

letters to the editor

Editor's Note: The following Letter to the Editor was received by the George Wright Society FORUM, in response to the "Review and Recommendations on Animal Problems and Related Management Needs in Units of the National Park System," by Durward L. Allen, Larry Erickson, E. Raymond Hall, and Walter M. Schirra, which appeared in the Autumn 1981 issue of FORUM. It is run here because of its pertinence to National Park management and in the hope that it will elicit further comment.

To the Editor:

In the autumn issue of *The George Wright Forum*, Allen *et al.* (1981), p. 27-28, state that "even the most superficial review of animal problems in the parks reveals that overpopulations are at the root of many difficulties." They further suggested that perhaps deputized hunting, "to take surplus big game within national parks will need to have greater consideration in the future." Although I am confident that the authors were not proposing that ungulate management in national parks be based on superficial analyses, I believe that they understate the complexity of the issue.

The term "overpopulation" implies that there are too many individuals of a given species in a given locality. However, determination of acceptable population sizes or densities is difficult, except in cases of exotic animals in national parks, where even one individual represents an overpopulation. Even that policy is based on a social judgment and is subject to change with changing societal values.

Identification of overpopulations of native animals is considerably more complex. Allen *et al.* (1981) felt that overpopulations existed when *man-caused* habitat changes or other influences caused a species to increase to a level which was destructive of its food supply or damaging to pristine plant and animal communities. If it were easy to identify man-cause changes and to document damage to food supply and pristine ecosystems then animal management decisions would be fairly simple. However, identifying those impacts usually is difficult.

An important problem is our lack of understanding of primeval systems. In order to measure ecological change caused by man, we must understand how the system functioned prior to his arrival. Because we were not present to describe those environments, we must rely on historical accounts and current studies of contemporary habitats and wildlife populations that usually are conducted over a relatively short time span. As one would expect, this frequently results in oversimplification, conflicting opinions, and perhaps even misinterpretations and erroneous conclusions.

As a result, our understanding of processes by which wildlife populations were regulated primevally is fairly rudimentary. With regard to ungulates there are basically two perspectives; one emphasizes the role of predation and the other suggests that ungulate-habitat relationships are most important. It seems unlikely, however, that a single factor is involved in natural regulation of ungulates.

Peek, (1980, 1981) and Caughley (1981) provide excellent discussions of those two approaches. Briefly, predation hypotheses emphasize the impor-

ance of predators in limiting prey populations, both by direct reduction of numbers and impacts on behavior and distribution. Habitat-ungulate hypotheses postulate that ungulate populations were limited principally by availability of forage. Much of the latter approach has been derived from observations of sudden increases or irruptions of ungulates following improvement of habitat (i.e. by fire) or their introduction to previously unoccupied areas. Caughley (1979) considered irruption to be a basic pattern of population growth for ungulates, with establishment of new herbivore-plant equilibria following peak populations.

Clearly the park manager is faced with a dilemma. If extirpated predators were the principal factors limiting ungulate populations, hunting or direct reduction could be appropriate. On the other hand, if irruptive growth of ungulates is natural, high densities would not necessarily represent overpopulation.

Even if an unnatural increase in a population occurred, and reduction was desirable, we still must determine an appropriate population density. In other words, a "carrying capacity" must be established. This term requires careful definition. Caughley (1979) pointed out that it has been used commonly to denote a density of animals that provides a maximum sustained yield. Caughley calls this density "economic carrying capacity," in contrast to "ecological carrying capacity," which typifies an unharvested equilibrium.

Populations managed at economic carrying capacity typically will be at low to moderate densities, have high reproductive and survival rates, and individuals will be in relatively good physiological condition. The converse of these will be true for populations at ecological carrying capacity.

Neither of those two versions of carrying capacity is right or wrong. Rather, the two reflect differences in management objectives; it is critical that park managers know the difference between them. State game agencies most often will manage for economic carrying capacity, while the National Park Service appropriately should manage for ecological carrying capacity. Population densities that would be considered to be overpopulations on non-park lands may be perfectly natural in a national park.

Managers also should recognize that reduction of population densities will result in increased productivity and survival, thus making control even more difficult. This is precisely the technique that is used to manage ungulate populations for maximum sustained yield. Therefore, controls such as hunting would be required indefinitely. Not only will control change the demography and dynamics of the ungulate population, but behavior and distribution also will be influenced.

Thus, in view of our incomplete understanding of natural regulation, any decision to hunt or control native populations should be critically scrutinized and based on specific scientific research. This research should focus on the mechanisms of population regulation for the species and population in question. Superficial analyses may suggest that surplus individuals should be removed, when in fact populations are simply at ecological carrying capacity. On the other hand, increased knowledge of natural regulation would allow early identification of man-caused

changes and permit timely implementation of management programs to either control or augment populations.

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