

# ELEPHANT

MANAGEMENT



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# ELEPHANT MANAGEMENT

**A Scientific Assessment for South Africa**

Edited by R J Scholes and K G Mennell



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## FOREWORD



SOUTH AFRICA and its people are blessed with diverse and thriving wildlife. We are also a developing economy with a growing population. From these facts emerges the particular situation of having most of our protected areas surrounded by land that has been transformed, to a greater or lesser extent, by human development. Large mammals, such as elephants, no longer roam the entire landscape, and their populations are no longer completely governed by the laws of nature. Protecting elephants and the ecological systems in which they exist in a practical and sustainable way that balances the needs of humans, elephants and the environment is a challenge to which I am committed.

This Assessment was undertaken to reduce the degree of scientific uncertainty associated with decisions that must be made very soon and in the medium-to-long term. It helps to evaluate the costs and benefits associated with each choice, both in economic and ecological terms, and clarifies the legal framework within which they must be made. Collectively the chapters in this report reveal the many successes our country's experts, in collaboration with their peers in neighbouring countries and abroad, have achieved in understanding elephants and their needs, in fields as diverse as veterinary science, ecology, animal behaviour, population and resource modelling. Importantly, the Assessment exposes important gaps in our understanding and thus outlines necessary future avenues of research. This Assessment represents a key milestone in an ongoing Elephant Research Programme.

Science does not provide all the information required to resolve the difficult issues raised by the management of elephant in a changing and human-dominated world. Many of the required decisions have a strong element of human values implicit in them. How do South Africans wish to treat the other species with which they share our land? Extensive consultation and careful consideration of the values expressed by a wide range of stakeholders is also an essential part of the process of managing elephant in a democratic country. I am grateful to the many experts and interested persons who invested their time, experience and intellect to deliver this Assessment. I look forward to their continued engagement on the issue of elephant management, which is of great interest to many.

**Marthinus van Schalkwyk**

**Minister of Environmental Affairs and Tourism, 2008**



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**Jay Kirkpatrick** is Director of the Science and Conservation Center at ZooMontana, in Billings, Montana. For the past 34 years he has carried out research on fertility control for wild horses and other wildlife, for the purpose of developing non-lethal and humane methods of controlling wildlife populations, and on non-capture methods for studying reproduction in free-ranging wildlife species through the use of urinary and fecal steroid hormones.

**Laurence Kruger** is director of the Organization for Tropical Studies, South Africa, whose 'study abroad' programme is based in the Kruger National Park. His key interest in ecology is how plant species and communities respond to disturbance in the form of fire, herbivores, and the interaction between the two.

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**Keith Lindsay** joined the Amboseli Elephant Research Project in Kenya in 1977. His continuing research focuses on feeding ecology, habitat interactions, demography and ecosystem change.

**Dr Rob Little** is Conservation Director at WWF South Africa. He is leader of the WWF-SA Species Programme and a member of the global WWF Species Working Group. He is also the WWF-SA representative on the IUCN Species Survival Commission. Since October 2006, he has been Chairman for the Elephant Management & Owners Association (EMOA).

**H P P (Hennie) Lötter** is a professor of Philosophy at the University of Johannesburg. He specialises in political philosophy and environmental ethics.

**Robin L Mackey** is a lecturer in the School of Biological and Conservation Sciences at the University of KwaZulu-Natal. While recently she has focused on elephant population growth and management and other conservation studies, she is best known for her theoretical work on species diversity-disturbance relationships.

**Johan Malan** is an Operations Manager at Veterinary Wildlife Services with South African National Parks, based in the Kruger National Park. He has spent

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**Kathleen G Mennell** obtained her Honours in Ecology and Conservation from the University of the Witwatersrand. She is currently a Masters student within the Council for Scientific and Industrial Research.

**Pieter Olivier** is currently a master's student at the Conservation Ecology Research Unit in the Department of Zoology and Entomology, University of Pretoria. His research focuses on metapopulation dynamics in large mammals with the emphasis on the restoration of spatial axis to regain spatial-temporal dynamics to withstand extinctions and overcome local impacts on other species.

**Theresia Ott** studied at the Nelson Mandela Metropolitan University and completed a master's study at the University of Pretoria. She is a Ph.D. student at CERU, studying elephant movements in a landscape ecology context.

**Norman Owen-Smith** is Research Professor in African Ecology at the University of the Witwatersrand. He obtained his Ph.D. for a study on the behavioural ecology of the white rhinoceros conducted in the Hluhluwe-iMfolozi Park in South Africa. His book, *Mega herbivores*, generalises his findings for other very large mammals including elephants. He has supervised studies on the vegetation impacts of elephants in Kruger Park and northern Botswana.

**Bruce Page** has worked on the relationship between elephants and their habitats over the past 32 years in many localities in southern Africa. His primary research interest is an understanding of how elephant populations are regulated and how they influence the composition and dynamics of the systems in which they occur.

**Mike JS Peel** is Senior Researcher at the Agricultural Research Council – Livestock Business Division (Range and Forage). He is project leader of the Savanna Ecosystem Dynamics Project, which investigates the potential of the

natural resources of the Savanna Biome to contribute to the economy and development of the southern African sub-region.

**Michele Pickover** is Curator of Manuscripts: Historical Papers at the library of the University of the Witwatersrand. She is also a Board Member for the South African History Archives and Chairperson of the National Committee of the South African Society of Archivists. She is the author of the book *Animal Rights in South Africa* and a trustee and spokesperson of the organisation Animal Rights Africa.

**Mogobe Ramose** is Professor of Philosophy in the University of South Africa. He is currently Director of the University of South Africa Regional Learning Center in Ethiopia. His publications include the book, *African Philosophy through Ubuntu*.

**Jeremy Ridl** is an attorney and environmental law specialist having founded the first specialist environmental law practice in South Africa in 1990. He served as an associate professor and director of the Institute of Environmental Law at the University of KwaZulu-Natal before returning to full-time practice in 2006. Much of his professional time is devoted to environmental activism and the protection of environmental rights in rural communities.

**Robert J (Bob) Scholes** is a systems ecologist employed by the South African Council for Scientific and Industrial Research. He is an expert on the ecology of African savannas, and has been involved in several international scientific assessments, including the Millennium Ecosystem Assessment. He is a member of the South African National Parks Board.

**Rob Slotow** is Director of the Amarula Elephant Research Programme at the University of KwaZulu-Natal, Durban, which aims to contribute to conservation of the African elephant through research directed towards management of elephants in wild areas in South Africa and beyond.

**Izak Smit** is currently employed by the South African National Parks as Research Manager: GIS and Remote Sensing. His main interests revolve around the use of GIS and satellite remote sensing for detecting spatio-temporal patterns which may be of relevance to the effective management of conservation areas.

**Morgan Trimble** is an MSc student with CERU at the University of Pretoria. Her research interests include large mammal population ecology and conservation.

**Wayne Twine** is an ecologist who does research at the human-environment interface in rural areas of the former homelands of South Africa. He is based at the Wits Rural Facility in the central lowveld, where he manages a research programme for the School of Animal, Plant and Environmental Sciences, University of the Witwatersrand.

**Rudi J van Aarde**, Director of the Conservation Ecology Research Unit (CERU), focuses on the restoration of populations and communities as a contribution to conservation. At present, CERU's research on elephants covers populations in Botswana, Malawi, Mozambique, Namibia, South Africa, Zambia and Zimbabwe.

**JJ van Altna** served for seven years in the Kruger National Park during which he was involved with the game capture department and elephant contraception research project. Presently a partner in Catchco Africa, he continues to perform the capture, introduction, and management of wildlife species throughout southern Africa and the immunocontraception of African elephants in many private reserves.

**Marius van Staden** was admitted as an attorney in 1991. He takes a keen interest in nature conservation and environmental law. His client base includes South African National Parks. One of the environmental law matters he was involved in was decided by the Constitutional Court.

**Ian Whyte** was involved in the research environment in Kruger National Park for 37 years of which 24 were as co-ordinator of elephant research. He has been a member of the IUCN's Species Survival Commission - African Elephant Specialist Group since 1992.

# LIST OF REVIEWERS

Special acknowledgement and thanks to David Cumming, Holly Dublin and Brian Huntley who each undertook the important role of Review Editor for this Assessment. They supervised the extensive review process and saw that it was conducted in a balanced manner by ensuring that all comments generated were responded to in a consistent and justified manner.

Acknowledgement and thanks to the following people who contributed to this Assessment through the peer and stakeholder review processes and the review of the Summary for Policymakers:

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Joubert, Salomon	Von Maltitz, Graham
Knight, Mike	Voster, Shaun
Kruger, Judith	

## ACRONYMS AND ABBREVIATIONS

<b>AENP</b>	Addo Elephant National Park
<b>AFESG</b>	African Elephant Specialist Group
<b>AM</b>	Adaptive Management
<b>APNR</b>	Associated Private Nature Reserves
<b>ASF</b>	African swine fever
<b>ASIS</b>	Assateague Island National Seashore
<b>BCFR</b>	Budongo Central Forest Reserve
<b>BNR</b>	Balule Nature Reserve
<b>BP</b>	Years before present. As a convention, 1950 is the year from which BP dates are calculated
<b>BTB</b>	Bovine tuberculosis
<b>BWMA</b>	Botswana Wildlife Management Association
<b>CBNRM</b>	Community-based natural resource management
<b>CITES</b>	The Convention on International Trade in Endangered Species of Wild Fauna and Flora
<b>CONNEPP</b>	Consultative National Environmental Policy Process
<b>CoP</b>	Conference of Parties
<b>CWI</b>	Care for the Wild International
<b>DEAT</b>	Department of Environmental Affairs and Tourism
<b>EE2</b>	Ethinyl oestradiol
<b>EIA</b>	Environmental impact assessment
<b>EKZNW</b>	Ezemvelo KwaZulu Natal Wildlife
<b>EL</b>	Environmental loading
<b>ENSO</b>	El Niño-Southern-Oscillation
<b>ESSA</b>	Ethics Society of South Africa
<b>EZP</b>	elephant zona pellucida
<b>FMA</b>	Freund's Modified Adjuvant
<b>FMD</b>	Foot-and-mouth disease
<b>FSH</b>	Follicle stimulating hormone
<b>GLTP</b>	Great Limpopo Transfrontier Park
<b>GMPGR</b>	Greater Makalali Private Game Reserve
<b>GNI</b>	Gross national income
<b>GnRH</b>	Gonadotropin Releasing Hormone
<b>HEC</b>	Human–elephant conflict
<b>ICI</b>	Intercalving interval
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>IUCN</b>	International Union for Conservation of Nature and Natural Resources, or World Conservation Union
<b>KLH</b>	keyhole limpet haemocyanin
<b>KNP</b>	Kruger National Park
<b>KY</b>	Thousands of years ago

<b>LFI</b>	Landscape Functionality Index
<b>LH</b>	Luteinising hormone
<b>LSTCA</b>	Limpopo–Shashe Transfrontier Conservation Area
<b>LTCA</b>	Lubombo Transfrontier Conservation Area
<b>MA</b>	Millennium Ecosystem Assessment
<b>MFPN</b>	Murchison Falls National Park North
<b>MFPS</b>	Murchison Falls National Park South
<b>MK</b>	Mokomasi Game Reserve
<b>MTP</b>	D, L-lactide
<b>MY</b>	Millions of years ago
<b>N&amp;S</b>	Norms and Standards
<b>NDVI</b>	Normalised Difference Vegetation Index
<b>NEMA</b>	National Environmental Management Act of 1998
<b>NEMBA</b>	National Environmental Management: Biodiversity Act 10 of 2004
<b>NEMPAA</b>	National Environmental Management: Protected Areas Act 57 of 2003
<b>NGO</b>	Non-governmental Organisation
<b>NNI</b>	Net national income
<b>NP</b>	National Park
<b>OH&amp;S</b>	Occupational health and safety
<b>OIE</b>	World Organisation for Animal Health
<b>PES</b>	Payments for ecosystem goods and services
<b>PTSD</b>	Post-traumatic Stress Disorder
<b>pZP</b>	Porcine zona pellucida
<b>SANBI</b>	South African National Biodiversity Institute
<b>SANParks</b>	South African National Parks
<b>SRT</b>	Scientific Round Table
<b>SSC</b>	The IUCN Species Survival Commission
<b>TEV</b>	Total Economic Value
<b>TFCA</b>	Transfrontier Conservation Area
<b>TNP</b>	Tsavo National Park
<b>TP</b>	Testosterone propionate
<b>TPC</b>	Thresholds of Potential Concern
<b>TPNR</b>	Timbavati Private Nature Reserve
<b>VOC</b>	Dutch East India Company
<b>WTP</b>	Willingness to pay

# PREFACE

Kathleen G Mennell and Robert J Scholes

**A**S A CONSEQUENCE of the rising number of elephants in protected areas<sup>1</sup> in South Africa, the ecosystems that contain elephants and the people that live adjacent to elephant populations are perceived to be coming under increasing threat. The control of elephant populations by culling has been under a moratorium since the mid-1990s. Attempts to resolve differences of opinion between the authorities responsible for elephant management in the country, private elephant owners, animal rights and biodiversity conservation organisations in South Africa and abroad, and representatives of local communities, have to date not led to a widely agreed future course of action. In 2006, the Minister for Environment Affairs and Tourism convened a Science Round Table to advise on the issue. The Round Table recommended that a Scientific Assessment of Elephant Management be undertaken.

This book is the result of that Assessment, undertaken during 2007, on the authority of the Minister. The Assessment is the first activity in a proposed elephant research programme, which aims to reduce the uncertainties regarding the consequences of various elephant management strategies. The purpose of this Assessment is to:

- document what is known, unknown, and disputed on the topic of elephant–ecosystem–human interactions in South Africa
- synthesise and communicate the information in such a way that decision making and the reaching of social consensus is facilitated.

Note that the Assessment itself does not constitute policy at any level, although it is hoped that it is relevant to the process of policy making at all levels, from the individual protected area through provincial, local, national, regional and international policy.

The Assessment of South African Elephant Management focuses on the interactions between elephants, humans and the ecosystems in which they occur and, in particular, on the possible way elephants could be managed based on their ecology, biology and social significance.

The Assessment addresses more-or-less wild elephants of the species *Loxodonta africana*, in South Africa. Some of these elephant populations are shared with neighbouring countries. Elephants in captive environments, as defined by the Norms and Standards (DEAT, 2008), are not discussed – that is,

elephants that require intensive human intervention in the form of food, water, artificial housing and veterinary care, and which are kept in an area of less than 2000 ha designed to prevent escape.

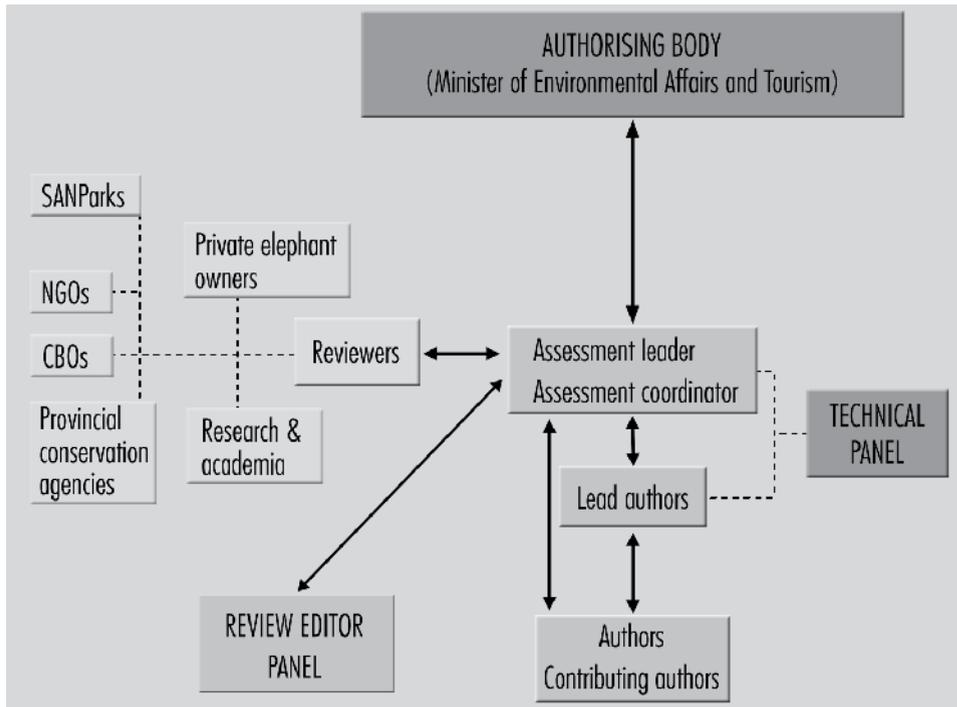
The Assessment is largely based on information in the peer-reviewed scientific literature, along with associated datasets and models. The Assessment has drawn on material from outside of South Africa where it is relevant to the task. Where non-peer reviewed studies were deemed important, this Assessment itself constitutes the peer-review process. Cited documents that are not easily accessible (i.e. in the 'grey literature') have been placed in the public domain by submitting a copy to the IUCN Elephant Specialist Group library in Nairobi. The Assessment did not aim to generate new primary knowledge but instead sought to add value to existing information by collating, summarising, interpreting, and communicating it in a form that would be useful to decision makers. An important feature of an assessment like this one is the explicit use of expert judgement to evaluate the state of existing knowledge.

This volume has four main sections and an overarching Summary for policymakers:

- What background information is necessary to understand the situation, and what are the current trends in elephant-containing ecosystems? (Chapters 1-4)
- What tools have been developed to manage the growth of elephant populations? (Chapters 5-8)
- What are the ethical, economic and legal issues regarding elephants and elephant-containing ecosystems? (Chapters 9-11)
- What management systems can assist in the responsible management of elephant-containing ecosystems? (Chapter 12)

The Assessment is driven by the issues underlying the management of elephants and not by representation of all elephant-containing areas in South Africa. Given the long history of the Kruger National Park, case histories, decisions and actions from the park are often employed as examples to illustrate various principles. These examples are well documented and have similar parallels in other parks.

A 14-member Technical Board comprising the lead authors, the Assessment leader and the Assessment coordinator were responsible for driving and directing the process (figure 1).

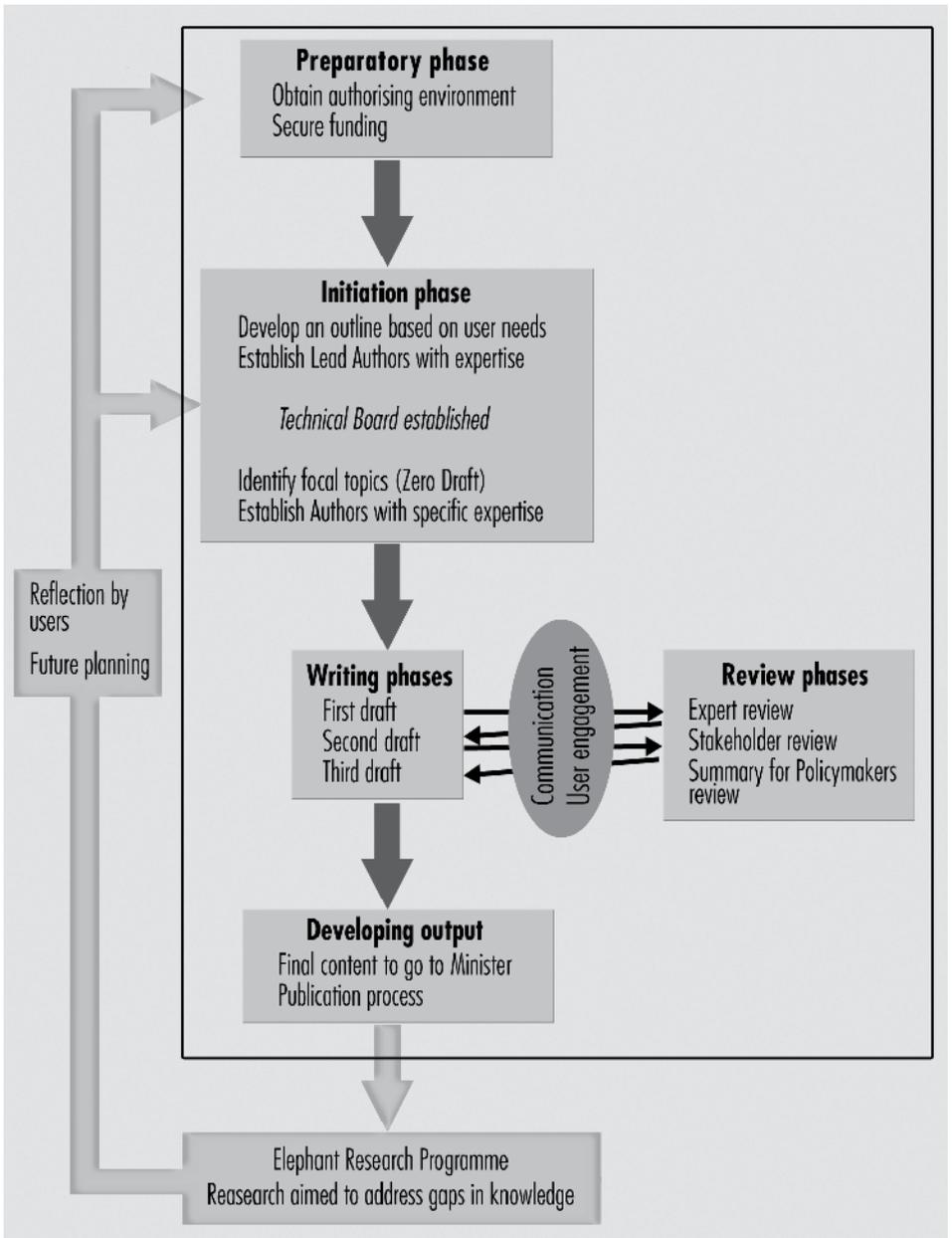


**Figure 1:** Overview of Assessment role players

Approximately 62 experts were involved as authors and members of the Review Editor Panel. The Assessment underwent two rounds of open review, first by experts who commented on the technical accuracy of the content and secondly by stakeholders who ensured that all issues were addressed adequately and in a balanced fashion (figure 2).

Review comments were received from 73 individuals, of which 21 were submitted by authors of other chapters. Reviewers represented the national and provincial conservation authorities, provincial parks, private managers and owners, conservancies, NGOs, animal welfare groups, academics and individuals involved in the private sector.

By identifying gaps in data and information that prevent policy-relevant questions from being answered, the Assessment can help to guide future elephant research and monitoring that may allow the questions that remain inadequately addressed to be answered in future assessments.



**Figure 2:** Schematic of the Assessment process and post-Assessment activities. This Assessment is not an isolated process; future research, feedback and suggestions will determine future assessment structure and goals. The iterative review process contributes to the credibility, clarity and balance of the Assessment findings and to the communication with users. The final Assessment findings are communicated to intended users and a wider audience

## **ENDNOTE**

- 1 The phrase ‘protected area’ will be used throughout this Assessment as shorthand for areas whose main purpose is the conservation of biodiversity of the legal status or ownership of the land. This includes National Parks, Provincial and Local Government Nature and Game Reserves, and a variety of formal and informal arrangements on private or communally owned land.



