

# Biodiversity Mainstreaming Toolbox

## for land-use planning and development in Gauteng



# Tool index

The main focus of the *Biodiversity Mainstreaming Toolbox for land-use planning and development in Gauteng* is on tools for mainstreaming biodiversity into government planning and decision-making in three broad areas:

- Land-use planning
- Environmental authorisations
- Protected areas

The table below provides a quick reference guide for the core tools, as well as some additional tools, available to aid in integrating biodiversity into these. A more detailed version of this table is on page 27 and provides a summary of the tools and their application.

Tool	Land-use planning	Environmental Authorisations	Protected Areas Expansion	Page
<i>Core tools</i>				
Gauteng Conservation Plan (C-Plan 3.3)				37
Bioregional plans				39
List of ecosystems threatened and in need of protection				41
National Freshwater Ecosystem Priority Areas				43
Gauteng Protected Areas Expansion Strategy				75
Environmental Management Frameworks				57
Gauteng ridges guideline				61
Red List Plant Species Guidelines				65
<i>Additional tools</i>				
Local Biodiversity Strategy and Action Plans				46
Grassland Ecosystem Guidelines				45
Gauteng biodiversity offset guidelines				59
Sustainable development criteria				63
Lifestyle estate guideline				64
Mining and Biodiversity Guideline				69
Gauteng biodiversity stewardship strategy				77
Green servitudes regulatory tool				79

The tools that relate to demonstrating the value of biodiversity are summarised in Section C (page 89).

# Biodiversity Mainstreaming Toolbox

## for land-use planning and development in Gauteng

Developed in partnership with





# Acknowledgements

The *Biodiversity Mainstreaming Toolbox for land-use planning and development in Gauteng* brings together the volume of tools and literature that currently exist to aid the mainstreaming of biodiversity into local government land-use planning and decision-making. The toolbox was compiled by ICLEI – Local Governments for Sustainability: Africa Secretariat and Cities Biodiversity Center as part of the South African National Biodiversity Institute's (SANBI) Grasslands Programme.

The principal author, Liz Metcalfe, was supported in compiling the toolbox by Shela Patrickson, Russell Galt, Georgina Avlonitis and Sarah Birch (ICLEI – Local Governments for Sustainability), Budu Manaka, Anthea Stephens (SANBI Grasslands Programme), Aimee Ginsburg (Benefits SE) and Emily Botts.

Special thanks go to those who gave voluntarily of their time and effort to review the toolbox. In particular, we would like to thank Abigail Kamineth and Eleanor MacGregor (Gauteng Department of Agriculture and Rural Development), Susan Stoffberg (West Rand District Municipality), Elisabeth van der Merwe (Ekurhuleni Metropolitan Municipality), as well as Mandy Driver, Jeffrey Manuel, Tammy Smith, Tracey Cumming and Sagwata Manyike of SANBI. Thanks also to Kevin Zunckel (Zunckel Ecological and Environmental Services) and Kennedy Nemutamvuni (SANBI) for their input.

Finally, we would like to give thanks to the production team led by Aimee Ginsburg and supported by Craig Smith.

The **SANBI Grasslands Programme** is a partnership between government, non-governmental organisations and the private sector to mainstream biodiversity objectives and activities into the Grassland Biome, with the intention of balancing biodiversity conservation and development imperatives in a production landscape. The Programme relies on partnerships to mainstream biodiversity objectives into the major production sectors that operate within the Grassland Biome. These sectors include agriculture, forestry, coal mining and urban economies, as well as the enabling environment. The programme has been made possible through support from the United Nations Development Programme (UNDP) and funded by the Global Environment Facility (GEF).

**ICLEI – Local Governments for Sustainability** is the world's leading association of cities and local governments dedicated to sustainable development. ICLEI promotes local action for global sustainability and supports cities to become sustainable, resilient, resource-efficient, biodiverse and low-carbon; to build a smart infrastructure; and to develop an inclusive, green urban economy. ICLEI Cities Biodiversity Center, hosted by ICLEI – Africa Secretariat, offers a broad portfolio of supportive services in recognition of the crucial role that cities and local governments play in the protection and management of biodiversity to achieve healthy, happy communities. ICLEI Cities Biodiversity Center's flagship programme – Local Action for Biodiversity (LAB) – is a unique global biodiversity programme, customized for local and regional authorities around the world. The LAB programme is aimed at improving and enhancing ecosystem management at the local level, and is recognized globally as the leading results-driven local government biodiversity initiative.

# Contents

## Introduction to the Biodiversity Mainstreaming Toolbox 1



### SECTION A: BIODIVERSITY – WHAT YOU NEED TO KNOW 4

<b>A1: Introduction to biodiversity</b>	6
What is biodiversity?	7
Ecological infrastructure	8
Biodiversity and climate change	11
Invasive alien species and biodiversity	13
Biodiversity in the urban context	15
<b>A2: The legal case for biodiversity</b>	16
Overarching conventions and legislation	17
Key national policy, legislation, strategies and assessments on biodiversity	19
National government priorities and biodiversity management	21
Gauteng Nature Conservation Bill/ Transvaal Nature Conservation Ordinance	22



### SECTION B: TOOLS FOR MAINSTREAMING BIODIVERSITY INTO GOVERNMENT PLANNING AND DECISION-MAKING 24

<b>Managing and conserving biodiversity</b>	26
Quick reference to tools	27
<b>B1: Mainstreaming biodiversity into land-use planning in Gauteng</b>	30
Local government mandates for mainstreaming biodiversity into land-use planning	31
Systematic biodiversity planning	35
Gauteng Conservation Plan (C-Plan 3.3)	37
Bioregional plans	39
List of ecosystems threatened and in need of protection	41
National Freshwater Ecosystem Priority Areas	43
Grassland Ecosystem Guidelines	45
Local Biodiversity Strategy and Action Plans	46
<b>B2: Environmental authorisations</b>	48
What is an environmental impact assessment?	49
Environmental impact assessment process	51
'Biodiversity-inclusive' impact assessments	55
Environmental Management Frameworks	57
Gauteng biodiversity offset guidelines	59
Gauteng ridges guideline	61
Sustainable development criteria	63
Lifestyle estate guideline	64
Red List Plant Species Guidelines	65
Mining and biodiversity	66
Mining and Biodiversity Guideline	69
<b>B3: Protected areas</b>	72
Protected areas in South Africa	73
National Protected Area Expansion Strategy	74
Gauteng Protected Area Expansion Strategy	75
Gauteng biodiversity stewardship strategy	77
Green servitudes regulatory tool	79



## SECTION C: THE VALUE OF BIODIVERSITY

82

### C1: The value of biodiversity

84

Biodiversity assessments for Gauteng

85

Accessing and contributing to biodiversity information

87

Demonstrating the value of biodiversity

89

Making the Case for biodiversity

91

Tools to communicate biodiversity effectively

93



## SECTION D: BIODIVERSITY FUNDING AND NETWORKS

96

### D1: The basics of biodiversity funding and networks

98

International funding for biodiversity

99

Local funding for biodiversity

102

Innovative financial mechanisms

103

Biodiversity networks

104



## SECTION E: ANNEXES

108

Annex 1: International instruments for biodiversity conservation

109

Annex 2: The Convention on Biological Diversity Aichi Targets

111

Glossary

113

# Introduction to the Biodiversity Mainstreaming Toolbox



This *Biodiversity Mainstreaming Toolbox for land-use planning and development in Gauteng* was designed to strengthen biodiversity mainstreaming in Gauteng. It provides a synopsis of policy, guidelines and decision-support tools that should be used by provincial and municipal government, private sector associations and non-governmental organisations (NGOs). The toolbox makes it easy for officials and other stakeholders to use biodiversity information and regulatory tools in executing their mandates.

The *Biodiversity Mainstreaming Toolbox* brings together the broad range of biodiversity management and conservation tools relevant to the urban context in Gauteng. By doing this, the toolbox ensures that users have a good understanding of:

- What tools exist.
- The purpose of each tool.
- What tools should be used for what activities.
- Where to find further information and the tools themselves.

As you will notice when you read the toolbox, there is a vast array of tools, and it is important that users know what tool to use and when. However, because this toolbox synthesises a large amount of information, it is anticipated that this toolbox will be a starting point for users to become acquainted with the tools available, and further reading on each tool will be required.

## What is a toolbox?

This toolbox works in a similar way to a real toolbox. It keeps tools in one place so that it is quick and easy to place your hand on whatever tool you need. However, if you want to hang a picture, the toolbox itself will not insert a nail into the wall – you need to go to the toolbox, choose the right tool for the job and use it! You also need to know that a hammer is the appropriate tool for inserting a nail, and a screwdriver is the tool for inserting screws. Each tool has a very specific application, and using the wrong tool will not make the job any easier.

This *Biodiversity Mainstreaming Toolbox* works in the same way. It ensures that relevant biodiversity tools are easy to find. However, the toolbox is not in itself a silver bullet! A more in-depth understanding of tools – supported by training where possible – will be required to use them effectively.

## Who is the toolbox for?

The *Biodiversity Mainstreaming Toolbox* will be useful for anyone working on, or affected by, land-use planning and environmental authorisations, or whose decisions impact on the environment. This includes:

- Spatial planners.
- Environmental practitioners.
- Politicians.
- Local and provincial governments.
- Local communities.
- NGOs.
- Community-based organisations.
- Private sector organisations.



### Key point

This icon will be used wherever there is an important point to be made.

This Toolbox will highlight important information but it is the reader's job to give due consideration to these and find out more.

## Toolbox navigation

For easy navigation, the toolbox is divided into 4 sections:

Section A: Biodiversity - what you need to know

Section B: Tools for mainstreaming biodiversity into government planning and decision making

Section C: The value of biodiversity

Section D: Biodiversity funding and networks

**Section A** introduces biodiversity in the urban context and the importance of ecological infrastructure for sustainable development. It also provides a review of the legislation surrounding biodiversity. These various policies and frameworks provide authority to biodiversity management decisions and to guide planning strategies.

**Section B** introduces the tools that should be used for mainstreaming biodiversity into government planning and decision making, including land-use planning, environmental authorisations and the expansion of protected areas. Remember that many tools are relevant to more than one application, and the sections merely organise the tools so that they are easy to find. The summary of tools at the beginning of the section offers an overview and guidance in this regard.

**Section C** provides an overview of: assessments of Gauteng biodiversity; how to assess and contribute to biodiversity information; tools and examples of demonstrating the value of biodiversity; and tools for communicating this value to different audiences.

**Section D** provides information on funding for biodiversity and some relevant biodiversity networks that can help with training, offer guidance to urban stakeholders or provide access to useful people and information. It also outlines various options for accessing funds for biodiversity management projects.

We hope that you find the toolbox useful. It is acknowledged that a document that covers material of this breadth will inevitably have gaps and will need to be updated over time. However, the toolbox serves as an introduction to the main biodiversity tools available. By using these tools, it is possible to make a positive contribution to the management and conservation of biodiversity in South Africa.

## Toolbox icons

In order to make the toolbox as user-friendly as possible, a number of icons have been used to clarify points and to signify further reading.



Tool.



Information.



Key points to be considered or remembered.



Important climate change related point.



Further reading – where to find more information, and/or the tools themselves.





# SECTION A: BIODIVERSITY - WHAT YOU NEED TO KNOW

**A1: Introduction to  
biodiversity**

**A2: The legal case for  
biodiversity**





# A1

# INTRODUCTION TO BIODIVERSITY

## **Fact sheets in this section:**

- **What is biodiversity?**
- **Ecological infrastructure**
- **Biodiversity and climate change**
- **Invasive alien species and biodiversity**
- **Biodiversity in the urban context**

Biodiversity and healthy ecosystems deliver vital benefits and services to society and the economy. South Africa is fortunate to have a particularly vast wealth of biodiversity, and in order to manage and conserve these assets and to reap the benefits that biodiversity provides, it is important that biodiversity is integrated into development planning. But what is biodiversity, and why is it so important? This section explores the value of biodiversity, and introduces the role that local governments can play in biodiversity management.

# What is biodiversity?



Biological diversity, or the shorter 'biodiversity' is the variety of genes, species and ecosystems on Earth, and the processes that maintain this diversity. It is the living species and natural processes that constitute nature. Rather than simply considering plant and animal populations (i.e. total numbers), biodiversity reflects the variability of plants and animals and crucially, the processes by which they are supported, and the functions that they deliver.

## Biodiversity – variety is the spice of life!

Compare two areas of the same size. Both areas have 100 animals living in the area. In the first area, there are 20 birds, 70 insects and 10 mice. The insects pollinate the flowers, the birds disperse seeds and the mice provide soil nutrients in the form of droppings so that more seed-producing plants grow. In the second area, all the animals are mice. Over time, they eat more seeds than are being replaced and the area becomes degraded. So we can see that even though both areas have the same total number of animals, the first has greater biodiversity, and is a functioning, healthy ecosystem.

Essentially, as biodiversity includes natural processes, it describes the health and functioning of a given area. For example, if a wetland becomes polluted and its ecological condition deteriorates, it is no longer able to function correctly and natural processes such as providing food (e.g. fish), materials (e.g. reeds) and water purification no longer take place. The real value in the term biodiversity is that by describing the variety of life forms rather than total numbers, biodiversity can be used at any scale (e.g. for landscapes such as grasslands or a habitat such as a woodland or koppie) to reflect the health of any area – not just wild landscapes, but pockets of urban biodiversity too.

## Why is biodiversity important for development?

"Our vast wealth of biodiversity offers us a suite of natural solutions in the face of unemployment, rising poverty and climate change."

*Bomo Edith Edna Molewa, Minister of Water and Environmental Affairs, South Africa. Source: National Biodiversity Assessment 2011.*

Biodiversity is not simply important for its own sake, but also because it constitutes the **ecological infrastructure** or 'natural capital', on which human wellbeing depends. South Africa's extraordinary biodiversity provides a foundation for economic growth (jobs), social development (service delivery), and human well-being<sup>1</sup>. People and our economies depend on healthy, functioning ecosystems and the services they provide.

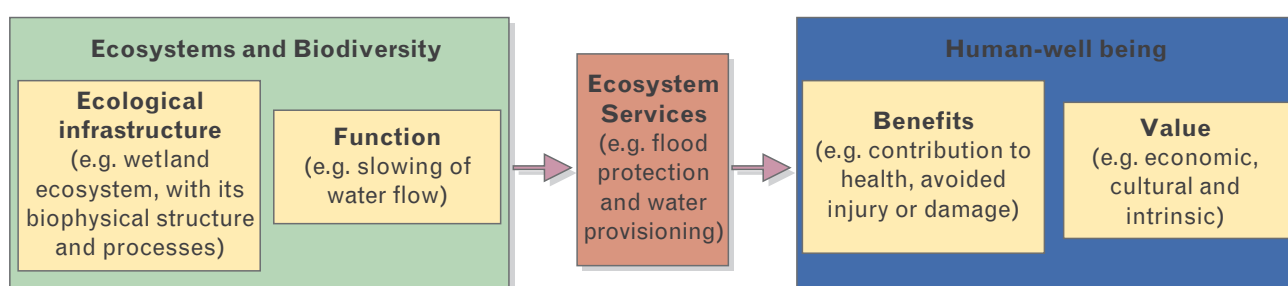
<sup>1</sup>National Biodiversity Assessment 2011.  
Available at <http://bgis.sanbi.org/nba/project.asp>

# Ecological infrastructure

Natural capital – the components of nature linked directly or indirectly with human welfare – is founded on biodiversity, including ecosystems and species. When ecosystems are healthy and functioning, biodiversity provides us with a variety of services. However, because these ecosystems and services occur naturally, we tend to take these benefits for granted without fully understanding how important they are in sustaining us and our economies. The concepts of ecosystem services (the services provided) and ecological infrastructure (the ecosystems that provide them) have been coined to help us understand these benefits.

The diversity of life in South Africa's ecosystems is a kind of infrastructure which, just like roads and railway lines, is critical to the wellbeing of the economy, communities and individual people.

Source: SANBI (2012) *Life: the State of South Africa's Biodiversity*.  
[http://bgis.sanbi.org/NBA/LIFESateBiodiversity2012\\_lowres](http://bgis.sanbi.org/NBA/LIFESateBiodiversity2012_lowres)



*The connection between ecological infrastructure, ecosystem services and human well-being (adapted from De Groot et al. (2010) in Ecological Complexity 7(3): 260-272).*

## Ecological infrastructure

When it comes to natural capital, not all ecosystems are equal. Ecological infrastructure refers to those ecosystems that deliver invaluable services; and is nature's equivalent to technologies such as water treatment plants, or built infrastructure such as dams. Examples of ecological infrastructure include wetlands, rivers, forests and coastal dunes – each providing services to society. Not all ecosystems are ecological infrastructure, so it makes sense to identify these ecosystems and invest in their conservation, management and maintenance.

Ecological infrastructure is a useful concept in planning because areas of ecological infrastructure can be spatially delineated (i.e. drawn on a map) and therefore included in local government spatial planning processes. It is important to be aware of this ecological infrastructure as it provides a wealth of useful, interconnected services. These natural areas can be 'working landscapes', conserving biodiversity whilst providing associated benefits to society through strategic management and careful land-use planning.



### Public goods and services for the benefit of all

South Africa has abundant ecological infrastructure, providing opportunities to support development and unlock economic potential. Because ecological infrastructure is largely free, its value is seldom captured in market transactions and its importance is often under-valued.

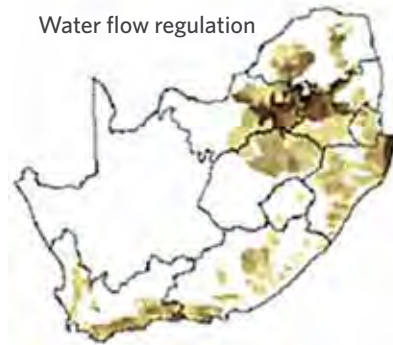
Carbon sequestration



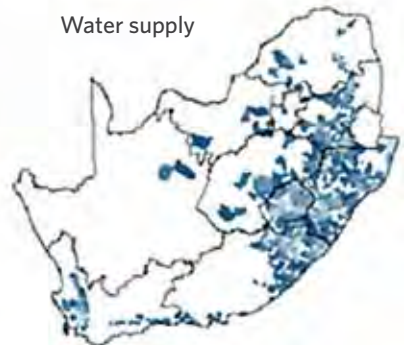
Soil retention



Water flow regulation



Water supply



Valuable ecological infrastructure and associated ecosystem services occur across South Africa, but are not evenly distributed. Source: TIPS (2008) *Making markets work for people and environment: employment creation from payment for ecosystems services*. [http://www.tips.org.za/files/EGS\\_report\\_-\\_18\\_Nov.pdf](http://www.tips.org.za/files/EGS_report_-_18_Nov.pdf)

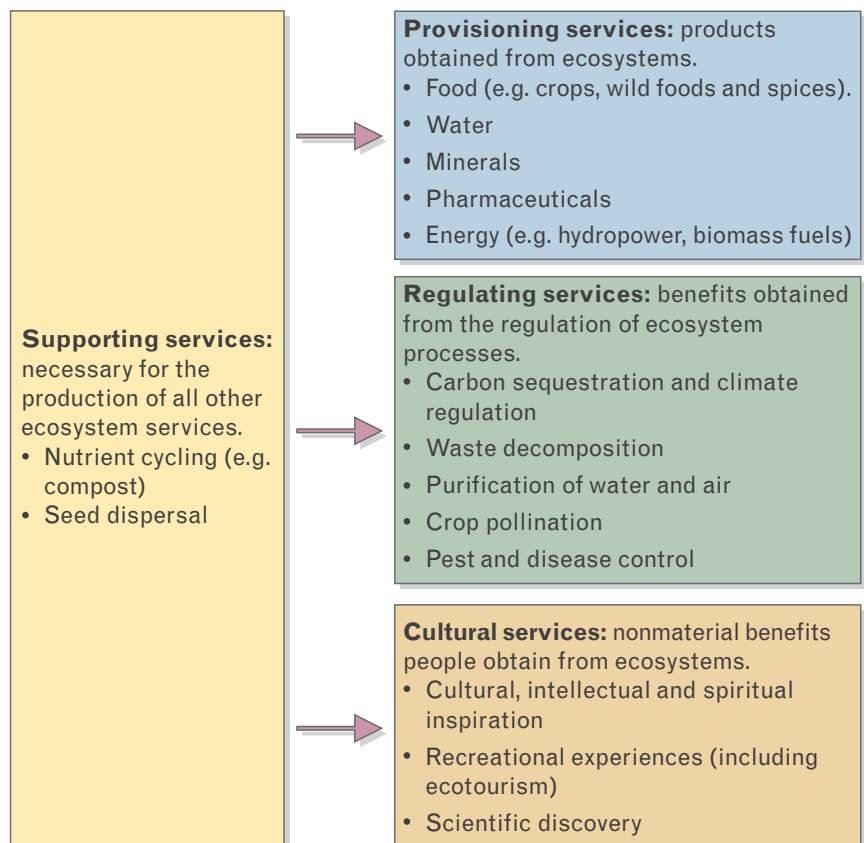


### Key point

Ecological infrastructure is nature's set of tools for providing ecosystem services.

## Ecosystem services

The interactions between all the plants and animals that make up biodiversity provide humans with a range of benefits. Clean water filtered through soils and reed beds, clean air from trees, pollination of crops by bees, as well as food, medicines, materials and fibres are some of the benefits afforded to us by nature. These are known as ecosystem services.



Adapted from Millennium Ecosystem Assessment (2005) *Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Synthesis*. <http://www.unep.org/maweb/en/synthesis.aspx>



## Green infrastructure and ecological infrastructure

The term '**green infrastructure**' is used to describe structures that are good for the environment i.e. any one piece of infrastructure with environmental benefits. It can be artificial or involves the engineering of natural systems e.g. permeable paving or green (planted) roofs. On the other hand, **ecological infrastructure** refers to natural areas that provide a host of ecosystem services. Examples of ecological infrastructure include wetlands and forests.

## Ecological infrastructure and sustainable development

As with any type of built infrastructure, restoring and maintaining ecological infrastructure ensures the long-term provision of services and contributes to job creation, whilst also aiding economic sectors such as sustainable farming and ecotourism. Poor communities often rely directly on ecological infrastructure (e.g. for basic services, flood protection), and tend to be most severely affected by declines in the quality of ecological infrastructure. It is therefore vital that maintaining ecological infrastructure is budgeted for in municipal, provincial and national budgets.

### Into the future

The advantage of ecological infrastructure is that it already exists – we don't have to pay for constructing it. However, for it to function effectively in the long-term, ecological infrastructure needs to be managed and maintained. By assessing existing biodiversity (**Chapter C1**) and applying systematic biodiversity planning techniques (**Section B**), the management and conservation of priority areas can ensure that ecological infrastructure is maintained into the future. Furthermore, a vast number of jobs can be created to restore infrastructure that is currently degraded. The Green Jobs report<sup>2</sup> points out that the bulk of the jobs identified in a green economy are likely to come from natural resource management. An example of this already exists with the 'Working for Water' programme.



486 000

Work opportunities created in environmental rehabilitation programmes since 1995



15 000

Jobs created through formal conservation of protected areas



27 000

Jobs supported by the fishing industry



140 000

Jobs in game ranching and ecotourism

### Case study:

Mount Fletcher Dam, Eastern Cape: how damaged ecological infrastructure has impacted man-made infrastructure.

Poor rangeland management in mountain grasslands, combined with inappropriate establishment and management of roads in the upper Umzimvubu River catchment has damaged ecological infrastructure upstream of the Mount Fletcher Dam. The resulting gully erosion and loss of soil has resulted in the dam losing approximately 70% of its water-holding capacity as silt has filled the dam.

Had the environmental conditions been assessed prior to the construction of the dam, the risk of water holding capacity loss could have been avoided. In response to the problem, the restoration of upstream wetlands and livestock management of grasslands is required to prevent overgrazing in the catchment. This will directly support the functioning of the Mount Fletcher Dam by minimising erosion, thus increasing its lifespan and water quality.

<sup>2</sup> DBSA & IDC (2011) Green jobs: an estimate of the direct employment potential of a greening South African economy.  
<http://www.idc.co.za/projects/Greenjobs.pdf>

# Biodiversity and climate change



# 1°C

For each  
1°C rise in  
mean global  
temperature



# 10%

10% of all  
known  
species will  
face a high-  
risk of  
extinction

Source: *Convention on Biological Diversity* <http://www.cbd.int/climate/doc/information-note-01-unfccc-cop15-en.pdf>

It is impossible to look at biodiversity management and conservation without paying thought to climate change – the two are inextricably linked. Not only is climate change expected to be the main cause of biodiversity loss by the end of this century<sup>3</sup> but conversely, biodiversity is also vital for adapting to and mitigating (reducing) climate change.

## Definitions:

**climate change adaptation:** Initiatives and measures that reduce the vulnerability of natural and built environments against actual or expected climate change effects, or adapt to those changes once they have occurred.

**climate change mitigation:** The process of reducing greenhouse gas (GHG) emissions that contribute to climate change. It includes both strategies to reduce GHG emissions and to remove carbon dioxide from the atmosphere through carbon sequestration.

## The impact of climate change on biodiversity

Changes in temperature and rainfall patterns as a result of climate change are expected to directly impact biodiversity. Although the climate has naturally changed in the past, human-induced climate change is happening at a much faster pace. It is unlikely that natural evolution will be able to 'keep up' and species that have specific requirements in water and temperature are likely to become extinct. This is particularly the case in urban areas, where habitat destruction and fragmentation confines species to small areas, not allowing species to move (e.g. upslope where the conditions are likely to be cooler). Secondary effects of climate change such as fires and flooding (from extreme weather events) and increasing numbers of invasive alien species (see next fact sheet) further amplify climate change threats.

## Biodiversity for mitigating and adapting to climate change

Although biodiversity is predicted to be affected by a changing climate, it is important to understand that biodiversity is itself a strategic tool for dealing with climate change. It is useful in two ways: by mitigating (limiting) climate change and to help society adapt to an altered climate.

Climate change mitigation involves the reduction in the level of greenhouse gases (GHGs), either through reduced emissions, or by removing it from the atmosphere (known as carbon sequestration). Forests, grasslands and other ecosystems remove carbon dioxide from the atmosphere, providing a stable store of carbon under changing conditions.

Secondly, biodiversity and associated ecosystem services offer cost-effective strategies for adapting to climate change through 'ecosystem-based adaptation' initiatives.



### Key point

The maintenance of key ecological infrastructure is absolutely vital in the face of climate change.

<sup>3</sup>Millennium Ecosystem Assessment (2005) <http://www.unep.org/maweb/en/index.aspx>



## Further reading

Biodiversity, climate change and sustainable development. <http://www.sanbi.org/sites/default/files/documents/documents/biodiversity-climate-change-and-sustainable-development.pdf>

UNEP Building Resilience of Ecosystems for Adaptation, <http://www.unep.org/climatechange/adaptation/EcosystemBasedAdaptation/tabid/29583/Default.aspx>

Ecosystem-based adaptation: benefiting humanity and nature together, [https://seors.unfccc.int/seors/attachments/get\\_attachment?code=FMA3JS8ZVN32LUUR4XIH12I2ACRFKCBY](https://seors.unfccc.int/seors/attachments/get_attachment?code=FMA3JS8ZVN32LUUR4XIH12I2ACRFKCBY)

## Ecosystem-based adaptation

Ecosystem-based adaptation is the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change.

Source: *UN Ecosystem-Based Adaptation Programme*, <http://www.ebaflagship.org/about/eba-purpose>

Ecosystem-based adaptation (EbA) is the use of biodiversity and ecosystem services for adapting to the impacts of climate change. Healthy, intact ecological infrastructure such as wetlands, coastal dunes and forests help to protect and buffer communities from the impacts of climate change, such as heavy storms, floods and storm surges. Maintenance of these strategically important ecosystems can offer communities protection from climate change impacts. EbA programmes are often more cost-effective than 'engineered' solutions and provide valuable day-to-day ecosystem services such as water and food and livelihood opportunities to communities.

Awareness raising about the importance of biodiversity in the bigger 'climate change' picture has been championed by the UN. Climate change should be mainstreamed into development planning to prepare for predicted impacts.

## Gauteng Climate Change Response Strategy

The role of biodiversity as response strategies to the mitigation and adaptation to climate change are highlighted in the Gauteng Climate Change Response Strategy (GCCRS) and Action Plan. As the economic hub of South Africa, Gauteng is both a major contributor of GHGs, and it is vulnerable to the impacts of climate change. The Gauteng Climate Change Response Strategy (GCCRS) recognises the need to mitigate (reduce) the release of GHGs and to develop strategies for adapting to the impacts of climate change. It outlines the key actions that need to be implemented for climate change mitigation and adaptation in the short-term.

For climate change mitigation, the focus is on Gauteng's energy sector. Targets set in the Gauteng Integrated Energy Strategy have been adopted into the GCCRS. For adapting and managing climate risks, the GCCRS has listed a number of actions, several of which correspond to the management and conservation of biodiversity through land-use planning. The table below highlights actions in the GCCRS that relate to biodiversity management and conservation in some way (and provides reference to other relevant fact sheets in this Toolbox):

CC mitigation:	Adaptation to climate change:
<b>4.6.5 Natural resources, land conservation and woodland management.</b>	<b>5.1.1 Develop and maintain efficient and secure water management systems</b> to account for increasing variability in rainfall and increased evaporation.
	<b>5.1.2 Protect wetlands and flood-prone areas from development</b> due to their services as ecological infrastructure (sources of water, water purification) by implementing zones of no development (see <a href="#">Chapter B1</a> ).
	<b>5.2.1 Densification of housing development</b> in order to reduce biodiversity loss (see <a href="#">Chapter B2</a> ).
	<b>5.2.2 Regulation and implementation of land-use planning and spatial development</b> to reduce biodiversity and habitat loss (see <a href="#">Chapter B1</a> ).
	<b>5.3.1 Conservation of urban parks and open areas (biodiversity)</b> to minimise urban heat islands and to increase storm water infiltration (see <a href="#">Chapter B1</a> and <a href="#">B3</a> ).
	<b>5.3.2 Removal of alien vegetation</b> , which disturb local biodiversity and ecosystems, reducing their ability to provide ecosystem services, and making it difficult for them to adapt to climate change (see next fact sheet).



## Key point

Important climate change related points are emphasized throughout the Toolbox in side boxes identified with this symbol.



## Further reading

GDARD: *Gauteng Climate Change Response Strategy and Action Plan*, <http://www.gdard.gpg.gov.za/DocumentsandForms/Documents/GPG%20Climate%20Change%20Strategy-Draft%20for%20comments.doc>

# Invasive alien species and biodiversity



*Pom-pom weed (Campuloclinium macrocephalum) is a CARA Category 1b invasive alien plant species.*

Invasive alien species (IAS) are plants, animals and microbes that are introduced into countries, and then out-compete the indigenous species. They represent a major threat to biodiversity. When introduced into an area, they thrive and out-compete the local species, reducing the biodiversity of the area and disrupting ecosystem services. As a result, invasive alien species cost South Africa tens of billions of rand annually in lost agricultural productivity and resources spent on managing this threat.

## What are invasive alien species?

An invasive alien species is one that has been introduced (accidentally or on purpose) to the area, and subsequently spreads unaided into new areas.

To understand the term invasive alien species, one needs to recognise that:

- 1) Not all alien (introduced) species are necessarily invasive – and may simply be 'alien species'.
- 2) A species that is an important native species in one area can become invasive and problematic in another. Invasive species refer to those causing harm to or having a negative impact on the economy, environment or health in the area where they have been introduced.

Since these species continue to spread unless actively controlled, IAS require constant monitoring and maintenance. The sooner that new invasions are discovered, especially before they are well established, the more likely it is that eradication will be possible, and the cost of managing the problem will be reduced.

Invasive alien species are a pervasive issue in Gauteng. Many of the biodiversity tools that are available contain information or guidance on dealing with IAS, these include:

- List of ecosystems threatened and in need of protection ([page 41](#))
- National Freshwater Ecosystem Priority Areas ([page 43](#))
- Grassland Ecosystem Guidelines ([page 45](#))
- Gauteng ridges guideline ([page 61](#))
- Mining and biodiversity ([page 66](#))
- Gauteng biodiversity stewardship strategy ([page 77](#))
- Innovative financial mechanisms ([page 103](#))

## Legislation for the control of IAS

### National

National legislation ([page 19](#)) places the onus on landowners to control IAS on their land.

- Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA) - Regulations 15 and 16 under this Act, which concern problem plants, were amended during March 2001. CARA regulations refer to 198 invasive alien plants, which are divided into three categories. CARA is administered by the National Department of Agriculture, Forestry and Fisheries.
- National Environmental Management: Biodiversity Act (No. 10 of 2004) – IAS regulations are published under the Biodiversity Act. The regulations contain lists of invasive species (fish, reptiles, birds, mammals and plants) requiring compulsory control (Category 1a) or management (Category 1b) if found on a property.



## Key point

IAS control and eradication plans are a requirement for municipalities for any land under a municipality's control in terms of Subsection 76(2) of the Biodiversity Act, and should form part of the Integrated Development Plan.

Category 1a: Invasive species that require compulsory control.

Category 1b: Invasive species that require control by means of an invasive species management programme.

The law requires property owners to determine if these IAP are present and if so, to control them so as to prevent them invading outside of the property (Category 1a) or to submit an invasive species management control programme as part of a permit application for them to remain on the property (Category 1b). If a permit is denied, the property owner is required by law to eradicate the IAS.

## Provincial

The provincial ordinance for Gauteng – currently the Transvaal Nature Conservation Ordinance, soon to be replaced with the [Gauteng Nature Conservation Bill](#) – guides management of IAS in Gauteng (see [page 22](#)).



## Further reading

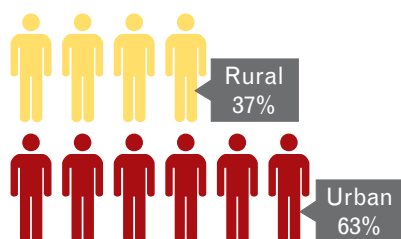
### IAS resources include:

- *Invasive Species South Africa website*: Created through a collaboration of international, national and local institutions, the website has a range of resources including those listed below and you can find out more at <http://www.invasives.org.za/>
  - Lists of plant and animal IAS, with photos and description for identification. The Biodiversity Act category and associated problems are also listed.
  - A dedicated metropolitan section for each of South Africa's metros (currently only Cape Town is listed).
  - A list of Government projects working towards the eradication of alien species. A selection of downloadable IAS resources, such as legislation, control methods, lists of what to plant and newsletters.
- *AGIS: Weeds and Invasive Plants toolkit*: A web-based toolkit on weeds and invasive plants compiled by the Agricultural Research Council, which includes plant IAS fact sheet, and a map of where IAS are found in South Africa. The website also allows users to add observations of sightings. After verification, the new locality will be displayed on the map. Find out more at <http://www.agis.agric.za/wip/>
- *IAS Strategy: Cape Floristic Region*: A strategy for dealing with IAS in the Western Cape has been developed by the Cape Action for People and Environment Programme. Whilst this focuses on the Cape Floristic Region, the Strategy includes fundamental principles that can offer guidance to policy-makers and task teams across South Africa. More information is available at [https://www.capetown.gov.za/en/EnvironmentalResourceManagement/publications/Documents/IAS\\_C.A.P.E.\\_IAS\\_Strategy\\_2009-06.pdf](https://www.capetown.gov.za/en/EnvironmentalResourceManagement/publications/Documents/IAS_C.A.P.E._IAS_Strategy_2009-06.pdf)



Pretoria's famous jacarandas are a CARA category 3 invasive alien species and may not be planted.

# Biodiversity in the urban context



Migration patterns and the lure of work opportunities have resulted in 63% of South Africans living in urban areas<sup>4</sup>. This influx of people to towns and cities means the footprint of these areas is increasing. Without careful land-use planning, urban expansion can fragment natural areas and impact negatively on the condition of ecosystems, species populations and ecological processes. However, by using systematic biodiversity planning (Section B1) and mainstreaming biodiversity into urban design, it is possible to minimise biodiversity loss and maintain ecosystem services for urban dwellers.

## The role of biodiversity in urban areas

Urban and natural environments are not mutually exclusive: both can co-exist through mindful planning and management. In fact, the management and conservation of natural areas improves the quality of life for urban citizens. Urban **ecological infrastructure** provides services for urban dwellers, whilst open spaces are important for cultural and social well-being. It is therefore essential to consider biodiversity in urban planning, protecting important areas of remaining biodiversity (Chapter B3) – and the connectivity between them. This is particularly the case at urban edges, where new sites are being developed: here is the opportunity to make sure that urban planning utilises systematic biodiversity planning (page 35) for long-term ecological, social and economic benefits.



On a national level, the density of development in Gauteng could present a challenge to the connectivity of biodiversity across the country from east-to-west, impacting on the long term survival of a range of species and ecosystems in the face of climate change. Maintaining connectivity across the province through the planning of natural corridors would represent a major contribution that the region can make to adapting to climate change within Gauteng and South Africa as a whole.

## Biodiversity in Gauteng

Gauteng is the smallest and most urbanised province in South Africa, however more plant species occur in Gauteng per unit area than in any other province!<sup>5</sup> The majority of the province is part of the Grassland Biome, an important yet threatened biome. The grasslands are a complex mix of ecosystems, including rivers and wetlands. In turn, these ecosystems provide habitats for a variety of bird, mammal, insect and reptile species – many found only in Gauteng. With rapid urbanisation, these natural areas are under increasing pressure: around 70% of the grasslands in Gauteng have already been transformed and the remainder is fragmented and under threat from development. Maintaining key areas of biodiversity – such as Gauteng's wetlands and ridges – is now essential for maintaining biodiversity and providing connecting corridors to support adaptation to climate change.

## The role of local stakeholders in urban biodiversity planning

Local governments have to juggle competing demands for land and space. In South Africa, poverty alleviation and land restitution issues are high priorities for local governments and the management and conservation of biodiversity can be seen as secondary to these. However, ecological infrastructure most directly benefits poor communities in peri-urban areas and should therefore be considered as the foundation for local development.

Local governments have a critical role to play in the management of biodiversity and ecological infrastructure due to their role in land-use planning, and because they are at the interface between local communities and governance. They are well-placed to apply the products of biodiversity planning into spatial planning (see Chapter B1) and to regulate and manage natural areas for the benefit of all residents.

<sup>4</sup>Statistics South Africa (2011) Census 2011 data. Accessible at <https://www.statssa.gov.za/Census2011/default.asp>

<sup>5</sup>Gauteng Department of Agriculture, Conservation and Environment (2004) Gauteng State of the Environment report.

A large white 'A2' is superimposed on a photograph of a field of tall grass and orange flowers under a cloudy sky.

# THE LEGAL CASE FOR BIODIVERSITY

## Fact sheets in this section:

- **Overarching conventions and legislation**
- **Key national policy, legislation, strategies and assessments on biodiversity**
- **National government priorities and biodiversity management**
- **Gauteng Nature Conservation Bill/ Transvaal Nature Conservation Ordinance**

As a signatory to the Convention on Biological Diversity, South Africa has an obligation to conserve biodiversity. Recognising the importance and uniqueness of South Africa's biodiversity, legislation surrounding biodiversity is extensive and well-developed. This section provides an overview of legislation relevant to biodiversity.

# Overarching conventions and legislation



## International instruments for the conservation of biodiversity

International instruments such as treaties and conventions guide national laws, and South Africa is party to several important international frameworks for the conservation of biodiversity. In terms of its Constitution, South Africa is bound by international agreements that it is party to, and all levels of government are responsible for and must abide by the agreements. The international frameworks relating to biodiversity that South Africa is party to are:

- Convention on Biological Diversity (CBD)
- Convention on the Conservation of Migratory Species of Wild Animals (CMS)
- Convention of Wetlands of International Importance (known as the Ramsar Convention)
- World Heritage Convention
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- Convention to Combat Desertification (UNCCD)
- Framework Convention on Climate Change (UNFCCC)

The CBD is most directly relevant to biodiversity, but all are relevant to biodiversity, as outlined in [Annex 1: International instruments for biodiversity conservation](#).

As a signatory to the CBD, South Africa has an obligation to conserve biodiversity. The twenty Aichi Targets ([Annex 2](#)) are the CBD's specific set of biodiversity targets and are a key element of the CBD's 2011-2020 Strategic Plan for Biodiversity. The Strategic Plan is significant as it is the overarching international framework on biodiversity – not only for the biodiversity-related conventions, but for the entire United Nations system. As a signatory to the Convention, South Africa must translate these targets into its National Biodiversity Strategy and Action Plan (NBSAP).

## Environmental legislation

South Africa has an extensive policy and legislative framework concerning the environment, from the Constitution, all the way through to municipal guidelines and plans. As a result, and in terms of the Constitution, conservation of the environment is a concurrent function of national, provincial and local government. Relevant legislation is outlined in the box overleaf.

**The Constitution of the Republic of South Africa (1996):** The Constitution is South Africa's overarching law. It prescribes minimum standards with which existing and new laws must comply. Chapter 2 of the Constitution contains the Bill of Rights in which basic human rights are enshrined. Section 24 of this chapter refers explicitly to the environment, detailing every citizen's right to a healthy environment and its protection.

*Continued on next page*

**The National Framework for Sustainable Development (2008):** NFSD highlights the need for maintaining the health and integrity of terrestrial and aquatic ecosystems as the foundation for sustainable development. It proposes the national vision, principles, trends, strategic priority areas and a set of implementation measures to guide all organs of state within the national, provincial and municipal spheres to align their policies with a consistent national system aimed at promoting sustainable development.

**The National Environmental Management Act (1998):** NEMA is an overarching framework Act covering broad principles of environmental management and can be regarded as the most important piece of general environmental legislation. Under the auspices of NEMA are the five 'specific environmental management acts', including the Biodiversity Act and Protected Areas Act.

NEMA covers three main areas:

- **Pollution control and waste management:** NEMA sets out the precautionary principle, polluter pays principle and duty of care relating to pollution control and waste management.
- **Environmental authorisations:** The Environmental Impact Assessment (EIA) Regulations, published under NEMA regulate development. The 2010 NEMA EIA Regulations came into effect on 2 August 2010. An in-depth review of the EIA process is provided in Chapter B2.
- **Natural and cultural resources use and conservation:** NEMA states that environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably. Disturbance of landscapes and sites that constitute the nation's cultural heritage is to be avoided, or where it cannot be altogether avoided, must be minimised and remedied.



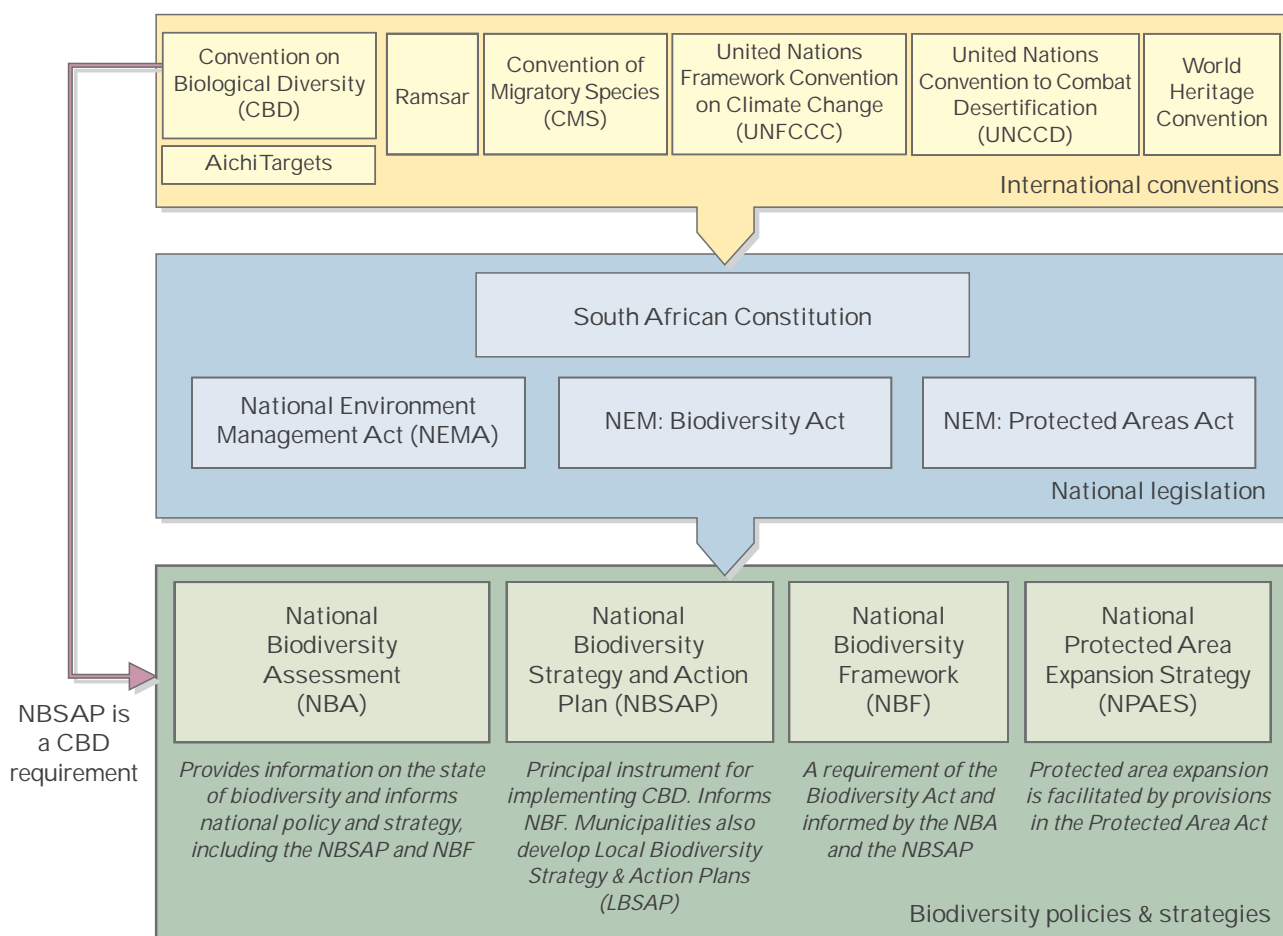
### Further reading

Detailed information on Environmental Legislation in South Africa is available in the SADC Environmental Legislation Handbook: [http://www.saiea.com/dbsa\\_handbook\\_update2012/dbsaFrameSet.html](http://www.saiea.com/dbsa_handbook_update2012/dbsaFrameSet.html)



# Key national policy, legislation, strategies and assessments on biodiversity

South Africa has a range of legislative instruments for biodiversity management and conservation. The Convention on Biological Diversity (CBD) has informed the legislative framework, since parties to the CBD are required to develop various legislative instruments at a national level for disseminating into local policies. From this, local level plans and guidelines are currently being developed.



*Relationship between international conventions, national legislation and biodiversity policies and strategies in South Africa.*

South Africa's biodiversity legislation is cutting-edge and well developed. However, challenges remain in ensuring effective implementation and enforcement of policy and legislation, as well as monitoring of policy outcomes. A brief summary of the key components of the legislative framework and biodiversity strategy documents are outlined in the text box that follows on the next page.



## Further reading

NBA report and maps are available on BGIS at <http://bgis.sanbi.org/nba/project.asp>

Download South Africa's NBSAP at <http://www.cbd.int/doc/world/za/za-nbsap-01-en.pdf>

The NBF is available at [http://www.greengazette.co.za/notices/national-environmental-management-act-no-107-of-1998-biodiversity-act-national-biodiversity-framework-for-south-africa-draft\\_20070629-GGN-30027-00801](http://www.greengazette.co.za/notices/national-environmental-management-act-no-107-of-1998-biodiversity-act-national-biodiversity-framework-for-south-africa-draft_20070629-GGN-30027-00801)

## South African legislation on biodiversity

**White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity (1997):** The progressive White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity highlights the important role of biodiversity and ecosystems in providing ecosystem services particularly to South Africa's development agenda. The White Paper outlines the need for new tools for biodiversity management outside the protected area network. It sets out the vision, mission and principles of a biodiversity strategy for South Africa. The goals of the White Paper have been carried through into the Biodiversity Act.

**National Environmental Management Act (NEMA) (No. 107 of 1998):** NEMA is an overarching framework Act covering broad principles of environmental management and can be regarded as the most important piece of environmental legislation. NEMA provides for the use of tools such as environmental impact assessments and Environmental Management Frameworks, as outlined in [Chapter B2](#). Under the auspices of NEMA are the five 'specific environmental management acts', including the Biodiversity Act and Protected Areas Act.

**National Environmental Management: Protected Areas Act (No. 57 of 2003):** The Protected Areas Act provides for the creation and management of a formal protection of a network of areas that are representative of South Africa's biodiversity and ecosystems. It is discussed in further detail in [Chapter B3: Protected Areas](#).

**National Environmental Management: Biodiversity Act (No. 10 of 2004):** The Biodiversity Act provides for the conservation and management of South Africa's biodiversity. It has been developed in alignment with NEMA for the conservation of species and ecosystems that warrant national protection, sustainable use of indigenous biological resources and fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources.

## National biodiversity assessments and strategy documents

**National Spatial Biodiversity Assessment (NSBA) (2004) and the National Biodiversity Assessment (NBA) (2011):** The National Biodiversity Assessment (NBA) and its predecessor the National Spatial Biodiversity Assessment (NSBA) provide information on the state of South Africa's biodiversity and ecosystems to i) inform national biodiversity policy and strategy revisions and ii) mainstream environmental decision-making such as land-use planning and the management and restoration of ecosystems.

**National Biodiversity Strategy and Action Plan (NBSAP) (2005):** A requirement for parties to the Convention on Biological Diversity (CBD), the NBSAP is the principle instrument used by national governments for implementing the CBD, and for reporting back. The NBSAP strategic objectives inform the National Biodiversity Framework, which is a requirement of the Biodiversity Act. South Africa's NBSAP is currently being updated to reflect the CBD Strategic Plan 2011-2020 and Aichi Targets ([Annex 2](#)).

**National Biodiversity Framework (NBF) (2008):** The NBF focuses on the most urgent strategies and actions required for protecting and managing South Africa's biodiversity. It is a requirement of the Biodiversity Act, is informed by the NBSAP and NSBA, and points to the roles and responsibilities of key stakeholders in the biodiversity sector, guiding the focus of their work through 33 Priority Actions. The NBF is a short- to medium-term tool (reviewed every five years), whereas the NBSAP is the long-term strategy.

**National Protected Area Expansion Strategy (NPAES) (2008):** The NPAES goal is to achieve cost-effective protected area expansion for ecological sustainability and increased resilience to climate change. It sets targets for protected area expansion, provides maps of the most important areas for protected area expansion (based on the NSBA), and makes recommendations on mechanisms for protected area expansion (facilitated by provisions in the Protected Areas Act).



## Key points on the Biodiversity Act

By recognising that biodiversity conservation must also occur outside of protected areas, the Biodiversity Act introduces tools including:

- Development of a National Biodiversity Framework (NBF)
- Development and publishing of bioregional plans ([page 39](#)) to map and identify Critical Biodiversity Areas (CBAs), and provide guidelines for land-use planning and decision-making in these areas.
- Development and publishing of Biodiversity Management Plans (BMP) for an ecosystem, an indigenous species, or a migratory species.
- Publishing of threatened ecosystems and species ([page 41](#)) in the Government Gazette, and the requirement for permits for carrying out a restricted activity involving a threatened species.
- Prevention of the spread, and eradication of, invasive alien species ([page 13](#))

# National government priorities and biodiversity management



## Key point

The NDP recognises the role of municipal and provincial government in the implementation of the plan at the 'ground-level'.

## The National Development Plan 2030

The National Development Plan (NDP) 2030 offers a long-term perspective on South Africa's priorities, and aims to eliminate poverty and reduce inequality by 2030. It defines a desired destination and identifies the role different sectors of society need to play in reaching that goal. The NDP recognises the wealth of natural resources such as biodiversity and the need to protect the environment whilst benefiting from mineral resources. It proposes three measures to protect natural resources in South Africa:

- i) An Environmental Management Framework (page 57), including biodiversity offsets for developments with negative environmental or social impacts.
- ii) Targets for protected areas.
- iii) Annual reports of the health of natural resources in order to inform policy.

## Government priorities and biodiversity

The Medium Term Strategic Framework (MTSF) is a framework that guides government's programme of work in a particular electoral mandate period. It provides a prioritisation framework focusing government efforts on strategic priority areas. The phased development of new MTSFs every 5 years provides guidance for achieving the NDP priorities.

The MTSF for the period of 2014-2019 provides a framework for implementing South Africa's transition to an environmentally sustainable, climate change resilient, low-carbon economy. The MTSF is a key input in determining national budget allocations, through the Medium Term Expenditure Framework.

The MTSF strategic priorities are articulated in more detail in key Outcomes, with accompanying measurable outputs and key activities, and Outcome Delivery Agreements. The latter are performance agreements between the President and Ministers. Outcome 10 in the MTSF 2014-2019 is 'Environmental assets and natural resources that are well protected and continually enhanced', and sets priorities for relevant government departments and conservation agencies.



## Further reading

More information about the NDP is available at <http://www.gov.za/issues/national-development-plan-2030>

Updated information about the MTSF and Outcomes is available at <http://www.gov.za>

## Outcome 10 Delivery Agreement

The Government's main priorities for the period reflected by the MTSF are reflected by 12 Outcomes, derived from the Strategic Plan of The Presidency's ten priorities. These outcomes form the government's delivery and implementation plans for the period. The plans are reviewed annually and reported on throughout the year, forming a key input in determining national budget allocations. Final budget allocations affect the order of priorities and phasing of the implementation of the delivery agreements.

# Gauteng Nature Conservation Bill/Transvaal Nature Conservation Ordinance

The Gauteng Nature Conservation Bill, once enacted, will detail the management of natural resources and regulate animals, plants and hunting in Gauteng. At the time of writing, the Transvaal Nature Conservation Ordinance of 1983 is still applicable, but will be superseded once the Gauteng Nature Conservation Bill has been passed.

The Gauteng Nature Conservation Bill provides the legislative framework for the management and conservation of biodiversity across the province – including areas outside of the protected area network. Prior to the National Environmental Management: Protected Areas Act (No.57 of 2003), designation of protected areas was provided for by the Transvaal Nature Conservation Ordinance. However, areas conserved under the ordinance have been declared under the Protected Areas Act and any future declaration of protected areas will also be declared under the Protected Areas Act.

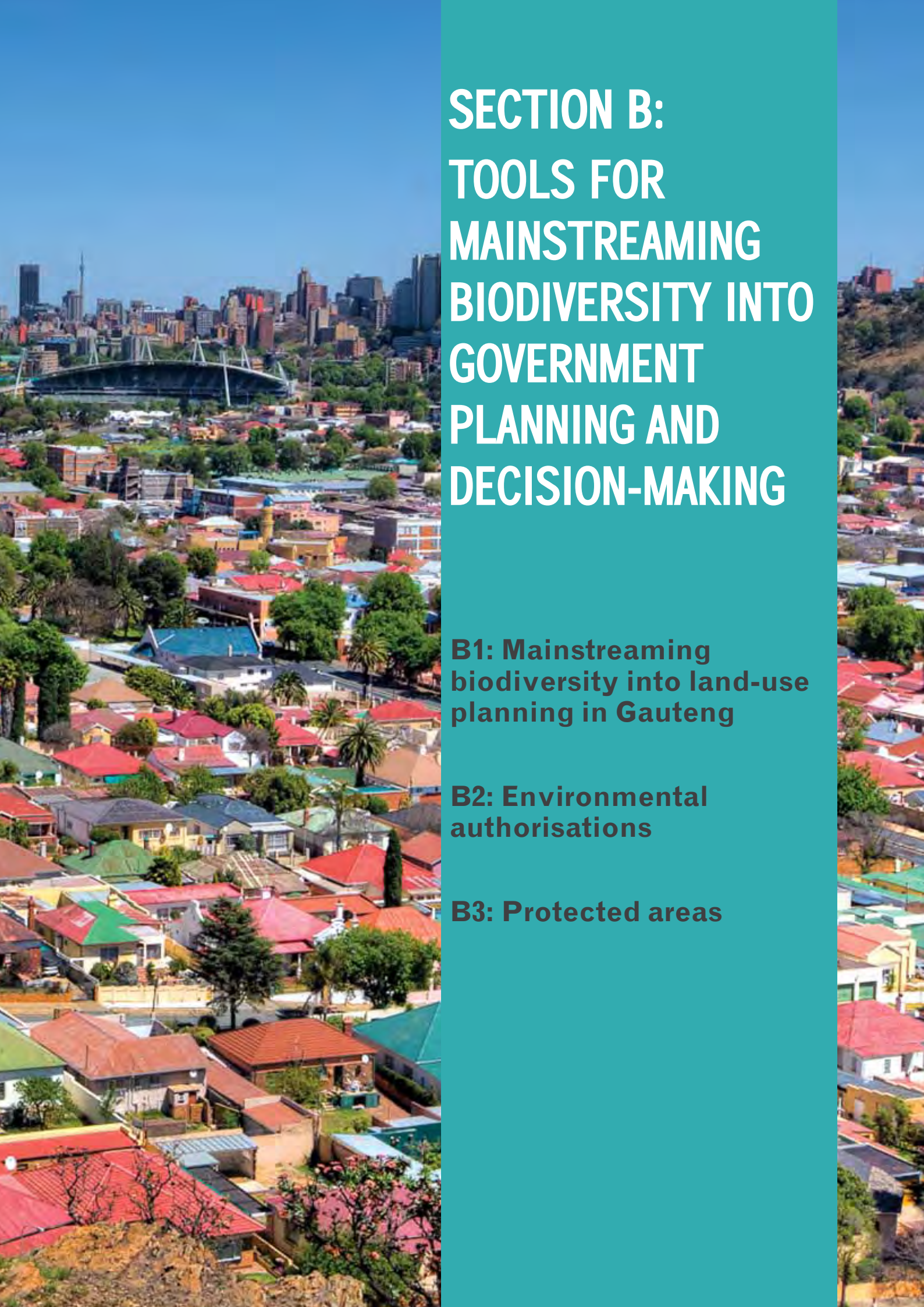
The Gauteng Nature Conservation Bill details the management and conservation of biodiversity and habitats in the province, as well as the management and control of [invasive alien species](#). The bill reflects the content of the Transvaal Nature Ordinance but has been created to align with the provisions of the National Environmental Management Acts ([Chapter A2](#)).

The Gauteng Nature Conservation Bill provides for:

- The conservation of biodiversity within Gauteng.
- The sustainable use of biodiversity within Gauteng.
- The protection of caves and cave formations.
- Professional hunting.
- The establishment of zoos and similar institutions.
- The appointment of nature conservators.
- The issuing of permits and other authorisations, as well as penalties for contraventions.







# SECTION B: TOOLS FOR MAINSTREAMING BIODIVERSITY INTO GOVERNMENT PLANNING AND DECISION-MAKING

**B1: Mainstreaming  
biodiversity into land-use  
planning in Gauteng**

**B2: Environmental  
authorisations**

**B3: Protected areas**

# COLBYN VALLEY WETLAND



**VISITING HOURS 6:00 - 18:00**

**ENQUIRIES: (012) 348-1265/6**

# B

# MANAGING AND CONSERVING BIODIVERSITY

## Chapters in this section:

- **Land-use planning**
- **Environmental authorisations**
- **Protected areas**

Management and conservation of biodiversity priority areas both inside and outside of protected areas is important to maintaining healthy, functioning ecosystems supportive of people and economic activities in Gauteng.

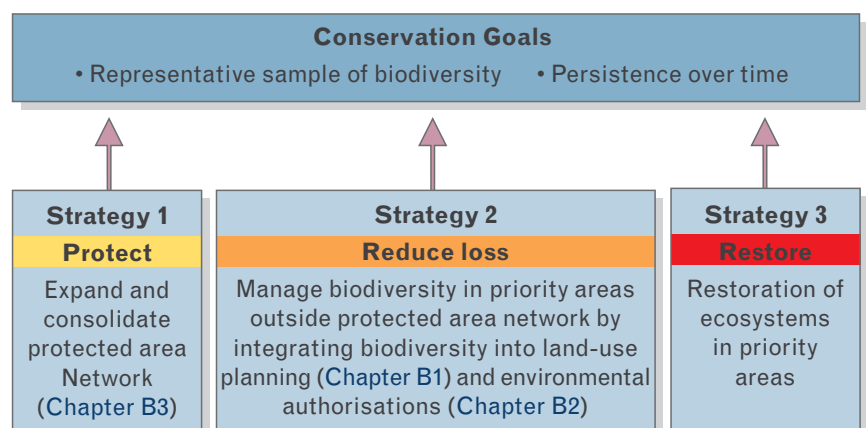
Expanding and consolidating the protected areas network provides one strategy for managing and conserving biodiversity but is limited in the area to which it can be applied. Particularly in densely populated regions such as Gauteng which has intense land use pressures and high land values.

Reducing loss in biodiversity priority areas that are outside of protected areas is therefore necessary. This strategy for managing biodiversity requires: integrating biodiversity into land-use planning at municipal or local government level; mainstreaming biodiversity into decision-making around environmental authorisations; and improving land-use management practices (such as grazing or fire management) in production landscapes such as agriculture, forestry or mining.

Rehabilitation of biodiversity priority areas to maintain biodiversity assets and ecological infrastructure that have been degraded is another important strategy for managing and conservation biodiversity. Rehabilitation efforts may be required both inside and outside protected areas, but it is a very expensive and difficult process that seldom restores an ecosystem to its natural state. It is more effective to manage and conserve biodiversity through:

- Integrating biodiversity into land-use planning ([Chapter B1](#))
- Environmental authorisations ([Chapter B2](#))
- Protected areas ([Chapter B3](#))

Through these three chapters, this section summarises the tools and information resources available to mainstream biodiversity into government planning and decision-making in Gauteng.



*Strategies for achieving biodiversity conservation goals*

# Summary of tools for mainstreaming biodiversity into government planning and decision-making

## Core tools

Tool	Page	Summary
<b>Gauteng Conservation Plan (C-Plan)</b>	<b>37</b>	Map of Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESAs) in Gauteng.
<b>Bioregional Plans</b>	<b>39</b>	Maps of CBAs and ESAs at the municipality level. In Gauteng, bioregional plans exist (in draft or gazetted form) for 10 municipalities.
<b>List of ecosystems that are threatened and in need of protection</b>	<b>41</b>	Ecosystems gazetted as critically endangered (CR), endangered (EN), and vulnerable (VU). Only terrestrial ecosystems have been listed.
<b>National Freshwater Ecosystem Priority Areas (NFEPA)</b>	<b>43</b>	Maps and management guidelines of priority freshwater ecosystems.
<b>Gauteng Protected Areas Expansion Strategy (GPAES)</b>	<b>75</b>	Provincial map of areas targeted to become protected areas.
<b>Red List Plant Species Guidelines</b>	<b>65</b>	List of species requiring protection. Guidelines indicate the size of buffer area depending on species and location.
<b>Environmental Management Frameworks (EMF)</b>	<b>57</b>	Map and land use guidelines for areas of environmental and cultural importance.
<b>Gauteng ridges guideline</b>	<b>61</b>	Map and guidelines of ridges classified ridges in Gauteng.

Application			Protected Areas
Land-use planning	Environmental authorisations		
Should be used to inform IDPs, SDFs, land-use planning and management.	Reflects CBAs which triggers a basic assessment. Provides context to decision-makers when considering individual applications or the cumulative impact of development within CBAs or ESAs.	Used to develop the GPAES and to highlight areas most appropriate for protected area expansion from a biodiversity perspective.	
Must be used to inform IDPs, SDFs, land-use planning and management.	CBAs trigger a basic assessment in terms of Listing Notice 3. Decision-maker must show how the Bioregional Plan was considered in the decision-making process.	Used to highlight areas most appropriate for protected area expansion from a biodiversity perspective.	
The need to protect CR and EN listed ecosystems must be taken into account in IDPs and SDFs.	Reflects threatened ecosystems which triggers a basic assessment. Provides context to decision-makers when considering individual applications or the cumulative impact of development.	Threatened ecosystems with low levels of protection are one of the primary drivers of protected area expansion.	
Spatial planning should take into account the need for appropriate land uses in FEPA sub-catchments.	Buffer of natural vegetation of 100m is recommended for river & wetland FEPAs (according to the Implementation Manual for FEPAs).	Use NFEPA map to identify priority areas for improving the protection levels of ecosystems.	
IDPs and SDFs should limit development in the areas outlined in the GPAES. Areas neighbouring those in the GPAES should have appropriate (e.g. low impact) development.	Reflects focus areas for National Protected Area Expansion Strategy which triggers a Basic Assessment. Provides context to decision-makers when considering individual applications or the cumulative impact of development within these areas.	The GPAES is the primary source of information for protected area expansion. The GPAES map show areas to be prioritised.	
Locations of threatened species inform land-use planning and management.	Buffer areas required where species are found on site. Size of buffer depends on species and location.		
EMFs support the compilation of the SDFs and identify areas where development is encouraged or should be excluded.	Sensitive areas outlined in an EMF are geographical areas that trigger a Basic Assessment under Listing Notice 3. Provides context to decision-makers.		
The guideline indicates applicable use for ridges in each of the four classes.	Use ridges map to determine ridge class and requirements for EIA applications.		

## Additional tools

<b>Local Biodiversity Strategy and Action Plan (LBSAP)</b>	<b>46</b>	A LBSAP aligns local and national policy, creating a local plan for biodiversity protection in the municipality that can be used across all departments.	IDP and SDF should take LBSAP (where they exist) into account.	
<b>Grassland Ecosystem Guidelines</b>	<b>45</b>	Management guidelines specific to grassland ecosystems.	Aids the development of biodiversity-compatible land use management plans and EMFs.	Guides pre-application screening of development risks and can aid decision-making for environmental authorisations.
<b>Gauteng biodiversity offset guidelines</b>	<b>59</b>	Guidelines for applying biodiversity offsets to development applications in Gauteng.		Unavoidable loss of biodiversity must be 'offset', in a 'like-for-like' exchange. Appropriate for 'medium' importance biodiversity areas - loss of biodiversity of 'high' importance should not be sanctioned, even with an offset.
<b>Green servitudes regulatory tool</b>	<b>79</b>	Tool for municipalities to implement green servitudes. Developed by the City of Johannesburg, but has application elsewhere.		Voluntary or enforced creation of a green servitude can conserve important biodiversity areas on a portion of a site.
<b>Lifestyle estate guideline</b>	<b>64</b>	Guidelines to inform the planning of lifestyle housing estates.		Aimed at consultants planning a lifestyle housing estate. Adherence to the guidelines would streamline the environmental authorisation process.
<b>Sustainable development criteria</b>	<b>63</b>	Criteria to ensure sustainable development principles are fully integrated into the design of built environment projects.		Guides planning professionals and environmental practitioners. Adherence to the guidelines would streamline the environmental authorisation process.
<b>Mining and Biodiversity Guideline</b>	<b>69</b>	Guidelines for mainstreaming biodiversity into mining applications and operations, including map of high and low risk sites.	The map details areas that would be more suitable for mining. This information should be included in the development of IDPs and SDFs.	Map can be used for determining the risk associated with a mining application.
<b>Gauteng biodiversity stewardship strategy</b>	<b>77</b>	Systematic approach to entering into agreements with private and communal landowners to protect and manage biodiversity priority areas.		Authorities may identify biodiversity stewardship as a mechanism to conserve and manage portions of land where important biodiversity exists.
				Provincial mechanism for securing important biodiversity on private land under the Protected Areas Act.





# MAINSTREAMING BIODIVERSITY INTO LAND-USE PLANNING

## Fact sheets in this section:

- **Local Government mandates for mainstreaming biodiversity into land-use planning**
- **Systematic biodiversity planning**
- **Gauteng Conservation Plan (C-Plan 3.3)**
- **Bioregional plans**
- **List of ecosystems threatened or in need of protection**
- **National Freshwater Ecosystem Guidelines**
- **Grassland Ecosystem Guidelines**
- **Local Biodiversity Strategy and Action Plans**

Informed, long-term land-use planning is the most effective way of optimising how land is used socially, economically and environmentally. It is important to understand that biodiversity conservation and development are compatible (i.e. conservation AND development, not conservation OR development) but only if local biodiversity information is considered during the planning process.

The first step in this process is known as **systematic biodiversity planning**, which identifies biodiversity priority areas that are important for conserving a representative sample of ecosystems and species, for maintaining ecological processes, or for the provision of ecosystem services. These areas are configured as efficiently as possible to take up the smallest possible area.

With these biodiversity priority areas identified, this information can be fed into other land-use planning processes in a way that avoids very important areas, reduces impact on biodiversity overall, and supports appropriate development planning.

There is a wealth of biodiversity information available and guidelines for integrating this information into land-use planning in Gauteng. The following fact sheets review biodiversity guidelines, plans and maps in Gauteng that should be used to mainstream biodiversity into land-use planning.

# Local government mandates for mainstreaming biodiversity into land-use planning



Land-use planning anticipates long-term trends in land use pressures in order to plan for a sustainable future. Since land use decisions are taken at the municipal and provincial level, local governments are vital stakeholders for mainstreaming biodiversity into land-use planning. Land-use planning in municipalities and provinces is guided by Integrated Development Plans and associated Spatial Development Frameworks, detailed below.

“Investing in sustainable land use will contribute to Gauteng’s economic vitality, while failure to mainstream sustainable land-use planning will result in significant economic costs. Addressing urban sprawl will regenerate previously defunct economic areas, whereas the long-term economic effect of unchecked urban sprawl is the isolation of low-income groups. Investing in Gauteng’s green spaces, which create opportunities to socialise and rest, will fundamentally boost quality of life and socio-economic integration ratings and the associated economic feedbacks. By investing in its green infrastructure, Gauteng will free up revenue that is spent on disaster recovery and infrastructure costs. There are exciting employment benefits in maintenance, entrepreneurial and public sector industries for Gauteng’s sustainable land use sector”.

Source: Department of Economic Development, Gauteng Provincial Government. Green Strategic Programme for Gauteng. <http://www.gcro.ac.za/project/green-strategic-programme-gauteng>

## Integrated Development Plan

As per the Municipal Systems Act, each municipality is required to create an Integrated Development Plan (IDP), which acts as the main strategic planning instrument for municipalities. An IDP is a ‘super plan’ for the municipality that gives an overall framework for development, detailing how land should be used, what infrastructure and services are needed and how the environment should be protected. The content of the IDP is directed by the Local Government: Municipal Planning and Performance Management Regulations, 2001. In the case of local and district municipalities, the respective IDPs must be aligned for both municipalities.

Once the IDP is drawn up, all municipal planning and projects should happen in terms of the IDP. The IDP has a lifespan of 5 years, linked directly to the term of office for local councillors. After every local government election, the new council has to decide on the future of the IDP. The IDP is reviewed every year and necessary changes can be made.



### Key point

IDPs must take account of any existing proposals and policies. The IDP must take **bioregional plans (page 39)** and **threatened ecosystems (page 41)** into account.



### Climate Change and the IDP

According to the Municipal Systems Act, the IDP must include plans on how potential disasters will be managed. Ecological infrastructure can prevent or mitigate natural disasters like floods, fires, landslides – events likely to increase in the face of climate change. Ecological infrastructure therefore has a critical role to play in disaster risk reduction, and should be integrated into all levels of disaster management planning, especially at the municipal level. The role of ecosystem-based adaptation to climate change (see **page 11**) should therefore be considered in the development of IDPs.



### Key point

The SDF must also comply with any existing municipal Environmental Management Frameworks (EMF). See [page 57](#) for further information.

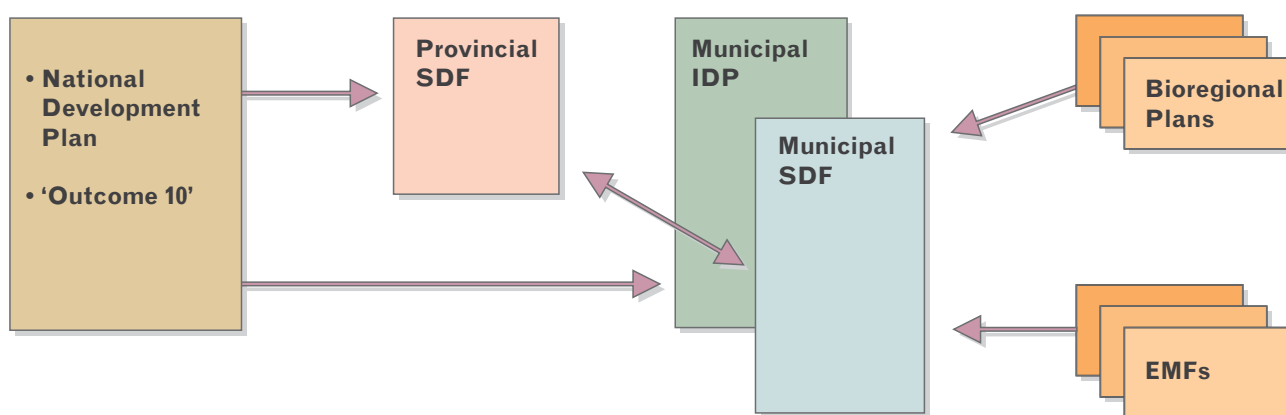
## Spatial Development Framework

The Local Government Municipal Systems Act also requires all municipalities to compile a Spatial Development Framework (SDF) as a core component of the IDP. The SDF maps the vision, goals and objectives of the municipal IDP, and is the legally enforceable component of the IDP, indicating to the municipality and the public where certain types of land use and associated developments are permissible, and where certain activities are unlikely to be permitted.

### What is the difference between an IDP and an SDF?

An IDP provides a clear strategic vision, set of goals and objectives of the municipality. The SDF translates the IDP spatially – i.e. maps how the implementation of the IDP should occur in space. The SDF is the legally enforceable component of the IDP.

A SDF should be based on the IDP planning principles, promoting equality and sustainability – and therefore should be aligned with bioregional plans and Environmental Management Frameworks (EMF). It must be aligned with relevant national and provincial policy, whilst understanding the requirements of a particular municipality. The content of a SDF is regulated by the Local Government: Municipal Planning and Performance Management Regulations, 2001, and requires a Strategic Environmental Assessment (SEA) of the SDF.



*Provincial and municipal SDFs must align national, provincial and municipal policies and frameworks*

## Spatial Planning and Land Use Management Act

The Spatial Planning and Land Use Management Act (No. 16 of 2013) (SPLUMA) has recently been gazetted to guide land-use planning in South Africa. It provides a framework regulating municipal and provincial planning. The Act defines which land-use decisions are a municipal, national and/or provincial responsibility and ensures that all land development applications must be submitted to a municipality.

One of the objectives of SPLUMA is to provide for the sustainable and efficient use of land, by aligning land-use planning with environmental management instruments. SPLUMA provides a range of minimum standards that national and provincial governments must comply with when compiling their spatial plans and requires national, provincial and local governments to prepare SDFs, however, SPLUMA only allows regional and municipal SDFs to have land use guidelines.



### Key point

SPLUMA makes provision for local municipalities to be the final decision-maker in land-use decisions. Where an activity requiring authorisation in terms of the Act is also regulated in terms of another law or the provincial body, the relevant municipality and other authority may exercise their respective powers jointly by issuing either separate or integrated authorisations.

According to SPLUMA, SDFs must take cognisance of environmental tools and instruments adopted, as well as legislation and policies relating to sustainable development. A five-year SDF must be created for the spatial form of the municipality – as per the Municipal System Act – with a long-term spatial development vision for growth and development patterns in the next 10-20 years. The municipal SDF must include a strategic assessment of environmental pressures and opportunities and municipalities should ideally ensure consistency and integration between different plans and frameworks such as IDPs, SDFs, EMFs and bioregional plans.

Although the SPLUMA came into effect in August 2013, a provision under Section 61 reads that it will only "come into operation on a date fixed by the President by proclamation in the Gazette". No such further proclamations had occurred at the time of writing. Many municipalities therefore still operate with different land use schemes for different areas. Within five years of the Act commencing, all municipalities must have adopted single land use schemes. Provincial planning legislation will have to be developed so as to align with SPLUMA (as outlined in the Act) and none of the provinces are currently compliant.

For more information visit [http://www.salga.org.za/app/webroot/assets/files/MediaRoomStatements/8th%20National%20Municipal%20Managers%20Forum/5\\_11%20SPLUMA%208%20SALGA%20Nat%20MM%20Forum%204-5%20Sept2014\\_edited.pdf](http://www.salga.org.za/app/webroot/assets/files/MediaRoomStatements/8th%20National%20Municipal%20Managers%20Forum/5_11%20SPLUMA%208%20SALGA%20Nat%20MM%20Forum%204-5%20Sept2014_edited.pdf)



### Climate change

SPLUMA highlights the importance of spatial planning in ensuring that communities and livelihoods are resilient to environmental shocks, such as those generated by climate change (e.g. floods, droughts). This principle should be integrated into land use planning and management.

### Streamlining biodiversity initiatives across the provincial and local government in Gauteng

The Green Strategic Programme (GSP) has been created so that municipalities, provincial departments and national government working on environmental issues within Gauteng are focused on the same targets. The programme actions provide a framework from which all government departments and agencies will commit resources and align environmental initiatives. It is envisaged that the GSP, will become the underlying strategy for ensuring that environmental and biodiversity issues are streamlined into local government mandates across Gauteng.

More information about the Gauteng Department of Economic Development, Gauteng Provincial Government's Green Strategic Programme for Gauteng is available at <http://www.gcro.ac.za/project/green-strategic-programme-gauteng>





# Systematic biodiversity planning

Systematic biodiversity planning is a technique used to identify, manage and conserve biodiversity priority areas, whilst ensuring that land use conflicts are minimised. Systematic biodiversity planning is used to create tools such as maps and land-use guidelines that support integration of biodiversity into land-use planning.

Systematic biodiversity planning is a rigorous scientific method for identifying geographic areas of biodiversity importance. The configuration of priority areas is designed to be spatially efficient (i.e. to meet biodiversity targets in the smallest area possible) and to avoid conflict with other land and water resource uses where possible<sup>6</sup>. It involves mapping biodiversity features and their ecological condition, setting biodiversity targets, and developing maps that show spatial biodiversity priorities.

## Step 1: Map spatial layers. WHAT do we need to conserve?

- Map biodiversity features (e.g. vegetation types, rivers, species of concern).
- Map land uses and ecological condition.
- Map protected areas.

## Step 2: Set targets. HOW MUCH of those areas do we need to conserve?

- Set targets for biodiversity features.

## Step 3: Analyse data. WHERE are the areas that we need to conserve?

- Use specialised biodiversity planning and GIS software to assess spatial options for meeting biodiversity targets.

## Step 4: Interpret outputs. HOW should it be managed?

- Identify Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) that maintain CBAs.
- Set land management objectives for CBAs and ESAs.

## Step 5: Present outputs as maps and guidelines. USING this information, COMMUNICATING it to others and MAINSTREAMING it across sectors.

- Recommend compatible land use types for CBAs and ESAs (i.e. what land uses are compatible for these areas?).
- Make map and accompanying guidelines available to users, and support their uptake.

*How to create a systematic biodiversity plan (adapted from: SANBI. 2010. Biodiversity for Development. [http://cmsdata.iucn.org/downloads/primer\\_11\\_2\\_mb.pdf](http://cmsdata.iucn.org/downloads/primer_11_2_mb.pdf))*

To effectively manage and conserve biodiversity, we need to conserve a representative sample of biodiversity pattern (ecosystems and species) and supporting ecological processes that will allow it to persist over time. To do this, we need to set quantitative biodiversity targets or thresholds that tell us how much of each biodiversity feature (e.g. vegetation type/unit/habitat/species) should be conserved in order to maintain functioning landscapes.

<sup>6</sup>National Biodiversity Assessment (2011). Available at <http://bgis.sanbi.org/nba/project.asp?>

## Biodiversity targets

A key question in systematic biodiversity planning is 'how much' needs to be conserved? Biodiversity targets provide a basis for monitoring of biodiversity conservation progress and define areas that need to be maintained in good ecological condition to allow each ecosystem type or species to be represented and to persist. The biodiversity pattern threshold or 'target' the minimum amount of an ecosystem type that should be maintained in good ecological condition.

An ecosystem in which the extent of remaining natural habitat in the ecosystem is less than the biodiversity target is categorised as critically endangered. This is one of the categories of threatened ecosystems. Find out more on [page 41](#).

## Identifying priority areas required to meet biodiversity targets

Spatial information on biodiversity features, ecological condition and land use is combined, using specialised biodiversity planning software in combination with GIS, to identify the most efficient and effective network of areas for meeting biodiversity targets, avoiding conflict with competing land uses where possible. The resulting map of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) are areas required to meet biodiversity targets and support ecological function and should be used to guide all spatial planning in the region.

Some of these areas are so important in terms of their biodiversity value that there is little flexibility in their location and management, and their persistence is critical to securing a representative sample of biodiversity. Other areas have more flexibility in terms of the management or development implications – certain appropriate development would be acceptable.

The provincial systematic biodiversity plan for Gauteng is the Gauteng Conservation Plan (known as Gauteng C-Plan). The most recent version is Gauteng C-Plan 3.3, which was released in 2011 (see [page 37](#) for more information).



### Further reading

SANBI Biodiversity Advisor:  
<http://biodiversityadvisor.sanbi.org/>

Driver, A., Cowling, R.M. & Maze, K. (2003) *Planning for Living Landscapes: Perspectives and Lessons from South Africa*.  
[http://www.cepf.net/documents/living\\_landscapes.pdf](http://www.cepf.net/documents/living_landscapes.pdf)





# Gauteng Conservation Plan (C-Plan 3.3)



## Key point

The Gauteng C-Plan uses these considerations for determining CBAs and ESAs:

- **Efficiency** – trying to meet biodiversity targets in the smallest area of land possible.
- **Conflict avoidance** – avoid conflict with other land uses where possible.
- **Representativeness** – conserving a representative sample of biodiversity pattern.
- **Persistence** – conserving processes that allow biodiversity to persist over time.
- **Targets or thresholds** – how much of each biodiversity feature should be conserved.
- **Transparency** – clear rationale for decisions, enabling review.
- **Climate change** design principles (e.g. conserving areas with climatic gradients, minimising fragmentation).

## What is a spatial biodiversity plan?

It is a plan that identifies one or more categories of biodiversity priority area, using the principles and methods of systematic biodiversity planning. South Africa has a suite of spatial biodiversity plans at national and provincial level, which together should inform land-use planning, environmental impact assessment, water resource management and protected area expansion. From: National Biodiversity Assessment (2011) (see [page 21](#))

## Introduction to the Gauteng C-Plan 3.3

The Gauteng Conservation Plan is a spatial biodiversity plan which highlights Critical Biodiversity areas (CBAs) and Ecological Support Areas (ESAs) in the Gauteng Province. Since habitat loss is the greatest threat to biodiversity, awareness of CBAs and ESAs in land-use planning and decision-making is essential. The Gauteng C-Plan is not simply a map of areas of existing biodiversity; it is a systematic biodiversity plan which determines which areas of remaining biodiversity most efficiently ensure biodiversity and ecological processes are maintained into the future.

### Definitions:

**Critical Biodiversity Areas (CBAs)** are the parts of the landscape we want to keep natural, and are required for meeting biodiversity targets. CBAs can also be defined as areas required to meet biodiversity targets for ecosystems, species or ecological processes, as identified in a systematic biodiversity plan. These areas may be terrestrial or aquatic.

**Ecological Support Areas (ESAs)** support the ecological functioning of CBAs and/or provide ecosystem services. ESAs need to stay functional in order to maintain the integrity of the CBAs, but do not need to be maintained in a natural state to do so as long as their natural function is retained. As a consequence, land use and management differs between CBAs and ESAs. ESAs play an important role in supporting the ecological functioning of one or more CBA or in delivering ecosystem services. These areas may be terrestrial or aquatic.

## Development of Gauteng C-Plan 3.3

The Gauteng C-Plan is a provincial plan, developed by the Gauteng Department for Agriculture and Rural Development (GDARD). To understand the Gauteng C-Plan and the importance of the CBAs and ESAs, it is useful to consider the data and logic used in the creation of the plan. The Gauteng C-Plan is a systematic biodiversity plan, which considers not only the presence and status of biodiversity, but also the **importance** and **efficiency** of maintaining a particular area.

## Who should use the Gauteng C-Plan?

The Gauteng C-Plan should be used as a basis for municipal-level planning and provincial-level decision-making, including SDFs and environmental authorisations. The Gauteng C-Plan is the systematic biodiversity plan that underpins bioregional plans in the province.

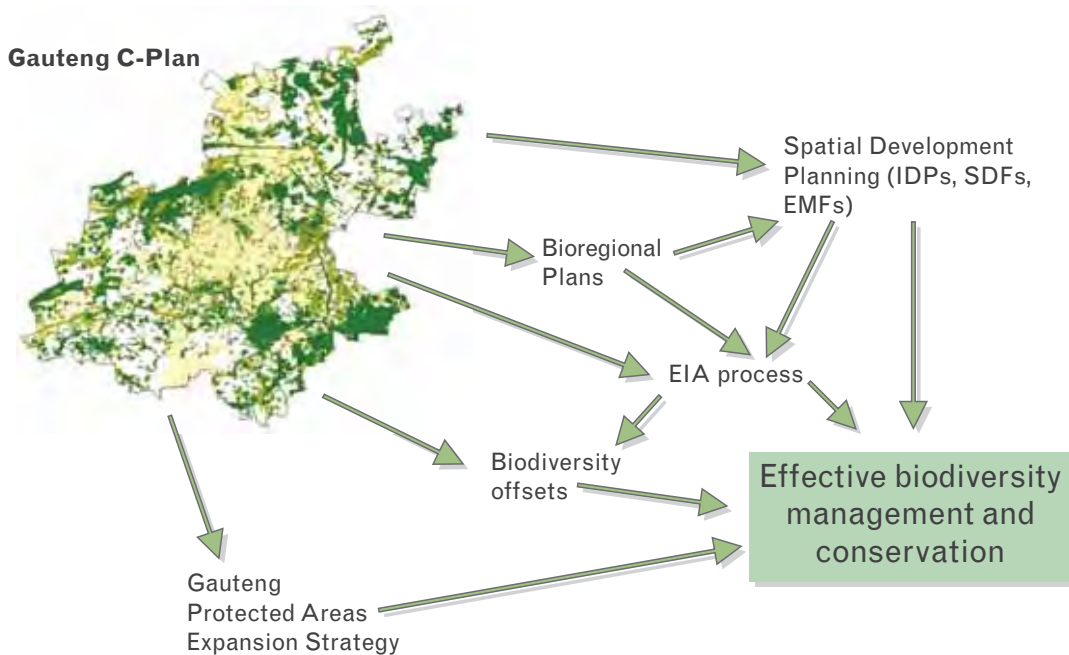


## Further reading

The Gauteng C-Plan is hosted for GDARD on the SANBI Biodiversity GIS (BGIS) website, viewable as an interactive map, or as a downloadable shapefile for analysis using GIS. Available at <http://bgis.sanbi.org/gauteng/project.asp>

The main purposes of the Gauteng C-Plan 3.3 are:

- To serve as a basis for municipal planning e.g. SDFs, land use zoning.
- To serve as a decision-support tool for the EIA process ([Chapter B2](#)).
- To inform protected area expansion and biodiversity stewardship programmes ([Chapter B3](#)) in the province.



*The Gauteng C-Plan should be used to inform land-use planning and environmental authorisations.  
Source: SANBI and GDARD.*

## Into the future

The Gauteng C-Plan must be considered a 'live' document as it will be updated and revised to reflect changes in the distribution and ecological condition of biodiversity over time. GDARD are the responsible party for ensuring the Gauteng C-Plan is up-to-date and contains the best available information.



# Bioregional plans



## Key point

Bioregional plans inform practitioners involved in land-use planning and decision-making. However, it is important to recognise that the bioregional plan does not in itself grant or limit land use rights – but must be considered during a decision-making process. Once published, municipalities are legally required to consider the bioregional plan during spatial planning.

Bioregional plans provide powerful tools for municipal land-use planning. To ensure effectiveness, a 'bioregion' aligns with municipal boundaries (district, metropolitan or local) and the bioregional plans are based on a systematic biodiversity plan. In Gauteng, all bioregional plans are based on Gauteng's provincial biodiversity plan (known as Gauteng C-Plan 3.3).

Provided for under the National Environmental Management: Biodiversity Act (No. 10 of 2004) (see [page 19](#)), bioregional plans inform land-use planning, environmental authorisations and natural resource management outside of protected areas. The development of bioregional plans for municipalities is a National Biodiversity Framework priority (no. 17). The bioregional plan serves as the primary source of biodiversity information for a range of planning processes. Bioregional plans map the Critical Biodiversity Areas (CBAs) in a municipality for use in municipal level planning such as the Integrated Development Plan (IDP) and Spatial Development Framework (SDF). The CBAs identified in bioregional plans also trigger Listing Notice 3 of the Environmental Impact Assessment (EIA) regulations ([Chapter B2](#)). In cases where a bioregional plan has not yet been published, the relevant provincial spatial biodiversity plan should be used, in Gauteng, this is the Gauteng C-Plan.

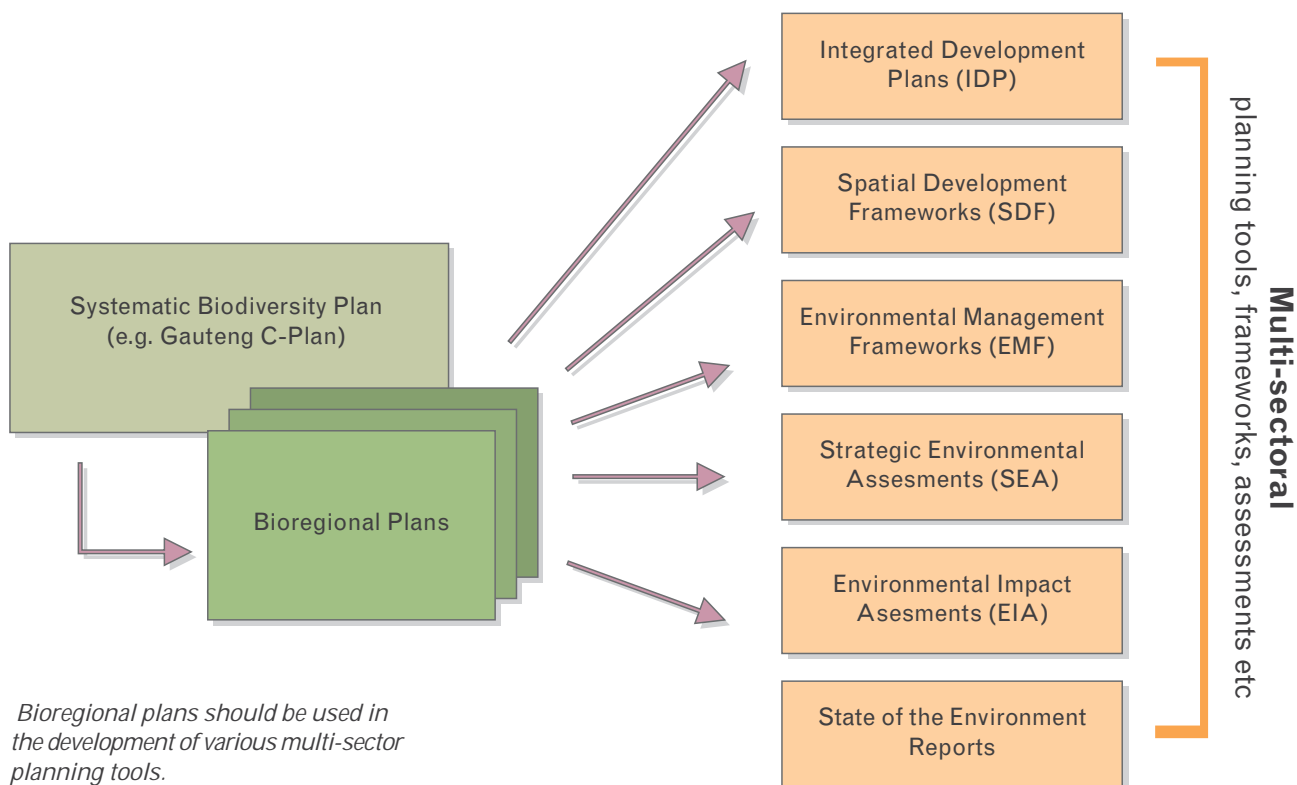
The basic elements of a bioregional plan are:

1. A biodiversity profile of the region, highlighting its biodiversity significance.
2. A map of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs).
3. Land use guidelines for the identified CBAs and ESAs.

## Biodiversity-compatible land use guidelines

Bioregional plans contain land-use guidelines for Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). These guidelines are designed to aid planners in identifying appropriate development zones and the controls for these designated areas. The guidelines also provide an indication of appropriate land-use within each area, providing compatible and incompatible land uses. Importantly, the bioregional plan provides guidance on appropriate land uses and activities, but does not in itself grant or remove development rights.





### Further reading

#### Where to find the bioregional plans and guidelines:

Bioregional plans for each of the municipalities within Gauteng have been developed. Once gazetted, they will be hosted by the SANBI Biodiversity GIS website:

<http://www.bgis.sanbi.org/>

#### When preparing a bioregional plan:

To assist with the development and publishing of bioregional plans in South Africa, SANBI and Department of Environmental Affairs (DEA) developed a guideline that has been gazetted under the Biodiversity Act - DEAT (2009) *Guideline regarding the Determination of Bioregions and the Preparation and Publication of Bioregional Plans*. This, and other information, is available on the Biodiversity Advisor website at <http://biodiversityadvisor.sanbi.org>

## Bioregional plans in Gauteng

High levels of development and high land prices limit protected area expansion in most areas of Gauteng (Chapter B3). Consequently, controls related to land-use planning (as outlined in this chapter) and environmental authorisations (Chapter B2) represent the best prospects for ensuring the long-term persistence of biodiversity in the region. Bioregional plans form an important basis for informing these decisions.

### Bioregional plan categories for Gauteng:

The categories of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) used in the Gauteng C-Plan have been split into two sub-categories in the bioregional plans developed for Gauteng municipalities. This has allowed more relevant land-use management guidelines for municipalities.

**Critical Biodiversity Area 1:** areas that need to remain in a largely natural state.

**Critical Biodiversity Area 2:** cultivated landscapes that are important for supporting threatened species.

**Ecological Support Area 1:** largely natural or near natural landscapes that should remain in, or be rehabilitated to, a functional state to prevent degradation of CBAs and protected areas.

**Ecological Support Area 2:** severely modified areas that retain some value for supporting ecological processes and where additional impacts on ecological processes should be avoided.



# List of ecosystems threatened and in need of protection

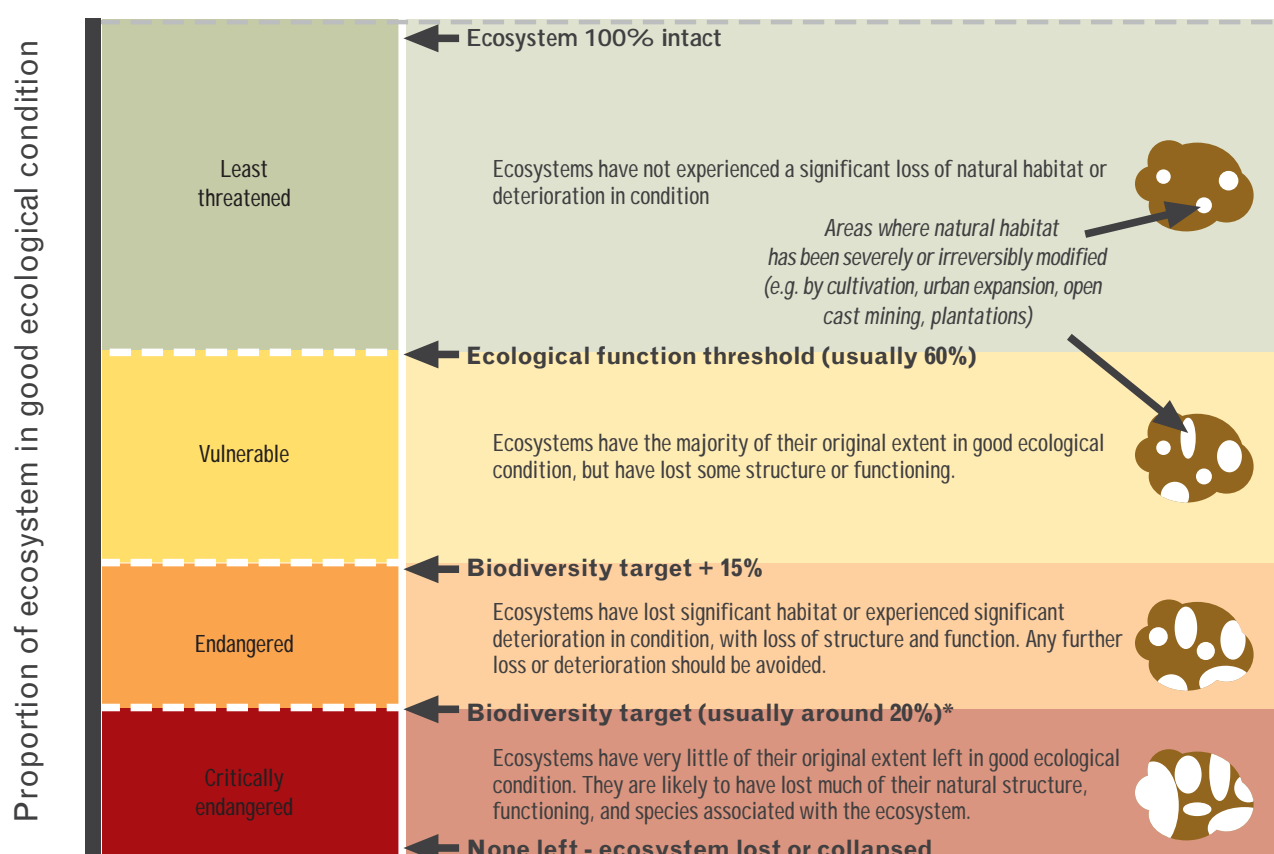


## Key point

In terms of EIA regulation, Listing Notice 3 requires that clearing 300m<sup>2</sup> or more of indigenous vegetation in a CR or EN ecosystem will trigger a basic assessment in terms of the Biodiversity Act. This means any development that involves loss of natural habitat in a listed CR or EN ecosystem is likely to require at least a basic assessment. If a CR or EN area more than 20 hectares is impacted, then a full scoping and EIA will be required.

Ecosystem threat status refers to the likelihood of an ecosystem persisting into the future. It is determined by considering how much of that ecosystem type is in poor ecological condition. The Biodiversity Act (NEM:BA) provides for listing ecosystems in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. Once a threatened ecosystem is gazetted, this must be accounted for during land-use planning. Listed ecosystems must be taken into account in municipal Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs) (as per Biodiversity Act) and for environmental authorisations in terms of NEMA ([Chapter B2](#)).

An ecosystem is categorised as critically endangered if the extent of remaining natural habitat of that type of ecosystem is less than or equal to its biodiversity target. For example, a 10 000ha ecosystem with a biodiversity target of 20% would be categorised as critically endangered if 2 000ha or less of the ecosystem remained in good ecological condition (i.e. natural or near natural). An ecosystem is categorised as vulnerable if the extent of remaining natural habitat in the ecosystem is less than or equal to 60% of the original extent of the ecosystem. This threshold indicates a loss of ecosystem functioning.



Thresholds used to assess ecosystem threat status. These relate to the proportion of any ecosystem type that remains in good ecological condition.  
\*Biodiversity target is the threshold for representation of biodiversity pattern.

In Gauteng, 6% of remaining natural vegetation is critically endangered, 5.8% endangered and 11.4% is vulnerable. As a total, 23.2% of the remaining natural vegetation in Gauteng is considered 'threatened'.

According to Section 54 of the Biodiversity Act, the need for protection of listed ecosystems must be taken into account in IDPs and SDFs. The following table outlines how IDP and SDFs should take threatened ecosystems into account during municipal and provincial planning:

Incorporating threatened ecosystems into the IDP	Incorporating threatened ecosystems into the SDF
Prioritise threatened ecosystems in the development of plans for invasive species control.	Include a map of listed ecosystems and accompanying descriptions.
Explore options to formally protect and manage municipal land that supports threatened ecosystems.	Ensure listed ecosystems are reflected in the final integrated map of spatial planning categories or zones.
Ensure that development projects identified by the IDP avoid conflict with or negative impacts on threatened ecosystems.	Apply appropriately restrictive land-use guidelines to listed ecosystems, so that further loss and degradation of natural habitat in these ecosystems is avoided.
Identify IDP projects or local economic development projects with biodiversity benefits, linked to management of threatened ecosystems.	

*Adapted from DEA (2011) National list of ecosystems that are threatened and in need of protection. Available at [http://bgis.sanbi.org/ecosystems/Threatened\\_Ecosystems\\_Descriptions\\_and\\_Maps.pdf](http://bgis.sanbi.org/ecosystems/Threatened_Ecosystems_Descriptions_and_Maps.pdf)*



### Further reading

Threatened ecosystems list and map: <http://bgis.sanbi.org/ecosystems/project.asp>





# National Freshwater Ecosystem Priority Areas



The National Freshwater Ecosystem Priority Areas (NFEPA) are freshwater ecosystems that have been identified as key areas for sustaining freshwater biodiversity and associated ecosystem services. Freshwater ecosystems refer to all inland water bodies whether fresh or saline, including rivers, lakes, wetlands, sub-surface waters and estuaries. These freshwater ecosystems are valuable ecological infrastructure (see [page 8](#)) for the provision of fresh water, fish and sustaining biodiversity and yet freshwater ecosystems are the most highly threatened group of ecosystem in South Africa.

In South Africa, 57% of river ecosystem types and 65% of wetland ecosystem types are classified as threatened. Wetlands are the most threatened ecosystems. In Gauteng, the flat nature of the landscape means that hydrological systems dominate the area and it is host to extensive wetlands and pans.

NFEPA maps provide strategic spatial priorities for conserving South Africa's freshwater ecosystems and supporting sustainable use of water resources, called Freshwater Ecosystem Priority Areas, or 'FEPAs'. FEPAs are the biodiversity sector's input on how many rivers, wetlands and estuaries should remain in good ecological condition.

The NFEPA maps were developed using the principles of systematic biodiversity planning and provide guidance on how many, and which, rivers, wetlands and estuaries should remain in a natural or near natural condition to support the water resource protection goals of the National Water Act and to protect water resources for human use. FEPAs do not necessarily need to be protected from human use entirely, but rather they should be supported by good planning, decision-making and management to ensure that use and development does not impact on the condition of the ecosystem.

The *Atlas of Freshwater Ecosystem Priority Areas in South Africa* maps the following priority freshwater ecosystems:

- **River FEPAs and associated sub-quaternary catchments:** Areas that are essential for achieving targets for river ecosystems and threatened or near threatened fishes and are in a 'natural' or 'largely natural' ecological condition.
- **Wetland or estuary FEPAs:** Wetlands or estuaries where ecological processes should be maintained.
- **Wetland clusters:** These are groups of wetlands in relatively natural landscapes that must be managed in support of maintaining ecological processes.
- **Fish sanctuaries and associated sub-catchments:** Rivers in good ecological condition that are essential for protecting threatened and near-threatened indigenous freshwater species (a red fish on a FEPA map indicates that critically endangered and/or endangered fish species may be present).
- **Fish support areas and associated sub-catchments:** Rivers in fair ecological condition that are important for conserving and supporting the migration of threatened or near-threatened indigenous fish species.
- **Upstream management areas:** These are sub-quaternary catchments that need to be managed to prevent degradation of downstream FEPAs and fish support areas.
- **Free-flowing rivers:** These are rivers that, due to their rarity as undammed systems, should preferably not be dammed. Of 63 free-flowing rivers, 19 flagship free-flowing rivers have been identified.



## Why are wetlands important?

Wetlands act like sponges, catching and storing water, either in the soil or on the surface and then slowly feeding it into rivers downstream. This protects areas from flooding and in times of drought, keeps rivers flowing.

A buffer of natural vegetation with a minimum width of 100 m is recommended for all river and wetland FEPAs.

If a site falls within a FEPA sub-catchment, the Implementation Manual for FEPAs should be used to guide planning and land use in and around these ecosystems. The guide gives a comprehensive overview on how to use the various NFEPA products in environmental assessments and recommends five steps for using FEPA products to inform environmental assessments.

### Case study:

#### Fines for wetlands degradation

A mining company was recently instructed to pay a sum of R4 million to the Department of the Environmental Affairs as a result of wrong-doing and negligence resulting in contraventions of the National Environmental Management Act (NEMA) and the National Water Act.

The contraventions of NEMA included restricted activities within a watercourse and the unlawful removal of indigenous vegetation in an environmentally sensitive environment without the necessary environmental authorisations. In addition, the accused was charged under the National Water Act for unlawfully diverting the flow of water, storing water and disposing of waste in such a manner that would result in detrimental harm to the environment.

The 'importance of wetlands, and the critical role that they perform in the supply of water and to biodiversity conservation' were cited in defence of the ruling.

Source: Department of Environmental Affairs

[https://www.environment.gov.za/mediarelease/environmentalaffairs\\_welcomes\\_courtjudgement](https://www.environment.gov.za/mediarelease/environmentalaffairs_welcomes_courtjudgement)



## Further reading

NFEPA documentation includes:

- Atlas of Freshwater Ecosystem Priority Areas in South Africa
- GIS data
- Implementation manual: how to use FEPA maps in existing planning and decision-making processes, along with freshwater ecosystem management guidelines.

These resources can be found at: <http://bgis.sanbi.org/nfepa/project.asp>





# Grassland Ecosystem Guidelines



40% of the country's human population live in grassland landscapes.

*Source: Grassland Ecosystem Guidelines*

South Africa has a diverse range of ecosystems and to ensure effective biodiversity conservation and management, it is important to understand ecosystem features and management techniques relating to the ecosystem of the region. Grasslands cover almost one third of South Africa's land surface, stretching from the Eastern Cape and KwaZulu-Natal, over the high escarpment and onto the central plateau of the country and are the dominant biome in Gauteng.

These grasslands contain irreplaceable biodiversity and are important water production landscapes. They provide the natural resources and ecological infrastructure that supports most of South Africa's important economic activities. However, many land-use practices in grasslands are currently unsustainable and grassland ecosystems and resources are coming under increasing pressure from a variety of competing land-uses.

The Grassland Ecosystem Guidelines bring together current knowledge on the state of grasslands and provide non-scientists with easy-to-use, practical guidelines on how to take better account of biodiversity in land-use planning and decision-making. Ecosystem guidelines can be useful aids to inform development planning and land-use management when used in conjunction with systematic biodiversity plans (such as the Gauteng C-Plan, [page 37](#)) and when formally built into the terms of reference for environmental impact assessments ([page 49](#)) or municipal spatial planning projects.



## Key point

Grasslands are critically important water production landscapes, playing a vital role in maintaining the quality and quantity of water entering rivers, streams and aquifers by capturing water, maximising infiltration, limiting erosive run-off and reducing soil loss. In this way, these ecosystems play a role regulating water flow and wetlands, slowly releasing it into rivers and streams, maintaining vital base flows into the dry seasons.

Approximately 34% of the country's remaining wetlands occur in grassland ecosystems.

The Guidelines provide a consistent benchmark and framework for addressing the biodiversity-related aspects of land-use planning, management and regulation in South Africa's grasslands. The Guidelines provide specific information such as restoration potential and project design for the following groups of ecosystems:

- Dry Highveld Grassland
- Mesic Highveld Grassland
- High Altitude Grassland
- Sub-Escarpment Grassland
- Coastal Grassland
- Wetlands
- Rivers
- Forests

The Guidelines offer guidance that may be useful in applications for mining rights or environmental authorisations ([Chapter B2](#)), or developing an Environmental Management Framework (EMF) (see [Chapter B2](#)).



## Further reading

SANBI (2013) Grasslands Ecosystem Guidelines available at [http://biodiversityadvisor.sanbi.org/wp-content/uploads/2014/07/2013\\_Grassland-Ecosystem-Guidelines\\_1st-PART.pdf](http://biodiversityadvisor.sanbi.org/wp-content/uploads/2014/07/2013_Grassland-Ecosystem-Guidelines_1st-PART.pdf)



# Local Biodiversity Strategy and Action Plans



## Key point

Local Biodiversity Strategy and Action Plans detail the broad strategy, as well as the specific actions that each local government implements in order to protect and enhance its biodiversity.

A Local Biodiversity Strategy and Action Plan (LBSAP) is a local-level version of the National Biodiversity Strategy and Action Plan (NBSAP), the principle instrument used by national government for implementing the Convention on Biological Diversity (CBD) and for reporting to the CBD secretariat (see [Chapter A2](#)). Although the LBSAP is not mandatory, the CBD has endorsed the use of LBSAPs as a significant tool for achieving the Aichi Targets ([Annex 2](#)). LBSAPs provide an overarching and coordinated framework for the integration of biodiversity into local governance structures across sectors and translate national biodiversity targets of the NBSAP for easy incorporation into municipal Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs).

LBSAPs are used to guide the management of biodiversity and ecosystem services, enable local action, and inform overarching city plans and decisions. In addition, the LBSAP guides the impact of municipal planning on biodiversity and ecosystem services beyond its boundaries. The LBSAP can be a standalone document, or can provide a mechanism for integrating biodiversity and ecosystem services considerations into broader city plans.

While LBSAPs can assist in implementing NBSAPs, they may also inform them and assist in establishing national targets and strategies. Likewise, in order to achieve the common goals of biodiversity conservation and management, local governments should take note of the NBSAP and align local objectives with it, and the Aichi Targets.

The foundation of an LBSAP is an assessment of the biodiversity and ecosystem services in the city, including their state, spatial distribution, management and threats, together with communication, education and public awareness (CEPA) activities. This assessment, which constitutes the first step of the LBSAP itself, provides the baseline data that can be used for monitoring progress and evaluating results. In Gauteng, much of this foundation is provided by the [Gauteng C-Plan](#) (see corresponding fact sheet on [page 37](#)). Additionally, the first step guides the process of prioritization of objectives and the identification of gaps, local priorities and targets; ultimately serving as a basis for better-informed planning into the future.



## Further reading

**LBSAPs in Gauteng:** The City of Johannesburg is the only municipality within Gauteng that currently has a LBSAP. The City of Johannesburg (2009) Local Biodiversity Strategy and Action Plan is available at [http://archive.iclei.org/fileadmin/template/project\\_templates/localactionbiodiversity/user\\_upload/LAB\\_Files/LBSAPs/Joburg\\_LBSAP.pdf](http://archive.iclei.org/fileadmin/template/project_templates/localactionbiodiversity/user_upload/LAB_Files/LBSAPs/Joburg_LBSAP.pdf)

**LBSAP guidelines:** These guidelines can assist local governments in making a start with, or improvements to, their strategies and action plans for managing and conserving biodiversity, using the spatial biodiversity priorities provided by the Gauteng C-Plan or a bioregional plan as a starting point. Drawing from local government experiences and examples, the guidelines provide background guidance and supporting information for biodiversity strategy and action planning at the local level. The ICLEI Cities Biodiversity Center (2013) *The Local Biodiversity Strategy and Action Plan Guidelines: an aid to municipal planning and biodiversity conservation* are available at <http://www.cbc.iclei.org/lbsap> Guidance in the preparation of a LBSAP is provided by the 'Local Action for Biodiversity' programme outlined on [page 105](#).

**CAUTION  
BULL  
FROGS**



SPONSORED BY: *Christine Williams*  
PROPERTIES

Christine 082 259 4955 TEL (011) 468 2868





# B2

# ENVIRONMENTAL AUTHORISATIONS

## Fact sheets in this section:

- **What is an environmental impact assessment?**
- **Environmental impact assessment process**
- **'Biodiversity-inclusive' impact assessments**
- **Environmental Management Frameworks**
- **Gauteng biodiversity offset guideline**
- **Gauteng ridges Guideline**
- **Sustainable development criteria**
- **Lifestyle estate guideline**
- **Red List plant species guidelines**
- **Mining and biodiversity**
- **Mining and Biodiversity Guideline**

Signatories to the Convention on Biological Diversity, Ramsar Convention and Convention on Migratory Species are required to recognise environmental impact assessments (EIA) as a core decision-making tool in the management of biodiversity. South Africa's National Environmental Management Act (NEMA) gives provision for the use of EIA. The following section outlines the EIA process, and how biodiversity can be duly considered during the EIA process.

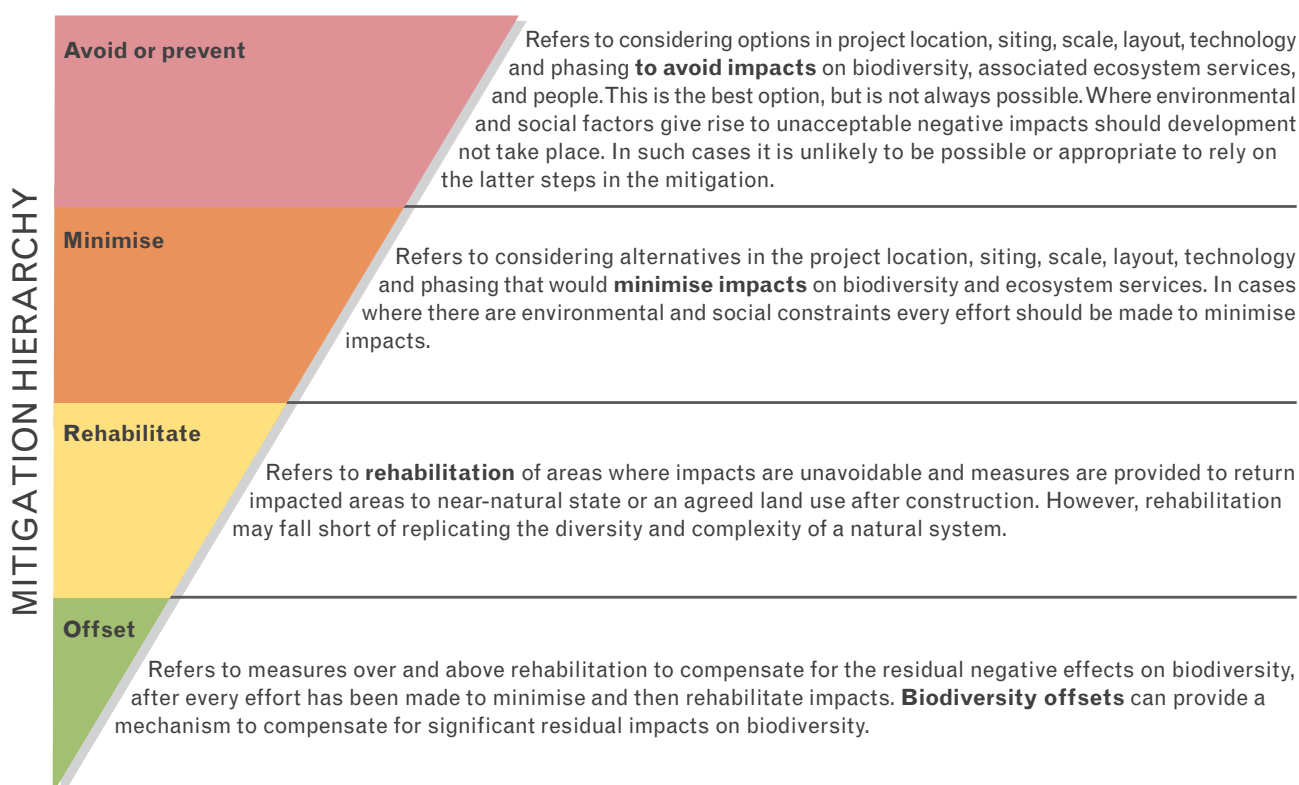
# What is an environmental impact assessment?

The environmental impact assessment (EIA) process pertains to the development of sites, and requires the land owner and/or developer to consider the environmental impacts of their intended activity, as well as alternatives and measures that will reduce or mitigate environmental impacts. It also provides the public with the opportunity to understand and comment on the proposed activity (via a public participation process). EIAs strive for proactive consideration of biodiversity by ensuring that priorities and targets for biodiversity at international, national, regional and local level are respected, and negative effects on biodiversity and in biodiversity priority areas is avoided.

The EIA process is therefore based on a 'mitigation hierarchy', in that the process should first strive to avoid or prevent the loss or damage of biodiversity through the consideration of alternative sites, layouts, technologies and designs. After these considerations have been taken into account, damage and loss of biodiversity should be minimised, again, through considering alternative sites, designs and technologies. Where unavoidable damage has occurred over-and-above efforts to avoid and minimise biodiversity loss, this should be rehabilitated. Finally, any significant residual negative effects on biodiversity should be offset, through the restoration and/or protection of an area of equal biodiversity value. This mitigation hierarchy is shown in the figure below.

In determining the significance of residual negative impacts on biodiversity, it is important to assess the probable success or effectiveness of the mitigation measures proposed and, where there is any doubt or uncertainty, to take a precautionary approach, and opt for avoidance. The scale and significance of residual impacts provides a key indication of whether or not additional mitigation (i.e. biodiversity offsets) is required to meet NEMA principles.

*The mitigation hierarchy for site development. Its application is intended to strive to first avoid disturbance of ecosystems and loss of biodiversity, and where this cannot be avoided altogether, to minimise, rehabilitate, or, as a last resort, offset any remaining significant residual negative impacts on biodiversity.*  
Source: DEA et al. (2013) Mining and Biodiversity Guidelines. See [page 69](#) of this Toolbox.



## Introduction to the EIA process in South Africa

When a developer (the applicant) wishes to engage in an activity that alters the environment (e.g. through construction, extraction, transformation), an environmental authorisation (previously named Record of Decision or RoD) from the government is required prior to the commencement of work. This authorisation is considered in terms of the EIA regulations, under the National Environmental Management Act (NEMA) and administered by provincial government.

### Who is the decision-maker for EIA applications?

The decision-maker is the Competent Authority, who may be the national Department of Environmental Affairs, its provincial counter-parts, the Department of Mineral Resources (with respect to mining), or an organ of state with delegated powers in terms of NEMA amendment 42(1) – e.g. the local municipality.



#### Key point

EIA regulations and the associated Listing Notices are subject to amendment. Effort must be made to stay abreast of latest amendments. See: <http://www.environment.co.za/environmental-laws-and-legislation-in-south-africa/eia-environmental-impact-assessment-regulations-law-south-africa.html>

Depending on the type, extent and location of the activity, the application must either be subjected to a Basic Assessment, or the full Scoping and EIA process (though there is provision for an Applicant to request to be exempted from any provision of the EIA regulations). EIAs are typically triggered through a set of thresholds for various activities. The activities, their thresholds and/or geographic areas to which they may pertain are captured in the Listing Notices associated with the EIA regulations.

### Exemptions

A Basic Assessment or Scoping & EIA is not required where the applicant has requested and been granted an exemption. Exemptions are issued by the Competent Authority. An application may only be exempted from a provision in the EIA regulations if the rights or interests of other parties are not likely to be adversely affected by the exemption.

### Environmental authorisation

The environmental authorisation is the written statement from the Competent authority permitting or refusing the proposed activity, issued after the submission and review of the Basic Assessment or Scoping and EIA. The applicant must have an environmental authorisation granting permission before commencement of a listed activity and it may contain specific conditions which must be complied with.



#### Key point

Water Use Licences may also be required over and above an environmental authorisation. As per the National Water Act (1998), licences are required for abstraction, storage, use, flow reduction or diversion and disposal of water or effluent.

The National Water Act ensures a minimum amount of water, the so-called ecological reserve, that "belongs" to the river and is needed to maintain its ecological functioning. Basic human needs and the ecological needs of rivers shall take priority. For instance, river habitat and fish migration routes must be taken into account for any development affecting a river.



# Environmental impact assessment process



The recommended environmental impact assessment (EIA) process is detailed below. Note that many of the tools outlined in this toolbox are used at a number of stages.

## Stage 1: Pre-application biodiversity screening

*Who?* The owner/developer of the land should initiate the process through the appointment of an independent Environmental Assessment Practitioner (EAP) to manage the application.

A pre-application biodiversity screening stage is recommended as it can be used to determine the likelihood of gaining environmental authorisation for the development of a site. Appointment of a biodiversity specialist is advised, especially where projects may affect Critical Biodiversity Areas, Ecological Support Areas (as identified in the [Gauteng C-Plan](#), see page 37), Freshwater Ecosystem Priority Areas or threatened ecosystems.

More information on the pre-application screening process can be found in the SANBI (2013) Grasslands Ecosystem Guideline: Section 9.3: Proactive incorporation of biodiversity into pre-application screening: a supplement for environmental assessment practitioners. Available at [http://biodiversity.advisor.sanbi.org/wp-content/uploads/2014/07/2013\\_Grassland-Ecosystem-Guidelines\\_1st-PART.pdf](http://biodiversity.advisor.sanbi.org/wp-content/uploads/2014/07/2013_Grassland-Ecosystem-Guidelines_1st-PART.pdf)

## Stage 2: Public participation

*Who?* The public participation component is driven by the independent EAP.

Public input is an important stage in the EIA process. A series of notifications and meetings are required so that the general public are aware of the application, and can comment on it. EAPs are required to ensure that the public participation process is fully inclusive by using methods appropriate for the stakeholders and potential interested and affected parties.

NEMA provides for public participation in the protection of the environment, with rights to information, consultation and to report transgressions.

Under NEMA, members of the public have the right to:

- be consulted on environmental impact assessments
- participate in dispute resolution
- report an environmental risk
- information and for decisions to be taken in an open and transparent manner
- access to information held by organs of state which relates to the implementation of the Act and any other law affecting the environment, the state of the environment and actual and future threats to the environment
- demand that the environment is taken care of
- legal standing to enforce environmental laws

More information on NEMA public participation process: <http://www.botany.uwc.ac.za/inforeep/decisions3.htm>



## Stage 3: Initial impact assessment or site sensitivity analysis

*Who?* The EAP must ascertain whether the Basic Assessment or Scoping and EIA application process should be followed.

To determine whether a Basic Assessment or Scoping report is required for a development application, the proposed development activity must be considered according to NEMA Listing Notices. Activities in Listing Notice 1 and 3 require a Basic Assessment, whilst those in Listing Notice 2 require a full Scoping and Environmental Impact Report. Listing Notice 3 is area-specific and ensures that a Basic Assessment is required for development in specified geographical areas, which include several biodiversity features (see figure at end of the fact sheet).

## Stage 4: Environmental Assessment

*Who?* The EAP will undertake the Basic Assessment or Scoping and EIA.

NEMA provides for two assessment processes that can be used to conduct an EIA, the Basic Assessment Report or a Scoping and Environmental Impact Report (often referred to as a full EIA). During the compilation of the Basic Assessment or Scoping and EIA, the full range of biodiversity tools should be used to adequately assess the impact of the development on the area. Biodiversity screening that relies solely on biodiversity maps and plans without adequate ground-truthing (i.e. verifying information through onsite assessment) or assessment at appropriate times of the year, will be viewed as incomplete and therefore inadequate for the purposes of informed decision-making.

### Basic Assessment Report

A Basic Assessment is the environmental assessment applied to activities listed in Listing Notice 1. It is usually done for activities with a lower threshold than those activities triggered in the Scoping and Environmental Impact Report process. This does not mean that the Basic Assessment Report is conducted in a less vigorous manner, for instance public notice and participation are still required. It is simply a more concise report and should still contain all the information the Competent Authority needs to make a decision on the application.

Most provinces offer a basic 'template' for what must be included in a Basic Assessment Report. If the Competent Authority is unable to decide based on Basic Assessment Report alone, the Competent Authority may request a more thorough Scoping and EIA process. Since 2010, a draft Environmental Management Programme (EMP) must also be submitted (previously only required for Scoping and Environmental Impact Report), indicating rehabilitation measures and remedial action that must be carried out as part of the listed activity.

### Scoping and Environmental Impact Report

Scoping and Environmental Impact Reporting is the thorough environmental assessment required for activities listed in Listing Notice 2. It is usually done for activities with higher threshold, and therefore usually have larger impacts (due to the nature and/or extent of the activities). The Scoping Report (including Plan of Study for EIA) requires a description of the proposed activity and any feasible and reasonable alternatives, as well as potential impacts. In addition, the Scoping Report must contain a roadmap for the Environmental Impact Report, specifying the methodology to be used to assess the potential impacts, and the specialists or specialist reports that are required.

The Applicant may only proceed with the Environmental Impact Report after the Scoping Report and the Plan of Study for the Environmental Impact Report have been approved. The process culminates in the development and submission of the Environmental Impact Report and the Draft Environmental Management Programme.



### Key point

Listing Notice 3 is a listing of activities and sensitive areas per province, for which a Basic Assessment process must be conducted. These include Critical Biodiversity Areas (CBAs) identified in a provincial biodiversity plan or a bioregional plan.

Listing Notice 3 also requires that clearance of indigenous vegetation in a Critically Endangered or Endangered ecosystem will trigger a Basic Assessment before any environmental authorisation is given. If more than 20 hectares of Critically Endangered or Endangered ecosystem are disturbed, then a Scoping report and EIA are required.

Biodiversity-related tools that should be considered in an effective EIA		
Gauteng C-Plan or Bioregional plans	Gauteng ridges guideline	Gauteng biodiversity offset guidelines
Red List Plant Species Guidelines	Lifestyle estate guideline	Gauteng sustainable development criteria
National Freshwater Ecosystem Priority Areas	List of ecosystems threatened and in need of protection	Gauteng Protected Area Expansion Strategy



## Stage 5: Decision-making

*Who?* Decisions are made by the Competent Authority. The Competent Authority, who may be the national Department of Environmental Affairs, its provincial counter-parts, the Department of Mineral Resources (with respect to mining), or an organ of state with delegated powers in terms of NEMA amendment 42(1) – e.g. the local municipality.

Depending on the information in the Basic Assessment or Scoping and Environmental Impact Report, the Competent Authority must make a decision whether to grant or deny environmental authorisation. If it is deemed that the Basic Assessment report does not provide sufficient details, a full Scoping and EIA can be requested. If a report is deficient, the Competent Authority may reject it.

## EIA Appeals

Applicants and interested and affected parties can appeal against the decision made by the Competent Authority, be it the granting or refusal of an environmental authorisation or exemption. This is except where the Competent Authority was the Minister or MEC themselves as appeals are lodged with the Minister or MEC, in terms of Chapter 7 of NEMA EIA Regulations. A 'notice of appeal' must be lodged within 10 days of being notified of the original decision taken by the Competent Authority. An official appeal form is lodged within 30 days after the notice of intention.

In processing an Appeal, the Appeal Authority may request further information and it can appoint an independent panel to help it reach a decision. Once a decision has been reached, the authority will notify relevant parties that they have upheld or overturned the original decision.



### Key point

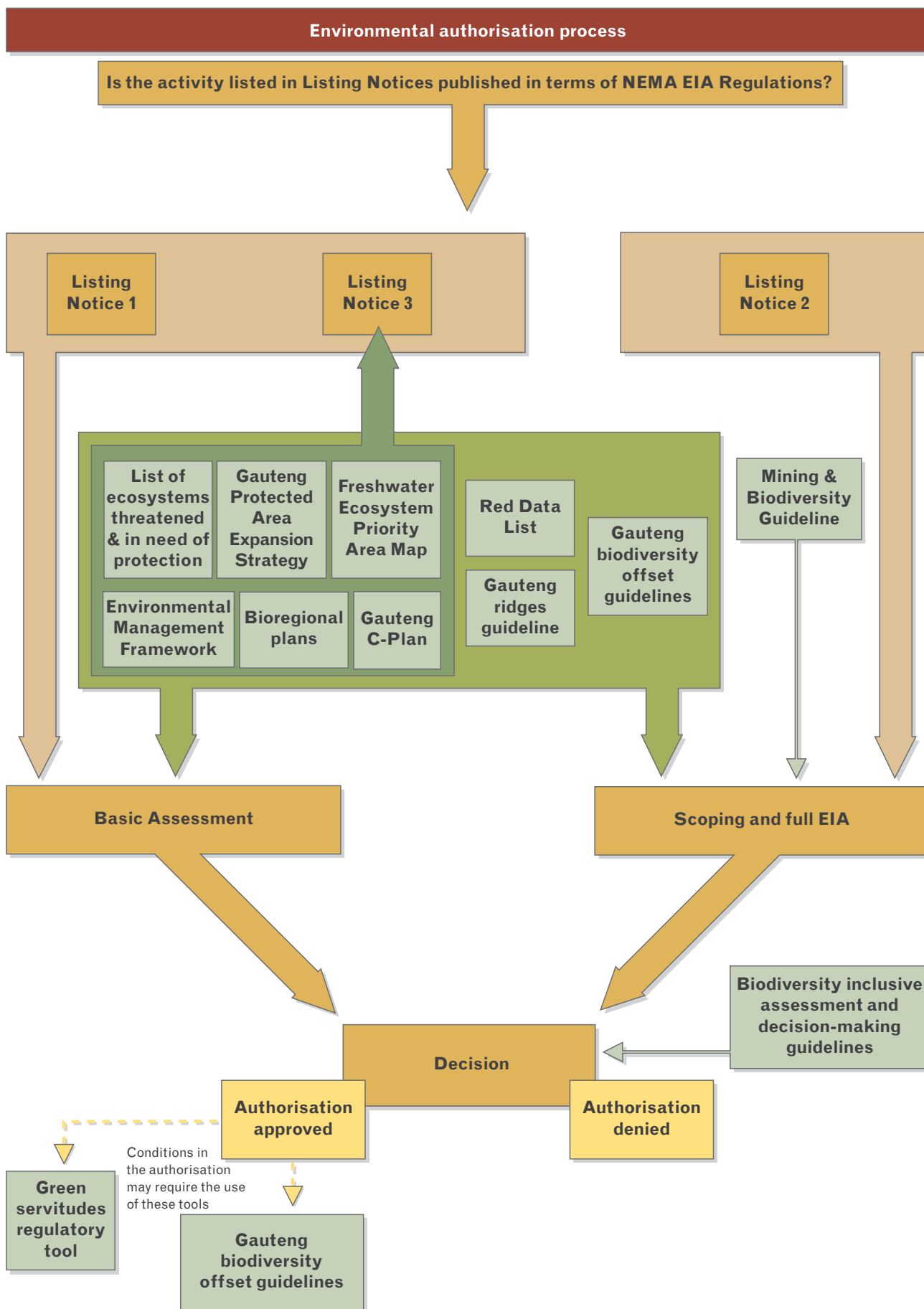
Interested and affected parties are those that provided their names and address to the EAP during the application process.



### Further reading

**Information on the EIA process:** Background information on the EIA process is available on SANBI Biodiversity Advisor – <http://biodiversityadvisor.sanbi.org/planning-and-assesment/environmental-assessments> and information on engaging with the EIA Process is available at <http://www.sdcea.co.za/images/stories/pdfs/eia%20booklet%20web.pdf>

**NEMA applications and appeals in Gauteng:** For NEMA Appeals, contact the Gauteng Department of Agriculture and Rural Development (GDARD) at <http://www.gdard.gpg.gov.za/DocumentsandForms/Pages/NEMAAppeals.aspx>



*Biodiversity tools (in green) used at various stages of the EIA process (in brown)*

# ‘Biodiversity-inclusive’ impact assessments



If environmental impact assessments (EIA) are to achieve their purpose, it is essential that biodiversity and ecosystem services are comprehensively taken into account during the assessment process. However, impacts on biodiversity are rarely sufficiently considered during the EIA process. Basic Assessments and Scoping and EIA often focus on the effects of the site or on the basis of individual species, rather than addressing broader, landscape-scale and cumulative impacts on ecosystems and processes, rendering EIAs ineffective for protecting biodiversity and supporting sustainable development.

## What do we mean by ‘broader, landscape-scale’ effects?

For example, if a development is close to a river, it is important to think how the development will affect the river (e.g. water flow, pollution) at the site of development, but also downstream, outside of the site. Other examples of landscape scale effects include: cutting off animal migration routes or biodiversity corridors, air pollution moving off-site, altered drainage patterns to increase flooding elsewhere, less water infiltration affecting groundwater reserves. [Acid mine drainage](#) is one particularly relevant example of how development in one area can negatively and cumulatively impact on another.

The Convention on Biological Diversity considers an **ecosystem approach** as the best methodology for addressing biodiversity management and promoting sustainable, fair and equitable use of natural resources. The ecosystem approach should:

- i) Prioritise the conservation and management of ecosystems (including managing ecological infrastructure and maintaining ecosystem services).
- ii) Consider the effects of the activity on the surrounding area and regional ecosystems (e.g. catchments and watersheds) and over time.
- iii) Seek an appropriate balance between conservation and use of biodiversity.
- iv) Involve all relevant sectors of society and scientific disciplines.

## Stakeholders who should be employing a biodiversity-inclusive approach

**Environmental Assessment Practitioners (EAP):** independent specialists that compile documentation that a developer must submit when applying to develop a parcel of land. They will compile the Basic Assessment or Scoping report. During a full EIA, the EAP must take into account guidelines and policies and look at how ecosystems and species could be affected by development, and how best the development can be designed, located and managed to avoid negative impacts.

**Competent Authority:** the governmental ‘decision-maker’ with regard to EIA applications. This is normally the provincial environmental department (i.e. the Gauteng Department of Agriculture and Rural Development, GDARD) but can be the Minister or an organ of state with delegated powers in terms of NEMA amendment 42(1) – e.g. the local municipality.

## How to ensure that EIAs are ‘biodiversity-inclusive’

The assessment and evaluation of impacts on biodiversity and ecosystem services as a result of site development is challenging. However, there is a wealth of tools, legislation and other biodiversity information that currently exist in South Africa, as introduced in this toolbox. In order to ensure that EIAs are biodiversity-inclusive, the use of these tools and/or local experts can ensure that EIAs fully consider the impacts of a development upon biodiversity. The key steps to ensure this are:

- 1) Use the best available biodiversity information:** Tools such as the [Gauteng C-Plan](#) (page 37), [bioregional plans](#) (page 39), [list of ecosystems threatened and in need of protection](#) (page 41) and [freshwater ecosystem priority area maps](#) (page 43) have been created to enable environmental assessment practitioners and governmental decision-makers to make informed decisions. Using these tools is a sound basis for identifying sites that fall within biodiversity priority areas, ensuring that applications within these areas are closely- scrutinised and that, if deemed suitable to development, due mitigation processes are employed.
- 2) Involve appropriate biodiversity specialists when in a biodiversity area,** such as in a Critical Biodiversity Area or Ecological Support Area identified in the [Gauteng C-Plan](#), or where sensitive ecosystems (such as wetlands) might be impacted, or where there is a high likelihood that threatened species are present.



### Further reading

A number of guidelines and tools have been produced in order to ensure that biodiversity is thoroughly included in EIAs.

#### **Guidelines for biodiversity assessments (i.e. one part of the EIA process):**

- GDARD (2012) *GDARD requirements for biodiversity assessments*. Available at <http://www.gdard.gpg.gov.za/Services/Documents/2014%20GDARD%20requirements%20for%20biodiversity%20assessments.pdf>
- SANBI (2013) *Grasslands Ecosystem Guideline: landscape interpretation for planners and managers* – Section 9.3: Proactive incorporation of biodiversity into pre-application screening: a supplement for environmental assessment practitioners at <http://www.grasslands.org.za/document-archive/category/21-grassland-ecosystem-guidelines>

#### **Guidelines for biodiversity-inclusive EIAs (a guide to the whole process):**

- The Southern African Institute for Environmental Assessment (SAIEA) has put together a regional guidance document for decision-makers in southern Africa, focusing on the integration of biodiversity into the decision-making process – *CBBIA-IAIA Guidance Document on Biodiversity, Impact Assessment and Decision-Making in Southern Africa* at <http://www.saiea.com/cbbia/html/guidance/main.html>
- The *Mining and Biodiversity Guideline* includes important information for the inclusion of biodiversity in EIA applications pertaining to mining applications – *Mainstreaming biodiversity into mining: A guideline for practitioners and decision-makers in the mining sector*, at <http://bgis.sanbi.org/mining/mineguide.asp>



# Environmental Management Frameworks

Environmental Management Frameworks (EMFs) are an environmental planning tool that should provide a broader context for considering environmental authorisations.

## What is an EMF?

An EMF is a study of the attributes of the environment (social and ecological) in a particular geographical area (such as a municipality or a water catchment boundary). The overall goal of an EMF is to secure environmental protection and to promote sustainability and cooperative environmental governance.

The National Environmental Management Act (NEMA) and its Regulations specify who and how an EMF may be initiated. The Minister or provincial Member of Executive Council (MEC) may initiate and adopt an EMF in order to inform Environmental Impact Assessment (EIA) decisions. EIAs are site specific assessments that often struggle to take cumulative impacts that may affect the broader area into account. The EMF collects, analyses and interprets environmental information relevant to the broader area to:

- Highlight environmental priorities.
- Identify developments or land-uses that will have significant impacts, where they may best be practiced and offer performance standards for maintaining appropriate use of such land.  
Reveal undesirable developments or land-uses in a given area.
- Indicate parts of the area with specific socio-economic values.

This can provide a basis for identifying activities and areas that can be excluded from full EIAs or conversely, where an EIA will definitely be required. An EMF therefore should provide a user-friendly decision-support system to streamline environmental authorisations.

EMFs provide a vital link between the EIA process (where decisions are often made at the provincial government level) and the planning strategies at the municipal level.

It must be taken into account in EIAs. It should also support municipal spatial planning by becoming an environmental layer that feeds into Spatial Development Frameworks.



## Key point

EMFs are required to highlight biodiversity information but the interpretation of EMF requirements is varied. It is therefore important to ensure that biodiversity priority areas have been appropriately reflected in the EMF and/or are taken into consideration in environmental authorisations.

## Developing an EMF

The NEMA and its Regulations outline the process to be followed in developing an EMF and what should be included in an EMF (see further reading box below). A variety of tools featured in this toolbox would be important to include in the development of an EMF, including:

- Gauteng C-Plan (version 3.3) ([page 37](#))
- Bioregional plans ([page 39](#))
- List of ecosystems threatened and in need of protection ([page 41](#))
- National Freshwater Ecosystem Priority Area maps and guidelines ([page 43](#))
- Grassland Ecosystem Guidelines ([page 45](#))



## Further reading

General EMF information:

- NEMA EMF Regulations available at [https://www.environment.gov.za/sites/default/files/legislations/nema\\_frameworkregulations\\_g33306rg9314gon547\\_0.pdf](https://www.environment.gov.za/sites/default/files/legislations/nema_frameworkregulations_g33306rg9314gon547_0.pdf)
- DEA (2010) Environmental Management Frameworks in terms of the EMF Regulations of 2010, Integrated Environmental Management Guideline Series 6. [https://www.environment.gov.za/sites/default/files/gazetted\\_notices/nema\\_environmentalmanagement\\_guidelinepublication\\_g35769gn806.pdf](https://www.environment.gov.za/sites/default/files/gazetted_notices/nema_environmentalmanagement_guidelinepublication_g35769gn806.pdf)

The following EMFs have been gazetted in the Gauteng region, although there are several other in draft format:

- Ekurhuleni EMF: <http://www.ekurhuleni.gov.za/business/useful-resources/enviro-reports>
- Tshwane Regional EMF - Zone of Choice: direct enquiries to Rudzani Mukheli (Deputy Director for Environmental Impact Management, City of Tshwane Metro Municipality) at [rudzani.m@tshwane.gov.za](mailto:rudzani.m@tshwane.gov.za) or 012 358 8731.

A Gauteng EMF is currently under development.



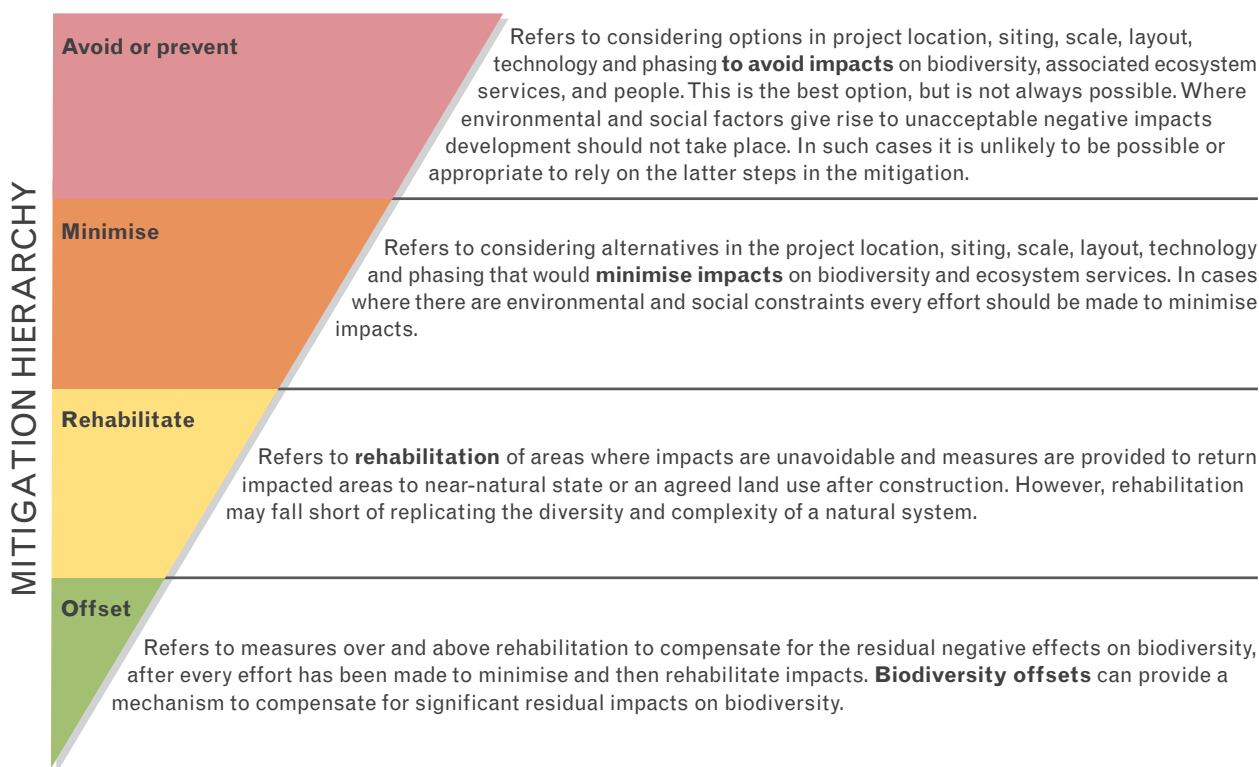


# Gauteng biodiversity offset guidelines

During the environmental impact assessment (EIA) process, the environmental and social impacts of the proposed development must be assessed, and the mitigation hierarchy steps must be taken to:

- First avoid or prevent the impact by considering alternative site plans
- Then minimise the impact if no alternatives are possible
- Then rehabilitate the affected environment, if possible, after the impact
- And only after these considerations have been taken, can measures be taken to offset any residual and unavoidable impact.

Offsetting therefore refers to the last possible option for compensating for the remaining negative impacts on the development site. It is achieved through the rehabilitation/improvement and/or protection of an alternative site with the same ecological significance.



*Offsets should be seen as the 'last resort' for managing the effects of biodiversity on development.*  
Source: DEA et al. (2013) Mining and Biodiversity Guidelines. See [page 69](#) of this Toolbox.

Ideally, new developments should be located and designed in such a way that there is no need for biodiversity offsets i.e. long-term impacts of new development minimally impact biodiversity and ecosystem services. Regardless, biodiversity offsets are mechanisms that correspond to Chapter 2 of NEMA and the need to 'avoid, or minimize and remedy' the disturbance of ecosystems and loss of biodiversity by:

- Correcting the impacts on biodiversity.
- Protecting ecological integrity.
- Using the 'polluter pays' principle such that the cost of biodiversity loss is not borne by society at large, but by those who profit from the development of a site.

**Biodiversity offsets mitigate biodiversity impacts only.** They cannot be used to offset social impacts, and vice versa.



## Key point

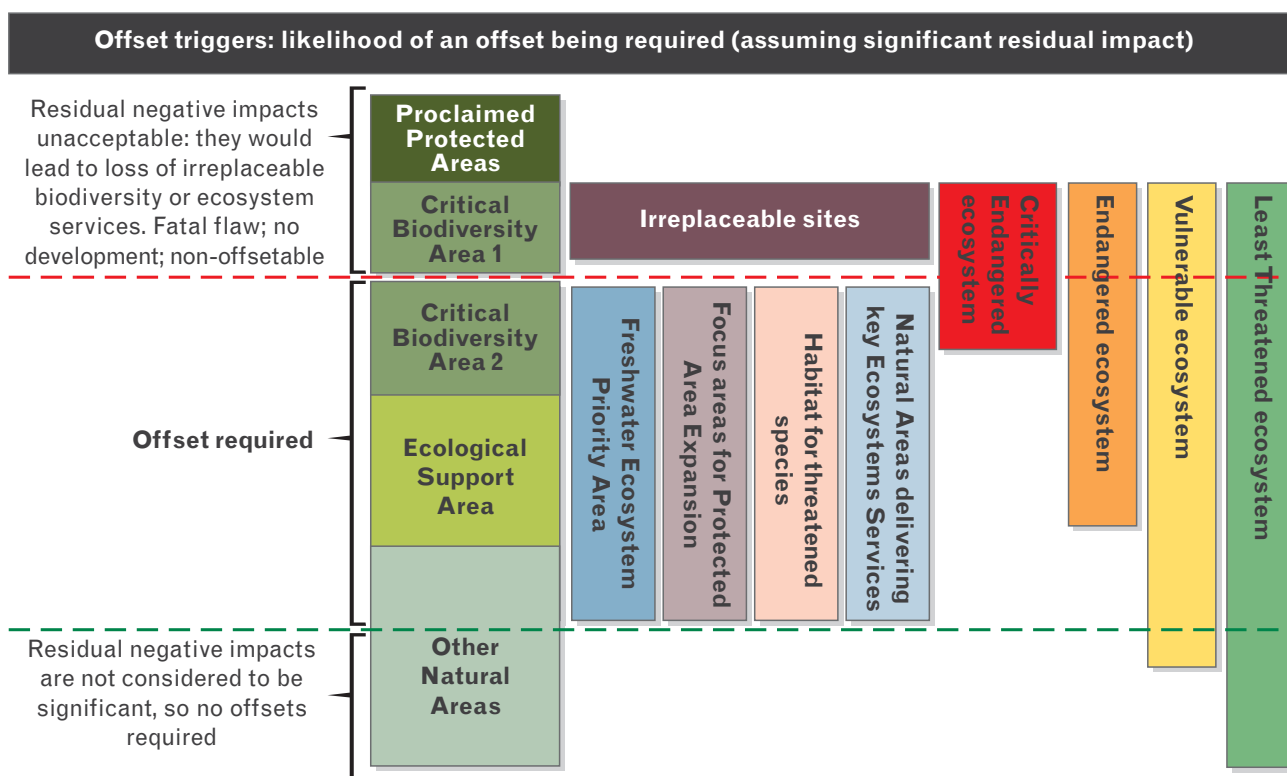
Offsets should not be used to compensate for impacts on irreplaceable biodiversity or biodiversity underpinning irreplaceable ecosystem services as these impacts cannot be fully remedied and are considered to be 'non offset-able'.

## Offsets in the EIA process

The need for a biodiversity offset for a development application will be highlighted during the early stages of the EIA. If it is likely that offsets are suitable and will be required, possible offsets must also be investigated during the EIA and decision-making process. The significance of long-term impacts on an area is used as the trigger for determining whether biodiversity offsets would be appropriate. Although it is crucial that offsets are considered on a case-by-case basis, the figure below illustrates some general rules of thumb for whether an offset would be appropriate in different types of biodiversity priority areas.

- Offsets are not appropriate for compensating for impacts on irreplaceable biodiversity, such as in critical biodiversity areas 1 (CBA 1) (identified in [Gauteng C-Plan, page 37](#)), critically endangered ecosystems (see [Chapter B1](#)) and irreplaceable sites such as certain freshwater ecosystem priority areas (FEPAs, [page 43](#)).
- Offsets would be required in the bulk of biodiversity priority areas where the biodiversity is of medium significance in the long-term, such as CBA 2, ESA's, some FEPAs, areas delineated under the Gauteng Protected Area Expansion Strategy (see [page 75](#)), as well as some endangered and vulnerable ecosystems.
- Offsets are not required in other natural areas where the residual negative impact is not considered significant (must be considered at on a case-by-case basis).

Figure illustrating the types of areas that could and should not be considered for development under offset guidelines. Source: GDARD (2013) *Concise Guideline on Biodiversity Offsets*.



A suitably qualified biodiversity specialist must be involved in determining the need for, and the options for, a biodiversity offset. The specialist must have sufficient practical experience of the local environment and be professionally registered with the [South African Council for Natural Scientific Professions \(SACNASP\)](#).



## Further reading

A specific guideline for biodiversity offsets in Gauteng has been developed which aligns with the national biodiversity offsets framework, which is currently being developed. GDARD (2013). *Concise Guideline on Biodiversity Offsets in Gauteng Province*. For more information contact Eleanor McGregor, Head of Component: Biodiversity Management, GDARD at [Eleanor.McGregor@gauteng.gov.za](mailto:Eleanor.McGregor@gauteng.gov.za) or 011 240 2516.



# Gauteng ridges guideline



## Key point

Ridges were an important feature used in the Gauteng C-Plan spatial analysis, both from a habitat and a climate change perspective. Hence, many ridges have been identified as Critical Biodiversity Areas (CBAs) and the remaining ridges are classified as Ecological Support Areas (ESAs).

Topography (e.g. hills and valleys) significantly influences biodiversity. Variations in aspect, drainage and altitude create a host of micro-environments that offer a range of conditions for plants and animals to flourish. Gauteng's ridges are thus characterised by a high-level of biodiversity and the conservation of these ridges may contribute to meeting biodiversity targets for Gauteng.

A ridge includes hills, koppies, mountains, kloofs and/or topographic features characterised by two or more: crests, plateaus, cliffs and/or footslopes. In addition, ridges have a slope of 5 degrees or more.

The quartzite ridges of Gauteng are extremely limited in distribution, and characterised by a unique plant species composition that is found nowhere else in the world. The ridges also fulfil ecological functions that are necessary for sustaining biodiversity, such as recharging of groundwater, wetlands and rivers, wildlife dispersal and providing essential habitats for pollinators.

The topographical diversity supports a range of micro-climates that are often able to support high level of biodiversity even when they become isolated. But isolation will compromise biodiversity and maintaining connectivity between ridges and other natural functioning areas is important.

## Gauteng ridges guideline

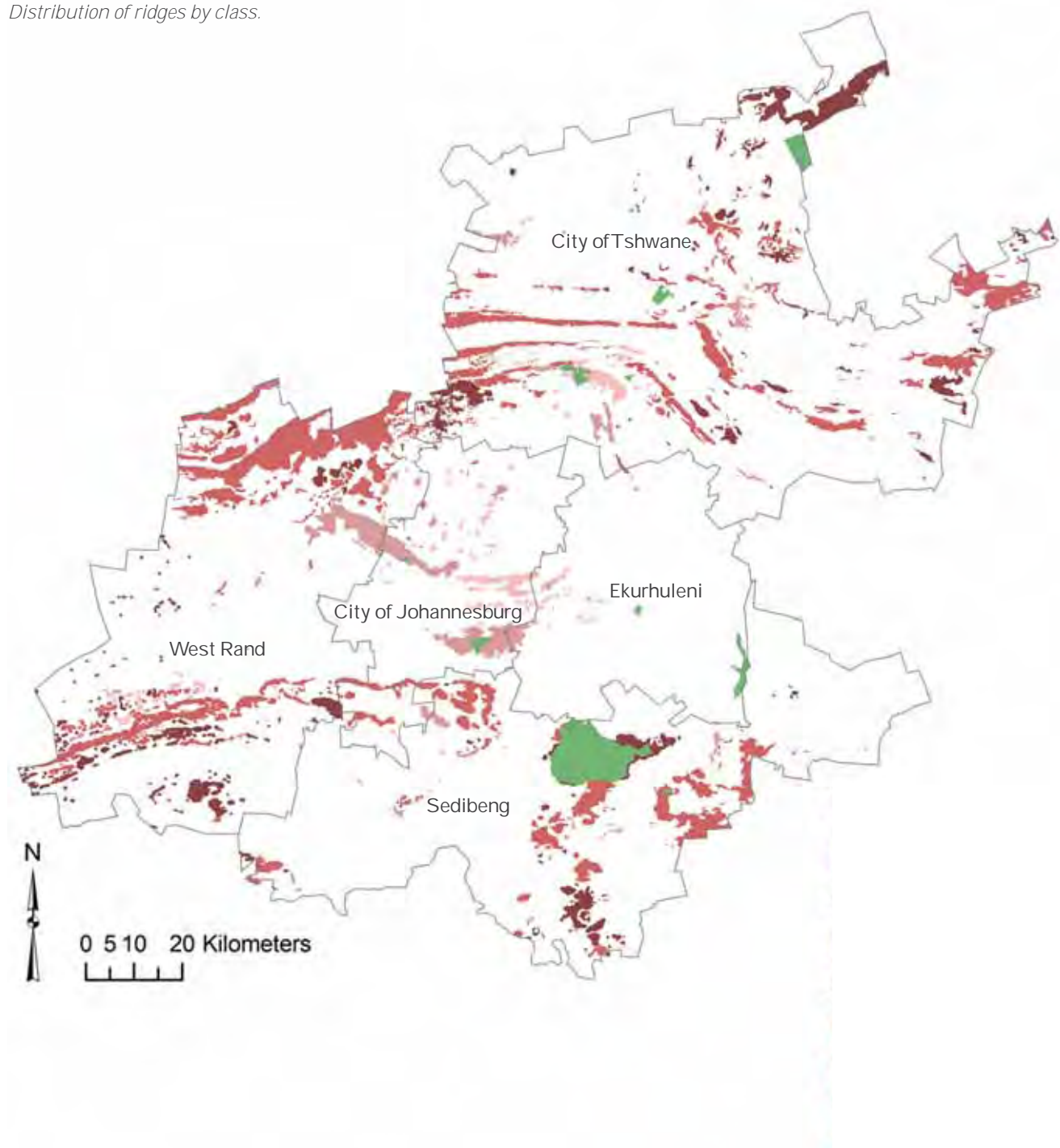
The ridges guidelines applies to all ridges in Gauteng. Most ridges falling within the scope of the guideline have been mapped by the Gauteng Department of Agriculture and Rural Development (GDARD), into four classes. The guidelines gives the applicable use and development of ridges, based on the different ridge classes.

Applications involving activities on a ridge that must be subjected to an environmental authorisation in any form must, in addition to any other requirements, be supported by a study describing the ecological conditions of the ridge, a survey of flora and fauna, impacts of the activity, slope stability and cultural and social aspects and values.

Applications involving developments on a ridge falling within Class 1, 2 or 3 must also be supported by a study on service provision and access. An environmental management plan must accompany an application.

Class	Currently transformed	Policy
1	0 - 5%	No further development allowed (including residential)
2	5 - 35%	No-go or low impact development policy, full EIA required
3	35 - 65%	(A) Low impact development, full EIA required (B) High impact development, exempt from EIA under some circumstances
4	65 - 100%	Exempt from EIA under some circumstances

Distribution of ridges by class.



#### Sensitivity classes in the Gauteng Ridges guideline

- Class 1, No further development
- Class 2, Low impact development, full EIA required
- Class 3, Development, with appropriate EIA
- Class 4, Exempt from EIA under some circumstances
- Protected areas



#### Further reading

GDARD (2006) *Development guidelines for ridges*. <http://stepsa.org/national-regional-spatial-dynamics/topnav/knowledge-outputs-1/knowledge-outputs-documents/development-guidelines-for-ridges>

For more information contact Albertina Setsiba, Biodiversity Management Directorate, GDARD at [ALBERTINA.SETSIBA@gauteng.gov.za](mailto:ALBERTINA.SETSIBA@gauteng.gov.za) or (011) 240 3452.



# Sustainable development criteria



The Gauteng Department of Agriculture and Rural Development (GDARD) has created a set of criteria that ensures that sustainable development is integrated into planning and design of built environment projects requiring environmental impact assessments (EIAs) in Gauteng. The document synthesises local legislation and global best practice to produce a set of criteria, which guide planning professionals and environmental practitioners and streamline planning applications.

The built environment refers to the man-made surroundings that provide the setting for human activity, ranging from large-scale urban spaces and commercial buildings to domestic dwellings.

*Source: GDARD (2010) Sustainable Development Criteria for Built Environment Projects requiring Environmental Impact Assessments in Gauteng*

For each of the objectives (e.g. land use, biodiversity, agriculture, water services, waste, construction, waste, transport and human well-being), the document provides guidance for the type of information required, the questions to be asked and the standards that should be observed in order for the changes to the area to reflect sustainable development principles.

Taking biodiversity as an example, the objective is that 'development should be located where damage to natural environments and ecosystems is minimised. It should ensure that existing natural environments are preserved and take opportunities to strengthen this'. Criteria are provided for:

- Sensitive areas (including CBAs and ESAs)
- Development on ridges
- Greenfield (currently undeveloped) sites
- Site clearing
- Planting of vegetation.

The document is a guideline and full compliance is not required by law. However, the criteria provides important guidance to professionals on the questions that should be asked and the data required in order to effectively process the application. The structure and content of the document can be drawn on in EIA applications and since government officials will be familiar with the criteria, this should expedite planning applications to GDARD.



## Further reading

GDARD (2010) *Sustainable Development Criteria for Built Environment Projects requiring Environmental Impact Assessments in Gauteng*. For more information contact Loyiso Mkwana, Head of Branch: Sustainable Utilisation of the Environment, GDARD at [Loyiso.Mkwana@gauteng.gov.za](mailto:Loyiso.Mkwana@gauteng.gov.za) or (011) 240 2570.



# Lifestyle estate guideline



## Key point

It is important to note that the Lifestyle Estate guideline is a guide and whilst adherence is not required by law, working within the guidelines outlined in this document will increase the likelihood of success of an EIA application.

In order to encourage the sustainable development of lifestyle estates, guidelines have been developed that inform the design and planning of new projects requiring environmental impact assessments (EIAs) in Gauteng. Lifestyle estates are large housing developments centred on a shared facility such as a golf course. Typically, they are located in a 'green field' or undeveloped location and in an area of natural beauty or other natural feature (e.g. ridge, river, wetland) and as a result, are often likely to significantly impact on the environment. Due to the large scale and sensitive location of these estates, an EIA will usually be required. The guidelines aim to provide practical considerations that can be used to inform the development of new lifestyle estates, such as golf estates and other eco-housing developments.

## Who is the guideline for?

The guideline provides a framework that can be used to inform and assess lifestyle estate projects that require EIAs. The guidelines should therefore be used by environmental assessment practitioners, design and planning professionals, and developers. The assessment criteria provide an indication of the impact and performance of the proposed lifestyle estate in terms of biodiversity and can inform areas where improvements need to be made.



## Further reading

The guidelines are currently awaiting approval by the Gauteng Legislature. For more information contact Loyiso Mkwana, Head of Branch: Sustainable Utilisation of the Environment, GDARD at [Loyiso.Mkwana@gauteng.gov.za](mailto:Loyiso.Mkwana@gauteng.gov.za) or (011) 240 2570.





# Red List Plant Species Guideline



## Further reading

For more information contact Albertina Setsiba, Biodiversity Management Directorate, GDARD at [albertina.setsiba@gauteng.gov.za](mailto:albertina.setsiba@gauteng.gov.za) or (011) 240 3452.

For the most recent assessment of threatened plant species, see <http://redlist.sanbi.org/>

*Guidelines for EIA*, see <http://redlist.sanbi.org/eiaguidelines.php>

GDARD (2001) *Red Data Plant Policy for Environmental Impact Evaluations*. Available at <http://www.eiatoolkit.ewt.org.za/documents/Gauteng/guidelines/Gauteng%20reddata%20guideline.pdf>

GDARD (2012) *GDARD Requirements for Biodiversity Assessments*. Available at <http://www.gdard.gpg.gov.za/Services/Documents/2012%20GDARD%20requirements%20for%20biodiversity%20assessments.pdf>

*Threatened Species: A guide to Red Lists and their use in conservation*. Available at <http://www.sanbi.org/sites/default/files/documents/documents/guide-threatened-species-and-red-listing.pdf>

The Gauteng Department of Agriculture and Rural Development (GDARD) must ensure that the threatened plant species in Gauteng are adequately conserved. The presence of any threatened species on a proposed development site will be identified during the environmental impact assessment (EIA) process. *The Red List Plant Species Guidelines* for Gauteng will subsequently apply to any activity that may impact the area supporting a population of a threatened plant species. The list and associated guidelines provide a decision-making support tool to any entity that is responsible for managing areas in Gauteng where populations of threatened plant species grow.

All of the plant species in South Africa have been reviewed according to IUCN Red List criteria. Threatened species are those that qualify for Vulnerable, Endangered or Critically Endangered status against the IUCN Red List criteria. Threatened species face a high risk of extinction in the wild.

*The Red List Plant Species Guidelines* refers to a list of species of special concern in Gauteng that have been ranked according to: i) those unique to a given area, ii) distribution size and iii) threat from urbanisation. Those endemic (unique) to the province of Gauteng are afforded the utmost protection, as they occur nowhere else in the world.

The *Red List Plant Species Guidelines* also provides a minimum buffer zone for each category of threatened species. The buffer zone is a 'collar' of land that filters out inappropriate influences from surrounding activities. It is accepted that a minimum buffer zone of 200 meters is required for any population of the plant species listed. However, rural areas should be given more protection from urban sprawl and therefore rural buffer zones are wider and dependant on the species rank. Urban and rural areas are set out in the Gauteng Spatial Development Framework. Priority groupings of taxa are listed in the table below with the minimum buffer distance in urban and rural areas.

Priority groupings	Minimum Buffer:	
	Urban Areas	Rural Areas
A1 taxa are endemic to Gauteng	200m	600m
A2 taxa are endemic to Gauteng and one other province	200m	500m
A3 taxa are endemic to Gauteng and two or more other provinces	200m	400m
B taxa are not endemic to South Africa	200m	300m

## Using the Red List Guidelines

Environmental impact assessments can be guided by the flow charts in the *Background to the EIA administrative guidelines on Red List plant species (2006)*. Policy rules for the various priority groups and locality are also provided. Any applicant wishing to undertake any action on a site that contains a threatened plant species must prepare an Environmental Management Plan (EMP). The EMP would be compiled by a suitably qualified specialist as part of the broader EMP of the site, both for protection during construction and for maintenance after the development is completed.

# Mining and biodiversity



Mining plays an important role in the development of South Africa's economy – there are over 150 mines in Gauteng alone, producing a quarter of South Africa's total mineral production<sup>7</sup>. However, the impact of mining on biodiversity and ecosystem services is often significant, and can impact well after the closure and decommissioning of the mine.

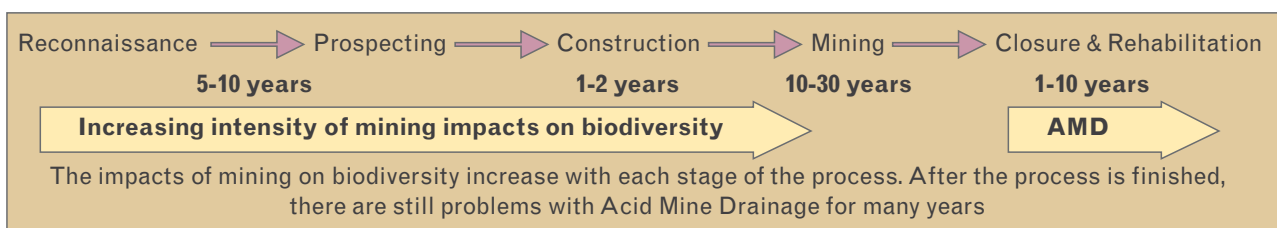
On the flip side, opportunities exist at every stage of the mining life cycle to reduce these impacts<sup>8</sup>. The positioning of a mine and the management practices put in place during and post mine closure can make sure that the effects of mining on biodiversity and ecosystem services are minimised. This section introduces the issues surrounding mining, plus the tools developed to minimise the impacts and risks of mining.

Mining for minerals and fossil fuels is an integral component of the South African economy, providing income and jobs. However, the effect of mining on the local landscape can be significant – loss of natural habitats and long-term pollution – impacting on biodiversity, ecosystem services and local communities. The impacts on biodiversity typically associated with mining vary significantly depending on the type of mining (opencast, underground, and alluvial mining), the scale and extent of mining, the environmental management approach adopted (detailed in an Environmental Management Plan or Programme), and the area and type of biodiversity being affected, and will also vary throughout the mining lifecycle.

## The impacts of mining on biodiversity:

- **Loss and/or degradation of natural habitats** through the removal of natural vegetation and disruption of habitats, including the introduction of invasive alien species.
- **Disruption of ecological processes** e.g. altering the water table, disruption of the local hydrological cycle, disturbing species migration routes.
- **Pollution** of air, soils, surface water, groundwater, as well as light pollution and noise pollution.

The impacts on biodiversity generally increase in severity as the project develops. Although rehabilitation is important and necessary, unfortunately even with significant resources and effort, rehabilitation is a limited process that almost always falls short of replicating the diversity and complexity of a natural system and there may also be long-term and/or residual impacts that continue to impact on biodiversity and ecosystem services after mine closure. The impacts of mining on biodiversity increase with each stage of the process. Even after the mining process is finished, impacts such as Acid Mine Drainage may continue for many years (illustrated in the figure below).



<sup>7</sup>From: [http://www.joburg.org.za/index.php?option=com\\_content&view=article&id=103:mining&catid=30&Itemid=58](http://www.joburg.org.za/index.php?option=com_content&view=article&id=103:mining&catid=30&Itemid=58)

<sup>8</sup>From: <http://bgis.sanbi.org/Mining/MiningandBiodiversityGuideline.pdf>



*Acid mine drainage discolouring and polluting a waterway in Gauteng. Photo by Water and Food under a Creative Commons licence.*

## Acid Mine Drainage

Acid Mine Drainage (AMD) is generated when water ingresses into mine shafts and other voids, long after the mine is closed. When a mine is working, dewatering is required to maintain working conditions, however, the dewatering stops when the mine is abandoned and the mine fills with water. This water then becomes acidic as it becomes enriched with iron sulphide from waste rock. The acidification of the water increases the mobilisation of various other metals, such as copper, lead, aluminium, manganese, uranium and particularly irons (giving it the red colouration). In cases where uranium is present, the water may have increased levels of radioactivity.

In the long-term, AMD water can contaminate shallow aquifers, rivers and wetlands, affecting the plants, animals and communities reliant on these ecosystems. In turn, this decreases water quality, affects crops and endangers human health.

### Case study: AMD in the West Rand

In 2002, water overflowed from the Western Basin mine void into the Tweelopie Spruit. The impacts on the water quality in the Tweelopie Spruit – which runs into the Krugersdorp Game Reserve – showed the deterioration of the water system from Class C (moderately modified ecological condition) to a Class F (serious modified ecological condition). A number of parameters also exceeded the Department of Water Affairs guidelines for stock watering and aquatic ecosystems, indicating that the water was now unsuitable for livestock and wild animals to drink and unable to support normal aquatic life. Downstream, the Krugersdorp Game Reserve reported a number of animal deaths which they believe are attributable to the poor water quality, as well as a dramatic decrease in the reproductive rates of animals in the Game Reserve.

Although there is mine water pumping and treatment of water with lime, the technology has been unable to produce the desired final water quality for release into the environment, especially in the wet summer months. Concerns on the effect on the Cradle of Humankind World Heritage Site (WHS) have been raised as the Tweelopie Spruit joins the Riet Spruit before entering the Bloubaan Spruit, which flows through the WHS. Acid mine drainage threatens the fossil remains found in the area.

*Source: Council of Geoscience (2010) Report to the inter-ministerial committee on AMD: Mine water management in the Witwatersrand gold fields, which special emphasis on acid mine drainage. [http://www.dwaf.gov.za/Documents/ACID\\_Report.pdf](http://www.dwaf.gov.za/Documents/ACID_Report.pdf)*

## Mining and biodiversity legislation

The Mineral and Petroleum Resources Development Act (MPRDA) of 2002 is the principal legislation governing all stages of the mining process in South Africa. No operation may commence without the appropriate authorisations, including environmental authorisations and water use licences (under the Water Act of 1998). It provides that the principles listed in Section 2 of NEMA must guide the interpretation, administration and implementation of the environmental requirements of the MPRDA. According to NEMA principles, the mining company is the responsible party for these external costs relating to environmental impacts.

Section 49 of the MPRDA allows the Minister of Mineral Resources to prohibit or restrict granting permissions/rights/permits in certain areas of biodiversity, heritage and hydrological importance.

## Rehabilitation of old mine areas

Old mining areas, known as Mine Residue Areas (MRAs), have been identified as a potential provincial priority for the reclamation of land. These areas offer opportunities for development, since the area has already been degraded and further environmental impacts are likely to be limited or development may even provide an improvement to the current status quo.

In order for development to proceed, land must be rehabilitated for human habitation, however initial studies suggested that only about 25 km<sup>2</sup> of the 321 km<sup>2</sup> covered by the 374 MRAs in Gauteng, could be rehabilitated at relatively low cost. As such, GDARD have commissioned a further study, on *Reclamation and Rehabilitation of Mine Residue Areas for Development Purposes: Strategy and Implementation Plan*.

The objective of this *Strategy and Implementation Plan* is to align all existing efforts within the provincial sphere of government in order to enable the extensive MRAs to be reclaimed and/or rehabilitated to the point where they become safe for human use.

For more information, see GDARD (2012) Gauteng Mine Residue Areas Strategy. <http://www.gdard.gpg.gov.za/DocumentsandForms/Documents/GDARD%20MRAs%20Strategy%2020120110-colour.pdf>



### Further reading

GDARD (2008) *Mining and Environmental Impact Guide*.  
<http://www.gdard.gpg.gov.za/DocumentsandForms/Documents/MiningandEnvironmentalImpactGuide.pdf>

## Determining the environmental impact of mining

Guidelines to determine the environmental issues and impacts of the mining industry in Gauteng are provided by GDARD, to aid EAPs to compile adequate environmental assessments, as well as provide guidance to GDARD environmental officers who review the mining licence and application. The guidelines outline: i) environmentally-sensitive areas and mining hot spots; ii) environmental impacts associated with the various stages of mining; and iii) the legislative framework surrounding mining.





# Mining and Biodiversity Guideline



The *Mining and Biodiversity Guideline* was developed to facilitate informed decisions about land-use planning and environmental authorisation for mining development. It provides the mining sector with a practical, user-friendly manual for integrating biodiversity considerations into the planning processes and managing biodiversity during all phases of the mining life cycle from exploration through to closure.

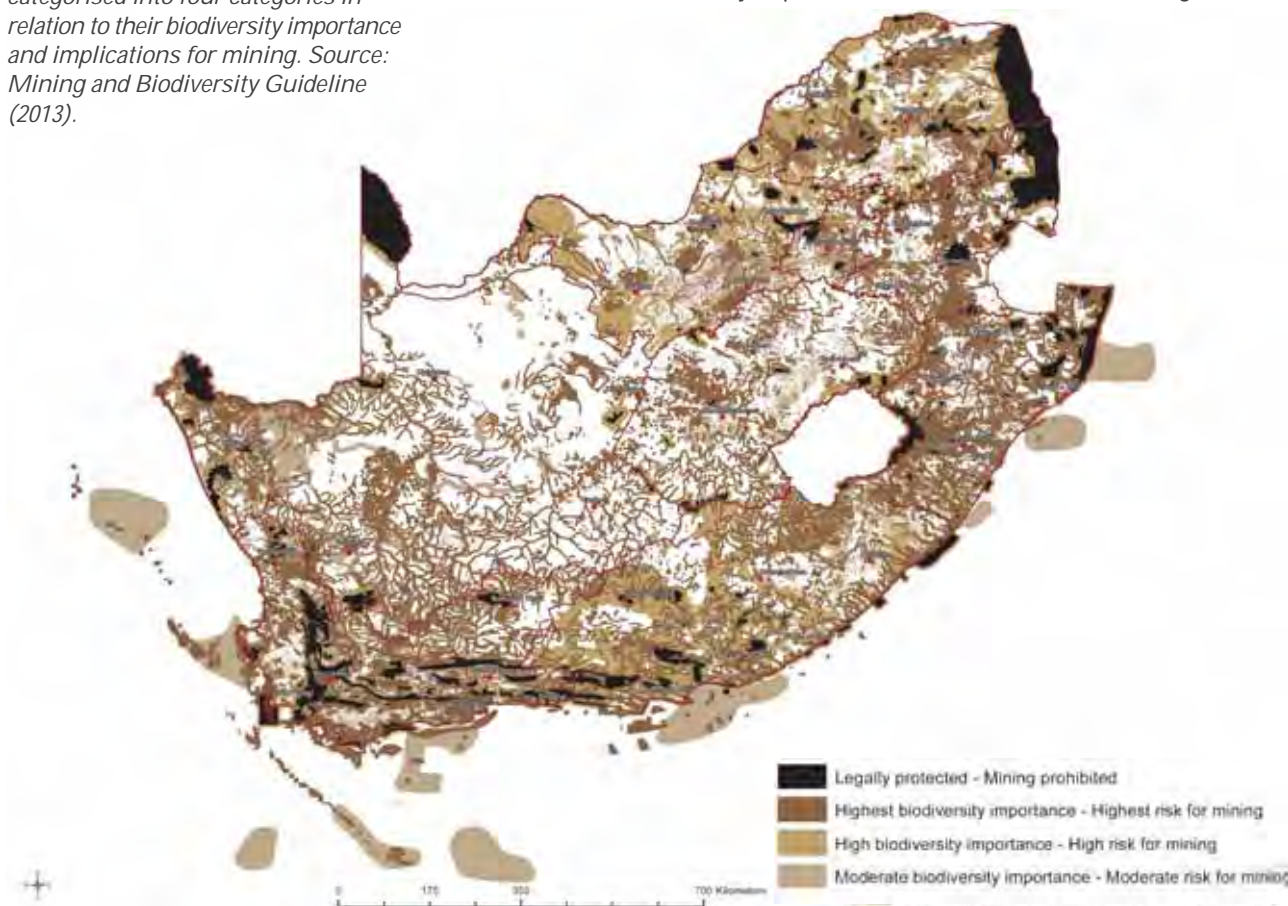
The guideline does not introduce new concepts or requirements but rather draws together all relevant information and presents it in a user-friendly format. In doing so, it provides explicit direction in terms of where:

- Mining-related impacts are legally prohibited.
- Biodiversity priority areas may present high risks for mining projects.
- Biodiversity may limit the potential for mining.

It presents this as a map of biodiversity priority areas vulnerable to the impacts of mining and categorises them into four categories in terms of the level of risk for investment in new mining projects and implications for current mining operations (such as the likelihood of environmental approvals being granted). Biodiversity priority areas include, among others, Critical Biodiversity Areas, Freshwater Ecosystem Priority Areas, Critically Endangered and Endangered ecosystems. The four categories are:

1. Legally protected and mining prohibited.
2. Highest biodiversity importance and highest risk to mining.
3. High biodiversity importance and high risk to mining.
4. Moderate biodiversity importance and moderate risk to mining.

*Map of biodiversity priority areas categorised into four categories in relation to their biodiversity importance and implications for mining. Source: Mining and Biodiversity Guideline (2013).*





### Key point

Because AMD occurs only many years after the mine has been closed, it is important that it is anticipated and included in environmental impact assessments when determining the mine location.

From a business perspective, the Guideline explains the value for mining companies of adopting a risk-based approach to managing biodiversity. The early identification and assessment of mining impacts on biodiversity provides an opportunity to put in place environmental management plans and actions that reduce risks to biodiversity, people and business.

The Guideline highlights that it is most cost-effective and efficient for mines to actively minimise biodiversity impacts through early and systematic planning, not least because this helps to:

1. Reduce risk to biodiversity.
2. Avoid delay in authorisations.
3. Reduce risk to the company by avoiding reputational damage and unexpected costs.
4. Obtain 'buy in' from local communities.
5. Reduce risk to society of deteriorating ecosystem services and loss of biodiversity, from local to national scale, over the short and long term.

## Managing impacts on biodiversity at different stages of the mining life cycle

The *Mining and Biodiversity Guideline* describes six principles for integrating biodiversity into mining-related decisions at each stage of the mining lifecycle – reconnaissance, prospecting, mining and decommissioning. The application of the six principles is tailored for each stage and provides descriptions of the implications for mining companies and decision makers.

Six principles for integrating biodiversity into mining-related decisions described in the *Mining and Biodiversity Guideline* are:

1. Apply the law (as a minimum).
2. Use the best available biodiversity information.
3. Engage relevant stakeholders thoroughly.
4. Use best practice environmental impact assessment (EIA) to identify, assess and evaluate impacts on biodiversity.
5. Apply the mitigation hierarchy when planning any mining-related activities and develop robust environmental management programmes (EMPs).
6. Ensure effective implementation of the EMP, including adaptive management.



### Further reading

Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute (2013) *Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector*. Pretoria. 100 pages. Available at [https://www.environment.gov.za/sites/default/files/legislations/miningbiodiversity\\_guidelines2013.pdf](https://www.environment.gov.za/sites/default/files/legislations/miningbiodiversity_guidelines2013.pdf)





# B3

# PROTECTED AREAS

## Fact sheets in this section:

- **Protected areas in South Africa**
- **National Protected Area Expansion Strategy**
- **Gauteng Protected Area Expansion Strategy**
- **Gauteng biodiversity stewardship strategy**
- **Green servitudes regulatory tool**

Increasing the number and area of protected areas is a key approach in the management and conservation of South Africa's biodiversity and is a strategy for adapting to climate change<sup>9</sup>. Protected areas are areas that have been declared in terms of the National Environmental Management: Protected Areas Act (No. 57 of 2003) or areas that are recognised in terms of this act.

In order to ensure that a representative sample of all ecosystems as well as key ecological processes are included in the protected area network, national and provincial Protected Areas Expansions Strategies have been developed to co-ordinate the expansion of protected areas. They ensure that all of South Africa's ecosystem types are effectively protected. Both the national and provincial strategies for this expansion are based on systematic biodiversity planning (see [page 35](#)), which includes setting targets for the area of land that should be represented in the protected area system by a certain date, taking into account how well each ecosystem type is currently protected.

This section introduces protected areas legislation, and the tools that can be used to protect and conserve natural areas into the future.

<sup>9</sup>South Africa's National Protected Area Expansion Strategy (2008)

# Protected areas in South Africa



## Protected areas and climate change

Protected areas play a vital role in contributing to climate change mitigation and adaptation, both on a global and local scale. Natural areas can mitigate (reduce) climate change because plants and soils are important for removing carbon dioxide (a greenhouse gas) from the atmosphere and storing it. On the other hand, loss of natural areas can contribute to climate change by releasing carbon into the atmosphere.

Protected areas can also conserve priority ecosystems and ecological infrastructure that can protect local communities from the impacts of extreme weather events associated with climate change, such as flooding. Protected areas also provide corridors and refugia that can allow species to adapt to climate change, thereby ensuring that they are not lost.



## Key point

Not only are protected areas important for biodiversity conservation, they can support local livelihoods and economic development through tourism and the provision of ecosystem services.

The declaration of protected areas is one approach for achieving biodiversity targets and for adapting to climate change. Not only do natural areas help to provide resilience to the effects of climate change (e.g. storms, floods) but in addition, by keeping a range of areas natural, a sample of all South Africa's biodiversity can be protected. Currently, the network of formally protected areas is not sufficient to conserve the biodiversity of South Africa. If we factor in the effects of climate change on biodiversity, the situation is compounded further. As such, the expansion of protected areas across the country and the province – according to national and provincial protected areas expansion strategies – is vital for biodiversity conservation.

## Protected Areas Act

The National Environmental Management: Protected Areas Act (No. 57 of 2003) sets out the mechanism for the declaration of protected areas, in order to create a system of protected areas. It is part of the group of National Environmental Management Acts and is based on the same principles as NEMA (see [page 19](#)).

Over and above the process for declaring protected areas, the Act also provides for the administration and management of these protected areas. The Protected Areas Act is also the legislation that regulates the National Parks Board (SANParks). The Protected Areas Act defines various kinds of protected areas including:

- Special nature reserves (comprising highly sensitive, outstanding ecosystems, species or geological features, available primarily for scientific research/environmental monitoring).
- National parks (areas managed by a national organ of state).
- Nature reserves
- Protected Environments
- World heritage sites (in terms of the World Heritage Convention Act, 1999).
- Marine protected areas (a protected area whose boundaries include some area of ocean).
- Specially protected forest areas, forest nature reserves and forest wilderness areas (as declared in terms of the National Forests Act, 1998).
- Mountain catchment areas (as declared in terms of the Mountain Catchment Areas Act, 1970).



# National Protected Area Expansion Strategy



## NPAES and Environmental Impact Assessments

NPAES areas are one of the geographical areas in Listing Notice 3 of the National Environmental Management Act that act as a trigger for at least a Basic Assessment for activities in those areas.

The National Protected Area Expansion Strategy 2008 (NPAES) aims to achieve cost-effective protected area expansion. The NPAES sets targets for protected area expansion, provides maps of the most important areas for protected area expansion, and makes recommendations on mechanisms for protected area expansion.

The NPAES is based on a scientific assessment (using [systematic biodiversity planning](#)) of what and how much of each ecosystem type needs to be protected, and the targets in NPAES are ecosystem-specific. This ensures that targets are not simply an 'overall' total of how much land should be included in the network: the NPAES also considers how the areas are distributed across different ecosystems. To identify priority areas for protected area expansion, a combination of two key factors, importance and urgency, are considered.

**Importance** refers to the contribution an area can make to meeting biodiversity thresholds, maintaining ecological processes and/or providing resilience to climate change. **Urgency** is the extent to which options still exist for the conservation of an ecosystem-type. Where there is a high degree of competing land uses in an area, options for meeting protected area targets are limited and the urgency of protected area expansion is high. However, land prices in these areas are likely to be much higher, so that it may become more strategic to buy larger areas where the urgency is less and the land cheaper, but where the importance is still high.

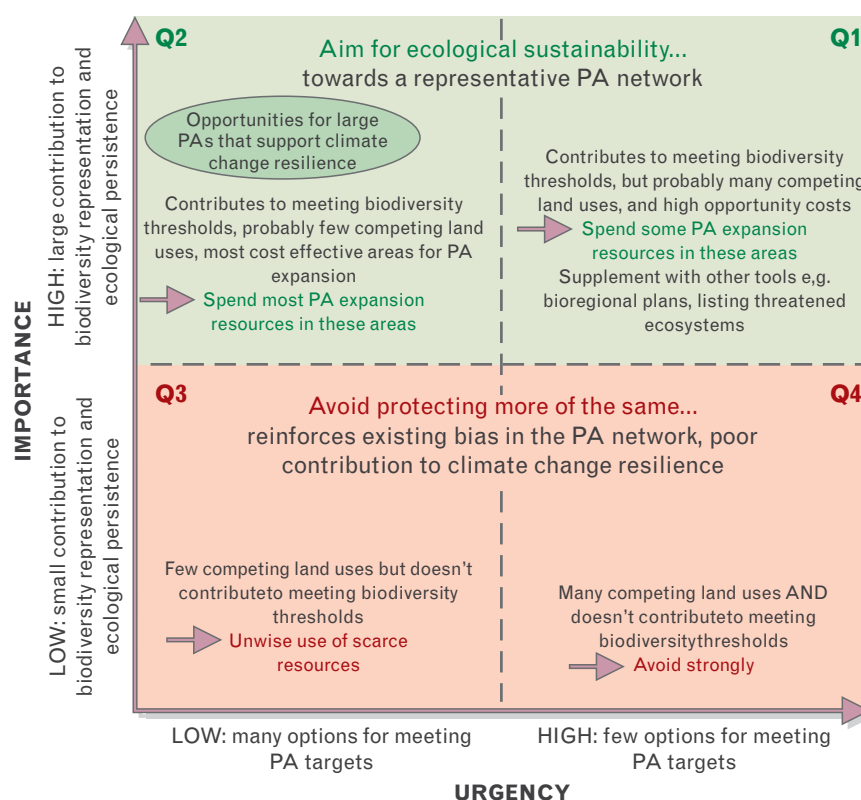
The combination of importance and urgency is shown in the quadrants below. Quadrants 1 & 2 are those where the effectiveness of protected area expansion is greatest.

The NPAES identifies focus areas for land-based protected area expansion. These are areas of high importance for protected area expansion.



## Further reading

The Government of South Africa (2008) National Protected Areas Expansion Strategy maps and report are available online from BGIS: <http://bgis.sanbi.org/protectedareas/NPAESinfo.asp>.



*Priority areas for protected area expansion are identified on the basis of importance and urgency. Source: The Government of South Africa (2008) National Protected Areas Expansion Strategy.*



# Gauteng Protected Area Expansion Strategy

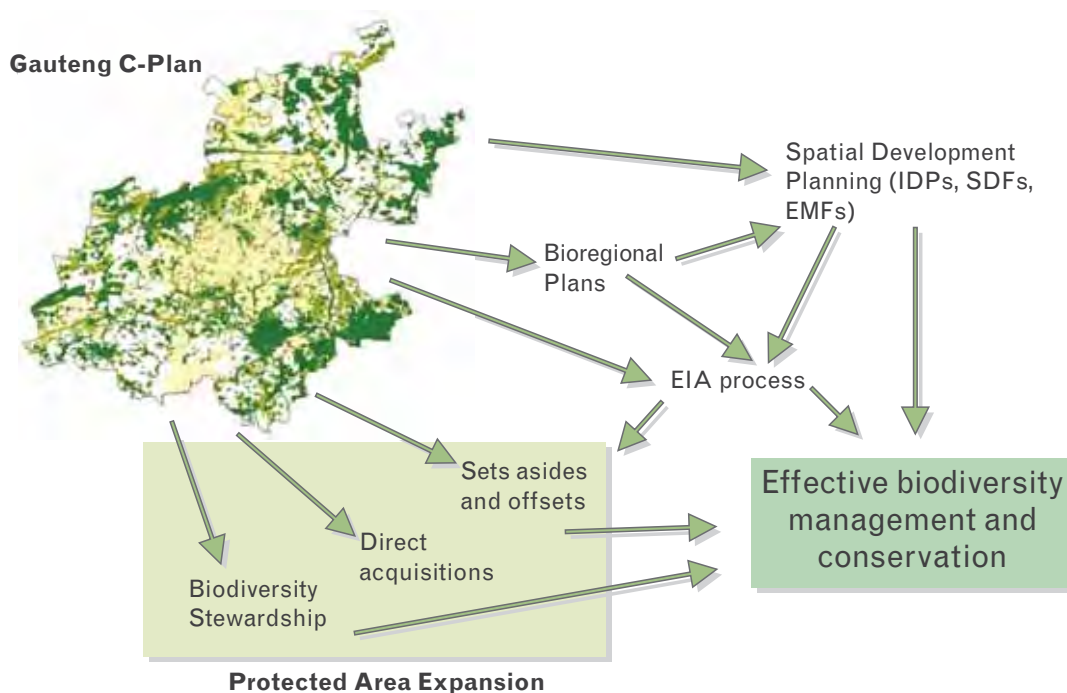


## Key point

The GPAES sets out the key strategies for protected area expansion and identifies spatial priorities and protected area targets. Although protected area expansion is administered at a provincial-level, it is important for local governments to be aware of the areas that are being targeted for inclusion into the protected area network, and are taken cognisance of in IDPs and SDFs.

A strategy for increasing the amount of protected areas specifically in Gauteng has been developed and is called the Gauteng Protected Area Expansion Strategy (GPAES). The GPAES is a requirement of the National Protected Area Expansion Strategy (NPAES) and its purpose is to provide the framework for protected area expansion in Gauteng over the next 20 years. A provincial-level strategy is required because the NPAES focuses its efforts on natural, unfragmented areas larger than 5,000ha. This scale excludes much of Gauteng's natural areas, and finer-scale identification of priorities for protected area expansion is therefore required for the province.

As with the NPAES, expansion of the protected area system in Gauteng is undertaken in a strategic, targeted fashion to ensure the long-term persistence of key biodiversity features and ecological processes within the province. The spatial biodiversity information underpinning the GPAES areas comes from Gauteng's provincial conservation plan, [Gauteng C-Plan 3.3](#).(page 37).



*The Gauteng C-Plan 3.3 was used to derive the priority areas for protected areas expansion, by selecting all important and irreplaceable areas and merging this with the Threatened Ecosystems map for Gauteng, thus ensuring that all ecosystems are represented. Source: SANBI & GDARD.*



## Key point

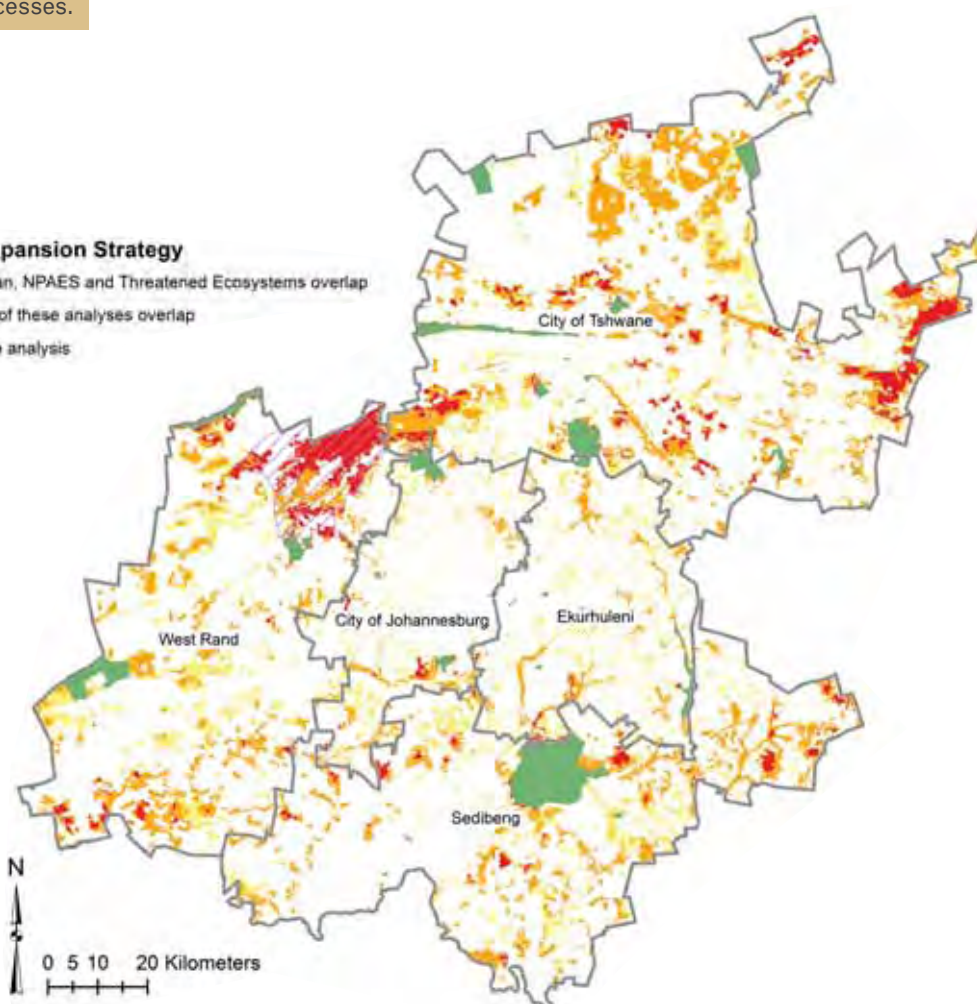
Gauteng protected area expansion is driven by conservation agencies and government at the provincial-level, however, it is important for local governments and private landowners to be aware of the GPAES so that priority areas and adjacent land are properly considered in the development of SDFs as well as in EIA processes.

Priority Areas for protected area expansion are divided into 3 levels, with level 1 being highest priority/most important to secure and level 3 being the least.

- Level 1: The largest intact areas in which the **Gauteng C-Plan** irreplaceability layer, NPAES spatial priority layer and threatened ecosystem layer overlap in areas of natural habitat.
- Level 2: The largest intact areas in which two of the three layers overlap in areas of natural habitat.
- Level 3: The largest intact areas within one of the three layers in areas of natural habitat.

### Gauteng Protected Areas Expansion Strategy

- Level 1: Priority areas from CPlan, NPAES and Threatened Ecosystems overlap
- Level 2: Priority areas from two of these analyses overlap
- Level 3: Priority area from single analysis
- Protected Areas
- World Heritage Site



Map showing the Gauteng Protected Area Expansion Strategy – priority areas are categorised into three levels.



## GPAES in the face of climate change

The GPAES takes predicted impacts of climate change into account by considering how the protected area system can be designed to adapt to the impacts of climate change. This can be achieved by:

- Securing priority areas of natural or near-natural habitat for representation and persistence of biodiversity (see systematic biodiversity planning – [page 35](#))
- Securing water resources and other areas of key ecological infrastructure to ensure that ecosystem services (e.g. flood attenuation) provided by naturally functioning ecosystems are maintained.
- Establish a system of ecological corridors, which will potentially include areas of degraded habitat that allow the movement and dispersal of key species across Gauteng and between adjoining provinces.



## Further reading

The Gauteng Protected Area Expansion Strategy will be available soon at <http://bgis.sanbi.org>



# Gauteng biodiversity stewardship strategy



## Key point

The two highest levels of biodiversity stewardship agreements are Nature Reserves and Protected Environments, declared under the Protected Areas Act.

For Nature Reserves, the terms of the biodiversity stewardship agreement are written into the property title deeds and are binding on subsequent owners of the property

Biodiversity stewardship is a programmatic approach to entering into agreements with private and communal landowners, in order to protect and manage biodiversity priority areas. Different categories of agreements confer varying degrees of protection on the land and hold different benefits for landowners. Entering into a biodiversity stewardship agreement is entirely voluntary for the landowner. The process is led by conservation officials at the Gauteng Department for Agriculture and Rural Development (GDARD) and the agreement forms a partnership between the state and landowners for the management and conservation of the area. In Gauteng, development pressure results in high land values, making it very expensive to secure protected areas through the purchase of land. As a result, biodiversity stewardship has been identified as the primary mechanism to expand the protected area network within Gauteng and support protected area targets and priorities.


There are several different types of biodiversity stewardship agreements, which provide varying levels of protection. The Protected Areas Act specifically makes provision for landowners to undertake actions to protect biodiversity on their land and the most secure levels of biodiversity stewardship agreements (Nature Reserve and Protected Environment) can therefore be declared under the Act. The less restrictive types of agreements are linked to the Biodiversity Act (Biodiversity Management Agreement), rely on contract law (Biodiversity Agreement), or are non-binding (Biodiversity Partnership Area).

Biodiversity stewardship is a cost-effective method for protecting biodiversity priority areas whilst leaving ownership and management of the land in the hands of land owners and therefore allowing the public to benefit from the ecosystem services that the areas provide. Wherever possible, land owners are offered a range of support mechanisms for entering into a biodiversity stewardship agreement. Benefits for landowners depend on the level of commitment/protection offered, but include:

- Those areas declared Nature Reserves and not used for commercial, business, agriculture or residential purposes are excluded from property rates.
- Income tax deductions for landowners involved in statutory conservation (Nature Reserves, Protected Environments, Biodiversity Management Agreements) in relation to the value of the land and conservation and management expenses.
- Invasive alien clearing assistance and technical advice.

## Biodiversity stewardship agreement protection levels

GDARD has developed a Gauteng Biodiversity Stewardship Programme which is consistent with the national biodiversity stewardship guidelines. There are five levels of protection that can be assigned, based on the agreement of the land owner, outlined in the table following.



Biodiversity stewardship agreement types	Legal mechanism	Detail
<b>Nature Reserve</b>	National Environmental Management: Protected Areas Act (No. 57 of 2003)	<ul style="list-style-type: none"> <li>• Favourable for sites with highest biodiversity importance.</li> <li>• Requires a title deed restriction</li> <li>• Contract with landowner usually for 30 - 99 years/in perpetuity</li> <li>• Contributes to South Africa's protected area estate</li> </ul>
<b>Protected Environment</b>		<ul style="list-style-type: none"> <li>• Allows for some form of production on the land as part of approved management plan.</li> <li>• Contract with landowner usually for 30 years</li> <li>• Favourable for declaration over multiple properties</li> <li>• Contributes to South Africa's protected area estate</li> </ul>
<b>Biodiversity Management Agreement</b>	National Environmental Management: Biodiversity Act (No. 10 of 2004)	<ul style="list-style-type: none"> <li>• Formalised agreement of 5-10 years for a biodiversity feature that has a NEM:BA Biodiversity Management Plan.</li> <li>• Contributes to South Africa's conservation area estate</li> </ul>
<b>Biodiversity Agreement</b>	Contract Law	<ul style="list-style-type: none"> <li>• Contractual agreement with landowner and conservation authority of 5 - 20 years</li> <li>• Generally a minimum 5 year contract.</li> <li>• Contributes to South Africa's conservation area estate</li> </ul>
<b>Biodiversity Partnership Area</b>	Informal/non-contractual	<ul style="list-style-type: none"> <li>• Non-binding partnership, may include a Memorandum of Understanding</li> </ul>



### 'Protected areas' and 'conservation areas'

Protected areas are declared under the Protected Areas Act or in terms of other legislation recognised by the Protected Areas Act. Conservation areas are managed at least partly for biodiversity conservation, receive some form of protection by landowners, and thus contribute to the broader 'conservation' estate but are not formally declared.

## Responsible parties for implementing biodiversity stewardship

Biodiversity stewardship is implemented at the provincial-level (in Gauteng, biodiversity stewardship is co-ordinated by the Biodiversity Stewardship Unit of GDARD) and is supported by the Department of Environmental Affairs, the South African National Biodiversity Institute and various NGOs. Private landowners are obviously important stakeholders in the implementation of biodiversity stewardship, and local governments can support the process through supportive property rates policies for land under a biodiversity stewardship agreement.

Potential biodiversity stewardship sites can be identified using the Gauteng Protected Areas Expansion Strategy, as part of the EIA process and on the account of specialist knowledge of areas of important biodiversity. Sites are assessed on a case-by-case basis and the number of stewardship sites supported is therefore depends on the funding of the Biodiversity Stewardship Unit.



### Further reading

For more information on the Gauteng Biodiversity Stewardship Strategy contact Eleanor McGregor, Head of Component: Biodiversity Management, GDARD at [Eleanor.McGregor@gauteng.gov.za](mailto:Eleanor.McGregor@gauteng.gov.za) or 011 240 2516.



# Green servitudes regulatory tool



## Key point

Green servitudes refers to servitudes over private properties that are registered with the purpose of preventing the degradation of the environmental values of the servitude land.

Other terms used globally for green servitudes include conservation servitudes, conservation easements or conservation covenants.

*Source: City of Johannesburg (2011) Green servitudes regulatory tool.*

Green servitudes are legal mechanisms through which local authorities or conservation agencies can conserve biodiversity and/or ecological infrastructure by limiting certain types of land use activities on private land. As with other types of servitudes, green servitudes have legally-imposed conditions which are attached to the title deeds of the property. The establishment of a green servitude gives rights to an external entity (i.e. the municipality) to ensure the use of that portion of the property for biodiversity management and conservation.

Green servitudes are registered against the title deeds of a property, in favour of a custodian (e.g. the municipal Environmental Management department or other elected entity) to protect environmentally sensitive parts of a private property. These areas remain in the ownership of the titleholder, but in general, may only be used for conservation purposes.

**Green servitudes are different to 'green' municipal by-laws**, but they are complementary to each other. By-laws apply to every property in a municipality, while green servitudes work on a property-by-property basis (attached to title deeds of properties to which they were applied). Certain green by-laws might however make use of a green servitude regulatory tool for implementation of its policies. For example, the Mogale City Municipality by-law on Urban Greening and Biodiversity Preservation requires the 'interconnectedness of open spaces on a specific site or development', for which a green servitudes tool could be applied.

## Why create a green servitude?

A green servitude can ensure certain portions of a property are managed for biodiversity/conservation with restrictions on inappropriate/incompatible land use activities. It is a legal tool for conservation, with title deed restrictions for the identified portions of a property that has biodiversity/conservation value.

## How are green servitudes created?

A green servitude can be established by either the voluntary surrender of development rights on some or all of the land by a land owner or can be imposed by an authority in order to protect areas that are deemed important for biodiversity conservation.

### Role players in the creation of green servitudes:

Municipal Planning and Environmental Departments are key partners for determining areas where green servitudes need to be created.

Landowners can use Gauteng C-Plan, bioregional or municipal plans, such as the Spatial Development Framework (SDF), to identify if there is important biodiversity on their land (see [Chapter B1](#)).

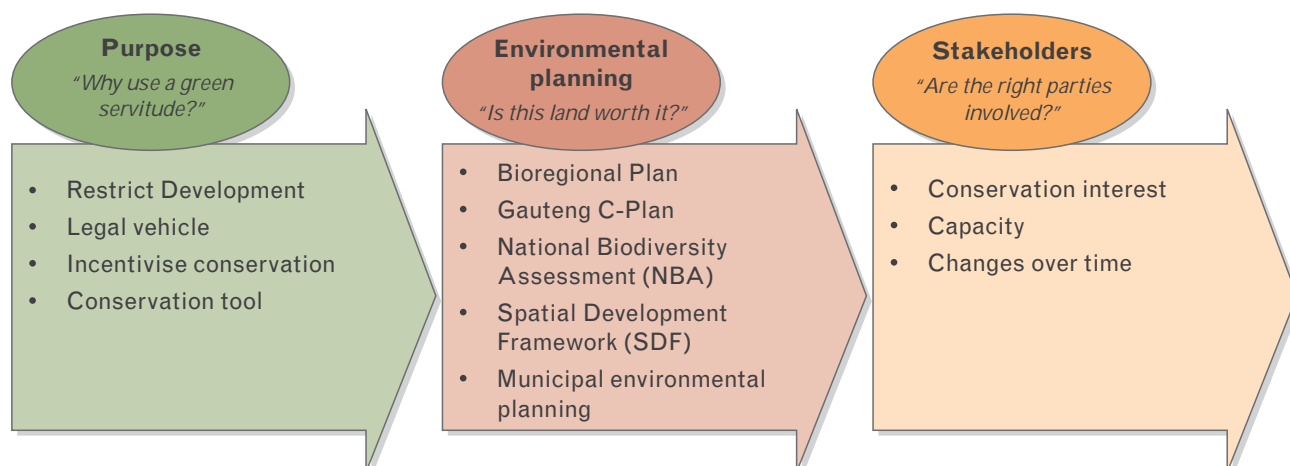
Development authorisations with respect to environmental impact assessments are often made at a provincial-level (GDARD). It is important for municipalities with green servitude regulatory tools to work in partnership with GDARD to ensure that green servitudes required through an authorisation process are implemented on parcels of land of high biodiversity value.



## Key point

At time of writing, guidelines for green servitudes in Gauteng only exist in draft for the City of Johannesburg. Outside of Gauteng, other local governments using a green servitudes regulatory tool include Nelson Mandela Bay Metropolitan and eThekweni municipalities.

In cases where the servitude is imposed by an authority, development is restricted through the authority's right to exercise an environmental management function on the property. Voluntary surrendering of development rights, on the other hand, usually relate to some form of financial incentive that will accrue to the landowner, such as property rates or increased land use densities for the remaining portion of the erf, depending on the municipal regulations. In either instance, permanent, legal responsibility for the protection and management of the conservation value remains with the property owner.



*Screening process for green servitudes regulatory tool. Source: City of Johannesburg (2011) Green servitudes regulatory tool.*

When registering a green servitude, the land owner must submit a Surveyor's plan of the green servitude to the office of the provincial Surveyor General (Department of Rural Affairs and Land Reform) so that the green servitude can be included in cadastral maps. The following information must be recorded against the title deed:

- Servitude agreement.
- Duration.
- Restrictive conditions.
- Obligations.
- Maintenance standards.
- Permissible activities.

## What is the difference between Biodiversity Stewardship and a Green Servitude?

Green servitudes are employed at the municipal-level to further biodiversity conservation and management targets within the municipality and can be imposed on the landowner. Biodiversity stewardship agreements are based on a consensual (voluntary) agreement with the landowner and the provincial conservation authority, GDARD. That said, green servitudes can also be created by request of the landowner, who may receive favourable rates for the conservation of a portion of land, or preferable development restrictions for the remaining portion of the land – to be determined by the municipality.

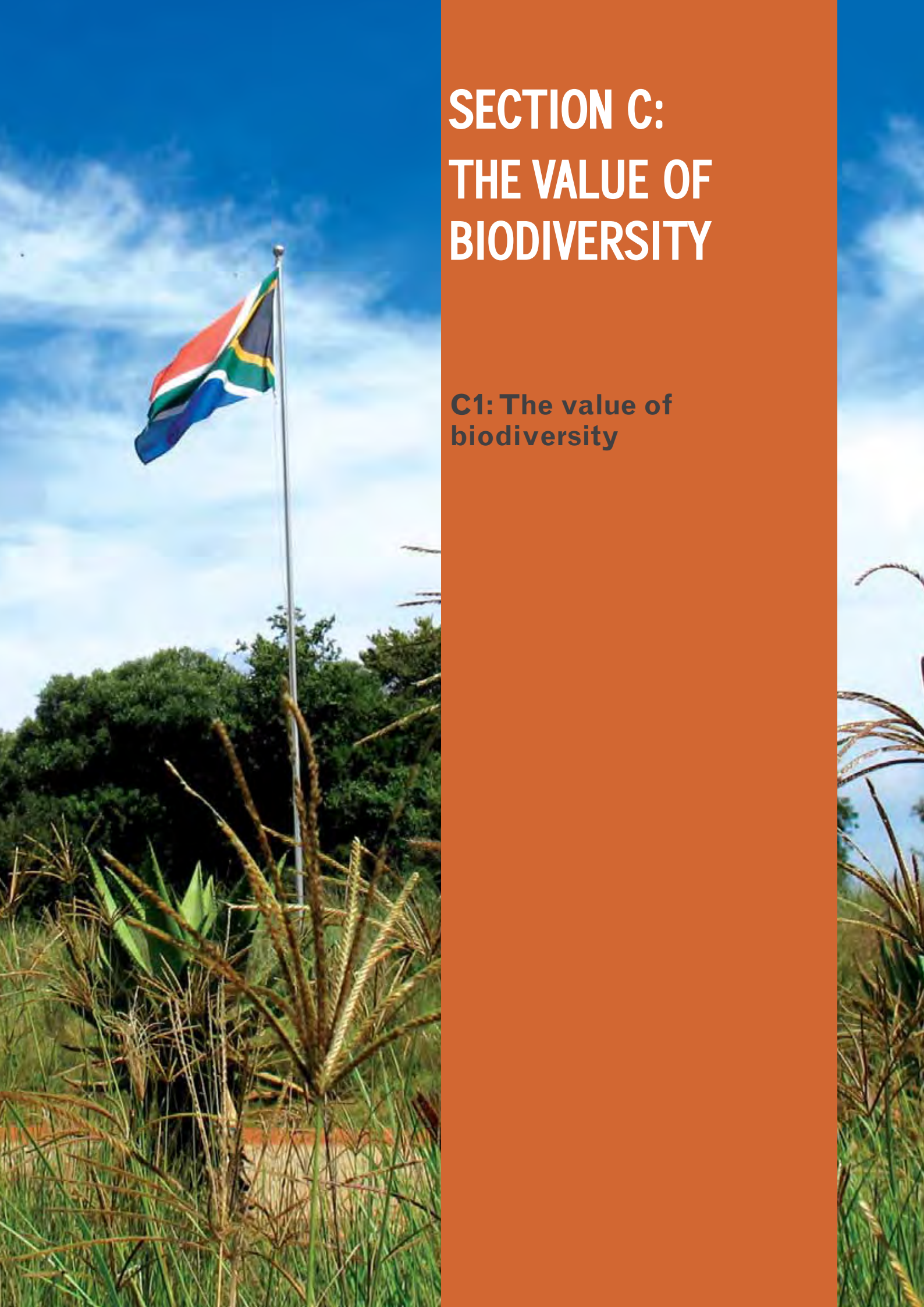
Biodiversity stewardship agreements have five different levels of protection and the land may remain productive, subject to the provisions of the approved management plan. Green servitudes are likely to be used solely for conservation. However, the two are not mutually exclusive and green servitudes could be implemented within a biodiversity stewardship area, particularly where a portion of land represents high biodiversity value and the biodiversity stewardship agreement does not afford long-term or strict protection.



## Further reading

For more information on the City of Johannesburg (2011) *Green servitudes regulatory tool* available from Open Space Planning at the City of Johannesburg, in the National Resources Directorate of the Department of Environmental Planning and Management.





# SECTION C: THE VALUE OF BIODIVERSITY

## **C1: The value of biodiversity**





# THE VALUE OF BIODIVERSITY

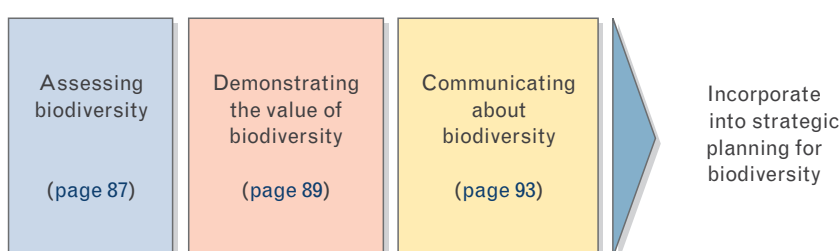
## Fact sheets in this section:

- **Biodiversity assessments for Gauteng**
- **Assessing and contributing to biodiversity information**
- **Demonstrating the value of biodiversity**
- **Making the case for biodiversity**
- **Tools to communicate biodiversity issues**

For local governments, biodiversity is important for more than just conservation. The value of biodiversity should be understood in the broadest sense to include environmental, cultural, economic and intrinsic values<sup>10</sup>. The benefits of biodiversity (such as the goods and services it underpins) should be reflected in the plans and budgets of a range of relevant sectors and macro-economic planning, for instance tourism, water and sanitation, health, waste management and climate change adaptation and mitigation.

Understanding, appreciation and awareness of the diverse range of benefits of biodiversity is needed to generate the “will” (political or otherwise) of individuals to implement the necessary changes and actions required for local governments to effectively plan, manage and conserve biodiversity.

This section provides an overview of: assessments of Gauteng biodiversity; how to assess and contribute to biodiversity information; tools and examples of demonstrating the value of biodiversity; and tools for communicating this value to different audiences.



<sup>10</sup>CBD Aichi Biodiversity Target 1, available at <http://www.cbd.int/doc/strategic-plan/targets/T1-quick-guide-en.pdf>

# Biodiversity assessments for Gauteng



## Climate change

When planning for climate change, it is important to have a thorough assessment of the amount and state of biodiversity and ecological infrastructure in the region. Since ecological infrastructure such as wetlands can help us adapt to climate change, it makes sense to ensure that wetland areas are properly managed and (if required) rehabilitated.

Biodiversity monitoring and assessment is also important in the creation of 'baseline' data, which is data from which future changes can be measured. This is a long-term process, but is important to see the effect that climate change is having on biodiversity, and to aid future predictions.

The first stage in monitoring and assessing biodiversity is to understand what biodiversity exists and where it is, what condition it is in (e.g. the health and functioning of ecosystems), and what ecosystem services are being – or could be – provided. This fact sheet provides a summary of assessments of Gauteng's biodiversity, including provincial assessments as well as national assessments that are relevant to users in Gauteng.

## Existing assessments of biodiversity in Gauteng

The following biodiversity information for Gauteng can be found on the Biodiversity GIS website (BGIS; <http://bgis.sanbi.org>).

### Gauteng's provincial conservation plan (Gauteng C-Plan 3.3)

The [Gauteng C-Plan](#) is a systematic biodiversity plan for the province that should be used as a land-use planning and decision-making tool. It details the Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) of the Gauteng Province. Land use guidelines for CBAs and ESAs are given. Find out more in [Chapter B1 \(page 37\)](#) and <http://bgis.sanbi.org/gauteng/project.asp>

### Bioregional plans in Gauteng

Bioregional plans map biodiversity priorities at the municipal level and have been developed based on the Gauteng C-Plan to inform land-use planning, environmental impact assessments and authorisations, and natural resource management outside of protected areas. In bioregional plans, both CBAs and ESAs are divided into two levels to provide more precise management information for a portion of land. Find out more in [Chapter B1 \(page 39\)](#).

### Municipal biodiversity summaries

Municipal biodiversity summaries provide basic biodiversity information for all municipalities in South Africa. Primarily a reporting tool providing biodiversity statistics, municipal biodiversity summaries were developed by SANBI and DEA to support municipalities in the development of State of the Environment reports. The municipal summaries provide an overview of municipal biodiversity, including digital maps (GIS layers) of land cover, protected areas (including Ramsar sites), biomes, vegetation types, CBAs, ESAs, threatened ecosystems, wetlands and rivers. Find out more: <http://bgis.sanbi.org/municipalities/project.asp>

### National Biodiversity Assessment (2011) and National list of ecosystems threatened and in need of protection

National maps of ecosystem protection level, ecosystem threat status and formal protected areas have been produced as part of the National Biodiversity Assessment (NBA). The NBA also summarises and consolidates all spatial biodiversity priority areas in the country. These data sets can be used to locate threatened ecosystems and biodiversity priority areas for national development planning. The latest assessment was undertaken in 2011, and will be updated periodically. In terms of the National Environmental Management: Biodiversity Act, a national list of ecosystems threatened and in need of protection can be gazetted. For the national list of ecosystems threatened and in need of protection, any removal of indigenous vegetation in critically endangered or endangered areas should trigger at least a basic assessment in terms of EIA regulations. Find out more in [Chapter B1 \(page 41\)](#) and about the NBA at <http://bgis.sanbi.org/NBA/project.asp> or the National list of threatened ecosystems at <http://bgis.sanbi.org/ecosystems/project.asp>





## National Freshwater Ecosystem Priority Areas

The National Freshwater Ecosystem Priority Areas (NFEPA) is a national network of freshwater priority areas, including rivers, wetlands and associated sub-catchments. Maps of Freshwater Ecosystem Priority Areas, or FEPAs, provide NFEPA maps provide strategic spatial priorities for conserving South Africa's freshwater ecosystems and supporting sustainable use of water resources. They are summarised, together with other spatial information about freshwater ecosystems, in the Atlas of Freshwater Priority Areas in South Africa.

Find out more in Chapter B1 (page 43) and <http://bgis.sanbi.org/nfepa/project.asp>

## Cities Biodiversity Index — a biodiversity management tool for cities

Developed specifically for urban areas, the City Biodiversity Index (CBI) was created in response to the Convention of Biological Diversity acknowledging the role of cities in minimising the loss of biodiversity.

Also known as the Singapore Index, the CBI is a self-assessment tool that incorporates indicators on biodiversity, ecosystem services, and good governance and management, and was designed for cities to monitor and evaluate biodiversity and ecosystem services at a local level. As a self-assessment tool, the final score is of less importance than monitoring changes in the score over time, the improvements made by cities over a given period, and identifying target areas to improve biodiversity management.

The CBI can help local authorities evaluate how effectively they are reducing the rate of biodiversity loss, where there are gaps in information about local biodiversity, and inform the development of a Local Biodiversity Strategy and Action Plan.

More information is available at <http://www.cbd.int/authorities/gettinginvolved/cbi.shtml>



# Accessing and contributing to biodiversity information



Biodiversity information underpins the tools and resources summarised in this toolbox. Maintaining and using good biodiversity information is therefore important to good decision-making.

National governments, local government planners and policy-makers, researchers, environmental assessment practitioners, and many NGOs all use biodiversity data in some way. This includes occasionally collecting and interpreting biodiversity data.

Those with biodiversity data should make an effort to make those data accessible by publishing the data for wider use. There are several facilities for publishing new or updated biodiversity information.

## Who uses biodiversity data?

National governments that are signatories to the Convention on Biological Diversity are required to gather, collate and manage biodiversity information.

Biodiversity data and information are used by local governments for planning, EIAs and evaluating ecosystem services, by environmental assessment practitioners when preparing EIA's and other specialist reports, and by scientists for research.

Where possible these users of biodiversity data and information make use of available resources, but they do sometimes also collect new or supplemental data. These data should be made accessible to others by publishing it. Thereby contributing to biodiversity datasets and information.

## South African data facilities



South Africa has a variety of detailed biodiversity information. Processed data that has been analysed and interpreted (e.g. into systematic biodiversity plans) so that it is useful for land use planning, can be accessed on two portals hosted by the South African National Biodiversity Institute (SANBI). These portals, the Biodiversity Advisor and BGIS, are kept up-to-date and are the 'go-to' place for biodiversity data in South Africa. Municipalities, amongst other organisations, can make biodiversity information available through these platforms (e.g. the Gauteng Conservation Plan 3.3 is available on BGIS).

Species locality data can be found on South African Biodiversity Information Facility (SABIF) and SANBI's Integrated Biodiversity Information System (SIBIS).

## Biodiversity Advisor

SANBI's Biodiversity Advisor centralises South African biodiversity information. The website supports improved decision-making and research through access to online maps, biodiversity plans and reports, specimen records, training materials, species mapping tools and municipal biodiversity summaries. It includes information resources from the SANBI Grasslands Programme.

For more information, <http://biodiversityadvisor.sanbi.org/>



## BGIS

The Biodiversity GIS (BGIS) unit at SANBI manages biodiversity and spatial planning information. Maps and relevant planning information such as bioregional plans and the Gauteng provincial biodiversity plan (C-Plan) are easily accessible and freely available on its website. Electronic copies of datasets, maps and reports can be downloaded. For those who do not have Geographic Information Software (GIS) on their computers can still view the maps as BGIS has an online viewer that can be used by any one with internet access. The BGIS unit also provides advice on the application of biodiversity data. BGIS is therefore more than a data portal – it provides access to reports such as the NBA Synthesis Report and Atlas of FEPAs, where biodiversity data is presented and assessed.

For more information, <http://bgis.sanbi.org>

## SIBIF

The South African Biodiversity Information Facility (SABIF) is the South African node of Global Biodiversity Information Facility (GBIF) and biodiversity data presented on SABIF is also available via GBIF. SABIF is part of the GBIF Africa region where collaboration across the continent contributes to sharing resources, capacity and knowledge. Any biodiversity data collected can be uploaded to SABIF (and therefore GBIF), as long as it conforms to the data publishing rules.

For more information, <http://www.sabif.ac.za/>

## SIBIS

SANBI's Integrated Biodiversity Information System (SIBIS) has been incorporated into SABIF. SIBIS reflects biodiversity data collected specifically by SANBI, whereas SABIF has datasets from a number of institutions.

For more information, <http://sibis.sanbi.org>

## Global data facilities

Global data on biodiversity is important for global research on climate change impacts and determining global biodiversity priorities. Such data may not be fine-scale enough for local governments for systematic biodiversity planning (see [Chapter B1](#)), however, as part of their commitment to international and national legislative frameworks, local governments are already collecting biodiversity data and therefore have a critical role in publishing of biodiversity data.



## GBIF

The Global Biodiversity Information Facility (GBIF) provides free, open, internet access to biodiversity data. It is a global network, where countries, international organisations and even the public can find and share biodiversity information. The data portal is the access point for the data registry, and also provides guidelines and instruction manuals for those wishing to publish data.

The *GBIF-ICLEI Best Practice Guide for Biodiversity Data Publishing by Local Governments* explains important principles that underlie the data publishing process and describes the tools, standards and infrastructures to capture, manage and publish the biodiversity data generated during local government planning, decision-making, assessment and reporting processes.



### Further reading

GBIF website: <http://www.gbif.org/>  
 GBIF (2012) *GBIF-ICLEI Best Practice Guide for Biodiversity Data Publishing by Local Governments*: <http://www.gbif.org/resources/2380>

# Demonstrating the values of biodiversity



When one thinks about 'value', one typically thinks of the financial or economic value. But demonstrating the value of biodiversity does not have to involve Rands and Cents. There are different ways of thinking about value – about why people care about biodiversity.

People benefit from goods and services underpinned by biodiversity in a range of ways. Many of these services are public goods, that are difficult to put a price on or are considered 'free', but this does not mean that they are not valuable. Avoided loss of human life as a result of healthy functioning wetlands reducing the impact of a flooding event is a valuable direct benefit of maintaining these ecosystems. Indirect benefits, such as that derived from open spaces used for recreation, enjoyed for aesthetic reasons and contributing to quality of life in a city, are also valuable in economic and non-economic ways (cultural, religious and social value of biodiversity). The 'value' of biodiversity should therefore be understood in the broadest sense to include environmental, cultural, economic and intrinsic value.

While the value of biodiversity is often under-estimated or ignored in land-use planning and decision-making, this fact sheet summarises projects and tools that are helping to address this.

## Projects that demonstrate the value of biodiversity

### Gauteng City-Region Observatory

The Gauteng City-Region Observatory's (GCRO) Green Assets and Infrastructure project is looking at green assets and ecosystem services in the Gauteng City-Region (GCR), and how they are or should be valued.

An initial case study of Johannesburg's ecosystem services showed a lack of knowledge on ecosystem services in the area. The key output of current research is the 'State of Green Infrastructure Report', which assesses the physical state of green infrastructure in the GCR as well as whether municipalities in the city-region have adequately appreciated and valued green infrastructure within their planning processes. The report provides essential reading for planners and decision-makers in the Gauteng area.

### Project for Ecosystem Services

The international Project for Ecosystem Services, in which South Africa is one of several participating countries, demonstrates how to best use the findings of ecosystem services assessments in decision-making processes. A case study in the Eden District Municipality in the Western Cape province of South Africa, and highlights how this can improve land-use planning for enhanced socio-ecological resilience. The project demonstrates the value of managing biodiversity and ecological infrastructure as a means of ecosystem-based disaster risk reduction (with specific reference to an urban context), and how this can be incorporated into bioregional plans and other multi-sectoral plans and assessments (such as Integrated Development Plans (IDP) or Spatial Development Frameworks (SDF)).

A Disaster Resilience Learning Network has been established in Eden to strengthen the implementation of climate adaptation programmes in the District Municipality. It is hosted by the Climate Change and Biodiversity Directorate of the Western Cape Department of Environmental Affairs and Development Planning.



#### Further reading

Green assets and infrastructure at <http://www.gcro.ac.za/project/green-assets-and-infrastructures>

The Green Strategic Programme for Gauteng at <http://www.gcro.ac.za/project/green-strategic-programme-gauteng>



#### Further reading

Project for Ecosystem Services in South Africa: <http://www.csir.co.za/nre/ecosystems>

Integrating ecosystem services into land use planning at a local level: <http://biodiversityadvisor.sanbi.org/wp-content/uploads/2012/09/04-Opp-challenges-for-mainstreaming-eco-services-Sitas.pdf>



### Further reading

The LTAS is responding to the South African National Climate Change Response White Paper (NCCRP). For more information visit

<http://www.sanbi.org/biodiversity-science/statebiodiversity/climate-change-and-bioadaptation-division/ltas>



### Further reading

The NBA provides information on the state of South Africa's biodiversity and ecosystems, available at <http://bgis.sanbi.org/nba/project.asp>



### Further reading

TEEB – The Economics of Ecosystems & Biodiversity: <http://www.teebweb.org>

TEEB (2010) *The Economics of Ecosystems & Biodiversity for Local and Regional Policymakers*: <http://www.teebweb.org/our-publications/teeb-study-reports/local-and-regional-policy-makers>

TEEB (2011) *TEEB Manual for Cities: Ecosystem Services in Urban Management*: [http://www.teebweb.org/wp-content/uploads/Study%20and%20Reports/Additional%20Reports/Manual%20for%20Cities/TEEB%20Manual%20for%20Cities\\_English.pdf](http://www.teebweb.org/wp-content/uploads/Study%20and%20Reports/Additional%20Reports/Manual%20for%20Cities/TEEB%20Manual%20for%20Cities_English.pdf)

## Socio-economic implications of climate change

Climate change poses a range of challenges to all sectors in South Africa and exacerbates various ecosystem-based disaster risks, such as flooding, drought, or wildfires. The Long Term Adaptation Scenario Research Flagship Programme (LTAS) provides projections of climate change impacts for key sectors (one of which is biodiversity), an evaluation of their socio-economic implications, and relevant adaptation needs and responses for the key sectors. Managing and conserving biodiversity is seen as important for contributing to building climate resilience and to supporting adaptation in sectors such as water and agriculture (through continued supply of ecosystem services).

Also see [Chapter A1](#) for Ecosystem-Based Adaptation to climate change (see [page 12](#)).

## National Biodiversity Assessment

The National Biodiversity Assessment (NBA) highlights specific examples of the value of various ecosystem types in South Africa. The examples provided point to selected studies, some of which provide a valuation of the benefits of goods and services provided by these ecosystems. The examples in the NBA illustrate the value of biodiversity from terrestrial, freshwater, wetlands, estuaries and marine and coastal ecosystems (see Boxes 6, 9, 11, 13 and 15 in Chapters 4 to 8 of the NBA).

## The Economics of Ecosystems and Biodiversity

The Economics of Ecosystems and Biodiversity (TEEB) is a global initiative, illustrating the economic benefits of biodiversity and ecosystems, and highlighting the growing cost of biodiversity loss and ecosystem degradation. It recommended a tiered approach: recognising the value of biodiversity and ecosystems, demonstrating this value, and capturing it in planning and decision-making.

The TEEB initiative has produced a suite of reports for national and international policymaking. Of specific interest to urban biodiversity is the TEEB for Local and Regional Policymakers report, which raises awareness about the importance of understanding natural capital and services, and applying this within local policy. The TEEB Manual for Cities: Ecosystem Services in Urban Management is based on this report, and offers a step-by-step guide on how to include ecosystem services in decision-making and policy. This can be used to assess all ecosystem services in a municipality or to focus on one particular area, such as the value of open spaces within a city. The manual is useful for highlighting beneficial ecosystem services for cities. Several case studies provide real-world examples of valuation of ecosystem services, including two in South Africa.

### eThekweni Municipality, Durban

eThekweni municipality examined the importance of open spaces for its residents, and their role in meeting the basic needs of the poorest sectors of society. An assessment of ecosystem services provided by open space areas revealed their importance in providing fresh water, food and raw materials, for tourism and recreation, and in providing protection against extreme events. This has motivated for improved management and conservation of biodiversity.

### City of Cape Town

An ecosystem services assessment by the City of Cape Town has shown that the natural hazard regulation (e.g. floods, fires and storm surges from the sea) by ecological infrastructure has avoided damages of between R4.8 million to R65 million. The study also revealed that for every R0.16 put into restoring and managing the environment, the municipality received R1.00 of benefits back – and therefore there is a very high return on investing in natural assets.

Source: *TEEB Manual for Cities*

# Making the case for biodiversity



## Further reading

DEA & SANBI (2011) *Making The Case For Biodiversity – Phase 1. Final Draft Project Summary Report*. Available from: <http://biodiversityadvisor.sanbi.org/wp-content/uploads/2014/07/final-draft-mtc-summary-report-september-2011.pdf>

SANBI (2013) *Making the Case for Biodiversity: The Biodiversity Case Study Development Toolkit*. Available at [http://biodiversityadvisor.sanbi.org/wp-content/uploads/2014/02/MTC-Case-Study-Development-Toolkit\\_medium\\_resolution.pdf](http://biodiversityadvisor.sanbi.org/wp-content/uploads/2014/02/MTC-Case-Study-Development-Toolkit_medium_resolution.pdf)

"Effective communication is about having clear objectives as to what we want to change in knowledge, attitudes, and behaviour. It is about messages, messengers, choice of media and the tone of voice."

*Dr. Ahmed Djoghlaif, former Executive Secretary to the CBD*

Biodiversity is the foundation of sustainable socio-economic development and human well-being (**Chapter A1**). Good biodiversity management can help achieve goals in job creation, poverty reduction and climate change adaptation. Unfortunately, the biodiversity sector often struggles to communicate (a) what biodiversity is and (b) how it contributes to socio-economic growth and development.

Communicating negative 'fear of loss' messages seldom inspires people to act positively according to research. Positive messages, centred on the hope of gain from a range of biodiversity benefits, are more effective. A communications strategy for the biodiversity sector, known as "*Making the Case for Biodiversity*", was developed in 2011 and provides powerful lessons and tips for communicating the value of biodiversity. It does so in a way that will leverage emotional and financial investment.

The Making the Case for Biodiversity strategy emphasizes that messages about biodiversity should centre around a narrative reflecting the value of biodiversity to society. When biodiversity is thought of rationally as a national priority, felt emotionally to be the right thing to do, and definite actions provide a way forward, then we can expect change. This points to the three key elements of communication about biodiversity described in the table below.

Element of the case for biodiversity	Winning concept for communication*	Core focus of message	Description
<b>Economic</b>	National asset	"have to" - rational arguments about how biodiversity contributes to national development goals such as job creation, poverty alleviation and rural development.	These are rational messages that should convince the head why it is important to manage and conserve biodiversity.
<b>Emotional</b>	Children's legacy	"want to" emphasizing that biodiversity is important for the future of our children and country	These are emotional messages that should inspire feeling and empathy, so that people want to manage and conserve biodiversity
<b>Practical</b>	Practical solutions	"how to" - clear examples of actions that can be implemented to realise the benefits of biodiversity.	These are practical messages that should give people concrete actions that they can take to effect change. They should be implementable to avoid the sense of being overwhelmed by the task, ideally with examples of where they have been successfully put into practice either in South Africa or elsewhere.

\* Based on testing various options with decision-makers.

Case studies serve as powerful proof points in biodiversity communication. A *Biodiversity Case Study Development Toolkit* has also been developed to equip researchers and practitioners to collect compelling information and formulate of evocative case studies. These resources for Making the Case for Biodiversity should be used for constructing compelling messages and disseminating them through communications and awareness strategies.





# Tools to communicate biodiversity effectively

For Gauteng to move towards sustainable development, perceptions of biodiversity must change at all levels – from individuals to organizations, from government to societies. Why? Because the management and conservation of biodiversity will only happen if there is collaboration and cooperation of individuals, organisations, and groups in society to act on its behalf. The involvement and participation of communities develops partnerships to ensure long-term success of rehabilitation projects. Secondly, awareness of biodiversity and its importance means that its value is recognised by decision-makers and ensures that citizens hold politicians accountable for their decisions. Communication, education and public awareness (CEPA) are the tools that will make the concept of biodiversity and its importance to people's lives understandable and relevant.

Article 13 of the Convention on Biological Diversity requires signatories to promote and encourage understanding of biodiversity by developing education and public awareness programs.



## Key point

CEPA has to be strategic, positive and tailored to different target audiences, circumstances and cultural situations.

## Why do we need CEPA?

With increasing numbers living in cities and therefore disconnected with nature, CEPA is becoming increasingly important. CEPA can reconnect people (be it school children, elders, politicians or communities) with the role of nature in our lives, and the importance of championing nature. Over and above a general understanding of the importance of biodiversity, awareness of biodiversity ensures public and political buy in for biodiversity-related projects, and ensures that these projects are sustained into the future. For instance if money is spent to rehabilitate a wetland it is important that communities around the wetland understand why the project is happening and take ownership of the project because of the benefits they will derive. This is important to sustaining the project into the future. From a financial point of view, CEPA ensures a good return on the investment.

Local governments also need support for biodiversity management and conservation from NGOs, local communities, business and industry and land owners. To work with these different groups, CEPA initiatives are critical to build trust, understanding and shared agreements for action and to reduce conflict. However, effective communication is still a challenge for many local governments. Local governments need to consider not only what to communicate, but how to communicate it.



## Further reading

CBD & IUCN (2007)  
*Communication, Education and Public Awareness (CEPA): A toolkit for National Focal Points and NBSAP coordinators*: <http://www.cbd.int/cepa/toolkit/2008/doc/CBD-Toolkit-Complete.pdf>

## The IUCN CEPA Toolkit

The International Union for Conservation of Nature (IUCN) has developed a CEPA toolkit for use by parties to CBD. The toolkit includes fact sheets, checklists and examples to introduce users to the practical side of CEPA. Tools and methods include information exchange, dialogue, education and social marketing.





### Further reading

ICLEI Cities Biodiversity Center (2012) *Local Biodiversity Communication, Education & Public Awareness Strategy & Action Plan Guidelines*. Available at <http://cbc.iclei.org/>

## Local Biodiversity CEPA Strategy and Action Plan



ICLEI's Local Biodiversity CEPA Strategy and Action Plan Guidelines are aimed at local government, to guide both external (outside of the organisation) and internal (within the local government) communications to make local government communication more effective. The guidelines help local government to create a Local Biodiversity CEPA Strategy and Action Plan that will integrate with and support their Local Biodiversity Strategy and Action Plan (see [Chapter B1](#)).

The guideline details information about CEPA goals, target audiences, key messages, communication methodologies and monitoring and evaluation (for both internal and external communication), and coordinates and implements effective and strategic biodiversity communication. By setting realistic targets, budgets, timeframes and responsibilities for implementing specific CEPA activities, Local Biodiversity CEPA Strategy and Action Plans can induce positive behavioural change and tangible action, thereby contributing significantly towards achieving the environmental goals of local governments.

## The CEPA Evaluation Toolkit



It is clear that effective biodiversity communication, education and public awareness is pivotal in achieving biodiversity conservation and good management at all levels in society. However, many CEPA activities fall short of their objectives.

How can biodiversity CEPA practitioners gauge the effectiveness of their CEPA activities in order to ensure that stakeholders are being optimally engaged and persuaded to change their behaviour and choices?

ICLEI – Local Governments for Sustainability and the City of Cape Town collaborated to produce a toolkit that will assist CEPA managers, practitioners and partners in planning the evaluation of the effectiveness of their biodiversity CEPA programmes. Four local governments – Cape Town, Edmonton, Nagoya and São Paulo – contributed case studies. These illustrate the kinds of contexts in which the practical planning tools can be applied. The toolkit provides facts, examples and checklists from different parts of the world. It helps local government practitioners to plan, develop and implement attractive and effective communication and education interventions that make the conservation and sustainable use of biological diversity relevant, and a priority on the agenda of a range of stakeholders.



### Further reading

ICLEI & City of Cape Town (2012) *Biodiversity Communication, Education and Public Awareness (CEPA) Evaluation Design Toolkit*: <http://cbc.iclei.org/cepa-toolkit>

IDP - Integrated  
Development Plan

SDF Spatial  
Development Framework

EMF Environmental  
Management Framework

NEMA - National Enviro  
Management Act

SEA - Strategic  
Environmental Assessment

MOSS - Metropolitan  
Open Space System

EIA - Environmental  
Impact Assessment

EMP - Environmental  
Management Plan





# SECTION D: BIODIVERSITY FUNDING AND NETWORKS

## D1: Biodiversity funding and networks





# D1

# BIODIVERSITY FUNDING AND NETWORKS

## Fact sheets in this section:

- **International funding for biodiversity**
- **Local funding for biodiversity**
- **Innovative financial mechanisms**
- **Biodiversity networks**

Owing to its status as a megadiverse country, South Africa has been well-placed to receive and effectively utilise donor funding in response to its initiatives to better manage the high biodiversity of the region. A number of pioneering and innovative responses to our conservation and development challenges have emerged as a result of donor support to these locally driven initiatives.

However, financial shortage has been identified globally as one of the principal barriers to the implementation of the Convention on Biological Diversity<sup>11</sup>, and it is sometimes difficult to motivate for conservation funding amidst other pressing socio-economic priorities. When seeking funding for biodiversity, it is important to recognise the close linkages between well-managed, maintained and restored ecological infrastructure and opportunities for sustainable communities, poverty alleviation and job creation.

The following section looks at international and local funding programmes and discusses innovative funding mechanisms that have the possibility of creating new funding sources. It also provides a summary of networks that may be useful for urban biodiversity information, best practice, case studies, and contacts. Joining a network can be a simple way to stay abreast of urban biodiversity issues and to connect to other local governments dealing with similar issues.

<sup>11</sup>CBD: Innovative Financial Mechanism:  
Ad-hoc working group notes:  
UNEP/CBD/WGRI/3/INF/5

# International funding for biodiversity



The following list of funding sources details funds that are available for biodiversity conservation projects. As the dates and requirements for proposals changes all the time, some of the funds listed below may be closed, and new calls may also have opened. The following list is not exhaustive, but details international funding facilities that have a focus on biodiversity conservation and are open to applicants from South Africa.

## Funding bodies

### Japan Biodiversity Fund

The Japan Biodiversity Fund has been established by Convention on Biological Diversity in support of the implementation of the Nagoya Biodiversity Outcomes. It supports signatory countries in their work toward the new Strategic Plan for Biodiversity 2011-2020 (the Aichi targets) at regional and sub-regional levels.

For more information, see <http://www.cbd.int/jbf/>

### UNDP GEF Small Grants Programme

Biodiversity is the largest portfolio within the Global Environment Facility (GEF), with 36% of funded projects relating to biodiversity conservation. Funding from GEF can only be accessed directly through the Small Grants Program (SGP), by NGOs, local communities and grassroots organisations. The maximum grant amount per project is US\$50,000. Projects must align with the SGP Country Programme for South Africa, be proposed by national community-based organizations or NGOs and must fit within the SGP focal areas, of which, biodiversity is one.

For more information, see [http://sgp.undp.org/index.php?option=com\\_content&view=article&id=94&Itemid=160#.UZtyR7VTArc](http://sgp.undp.org/index.php?option=com_content&view=article&id=94&Itemid=160#.UZtyR7VTArc)

### IUCN Small Grants Programme

The IUCN National Committee of the Netherlands Small Grants Programme for the Purchase of Nature (SPN) supports the conservation of biodiversity through the strategic purchasing of threatened natural areas e.g., securing a corridor between two protected areas or a buffer area to guard against development. Proposals can be submitted by local NGOs, who hold land or management rights to the property. Maximum financial assistance provided by the programme is €85,000.

Funding priority will be given to:

- Land purchase of, or adjacent to, areas with a high biodiversity value, e.g. Ramsar sites.
- Areas with ecosystems hosting species listed critical (CR) or endangered (EN) on the IUCN Red List.
- High priority will be given to ecosystems hosting threatened amphibians;
- Land purchase involving ecosystems under-represented in the public protected areas system.
- Areas with a strategic importance for the protection of the hinterland (buffer zones) or that connect important areas (corridors).

All NGOs must submit a pre-proposal. For more information, see [http://www.iucn.nl/en/themes/restoring\\_and\\_conserving\\_nature/spn/](http://www.iucn.nl/en/themes/restoring_and_conserving_nature/spn/)



## French Global Environment Facility (FFEM)

The French Global Environment Facility (FFEM: Fonds Français pour l'Environnement Mondial) is a French instrument for development policy and co-operation in areas such as climate change, biodiversity and land degradation. The FFEM acts in more than 80 countries, fostering partnerships with national or international partners including researchers, public bodies, private enterprise, local authorities, NGOs and foundations.

Eligible countries are all developing countries eligible for official development assistance as defined by the OECD, with priority given to Africa and the Mediterranean.

For more information, see <http://www.ffem.fr/lang/en/accueil> or go to [http://www.ffem.fr/lang/en/accueil/projets/autour-des-projets/comment\\_prese](http://www.ffem.fr/lang/en/accueil/projets/autour-des-projets/comment_prese) nter\_projet\_ffem for how to apply.

## Ensemble Foundation

The Foundation intervenes through two Funds, the Programme Fund, and the Small Grants Fund. The Programme Fund is not available in South Africa, however the Small Grants Fund is open to any country for projects related to endangered animals, and for developing countries for other biodiversity initiatives. Applications can range between €3,000 to €30,000, with project duration of 2 years or less.

For more information, see [http://www.fondationensemble.org/adom\\_bio.php](http://www.fondationensemble.org/adom_bio.php)

## The Mohamed bin Zayed Species Conservation Fund

The Mohamed bin Zayed Species Conservation Fund primarily supports conservation work for species facing a high threat of extinction (with an emphasis on endangered and critically endangered species), as well as those which are listed as Data Deficient or unlisted but are suspected as highly threatened. In general, projects should be focused on a single species, unless it is more appropriate to focus on a group of species. Maximum grant amount is \$25,000.

For more information, see <http://www.speciesconservation.org/grants/>

## Ramsar

Ramsar offers a Small Grants Fund for the conservation and management of wetland resources, providing up to 40,000 Swiss Francs (CHF) per project.

The Swiss Grant for Africa is specifically for the conservation of wetlands in Africa, and can be used for funding emergency actions and other activities.

For more information, see <http://www.ramsar.org/activity/investing-in-wetlands>

## Rufford Foundation

The Rufford Foundation provides funding for small biodiversity conservation projects and pilot programmes in developing countries, for projects of up to 18 months duration.

For more information, see <http://www.rufford.org/> or apply at <https://apply.ruffordsmallgrants.org/>

## **Toyota Environmental Activities Grant Programme**

Grants for biodiversity conservation are available for Non Profit Organisations as part of Toyota's Environmental Activities Grant Programme. Grants are up to a maximum of 7 million Yen, and for a project duration of up to 2 years.

For more information, see [http://www.toyota-global.com/sustainability/environment/blessings\\_of\\_nature/ecogrant](http://www.toyota-global.com/sustainability/environment/blessings_of_nature/ecogrant)

## **Non-biodiversity specific funding bodies**

The following funding bodies may fund biodiversity projects under their general 'environment' themes and areas.

### **European Commission**

For more information, see [http://ec.europa.eu/europeaid/about-funding\\_en](http://ec.europa.eu/europeaid/about-funding_en)

### **United States Agency for International Development (USAID)**

To search for proposals, visit <http://www.usaid.gov/work-usaid/partnership-opportunities/search-for-opportunities>

## **Education**

The British Ecological Society provides funds for post-graduate ecology researchers in Africa to undertake innovative ecological research. Applicants must be citizen of any country in Africa, be working for a research institution in Africa, and undertake the research in Africa.

For more information, see <http://www.britishecologicalsociety.org/grants-awards/ecologists-in-africa/>

## **Other resources**

### **Terra Viva Grants Directory**

The Terra Viva Grants Directory is an information service about international grant funding for biodiversity. Email subscriptions to the service ensures that funding alerts are sent directly to your inbox.

For more information, see <http://www.terravivagrants.org/Home/funding-news/biodiversity-conservation-wildlife>

### **Convention on Biological Diversity (CBD) catalogue**

The CBD has produced a catalogue of Funding Sources, detailing financial institutions, agencies, services and other entities that provide international assistance to biodiversity projects.

For more information, see <http://www.cbd.int/doc/guidelines/fin-sources.pdf>

# Local funding for biodiversity



## Green Fund

The Green Fund is a national environmental finance initiative administered by the Development Bank of Southern Africa (DBSA) on behalf of the Department of Environmental Affairs (DEA) to support the transition to a low carbon, resource efficient and climate resilient development path. The Green Fund will consider research projects from R500 000 to R5 million.

Project proposals can focus on any area supporting the national objectives of a green economy, and should make input into the following project windows: i) Low Carbon Economy, ii) Environmental and Natural Resource Management and iii) Green Cities and Towns. Over and above this, funding will be in a phased approach, divided into difference focus areas. Green Fund focus areas are: project development and/or investment in green projects and programmes; research and policy development; capacity building.

For more information, see <http://www.sagreenfund.org.za/>

## WWF Nedbank Green Trust

The WWF Nedbank Green Trust funds projects that promote the conservation of species and ecosystems; adaptation to climate change; sustainable use of renewable natural resources and strengthening environmental leadership. Preference is given to funding environmental conservation projects that:

- Are strategic and catalytic.
- Contribute towards conserving the biodiversity assets (species, habitats, and ecosystems) of South Africa as outlined in the thematic areas above.
- Ensure that natural ecosystems and their services are appropriately valued and integrated into sustainable development.
- Contribute towards poverty alleviation and human livelihoods through better environmental practices.
- Address the risks and opportunities associated with climate change.
- Ensuring that South African consumers have the knowledge to influence appropriate environmental practice from the private and public sectors.
- Leverage environmental commitments from stakeholders such as industry or government.
- Build capacity and increase environmental skills and capacity exists among current and future leaders.

Projects are funded on a maximum 3 year timeframe. For more information download the WWF Nedbank (2012) Green Trust Application Guidelines at [http://awsassets.wwf.org.za/downloads/wwf\\_nedbank\\_green\\_trust\\_application\\_guidelines\\_march\\_2012.pdf](http://awsassets.wwf.org.za/downloads/wwf_nedbank_green_trust_application_guidelines_march_2012.pdf)

## National Research Foundation

The National Research Foundation (NRF) is currently funding biodiversity research projects which:

- generate primary biodiversity data sets for SABIF.
- produce DNA barcodes for species.
- develop or apply innovative approaches to managing or disseminating foundational biodiversity information.

For more information, see [http://www.nrf.ac.za/funding\\_overview.php?fid=181](http://www.nrf.ac.za/funding_overview.php?fid=181)

# Innovative financial mechanisms



## Key point

These mechanisms recognise the role of market forces in protecting the environment, and how governments can incentivise public-private sector partnership, e.g. for eco-tourism.

Innovative financial mechanisms are methods for mobilising long-term financial capital for the management and conservation of biodiversity, over-and-above the receiving of project grants. These mechanisms look to transform current economic systems that do not recognise the value of ecosystem services to those that acknowledge the benefits of conserving biodiversity. Innovative financial mechanisms also take into account the knock-on benefits that biodiversity conservation has for other areas of environment and economy, such as assisting with municipal service delivery, improving livelihoods and adapting to climate change.

Innovative financial mechanisms include:

- **Biodiversity offsets:** The use of biodiversity offsets during the process of obtaining environmental authorisation for site development offers the opportunity for biodiversity priority areas to be rehabilitated and/or protected as an offset for the loss of biodiversity elsewhere. For more information, see [Chapter B2](#).
- **Investments in ecological infrastructure:** Investments in ecological infrastructure such as through the maintenance or rehabilitation of degraded ecological infrastructure offer a low-cost, high-return development strategy which has multiple social, economic and environmental gains such as job creation, poverty alleviation through increased livelihood opportunities. See case study below on the Working for Water programme.
- **Environmental fiscal reform:** Includes the taxation of environmentally-unfriendly practices, and the financial incentivising of environmentally-friendly ones. Environmental taxes encourage the careful use of natural resources by imposing financial penalties to activities and products that damage biodiversity and the environment. Fuel and plastic bag levies are examples of taxation on environmentally-unfriendly practices. An example of financial incentivising environmentally-friendly practices would be the income tax and property rates incentives for landowners who participate in the Biodiversity Stewardship programme may be eligible ([Chapter B2](#)).
- **Markets for green products:** Green products refer to natural products and nature-based products which are provided by ecosystems. These goods are provided on a sustainable basis, and provide a livelihood for local people. If markets are developed for these goods, then there are incentives (for local communities and governments) to maintain and manage the natural areas.



## Biodiversity in climate change funding

There are two possibilities for tapping into the climate change funds: i) ecosystem-based adaptation (see [Chapter A1](#)) opens up the possibility of using accessing funds for climate change adaptation and ii) rehabilitating degraded areas and/or protecting areas with high carbon sequestration and storage potential can be used to access climate change mitigation funds or carbon offset projects. To tap into climate change funding for biodiversity conservation requires economic valuation and mapping of ecosystem services benefits to identify areas with high carbon and high biodiversity.

## Examples of innovative financial mechanisms

### Investments in Ecological infrastructure Case study: Working for Water programme

Invasive alien species (IAS) pose a direct threat not only to South Africa's biodiversity, but also to the ecological functioning of water systems. The Working for Water (WfW) co-ordinates the removal of IAS from catchments, using a local workforce to enhance the ecological functioning of water systems, whilst providing jobs. More information: <http://www.dwaf.gov.za/wfw/>

### Proposed South African Environmental Fiscal Reform: Carbon Tax

The 2012 Budget Review announced the introduction of a Carbon Tax in January 2015. The carbon tax will financially penalise those who emit large quantities of carbon dioxide, however, companies will be able to 'offset' how much tax they are liable to pay, through offset projects such as the purchase of land for conservation, as plants and soil are important for the capture and storage of carbon dioxide, known as carbon sequestration.

# Biodiversity networks



This fact sheet provides summaries of some of the main networks relevant to urban biodiversity management and conservation. It is not an exhaustive list.

## South African networks

### Gauteng Integrated Biodiversity Management Task Team

The Gauteng Integrated Biodiversity Management Task Team (GIBMTT) is a new urban network that is being co-ordinated by the Gauteng Department of Agriculture and Rural Development (GDARD). It replaces the successful Urban Task Team convened by SANBI under the Grasslands Programme. The aim of the task team is to provide opportunities to share experiences, lessons and knowledge about urban biodiversity management and conservation in Gauteng. It consists of a core team of municipal and provincial officials, along with other key collaborators within the Gauteng urban biodiversity context.

For more information, contact the GDARD Deputy Director of Mainstreaming and Stewardship at 011 240 2516.

### Gauteng City Region Observatory

The Gauteng City-Region Observatory (GCRO) was established in 2008 as a partnership between the University of Johannesburg (UJ), the University of the Witwatersrand (Wits) and the Gauteng Provincial Government, with local government in Gauteng also represented on the GCRO Board. The GCRO has a vision for South Africa's economic heartland as a region that is competitive, spatially integrated, environmentally sustainable and socially inclusive. GCRO is charged with helping to build the knowledge base that government, business, labour, civil society and citizens all need to make this vision a reality. GCRO collects data and benchmarks the city-region, provides policy analysis and support, undertakes applied research, and publishes critically reflective academic work.

For more information, see <http://www.gcro.ac.za/>

### SANBI Municipal Programme

The SANBI Municipal Programme has a national footprint, working in partnership with key stakeholders on cross cutting themes such as land use planning, ecological infrastructure, ecosystem based adaptation, policy and other biodiversity related aspects. The Programme also provides direct support to municipalities that have key biodiversity strategic projects and require guidance and advice in mainstreaming biodiversity efforts and decision making. The Programme works at the municipal level to:

- Support the integration of biodiversity considerations into land use planning and environmental decision-making.
- Develop policies and tools that support better biodiversity management.
- Provide capacity building and awareness raising initiatives for improved land use planning and decision-making.

The Programme provides strategic support in the coordination of three tiers of government involved in biodiversity mainstreaming in relation to local government work, and provides a platform for dialogue with all stakeholders involved in supporting local government to mainstream biodiversity and environmental management initiatives.

For more information, see <http://www.sanbi.org/biodiversity-science/science-policyaction/mainstreaming-biodiversity/municipal-programme>



## **The Endangered Wildlife Trust's Urban Conservation Project**

The Endangered Wildlife Trust hosts an Urban Conservation Project that aims to provide tools and support for the sustainable management of the human-wildlife interface within the urban matrix of Gauteng.

The primary output of the Urban Conservation Project is the development of the Urban Conservation Hotline. The hotline provides advice and assistance to urban residents that may come into conflict with wildlife in and around the city, to help them face issues in an environmentally sustainable way.

The project also creates guidelines and toolkits to help with wildlife issues, has experts on hand for specific queries and educates the urban public on their place in the larger natural system.

For more information, see <https://www.ewt.org.za/URBAN/urban.html>

## **The South African Cities Network**

The South African Cities Network (SACN) is an established network of South African cities and partners that encourages the exchange of information, experience and best practices on urban development and city management. The network is both a source of information for leadership of South Africa's largest cities and a catalyst for debate. It is an initiative of the Minister for Provincial and Local Government and nine of the country's largest municipalities, in partnership with the South African Local Government Association (SALGA).

The network identifies, assembles and disseminates information that enhances the ability of decision-makers to learn from the experience of others and efficiently use their resources to build sustainable cities.

Within the context of developmental local government and integrated governance, SACN focuses on the full scope of the urban management process. This includes promoting sustainable cities, economic growth and poverty reduction, urban renewal, good governance, integrated land management, service delivery and city development strategies.

For more information, see <http://sacitiesnetwork.co.za/>

## **National Business and Biodiversity Network**

The National Biodiversity and Business Network (NBBN) was initiated by the Endangered Wildlife Trust (EWT) in collaboration with founding partners. The network aims to assist businesses from various sectors to integrate and mainstream biodiversity issues into their strategies and operations. The NBBN was developed in response to the Convention on Biological Diversity's Global Partnership for Business and Biodiversity, which encourages the development of national business and biodiversity initiatives.

It is designed to be an open and inclusive association of organisations that recognise the need to raise awareness of, and stimulate conversation about, biodiversity issues amongst the business community. Founding partners include the Department of Environmental Affairs, and supporting partners include the Johannesburg City Parks. Membership is currently free.

For more information, see <https://www.ewt.org.za/BUSINESSDEVELOPMENT/business.html>

## Global networks

There are several global networks addressing urban biodiversity management and conservation that may provide useful and innovative information and case studies from around the world. However, their relevance may be limited to those involved in the science-policy interface.



### Further reading

ICLEI Cities Biodiversity Center: <http://cbc.iclei.org>, particularly see the ICLEI – Local Governments for Sustainability (2010) *Local Action for Biodiversity Guidebook: Biodiversity Management for Local Governments* at <http://cbc.iclei.org/lab-guidebook>  
Local Action for Biodiversity: <http://cbc.iclei.org/lab-about>

### ICLEI — Local Governments for Sustainability's Cities Biodiversity Center and the Local Action for Biodiversity (LAB) Programme

The Cities Biodiversity Center is ICLEI's global headquarters for biodiversity, and runs several projects, providing technical support, networking opportunities and a platform for local authorities within the global biodiversity arena.

Local Action for Biodiversity (LAB) is ICLEI's flagship global urban biodiversity programme where the importance of urban biodiversity, the role of local governments in its management, and the experiences, successes and challenges of urban biodiversity management are shared by participating cities and local authorities through workshops, forums, a knowledge bank, networks and various strategic projects that address specific local and national needs.

Participating local governments are guided through 5-steps, which include an assessment of local biodiversity and ecosystem services, signing of an international political commitment (Durban Commitment: Local Governments for Biodiversity), the development of a [Local Biodiversity Strategies and Action Plan](#) (LBSAP, [page 46](#)), political approval and awareness for the LBSAP, and biodiversity projects implemented on the ground.

### URBIS

URBIS is a global network connecting local governments with scientific researchers, policy-makers, planners and environmental practitioners from across the world to share, develop and implement ideas for creating more resilient and equitable urban regions. ICLEI hosts the URBIS Secretariat, and runs the network in close partnership with the Stockholm Resilience Center and the CBD, amongst other partners.

Local governments can join the initiative for free by sharing at least one good practice case study. Furthermore, local governments can also become an URBIS City of Distinction by applying to be considered for the award. More information is available at <http://www.urbis.org/>

### URBIO

The International Network on Urban Biodiversity and Design (URBIO) is a scientific initiative of the Convention on Biological Diversity to foster the scientific exchange between researchers, practitioners and stakeholders. URBIO sends out a regular newsletter. More information is available at <http://www.fh-erfurt.de/urbio>

### World Urban Forum

The World Urban Forum was established by the United Nations to examine rapid urbanisation and its impact on communities, cities, economies, climate change and policies. It brings together government leaders, ministers, mayors, diplomats, members of national, regional and international associations of local governments, non-governmental and community organizations, professionals, academics, grassroots women's organizations, youth and slum dwellers groups as partners working for better cities. Whilst not strictly related to biodiversity, it is a useful platform for learning about sustainable cities and urban planning. More information is available at <http://wuf7.unhabitat.org/>





# **SECTION E: ANNEXES**

**Annex 1: International  
instruments for biodiversity  
conservation**

**Annex 2: The Convention on  
Biological Diversity Aichi  
Targets**

# Annex 1: International instruments for biodiversity conservation

The table summarises biodiversity relevant conventions that South Africa has signed.

International framework	Overall objectives and provision	Key features	Relevance to South Africa
<p>The United Nations Convention on Biological Diversity (CBD)  <a href="http://www.cbd.int/">http://www.cbd.int/</a></p>	<p>The three goals of the CBD are to promote the conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from these resources.</p> <p>Its objective is to develop national strategies for the conservation and sustainable use of biological diversity.</p>	<p>1. Promotes engagement of cities and local authorities<sup>12</sup>. <a href="#">Local Biodiversity Strategies and Action Plans</a> (LBSAPs) were endorsed by the CBD<sup>13</sup> as a methodology for doing this.</p> <p>2. Strategic Plan for Biodiversity 2011 – 2020 and the Aichi Targets (see below): now the overarching framework on biodiversity, for the entire United Nations system (e.g. Conventions on climate change, land degradation, etc.).</p> <p>Aichi Targets must be incorporated into the National Biodiversity Strategies and Action Plan (NBSAP).</p> <p>The CBD is one of three “Rio Conventions” adopted at the “Rio Earth Summit” in 1992. Its sister Conventions are the UN Convention to Combat Desertification (UNCCD) and the UN Framework Convention on Climate Change (UNFCCC). The three are intrinsically linked.</p>	<p>The Convention on Biological Diversity calls for each Party to develop a National Biodiversity Strategy and Action Plan (NBSAP) to guarantee that the objectives of the Convention are undertaken at all levels and in all sectors in each country.</p> <p>South Africa’s NBSAP was initially completed in 2005, and has directly fed into the National Biodiversity Framework (2008). At the time of writing, it was being updated.</p>
<p>Convention on the Conservation of Migratory Species of Wild Animals (CMS)  <a href="http://www.cms.int">http://www.cms.int</a></p>	<p>Aims to conserve migratory species (terrestrial, aquatic and avian) throughout their range.</p>	<p>Guidelines on the Integration of Migratory Species should be used in the preparation of the NBSAP.</p>	<p>National and regional conservation areas required to ensure habitats for migratory species.</p>
<p>Convention of Wetlands of International Importance (the Ramsar Convention)  <a href="http://www.ramsar.org/">http://www.ramsar.org/</a></p>	<p>A global framework for the conservation and sustainable use of wetlands. It also provides the framework for national action for the conservation and wise use of wetlands and their resources.</p>	<p>Parties to Ramsar are committed to designate wetlands for the ‘List of Wetlands of International Importance’ (“Ramsar List”) and ensure effective management of them through national land-use planning, appropriate policies and legislation, management actions, and public education.</p>	<p>South Africa has 21 designated sites, with the most recent, uMngeni Vlei (Drakensberg, KZN), declared in 2013. This designation is significant because it highlights the importance of wetland areas and gives weight to their conservation and management. Not all of South Africa’s Ramsar sites are protected under the Protected Areas Act.</p>

<sup>12</sup>CBD Decision IX/28 (CBD COP 9, decision 28)

<sup>13</sup>CBD Decision X/22 of (CBD COP 10, decision 22)

International framework	Overall objectives and provision	Key features	Relevance to South Africa
UNESCO: World Heritage Convention <a href="http://whc.unesco.org/">http://whc.unesco.org/</a>	The Convention recognises the way in which people interact with nature, and the need to preserve natural heritage.	By signing the Convention, each country pledges to conserve not only the World Heritage Sites, but also to protect national heritage in general. Parties should integrate the protection of the cultural and natural heritage into regional planning programmes.	South Africa has 8 World Heritage Sites: 4 cultural, 3 natural and 1 a mixture of both. There areas are recognised as 'protected areas' in the Protected Areas Act.
CITES Convention on International Trade in Endangered Species of Wild Fauna and Flora <a href="http://www.cites.org/">http://www.cites.org/</a>	International framework to safeguard certain species from over-exploitation due to trade. The convention provides various degrees of protection to more than 30 000 species of animals and plants, whether they are traded as live specimens, fur coats or dried herbs.	Species are listed according to how threatened they are by trade, which determines the level of control needed through a licensing system.	Many of the listed species are endemic (unique) or indigenous (native) to South Africa. South Africa has Management Authorities in charge of CITES administration, and Scientific Authorities to advise on the effects of trade on the species.
Convention to Combat Desertification (UNCCD) <a href="http://www.unccd.int">http://www.unccd.int</a>	The UNCCD is the only legally binding international agreement linking environment and development to sustainable land management. The Convention addresses specifically arid, semi-arid and dry sub-humid areas.	<p>The convention focuses on sustainable land management and the prevention and/or amelioration of land degradation. It is therefore inextricably linked to the management of biodiversity.</p> <p>The UNCCD is a "Rio Convention", and is linked with its sister's conventions: the CBD and the UNFCCC.</p>	<p>Creation and implementation of the National Action Programme (NAP, 2004) addresses a wide range of issues related to desertification, land degradation, and the effects of drought, some of which have strong links with biodiversity.</p> <p>Several of the Priority Actions in the National Biodiversity Framework (NBF) will directly support the achievement of several of the priority activities identified in the NAP.</p>
UN Framework Convention on Climate Change (UNFCCC)	The objective of the treaty is to "stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system".	<p>The UNFCCC is linked with its 'sister Rio Conventions', the CBD and the UNCCD.</p> <p>The Convention acknowledges the vulnerability of all countries to the effects of climate change and calls for special efforts to reduce GHG (mitigation), as well as to ease the consequences (adaptation to climate change), especially in developing countries.</p>	<p>South Africa is considered a 'non Annex I' party to the convention, and therefore recognised as being 'especially vulnerable to climate change'.</p> <p>Biodiversity is recognised as a critical component in response strategies to climate change.</p> <p>Parties must submit a National Adaptation Programme of Action (NAPA) and National Action Plan (NAP) to UNFCCC. South Africa's National Climate Change Response White Paper reflects the country's commitment to reducing GHG emission levels, meeting energy efficiency and renewable energy targets, sustainable development, green economic enhancement and extensive national research programmes on climate change and associated vulnerabilities.</p>

# Annex 2: The Convention on Biological Diversity Aichi Targets

The 20 Aichi Targets are broadly classified under five goals that capture the essence of the agreement.

*Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society*



## Target 1

By 2020, at the latest, people are aware of the value of biodiversity and the steps they can take to conserve and use it sustainably.



## Target 2

By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.



## Target 3

By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-economic conditions.



## Target 4

By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

*Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use*



## Target 5

By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.



## Target 6

By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem-based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.



## Target 7

By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.



## Target 8

By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.



## Target 9

By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.



## Target 10

By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

*Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity*



**Target 11**

By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.



**Target 12**

By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.



**Target 13**

By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

*Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services*



**Target 14**

By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.



**Target 15**

By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.



**Target 16**

By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

*Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building*



**Target 17**

By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.



**Target 18**

By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.



**Target 19**

By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.



**Target 20**

By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.

# Glossary

**Biodiversity:** The diversity of genes, species and ecosystems on Earth, and the ecological and evolutionary processes that maintain this diversity.

**Biodiversity stewardship:** A systematic approach to entering into agreements with private and communal landowners to protect and manage biodiversity priority areas, led by conservation authorities. Different categories of agreements confer varying degrees of protection on the land and hold different benefits for landowners. The landowner retains title to the land, and the primary responsibility for management remains with the landowner, with technical advice and assistance provided by the conservation authority.

**Biological diversity:** See biodiversity.

**Biome:** An ecological unit of wide extent, characterised by complexes of plant communities and associated animal communities and ecosystems, and determined mainly by climatic factors and soil types. A biome may extend over large, more or less continuous expanses or land surface, or may exist in small discontinuous patches.

**Bio-prospecting:** The search for naturally occurring chemical compounds and biological material which are analysed for useful chemical and genetic material that can be extracted.

**Bioregion:** Relatively large land areas characterised by broad, landscape-scale natural features and environmental processes.

**Bioregional plan:** A map of Critical Biodiversity Areas and Ecological Support Areas, for a municipality or group of municipalities, accompanied by contextual information, land- and resource-use guidelines and supporting GIS data. The map must be produced using the principles and methods of systematic biodiversity planning, in accordance with the Guideline for Bioregional Plans. A bioregional plan represents the biodiversity sector's input into planning and decision-making in a range of other sectors. The development of the plan is usually led by the relevant provincial conservation authority or provincial environmental affairs department. A bioregional plan that has not yet been published in the Government Gazette in terms of the Biodiversity Act is referred to as a biodiversity sector plan.

**Climate change adaptation:** An adjustment in natural or human systems in response to actual or expected climatic effects. Climate change adaptation also includes initiatives and measures that reduce the vulnerability of natural and built environments against actual or expected climate change effects.

**Climate change mitigation:** Any action taken to permanently eliminate or reduce greenhouse gas (GHG) emissions, and thus the long-term risk and hazards of climate change. Climate change mitigation can also be defined as the process of reducing GHG emissions that contribute to climate change. It includes both strategies to reduce GHG emissions and to remove carbon dioxide from the atmosphere through carbon sequestration.

**Conservation area:** Areas of land not formally protected by law but informally protected by the current owners and users and managed at least partly for biodiversity conservation. Because there is no long-term security associated with conservation areas, they are not considered a strong form of protection. Also see Protected Area.

**Conservation planning:** See systematic biodiversity planning.

**Critical Biodiversity Areas:** Areas required to meet biodiversity targets for ecosystems, species or ecological processes, as identified in a systematic biodiversity plan. May be terrestrial or aquatic.

**Critically endangered ecosystem:** An ecosystem type that has very little of its original extent (measured as area, length or volume) left in natural or near-natural condition. Most of the ecosystem type has been severely or moderately modified from its natural state. The ecosystem type is likely to have lost much of its natural structure and functioning, and species associated with the ecosystem may have been lost.

**Ecological infrastructure:** Naturally functioning ecosystems that deliver valuable services to people. Networks of ecological infrastructure may take the form of large tracts of natural land or ocean, or small remaining patches or corridors embedded in production landscapes. If ecological infrastructure is degraded or lost, the flow of ecosystem services will diminish. Ecological infrastructure is just as important as built infrastructure for providing vital services that underpin social and economic activity.

**Ecological support areas:** An area that is not essential for meeting biodiversity targets but plays an important role in supporting the ecological functioning of one or more Critical Biodiversity Areas or in delivering ecosystem services. May be terrestrial or aquatic.

**Ecosystem:** An assemblage of living organisms, the interactions between them and with their physical environment. Each ecosystem is characterised by its composition (the living and non-living components of which it is made), its structure (how the components are organised in time and space) and the ecological processes.

**Ecosystem services:** The benefits that people obtain from ecosystems, including provisioning services (such as food and water), regulating services (such as flood control), cultural services (such as recreational benefits), and supporting services (such as nutrient cycling, carbon storage) that maintain the conditions for life on Earth. Ecosystem services are the flows of value to human society that result from ecosystems.

**Ecosystem-based adaptation to climate change:** The use of biodiversity, ecological infrastructure and ecosystem services as part of an overall adaptation strategy to help people adapt to the adverse effects of climate change. Includes managing, conserving and restoring ecosystems to buffer humans from the impacts of climate change, rather than relying only on engineered solutions. Combines socio-economic benefits, climate-change adaptation, and biodiversity and ecosystem conservation, contributing to all three of these outcomes simultaneously.

**Endangered ecosystem:** An ecosystem type that is close to becoming critically endangered.

**Endemic:** A plant or animal species confined, or exclusive to, a particular specified geographic area, occurring nowhere else.

**Greenhouse gases (GHGs):** Gases that when in the atmosphere, absorb and emit radiation within the thermal infrared range, e.g. carbon dioxide, methane. This process is the fundamental cause of the greenhouse effect - a process by which thermal radiation (e.g. from the sun) is absorbed by atmospheric greenhouse gases, and is re-radiated in all directions, including back towards the earth's surface. It results in an elevation of the average surface temperature, resulting in climate change.

**Indigenous:** Originating or occurring naturally in a particular place.

**Invasive alien species (IAS):** Any plant or animal species whose establishment and spread outside of its natural range threatens natural ecosystems, habitats or other species.

**Polluter pays principle:** The party responsible for producing pollution is responsible for paying for the damage done to the natural environment.

**Precautionary principle:** When scientific evidence is ambiguous as to when an act causes harm to the environment, the precautionary principle suggests to avoid or change the action until its effect is known.

**Protected Area:** In South Africa, protected areas are defined as geographic areas that are formally protected by the National Environmental Management: Protected Areas Act (No. 57 of 2003) and managed mainly for biodiversity conservation. This is a narrower definition than the IUCN definition, which includes areas that are not legally protected and that would be defined in South Africa as conservation areas rather than protected areas.

**Species:** A kind of animal, plant or other organism that does not normally interbreed with individuals of another kind, and includes any sub-species, cultivar, variety, geographic race, strain, hybrid or geographically separate population.

**Sustainability:** Defined as 'Meeting the needs of the present without compromising the ability of future generations to meet their needs'<sup>14</sup>. In practice, sustainability reflects the intersection of three areas of concern for local governments: economy, environment and equity – often referred to as the “triple bottom line”.

**Sustainable development:** Development based on the use of resources that can be replaced or renewed and therefore not depleted, and that guarantees the welfare and promotes equity of current and future generations.

**Systematic biodiversity planning:** A systematic approach for identifying geographic areas of biodiversity importance. The configuration of priority areas is designed to be spatially efficient (i.e. to meet biodiversity targets in the smallest area possible) and to avoid conflict with other land and water resource uses where possible.

**Threatened ecosystem:** An ecosystem that has been classified as critically endangered, endangered or vulnerable, based on an analysis of ecosystem threat status. A threatened ecosystem has lost or is losing vital aspects of its structure, function or composition. The Biodiversity Act allows the Minister of Environmental Affairs or a provincial MEC for Environmental Affairs to publish a list of ecosystems that are threatened and in need of protection. To date, threatened ecosystems have been listed only in the terrestrial environment.

**Threatened species:** A species that has been classified as critically endangered, endangered or vulnerable, based on a conservation assessment (Red List), using a standard set of criteria developed by the IUCN for determining the likelihood of a species becoming extinct. A threatened species faces a high-risk of extinction in the near future.

<sup>14</sup> Brundtland Report, Our Common Future, 1987

**Topography:** Earth surface features e.g. hills, valley and plains.

**Vulnerable ecosystem:** An ecosystem type that still has the majority of its original extent (measured as area, length or volume) left in natural or near natural condition, but has experienced some loss of habitat or deterioration in condition. The ecosystem type is likely to have lost some of its structure and functioning, and will be further compromised if it continues to lose natural habitat or deteriorate in condition.

# Acronyms

AMD	Acid Mine Drainage
BGIS	Biodiversity GIS
CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Areas
CBD	Convention on Biological Diversity
CBI	City Biodiversity Index
CEPA	Communication, Education and Public Awareness
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals
CR	Critically endangered
DEA	Department of Environmental Affairs
EAP	Environmental Assessment Practitioner
EbA	Ecosystem-based Adaptation (to climate change)
EIA	Environmental impact assessment
EMF	Environmental Management Framework
EMP	Environmental Management Programme
EN	Endangered
ESA	Ecological Support Areas
FEPA	Freshwater Ecosystem Priority Areas
GBIF	Global Biodiversity Information Facility
GCCRS	Gauteng Climate Change Response Strategy
GCRO	Gauteng City-Region Observatory
GDARD	Gauteng Department of Agriculture and Rural Development
GHG	Greenhouse gas
GIS	Geographic Information System
GPAES	Gauteng Protected Area Expansion Strategy
GSP	Green Strategic Programme
IAS	Invasive alien species
IDP	Integrated Development Plan
IUCN	International Union for Conservation of Nature
LAB	Local Action for Biodiversity
LBSAP	Local Biodiversity Strategy and Action Plan
MEC	Member of the Executive Council
MPRDA	Mineral and Petroleum Resources Development Act
MTSF	Medium Term Strategic Framework
NBA	National Biodiversity Assessment
NBF	National Biodiversity Framework
NBSAP	National Biodiversity Strategy and Action Plan
NDP	National Development Plan
NEMA	National Environmental Management Act
NFEPA	National Freshwater Ecosystem Priority Areas
NFSD	National Framework for Sustainable Development
NGO	Non-governmental Organisation
NPAES	National Protected Area Expansion Strategy
NSBA	National Spatial Biodiversity Assessment
SABIF	South African Biodiversity Information Facility
SADC	Southern Africa Development Community
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SIBIS	SANBI's Integrated Biodiversity Information System
SPLUMA	Spatial Planning and Land Use Management Act
TEEB	The Economics of Ecosystems and Biodiversity
UN	United Nations
UNCCD	Convention to Combat Desertification
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	Framework Convention on Climate Change
VU	Vulnerable

## Notes

## Notes

**Citation:** SANBI. 2014. Biodiversity Mainstreaming Toolbox for land-use planning and development in Gauteng. Compiled by ICLEI – Local Governments for Sustainability. 116 pages.

**ISBN:** 978-1-919976-99-0

**Production management by:** Aimee Ginsburg

**Design by:** Ideaology: Design. Advertising. Digital Pty Ltd

**Printed by:** Typo Colour Specialists cc

**Paper:** Printed on environmentally friendly Triple Green Print Silk recycled paper

**Copyright:** © South African National Biodiversity Institute Grasslands Programme. 2014. Reproduction of this publication for educational or other non-commercial purposes is authorised without prior written permission from the copyright holder provided the source is fully acknowledged. Reproduction of this publication for resale or other commercial purposes is prohibited without prior written permission of the copyright holder.

**Photo credits:** Grateful thanks go to the many people and organisations whose photographs bring life to the pages of this report.

*Cover:* Johanne Snyman

*Inside:* Fred Inklaar (pg iii, 34, 55, 105, 107), Derek Keats (pg 1, 5, 17, 89, 97, 98, 100), Anthea Stephens (pg 3, 13, 29, 42, 51, 53, 58, 64), Mary Joye-Louw (pg 6, 31, 86), Jonathan Gill (pg 7, 39, 43, 102), Martin Heigan (pg 48, 50), Aimee Ginsburg (pg 16, 18, 33, 63, 66, 71, 81, 99), Budu Manaka (pg 22), Pascal Parent (pg 23), Albert Froneman (pg 26), SANBI (pg 30, 36, 83, 95, 104), Mike Cadman (pg 44, 47), Steve Germishuizen (pg 45), ICLEI Cities Biodiversity Centre (pg 25, 52), CGIAR Challenge Program on Water and Food (pg 67), John Dini (pg 68), De Beers (pg 69, 87), Matthew Axelrod (pg 72) iSimangaliso Wetland Park Authority (pg 84), Cobus Botha (pg 88), Ellen Elmendorp (pg 92).



ISBN 978-1-919976-99-0



9 781919 976990