

# Filling Elephant-sized Gaps

Dr George Chirima and Dr Tony Swemmer - SAEON Ndlovu Node

Throughout the protected areas of southern and eastern Africa, elephant populations continue to grow, trees continue to fall and managers and scientists continue to argue. The so-called “elephant debate” began decades ago, as the impact of elephants on the vegetation of game reserves and national parks started becoming visible to managers, tourists and scientists.

In a recent article in SAEON eNews, “Mom, I want to be an ecosystem engineer”, SAEON’s Observation Science Specialist, Prof Tim O’Connor describes how his long-term research in a private game reserve provides direct evidence of how a relatively low density of elephants is transforming a woodland into a shrubland, and may eliminate a number of tree species from the protected area.

While not as detailed, other studies and observations indicate similar transformations for much larger protected areas, such as the Kruger National Park, Chobe Game Reserve, Hwange National Park and Amboseli National Park.



Image: Courtesy Wikimedia Commons

Is this information adequate to initiate large-scale management interventions to stop the growth of elephant populations over much of Africa? This is not a trivial, “bunny hugger” concern given the extent of land that falls within protected areas containing elephants, the invaluable contribution of these areas for the continuation of ecosystem services and much of Africa’s remaining biodiversity, and the potential for elephants to dramatically alter the nature of these ecosystems.

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“The last point is the critical one.

While it is clear that elephants can and are changing the structure of ecosystems by breaking, pushing and uprooting trees, it is not clear what the long-term consequences of such changes will be for the thousands of other species that inhabit these ecosystems. If elephants transform a tall savanna to a short savanna, or a woodland to a shrubland, or bushveld to grassland, will this result in a net loss of biodiversity in the long term?"

Considering that the conservation of biodiversity is the primary mandate of protected areas, this is a key question in the elephant debate. Unfortunately, very little scientific evidence is available to answer this question. Despite decades of research and an imposing bibliography on elephant ecology, it is a question that continues to boggle the minds of scientists and managers alike.

Dr George Chirima, a scientist at the SAEON Ndlovu Node has begun synthesising previous research on the impacts of elephant on biodiversity, with over 300 published and non-published articles on this topic located to date. Most, if not all publications have underscored the need for more real data in order to generalise impacts on other species resulting from elephant foraging. A small fraction of this published work spanned more than five years, and comparisons between findings from different areas have been inconsistent, not quantitative and not exhaustive enough to draw meaningful generalisations.

How other components of biodiversity including birds, insects, reptiles, small mammals and herbaceous plants respond to elephant impacts remains largely speculative, or entirely unknown. What is clear is that long-term research spanning different ecosystems and covering a range of soils and climates, is needed to produce reliable data, and ultimately consensus amongst the leading experts and managers.

The SAEON Ndlovu Node will be contributing to filling this knowledge gap with a new project aimed at determining the effects of elephants on many aspects of biodiversity, over and above tree structure and species diversity. This new project will make use of the Node's network of tree monitoring sites established by Node Manager Dr Tony Swemmer over the past few years, which includes some sites in protected areas with no elephants, and some with elephants.

The Node will also be working with Kruger National Park scientists, particularly Dr Sam Ferreira to exploit existing elephant enclosures as additional study sites. These enclosures consist of blocks of some 50 ha with electrified fencing that keeps out elephants, but allows smaller herbivores to move freely in and out. This provides a valuable research tool for disentangling the impacts of elephants from those of other herbivores. Partnerships with private game reserves bordering the Kruger National Park have allowed for control sites to be established in protected areas with no elephants. Variables to be measured include not only local impacts on various types of biodiversity over a time-scale of years or a decade, but also those that relate to ecological processes that will improve models and predictions of future changes.

