A Comparison of Wildlife Management in Mid-size Parks in South Africa and the United States

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Introduction

In many parts of the world, national parks are the last remaining wild areas and the best hope for conserving native wildlife and natural processes. This is true in the United States and in South Africa, where both countries are viewed as leaders in wildlife conservation. However, both countries face similar threats and issues when attempting to conserve native grassland wildlife, especially large fauna. For example, many native grassland ungulates historically traveled great distances in response to changing environmental conditions, yet landscape fragmentation and societal concerns (e.g., impacts on cropland) now prevent large-scale movements. Hence, parks in both countries often use fences to constrain large animals. These fenced areas are often less than 100,000 acres and isolated within agrarian landscapes. Despite these similarities, there are striking differences in management approaches. We compare large-fauna management in national parks in the Northern Great Plains of the United States with similar parks and protected areas in South Africa. Such a comparison can improve agency effectiveness and wildlife conservation by inspiring management actions and policies currently outside of agency paradigms.

Policy

The U.S. National Park Service was established in 1916. The agency has a hierarchical organization with centralized planning and oversight. Agency-wide policy and management plans are produced approximately every 10 years, with the most recent document being completed in 2006 (National Park Service 2006). In contrast, SANParks is a comparatively young agency that is reinventing national oversight of parks in South Africa (SANParks 2006) since it took over from the old South Africa National Parks Board in the newly democratic South Africa.

At a national level, the agency mission statements and policy are very similar. Consider the mission statement for the U.S. National Park Service:

> … preserves unimpaired the natural and cultural resources and values … for the enjoyment, education, and inspiration of this and future generations.

Whereas the SANParks mission statement is:

> To acquire and manage a system of national parks that represents the indigenous wildlife, vegetation, landscapes and associated cultural assets … for the joy and benefit of *the nation.*

However, at the provincial level some noticeable differences are evident. Consider the mission statement of the Northwest Parks and Tourism Board in South Africa:

> To direct and develop the integration of tourism and nature conservation in a manner that uplifts the people of the province, by creating value where the mark would not intervene on its own.

The emphasis on ecotourism and revenue generation from park activities is more prevalent in South Africa than in the United States. South African national and provincial parks must be financially self-supporting due to the minimal amount of government appropriations in the face of social imperatives. In contrast, U.S. national parks are funded primarily through federal appropriations and therefore have little incentive to generate revenue for their own operations. Although there are economic benefits from the presence of parks in the United States, such benefits are typically viewed as indirect and not the primary reason for establishment of the site. In contrast, revenue generation and local economic development is a primary purpose for the creation of most new conservation areas in South Africa. The ecotourism model in South Africa has been so successful in generating revenue that there are many for-profit private conservancies. The laws, government oversight, and integration of these private conservancies varies among provinces; however, they are often operated similarly to the government-operated parks in that they strive to conserve native fauna in large part for the economic benefits. In this paper we collectively refer to these private, regional, and national conservation lands in South Africa as "parks." No comparable privately owned for-profit natural areas model exists in the United States (although some models are being cautiously explored and developed; see www.americanprairie.org).

Management

To better compare park management between the countries, we examined the presence and management of megafauna in a subset of parks from both countries. Specifically, we compared large animal abundance from three fenced parks in the Northern Great Plains of the United States (Badlands National Park, Theodore Roosevelt National Park, and Wind Cave National Park) to 10 fenced parks (public and private) of comparable size (8,600–220,000 acres) and habitat (grassland–savannah parks) from various regions in South Africa.

The differences between parks within a country in terms of the diversity of large animals were minor compared to those between countries. For example, the three U.S. parks all supported 5–7 large fauna species, whereas the South African sites all supported 15–30 such species. Therefore, for illustrative purposes we will compare the representative 46,200-acre South Unit of Theodore Roosevelt National Park in North Dakota, United States (Table 1) to the 39,026-acre Kwandwe Conservancy (a privately owned site) in the Eastern Cape province of South Africa (Table 2).

One of the most striking and obvious differences between the two representative sites is the huge disparity in large animal abundance and biomass, with the slightly smaller South African unit supporting more than three times the abundance of the United States site (this disparity would be even greater except for the fact that elk abundance in Theodore Roosevelt National Park is currently well above desired levels due to the presence of chronic wasting

disease, which is precluding the removal of surplus elk). A small part of this difference may be due to the South African parks striving for wildlife abundance (for tourism value), whereas the United States parks tend to be more lightly grazed due to decades of concerns about overgrazing on most rangelands. However, the most likely reason for the great disparity in terms of megafauna abundance and biomass is that primary productivity is greater on the South African site, and therefore probably more comparable to the tallgrass region of the central United States, a region which has been effectively destroyed ecologically and which has no mid-size park units applicable to this study.

Common Name	Abundance
bison	310
horse	120
elk	900
mule deer	300
white-tailed deer	100
pronghorn	50
Total	*1,780*

Table 1. Large animals at Theodore Roosevelt National Park (South Unit: 46,200 acres), North Dakota, USA.

The second item of interest from Tables 1 and 2 is the disparity in large animal species richness between the two parks. This contrast is more difficult to explain, i.e., why should one grassland–savanna site have so much higher megafauna richness then another site on the other side of the world? The answer likely lies in the history of the sites. According to the "overkill" theory, when humans first came to North America shortly after the last ice age (about 20,000 years ago) they encountered a high diversity of large animals that roamed the plains of North America, which the human colonizers subsequently eliminated via over-hunting (Martin 2005). Whatever the cause, 20,000 years ago the Northern Great Plains of the United States had a megafauna richness comparable to that of modern-day South Africa.

The third item of interest from Tables 1 and 2 is the difference between the two sites in terms of the low end of the animal populations. This disparity is a reflection of the policies and operational differences of the two countries, and is a main point of this paper. In Theodore Roosevelt National Park (Table 1), all of the large animal populations consist of at least 50 individuals (however, only the bison are fully contained; all other animals have movements hindered by the fence, but regularly find openings). In contrast, several large animal populations at Kwande Conservancy consist of less than 50 individuals, and some have less than 20 individuals (in contrast to Theodore Roosevelt, the fence at Kwande effectively prevents escapes). The presence of very small populations of some megafauna occurs at all sites in South Africa. This is a deliberate management strategy in South Africa and applies to both large prey and large predators. Large charismatic species are supported, even if it must be at low numbers, to increase economic potential of reserves. Also, in some cases parks form part of a metapopulation of endangered species (e.g., wild dog and black rhinoceros) that contribute to the national conservation plan for such species. The presence of even small populations of certain species (e.g., lion and elephant) also conserves ecological processes.

The willingness to support very small populations of megafauna means that South African parks better meet the goals and policy of conserving native biological diversity and indigenous fauna, a goal common to both countries. Almost all of the South African sites reviewed as part of this study supported the full assemblage of native species, whereas none of the United States sites did. Of the over 270 national park units in the United States with

Common Name	Abundance
African buffalo	83
bushbuck	117
black wildebeest	173
brown hyena	17
cheetah	14
duiker	114
eland	128
elephant	35
gemsbuk/oryx	213
giraffe	47
red haartebeest	264
hippo	17
impala	396
kudu	1,900
leopard	7
lion	18
ostrich	50
mountain reedbuck	43
black rhinoceros	11
white rhinoceros	39
springbuck	530
steenbuck	73
warthog	1,050
wild dog	6
waterbuck	137
zebra	236
Total	*5,718*

Table 2. Large animals at Kwande Conservancy (39,026 acres). (Thanks to Angus-Sholto Douglas for providing these data.)

significant natural resources, less than 10 can claim to support all of the indigenous large fauna, and all of those are extremely large (e.g., Yellowstone National Park) or situated within or adjacent to large wildernesses and natural areas. The benefits that South African parks derive from having all of the native species present include ecological as well as human benefits (e.g., ecotourism).

The downside to having these very small populations present in a fenced park is that their existence necessitates a very hands-on approach to replenish extirpated populations, preserve genetic fitness, maintain desired sex and age ratios, and other needs. In South Africa, the numerous disjunct natural areas essentially manage their large wildlife species as subpopulations of larger multi-park metapopulations. If a park needs new animals due to local extirpation, genetic concerns, sex ratio imbalances, or other needs, they translocate animals between units. With the exception of imperiled species (e.g., wild dog: see Gusset et al. 2006) the implementation of this multi-park management approach is completed with minimal government oversight. In contrast, national parks in the United States have a high level of central planning and hierarchy, yet virtually no between-park exchanges of animals nor a metapopulation approach.

Some wildlife reintroductions in South Africa involve very few animals, but are remarkably successful. The Makalali Conservancy African lion population provides an excellent example. In 1994, a lioness and four cubs were introduced into the fenced 34,580-acre site (Druce et al. 2004). Since then, more than 30 lions have been produced, with many surplus individuals being translocated elsewhere. Throughout South Africa there are similar experiences where even small populations of predators within fenced sites adequately limit ungulate numbers, perform other ecosystem services, and survive for long periods. However, there are considerations when managing small populations in small closed systems. On small sites the margin for error is less, and even apparently minor changes can have profound effects. For example, a shift in the male:female sex ratio of lions can significantly impact predation rates of key species through prey switching or sex-specific targeting of particular species (Gus van Dyk, pers. comm.). For example, male lions attack valuable buffalo when in

large enough groups, whereas females target blue wildebeest. Similarly, the distribution of watering sites within small enclosed sites can alter prey selection by lions (Gus van Dyk, pers. comm.). Reintroduced packs of wild dogs have been observed using fences to help capture prey (van Dyk and Slotow 2003). With such small populations of both predator and prey, managers must closely monitor their actions and adapt where necessary. This hands-on approach has resulted in some notorious unforeseen consequences, such as occurred after the introduction of young bull elephants into Pilanesburg National Park, which, in the absence of older males, initiated musth earlier than expected and killed rhinoceros (Slotow et al. 2000). Yet in spite of these negative instances, the metapopulation approach is extremely successful in conserving the full assemblage of native species in small South African parks.

The presence of large predators such as lions does result in additional management costs. For example, sites in South Africa must gain permission from adjacent landowners before reintroducing lions, a predator-proof electric fence must be installed and maintained, there must be a comprehensive predator management plan in place, and there must be liability insurance in case of breakouts. However, these additional costs are typically more than offset by the increase ecotourism revenue generated by the presence of the predators. Although wolves have not been reintroduced into small parks in the United States, an increase in ecotourism associated with wolf reintroduction has been documented at Yellowstone National Park (Duffield et al. 2006).

At this time the U.S. National Park Service policies (National Park Service 2006) actually discourage the conservation of small populations, both predator and prey. The policies state that the agency will strive to restore extirpated native species when "[a]dequate habitat to support the species … exists … and, once a natural population level is achieved, the population can be self-perpetuating." The policies also clearly discourage the hands-on management needed to successfully implement a metapopulation approach as practiced in South Africa. Yet such an approach would undoubtedly have benefits in the United States.

The professional organization, The Wildlife Society, recognized the potential for reintroducing small numbers of wolves and managing them as a metapopulation when it stated that "if national parks and other protected areas cannot provide large enough areas for self-perpetuating populations of wolves, systematic and periodic reintroduction of wolves from outside may ensure population survival" (The Wildlife Society 1991:8).

The same paper stated that populations that are "ecologically functional" may be a more suitable goal in some cases than those that are "minimally viable." Ecological functions include prey population control, removal of unfit prey animals, modification of prey behavior, creation of carrion, and interspecific impacts that have a ripple effect through the system (Smith et al. 2003). Even small populations of wolves may have the potential to control exotic diseases such as chronic wasting disease (Margaret Wild, in prep.).

Documenting the causes for these different approaches between the two countries is beyond the scope of this paper. An easy speculation is that there are social and cultural differences that result in these differing strategies. However, other differences may be equally important. For example, many parks and conservancies in South Africa are much younger than the United States parks evaluated in this study. The establishment of these new sites, both public and private, creates a clean slate from which to propose bold new ideas. In some

cases these new reserves were developed by newly constituted staff, including innovative individuals with experience in other countries and agencies. Another significant causal factor is that South Africa wildlife must "pay their way." South African sites that support the "big five" (lion, leopard, elephant, buffalo, rhinoceros) are a greater draw than those that don't.

Summary

Although there are many similarities in how the two countries manage large grassland–savanna animals, there are also stark differences. The most significant difference in terms of wildlife management is that: (1) mid-size South African parks are more likely to support small populations that are not self-sustaining; (2) South African parks implement a more hands-on approach that includes the regular translocation of animals between parks using a meta-population approach; and (3) South African parks are more likely to support top-level predators for their ecological role and for increasing ecotourism and revenue. Park management in the two countries can benefit from understanding the other country's approaches. Furthermore, consistencies in research and management between the countries may lead to a better understanding of ecological principles and of anthropogenic effects such as climate change (Knapp et al. 2004).

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