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Effects of wildlife management in national parks on its populations - Where to go?

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Introduction

Wildlife management, especially of wild ungulates, is a key aspect of national park management in Europe. The lack of natural densities of large carnivores in Austrian National Parks, leads to a substantial need for population control, as long as natural processes ought to be protected.

The interpretation of simulating natural population size limitations is very diverse in national parks throughout Europe and even within Austria. It ranges from a „no-control strategy“ to very intensive culling including the use of bait. However most of the national park administrations are striving for a 75% core zone where no management is operated. While this ”hands off” strategy suits perfectly for the management of more stationary parts of the ecosystem such as plants (e.g. zoning of phytosanitary management), it might not meet the demands of protecting wild ungulate populations from unnatural influence.

The wildlife management goals in national parks

The IUCN Guidelines

In the “Guidelines for Applying Protected Area Management Categories” published by the IUCN (DUDLEY 2008) we find a very clear definition on the goals in the various categories. For the category II, as all Austrian national parks are declared we find the following:

> *“Category II protected areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities.”*

With the primary objective:

> *“To protect natural biodiversity along with its underlying ecological structure and supporting environmental processes, and to promote education and recreation.”*

And other objectives (1-3 out of 6):

> *-To manage the area in order to perpetuate, in as natural a state as possible, representative examples of physiographic regions, biotic communities, genetic resources and unimpaired natural processes*
>
> *-To maintain viable and ecologically functional populations and assemblages of native species at densities sufficient to conserve ecosystem integrity and resilience in the long term*
>
> *-To contribute in particular to conservation of wide-ranging species, regional ecological processes and migration routes;*

What does this mean for a population of red deer

At first we need to define the natural processes that need to be protected, according to the IUCN guidelines.

Red deer are the largest herbivores, present in Austrian national parks, and are capable of influencing the vegetation composition (AMMER 1996; VAN HEES et al. 1996; SCOTT et al. 2000). A prominent example of the interaction between deer (in this case *Cervus canadensis*), vegetation and even other mammals like beavers is documented for the Yellowstone ecosystem (FORTIN et al. 2008). Thus it is important to know how the quantity and the quality of the ecological impact is shaped.

Environmental factors

It is widely accepted, that environmental factors influence the behavior of deer. This is mainly due to the quantitative and qualitative availability of forage (KUIJPER 2011).

In Austrian alpine national parks these environmental factors can be considered as “natural” during summer months, whereas in winter artificial feed is provided in summer habitat, thus prohibiting seasonal migration. The seasonal migration is a natural behavior. Even if winter habitats are not available, the widely used strategy of well distributed artificial feeding sites, does not meet the objectives of a national park.

Predation

In northern ecosystems large predators limit the densities of herbivores (RIPPLE & BESCHTA 2012), although this effect varies with the productivity of the ecosystem (MELIS et al. 2009). Also the combination of large predators

has different effects on its prey species compared to situations where species of predators are missing (RIPPLE & BESCHTA 2012).

Austrian national parks lack the existence of large carnivore species inventory in sufficient densities, necessary to keep up the natural process of limiting the numbers of wild ungulates. Every national park in Austria controls the population of red deer (where the species is present) artificially, because overpopulation is expected to cause various problems (ANONYMUS 2011).

The density of ungulates alone is not the only factor influencing their impact on vegetation. Indirect effects of predation are key drivers of the spatio-temporal behavior in many prey species (BUSKIRK et al. 2002; SCHMITZ et al. 1997) by creating a "landscape of fear" (LAUNDRÉ et al. 2010). In response to this, prey species alter their behavior and thus their impact on the vegetation changes.

The "landscape of fear" is widely ignored as a key natural process in our ecosystems. Without anti-predation behavior, ungulate species are kept in a system that is far from being natural.

For protecting the natural processes in national parks without predators, the question is not if population control is maintained, but rather how it is done (CROMSIGT et al. 2013).

Regular hunting is a very poor substitute for imitating the "landscape of fear" normally created by large carnivores (PROFFITT et al. 2009) and contains great risks to the objectives of the national parks. Human hunters can select by unnatural behavioral criteria (MILNER et al. 2007) or have negative genetic effects (COLTMAN et al. 2003).

Conclusion

The future challenge for national park administrations will be to set up a high quality program to ensure the natural process of predation, as long as there are not enough natural predators present. Wildlife managers in national parks should be strongly encouraged to keep an eye on how population control is carried out in their areas regarding the objectives of the IUCN category.

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