that the population curve is beginning to climb. A similar statement can be made for the Cabeza Prieta Game Range, but here the results will, doubtless be slower because of a slightly less favorable habitat and the proximity of this area to Mexico. Plans are projected, in cooperation with the Mexican Government for the creation of a bighorn reserve south of the border to match our Cabeza Prieta Range.

A good deal of careful life history work has been done with the sheep of the northern United States, particularly in Wyoming and Colorado. Studies in the Southwest have lagged behind and part of the pleasure of field work in the border states is the possibility that the next sight of sheep may uncover another clue that would help in their restoration.

Even today, one can start a lively argument regarding the

lambing season of Arizona bighorns. Men who have spent years on the desert will insist that some of the ewes lamb twice a year. Sight records in southern Arizona indicate a spread of at least three months in the lambing season. In addition to large and small lambs, sheep of the previous year's crop may be present in a band. The gestation period of our native sheep is variously stated to be from 150 to 180 days. Further detailed field work will settle this subject of campfire banter.

Much speculation in the border country also exists as to whether or not sheep have twins. We have not been lucky enough to settle this point to the entire satisfaction of all the skeptics, but the fact that on June 1, 1939 National Park Ranger John Bauman witnessed the birth of twin lambs to a ewe in Yellowstone National Park, lends credence to our thought that under favorable conditions twins are not a distinct rarity to the sheep of the border, which are a variety of the true bighorn of Wyoming.

Bighorns on native ranges, where competition from deer and domestic stock is not severe, are, generally speaking, dainty eaters. They will pick a tender morsel here and there or sometimes stand quietly picking the most succulent leaves and recent growth on one side of a palatable bush. At other times they graze on herbs and grasses, particularly when the latter are green. The exception to this rule of fastidious feeding is seen when bighorns concentrate for an extended period near a favored bed ground. At these locations, even on ranges untouched by domestic stock, the choicest plants are heavily utilized. This condition gives a hint that bighorns need an

extensive range. When one of these concentration areas no longer can supply enough food the sheep must move on. If they have suitable range to which to move they will probably do well. If, however, the range is so restricted that the sheep cannot move freely to similar or more desirable locations, the range and the sheep will deteriorate.

In Texas, Vernon Bailey found that the sheep ate Mormon tea (Ephedra), trumpet-flower (Tecoma), and silk tassel (Garrya). In New Mexico direct observation indicates that a complete list of mountain sheep food plants would ultimately cover most of the plants of the range. Some favored foods of south-central New Mexico are: silk tassel (Garrya), mountain mahogany (Cercocarpus), sotol (Dasylirion), fendlerbush (Fendlera), big mallow (Sphaeralcea), prickly pear (Opuntia), wild onion (Allium), day flower (Commelina), black and side oats grama (Bouteloua) and green sprangle-top (Leptochloa). In the deserts of southwestern Arizona plants utilized include Mormon tea (Ephedra), paloverde (Cercidium), ironwood (Olneya), coffee-berry (Simmondsia), big mallow (Sphaeralcea), and a host of other desert forms. The famous naturalist William T. Hornaday reported in 1908 that, in the Pinacate region of Sonora, just south of the Cabeza Prieta Game Range, sheep ate "Galleta grass, paloverde, torote prietao, Sphaeralcea, and white brittle bush."

In summary, we can say that the decline of the native sheep in the southwestern United States has been due to range competition, lack of permanent or semi-permanent water, excessive numbers

of the large predators, illegal killing, and other local factors. We have cited examples known to us. Many other areas in western Texas, New Mexico, Arizona, Nevada and southern California contain sheep in favored localities. Each of these will have different problems and different intensities of the various factors we have encountered. These differences, will, doubtless, mean that additions and improvements of management practices as applied in the past will have to be made. Although the battle to save the bighorns of the border is far from won it can now be said that these animals will respond to management if these techniques are persistently applied. It is axiomatic that in order to apply these practices persistently the status of the land be such that the necessary measures can be activated with a relatively free hand over a period of years.

In conclusion we can state that it is now possible to increase the numbers of bighorns on native ranges in the Southwest if certain conditions of land status are met and known game management techniques are utilized.