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## Wildlife Conservation on the Rangelands of Eastern and Southern Africa: Past, Present, and Future<sup>☆</sup>

Jerry Holechek<sup>a,\*</sup>, Raul Valdez<sup>b</sup>

<sup>a</sup> Professor, Department of Animal and Range Sciences, New Mexico State University, Las Cruces, NM 88003, USA

<sup>b</sup> Professor Emeritus, Department of Fish, Wildlife and Conservation Ecology, New Mexico State University, Las Cruces, NM 88003, USA

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## ABSTRACT

Our objective was to assess the status of the large native rangeland mammals in the eastern and southern African countries focusing on conservation strategies that will benefit the animals, their rangeland habitats, and the people who live in this region. Eastern and southern African rangelands are renowned for supporting a globally unique diversity and abundance of large mammals. This wildlife legacy is threatened by changing demographics, increased poaching, habitat fragmentation, and global warming, but there are reasons for optimism. After sharp declines from 1970 to 1990 across Africa, wildlife populations in some countries have subsequently increased due to incentives involving sport hunting and ecotourism. National parks and protected areas, which have been critically important in maintaining African wildlife populations, are being increased and better protected. Over the past 50 years, the number of parks has been doubled and the areas of several parks have been expanded. The major problem is that no more than 20% of the national parks and reserves set aside for wildlife are adequately protected from poaching. The southern African countries where wildlife has recently thrived have robust hunting and ecotourism programs, which economically benefit private landowners. Considerable research shows rural communities dependent on rangelands can be incentivized to participate in large mammal conservation programs if they can economically benefit from wildlife tourism, sport hunting, and the legal sale of animal by-products. Community-based wildlife conservation programs can be economically and ecologically effective in sustaining and enhancing African wildlife biodiversity, including rhinos, elephants, and lions. Low-input ranching wild ungulates for meat and hunting may be an economically viable alternative to traditional range livestock production systems in some areas. However, in many situations, common-use grazing of livestock and wildlife will give the most efficient use of rangeland forages and landscapes while diversifying income and lowering risk.

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## Introduction

The countries of eastern and southern Africa are renowned for their diversity and abundance of wildlife, especially hoofed mammals, and large carnivores. Over the past 50 years, major changes have occurred in the status of wildlife populations in this region. The eastern (Kenya, Tanzania, Uganda) and southern African countries included here (Republic of South Africa—hereafter referred to as RSA, Botswana, Zambia, Zimbabwe, Namibia, Mozambique) are especially famous for the “big five” game animals (elephant [*Loxodonta africana*]; two species of rhinoceros, black [*Diceros bicornis*] and white [*Ceratotherium simum*]; leopard [*Panthera pardus*], lion [*Panthera leo*], and Cape buffalo [*Syncaerus*

*caffer*]). Several studies have recently become available on the status and conservation of wildlife, as well as the intricate relationships of people, wildlife, and rangelands in the eastern and southern African countries. However, articles reviewing this information are lacking. Our primary objectives are to assess the status of eastern and southern African wildlife populations and their rangeland habitats, focusing on the large mammals (especially the big five); discuss the importance of game parks and reserves; examine the roles of ecotourism and sport hunting in African wildlife conservation; and discuss management policies and strategies that can be implemented to conserve eastern and southern Africa's wildlife legacy and rangelands while also benefitting local ethnic communities. Our secondary objective is to identify important literature regarding wildlife conservation on rangelands in eastern and southern Africa.

## Historical Perspective

For hundreds of years before the 1800s, the peoples of eastern and southern Africa were primarily pastoralists who herded cattle in

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\* Correspondence: Jerry L. Holechek, Dept of Animal and Range Sciences, New Mexico State University, Las Cruces, NM 88003, USA. Tel.: +1-575-646-1649.

E-mail address: [holechek@nmsu.edu](mailto:holechek@nmsu.edu) (J. Holechek).

coexistence with wildlife. A somewhat harmonious balance existed, but it was disrupted when Europeans began to settle in the region in the early 1800s (Pearce, 2010). The key event changing this balance was rinderpest, a deadly cattle virus brought to the Horn of Africa in 1887 by an Italian expeditionary force with infected cattle from Asia. Rinderpest spread quickly from Eritrea to Ethiopia and then to other parts of Africa, killing cattle and hoofed wild animals in immense numbers (Normile, 2008; Pearce, 2010). Indirectly, it also devastated human populations because their livelihoods heavily depended on meat and milk from their cattle, which were also used as draft animals (Phoofolo, 1993; Pearce, 2010). Roughly between one third and two thirds of the people in eastern Africa died from a combination of rinderpest and drought in the early 1890s (Phoofolo, 1993; Pearce, 2010). Wildlife populations recovered much more quickly than human populations in the period following the rinderpest epidemic. The high wildlife abundance, but low human population that occurred in eastern and southern Africa in the early 1900s, was a historical aberration caused by rinderpest. The rinderpest epidemic was an important factor in the rapid colonization of eastern and southern Africa, as well as in the limited resistance from most ethnic societies. The tsetse fly, which carries a virus (trypanosomiasis) causing sleeping sickness among cattle and humans, was positively impacted by habitat changes that occurred in response to the decimation of livestock herds by rinderpest (Pearce, 2010). This further delayed recovery of human populations and livestock numbers after the rinderpest epidemic subsided, but wild animals benefitted because they have some immunity to trypanosomiasis. During the latter half of the 20th century, rinderpest across Africa was gradually brought under control through cattle vaccination programs with the last major African outbreak in the 1982–1984 period (Spinage, 2003; United Nations, 2015). The United Nations Food and Agriculture Organization declared rinderpest formally eradicated worldwide in 2011 (McNeil, 2011). We refer readers to Sinclair and Arcese (1995), du Toit (2003), Collins and Burns (2007), Carruthers (2008), Reid (2012), and Sinclair et al. (2015) for detailed discussions of the history of human and wildlife interactions in the eastern and southern African region. Rinderpest, tsetse flies, and other disease impacts on African wildlife, livestock, and human populations are discussed by Osofsky (2005), Matthiessen and Douthwaite (2009), and Pearce (2010).

#### *Colonial Settlement Period*

Ivory, precious metals, gems, and slaves were the initial motivations for European countries (especially Great Britain) to explore and then colonize the eastern and southern Africa regions. The development of the steamship in the early 1800s greatly facilitated travel, trade, exploration, and colonization in the region. The early colonial era began in the 1830s, with initial settlements on coastal areas, followed by interior settlements after exploration, mostly by British explorers such as David Livingstone (1813–1873) (Jeal, 2001). Rapid settlement of interior eastern Africa began in 1903 with the construction of a railroad from the Kenya coast at Mombasa with termination at Kisumu on Lake Victoria in Uganda (Mwaruvie, 2006).

#### *African Big Game Hunting Era*

The abundance and diversity of wildlife was an important factor in attracting European settlers into the eastern and southern Africa region in the late 1800s. Several fortunes from ivory were made by European elephant hunters in the 1880–1915 period (Hunter, 1954; MacKenzie, 1988; Adams, 2004). Around 1910, abundant game animals in combination with more efficient sea and rail transportation initiated the colorful and romantic era of the African hunting safari led by a “white hunter” most associated with Kenya, Tanzania, and Uganda (Hunter, 1954; Herne, 1999; Balfour and Balfour, 2001; Adams, 2004). The famous East African hunting trip of Theodore Roosevelt in 1909 created a safari craze among wealthy sportsmen in Europe and the United States. In that

era, African big game hunting was viewed as a highly fashionable aristocratic activity involving courage, stamina, skill with firearms, and sportsmanship (Hunter, 1954; Bonner, 1993; Herne, 1999). After World War I, the popularity of the eastern African hunting safari escalated due to the financial boom in the 1920s, improvements in transportation (the automobile), and communication infrastructure. The British government strongly supported safari hunting because it reduced the high populations of large dangerous animals that were an impediment to agricultural development and generated income through the sale of hunting licenses (Hunter, 1954). Safari hunting in Kenya reached its peak around 1963 when Kenya gained independence from Great Britain. In the early 1960s, Kenya still had abundant wildlife populations, infrastructure development had made prime hunting areas easily accessible, international airplane transportation facilitated travel, the United States had a booming economy, movies had romanticized the safari, and hunting was a favorite sport of some legendary American movie actors. Safari hunting suffered a setback in 1973 when Kenya banned elephant hunting followed with a ban on all big game hunting in 1977. However, it has continued into the present in several African countries, although it is no longer possible to take all the big five on a single hunt (Lindsey et al. 2007). We note the 1977 big game hunting ban in Kenya was primarily in response to rampant elephant and rhino poaching, coupled with pressure on Kenya from international animal welfare organizations rather than excessive legal sport hunting (Herne, 1999; Pack et al. 2013). As an example, in 1972 Kenya issued only 19–34 rhino hunting permits, but over 1 000 rhino horns were imported into Hong Kong from Kenya (Herne, 1999).

#### *Wildlife Decline and Partial Recovery*

Starting in the late 1960s, a combination of factors caused rapid declines in wildlife populations in several eastern and southern Africa countries. These factors involved, most importantly, escalated poaching but also a rapid human population increase, habitat loss and fragmentation, poorly regulated hunting, lack of wildlife protection in national parks, and civil wars in countries such as Mozambique and Uganda (Herne, 1999; Adams, 2004; Lindsey et al. 2007; Carruthers, 2008; Pack et al. 2013). Across Africa since 1970, a roughly 60% decline has occurred in large mammal populations on protected areas based on a study by Craigie et al. (2010). However, wildlife population trends varied greatly by region and country. On the basis of various estimates during the 1970s and 1980s, large high-value animals such as elephants, lions, and rhinos in Kenya decreased by 70% or more outside of national parks and declines near 40–70% occurred inside national parks (Norton-Griffiths, 2007; Nelson et al. 2009; Western et al. 2009; Ogutu et al. 2011; Martin, 2012, 2014). We have focused on Kenya because of its high popularity for safaris and the lack of quantitative data on wildlife trends in the 1970s and 1980s for other countries. However, we note Tanzania also experienced major wildlife population declines due to poaching in the 1970s and suspended hunting for some animals for a brief period (Pack et al. 2013).

Although excessive sport hunting and habitat loss are commonly blamed as major causes for the sharp declines in African wildlife populations in the 1980s and 1990s, the major problem was actually poaching (Herne, 1999; Pack et al. 2013). The number of animals legally taken by sport hunting in this period appears to be well under 10% of those taken by poachers and was generally at sustainable levels (Herne, 1999; Coogan, 2012; Pack et al. 2013). The amount of habitat that potentially could be occupied by the big five across Africa was still high through the 1980s. However, rapidly expanding globalization, government corruption, lack of funds for wildlife law enforcement, and inadequate international laws governing the rhino horn and ivory trade led to a severe poaching crisis (Herne, 1999; Coogan, 2012; Pack et al. 2013). Elephant population declines in Kenya actually accelerated in the 1974–1976 period (45% loss) following the 1973 sport hunting ban (Coogan, 2012; Pack et al. 2013). The hunting ban appears to have

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