



HAL
open science

Wildlife preservation in semiarid regions

Victor H. Cahalane

► **To cite this version:**

Victor H. Cahalane. Wildlife preservation in semiarid regions. Revue d'Écologie (La Terre et La Vie) , 1958, 4, pp.381-389. <hal-03532338>

HAL Id: hal-03532338

<https://hal.science/hal-03532338v1>

Submitted on 18 Jan 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



HAL Authorization

LE PROBLÈME EN AMÉRIQUE

AMÉRIQUE DU NORD

WILDLIFE PRESERVATION IN SEMIARID REGIONS

by Victor H. CAHALANE

(*Chief Biologist,*

*National Park Service U.S. Department of the Interior
Washington 25, D.C., U.S.A.)*

The grasslands of the world, most of which are in regions of scanty rainfall, were once richly endowed with animal life. Some of the most diversified groups of mammals, such as the Antelopes, have developed here. The birds were varied and abundant. Unfortunately, this rich animal assemblage has suffered drastic reduction at the hand of man. Wildlife which was adapted to survive adverse rainfall and temperature was unable to withstand unrelenting hunting. Its food was primarily in grasses. This, as well as scanty water supplies, was preempted by man's domestic flocks and herds. The wildlife of semiarid regions has lost ground even faster than has that of forested areas of the world.

An interesting illustration of depletion of species as a result of overgrazing is found in southwestern North America. The masked bobwhite (*Colinus virginianus ridgwayi*) has almost disappeared in the wild state. Formerly numerous in grassland of northwestern Mexico and extreme southern Arizona, the birds progressively vanished from ranges as cattle ranching was extended and intensified. In times of high meat prices, heavy stocking resulted in overuse of grass. Drought, always recurring in that region, was an added detrimental factor. As the protective cover was destroyed, the quail were exposed unduly to natural enemies. The latter often increased on augmented food supplies in the form of drought-weakened and dead cattle.

Some wild species can survive in competition with domestic animals such as cattle and horses, and even sheep and goats. In these instances, the wild animals usually have different food preferences and can tolerate a reduction

in protective vegetation. However, sheep and goats are so omnivorous that, at least when heavily stocked, they inevitably devour food plants which are essential to most of the larger hoofed wildlife. In practically all areas of the world where sheep and goats are important in human economy, wildlife (in common with other natural surface resources) has been very severely depleted.

In many parts of the western United States, feral horses, burros, and goats also compete with wildlife for forage and water. The effect is similar to unregulated or unmanaged use of the range by comparable numbers of domesticated animals. The conflict is accentuated particularly in the most arid regions. There the essentials to life — especially water — are at a premium. During the hot rainless summers, many springs dry up. Animal life of species which do not metabolize water from carbohydrates in plant food is concentrated within walking distance of the remaining springs. In effect, the carrying capacity of the desert is limited to the animals that can exist on this minimum amount of water and the nearby forage.

Horses need considerable water and must drink daily. Feral horses, therefore, have not come into the more arid localities as much as the other exotics. They have been most destructive in limited areas of eastern Oregon and parts of Idaho, Wyoming, Utah, and Nevada, chiefly by overutilization of forage.

Much greater damage has resulted in more arid regions where burros are able to thrive. These animals were much used as pack stock in the American Southwest and in northwestern Mexico during the 75 years prior to World War I. Escaped and abandoned animals quickly reverted to the wild state. They found habitat conditions similar to, or even more favorable than, those in their ancestral home in southwestern Asia or northeastern Africa. The wolf (*Canis lupus*), the only effective native predator, was quickly exterminated by man as stock-protection measure. Burros increased and spread over hundreds of square miles in New Mexico, Arizona, Nevada, and southern California, as well as in the Republic of Mexico.

Burros have been especially detrimental to the desert races of bighorn, or mountain sheep (*Ovis canadensis*). They trample and befoul the watering places or drink them dry, and such places are soon abandoned by the more fastidious bighorns. Burros are gregarious and often « loaf » around waterholes for considerable periods. They not only consume much water, but they strip all forage from the locality. Being pugnacious, they may drive off any bighorns

which approach and attempt to drink. In areas where burros are abundant, they may so deplete the forage and water and exclude the bighorns from the latter as to lower the vitality and reproductive potential of the wild species. Competition by burros undoubtedly has been a considerable factor, with overhunting, in the decline of the desert races of American bighorns.

Feral goats have been less troublesome in the American Southwest, but are a serious problem in Hawaii and some other Pacific islands. These animals reproduce rapidly, are close feeders, and thrive especially on the dry slopes above the rain forests.

Overgrazing by domestic stock, feral animals, or man-caused overpopulations of wildlife results not only in temporary loss of food. Grass, which acts as a mechanical binder, also contributes humus and aids the infiltration and storage of water. When the grass is destroyed, erosion sets in and both food and water may be lost.

Notable examples are found in Africa, where, in vast regions of little rainfall, the relationship between various environmental factors is especially fragile. Intensified grazing of sheep and goats in the Kalahari Desert has devastated great areas where grass and shrubs formerly grew. Dust devils now swirl hundreds of feet high, or the sand washes in the violent downpours of the brief rainy season. The small amount of plant food which was accumulated in the soil has oxidized and blown or leached away. Domestic animals are being forced to forage ever further from their home windmills, and the remaining herds of springboks (*Antidorcas marsupialis*) and other Antelopes are restricted to the most remote and driest regions.

Erosion is, of course, also caused by wrong or over-cultivation of the earth. When the grasslands of the North American Great Plains were broken up by the plow, wind erosion was greatly accelerated. With the cover gone, wind and water tore at the earth. It is estimated that a single windstorm during the great drought of the 1930's removed 300 millions tons of fertile topsoil.

Loss of fertility lowers the productiveness of an area in terms of wildlife no less than in amounts of cereals or hay or other crops. Because mankind frequently has elbowed wildlife back into infertile places, it is often considered that the latter are normal habitat. Almost invariably, areas of low fertility are actually wildlife deserts. Wild mammals and birds have certain requirements in quantity and quality of food and the location of shelter. If minimum needs are not met, animals will be few or

absent. Fertile land yields large crops, whether these be wildlife or grain.

The chief cause of the near extinction of millions of buffaloes (*Bison bison*) and Antelopes (*Antilocapra americana*) on the Great Plains of North America was hunting. Overhunting all over the world has been the immediate cause of the extermination of incalculable hordes of wildlife. Most of the wild sheep (*Ovis*), Antelopes, and asses (*Asinus*) have been greatly depleted on their arid ranges in Africa and central and southwestern Asia. A few species have been exterminated and others are approaching extinction.

No species can survive indefinitely if it is overhunted. Sufficient breeding stock must be reserved to assure that the population will withstand the inevitable drain resulting from superannuation, predation, accidents, and other natural causes. This is so fundamental that even brief mention may seem unnecessary. Nevertheless, overutilization through hunting may be overlooked by many intelligent but uninformed persons, even in these enlightened days, with drastic examples before us.

What steps can be taken to preserve the remnants of wildlife in semiarid places ?

Only by setting aside areas, where the needs of wildlife will have primary consideration, can we achieve a complete restoration of primitive wildlife populations. Wherever possible, these wildlife preserves will richly reward the human as well wildlife populations. They will afford recreational and educational facilities, and great laboratories for the study of animal life histories, habitats, and diseases.

These areas can preserve vanishing forms of wildlife and provide breeding stock for other areas. Probably these are the only areas in the world where species like Elephants and Buffaloes that conflict too heavily with economic pursuits can be preserved under natural conditions.

Certain other steps can be taken to further the natural increase of wildlife :

1. Regulations should prevent overgrazing for the benefit of domestic stock as well as of wildlife.

2. Feral stock should be removed where possible. Many wild horses in the western United States have been rounded up and destroyed for use by packing plants and soap factories. Large numbers of goats in Hawaii have been disposed of in like manner. Burros, however, can

rarely be herded successfully and captured alive in corrals. They must be shot on the open range. As they are adapted to living in rough, mountainous country, and quickly become wary, this is a time-consuming process. Feral goats also are resistant to hunting among cliffs and volcanic slopes. The burro in southwestern America and the goat on the Pacific islands seem destined to remain perpetual competitors of native wildlife.

3. State or provincial regulations should establish hunting seasons and limit of kill whenever necessary. Overhunting and reduction of species to dangerously low levels would thus be eliminated.

4. Trained scientists should be employed in sufficient numbers to make adequate studies of wildlife, their food and water supplies, their habitat and diseases. Their surveys would determine necessary legislation, regulations, and provisions.

5. In some cases, control of predators on a vanishing species may be employed. This often obvious measure is especially tempting in regions where the natural environment and carrying capacity have been impaired by man's reckless use of cover.

Control of predators is often an illusive remedy. Under entirely normal conditions, the population of herbivorous species cannot be raised materially, over long periods, by removal of predators. The limiting factors of lack of food and of disease will soon become dominant. As a temporary measure, to assist a prey species through an interval of special stress, control of an enemy may be desirable. In this case, control must be accompanied by correction of man-caused factors such as overhunting or overuse of food and cover. In the presence of essential amounts of these necessities of life, wild species are admirably equipped to survive against their natural enemies. Usually only the sick, weak, or surplus are eliminated. Extirpation or severe depletion of predators usually is followed by other evils — overgrazing and erosion, destruction of food, or disease.

6. Water, of course, is equally as important as food. In semiarid country, it is frequently the primary factor controlling the numbers and distribution of the wildlife species which are of the greatest interest to man. Judicious development of artificial water supplies is often one of the most important measures in a wildlife conservation program.

The United States Fish and Wildlife Service has employed two types of water development in the dry southwestern states :

1. In mountain ranges which are inhabited by bighorns, or in special restoration areas, small springs or seeps are « improved » and the water made more readily available. Frequently the seeps are so slight that the water sinks into the ground before it can be utilized by animals. In such cases the earth and rock are excavated until the source, or at least sufficient water, is located. The water is then piped to a concrete tank, whence it is fed by a float valve into an open trough or basin at which the animals can drink.

2. Surface runoff from seasonal rains is stored in comparatively large concrete reservoirs or in earth « tanks ». In this type of development, the entire water area is open to wildlife use. Ducks and other waterfowl are frequently attracted. Surface evaporation is high, but the bulk of the impounded water is sufficient to last through the dry season until rains replenish the supply.

Some impoundments have begun as artesian projects. Underground water with enough pressure to reach the surface has been gathered and put to use. When artesian pressure proved insufficient or failed, electrically driven pumps have been installed. In a very few instances, windmill pumps have been used.

Windmills are avoided whenever possible in American parks because of landscape considerations. Differing from that of the wildlife refuges, the objective of the National Park System is not only to preserve wildlife, but to present an authentic picture of primitive conditions. Water is developed artificially here only when it will compensate for supplies which man has diverted to visitor use or rendered unavailable in other ways. In some few instances, where cattle grazing must still be permitted temporarily as an extension of privileges established before the sanctuary came into being, water must continue to be furnished to this livestock. In the southwestern desert, especially, this is a direct loss to the native wildlife.

Reliance for necessary artificial water supplies in the parks is placed on gravity flow or artesian water. If feasible, storage tanks are covered to reduce loss by evaporation, to exclude debris, and to prevent animals from getting into them and drowning. It is standard practice to make water available to the smaller mammals and to birds, as well as to the large species, by providing a small, shallow pool near each trough or other deep watering place. Such a pool is fed from the storage reservoir, or by normal wastage from the principal trough. These additional facilities are not expensive to construct and are simple to maintain,

especially if the pool is fenced to exclude trampling by domestic stock and large wildlife.

In southern and eastern Africa, where wind is constant and is a reliable source of power, game conservation authorities have installed numerous windmills for pumping water to the surface for use by wildlife. Water sources are usually small but generally can be found within 60 feet of the surface. Water from the mill is conducted into a concrete reservoir, which is usually about 30 feet in diameter and 8 to 10 feet deep. A float valve allows water to flow as needed into a concrete trough or into a small earth « pan ». In South Africa, particularly in Kruger Park, some difficulty has been encountered owing to much of the water being strongly alkali and unacceptable to the animals.

Elephants frequently refuse to drink from a trough or artificial open pool. If water sinks too rapidly into the soil, a shallow pan approximately 20 by 20 feet by 3 feet deep is made of concrete and filled with sand. Water is then fed into the pan until the sand is saturated. When the Elephants dig, as is their custom in river beds during the dry season, water flows into the hole in a very natural manner. In Elephant country, it is always necessary to protect windmill installations by surrounding the structures with heavy fences made of railroad or tram rails.

Throughout the world water development unquestionably is necessary in many areas as a compensatory measure, and it has possibilities for increasing the game supply in arid regions where food is plentiful. A program to provide water, however, can be overdone or be wasteful of funds and effort. Even with adequate supplies, there are limits to the number of animals that can be carried over a long period of time. Biological knowledge of the various factors, such as forage, water, wildlife diseases, and cyclic and migration phenomena, should guide the water-development program.