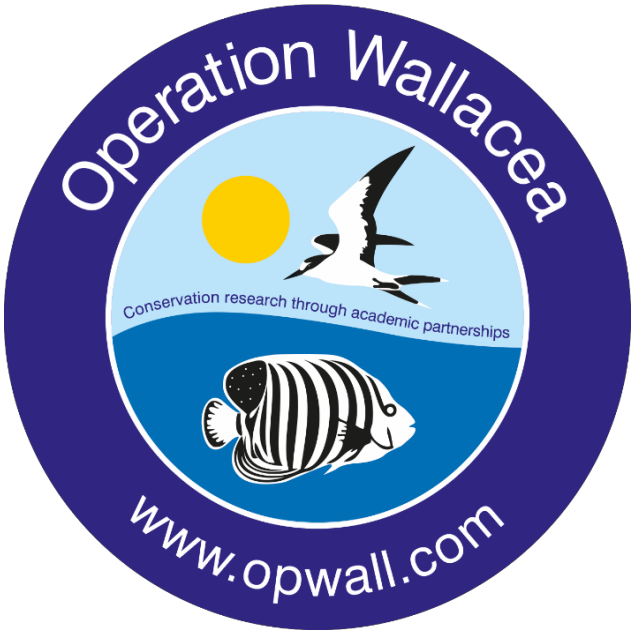


# South Africa Schools Booklet 2020

## Masebe & Dinokeng

# Contents

# 1. Study Area & Overall Research Aims

South Africa is the best place in the world if you want to learn about how to make wildlife conservation work financially. Income from game management and ecotourism revenue has meant that there is an ever-expanding network of game reserves that also benefit much other wildlife besides the game species. For the 2020 season there is the choice of options for school groups. This booklet will focus on the expedition involving one week undertaking wilderness training in Masebe Nature Reserve and one week helping with research in the high-veld reserve of Dinokeng. Note there are other sites on the map of research sites in South Africa (Figure 1) where university students are helping with related studies in other reserves.

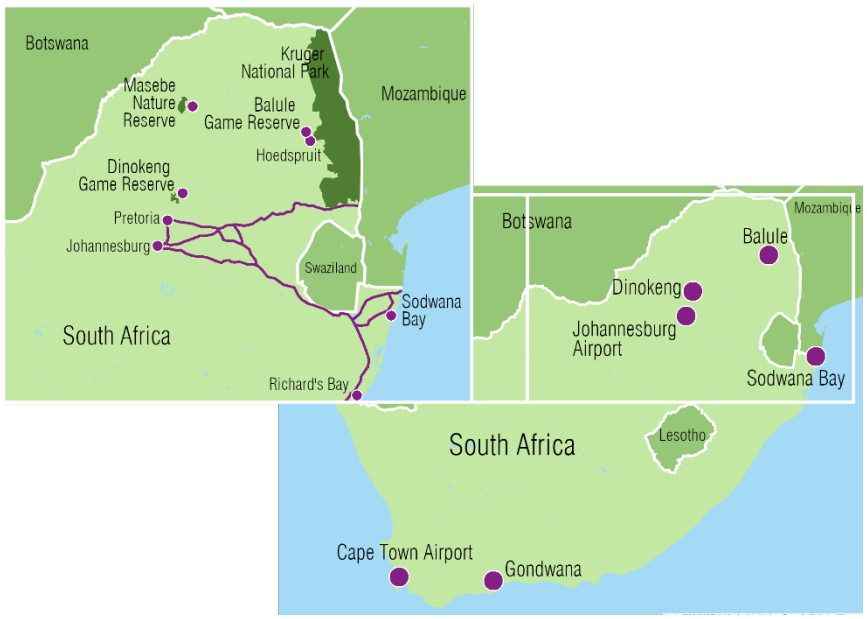


Figure 1. Location of the terrestrial sites – Balule, Dinokeng, Gondwana and Masebe Reserves - and the marine camp – Sodwana Bay.

The terrestrial sites offer slightly different insights into African conservation as they were all developed in slightly different ways leading to different management challenges. Dinokeng Game Reserve was formed through the donation of land from multiple small and large landowners in the area, many of whom still live within the reserve in fenced homesteads. The animals can roam freely around the individual properties within the reserve, which means the reserve offers a novel model for future South African conservation.

Balule Reserve is an example of where private landowners adjacent to an existing successful National Park (Kruger National Park) have dropped their fences to allow animals to move freely between these areas. This gives an extended range for the animals, but also enhances the tourism value of the privately-owned reserves. Gondwana Reserve is an example of where adjacent cattle and game ranchers put together a potential reserve, fenced it and introduced game. Funding comes from setting aside 2 X 50ha areas within the reserve where individuals can buy a 1ha plot, build a house/lodge for their own use and have traversing rights across the whole reserve.

Given all this investment in wildlife management in enclosed reserves in South Africa, a whole series of management practices have grown up on which decisions are made. Some of these approaches seem to be making assumptions that are not borne out in practice. Examples include:

- Fynbos vegetation has zero carrying capacity for herbivores.
- Setting stocking rates for herbivores based on look-up tables linked to rainfall levels or using a computer programme to calculate amount of foliage based on standard tree shapes, gives accurate stocking levels. In practice developing techniques to measure the amount of foliage available for browsers for individual reserves may give more accurate data.
- Elephants damage vegetation and massively reduce the availability of forage for other species so should be stocked at no more than 0.35 animals per $km^2$. In practice, they may keep the savannah from converting to woodland where most of the forage is then out of reach of the other herbivores and by knocking over trees make additional forage available to those species only feeding below 2m height.
- Direct counts by helicopter are necessary to get accurate counts of game numbers, whereas DISTANCE based transect surveys provide a much more cost-effective method and allow species that cannot be counted from the air, such as Nyala, to also be estimated.

The overall objective of the Opwall surveys in South Africa, which are run in conjunction with WEI, is to develop a manual of best practices for wildlife conservation reserve managers based on the latest scientific data and the results of some of these research projects across the high veld, low veld and fynbos vegetation communities.

## 2. Itinerary

This expedition will start with one week in Masebe Nature Reserve in the Limpopo Valley and then spend one week in the high veld Dinokeng Game Reserve, just north of Pretoria (see sections 4 and 5 for details).

International flights will need to be arranged into Johannesburg airport by Friday at 0800hrs and out of Johannesburg airport on Friday after 2000hrs. Internal travel will be costed by the Opwall travel section once the flights have been arranged to ensure transfers to Masebe from the airport at the start of the expedition and back from Dinokeng to Johannesburg airport at the end of the expedition.

On this option the students will complete an African Origins Wilderness Survival Course (see section 4) in the first week. In the second week students will be assisting with active research while completing an African Wildlife Management course (see section 6).

## 3. Activities & Schedule at Masebe Nature Reserve

On this one-week wilderness survival course where you will learn the principles of survival while based in one of the most scenic nature reserves in South Africa. All the skills on the course is expertly demonstrated and explained in detail by our field instructors, after which you will get the opportunity to practice the skills for yourself. This course is structured to allow students interaction with the field instructor and encourage them to challenge their abilities and master the skills at their own pace.

Our camp is located adjacent to Masebe Nature Reserve, a protected area forming part of the UNESCO Waterberg Biosphere in the Limpopo Valley of South Africa. The variety of rock formations, majestic mountains, savannah landscape, rivers and abundant wildlife make this a spectacular setting. Masebe is not only a pivotal sanctuary for biodiversity but also a flagship nature reserve that reconciles conservation of biological fauna and flora with the cultural diversity of its local people. Set in spectacular scenic surroundings this 4500 hectare reserve has been home to the Bakenberg community for many centuries. Here the local people have learned to live of the land and ultimately thrive in their natural surroundings, an

ideal location to learn your wilderness survival skills! Humans have their origins in Africa, and much of human evolution occurred on this continent. For hundreds of thousands of years, people have been living off the landscape, and shaping it in a number of ways. This course not only endeavours to develop your practical survival skills but also explores how pre-modern humans lived in their environment, as well as how people are currently interacting with the natural world around them. Students will learn about archaeology and cultural heritage and discover how human ancestors were able to survive in areas where people have lived for thousands of years. Students can immerse themselves into the daily experiences of indigenous tribes and also learn how local peoples are a part of the ecology of the land today.

What practical skills will you learn on the course?

* The basics of survival including the rule of 3 principle.
* How did humans survive in nature centuries ago.
* How to safely use your knife for cutting and carving.
* How to make rope from plants and learn how to tie and use knots.
* How to protect yourself against the elements and build a shelter.
* How to make fire in the outdoors.
* What food you can find in the wild.
* How to trap and hunt animals for food.
* How to find, collect, filter and purify water.
* How to navigate accurately in the wild.
* How to treat basic injuries in the wild.
* How to get rescued.
* How to use and sharpen implements in nature.

The programme follows the outline of a real-life survival situation where students progress through the standard survival guidelines: Assess; Water; Food; Shelter; Acclimatise; Navigate / Explore. It further consists of a series of lectures on archaeology and ecology, and survival experiences in the African Wilderness.

Day 1 (Friday)
Students arrive at camp and initial orientation.

Day 2 (Saturday) – Assess - Orientation
Explore the reserve with qualified field guides learning about the Geology and Ecology of the area.
Lecture on the history of the area, early hunter-gatherers, San people and their rock paintings.
Lecture: Safety in the bush

Day 3 (Sunday) – Water - Stone-Age Survival Training
Today the students will be on foot with knowledgeable guides who will teach them basic survival skills. This will include how to find water, how to start a fire without modern tools and how to use plants for medicinal uses. They will visit a local site of historical significance (rock-painting or historical home).
Lecture: Indigenous land use and cultural history

Day 4 (Monday) – Food and agriculture
Students learn how to harvest food from the environment and prepare a healthy meal. They learn about the history of agriculture in southern Africa and its influence on natural ecology and the environment.

Dinner will further include edible plants that were foraged during the day. There will be a cultural performance by the local people.

Day 5 (Tuesday) – Shelter/Acclimatise - Track and Sign interpretation
Students are led into the bush and taught assess, interpret and understand through tracks and signs of wild animals, insects and reptiles. Students are taught how to prepare over night shelters and which items from the surrounding bush can be used. Students are instructed on making a rope from tree bark or plants and how to tie knots. They will then spend the night in their own hand made shelters and have fireside discussions around what it would have been like on a night thousands of years ago.

Day 6 (Wednesday) – Acclimatise - Navigation and Tools
Students are shown how to navigate and a demonstration on the making of hunting tools (e.g. bow and arrow from wood, stone chards as cutting tool). They go on a bush walk and are required to 'stalk' a wild animal or bird on foot while applying their knowledge of wind direction, sight and sounds. A demonstration on setting an animal / bird trap.
Lecture: The impact of historical humans
Workshop: Introduction to the cultural heritage of the area by a local cultural leader.

Day 7 (Thursday) – Explore/Walk to Rescue
Modern Africans in their landscape
Students learn about the current state of rural livelihoods and the sustainable use of wildlife. There will be a series of workshops around how to manage and conserve the environment as well as cultural heritage. The afternoon will consist of a hike up the mountain with perceived 'dangers' and how to deal with them. The hike ends in an area of local historical significance.

Day 8 (Friday)
Transfer to Dinokeng Game Reserve

Accommodation will be in large shared dorms in a fenced compound. There will be hot showers and long-drop toilets on site and electrical power each evening.

*Table 1. Indicative daily timetable at Masebe. Note there may be changes depending on fitness of students, group sizes and numbers, weather conditions or operational problems.*

| | |
|---|---|
| 06h00 | Breakfast |
| 06h30 | Depart for morning activity |
| 10h00 | Return to camp |
| 10h30 | Lecture |
| 12h00 | Lunch |
| 13h15 | Afternoon activity |
| 17h00 | Presentation/lecture |
| 18h30 | Dinner |
| 20h00 | Evening discussion |

# 4. Research Objectives, Activities & Schedule at Dinokeng Game Reserve

The Dinokeng Reserve is an 18,500 ha reserve in the high veld just north of Pretoria that provides a unique approach to wildlife conservation, which if successful, may offer a way in which wildlife corridors can be established and funded in Africa across landscapes with multiple previous uses. Much of the wealth of South Africa is concentrated around Johannesburg and Pretoria, yet just 50km north lies a large impoverished local community. In the early part of the century, the government of Gauteng province provided economic development support to these communities, by the creation of a large wildlife reserve to hold the big 5 (lion, leopard, elephant, buffalo and rhino) across what had been a landscape of game farms, traditional farms and small holdings. The government funded the fencing of the whole area and fenced around each of the buildings within the newly created reserve areas. The whole area was then stocked with game species and the owners of the land given traversing rights across the reserve. Thus instead of having large areas with animals fenced in, it is those living in the area of the reserve that are fenced out!

This initiative been very successful and has allowed the creation of a number of tourism related businesses by the previous landowners and employment for local community members. Indeed so successful has it been that the area of the reserve is continuing to expand as additional landowners opt to join in the scheme. This approach may provide a model for how wildlife corridors linking existing conservation areas can be created and funded, so is a crucial project to study. WEI and Operation Wallacea have been appointed to provide data on a range of research outputs with the following objectives:

1) To determine the distribution of herbivores in DGR
2) To assess the impacts of elephants on woody vegetation
3) To monitor bird community structures across the reserve
4) To measure the human – wildlife interactions and how they can be mitigated

Over the course of the week, the students will complete bush skills training alongside helping with the biodiversity research surveys needed to answer these research questions. Question 1 is being answered from the large mammal transect studies which are conducted by vehicle and the position, species name, sex and age of all mammals sighted are recorded. Their angle using a GPS and distance from the transect are noted. Data are gathered on the level of browsing pressure on each tree and shrub using the Walker scale classification, the stem diameter of all woody plants and the amount of woody vegetation using the touch pole techniques. This data also includes specific information relating to elephants so can also be used to answer question 2. The data to answer question 3 is gathered from early morning bird point counts at a series of standard sites across the management unit. Question 4 will combine data from all survey types with detailed maps of the human activity within the reserve. Students may also be involved in direct monitoring of human activities such as road usage and the presence of roadkill.

The volunteers will be divided up into groups of a maximum of nine and each will spend half of each day in the large fenced area of the camps having briefings and lectures. The other half of each day will be spent in the bush in vehicles or on foot in groups of nine with an armed guard and an experienced guide for each group. Thus some of the students will spend the morning in camp with briefings and lectures followed by the afternoon in the bush, whilst the rest will spend the morning in the bush and the afternoon on briefings and lectures, alternating each day.

The schedule is full but there is time for the students, either individually or in small groups, to prepare a short presentation based around information they have learnt across the week and these presentations will be given on the Thursday evening.

*Table 2. Indicative timetable for the week at Dinokeng. Note there may be changes depending on fitness of students, group sizes and numbers, weather conditions or operational problems.*

| Day | Group 1 | Group 2 |
|---|---|---|
| Fri eve | Introduction to camp and safety rules | Introduction to camp and safety rules |
| Sat am | Lecture 1 – An introduction to Africa's Biodiversity<br>Workshop 1 – Effects of fire on biodiversity | Vehicle based field visit with briefings about species encountered and safety when encountering these animals |
| Sat pm | Vehicle based field visit with briefings about species encountered and safety when encountering these animals | Lecture 1 – An introduction to Africa's Biodiversity<br>Workshop 1 – Effects of fire on biodiversity |
| Sat evening | Lecture on small and potentially dangerous species – spiders, snakes and scorpions | Lecture on small and potentially dangerous species – spiders, snakes and scorpions |
| Sun am | First field trek with armed guard to learn about safety issues and approaching game species | Lecture 2 – South African Birds<br>Workshop 2 – Bird identification and practical survey skills |
| Sun pm | Lecture 2 – South African Birds<br>Workshop 2 – Bird identification and practical survey skills | First field trek with armed guard to learn about safety issues and approaching game species. |
| Sun eve | Debate on local conservation issues | Debate on local conservation issues |
| Mon am | Bird point counts | Lecture 3 – The herbivores of South Africa<br>Workshop 3 – Calculating density estimates and carrying capacities |
| Mon pm | Lecture 3 – The herbivores of South Africa<br>Workshop 3 – Calculating density estimates and carrying capacities | Herbivore damage survey (habitat assessment) |
| Mon eve | Create elephant ID kits | Create elephant ID kits |
| Tue am | Lecture 4 – The predators of South Africa<br>Workshop 4 – Problems with managing closed populations | Bird point counts |
| Tue pm | Herbivore damage survey (habitat assessment) | Lecture 4 – The predators of South Africa<br>Workshop 4 – Problems with managing closed populations |
| Tue eve | Documentary & discussion | Documentary & discussion |
| Wed am | Large mammal transect surveys | Lecture 5 – The elephant<br>Workshop 5 – Reducing human-animal conflict |
| Wed pm | Lecture 5 – The elephant<br>Workshop 5 – Reducing human-animal conflict | Large mammal transect surveys |
| Wed eve | Presentation preparation | Presentation preparation |
| Thur am | Lecture 6 – African conservation and wildlife management | Bird point counts |

| | | |
|---|---|---|
| | Workshop 6 – Consumptive vs non-consumptive reserve management | |
| Thur pm | Herbivore damage survey (habitat assessment) | Lecture 6 – African conservation and wildlife management<br>Workshop 6 – Consumptive vs non-consumptive reserve management |
| Thur eve | Presentations | Presentations |
| Friday | Transfer to airport | Transfer to airport |

Accommodation will be in a large fenced camp inside the reserve. Sleeping arrangements will be in single sex dorms and there are flush toilets and hot showers in the camp.

## 5. African Wildlife Management Course

During the time in camp during the second week, the students will be completing an African Wildlife Management Course that will have direct relevance to the research they are helping with in the field. Each session starts with a 40 – 45-minute lecture and the rest of the time is then spent on a workshop aimed at reinforcing elements of the lectures and applying the knowledge to practical South African examples.

Lecture 1 – An introduction to Africa's biodiversity
This lecture will outline the term 'biodiversity' and what this can mean in different situations to different groups of people. Students will also learn about the biodiversity of Africa and how humans, latitude and other gradients affect biodiversity.

Workshop 1 – Effects of fire on biodiversity
Different fire regime case studies will be presented to the students which they will discuss and compare best method. The practical activity will be an exercise where students are given example vegetation data from savannah plots and asked to determine for each data set, which herbivores would be utilising the grazing/browsing, the fire loads and whether burning would be beneficial.

Keywords
- Biodiversity
- Biogeography
- Fire & succession

Lecture 2 – South African birds: how we name, identify and survey their numbers and distribution
This lecture briefly looks at the importance of taxonomy and its role in conservation. It then looks in more detail at the identification of local birds and how survey work is carried out.

Workshop 2 - Students will learn 10 of the commonest bird calls likely to be encountered on the surveys. In addition, they will be taught how to use a GPS to plot routes and range finders to estimate distances will be demonstrated and the students will have to complete a test course using only GPS and estimating distances of target objects.

Keywords

- Classification; Taxonomy; Binomial system; Dichotomous Keys
- Identification

Lecture 3 – Adaptation: the herbivores of South Africa
This lecture will give an overview of Africa's main ecosystems and how herbivores are adapted for survival. There will also be a brief description of Kruger National Park and its importance in conservation. The lecture will concentrate on the mammalian herbivores and their ecology, behaviour and identification.

Workshop 3 - The requirements in terms of browse or grazing amounts, minimum herd sizes and distance from water that each of the species routinely feeds will be discussed for each of the main ruminant (buffalo, impala, kudu, wildebeest, nyala, giraffe and other antelope species) and non-ruminant (zebra, elephant, rhino, hippo, bush pig, warthog) herbivore species. Students will be given stock density data and asked to estimate what percentage of the browse and grazing capacity was being utilised and what mix of additional browsers and grazers could be added to the reserve.

Keywords

- Ecology; Habitat; Niche; Abiotic; Biotic
- Biome; Ecosystems;
- Adaptation
- Populations; Competition; Interspecific; Intraspecific; Predator Prey; density dependent; independent.
- Behaviour / nutrition

Lecture 4 – Adaption: the predators of South Africa.
This lecture will look at the role of the main predators and how they are adapted for survival. In particular it will focus on the ecology of lions, cheetah and leopards will be looked at in detail.

Workshop 4 – A film on hunting techniques in a savannah environment will be shown. Why reserves are fenced in South Africa and the problems associated with managing closed populations. Determining how many and what types of predators (lion, cheetah, hyena, leopard etc) should be introduced to control the growth of populations.

Keywords

- Ecology; Habitat; Niche; Abiotic; Biotic
- Biome; Ecosystems;
- Adaptation
- Populations; Competition; Interspecific; Intraspecific; Predator Prey; density dependent; independent.
- Behaviour

Lecture 5 – Africa's iconic animal: The Elephant
This lecture looks at the ecology and behaviour of the world's largest land mammal. It also considers the role of this iconic animal in tourism and other problems such as the ivory trade and control of elephant populations.

Workshop 5 - How do we define a damage causing animal and who should take responsibility? A hypothetical example will be given of a human wildlife conflict situation and the students will be asked how to best reduce the impacts.

Keywords

- Conservation, Sustainability
- Tourism, trophy hunting, population control, poaching, CITES
- Damage-causing; compensation
- Behaviour

Lecture 6 - African conservation and wildlife management
This lecture compares the consumptive use of game and non-consumptive use of game on game reserves through ecotourism. This lecture will include case studies on the sustainability of hunting and intensive breeding industries.

Workshop 6 – A film discussing intensive breeding and hunting (legal) in conservation will be shown. Students will be asked to justify the role of private land owners in the conservation of rare (sable and roan) and endangered (lion, cheetah, wild dog and rhino) large mammals in South Africa in the context of consumptive and non-consumptive ecotourism.

Keywords

- Ecotourism
- Hunting
- Game breeding
- Conservation

## 6. Academic Benefits

Apart from the most obvious values of going on an expedition such as contributing towards conservation, the physical challenge and adventurous travel, the experience can also benefit a student by increasing their chances of gaining entry to university or being successful in a job application and impressing at interview. This can be achieved in many ways but it will often depend upon which country and educational system a learner is from. Common to most countries the experience will:

Enhance their understanding of course syllabuses
Allow learners to gain specific qualifications such as:
Research Qualifications e.g. Extended Essays for IB and UK EPQs
University Course Credits in US
Creativity, Action and Service (CAS) for IB
Universities Award from ASDAN

### *IRPs or Individual Research Projects*

In the last few years an increasing number of students joining our research programmes take this opportunity to undertake IRPs. These research projects take many different forms, but what they all have in common is the need to pose and answer a research question. Examples of these include Extended Project

Qualification (EPQ), Extended Essay (EE) for IB, as well as many different projects specific to various education systems worldwide.

We can support a selection of different topics for either essay-based research projects or data-led research projects that are tailored towards what the students will experience on site. It is a fantastic opportunity for a student to witness first-hand many of the aspects of their research question and, in many cases, they will have access to samples of past datasets for their project. Students may also have the opportunity to talk with the actual scientists involved which will give them a convincing 'slant' to the way in which they answer their research question.

For success with IRPs, careful planning is needed by the student and a lot of the work will be done prior to their expedition. They will need close guidance from their school supervisor, and the scientists in the field need to be briefed so that support can be provided where they can. If you or your students are interested in undertaking a research project with us, you should contact schoolresearchprojects@opwall.com.

For more information visit the Opwall website - https://www.opwall.com/schools/educational-benefits/independent-research-project/.

*Relevance of their expedition to the syllabus*

Specific specifications for Biology, Geography and Environmental Studies have been reviewed for over 10 examination boards from around the world to see how relevant a student's expedition experiences will be when related to what they learn in their classroom. The tables in the appendix section show how this matching works although not all topics are relevant to all sites so have been grey-out.

## 7. Additional Reading


Apps P, (2012) Smither's Mammals Southern Africa Random House Struick ISBN-13: 9781770079137

Branch, B. (1998) Field Guide to Snakes and other Reptiles in Southern Africa. Struik Publishers, Capetown.www.struik.co.za. ISBN 1 86872 040 3

Briggs P, Lizzie Williams (2009) The AA Guide to South Africa AA Publishing. ***Excellent summary at the start of history and politics***. ISBN-10: 0749562366

Carruthers, V. (2008) The Wildlife of Southern Africa - a field guide to the animals and plants of the region. Struik Publishers - ISBN-13: 9781770077041

Cillie B, (2009) The Mammal guide of Southern Africa Briza Publications ISBN: 1875093451

King D, Valda Frase (2014) The Reef Guide: East and South Coasts of Southern Africa Random House Struick ISBN-13: 9781775840183

Marais, J (2004) A complete Guide to the snakes of Southern Africa New Holland Publishers ISBN: 186872932X

Newmann KB, Faansie Peacock, Vanessa Newman Ralph Boettger (2010) Newman's Birds of Southern Africa Random House Struick ISBN-13: 9781770078765

Palgrave K, Meg Palgrave (2001) Everyone's Guide to Trees of South Africa Random House Struick ISBN: 1868724891

RoveroF , Fridolin Zimmermann (2016) Camera Trapping for Wildlife Research Pelagic Publishing ISBN-13: 9781784270483

Sinclair, I, Phil AR Hocke, Warwick Tarboton , Peter G Ryan , Norman Arlott , Peter Hayman (2011) SASOL Birds of Southern Africa Random House Struick ISBN-13: 9781770079274

Van Wyck, B, Van Wyck, P & Van Wyck, B. E (2000) Photographic Guide to Trees of Southern Africa. Briza Publications, Pretoria.

Walker, C. (1996) Signs of the Wild - a field guide to the spoor and signs of the mammals of southern Africa. Struik Publishers, Capetown.www.struik.co.za. ISBN 1 86825 896 3.

Whyte, I. & Chittenden, H. (2008) Roberts Bird Guide: Kruger National Park and Adjacent Lowveld: A Guide to More than 420 Birds in the Region. Jacana Media. SBN-13: 9781770096387

Electronic media
BBC Last Chance to See, Episode 3: Northern White Rhino. Available online at http://www.bbc.co.uk/programmes/b00mvbbx
BBC Life of Mammals, Episode 4: Plant Eaters
BBC Life of Mammals, Episode 5: Meat Eaters
BBC Planet Earth, Episode 7: Great Plains
The Secret Life of Elephants. BBC Video. Available from NHBS - www.nhbs.com/
BBC's Africa Documentary