

INTEGRATED RESERVE MANAGEMENT PLAN

STEENBRAS NATURE RESERVE

June 2011



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AUTHORIZATION PAGE

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DOCUMENTED

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City of Cape Town

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List of abbreviations used

APO	annual plan of operations
C.A.P.E	Cape Action for People and the Environment
CARA	Conservation of Agricultural Resources Act
CDF	Conservation Development Framework
CFR	Cape Floristic Region
EIA	environmental impact assessment
GIS	geographic information system
IDP	Integrated Development Plan
IMEP	Integrated Metropolitan Environmental Policy
IUCN	International Union for Conservation of Nature and Natural Resources
METT-SA	Management Effectiveness Tracking Tool South Africa
MOU	memorandum of understanding
NEMA	National Environmental Management Act
NGO	non-governmental organisation
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
ToR	terms of reference
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WWF	Worldwide Fund for Nature

PART 1

DESCRIPTION

1. INTRODUCTION

The Kogelberg is often referred to as the heart of the globally unique Cape Floristic Region (CFR) – an area of exceptional conservation significance. The high diversity and endemism characteristics of this area is the result of the greater diversity of microhabitats and seasonality of climate. More than 1 650 plant species are estimated to occur in the Kogelberg, of which 77 taxa are thought to be locally endemic. In addition to the high plant diversity, a large number of bird, mammal, reptile and amphibians inhabit the area.

The Kogelberg is also of outstanding importance as it offers a predominantly natural area with a core wilderness so close to a large city (within 40 km from the centre of Cape Town). An exceptional diversity of natural environments characterise the area, ranging from marine and coastal environments, rare black-water lakelets, marshes, estuaries, rivers, and mountains bordering on a narrow coastal plain. These natural features make the area a highly desirable destination for eco-tourists, and provide unparalleled opportunities for environmental education. It is in the interest of local communities, landowners and the general public that this area be maintained in a predominantly natural condition, and that it is used sustainably.

The strategic management planning process – resulting in the development of an Integrated Reserve Management Plan (IRMP) – for Steenbras Nature Reserve began with the definition of the vision, followed by the purpose for the reserve. This purpose is then supported by desired states for the reserve. The reserve objectives contribute to realising the purpose and desired states. For each desired state, a number of management objectives are identified. These management objectives are then implemented through the identification of outputs. Objectives for each desired state are prioritised for the five-year time horizon of the plan. Time frames, deliverables, performance indicators and targets are then allocated to each objective, or a group of linked outputs contributing to the desired state.

1.1. Aim of the Integrated Reserve Management Plan

The aim of the IRMP is to ensure that Steenbras Nature Reserve has clearly defined objectives and activities to direct the protection and sustainable use of its natural, scenic and heritage resources over a five-year period. The IRMP thus provides the medium-term operational framework for the prioritised allocation of resources and capacity in the management, use and development of the reserve. The IRMP also intends to add value and continuity by clearly stating management objectives, scheduling actions, and providing management guidelines.

The reserve planning process for Steenbras Nature Reserve takes place against the backdrop of (i) the City of Cape Town's Integrated Development Plan (IDP) (Anon 2010); (ii) the City of Cape Town's Integrated Metropolitan Environmental Policy (IMEP) (Anon 2003¹); (iii) the City of Cape Town's biodiversity strategy (Anon 2003²) and Local Biodiversity Strategy and Action Plan (LBSAP) (Anon 2009¹), and (iv) the bioregion (Cape Action for People and the Environment, or C.A.P.E). The major elements of the IRMP are this document (overall strategy, vision and context), the detailed subsidiary plans (as required) and an annual plan of operations (APO). The IRMP for Steenbras Nature Reserve is supported by a State of Biodiversity report (Holmes *et al.* 2008), operational guidelines and a monitoring and evaluation framework to ensure ongoing implementation and review of protected-area management activities (figure 1).

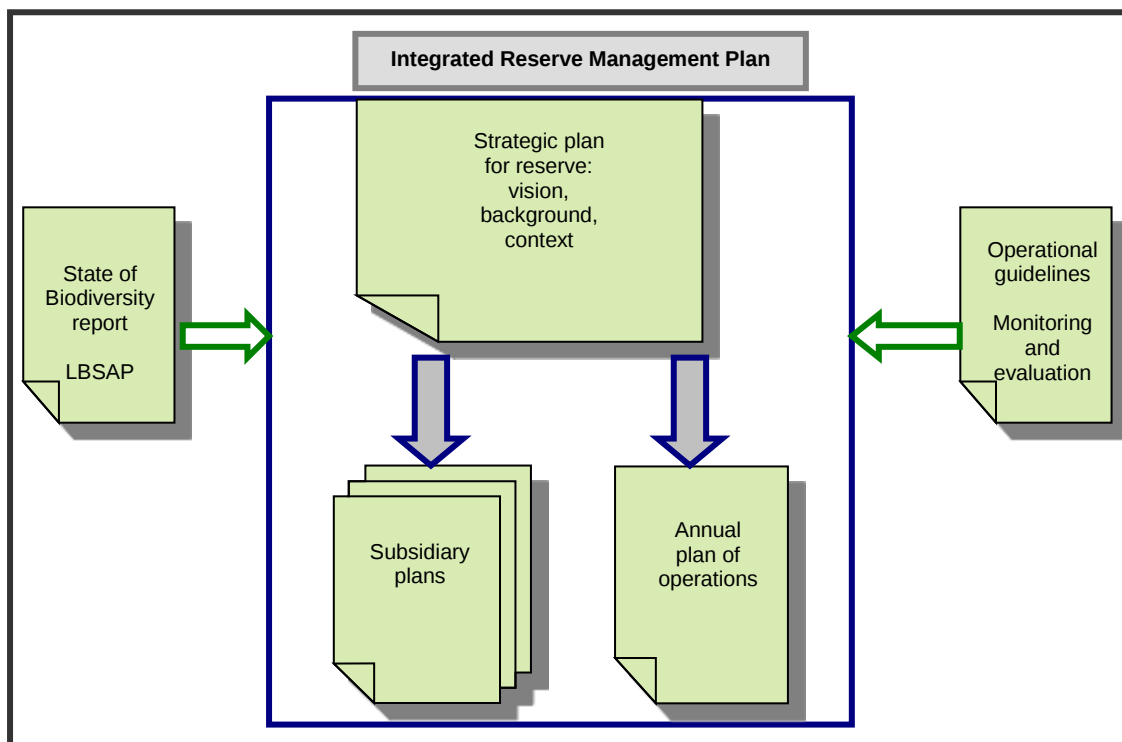


Figure 1: The elements of the IRMP

The IRMP for Steenbras Nature Reserve forms part of a tiered series of policies, legislation and related planning documents at the sector, institutional, agency and local level (see figure 2).

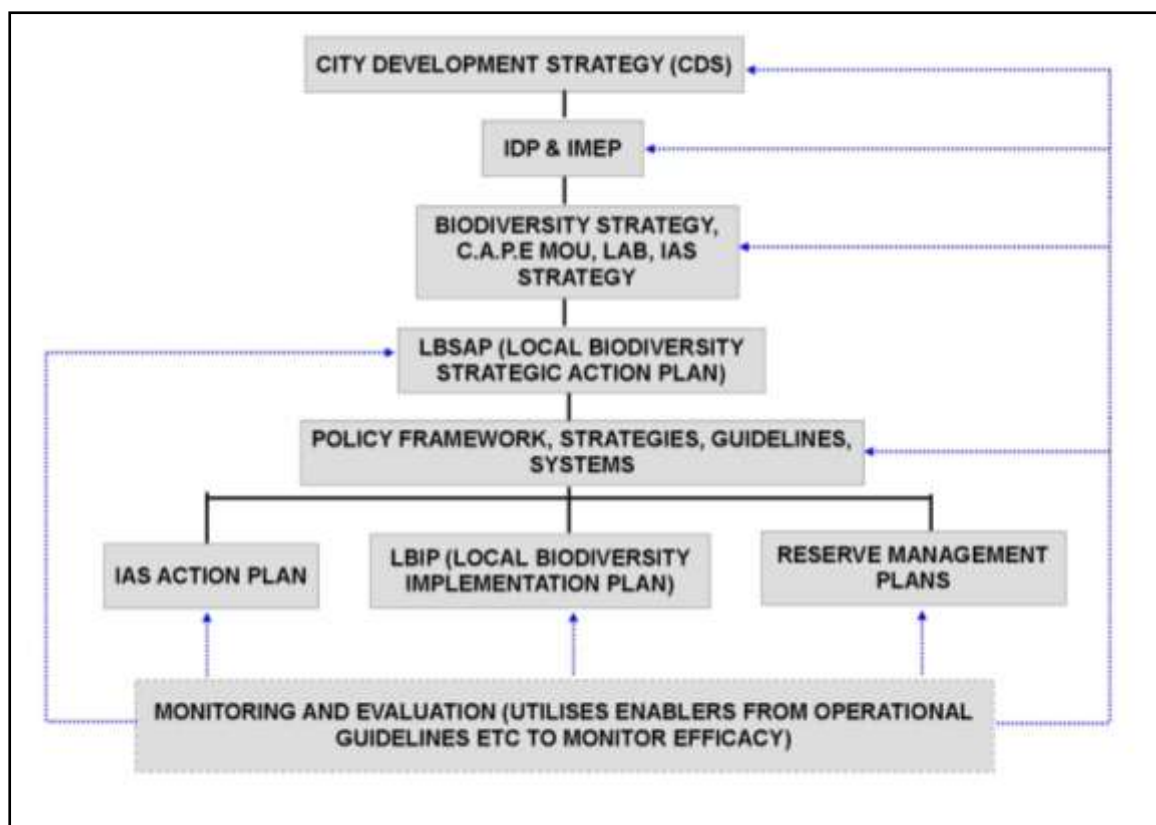


Figure 2: Legal and planning framework for the IRMP

Where possible, emphasis has been placed on the following:

- Assigning responsibility for management interventions
- Scheduling said management interventions
- Quantifying management costs

This approach is specifically intended to create a mechanism whereby management interventions can be monitored and audited on an annual basis.

In context, this IRMP is a dynamic document, and the detailed subsidiary plans should be updated annually or as soon as new information comes to light that may better inform decisions on responsible land management. The IRMP should be updated every five years.

The drafting of this management plan has been guided by a small interdisciplinary Reserve Planning Committee (RPC), comprising the branch manager, the regional manager, the area manager, various specialists, and other interested and affected persons. Repeated drafts of the IRMP were presented to, and discussed by, the RPC before broader circulation for public participation.

Pre-engagement workshops were held with community partners from March to May 2010. This afforded key community partners an opportunity to give their input at an early stage. The ideas and outputs from the workshops have, where practical, been incorporated into the IRMP.

1.2 Location and extent

Steenbras Nature Reserve forms part of the greater Kogelberg Biosphere Reserve (map 1) registered in 1998 with the United Nations Educational, Scientific and Cultural Organisation (UNESCO), giving the area international conservation significance, thereby justifying its increased protection. The biosphere reserve is managed by a team representing local communities, agriculture, business, conservation and local authorities, and other relevant parties. UNESCO's biosphere reserve concept provides an ideal framework for such a holistic approach to the optimal conservation of this area, and the integration of conservation with wise use and sustainable development within buffer and transition zones around strictly protected core conservation areas.

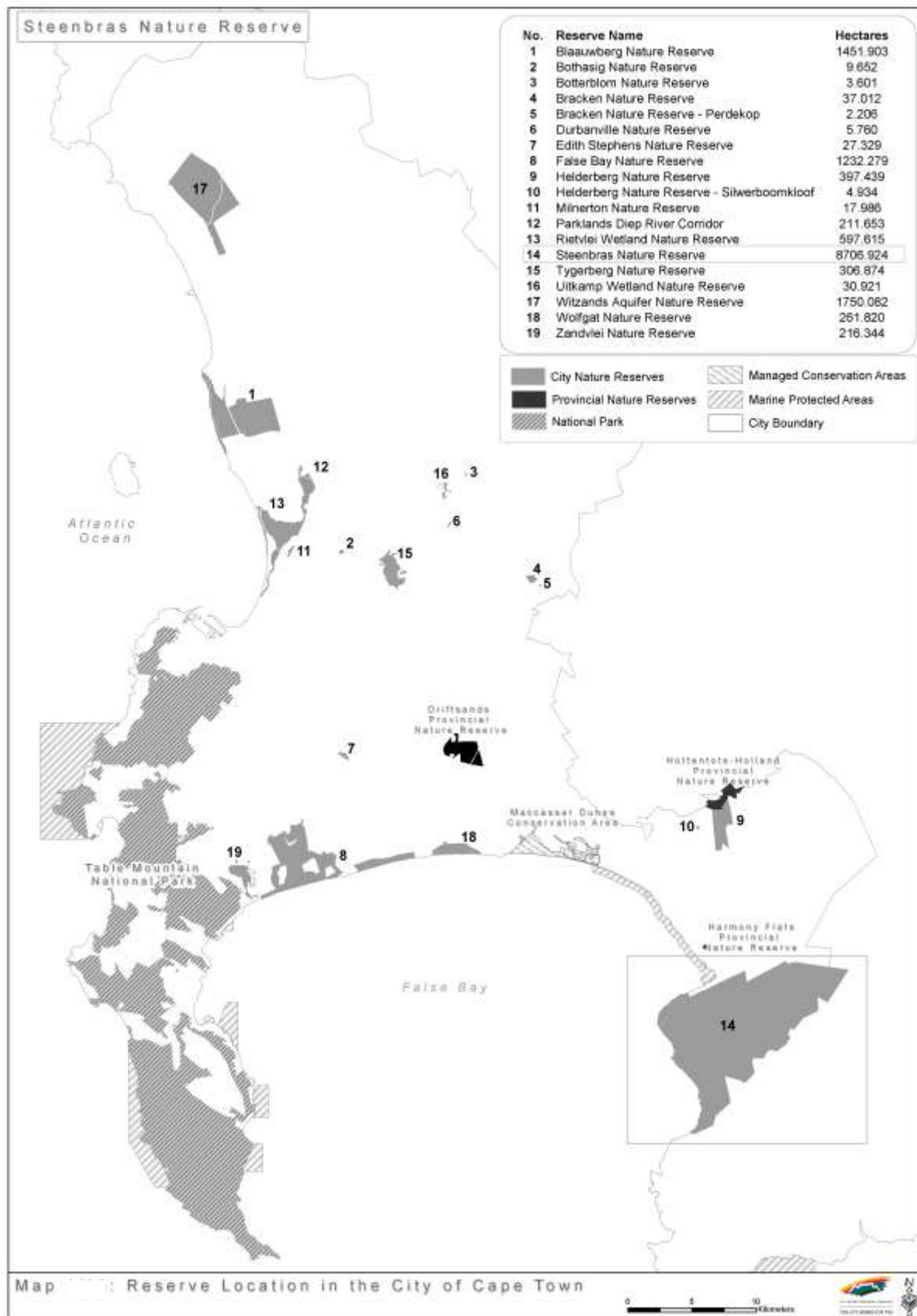
The Kogelberg Biosphere Reserve comprises an area of $\pm 90\,000$ ha (with 67 000 ha being terrestrial and 23 000 ha marine) between Gordon's Bay and the Bot River vlei, inland to Groenlandberg, including the near-shore coastal zone up to two sea miles ($\pm 3,5$ km) from the shore along the 70 km coastline. The core conservation area consists of the 18 000 ha (provincial) Kogelberg Nature Reserve and wilderness area, as well as the Groenlandberg, Houw Hoek mountains and Rooisand Nature Reserve; the $\pm 1\,700$ ha marine reserve; buffer zones ($\pm 34\,000$ ha: 11 000 ha terrestrial and 23 000 ha marine) comprising proclaimed mountain catchment areas; the Harold Porter Botanical Garden; local authority nature reserves (Kleinmond Coastal Nature Reserve and Rooi-Els Nature Reserve); other demarcated state forest land that has been reserved for conservation; the Bot River lagoon, and marine areas. The transition area (32 000 ha terrestrial) includes the rest of the terrestrial environments, which consist of natural areas, agricultural land (orchards and pastures), plantations, and six coastal villages and towns.

Steenbras Nature Reserve is situated between Gordon's Bay and Rooi-Els, bordering the provincial Kogelberg Nature Reserve, and stretching back to the N2 towards Grabouw (see map 2 and 3). The reserve includes the Steenbras dam and mountain catchment area, and slopes down from Steenbras, Boskloof and Kogelberg peaks towards the coast. The area was proclaimed a protected mountain catchment area on 16 November 1979 and 11 October 1985 in Gazette No. 2569 and 2266 under the Catchment Management Areas Act, Act 63 of 1970 (appendix 1).

The area includes approximately 8 486,778 ha of land owned by the City of Cape Town. A further 214,399 ha is currently owned by the Department of Public Works, and is included in the expansion plan. It is however part of the biosphere reserve and already managed as part of the reserve.

Steenbras Nature Reserve is located at the following grid reference:

34° 11.025' S 18° 52.161' E



Map 2. Steenbras Nature Reserve Location



Map 3. Steenbras Nature Reserve Boundary

2. DESCRIPTION OF LANDHOLDINGS AND OWNERSHIP

2.1 Property details and title deed information

Steenbras Nature Reserve comprises various erven under the management of different authorities (map 4). These erven include the following:

- i. Erf 933-2
In extent: 1,49 ha
Land owner: City of Cape Town
- ii. Erf 934-2
In extent: 0,335 ha
Land owner: City of Cape Town
- iii. Erf 934-0-1
In extent: 0,208 ha
Land owner: City of Cape Town
- iv. Erf 934-0-2
In extent: 5,698 ha
Land owner: City of Cape Town
- v. Erf 934-3-2
In extent: 0,017 ha
Land owner: City of Cape Town
- vi. Erf 933-0-1
In extent: 157,825 ha
Land owner: Department of Public Works
- vii. Erf 307
In extent: 2 264,953 ha
Land owner: City of Cape Town
- viii. Road
In extent: 2,166 ha
Land owner: City of Cape Town
- ix. Erf 308
In extent: 1 580,432 ha
Land owner: City of Cape Town
- x. Erf 934-1
In extent: 0,163 ha
Land owner: Department of Public Works
- xi. Erf 934-3-1
In extent: 1,026 ha
Land owner: City of Cape Town
- xii. Erf 863-0-2
In extent: 483,92 ha
Land owner: City of Cape Town
- xiii. Erf 933-0-2

In extent: 2,147 ha
Land owner: City of Cape Town

xiv. Erf 934-0-3
In extent: 0,115 ha
Land owner: City of Cape Town

xv. Erf 56-1
In extent: 112,506 ha
Land owner: City of Cape Town

xvi. Erf 56-19
In extent: 315,406 ha
Land owner: City of Cape Town

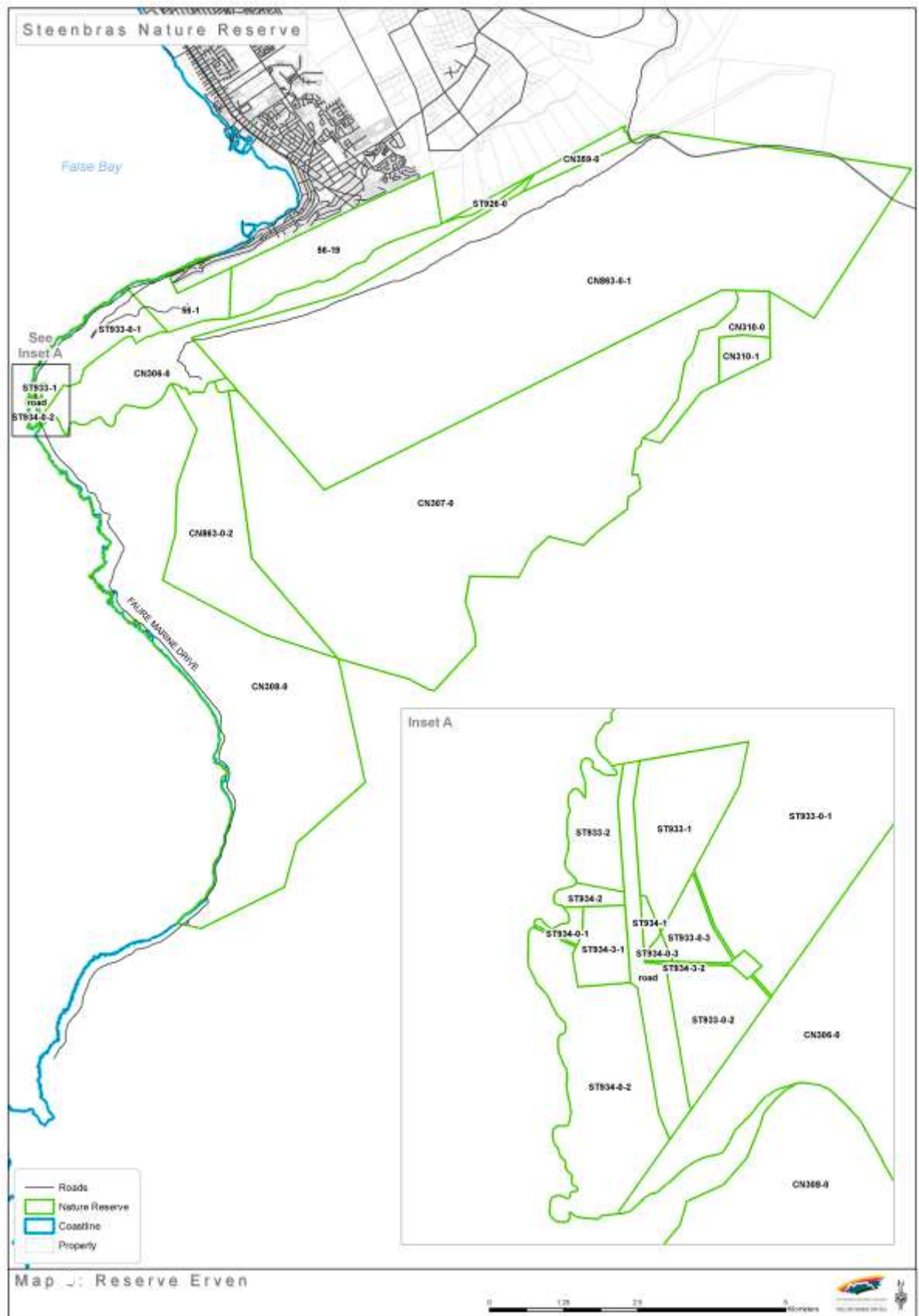
xvii. Erf 310-0
In extent: 131,779 ha
Land owner: City of Cape Town

xviii. Erf 926-0
In extent: 12,583 ha
Land owner: City of Cape Town

xix. Erf 359-0
In extent: 43,3 ha
Land owner: City of Cape Town

xx. Erf 863-0-1
In extent: 3 123,438
Land owner: City of Cape Town

xxi. Erf 306
In extent: 407,406 ha
Land owner: City of Cape Town



Map 4. Steenbras Nature Reserve erven

2.2 Landscape perspective

The reserve falls within the CFR, the smallest and richest of the world's six floral kingdoms, and the only one to be found entirely within one country, South Africa. This rich biodiversity is under serious threat for a variety of reasons, including conversion of natural habitat to permanent agricultural land, inappropriate fire management, rapid and insensitive development, overexploitation of water resources, and infestation by invasive species. The region has been identified as one of the world's "hottest" biodiversity hot spots (Myers *et al* 2000).

In response to this challenge, a process of extensive consultation involving various interested parties, including local government and non-governmental organisations (NGOs) resulted in the establishment of a strategic plan (C.A.P.E Project Team 2000) referred to as Cape Action Plan for the Environment, which identified the key threats and root causes of biodiversity losses that need to be addressed in order to conserve the floral kingdom. This resulted in a spatial plan, identifying areas that need to be conserved and a series of broad programme activities that need to take place over a 20-year period. Based on the situation assessment and analysis of threats, three overarching, mutually complementing and reinforcing themes were developed:

- To establish an effective reserve network, enhance off-reserve conservation, and support bioregional planning
- To strengthen and enhance institutions, policies, laws, cooperative governance and community participation
- To develop methods to ensure sustainable yields, promote compliance with laws, integrate biodiversity concerns with catchment management, and promote sustainable eco-tourism

The C.A.P.E partnership was formed that works together to implement the C.A.P.E vision and plan by strengthening institutions, supporting conservation efforts, enhancing education, developing tourism benefits, and involving people in conservation. The City of Cape Town was one of the 19 founding signatories of the C.A.P.E memorandum of understanding (MOU).

Steenbras Nature Reserve forms an important platform and integral link within the City of Cape Town's biodiversity network (Anon 2009²) (map 5). The biodiversity network ensures that parcels of land worthy of conservation are included in a protective network, connected to other parcels of conservation-worthy land.

The reserve links up with provincial conservation land on the Hottentots Holland and Kogelberg mountain ranges.

2.3 Physical environment

2.3.1 Climate

The climate is described as Mediterranean, which is characterised by warm, dry summers and mild, rainy winters. The lowest level of the reserve is at sea level; the highest point is Kogelberg Peak at 1 268 m.

Precipitation occurs mainly as rainfall. Coastal fog and upper-elevation orographic clouds (600 m and over), brought in on the south-easterly winds during the summer months, play a considerable yet unmeasured role in contributing towards the total precipitation. Snowfalls are uncommon due to the proximity to the coast, but may occur. Mist occurs on lower elevations in the form of coastal fog. On upper elevations, cloud cover is brought in on on-shore south-east winds. The topography and aspect of the area significantly affect rainfall distribution throughout the reserve.

Rainfall is most abundant in the winter months between June and August, and is associated with postfrontal events.

Temperatures along the coast vary significantly to the more inland catchment areas. Average coastal summer highs are around 23 °C compared to inland highs of around 35 °C. A similar disparity occurs with winter lows, the coast being relatively warmer. The coldest month on average is July, and the warmest months on average are January and February.

The prevailing winter wind is the north-west wind, whereas summer winds are predominately from the south-east. The force and direction are modified to some extent by the alignment of the mountains. The south-easterly wind is notoriously strong, often blowing at gale force for two to three days at a time. These winds are usually associated with fair-weather clouds capping the mountains such as the well-known 'table-cloth' on Table Mountain.

2.3.2 Geology, geomorphology, soils and land types

The Kogelberg mountains form the southernmost extension of the Hottentots Holland mountains, situated at the meeting point of two axes of the Cape Fold Belt – an expanse of sheer cliffs, deeply incised gorges, cascading waterfalls and a meandering inner-river valley that forms the wilderness core. Kogelberg Peak, at 1 268 m above sea level, is the highest

point of the area as well as being one of the highest and most steeply and densely vegetated peaks within such close proximity to the sea in the Southern Hemisphere.

Most of the Kogelberg catchment area is represented geologically by the Cape supergroup – a group of alternating sandstone and shale sedimentary strata laid down between 450 and 300 million years ago. Subsequently folded during a period of mountain building 278–215 million years ago, the layers were exposed and weathered, each forming their own morphological features and soils. The mountain peaks are mere stumps of their former size, and were said to have extended some 3 km higher than today. Dominating the landscape are the sandstones of the Table Mountain group. The oldest of these sandstone layers, the Peninsula formation, is found exposed along the rocky coast and on the lower coastal mountains as well as forming the western blockade of cliffs above Kogel Bay. The foothills of these cliffs are a sandstone scree of Quaternary origin, overlaying the oldest Tygerberg formation in the Malmesbury group. At Sir Lowry's Pass, intrusions of granite are found exposed between the scree. The younger Nardouw group of sandstones have produced the weathering resistant peaks and cliffs of the southern and inland mountains as well as the lower inland slopes. The Rietvlei formation within the Nardouw group forms the lowest of the inland northern slopes, bordering the Bokkeveld group of the Elgin basin and the Vyeboom valley.

Soils produced from the sandstones are typically white, and have an acidic topsoil of little humus overlying a deeper coarse-grained sand or rock. The Sandveld and Mispah soil series are two soil types formed. Generally, these soils are well drained, leaching away much of the nutrients. When it occurs at higher altitudes on moist southern-aspect slopes, the soils are of the Mposa series, and contain a significant accumulation of organic matter, a substrate that gives rise to a lush, dense vegetation. This soil resembles the sandy peats (Champagne series) of the coastal seepage areas. Soils of the Rietvlei formation have a higher clay content, and are referred to as yellowed sandstones (Anon 2003). Sandwiched between the Peninsula and Nardouw (Goudini, Skurweberg and Rietvlei formation) sandstone layers, the soft shales of the Cederberg formation have weathered to form the plateaus and gorges. In association with the shale band, and positioned immediately below it, the Pakhuis formation of massively bedded diamictite and erratics (tillite), formed from material compacted and transported by glaciers some 400 million years ago, is exposed along the banks of the Palmiet River and elsewhere. Soils produced are coarse sand and often confined to shallow hollows on the sheets of exposed rock. The line between shale and tillite is made visible by the conspicuous change in vegetation associated with the transition from one geological formation to another. The Bokkeveld group of shales and thinly dispersed layers of sandstone dominate the Elgin basin. These shales are geologically younger than the Cederberg shales, and had once covered the sandstones on the mountain peaks before they eroded away. Now found in

the intermontane valleys, these deep, rich, clayey soils are the substratum of the area's extensive fruit farming industry. Some small areas of the Wittenberg group may be found in the Elgin basin. Scree – fallen rock – covers most of the lower slopes of the mountains. Extensive deposits are seen in the road cuts from Gordon's Bay as well as along all the coastal mountain slopes.

2.3.3 Hydrology and aquatic systems

2.3.3.1 Catchments

Steenbras Nature Reserve falls within the Hottentots Holland mountain catchment area – more specifically, in the Steenbras catchment. The Steenbras River originates outside the reserve, and flows through the reserve into the Steenbras upper and lower dams, and then into the sea. Water stored in the dams is used for domestic supply to the citizens of Cape Town.

2.3.3.2 Rivers

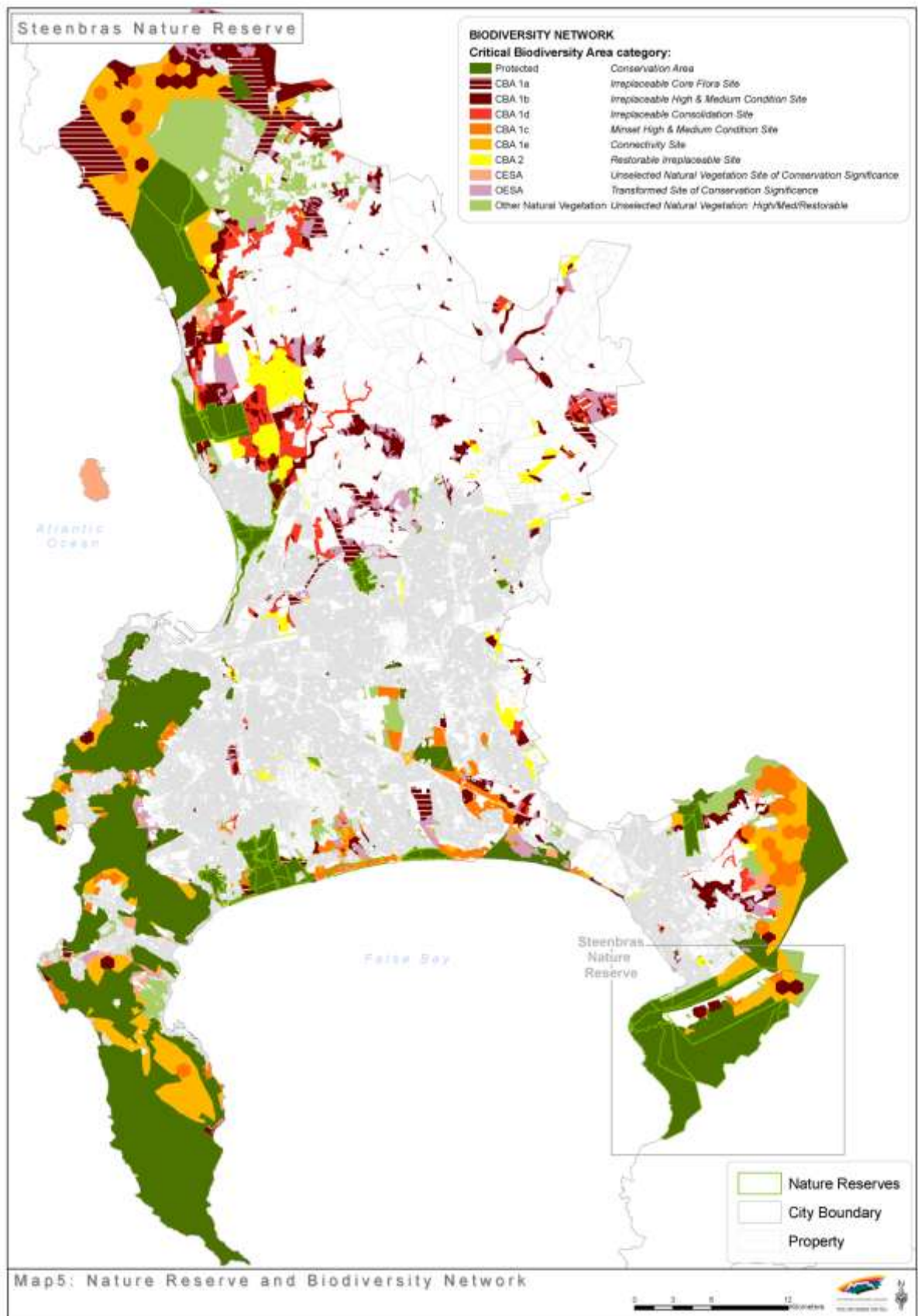
The Steenbras River is the main river that flows through Steenbras Nature Reserve. It has its source outside the reserve, near Grabouw. The majority of the water is collected into the Steenbras upper and lower dams, before discharging into the sea.

The reserve has numerous unnamed streams, many of which flow during periods of heavy rainfall.

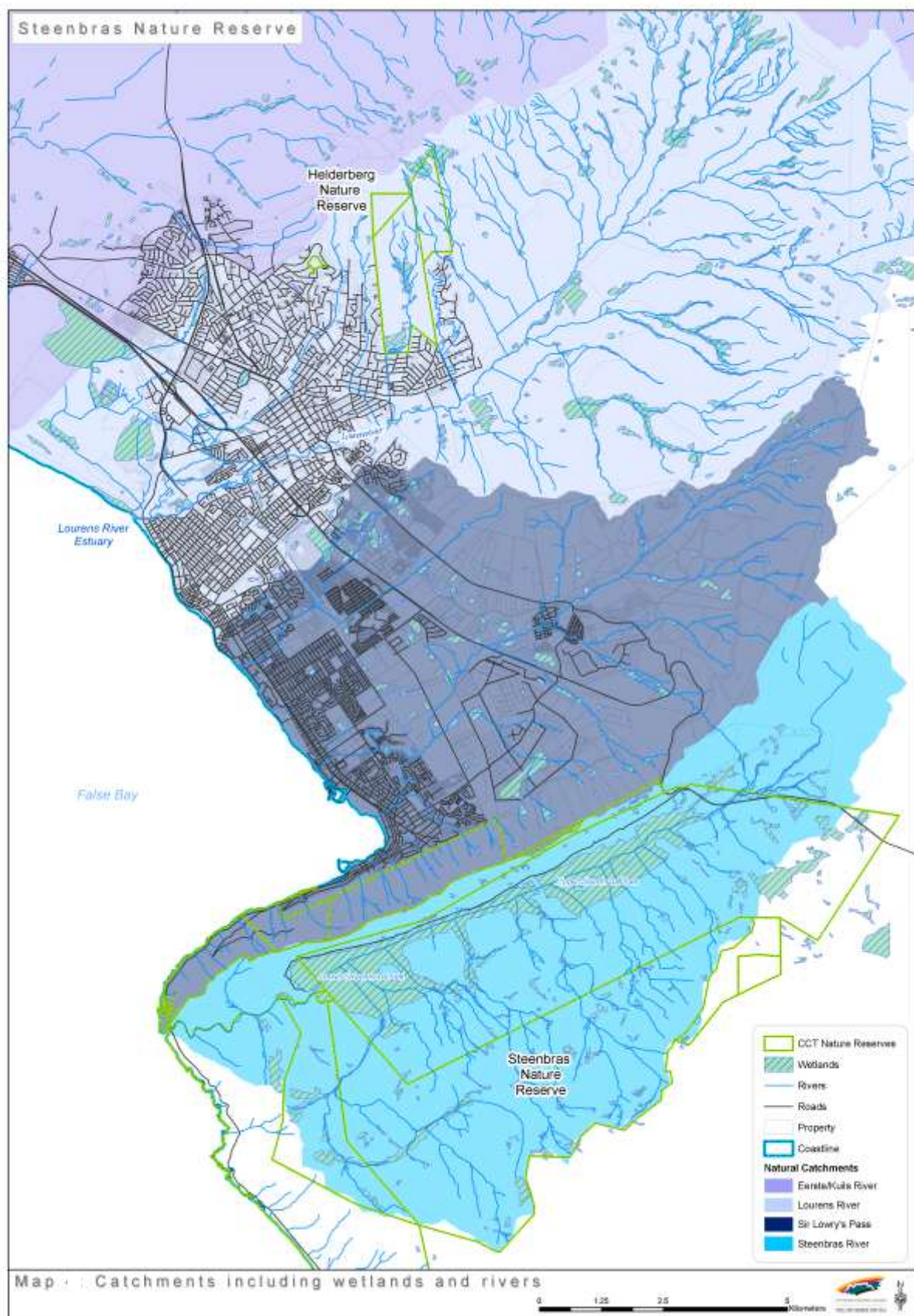
2.3.3.3 Wetlands and seeps

Numerous seepage areas associated with seasonal drainage lines and perennial rivers are found within the reserve.

Map 6 illustrates the water bodies, wetlands and seeps found in Steenbras Nature Reserve.



Map 5. Steenbras Nature Reserve and biodiversity network



Map 6. Steenbras Nature Reserve, catchments including wetlands and rivers

2.4 Biological environment

2.4.1 Vegetation

The Kogelberg mountains and adjoining lowland coastal areas are often regarded as the heart of the Cape Floral Kingdom. Home to more than 1 650 plant species, some of which occur nowhere else, the Kogelberg is considered one of the world's biodiversity hot spots (see appendix 2).

Fynbos (an Afrikaans term derived from the Dutch “fijn-bosch”) literally means ‘fine bush’ and is the dominant vegetation in the area. Small pockets of forest and thicket are present, but less prominent. It is an evergreen, fire-prone shrubland, characterised by the presence of restios, ericoid shrubs principally in the families *Ericaceae*, *Asteraceae*, *Rhamnaceae*, *Thymelaeaceae* and *Rutaceae*, as well as proteoid shrubs (*Proteaceae*). The main vegetation types present in the reserve are Kogelberg Sandstone Fynbos and Cape Winelands Shale Fynbos. Small areas of Elgin Shale Fynbos, Western Coastal Shale Band and Boland Granite Fynbos also occur.

Kogelberg Sandstone Fynbos occurs over the greatest proportion of the reserve. The vegetation and landscape features are high mountains with steep to gentle slopes, and undulating plains and hills of varied aspect. The vegetation is low, closed shrubland, with scattered, emergent tall shrubs. Proteoid, ericaceous and restioid fynbos dominate, while asteraceous fynbos is rare. Numerous seeps and seasonally saturated mountain-plateau wetlands are very common and support restioid and ericaceous fynbos.

Kogelberg Sandstone Fynbos is classified as critically endangered, as it contains 100 Red Data threatened species. The vegetation is however well conserved, with more than the national target of 30% already being protected. Two endemic genera occur here, namely *Charadrophila* and *Glischrocolla*. Examples of endemics include *Mimetes arboreus*, *Protea stokoei*, *Aspalathus globosa*, *Cliffortia heterophylla*, *Liparia calycina*, *Mimetes hottentoticus* and *Orothamnus zeyheri*.

The soil and geology of this vegetation type are acidic lithosol soils derived from Ordovician sandstones of the Table Mountain group. Deep sandy blankets of whitish, nutrient-poor acidic sand develop in depressions and on slopes resisting erosion. Climatic requirements are a mean annual rainfall of 1 330 mm, peaking between May and August. This region has the highest rainfall in Cape Town. Mean daily temperatures are recorded as a minimum of 6,1 °C and a maximum of 24,0 °C. Frost may occur two to three times a year. The summit cloud often referred to as the ‘Hottentot’s blanket’ is a regular feature in the summer, when the

southeaster brings heavy mist precipitation to the summits and adjacent south and east-facing slopes.

The **Cape Winelands Shale Fynbos** type is present within Steenbras Nature Reserve in patches from Blousteen on Clarence Drive and within the Kogel Bay basin area. It occurs on altitudes of 0–700 m. Approximately 37,5% of this vegetation type occurs within the Cape Town boundary. Transformation rates of this vegetation type nationally are high, and, therefore, the conservation of this vegetation is important.

Cape Winelands Shale Fynbos occurs on moderately undulating plains and steep slopes against mountains. In structural terms, the vegetation takes the form of moderately tall and dense shrublands, dominated by proteoid and closed-scrub fynbos.

The geology and soil type characteristics are acidic, moist clay-loamy, red-yellow apedal and Glenrosa and Mispah forms derived from Malmesbury shales. The vegetation type's climatic requirements include a mean annual rainfall of 865 mm (520–1 690 mm), peaking from May to August. This is the shale fynbos type requiring the highest rainfall. Mean daily maximum and minimum temperatures are 26,4 °C and 6,6 °C for February and July respectively. Frost incidence is recorded on two or three days per year.

Cape Winelands Shale Fynbos is classified as Vulnerable, but well conserved. Endemic taxa include *Moraëa aristata*. The national target of 30% has already been reached, with 25% statutorily conserved in national parks and nature reserves, and an additional 25% being protected in mountain catchment areas. The remaining areas have been largely transformed by pine plantations, vineyards as well as urban development. Threats include invasive alien species, mainly *Pinus pinaster* and *Hakea sericea*.

Elgin Shale Fynbos is a Critically Endangered vegetation type, and occurs at the Steenbras dam within the Kogelberg Biosphere Reserve area. Only 3% of this vegetation type remains within the City of Cape Town's jurisdiction, but transformation nationally is high. Therefore, the conservation of this vegetation type is crucial. The target of 30% is impossible to achieve, as there is less than this amount of this vegetation type remaining. Endemic taxa in this veld type include *Leucadendron elimense subsp.* (vyeboommense) and *Leucadendron globosum*. However, more of this vegetation type has been transformed by the Steenbras dam.

Elgin Shale Fynbos is characterised by undulating hills, moderately undulating plains, and steep slopes of adjacent mountains. Structurally, it is an open to medium-dense, tall proteoid shrubland over a matrix of moderately tall and dense evergreen shrubs, dominated by

proteoid, asteraceous and closed-scrub fynbos, and ericaceous fynbos in the wetter localities. The vegetation type occurs on acidic, moist clay-loam Glenrosa or Mispah forms derived from Bokkeveld group shales. The vegetation type's climatic requirements place it in a winter-rainfall regime, with a mean of 830 mm, peaking from May to August. Mean daily maximum and minimum temperatures are 26,2 °C and 6,2 °C for February and July respectively. Frost occurs two or three times a year.

Western Coastal Shale Band vegetation is a linear feature of up to 0,5 km wide in places. It supports diverse fynbos shrublands of all structures, including waboomveld at lower altitudes. Endemics include *Protea laticolor*, *Prismatocarpus cliffortioides*, *Protea caespitosa*, *Lampranthus walgateae*, *Bobartia lilacina*, *Morea lilacina* and *Pentameris hirtiglumis*. The minimum conservation target of 30% has already been met.

The vegetation type grows on clay soils derived from the Cederberg formation shales. The climate records a mean annual rainfall of 1 070 mm, peaking between May and August. South-easterly cloud brings heavy mist precipitation at higher altitudes in summer. A mean daily maximum is recorded at 24,3 °C, with the mean daily minimum at 5,0 °C.

Boland Granite Fynbos occurs on moderately undulating plains and hills, varying from extensive deep soils to localised deep soils between large granite domes and sheets. It is a fairly dense vegetation type with 1–2 m closed shrubland, with occasional low, gnarled trees dotted through the landscape. It is diverse, dominated by scrub, asteraceous and proteoid fynbos, with restioid and ericaceous fynbos in the wetter areas. Waboomveld is typical and very extensive within this vegetation type.

Endemic taxa present in Steenbras Nature Reserve include *Leucospermum grandifolium*, *Aspalathus cephalotes subsp cephalotes*, *Erica fausta*, *Psoralea gueinzii*, *Serruria gracilis*, *Ixia cochlearis*, *Laperiousia azurea*, *Watsonia amabilis* and *Conophytum turrigerum*. The minimum national conservation target of 30% has been reached.

The underlying geology is the Cape granite suite. Soils are usually Glenrosa, Mispah forms, or red-yellow apedal. Freely draining soils are dominant, with exposed dome rock and large boulders. Mean annual rainfall is recorded at 985 mm, peaking between May and August. Mean daily temperatures are recorded as a minimum of 5,9 °C and a maximum of 26,6 °C.

2.4.2 Mammals

Although large game has disappeared from the area, smaller mammals remain. Many are inconspicuous, nocturnal and seldom seen. However, signs of their presence in the form of spoor, latrines and middens are abundant.

Smaller antelope are represented by *Oreotragus oreotragus* (Klipspringer), *Raphicerus melanotis* (Cape Grysbok) and *Sylvicapra grimmia* (Common Duiker). While species such as *Pelea capreolus* (Grey Rhebok) and *Raphicerus campestris* (Steenbok) were historically recorded as present, they have not been confirmed as still occurring in the reserve. These species are known to occur on neighbouring conservation land, and it is likely that they still frequent the reserve.

Top predators include *Panthera pardus* (Cape Leopard) and *Felis caracal* (Caracal). *Aonyx capensis* (Cape Clawless Otter) and *Mellivora capensis* (Honey Badger), *Genetta genetta* (Small Spotted Genet), *Atilax paludinosus* (Water Mongoose) and *Galerella puverulenta* (Small Grey Mongoose) are all recorded as being present on the reserve.

The reserve has a healthy population of small mammal species including, *Pronolagus rupestris* (Smith's Red Rock Rabbit), *Lepus capensis* (Cape Hare), *Procavia capensis* (Rock Hyrax) and a variety of mouse and shrew species including *Mus minutoides* (Pygmy Mouse), *Aethomys namaquensis* (Namaqua Rock Mouse) and *Dendromus mesomelas* (Brant's Climbing Mouse), *Elephantulus edwardii* (Cape Rock Elephant Shrew) and *Crocidura cyanea* (Red Musk Shrew).

There is a growing concern regarding conflict between humans and the local troop of *Papio ursinus* (Chacma Baboon). This conflict threatens the survival of this species. Two troops have their home range within the reserve, and, while they spend the majority of their time foraging in natural areas, they have become acquainted with human impact areas, and have become accustomed to raiding these areas for opportunistic food sources.

A working list of mammal species occurring within Steenbras Nature Reserve is included as appendix 3.

2.4.3 Birds

The Kogelberg Biosphere Reserve boasts a comprehensive bird list (see appendix 4). Many of the species included have been recorded on the portions owned by the City of Cape Town. The area is home to the fynbos region's six endemic bird species. These are *Anthobaphes violacea* (Orange-breasted Sunbird), *Chaetops frenatus* (Cape Rockjumper), *Promerops cafer*

(Cape Sugarbird), *Cryptillas victorini* (Victorain's Warbler), *Crithagra totta* (Cape Siskin), *Crithagra leucopterus* (Protea Canary).

A breeding pair of *Aquila verreauxii* (Verreaux's Eagle) also occurs in the area. The monitoring of these individuals in terms of breeding success forms part of a study managed by the Western Cape raptor research programme, overseen by the University of Cape Town's Avian Demography Unit.

The area incorporates a coastline and beach, thus including some coastal species such as the *Haematopus moquini* (African Black Oystercatcher). Offshore visitors have been recorded on occasion. These include, *Puffinus griseus* (Sooty Shearwater) and *Procellaria aequinoctialis* (White-chinned petrel).

See appendix 4 for a list of the bird species recorded in the area to date.

2.4.4 Amphibians

Amphibian fauna within the Kogelberg Biosphere Reserve are rich and diverse. No less than 17 different species have been recorded throughout the biosphere reserve (see appendix 5). Four species, namely the *Xenopus gilli* (Cape Platanna), *Capensibufo rosei* (Rose's Mountain Toadlet), *Poyntonia paludicola* (Montane Marsh Frog) and *Arthroleptella landrosia* (Landdrooskop Moss Frog) are listed in the Red Data book of amphibians.

Little work has been completed to confirm which of these species are in fact found on City of Cape Town land. To date, only seven of the more common species have been identified and confirmed to be present. These include *Breviceps montanus* (Cape Mountain Rain Frog), *Amietophrynus rangeri* (Raucous Toad), *Strongylopus bonaspei* (Banded Stream Frog), *Strongylopus grayii* (Clicking Stream Frog), *Xenopus laevis* (Common Platanna) and *Arthroleptella villiersi* (De Villiers Moss Frog). The remaining species are likely to be present; however, further research is required.

2.4.5 Reptiles

Reptiles are well represented in the area (appendix 6). Snakes such as *Naja nivea* (Cape Cobra), *Dispholidus typus* (Boomslang), *Bitis arietans* (Puff adder) and *Pseudaspiscanq* (Mole snake) are common. *Bitis atropos* (Berg Adder) and *Crotaphopeltis hotamboeia* (Herald Snake) are also occasionally sighted. *Hemachatus haemachatus* (Rinkhals) is thought to still occur in the area; however, this is yet to be confirmed.

Agama atra (Southern Rock Agama), *Cordylus cordylus* (Cape Girdled Lizard), *Pseudocordylus microlepidotus* (Cape Crag Lizard), *Tetradactylus tetradactylus* (Common Long Tailed Seps) and *Mabuya homalocephala* (Red-sided Skink) are known to occur in the area, as are *Chersina angulata* (Angulate Tortoise) and *Homopus areolatus* (Parrot-beaked Padloper).

2.4.6 Invertebrates

Several research and monitoring projects are known to have been completed on the reserve by various students studying at Stellenbosch University. However, the reserve does not have copies of the research results. As part of the data collection programme, such documentation is essential in order to assist with the compilation of a species list for the reserve.

2.5 Socio-political context

2.5.1 History

Pre-colonial occupants of the Kogelberg region included the San and Khoikhoi, who inhabited mainly the low-lying areas, where they gathered shellfish and grazed their cattle. The San were hunter-gatherers, and may have deliberately burnt the veld to encourage game to concentrate on new growth, and to stimulate growth and production of edible Iridaceous plants and other bulbs (Anon 2003). The Khoikhoi were pastoralists and reported to have habitually burnt the veld to provide pasture for their sheep (Anon 2003). Sheep would have had a very different ecological influence on the plant communities compared to the local wild herbivores.

Simon van der Stel was one of the first European settlers to journey through the Kogelberg area during 1687, to visit areas such as Rooi-Els.

The area was also used as a hide-out for outlaws and runaway slaves known as 'drosters'. They raided farms and attacked travellers who moved through the area (Anon 2003)

In 1777, William Paterson, a young Scot, came to the Cape to collect plants and seeds in the Kogelberg mountains. During his journey from Steenbras to the Palmiet River, he discovered the 'mealie heath', which he named *Erica patersoni*, after himself.

Before World War II, the coast from the Steenbras River mouth to Rooi-Els was one of the most inaccessible stretches of the South African shoreline. The flow of the water had been much stronger before the dams were built in 1921 and 1954. Fishermen and visitors crossed the river mouth by means of a rope bridge. In the 1920s, youth groups and families would hike to Rooi-Els while their camping equipment was transported by boat from Gordon's Bay. The construction of a road was started in the early 1940s by Mr Jack Clarence, a then owner of the

Hangklip Beach Estates. The road was built using labour from the Italian prisoners of war. In 1950, the drive was named after Clarence. A message on the monument reads: "This road is named for G.J.V. (Jack) Clarence, whose vision, faith and determination helped to bring it into being. God speed you to the next milestone and beyond 1st Jan 1950."

The origin of the name Kogel Bay is contentious. It has been suggested that the Afrikaans term "koeël" (meaning 'bullet') is a corruption of "Cole" from the ship the Colebrooke, which wrecked in the bay in 1778. However, the name occurs on some maps that predate the wreck. Therefore, the name may refer to the rounded stones in many of the small bays, which resemble cannon balls. The noise the stones make as they roll around from the waves also resembles the sound of loose cannon balls rolling upon the pitching deck of a ship.

2.5.2 Socio-economic context

The socio-economic profile of the Helderberg and surrounds is wide-ranging, with beautiful, affluent areas on the one hand, and poor, informal areas on the other. There are an estimated 193 000 people living in the subcouncil area, with 77% of these in formal housing, and 23% in informal settlements. To cater for the underprivileged, approximately 6 000 low-cost houses have been built in the area over the past eight years, and seven high-rise apartment blocks have been constructed in the past six years. Private developers have serviced approximately 3 000 erven, and building in these land tracts is progressing steadily. Another 1 000 low-cost houses are planned for construction within the next three years.

There is an active community life in the area, with a number of service and ratepayers' organisations. About six neighbourhood watches operate in close cooperation with the Metro Police and South African Police Service. Sports bodies ensure that facilities are maintained to the highest standard, and there are numerous facilities for senior citizens, not to mention various support groups (such as the stroke support group, arthritis support group and Alzheimer's support group).

The subcouncil is the interface between the City of Cape Town and its communities, and plays an important role in promoting public participation in Council's plans and policies, such as the IDP, the Integrated Zoning Scheme and the Spatial Development Framework (SDF) and district plans. It also promotes short-term job creation by using unemployed residents for street and river cleaning, litter picking as well as alien plant removal. Various clean-up operations have been undertaken in informal areas, and upgrades and beautification of the area around Nomzamo Community Hall are far advanced. The subcouncil does its utmost to be a conduit between the community and the City of Cape Town, and to function as efficiently as possible within its delegated powers. The upliftment of communities and the continuous assessment of service delivery, community needs and budget priorities are ongoing activities.

In the 2009/10 financial year, the subcouncil has made R270 000,00 in grant-in-aid funding available to 24 benevolent and welfare community organisations to promote cultural activities, care for the aged, contribute to sports and youth development, and develop skills in disadvantaged communities.

The subcouncil is sensitive to community aspirations, needs and participation, and endorses all activities aimed at preserving the area's rich natural environment, while fulfilling its role as a facilitator of meaningful and orderly socio-economic development and good governance.

2.6 Protected-area expansion

Steenbras Nature Reserve has the potential to expand. Three erf sections near Steenbras River Gorge are currently owned by the Department of Public Works. The land is surrounded by City of Cape Town land as is already incorporated into the biosphere agreement and included as a management block to aid the operational management of the reserve.

The details of potential erven for expansion are as follows:

- Erf 933-1
In extent: 3,371 ha
Land owner: Department of Public Works
- Erf 933-0-3
In extent: 0,853 ha
Land owner: Department of Public Works
- Erf 310-1
In extent: 50,036 ha
Land owner: Department of Public Works

The following guiding principles are relevant to the negotiation of contractual agreements:

- Reserve management shall seek to conclude mutually beneficial partnerships with the parties concerned.
- All actions taken in managing the reserve shall at all times adhere and be subject to the principles of accountability and transparency.
- Based on the principles of custodianship, the reserve and its environmental resources are held in trust. It is the duty of all involved with the reserve to respect, protect and promote the reserve and its resources in the public interest.
- In terms of the principle of holism, the reserve and its surrounds form an indivisible system.
- In accordance with the principle of common heritage, reserve management must safeguard the public interest by conserving the reserve's ecological, cultural and scenic resources.

Landowners could by voluntary agreement contract all or portions of their land into the reserve. In return, the reserve will provide various environmental management services on their land. Both parties stand to gain from the arrangement. Some of the incentives include:

- invasive-vegetation clearing;
- fire management;
- erosion control and maintenance of footpaths;
- rates rebates;
- access to Biodiversity Management Branch specialist services; and
- legal protection in terms of the National Environmental Management: Protected Areas Act.

It must be remembered that this expansion plan is predicated on the willingness of the landowner to 'hand over' his land to the City of Cape Town, depending on the type of contract entered into.

3. PURPOSE, VISION/MISSION, SIGNIFICANCE/VALUE

3.1 Purpose of the protected area

Steenbras Nature Reserve is located in the CFR – an area of global biodiversity significance. The reserve conserves a unique combination of habitats, ecosystems and species, many of which are either rare or endemic to the area.

The primary purposes of the reserve are the **conservation of its unique biodiversity and associated ecosystem features and functions**, and the **provision of quality water to the citizens of the City of Cape Town**.

3.2 Vision and mission

Integrated Development Plan vision

The vision of the City of Cape Town remains as follows:

- To be a prosperous city that creates an enabling environment for shared growth and economic development
- To achieve effective and equitable service delivery
- To serve the citizens of Cape Town as a well-governed and effectively run administration

To achieve this vision, the City recognises that it must:

- actively contribute to the development of its environmental, human and social capital;
- offer high-quality services to all who live in, do business in, or visit the city as tourists; and
- be known for its efficient, effective and caring government.

C.A.P.E vision

We, the people of South Africa, are proud to be the custodians of our unique Cape Floral Kingdom, and share its full ecological, social and economic benefits now and in the future.

Environmental Resource Management Department vision

To ensure that sustainable and equitable development is combined with sound environmental practice for a healthy local environment, which sustains people and nature, provides protection for our unique resources, and results in an enhanced quality of life for all.

Biodiversity Management Branch vision (accepted by Council in June 2009)

To be a City that leads by example in the protection and enhancement of biodiversity; a City within which biodiversity plays an important role, and where the right of present and future generations to healthy, complete and vibrant biodiversity is entrenched; a City that actively protects its biological wealth, and prioritises long-term responsibility over short-term gains.

Steenbras Nature Reserve vision

To actively promote the conservation of the ecological systems of Steenbras Nature Reserve through partnership, with an emphasis on biodiversity, endemism and water yield, while promoting sustainable recreational use of the area.

Biodiversity Management Branch mission

- To manage biodiversity proactively and effectively
- To ensure an integrated approach to biodiversity between City of Cape Town line functions and departments, and actively pursue external partnerships
- To adopt a long-term approach with regard to biodiversity
- To ensure the sustainability of our rich biodiversity
- To adopt a holistic and multifaceted approach to biodiversity
- To continue to measure and monitor the City of Cape Town's performance in the protection and enhancement of biodiversity
- To continue to measure and monitor the state of biodiversity in Cape Town

3.3 Significance of property (biodiversity, heritage and social)

Steenbras Nature Reserve accommodates five national vegetation types, two of which are critically endangered and three vulnerable. The reserve forms an integral part of the City's biodiversity network within the area. It also has an outstanding bird species list. All six fynbos endemic bird species occur within the reserve, as do more than 1 650 plant species as well as

over 30 mammal species. The reserve forms an integral part of the Kogelberg Biosphere Reserve, and is also part of the catchment area that supplies water to Cape Town.

PART 2

MANAGEMENT POLICY FRAMEWORK

3. ADMINISTRATIVE AND LEGAL FRAMEWORK FOR THE MANAGEMENT AUTHORITY

3.1. Legal Framework

The following is a list of Legislation applicable to the management of the CCT's Biodiversity Management branch, with particular reference to the Steenbras Nature Reserve. Repealed legislation has been included in greyed out text for information purposes only.

Table 1: Legislation applicable to the Steenbras Nature Reserve

Legislation: Acts, ordinances, bylaws	Relevance: Description	Amendment: Latest amendment date	Comment: Other notes
Constitution of the Republic of South Africa, Act 108 of 1996	Lists South African citizens' environmental rights	N/A	Chapter 2: Bill of Rights assigns citizens with particular rights
ENVIRONMENTAL LEGISLATION			
National legislation			
National Environmental Management Act (NEMA), Act 107 of 1998	One of the most important environmental laws relating to most aspects of the environment, including environmental impact assessments (EIAs), environmental information and legal standing, etc.	- Amendment Act 56 of 2002 - Amended by GN 26018, Vol 464 of 13 February 2004	Provides for cooperative environmental governance
National Environmental Management: Biodiversity Act, Act 10 of 2004	The objectives of the Act are to provide for: - the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; - the protection of species and ecosystems that warrant national protection; - the sustainable use of indigenous biological resources; - the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; and - the establishment and functions of a South African National Biodiversity Institute.	N/A	The development of the IRMP will assist in ensuring that the objectives of this Act are achieved in the reserve.

	In essence, the Act was put in place to safeguard the important biodiversity attributes in the country, while allowing people to benefit equally from the natural resources. In order to achieve these goals, the Act made provision for the South African National Biodiversity Institute (SANBI), which has been designated certain functions and afforded powers and duties in respect of this Act.		
National Environmental Management: Protected Areas Act, Act 57 of 2003	To provide for: - the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and natural landscapes and seascapes; - the establishment of a national register of all national, provincial and local protected areas; - the management of those areas in accordance with national norms and standards; - intergovernmental cooperation and public consultation on matters concerning protected areas; and - matters in connection therewith.	- Amendment Act 62 of 2008 - Amendment Act 15 of 2009	Regulations Notice 1029 of 2009 lists specific regulations for reserves proclaimed by the Member of the Executive Council (MEC) (draft August 2009).
Conservation of Agricultural Resources Act (CARA), Act 43 of 1983	The CARA regulations contain a list of alien invasive vegetation categorised according to their legal status. The Act regulates the sale, position and use of listed species.	Amended by GN R 2687 of 6 December 1985 and GN R 280 of 30 March 2001	Alien invasive plant legislation to be included under the Biodiversity Act in future
National Veld and Forest Fire Act, Act 101 of 1998	Relates to veld fire prevention, fire protection associations, fire danger indexing, enforcement of fire legislation, and the fighting of fires	N/A	A detailed fire management plan will be developed.
Marine Living Resources Act, Act 18 of 1998	Regulates conservation of the marine ecosystem and the long term sustainable utilisation of marine living resources		
Environment Conservation Act, Act 73 of 1989	The Environment Conservation Act is the other law that relates specifically to the environment. Although most of this Act has been replaced by NEMA, some important sections still remain in operation. These sections relate to:	- Environment Conservation Amendment Act 98 of 1991 - Environment Conservation Amendment Act 79 of 1992	

	- protected natural environments; - littering; - special nature reserves; - waste management; - limited-development areas; - regulations on noise, vibration and shock; and - EIAs.	- Environment Conservation Second Amendment Act 115 of 1992 - Environment Conservation Amendment Act 94 of 1993 - Environment Conservation Second Amendment Act 52 of 1994 - Proclamation R27 of 1995 - Proclamation R43 of 1996 - National Environment Management Act 107 of 1998	
National Water Act, Act 36 of 1998	Relates to all use of water and the management of all water resources in South Africa	•	
National Environmental Management: Air Quality Act, Act 39 of 2004	To provide for enhancing the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of the people		Promulgated to give effect to section 24(b) of the Constitution. The South African Air Quality Information System is a web-based system that provides information on the quality of ambient air across the country.
Animal Protection Act, Act 71 of 1962	To consolidate and amend the laws relating to the prevention of cruelty to animals	Animal Matters Amendment Act, Act 42 of 1993	
Animal Diseases Act, Act 35 of 1985	Provides for control measures relating to animal diseases		
Animal Health Act, Act 7 of 2002	Regulates animal health		
Game Theft Act, Act 105 of 1991	Regulates the ownership and protection of game		
Mountain Catchment Areas Act, Act 63 of 1970	Provides for catchment conservation		Administered under the Western Cape Nature Conservation Board Act, Act 15 of 1998
National Heritage Resources Act 25 of 1999	Provides for the protection of heritage resources		N/A
World Heritage Conservation Act 49 of 1999	Incorporates the World Heritage Convention into South African law		N/A

Problem Animal Control Ordinance, Ordinance 26 of 1957	Regulates problem animals		Administered under the Western Cape Nature Conservation Board Act, Act 15 of 1998
Mineral and Petroleum Resources Development Act, Act 28 of 2002	Provides for equitable access to, and sustainable development of, mineral and petroleum resources		
Atmospheric Pollution Prevention Act, Act 45 of 1965		Entire Act repealed on 1 April 2010 in favour of the National Environmental Management: Air Quality Act, Act 39 of 2004	
Provincial legislation			
Land Use Planning Ordinance, Ordinance 15 of 1985	The purpose of the Ordinance is to regulate land use and to provide for incidental matters related to land use.	- Assented to on 22 November 1985 - Western Cape Land Use Planning Ordinance, 1985, Amendment Act, 2004	Although it might not have a direct application in the management of nature reserves, it does affect the surrounding properties, and could possibly be used to control activities/developments around the reserves to minimise negative effects, for example in applying zoning restrictions.
Cape Nature and Environmental Conservation Ordinance, Ordinance 19 of 1974	The purpose of this Ordinance is to regulate wild animals and plants, and the establishment of nature reserves.	Publication date 1 September 1975	Administered under the Western Cape Nature Conservation Board Act, Act 15 of 1998
Western Cape Nature Conservation Board Act, Act 15 of 1998	The purpose of this Act is to promote and ensure nature conservation, render services and provide facilities for research and training and to generate income		Biodiversity agreements are signed under this Act.
Municipal legislation			
Integrated Metropolitan Environmental Policy (IMEP), 2001	Envisages a set of Citywide aligned strategies dealing with all aspects of the environment.		Influenced the Biodiversity Strategy, 2003
Biodiversity Strategy, 2003	To be a city that leads by example in the protection and enhancement of biodiversity	Draft amendment for 2009–2019	Influenced the development of the IRMP
City of Cape Town Bylaw relating to Stormwater Management, LA 31420	To provide for the regulation of stormwater management in the area of the City of Cape Town, and to regulate activities that may have a detrimental effect on the development, operation or maintenance of the stormwater system	Publication date 23 September 2005	Communication strategy and action plan will take effect to address the issues with the relevant departments

City of Cape Town Air Pollution Control Bylaw, LA 12649	The purpose of this bylaw is to give effect to the right contained in section 24 of the Constitution of the Republic of South Africa Act (Act 108 of 1996) by controlling air pollution within the area of the Council's jurisdiction; to ensure that air pollution is avoided, or, where it cannot be altogether avoided, is minimised and remedied.	Publication date 4 February 2003	
Bylaw relating to Community Fire Safety, Province of the Western Cape, LA 11257	The purpose and scope of the bylaw is to promote the achievement of a fire-safe environment for the benefit of all persons within the municipality's area of jurisdiction, and to provide for procedures, methods and practices to regulate fire safety within the municipal area.	Publication date 28 February 2002	A fire management plan to be designed
City of Cape Town Draft Animal Bylaw, 2009	The purpose of the Bylaw is to formulate a new single bylaw, including ten different municipal dog bylaws and the Animal Protection Act of 1962. The Bylaw includes chapters on dogs, cats, poultry and working equines.	Draft, 2009	
HUMAN RESOURCES/ADMINISTRATION LEGISLATION			
National legislation			
Occupational Health and Safety Act, 1993	To provide for the health and safety of persons at work, and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety, and to provide for matters connected therewith.	Occupational Health and Safety Amendment Act, No 181 of 1993	
Basic Conditions of Employment Act, Act 3 of 1997	Provides for control measures pertaining to employment	Amendment Act 11 of 2002	
Labour Relations Amendment Act, Act 66 of 1995	The Act aims to promote economic development, social justice, labour peace and democracy in the workplace.	- Labour Relations Amendment Act, 42 of 1996 - Afrikaans Labour Relations	

		Amendment Act, 1998 • Labour Relations Amendment Act, 127 of 1998 • Labour Relations Amendment Act, 2000 • Amendment Act 12 of 2002	
Local Government Municipal Systems Act, Act 32 of 2000	Establishes core principles, processes and mechanisms relating to local government		
Promotion of Equality/Prevention of Unfair Discrimination Act, Act 4 of 2000	Provides for the prevention of discrimination and other related matters		
Criminal Procedure Act, Act 51 of 1977	Makes provision for procedures and related matters in criminal proceedings	• Criminal Procedure Amendment Act, Act 65 of 2008	
Firearms Control Act, Act 60 of 2000	To establish a comprehensive and an effective system of firearms control and, to provide for matters connected therewith		
Civil Aviation Act, Act 13 of 2009			
Fencing Act, Act 31 of 1963	Regulates all matters relating to fencing		
Hazardous Substances Act, Act 15 of 1973	Controls substances that may cause injury or ill health to, or death of, human beings by reason of their toxic nature		
Land Survey Act, Act 8 of 1997	Regulates land surveying, beacons and other related matters		
Promotion of Access to Information Act, Act 2 of 2000	Promotes access to information		
Promotion of Administrative Justice Act, Act 3 of 2000	Provides for the promotion of administrative justice	• Amendment Act 53 of 2002	
Regional Services Council Act, Act 109 of 1985	Regulates and controls land, land use and other related matters		
Skills Development Act, Act 97 of 1998	Promotes the development of skills		
State Land Disposal Act, Act 48 of 1961	Regulates the disposal of state-owned land		
Subdivision of Agricultural Land Act, Act 70 of 1970	Regulates the subdivision of agricultural land		
Tourism Act, Act 72 of 1993	Provides for the promotion of tourism, and regulates the tourism industry		A tourism strategy is envisaged.

Public Resorts Ordinance, Ordinance 20 of 1971	Regulates nuisance and pollution control		
Municipal Ordinance, Ordinance 20 of 1974	Regulates pollution and waste management		
South African National Road Agency Limited and National Roads Act, Act 7 of 1998			
Aviation Act, Act 74 of 1962	Provides for the control, regulation and encouragement of aviation activities in the Republic of South Africa	Repealed in favour of the Civil Aviation Act, Act 13 of 2009	
Provincial legislation			
Western Cape Land Administration Act, Act 6 of 1998	Regulates land and land use		
Western Cape Planning and Development Act, Act 7 of 1999	Regulates planning and development within the province		
Municipal legislation			
City of Cape Town Bylaw relating to Filming, LA30441	The purpose of the Bylaw is to regulate and facilitate filming in Cape Town.	Provincial Gazette 6277, 24 June 2005	
City of Cape Town Bylaw relating to Streets, Public Places and the Prevention of Noise Nuisances, 2007	The purpose of the Bylaw is to regulate activities in streets and public places, and to prevent excessive noise nuisance	Promulgated 28 September 2007, PG 6469; LA 44559	
City of Cape Town Bylaw relating to signage			

4.2 Administrative framework

Steenbras Nature Reserve is managed by various departments under the authority of the City of Cape Town. The Biodiversity Management Branch, which forms part of the City of Cape Town's Environmental Resource Management Department, is responsible for the management of nature conservation and biodiversity-related issues. Within the Biodiversity Management Branch, Steenbras Nature Reserve is located within the eastern district, and falls under the oversight of the regional manager. Steenbras Nature Reserve is the management responsibility of the area manager. The Bulk Water Department is responsible for the management of water supply to Cape Town and surrounds. The Sport and Recreation Department oversees the management of the Kogel Bay resort. The recreational area comprises overnight camping facilities as well as day visitor facilities at Spark's Bay and Klippies Bay. The Kogel Bay resort falls within the boundary of Steenbras Nature Reserve.

The current staffing complement for biodiversity management is as follows:

Table 2: Current Staffing Complement

Designation	Number of staff	Workweek	Supervisor
Area manager	1	40 hours, Mondays–Fridays	Regional manager
Senior field ranger	3	40 hours, shifts	Area manager
Field ranger	4	40 hours, Mondays–Fridays	Senior field ranger
Experiential training student	Varies	40 hours, Mondays–Fridays	Area manager
Intern	Varies	40 hours, Mondays–Fridays	Area manager

4. PROTECTED-AREA POLICY FRAMEWORK & GUIDING MANAGEMENT PRINCIPLES

5.1 Management objectives

The management objectives for Steenbras Nature Reserve are as follows:

- To manage biodiversity proactively and effectively so as to ensure the conservation of diversity, the integrity of biotic communities, both faunal and floral, within natural ecosystems, and to safeguard genetic diversity of species
- To ensure an integrated approach to biodiversity management between the City of Cape Town's various line functions and departments, as well as cooperation with external stakeholders affiliated with the management of the greater Kogelberg Biosphere Reserve (CapeNature, Overstrand Municipality and the South African National Botanical Institute, or SANBI)
- To monitor the area's biodiversity as well as resource sustainability effectively in order to assist with sound management decisions concerning the area
- To conduct support and coordinate research on biological and social attributes and benefits of the protected area, as well as their potential threats
- To control invasive and alien species in accordance with the City's policies, strategies and eradication programmes
- To create awareness, environmental education and outdoor recreational opportunities

Table 3. Biodiversity and Heritage Objectives

<i>High-level objective</i>	<i>Objective</i>	<i>Sub-objective</i>	<i>Initiative</i>	<i>Low-level plan</i>
CONSERVATION OF REPRESENTATIVE, FUNCTIONAL ECOSYSTEMS To conserve a representative sample of the region's ecosystems in a linked landscape, and maintain or restore environmental processes to enable natural spatial and temporal variation in structural, functional and compositional components of biodiversity	Representative ecosystems To incorporate a spectrum of viable aquatic and terrestrial ecosystems characteristic of Steenbras Nature Reserve, and to re-introduce missing elements where possible	Consolidation and expansion of land areas Consolidation of protected areas, focusing on underrepresented ecosystems, functional linkages and processes	(1) Identify underrepresented habitats/ecosystems (2) Consolidate reserve boundaries (3) Incorporate untransformed fynbos (4) Establish corridors linking Steenbras Nature Reserve with mountain catchments and neighbouring conservation areas (5) Investigate conservation stewardship options with key landowners	Reserve expansion plan
		Re-introduction of biota Re-establishment, where possible, of locally extinct or depleted biodiversity components and populations in accordance with principles and guidelines of the International Union for Conservation of Nature (IUCN) and the City of Cape Town's draft policy on fauna management	(1) Re-establish indigenous herbivore complement within constraints of reserve size and urban setting	Faunal management plan
		Fire management Apply appropriate fire regime in fynbos areas (frequency, season, intensity, size)	(1) Implement a fire management plan in accordance with objectives of conserving biodiversity and threatened biota (2) Monitor impact of fire management regime	Fire management plan
		Threatened biota Maintain viable populations of threatened species in order to meet obligations in terms of international agreements and conventions	(1) Maintain viable populations of rare/threatened plant and animal species (identify, locate and monitor populations of priority species)	Incorporated into Biodiversity Management Branch monitoring plan
		Monitoring plan Implement and maintain an approved monitoring plan for the reserve	(1) Implement and maintain a biological monitoring programme for the reserve	Monitoring plan

	Rehabilitation Rehabilitate degraded areas, including the re-establishment of natural biodiversity patterns, and the restoration of key processes that support the long-term persistence of biodiversity	Vegetation Re-establishment of physical, chemical and biological processes in degraded vegetation areas	(1) Rehabilitate all old, degraded sites	Vegetation management and rehabilitation plan
		Alien plants and other alien biota Control and, where possible, eliminate alien biota to facilitate re-establishment of natural biodiversity patterns and processes in invaded areas	(1) Establish the distribution and density of invasive species (2) Prioritise areas and species for alien removal, focusing on biodiversity restoration (3) Implement removal programmes for priority species and areas	Invasive-plant management plan; invasive-biota management plan
MITIGATE INTERNAL and EXTERNAL PRESSURES To reduce threats and pressures, and limit environmental impacts resulting from non-biodiversity management aspects and operations on surrounding land and resource use	Reconciling biodiversity with other reserve objectives To ensure that non-biodiversity management aspects of reserve operations (revenue generation, including visitor, resource use, developments, management activities, etc.) are informed and constrained by biodiversity conservation objectives, and that the impacts of these activities on biodiversity are minimised	Internal developments Minimise the impacts associated with the development of visitor and reserve management infrastructure, and ensure that such developments do not compromise biodiversity objectives	(1) Reserve zonation (2) Develop and implement CDF. (3) Developments in accordance with EIA process (NEMA) and corporate policies. (4) Establish visitor carrying capacities. (5) Implement green standards and environmental best practice based on corporate policy	CDF
		Internal activities Minimise the impacts associated with visitor and reserve management activities, and ensure that such activities do not compromise biodiversity objectives		
		Extractive resource use Minimise the impacts of extractive resource use, and ensure that such activities are aligned with corporate guidelines, are within management capacity constraints, and do not compromise biodiversity objectives	(1) Quantify current extractive resource activities (2) Define opportunities and constraints in line with corporate guidelines	Feasibility study to be initiated

	Reconciling biodiversity with external threats To reduce external threats and pressures, and limit impacts of surrounding land and resource use on biodiversity conservation within the reserve	External developments Minimise the impacts associated with inappropriate developments outside the reserve	(1) Engage with regional land management authorities, including IDPs and SDFs at local and regional level (2) Align with bioregional planning, including explicitly identified areas for the maintenance of important biodiversity patterns and processes with appropriate land use guidelines (3) Provide input into planning and decision-making processes for external development that may compromise reserve and biodiversity network objectives (4) Negotiate to ensure that external developments are not visually obtrusive or out of character with the park	Biodiversity Management Branch communication strategy and action plan
		External activities Negotiate to ensure that external resource and land use do not detrimentally affect ecological processes within the reserve	(1) Negotiate to mitigate or improve the management of external, potentially detrimental impacts (2) Encourage eco-friendly resource use and land management practices on adjacent properties (3) Mitigate the impacts of oil and other pollution events through appropriate contingency planning	Hazardous material contingency plan
		Hydrological and water chemistry changes Participate in activities for the maintenance of river flow regimes and water chemistry within limits for the maintenance of ecosystem processes in aquatic ecosystems within the reserve	(1) Lobby for appropriate catchment categorisation (currently general authorisation) (2) Encourage enforcement of legislation applicable to the management and protection of aquatic resources (3) Facilitate regular assessments of river health (4) Address the issue of sewage and other point-source pollution of aquatic systems	Biodiversity Management Branch communication strategy and action plan
		Illegal harvesting of resources Prevent the illegal collection, removal and destruction of physical and biological resources	(1) Public liaison (2) Law enforcement	Reserve protection plan, safety and security programme

WILDNESS/ REMOTENESS To maintain and restore wildness/remoteness in Steenbras Nature Reserve so that the spiritual and experiential qualities of wildness are maintained, enhanced or, where necessary, restored	Range of experiences Provide a range of visitor experiences		(1) Reserve zoning (2) Develop Conservation Development Framework (CDF) and sensitivity-value analysis	(1) CDF (2) Reserve expansion plan (3) Invasive-plant management plan
	Sense of place Maintain or restore appropriate sense of place		(1) Implement and update CDF (2) Establish and apply appropriate visitor carrying capacity (3) Negotiate to ensure that external developments are not visually obtrusive or out of character with the reserve	
CULTURAL HERITAGE MANAGEMENT To investigate and manage all cultural assets	Conserve and manage cultural heritage assets	N/A	(1) Develop a database of all tangible and intangible cultural assets, including inventory, maps and relevant documentation (2) Develop site management plans for each cultural heritage site, with monitoring systems in place for management priorities and prescriptions (3) Facilitate appropriate interpretation of cultural heritage associated with the reserve	

Table 4. Socio-economic objectives

High-level objective	Objective	Sub-objective (where required)	Initiative	Low-level plan
Nurture productive and mutually beneficial partnerships that result in gains in economic and/or biodiversity equity	Enhance socio-economic benefits to local communities	N/A	(1) Contribute to local community development by supporting the Expanded Public Works Programme/poverty relief initiatives (2) Contribute to local skills development by supporting the skills and learnership programmes (3) Identify and facilitate the creation of business opportunities in association with the reserve (4) Support community-based social development initiatives	Biodiversity Management Branch development plan
	Increase environmental awareness, and encourage participation in conservation initiatives	Inspire visitors and communities to consider the environment as an interrelated and interdependent system, of which they are an integral part	(1) Develop and implement an interpretation plan that feeds into both the education and zoning plans (2) Implement environmental education and youth development programmes suited to the needs of each focus group (i.e. tailor-made programmes for each focus group)	Biodiversity Management Branch environmental education plan
		Educate learners, educators and other community focus groups to be able to take environmental action		
		Support educators and community leaders with resource and information material	(1) Establish and market an environmental resource centre and outdoor classrooms, with a range of interpretive and information resources	
Support cooperative governance that will build custodianship	Maintain good reserve/community/stakeholder relations	N/A	(1) Identify and involve all relevant stakeholders for participation in the reserve advisory forum (2) Develop effective communication mechanisms and responsibilities for representatives	Biodiversity Management Branch stakeholder plan

	Effective cooperative governance	Minimise degrading impact and consequences of inappropriate development in and around the reserve	(1) Establish and maintain good working relationship with relevant government departments as well as internal City of Cape Town departments	
		Ensure support/buy-in for management decisions through participatory decision-making processes	(1) Define roles and responsibilities with stakeholder groups, partnerships and government through written agreements/terms of reference (ToRs) and MoUs	
<i>Become the nature-based visitor destination of choice in the region</i>	To develop, manage and enhance a range of sustainable visitor products		(1) Design customer satisfaction survey (2) Analyse current product usage, and identify opportunities	Visitor plan
			(1) Plan for visitor infrastructure and facilities as identified by the CDF (2) Develop and implement the infrastructure management plan (in compliance with State of Infrastructure report) (3) Compile a State of Infrastructure report	Infrastructure programme
	Conserve and manage cultural heritage assets		(1) Develop a database of all tangible and intangible cultural assets, including inventory, maps and relevant documentation (2) Develop management plans for each cultural heritage site, with monitoring systems in place for management priorities and prescriptions (3) Facilitate appropriate interpretation of cultural heritage associated with the reserve	Cultural heritage management plan

Grow the domestic visitor profile to be representative of South African society	Grow the domestic visitor profile of the reserve to be representative of regional demographics	N/A	(1) Promote and manage access to the reserve (2) Develop and support dedicated access programmes, or incorporate a 'dedicated access' element into existing programmes (3) Actively market reserve resources and services	Biodiversity Management Branch marketing plan
Enhance the City of Cape Town's reputation	Enhance the reserve's reputation	N/A	(1) Develop and implement a communication plan to promote reserve activities	Biodiversity Management Branch communication programme
Advance strategic human resource management	To ensure good human resource management	N/A	(1) Implement and support learnership and volunteer programmes (2) Ensure all staff have access to training initiatives as per the Workplace Skills Plan (3) Ensure all corporate human resource policies are adhered to	City of Cape Town staff capacity-building programme/institutional development and staff capacity-building programme
Financial management	To ensure sound financial management practices are applied to and underpin the reserve	N/A	Manage cost spending appropriately	Biodiversity Management Branch business plan
Achieve good corporate governance management	Effective management of risk profile	N/A	Conduct legal review	Risk management programme

5.2 SWOT analysis

Although Steenbras Nature Reserve as a whole still has a substantially natural character, the biodiversity and ecological integrity and aesthetic beauty of the area are at risk. The following analysis identifies the reserve's strengths, weaknesses, opportunities and threats:

Strengths

- Local knowledge and expertise of areas under its jurisdiction
- Proclaimed as a mountain catchment area
- Staff buy-in, and positive attitude of neighbouring landowners
- Strong community involvement
- Good radio and telephonic communication systems in place
- Good information technology infrastructure and communications platform
- Management commitment to compiling and implementing management plans and biodiversity action plans
- Legislative support: Constitution, municipal bylaws, Nature Conservation Ordinance and National Environmental Management Act
- All staff and management have experience and knowledge in managing protected areas
- Existing corporate support services
- Defensible boundaries
- Access to specialist services and databases
- Well-resourced reserve in terms of staff, infrastructure and equipment
- Staff determination and will to succeed
- Existing, fully functional ecosystems
- Biological monitoring systems are implemented and monitored regularly

Weaknesses

- Insufficient appropriately trained staff to ensure that all biodiversity objectives are met, e.g. basic field ranger and law enforcement. Law enforcement tends to be reactive instead of proactive.
- Limited knowledge of security threats within reserve
- Few patrols during the day, and none after hours
- Lack of operationally mandated staff to utilise environmental legislation adequately
- Public's ignorance of applicable environmental legislation

Opportunities

- To create buy-in among key stakeholders and role players
- Community constituency building

- Increased community ownership
- Job creation and career succession and planning
- Accessing funds for Expanded Public Works/Sustainable Livelihoods programmes to assist in job creation, reserve infrastructure maintenance and development
- Proactively to engage communities bordering the reserve, recognising their needs
- Establishing Friends/volunteers support group
- To link up with surrounding landowners, and share knowledge and resources in order to manage the biodiversity network effectively
- Promote the reserve as a destination for outdoor eco-activities
- Tourism opportunities
- Extend world heritage boundaries to include reserve

Threats

- Uncontrolled and unplanned wildfires
- Spread of invasive and alien vegetation
- Settlement of invasive and alien fauna species
- Poaching of fauna and flora
- Further damming and abstraction of the mountain catchment area
- Irresponsible, ad hoc development in and out of the reserve
- Lack of continuous buffer around the reserve
- Insufficient resources
- Prioritisation of commercial activities in order to become more financially dependent may threaten core conservation objectives
- Climate change
- Increased crime in and around reserve
- Sand-mining threat of potential prospecting and mining applications
- Unauthorised access
- Law enforcement difficulties, large area, lack of capacity, threats and intimidation to staff when enforcing legislation
- Unemployment leads to rising crime levels
- Lack of coordination and cooperation between government departments
- Lack of collaborative mechanisms for natural resource management and decision making
- Lack of awareness
- Lack of capacity with relevant government departments
- Lack of commitment from stakeholders
- Lack of appropriate training

- Personal safety of staff
- Growing external communities with increasing needs
- Lack of sustained funding for students and interns
- Change in local government political structures

5.3 Protected-area management policy framework and guiding principles

5.3.1 Community participation

Steenbras Nature Reserve will strive to nurture productive and mutually beneficial partnerships that result in economic and/or biodiversity equity. This will be achieved through the creation of job opportunities in support of the Expanded Public Works Programme and poverty relief initiatives. The reserve will also participate in skills development and learnership programmes in order to contribute towards the development of local skills. Through the support of community-based social development initiatives, the reserve can also enhance socio-economic benefits to local communities.

Through the development of an education plan, Steenbras Nature Reserve will contribute to raising environmental awareness and encouraging participation in conservation initiatives.

The main aims of the reserve education plan will be as follows:

- Inspiring visitors and communities to consider the environment as an interrelated and interdependent system, of which they are an integral part
- The education of learners, educators and community focus groups to take environmental action, assisted by supporting such groups with resource and information materials
- The development and implementation of environmental education programmes suited to the needs of various focus groups
- The development and implementation of an interpretation plan that complements the education plan

In order to develop and maintain good reserve/community/stakeholder relations, all relevant stakeholders need to be identified. The development of an effective communication system in order to address interested and affected parties is required. Where necessary, task teams and working groups may be established in order to assist the reserve with key issues.

5.3.2 Safety and security

A safety and security audit (appendix 7) aimed at completing a rapid and verifiable analysis of the current security situation, security services, infrastructure, staffing and social context has been carried out in Steenbras Nature Reserve.

The reserve has no fences, apart from a small section of green diamond mesh with three strands of barbed wire near the entrance to the Steenbras River Gorge used to control access into the gorge. Management tracks into the reserve are closed off with a locked boom.

The main office depot also has no fences, with only the building windows and doors being protected by burglar bars. Some buildings are constructed of prefabricated material, and are not very sturdy. No formal security measures are currently in place. There are no private security services.

Reserve staff conduct ad hoc patrols. There are no dedicated law enforcement staff, so the reserve relies on assistance from municipal law enforcement authorities and the South African Police Service. The nearest police station is situated in the town of Gordon's Bay, approximately 15 km from the reserve.

Crime in the area predominantly consists of petty theft, which includes the removal of solar panels from infrastructure, and theft from parked vehicles. Considering the distance from settlements, it is thought that many of the crimes are planned. Trespassing and overnighting in the reserve are also common occurrences.

Biodiversity threats include illegal flower harvesting and the collection of medicinal ritual plants. Abalone poaching is known to take place along the coast.

5.3.3 Culture-historical, archaeological and paleontological management

The effective management and conservation of culture-historical, archaeological and paleontological heritage within Steenbras Nature Reserve are essential. The preservation of the area's historical character and characteristics for future generations will be achieved through the identification and mapping of sites, as well as the evaluation and establishment of management guidelines. With regard to sites of cultural and historical significance, the reserve will cooperate with the City's relevant departments and the South African Heritage Resources Agency (SAHRA).

The implementation of a culture-historical management plan includes:

- the development of a cultural assets database, which includes maps, inventory and relevant documentation;
- the development of site management plans for each cultural heritage site; and
- the interpretation of cultural heritage sites within the reserve.

5.3.4 Tourism development and management

Steenbras Nature Reserve is well appreciated for its aesthetic landscape, which is enjoyed by many visitors and the general public when using the provincial coastal road, the R44 Clarence Drive. This scenic route forms part of the popular whale route, which continues on to Hermanus. The Clarence Drive route also provides access to angling points along the coast line. The fishing opportunities are enjoyed by locals and tourists alike.

The Kogel Bay resort is surrounded by the nature reserve, and is managed by the City of Cape Town's Sport and Recreation Department. The resort facilities make provision for overnight and day visitors. Infrastructure is basic and, apart from the beach landscape, there are currently very few activities for visitors.

The Steenbras River Gorge is a popular hiking trail, which guides visitors to a series of crystal mountain pools. The area is enjoyed by hikers and adventure seekers, participating in activities such as swimming, abseiling and kloof jumping. The area is controlled by a permit system. However, control of access to the area is currently constrained due to a variety of management issues. Visitor safety to the area is a primary concern, as numerous accidents have occurred in the gorge as a result of visitors entering the area ill-prepared for the hiking conditions, or attempting extreme activities without guidance.

As the area lacks hiking trails, a network of trails need to be configured. It is necessary to consider the surrounding trail networks, and align the placement and construction of new hiking trails with these neighbouring areas. The zoning of the reserve and the prescribed requirements set out in the biosphere reserve requirements will need to be considered when determining future plans for the reserve.

Near the Steenbras dam, there is an unused overnight facility consisting of a number of chalets and accompanying infrastructure. The facility has been closed to the public for a number of years. The City of Cape Town has come under pressure to re-open the facility and

allow the public access to the area. A variety of potential visitor use options do exist. However, the impacts of these on the management of the water bodies as well as the impact on the biodiversity and ecosystem functioning of the area will need to be considered. Much of the infrastructure requires upgrades. The maintenance and management of such a facility and associated infrastructure as well as the management of visitors and activities to the area would have to be well considered prior to any implementation.

5.3.5 Infrastructure management

Steenbras Nature Reserve has a large amount of infrastructure, for which various departments within the City of Cape Town share responsibility. A full audit of all infrastructure in the reserve, its current usage and structural integrity is required. All infrastructure needs to be mapped.

Infrastructure that is or could be used should be included in a five-year maintenance plan. Infrastructure with no use should be demolished and the sites rehabilitated.

The culture-historical significance of some infrastructure will need to be considered. This process would be completed with guidance from the relevant departments and SAHRA.

5.3.6 Biodiversity conservation management

5.3.6.1 Community-based natural resource management

The harvesting of natural resources within Steenbras Nature Reserve is not permitted. Research on the amount of illegal harvesting and the species harvested across the city is currently under way. Some investigations as to the types and extent of illegal harvesting in the reserve have been launched, but, to date, there is no detailed or conclusive information to determine where these practices are sustainable, and/or what potential threats are foreseen should they persist.

5.3.6.2 Fire management

Fire plays an essential ecological role in the life cycle of fynbos species. Fire is crucial to the long-term conservation of species within Steenbras Nature Reserve, and is therefore considered an important component of reserve management. Fire management involves varying the season, frequency and intensity of fires, and reconciling ecological and practical requirements. Too frequent fires, or fires that burn out of phase with the natural burning regime, present a threat to slower-growing species, which may be entirely eliminated. If fire is excluded from the area, forest species could invade, resulting in fynbos species losses. Conversely, if vegetation is allowed to burn too frequently, the area becomes degraded, and

alien species, especially grasses, invade. Grasses maintain a shorter fire cycle, and permanently change the vegetation structure and biodiversity value.

The fire management programme for Steenbras Nature Reserve involves the monitoring of large wildfires as well as smaller fires, whether natural or unnatural. Historic records of fire events in the reserve area as well as post-fire monitoring records assist in the documentation of veld ages, which in turn influence fire management. Minimal interference takes place in the case of naturally ignited fires. In the case of human-induced fires that would simulate a natural fire, the same management responses would apply. Natural fires are limited in spread within the constraints of ecological, project and public safety requirements. All possible actions are taken to prevent the spread of fire onto the adjacent properties. All unnatural fires that threaten the reserve ecologically, or pose a threat to infrastructure and/or public safety, are controlled.

Prescribed burning of vegetation is a management option in areas where vegetation becomes senescent (old), and where there is a risk of species loss. The use of prescribed burning practices would assist in maintaining a vegetation mosaic that promotes plant and animal diversity. Accurate fire records and post-fire monitoring data will require the initiation of prescribed burns in the core area of the reserve. The decision to administer prescribed burns is considered on an annual basis, and, if required, planned and implemented accordingly.

Fire may be used to keep fuel loads low so as to reduce the risk of uncontrolled fires, particularly on the urban edge and in areas that become a potential risk to infrastructure and public safety.

Firebreaks and other fire control measures required by law will be implemented where necessary and feasible.

The nature of the area's terrain, property boundaries and extensive areas of natural veld increase the chances of fire spreading both into and out of the reserve. Reasonable pre-fire protection measures are necessary, as well as a plan of action in the event of wildfire. Interaction with various City of Cape Town departments and independent stakeholders as well as continuous public/private landowner involvement are essential. The development of fire protection and response plans is an important component of the reserve's fire management approach.

Fire management implementation in Steenbras Nature Reserve involves:

- the application of guidelines on seasonal burning intervals and species requirements acquired from relevant documentation and biophysical specialists;
- accurate record keeping of all fires, including details and maps;
- the use of fire data and the geographic information system (GIS) for recording and mapping;
- the application of post-fire monitoring programmes;
- the application of fire data to determine prescribed burning needs; and
- the development and implementation of a fire protection and response plan that includes affected stakeholders, such as additional City of Cape Town departments and private landowners neighbouring the nature reserve.

5.3.6.3 Catchment management

Steenbras Nature Reserve is recognised as a critically important catchment area, and is managed to ensure the optimal sustained flow of high-quality water. The reserve encompasses the Steenbras dam and catchment system, which supplies water for domestic supply to the citizens of Cape Town. Water is a scarce resource, and its wise use is of paramount importance. The City of Cape Town's Bulk Water Department is responsible for the management of domestic water supply.

Future management of these systems should focus on mitigating further impacts and, where necessary and practical, restoring the functional integrity of the various systems. Water resources should be managed and monitored to ensure that utilisation is sustainable and does not affect the ecological requirements of the reserve.

5.3.6.4 Soil erosion and control

Within Steenbras Nature Reserve, natural erosion processes are allowed to take their course without interference, except where necessary. In the case of human-induced and natural areas that are aggravated, appropriate management action will be taken. Potential human impacts should be avoided through correct planning and maintenance of infrastructure.

Areas that had previously been degraded by human activities and are no longer in use will be restored as close as possible to their natural state. Disturbed areas and areas affected by unnatural accelerated erosion will be controlled by means of appropriate methods. The cause and management of problem erosion sites will also be considered.

Implementation with regard to soil management in Steenbras Nature Reserve includes:

- the identification and recording of all soil erosion sighted, including the assessment and development of restoration plans where required;
- the use of soil erosion data and GIS for recording and mapping;
- the application of fixed-point monitoring programmes at identified soil erosion sites; and
- accurate documentation of management actions applied to restoration sites, including results from areas responding to these actions.

5.3.6.5 Invasive-species management

The management of invasive and alien species is a priority within the Steenbras Nature Reserve. It is necessary that alien and invasive biota are controlled and, where possible, eliminated in order to facilitate the re-establishment of natural biodiversity and processes in invaded areas.

Invasive and alien-species management within the reserve is applied in accordance with the City of Cape Town's invasive alien species strategy and in coordination with various government-funded initiatives, including Work for Water and Work for Wetlands. Invasive plant species could spread rapidly should management fail to continue implementing a properly planned and coordinated programme.

Until recently, invasive-species management focused on woody alien plant species, such as *Acacia saligna* (Port Jackson), *Hakea spp* (hakea) and *Acacia Cyclops* (rooikrans). Herbaceous weeds were largely ignored. Recent monitoring and the development of an extensive herbaceous weed and grass species for the reserve have however shown that some herbaceous species already pose a risk to biodiversity in the area, while others have the potential to become a risk.

Within Steenbras Nature Reserve, a number of indigenous species that are not endemic to the area have been identified. The occurrence of such species is generally the result of planting in old recreational areas in an attempt to beautify the environment. Horticultural strains of indigenous species also present a risk to naturally occurring specimens. Some species are known to hybridise with endemic species in the area, and pose a potential threat to the genetic diversity of such populations.

In order to protect indigenous vegetation from invasive species, the following is required:

- Prioritisation of areas for alien removal, focusing on biodiversity restoration
- The implementation of removal programmes for priority species and areas
- The development and implementation of an invasive and alien flora management plan as well as a management plan for alien fauna

Invasive and alien faunal species are also eradicated in the reserve. Formal plans outlining the monitoring of the removal of identified species are however required.

Currently, one alien invertebrate species is known to occur within the reserve, namely *Linepithema humile* (Argentine ant). Although research is ongoing, populations have been confirmed at the following sites:

- Kogelberg depot
- Kogelbay camp site
- Spark's Bay camp site
- Steenbras River Gorge
- Boskloof parking area

A small population of *Numida meleagris* (Helmeted guineafowl) are known to frequent the Kogelberg depot area. *Mus musculus* (House mouse) have been identified at the Kogelberg depot; however, the extent of their range is yet to be confirmed. Domestic dogs and cats are identified on occasion, and removed with immediate effect. *Corvus splendens* (Indian House crows) and *Anas platyrhynchos* (Mallard ducks) have not been recorded in the reserve, but are known to occur within the Gordon's Bay and Somerset West areas.

5.3.6.6 Species introduction

There is no re-introduction plan for species historically indigenous to the Kogelberg, and for which suitable habitat and eco-niches are available. Several fauna species that had previously occurred in the Kogelberg are down to very small numbers or are no longer present. Animals recorded as historically inhabiting the area include *Proteles cristatus* (Aardwolf), *Taurotragus oryx* (Eland), *Syncerus caffer* (Buffalo) and *Damaliscus pygargus pygargus* (Bontebok). *Pelea capreolus* (Grey Rhebuck) are also known to have inhabited the area, although recent records of their occurrence show that they either no longer exist or their numbers are extremely low.

Prior to the re-introduction of any species, a full proposal is required. Investigation into the availability of suitable habitat for the species with reference to the public utilisation of areas is required, as is a full investigation into the historical occurrence and status of the species. The

effect of re-introducing species to the area must also be researched. Re-introduction of potentially dangerous or problematic species may also require a public participation process. An investigation of suitable sources is also needed.

All proposed re-introductions need to be recommended and approved before implementation by both the Fauna Management Committee and provincial authorities. The implementation of any re-introduction programmes must be specified in a plan of action, and must be documented accurately.

5.3.6.7 Strategic research

Research subjects beneficial to the management of Steenbras Nature Reserve need to be identified. These subjects could then be prioritised and pursued.

Currently, research is being undertaken, supported by reserve management. However, many of the projects are conducted by outside student researchers and organisations, and are not informed by the reserve's needs.

An effort needs to be made to obtain copies of data resulting from research projects conducted within the reserve's boundaries.

5.4 Sensitivity analysis of Steenbras Nature Reserve

Steenbras Nature Reserve is a considerable asset to the City of Cape Town, and significantly contributes to national targets of threatened vegetation types as listed in the National Spatial Biodiversity Assessment (Driver *et al.* 2005) as well as provides a habitat for an abundance of fauna species.

The development of the sensitivity and zoning plan is one of the steps towards compiling a CDF for the reserve. CDFs are tools to reconcile the various land use needs, and to delineate visitor user zones and the positioning and nature of new infrastructure, access points, roads and facilities. The CDF process has grown in response to the requirements of the National Environmental Management: Biodiversity Act of 2004, and seeks to comply with the spatial planning requirements of the Act. The CDFs will ensure that best practice and sustainable development principles are integrated with spatial planning in protected areas.

The sensitivity-value analysis is the landscape analysis portion of the broader CDF. It is a multi-criteria decision-support tool for spatial planning, designed to present the best available information in a format that enables defensible and transparent decision making. The

sensitivity-value process is based on the principle that the acceptability of a development (or placement of a structure) at a site is based on that site's value (arising from the site's biodiversity, heritage, aesthetic or other values) and its sensitivity or vulnerability to a variety of disturbances (Holness, 2005).

The sensitivity-value analysis, the CDF and the associated zoning plan should form part of an adaptive management system. They will grow and change over time as the understanding of the landscapes and ecosystems improves. They, however, do not replace the need for detailed site and precinct planning and environmental impact assessment (EIA) compliance at site level.

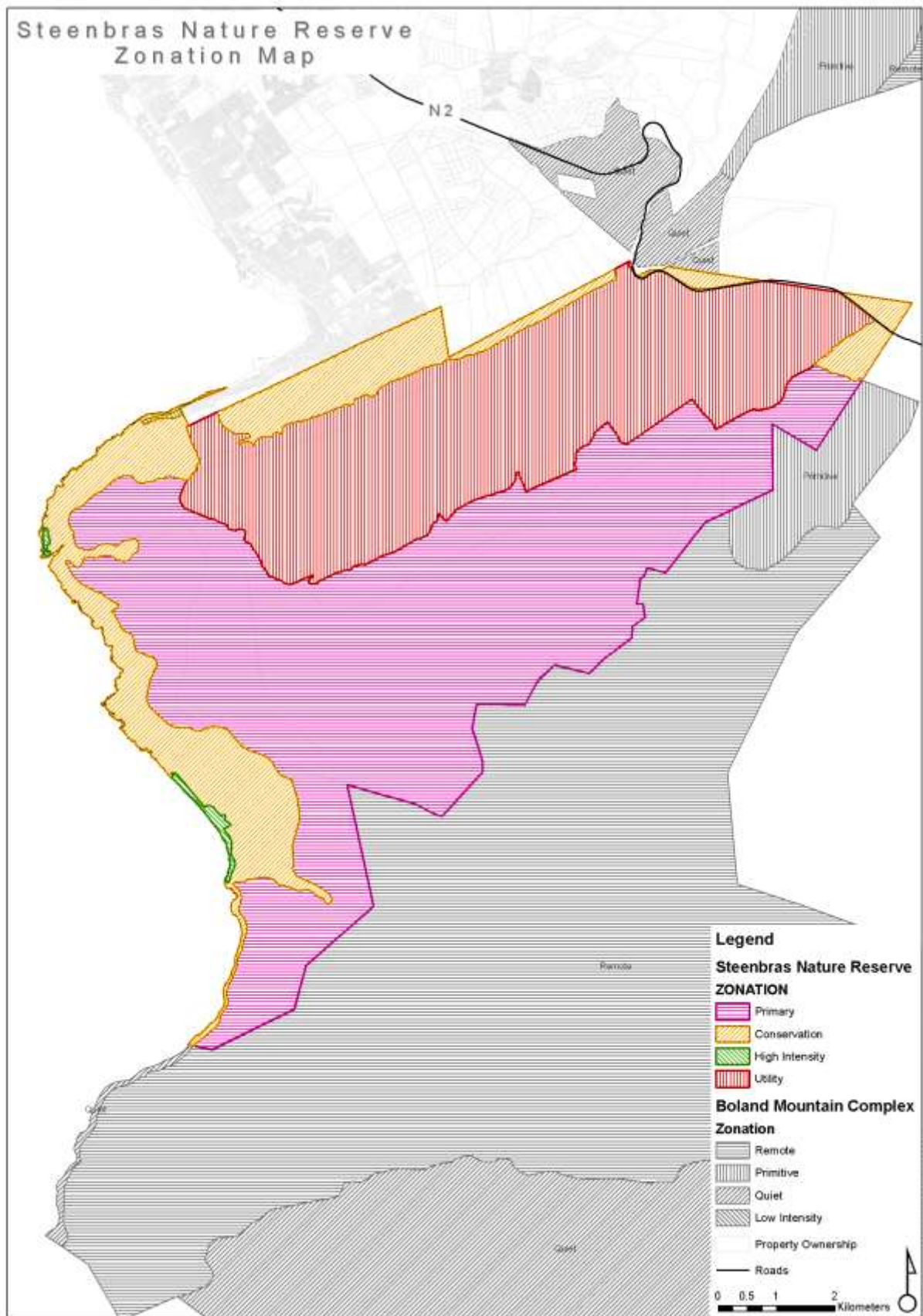
Steenbras Nature Reserve is included in a sensitivity-value analysis and zoning process report for the Boland reserve complex. The document includes all areas that make up the greater Kogelberg Biosphere Reserve (see appendix 8 for the full report).

5.5. Zoning plan of Steenbras Nature Reserve

Zoning in Steenbras Nature Reserve (map 7) is in line with zoning in the greater Kogelberg Biosphere Reserve. The primary zoning is based on ecological sensitivity. Sustainable utilisation and peripheral development within a biosphere have also been used as zoning guidelines.

Ecological constraints determine the acceptable location and impact of utilisation, while landscape and/or physical features determine the type of activity to achieve a particular recreational experience. The preservation of natural biotic features in all zones is a major consideration.

Land use zoning that includes desired states and experiential qualities for the City of Cape Town nature reserves and protected areas is outlined in appendix 9.



Map 7: Steenbras Nature Reserve zoning

6. Development plan

A comprehensive development plan for Steenbras Nature Reserve is required. This document would include detailed precinct plans for high-intensity use zones. It will indicate suitable development nodes, and would be guided by the infrastructure and zoning management plans.

7. Costing plan

A costing for broad-category management interventions for Steenbras Nature Reserve is included in the following table:

Table 5: Costing Plan for Management Actions: Steenbras Nature Reserve

Management action	Funding source	Approximate costs 2011–2012	Approximate costs 2012–2013	Approximate costs 2013–2014	Approximate costs 2014–2015	Approximate costs 2015–2016
1. Invasive alien plant programme Clearing of important alien species 1 & 2	Grant funding	R312 136	R49 100	R13 416	R621 036	R697 796
2. Fire management - Maintenance of fire belts - Planned ecological burn	Operating	R35 000 -	R36 750 R20 000	R38 587 -	R40 516 -	R42 542 -
3. Road and trail maintenance - Road repairs - Footpath maintenance - Parking area maintenance	Grant funding Operating Operating Operating	R20 000 R4 750 R5 000 -	- R5 000 R5 250 R10 000	- R5 250 R5 512 -	- R5 512 R5 788 R15 000	- R5 788 R6 077 -
4. Fencing - Repairs and maintenance - New fence reserve development	Operating Capital expenditure	- R100 000	R5 000 -	- -	R5 500 -	- -
5. Infrastructure development	Capital reserve fund	-	-	-	-	-
6. Human resources Direct human resource costs	Operating	R1 500 000	R1 620 000	R1 749 600	R1 889 568	R2 652 953
7. General expenses General operating costs	Operating	R200 000	R210 000	R220 500	R231 525	R243 101
8. Special projects - Environmental education - Signage and interpretation	Operating Capital expenditure	R30 000 -	R31 500 R50 000	R33 075 -	R34 728 -	R36 465 -
Note: Human resource costs are escalated at 8% per annum. Operating expenditure is escalated at 5% per annum.						

PART 3

MONITORING & AUDITING

8. MONITORING AND AUDITING

8.1 Annual audit procedure

Steenbras Nature Reserve is subject to a detailed auditing process. The process is based on a number of predetermined annual activities. These include the protected-area review as well as the annual reserve visit. Every three years, the audit process also includes the METTS-SA. The focus of the audit is to assist management in achieving management objectives and improving management effectiveness in the protected area.

8.1.1 METT-SA – Management Effectiveness Tracking Tool South Africa

The METT-SA is a rapid, site-level assessment tool adapted from the World Bank and Worldwide Fund for Nature (WWF) system (second edition, 2007). The system is based on the idea that good protected-area management follows a process comprising six distinct stages or elements:

It begins with understanding the **context** of existing values and threats (where are we now?), then progress through **planning** (where do we want to be?), followed by allocation of resources (**inputs**) (what do we need?). As a result of management actions (**processes**) (how do we go about it?), it eventually produces products and services (**outputs**) (what were the results?), which result in impacts or **outcomes** (what did we achieve?).

This version has been compiled so that it can be applied to the full range of protected areas managed by all C.A.P.E partners. It also applies to protected areas in other regions, and, with minor adaptations, could be applied outside of South Africa as well. It may also be used for marine protected areas (MPAs) and islands, but, in the long run, it may become necessary to amend the system to be more specific to these areas. In addition, a system for off-reserve conservation areas, such as conservancies or stewardships, may need to be developed.

When applying METT-SA, it is important for the following to be kept in mind:

- The METT-SA is intended to report on the reserve's progress. Thus, the score is the baseline against which future assessments are made to see if there has been an improvement.
- It is site-specific and must therefore not be used to compare scores between different protected areas.

- It is a useful tool to give indications of management trends. In this version, the six elements of the management process, as defined in the original version, are scored as subsets of the total. This gives an indication of where management should strive for improvement.
- It is not intended to replace more detailed assessments as part of adaptive management systems.
- The METT-SA has limitations in the quantitative measurement of outcomes, and these should be measured by more objective and quantitative systems.
- This version adjusts the total score where questions are irrelevant.
- Often, low scores on some questions could be a reflection on the organisation as a whole, and do not necessarily point to issues over which the protected-area manager has control. **The performance of managers should therefore under no circumstances be measured against the METT-SA results.**

Tracking the trends of management effectiveness is a long-term process, and instant improvements are unlikely. Generally, the METT-SA is applied at three-year intervals, but an annual application is acceptable if it is understood that changes may only be slight. The METT-SA for Steenbras Nature Reserve was undertaken in 2007, and the results are presented in appendix 10. The METT-SA will be repeated in approximately September 2011.

8.1.2 Protected-area review (PAR)

The PAR is an internal review conducted annually to assist managers in reviewing their sites, and to allow for adaptive management actions where required (and within managers' control).

8.2 Management plan review

This IRMP should be reviewed every five years, and adjusted where necessary. To achieve this, the following questions among others should be addressed:

- Did this management plan make a meaningful contribution to the management of Helderberg Nature Reserve?
- Were individual management 'prescripts' realistic and achievable? Were they written unambiguously, or was there room for misunderstanding?
- Were budgets for each management activity realistic? Were the allocated budgets too much or too little?
- Were enough, adequately qualified staff members allocated to each management

activity?

There will be some overlap between the review and the audit, and they should therefore be done on the same day, by the same team.

8.3 Biodiversity monitoring

A number of monitoring programmes have been identified as needed to assist with the effective management of the Kogelberg Biosphere Reserve. Some programmes have been well implemented and included in the management of the reserve. Others require formalising and further implementation.

The following table outlines the reserve's monitoring requirements.

Table 6. Reserve Monitoring Requirements for Steenbras Nature Reserve

Action	Responsible party	Means of verification	Frequency
<u>Vegetation monitoring</u> Invasive alien species vegetation Aspects to be monitored include the effectiveness of the operation, the effectiveness of the follow-up, methods used, compliance with the alien clearing schedule, and environmental damage such as herbicide spillage. Fire mapping All veld fires must be accurately mapped and recorded to build up a useful record that will assist with veld interpretation. These records will take the guesswork out of the effects of fire when it occurs on the property. A simple map indicating the extent of the burn and the date of the fire is the minimum requirement. Post-fire recruitment Abundance, density and structure Threatened species	Reserve staff Reserve manager, students and interns Reserve staff Reserve manager, students and interns Reserve staff Reserve manager, students and interns Reserve staff Reserve manager, students and interns Reserve staff Reserve manager, students and interns	Weekly inspections Final inspections Field verification sheets Veld age map, fire map Stratified sampling plots Fixed-point photography Presence, abundance, density Field observation sheet	Weekly Once off – completion of contract Annually – to determine management unit clearing plan Post-fire Post-fire Six months 12 months Annually for three years Annually Seasonally
Action	Responsible party	Means of verification	Frequency
<u>Faunal monitoring</u> Nocturnal species counts Bird diversity	Reserve staff Reserve manager, students and interns Reserve staff Reserve manager, students and interns Aviation Demography Unit	Modified vehicle line transect Field observations	Monthly

Bird distribution	Reserve staff Reserve manager, students, interns and field staff	Bird ringing	Weekly
Small mammals	Reserve staff Reserve manager, students, interns and field staff	Stratified random Sherman trap array	Annually
Leopard distribution		Camera trapping	Seasonally
<u>Water monitoring</u>			Monthly
Rainfall	Reserve staff Reserve manager, students, interns	Field collection equipment	Daily

PART 4

REFERENCES

9. REFERENCES

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PART 5

10. APPENDICES

A. Charts and Tables

Appendix 1: Gazette for reserve proclamation

6 No. 6732		GOVERNMENT GAZETTE, 16 NOVEMBER 1979					
Service		Disaste	Estimate Beginning 1979/80	Month of October Maand Oktober		Total 1 April to 31 October Totaal 1 April tot 31 Oktober	
				1979	1979	1979	1979
South-West Africa Account		Salidat-tilikarekening	R	R	R	R	
1. Administrator-General	Administrateur-generaal	11 303 700	500 000	117 800	2 193 810	824 000	
2. Transport	Vervoer	5 836 000	342 245	40 000	1 102 570	390 000	
3. Manpower Utilization	Menskragbenutting	144 000	13 714	9 000	75 428	69 000	
4. Mines	Myne	670 000	67 857	130 000	461 714	368 000	
5. Co-operation and Development	Samenwerking en Ontwikkeling	73 808 000	11 000 000	4 000 000	39 030 000	29 044 000	
6. Statutory Amounts	Statistiese Bedrag	14 642 000	555 290	764 480	14 071 390	15 169 000	
7. Social Welfare and Pensions	Voorsiening op Pensioene	3 686 200	472 700	414 000	5 122 700	2 694 000	
8. National Education	Nasionale Opleiding	7 484 000	795 333	240 000	1 309 333	1 595 000	
9. Agricultural Credit and Land Tenure	Landboukrediet en Grondbesit	4 437 000	849 571	300 000	2 389 142	1 400 000	
10. Agricultural Economics and Marketing	Landbou-ekonomie en -vermarking	5 700 000	602 837	2 500 000	4 583 714	4 400 000	
11. Health	Landbou-geestesie Dienste	8 700 000	600 000	400 000	3 700 000	3 700 000	
12. Environmental Planning and Energy	Gesondheidsbeplanning en energie	2 242 000	275 300	130 000	1 055 300	850 000	
13. Directorate Finance	Finansiële Direksie	177 000	17 000	17 000	101 000	95 000	
14. Inland Revenue	Binnelandse Inkomste	3 782 000	185 175	139 711	555 775	598 815	
15. Customs and Excise	Douane en Verbruikersake	900 000	73 150	45 300	323 730	314 300	
16. Commerce and Consumer Affairs	Handel en Verbruikersake	64 000	6 205	4 000	34 160	29 000	
17. Industries	Industrie	155 000	2 714	16 600	147 428	116 200	
18. Justice	Justisie	2 224 100	120 000	2 000	73 284	73 000	
19. Statutory Amount	Statistiese Bedrag	103 428	—	7 000	48 000	58 000	
20. Pensions	Gevangenis	1 495 000	130 000	100 000	863 000	710 000	
21. Community Development	Gemeenskaplike Ontwikkeling	1 487 000	141 000	150 000	582 000	1 030 000	
22. Public Service Commission	Binnelandse Sakke	177 000	22 428	4 000	106 150	30 000	
23. Public Works	Openbare Werke	300 000	—	—	150 000	234 130	
24. Water Affairs	Waterwerke	4 175 000	719 283	300 000	4 778 370	4 671 000	
25. Forestry	Woudbou	42 212 000	3 747 428	2 300 000	23 684 876	18 700 000	
26. Coloured, Rehoboth and Nama Relations	Kleurings, Rehoboth- en Nama- streekings	33 000	2 142	2 500	14 384	15 250	
27. Education and Training	Onderwys en Opleiding	37 210 000	3 140 000	2 300 000	19 704 000	11 819 000	
28. S.W.A. Namibia Information Res.	S.W.A./Namibia Inligtingsres.	6 181 000	236 833	340 000	3 490 833	2 398 000	
		760 000	50 000	75 000	330 000	98 000	
		R	369 302 028	35 614 070	29 339 079	207 128 173	169 521 619
S.W.A. Territorial Revenue Fund C/s (T&A)	S.W.A. Gebiedsrekeningsfondse (Opleiding)	3 400 000	—	—	1 239 673	1 001 634	
South-West Finance Corporation Ltd.	South-West Finance Corporation Ltd.	10 000 000	—	—	—	—	
		R	22 400 000	—	—	1 239 673	1 001 634
		R	391 713 028	35 614 070	29 339 079	208 368 346	170 523 253
Other Items	Andere Uitbetalings	—	—	—	1 181 634	—	
Excess, S.W.A. Votes, 1978/79	Uitbetalings, S.W.A. Begrotingsposisie, 1978/79	—	35 614 070	—	209 548 980	—	
		R	—	1 649 640 800	—	11 232 437 257	—
Exchequer Balance, 31 October 1979:	Rekeningbalans, 31 Oktober 1979:	—	359 336 183	—	359 336 183	—	
Cash	Kontant	—	—	—	—	—	
Totals	Totale	—	3 208 977 041	—	11 791 773 442	—	

(a) Section 1 of Act 38 of 1977.
(b) Section 2 (1) (a) of Act 34 of 1971.
(c) Section 2 of Act 18 of 1956.
(d) Section 7 of Act 53 of 1957.
(e) Section 19(1) (i) of Act 63 of 1962.
(f) Section 23 (4) (a) of Act 23 of 1969.
(g) Section 23 (2) (a) of Act 25 of 1969.
(h) Section 5 of Ordinance 21 of 1953.

(a) Artikel 1 van Wet 38 van 1977.
(b) Artikel 2 (1) (a) van Wet 34 van 1971.
(c) Artikel 2 van Wet 18 van 1956.
(d) Artikel 7 van Wet 53 van 1957.
(e) Artikel 19(1) (i) van Wet 63 van 1962.
(f) Artikel 23 (4) (a) van Wet 23 van 1969.
(g) Artikel 23 (2) (a) van Wet 25 van 1969.
(h) Artikel 5 van Ordonnansie 21 van 1953.

No. 2581

16 November 1979

Notice is hereby given that the transfer books of the undermentioned internal registered stocks will be closed from 1 December 1979 to 1 January 1980, both days inclusive, and that the interest due on 1 January 1980, will be paid to the stockholders registered at the date of closing of the transfer books:

- 4½ Per Cent Cape of Good Hope Stock.
- Internal Registered Stock, 6½ Per Cent, 1982.
- Internal Registered Stock, 9½ Per Cent, 2004.
- Internal Registered Stock, 9½ Per Cent, 2004.

DEPARTMENT OF FORESTRY

No. 2569

16 November 1979

DECLARATION OF A MOUNTAIN CATCHMENT AREA IN THE WESTERN CAPE

Under and by virtue of the powers vested in me by section 2 of the Mountain Catchment Areas Act, 1970 (Act 63 of 1970), as amended, I hereby declare that from the date of publication hereof, the area situated in the Divisions of Stellenbosch and Caledon, Province of the Cape of Good Hope, shall be a mountain

No. 2581

16 November 1979

Hiermee word bekendgemaak dat die oordragboeke van die ondergenoemde binnelandse geregistreerde effekte van 1 Desember 1979 tot en met 1 Januarie 1980 gesluit sal wees en dat die rente betaalbaar op 1 Januarie 1980 aan die effektebesitters wat op die datum van sluiting van die oordragboeke geregistreer is, betaal sal word:

- 4½ Persent Cape of Good Hope Effekte.
- Binnelandse Geregistreerde Effekte, 6½ Persent, 1982.
- Binnelandse Geregistreerde Effekte, 9½ Persent, 2004.
- Binnelandse Geregistreerde Effekte, 9½ Persent, 2004.

DEPARTEMENT VAN BOSBOU

No. 2569

16 November 1979

VERKLARING VAN 'N BERGOPVANGGEBIED IN DIE WES-KAAP

Kragtens die bevoegdheid my verleen by artikel 2 van die Wet op Bergopvanggebiede, 1970 (Wet 63 van 1970), soos gewysig, verklaar ek hierby die gebied in die afdelings Stellenbosch en Caledon, provinsie die Kaap die Goeie Hoop, met ingang van die datum

catchment area. The boundaries of the area are shown on the appended sketch map and the unsurveyed beacons are described in the annexure hereto.

A. J. RAUBENHEIMER, Minister of Forestry.

SCHEDULE

PARTICULARS OF UNSURVEYED BEACONS IN TERMS OF SECTION 2A OF THE ACT

(a) TYPE.—Unless otherwise stated, all beacons conform to the following specifications:

Mild steel rods measuring 90 cm in length and 12 mm in diameter, driven 80 cm into the ground, surrounded by a packed cemented cairn of stones in which is cemented an aluminium tag on which is recorded the number of the beacon.

(b) LOCATION.

HOTTENTOTSHOLLAND:

HH1. Situated on the north-eastern boundary of Farm 837 in the Division of Stellenbosch, approximately 625 m north-west of the north-eastern corner beacon of Farm 837.

HH2. Situated approximately 3 250 m north-east of Tertiary Trig. Survey beacon 114 (Steenbras) and approximately 3 950 m east of Tertiary Trig. Survey beacon 84 (Knorhoek).

HH3. Situated on the northern boundary of the farm Knorhoek 830 in the Division of Stellenbosch, approximately 750 m south-west of the north-eastern corner beacon of the farm Knorhoek 830.

HH4. Situated on a cliff above the Landdroskloof stream, approximately 3 600 m south-west of Primary Trig. Survey beacon 19 (Sneeukop) and approximately 4 225 m north-west of Tertiary Trig. Survey beacon 85 (Moordenaarskop).

HH5. Situated near the northern bank of the Lourens River, approximately 3 000 m west of Primary Trig. Survey beacon 19 (Sneeukop) and approximately 6 750 m north-west of Tertiary Trig. Survey beacon 85 (Moordenaarskop).

HH6. Situated on a hillock approximately 8 825 m north-west of Tertiary Trig. Survey beacon 85 (Moordenaarskop) and approximately 5 900 m west of Primary Trig. Survey beacon 19 (Sneeukop).

HH7. Situated near the eastern bank of a tributary of the Lourens River above a dam and approximately 6 950 m west of Primary Trig. Survey beacon 19 (Sneeukop) and approximately 8 350 m north-west of Tertiary Trig. Survey beacon 84 (Knorhoek).

HH8. Situated on the western boundary of the farm Lourensford 741 in the Division of Stellenbosch, approximately 1 600 m south of the north-western corner beacon of the farm Lourensford 741.

HH9. Situated on the western boundary of the farm Erinvale 722 in the Division of Stellenbosch, approximately 425 m south of the north-eastern corner beacon of the Helderberg Nature Reserve (Lots 2597 and 2695) in the Division of Stellenbosch.

HH10. Situated on the western boundary of the Helderberg Nature Reserve in the Division of Stellenbosch, approximately 525 m south of the north-western corner beacon of the Nature Reserve (Lots 2597 and 2695).

HH11. Situated on the western boundary of Portion 26 of Farm 753 in the Division of Stellenbosch, approximately 750 m south of the north-western corner beacon of Portion 26 of Farm 753.

HH12. Situated on the western boundary of Portion 7 of Farm 753 in the Division of Stellenbosch, approximately 250 m south-west of the north-eastern corner beacon of Farm 752.

hiervan tot bergopvanggebied. Die grense van die gebied is in die bygaande sketskaart aangetoon en onopgemete bakens word in die Bylae hierby beskryf.

A. J. RAUBENHEIMER, Minister van Bosbou.

BYLAE

BESONDERHEDE VAN ONOPGEMETE BAKENS INGEVOLGE ARTIKEL 2A VAN DIE WET

(a) TIPE.—Tensy anders vermeld, voldoen alle onopgemete bakens aan die volgende spesifikasies:

Hardestaalpen, 90 cm lank en 12 mm in deursnee, 80 cm in die grond begrawe, vasgemaal in 'n betonblok waarop die bakennommer op 'n aluminium plaatjie in die beton aangebring is.

(b) LIGGING.

HOTTENTOTSHOLLAND:

HH1. Geleë op die noordoostelike grens van Plaas 837 in die afdeling Stellenbosch, ongeveer 625 m noordwes van die noordoostelike hoekbaken van Plaas 837.

HH2. Geleë ongeveer 3 250 m noordoos van Tersiere driehoeksbaken 114 (Steenbras) en ongeveer 3 950 m oos van Tersiere driehoeksbaken 84 (Knorhoek).

HH3. Geleë op die noordelike grens van die plaas Knorhoek 830 in die afdeling Stellenbosch, ongeveer 750 m suidwes van die noordoostelike hoekbaken van die plaas Knorhoek 830.

HH4. Geleë op 'n krans bokant die Landdroskloofstroom ongeveer 3 600 m suidwes van Primêre driehoeksbaken 19 (Sneeukop) en ongeveer 4 225 m noordwes van Tersiere driehoeksbaken 85 (Moordenaarskop).

HH5. Geleë naby die noordelike oewer van die Lourensrivier, ongeveer 3 000 m wes van Primêre driehoeksbaken 19 (Sneeukop) en ongeveer 6 750 m noordwes van Tersiere driehoeksbaken 85 (Moordenaarskop).

HH6. Geleë op 'n heuwel ongeveer 8 825 m noordwes van Tersiere driehoeksbaken 85 (Moordenaarskop) en ongeveer 5 900 m wes van Primêre driehoeksbaken 19 (Sneeukop).

HH7. Geleë naby die oostelike oewer van 'n sytak van die Lourensrivier bokant 'n dam en ongeveer 6 950 m wes van Primêre driehoeksbaken 19 (Sneeukop) en ongeveer 8 350 m noordwes van Tersiere driehoeksbaken 84 (Knorhoek).

HH8. Geleë op die westelike grens van die plaas Lourensford 741 in die afdeling Stellenbosch, ongeveer 1 600 m suid van die noordwestelike hoekbaken van die plaas Lourensford 741.

HH9. Geleë op die westelike grens van die plaas Erinvale 722 in die afdeling Stellenbosch, ongeveer 425 m suid van die noordoostelike hoekbaken van die Helderbergnatuursreservaat (Persele 2597 en 2695) in die afdeling Stellenbosch.

HH10. Geleë op die westelike grens van die Helderbergnatuursreservaat, in die afdeling Stellenbosch, ongeveer 525 m suid van die noordwestelike hoekbaken van die natuursreservaat (Persele 2597 en 2695).

HH11. Geleë op die westelike grens van Gedeelte 26 van Plaas 753 in die afdeling Stellenbosch, ongeveer 750 m suid van die noordwestelike hoekbaken van Gedeelte 26 van Plaas 753.

HH12. Geleë op die westelike grens van Gedeelte 7 van die Plaas 753 in die afdeling Stellenbosch, ongeveer 250 m suidwes van die noordoostelike hoekbaken van Plaas 752.

HH13. Situated on the south-eastern boundary of Farm 714 in the Division of Stellenbosch, approximately 325 m south-west of the north-western corner beacon of Farm 752.

HH14. Situated on the northern boundary of Farm 714 in the Division of Stellenbosch, approximately 900 m east of Tertiary Trig. Survey beacon 69.

HH15. Situated on the eastern boundary of Farm 572 in the Division of Stellenbosch (Stel. 10), approximately 450 m north-west of the south-eastern corner beacon of Farm 572.

HH16. Situated on the north-eastern boundary of Farm 525 in the Division of Stellenbosch, approximately 725 m north-west of the south-eastern corner beacon of Farm 525.

HH17. Situated on the eastern boundary of Farm 524 in the Division of Stellenbosch, approximately 1 375 m north-west of the south-eastern corner beacon of Farm 524.

HH18. Situated on the north-eastern boundary of Farm 1093 in the Division of Stellenbosch, approximately 1 400 m north-west of the north-eastern corner beacon of Farm 1093.

HH19. Situated on the south-eastern boundary of Farm 362 in the Division of Stellenbosch, approximately 450 m north-east of the south-western corner beacon of Farm 363 in the Division of Stellenbosch.

HH20. Situated on the south-eastern boundary of Portion 1 of Farm 345 in the Division of Stellenbosch, approximately 1 000 m south-west of the north-eastern corner beacon of Portion 4 of Farm 345.

HH21. Situated on the north-western boundary of Farm 351 in the Division of Stellenbosch, approximately 500 m south-west of the north-eastern corner beacon of Farm 351.

HH22. Situated on the northern boundary of Portion 8 of Farm 334 in the Division of Stellenbosch, approximately 650 m south-west of the north-eastern corner beacon of Portion 8 of Farm 334.

HH23. Situated on the northern boundary of Portion 5 of Farm 334 in the Division of Stellenbosch, approximately 800 m south-west of the north-eastern corner beacon of Portion 5 of Farm 334.

HH24. Situated on the western boundary of Portion 9 of Farm 122 in the Division of Stellenbosch, approximately 100 m north of the south-western corner beacon of Portion 9 of Farm 122.

HH25. Situated on the north-western boundary of Farm 338 in the Division of Caledon, approximately 400 m north-east of the southernmost corner beacon of Farm 338.

HH26. Situated on the south-eastern boundary of the farm Welgegund 284 in the Division of Caledon, approximately 2 325 m south-west of the north-eastern corner beacon of the farm Welgegund 284.

HH27. Situated on the south-eastern boundary of Farm 285 in the Division of Caledon, approximately 1 250 m south-west of the north-western corner beacon of Farm 284 in the Division of Caledon.

HH28. Situated on the Banghoekrivier on the boundary between Portion 1 of the Farm 122 and Farm 134 in the Division of Stellenbosch, approximately 3 350 m south-east of Trig. Survey beacon 66 (Spes-bona) and approximately 3 875 m south-west of Trig. Survey beacon 87 (Banghoek) and approximately 3 225 m north-west of Trig. Survey beacon 67 (Spitzkop).

HH29. Situated adjacent to the Department of Water Affairs' access road on Portion 1 of Farm 122 in the

HH13. Geleë op die suidoostelike grens van Plaas 714 in die afdeling Stellenbosch, ongeveer 325 m suidwes van die noordwestelike hoekbaken van Plaas 752.

HH14. Geleë op die noordelike grens van Plaas 714 in die afdeling Stellenbosch, ongeveer 900 m oos van Tersiëre driehoeksbaken 69.

HH15. Geleë op die oostelike grens van Plaas 572 in die afdeling Stellenbosch (Stel. 10), ongeveer 450 m noordwes van die suidoostelike hoekbaken van Plaas 572.

HH16. Geleë op die noordoostelike grens van Plaas 525 in die afdeling Stellenbosch, ongeveer 725 m noordwes van die suidoostelike hoekbaken van Plaas 525.

HH17. Geleë op die oostelike grens van Plaas 524 in die afdeling Stellenbosch, ongeveer 1 375 m noordwes van die suidoostelike hoekbaken van Plaas 524.

HH18. Geleë op die noordoostelike grens van Plaas 1093 in die afdeling Stellenbosch, ongeveer 1 400 m noordwes van die noordoostelike hoekbaken van Plaas 1093.

HH19. Geleë op die suidoostelike grens van Plaas 362 in die afdeling Stellenbosch, ongeveer 450 m noordoos van die suidwestelike hoekbaken van Plaas 363 in die afdeling Stellenbosch.

HH20. Geleë op die suidoostelike grens van Gedeelte 1 van Plaas 345, in die afdeling Stellenbosch, ongeveer 1 000 m suidwes van die noordoostelike hoekbaken van Gedeelte 4 van Plaas 345.

HH21. Geleë op die noordwestelike grens van Plaas 351 in die afdeling Stellenbosch, ongeveer 500 m suidwes van die noordoostelike hoekbaken van Plaas 351.

HH22. Geleë op die noordelike grens van Gedeelte 8 van Plaas 334 in die afdeling Stellenbosch, ongeveer 650 m suidwes van die noordoostelike hoekbaken van Gedeelte 8 van Plaas 334.

HH23. Geleë op die noordelike grens van Gedeelte 5 van Plaas 334 in die afdeling Stellenbosch, ongeveer 800 m suidwes van die noordoostelike hoekbaken van Gedeelte 5 van Plaas 334.

HH24. Geleë op die westelike grens van Gedeelte 9 van Plaas 122 in die afdeling Stellenbosch, ongeveer 100 m noord van die suidwestelike hoekbaken van Gedeelte 9 van Plaas 122.

HH25. Geleë op die noordwestelike grens van Plaas 338 in die afdeling Caledon, ongeveer 400 m noordoos van die mees suidelike hoekbaken van Plaas 338.

HH26. Geleë op die suidoostelike grens van die plaas Welgegund 284 in die afdeling Caledon, ongeveer 2 325 m suidwes van die noordoostelike hoekbaken van die plaas Welgegund 284.

HH27. Geleë op die suidoostelike grens van die Plaas 285 in die afdeling Caledon, ongeveer 1 250 m suidwes van die noordwestelike hoekbaken van Plaas 284 in die afdeling Caledon.

HH28. Geleë langs die Banghoekrivier op die grens tussen Gedeelte 1 van Plaas 122 en Plaas 134 in die afdeling Stellenbosch, ongeveer 3 350 m suidoos van driehoeksbaken 66 (Spes-bona) en ongeveer 3 875 m suidwes van driehoeksbaken 87 (Banghoek) en ongeveer 3 225 m noordwes van driehoeksbaken 67 (Spitzkop).

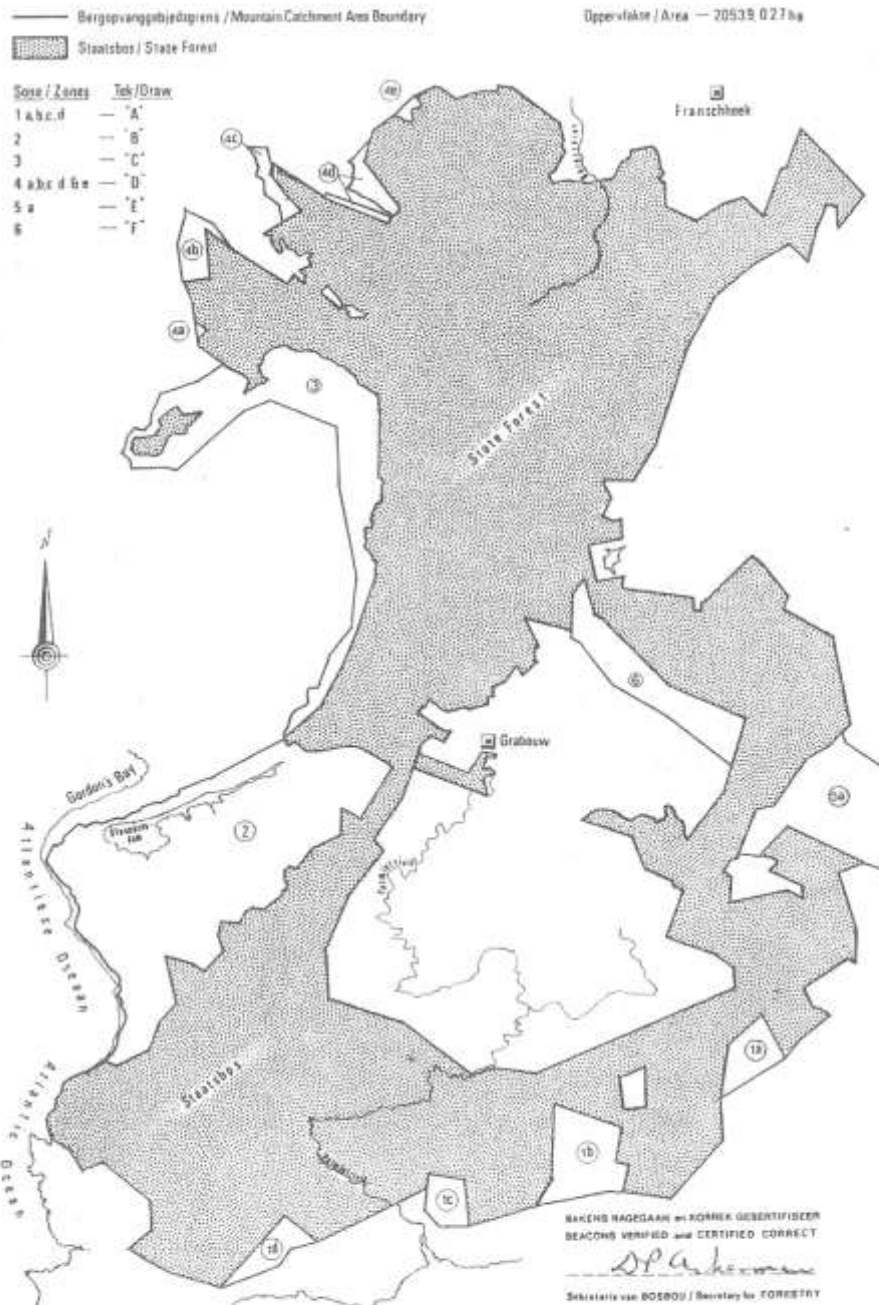
HH29. Geleë langs die Departement van Waterwese se toegangspad op Gedeelte 1 van Plaas 122 in die

Division of Stellenbosch, approximately 3 500 m south-east of Trig. Survey beacon 66 (Spes-bona) and approximately 3 600 m south-west of Trig. Survey beacon 87 (Banghoek) and approximately 3 400 m north-west of Trig. Survey beacon 67 (Spitzkop).

afdeling Stellenbosch, ongeveer 3 500 m suidoos van driehoeksbaken 66 (Spes-bona) en ongeveer 3 600 m suidwes van driehoeksbaken 87 (Banghoek) en ongeveer 3 400 m noordwes van driehoeksbaken 67 (Spitzkop).

BERGOPVANGEBIED / MOUNTAIN CATCHMENT AREA

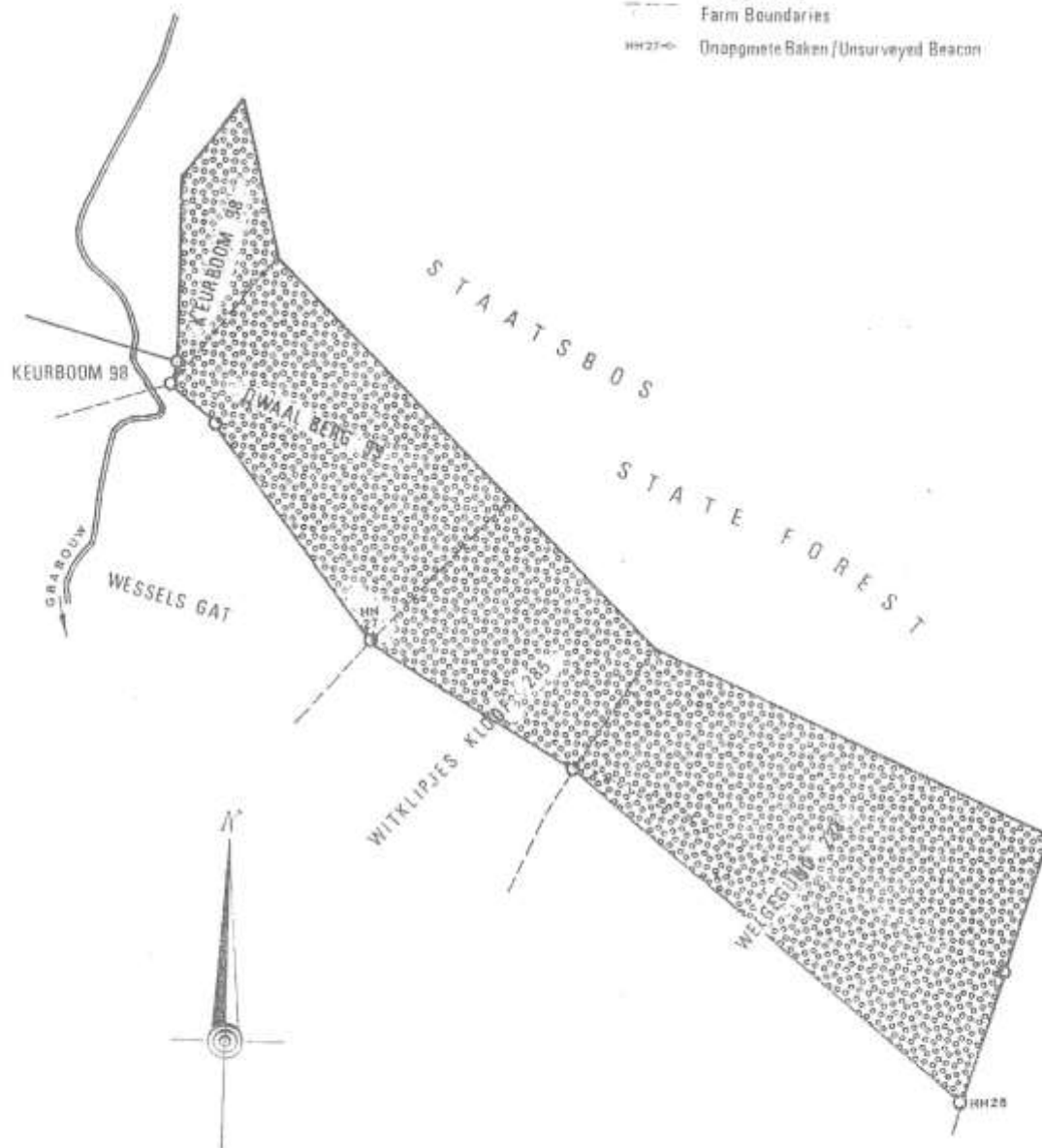
HOTTENTOTS HOLLAND



BERGOPVANGGEBIED / MOUNTAIN CATCHMENT AREA

HOTTENTOTSJHOLLAND

-  Bergopvanggebied / Mountain Catchment Area
-  Plaasgrense / Farm Boundaries
-  Onopgemete Baken / Unsurveyed Beacon



H4/3/1/2975.—Die kenteken van die Bogrondse Bedryf—Secunda-myne, soos by Goewermentskennisgewing 1861 van 23 Augustus 1985 gepubliseer.

H4/3/1/2981.—Die naam van die Laeveldse Wynproewersgilde, soos by Goewermentskennisgewing 1861 van 23 Augustus 1985 gepubliseer.

H4/3/1/2991.—Die naam van die Vrystaat-Wynproewersgilde, soos by Goewermentskennisgewing 1863 van 23 Augustus 1985 gepubliseer.

H4/3/2/366.—Die wapen van Atteridgeville-stadsraad, soos by Goewermentskennisgewing 1317 van 14 Junie 1985 gepubliseer.

H4/3/4/207.—Die wapen van Magnus Herbert Forssman Penny, soos by Goewermentskennisgewing 1861 van 23 Augustus 1985 gepubliseer.

H4/3/4/263.—Die wapen van Pieter Johannes de Villiers van Aardt, soos by Goewermentskennisgewing 1317 van 14 Junie 1985 gepubliseer.

DEPARTEMENT VAN OMGEWINGSKE

No. 2266

11 Oktober 1985

VERKLARING VAN 'N BERGOPVANGGEBIED IN WES-KAAPLAND

Kragtens die bevoegdheid my verleen by artikel 2 van die Wet op Bergopvanggebiede, 1970 (Wet 63 van 1970), verklaar ek hierby die gebiede in die afdelings Stellenbosch en Caledon, provinsie die Kaap die Goeie Hoop, met ingang van die datum van publikasie hiervan tot bergopvanggebied. Die grense van die gebiede word op bygaande sketskaarte getoon en onopgemete bakens word in die Bylae hiervan beskryf. Hierdie gebiede is uitbreidings van die Hottentotsholland-bergopvanggebied soos verklaar by Goewermentskennisgewing 2569 van 16 November 1979.

J. W. E. WILEY,

Minister van Omgewingsake en Toerisme.

BYLAE

BESONDERHEDE VAN ONOPGEMETE BAKENS INGEVOLGE ARTIKEL 2A VAN DIE WET

- (a) **TIPE.**—Tensy anders vermeld, voldoen alle onopgemete bakens aan die volgende spesifikasies:

Staalen, 90 cm lank en 12 mm in deursnee, 80 cm in die grond ingeplant, met klippe vasgemessel in 'n betonblok waarop die bakennommer op 'n aluminiumplaatjie in die beton aangebring is.

- (b) **LIGGING.**

HOTTENTOTSHOLLAND:

HH30. Geleë op die gemeenskaplike grens van die plaas Wolwekloof 966 en Plaas 966/4 in die afdeling Paarl, ongeveer 4 450 m noordwes van Driehoeksbakke 493 (Joubertspiek) af en ongeveer 1 325 m noordoos van Driehoeksbakke 25 (Simonsberg) af.

HH31. Geleë op die gemeenskaplike grens van Plaas 1331 en Plaas 1201 in die afdeling Paarl, ongeveer 725 m suidoos van Driehoeksbakke 493 (Joubertspiek) af en 4 750 m noordoos van Driehoeksbakke 66 (Bothmaskop) af.

HH32. Geleë op die gemeenskaplike grens van Plaas 923/1 en Plaas 851 in die afdeling Stellenbosch, sowat 2 250 m suidwes van Driehoeksbakke 114 (Moordenaarskop) af en 5 500 m wes van Driehoeksbakke 86 af.

HH33. Op die gemeenskaplike grens van Erf 1, Gordonsbaai, en Plaas 933 in die afdeling Stellenbosch, ongeveer 2 500 m wes van Driehoeksbakke 112 af en 1 800 m noordoos van Driehoeksbakke 58 af.

H4/3/1/2981.—The name of the Lowveld Wine Tasters' Guild, as published under Government Notice 1861 of 23 August 1985.

H4/3/1/2991.—The name of the Free State Wine Tasters' Guild, as published under Government Notice 1863 of 23 August 1985.

H4/3/2/366.—The arms of Atteridgeville Town Council, as published under Government Notice 1317 of 14 June 1985.

H4/3/4/207.—The arms of Magnus Herbert Forssman Penny, as published under Government Notice 1861 of 23 August 1985.

H4/3/4/263.—The arms of Pieter Johannes de Villiers van Aardt, as published under Government Notice 1317 of 14 June 1985.

DEPARTMENT OF ENVIRONMENT AFFAIRS

No. 2266

11 October 1985

DECLARATION OF A MOUNTAIN CATCHMENT AREA IN THE WESTERN CAPE

Under and by virtue of the powers vested in me by section 2 of the Mountain Catchment Areas Act, 1970 (Act 63 of 1970), I hereby declare that from the date of publication hereof, the areas situated in the Divisions of Stellenbosch and Caledon, Province of the Cape of Good Hope, shall be a mountain catchment area. The boundaries of the areas are shown on the appended sketch maps and the unsurveyed beacons are described in the Annexure hereto. These areas will be extensions of the Hottentots-Holland Mountain Catchment Area as declared in Government Notice 2569, dated 16 November 1979.

J. W. E. WILEY,

Minister of Environment Affairs and Tourism.

SCHEDULE

PARTICULARS OF UNSURVEYED BEACONS IN TERMS OF SECTION 2A OF THE ACT

- (a) **TYPE.**—Unless otherwise stated, all beacons conform to the following specifications:

Steel rods measuring 90 cm in length and 12 mm in diameter, driven 80 cm into the ground, surrounded by a packed cemented cairn of stones in which is cemented an aluminium tag on which is recorded the number of the beacon.

- (b) **LOCATION.**

HOTTENTOTS-HOLLAND:

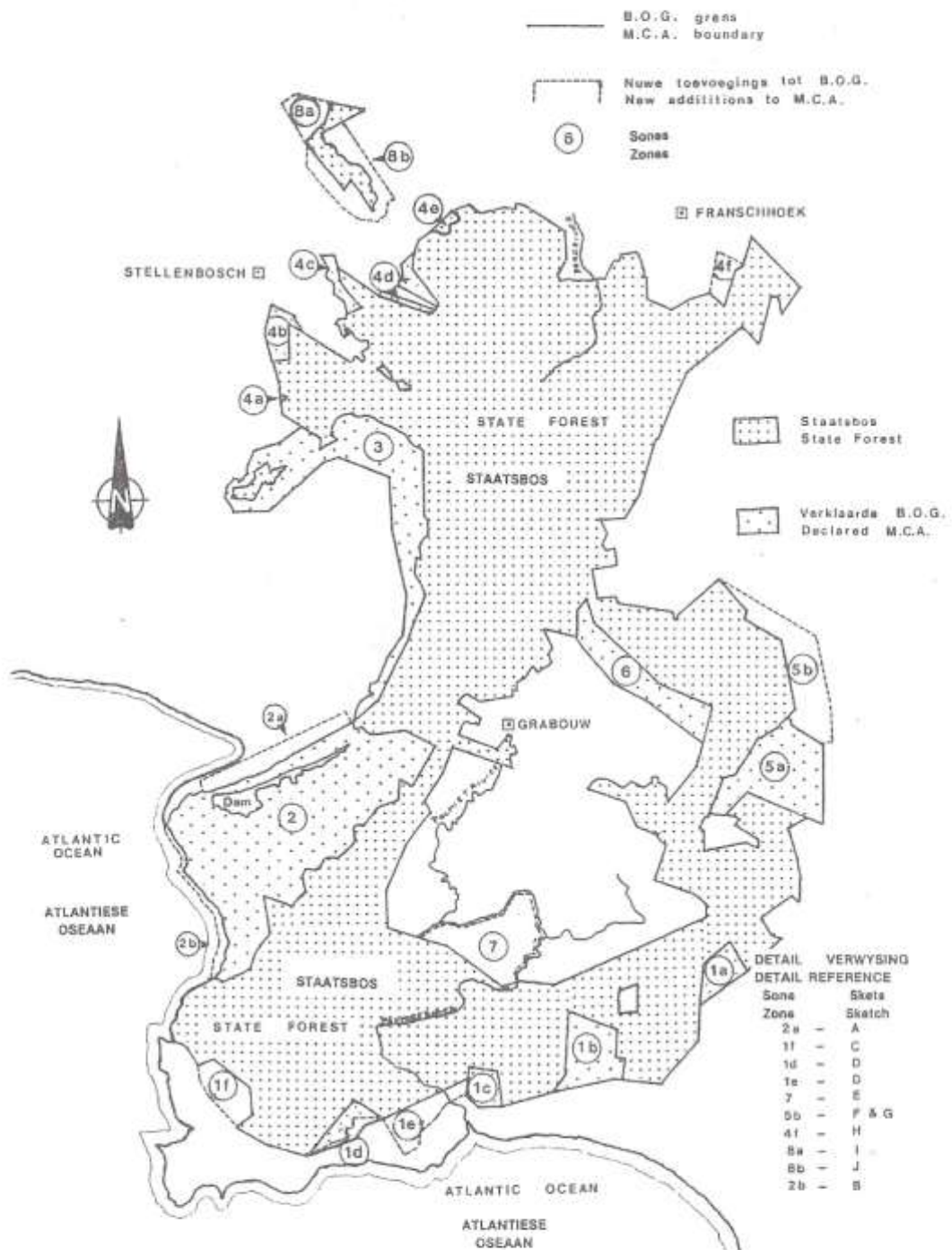
HH30. Situated on the common boundary of the farm Wolwekloof 966 and Farm 966/4 in the Division of Paarl, approximately 4 450 m north-west of Trig. Survey Beacon 493 (Joubert's Peak), and approximately 1 325 m north-east of Trig. Survey Beacon 25 (Simonsberg).

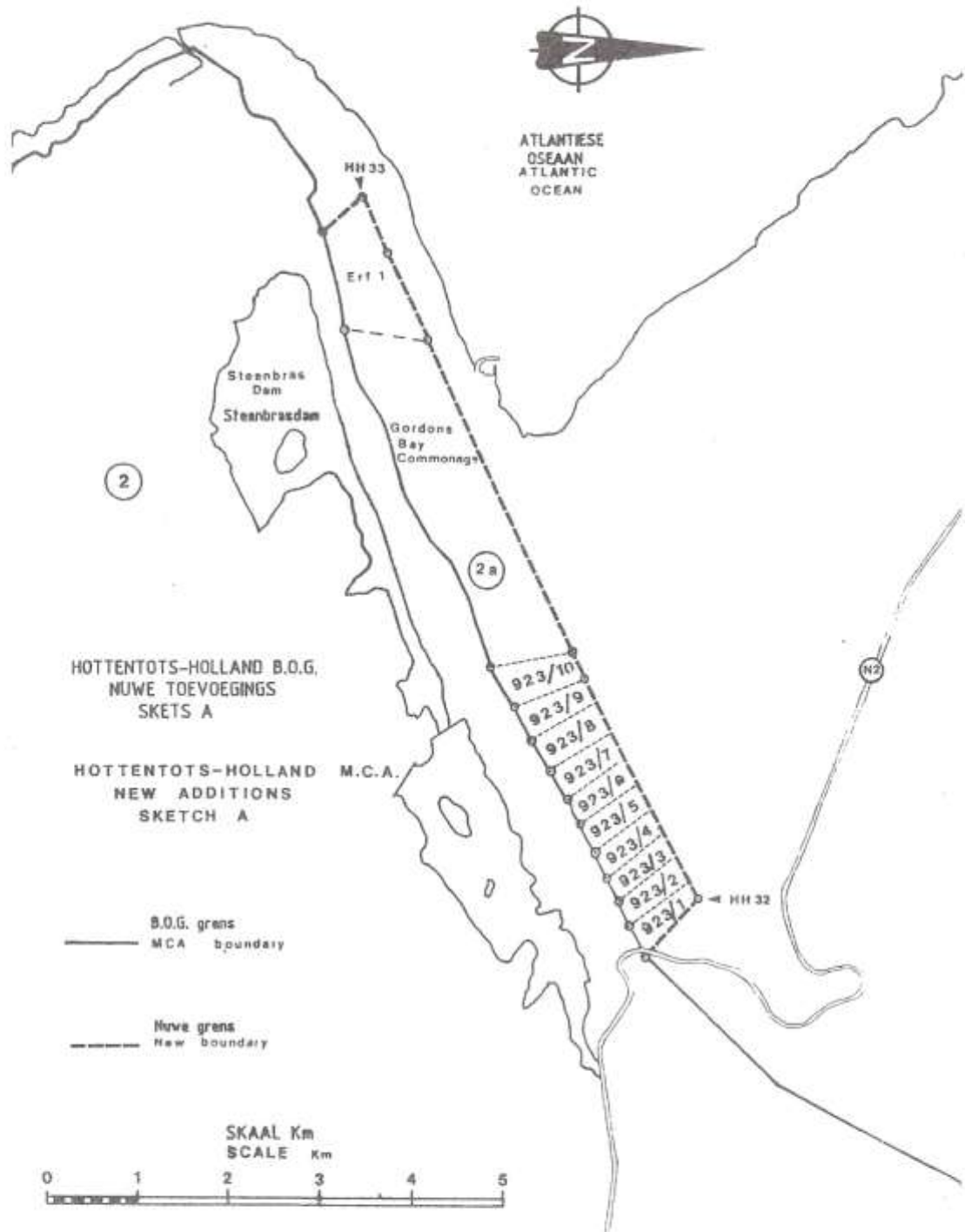
HH31. Situated on the common boundary of Farms 1331 and 1201 in the Division of Paarl, approximately 725 m south-east of Trig. Survey Beacon 493 (Joubert's Peak), and 4 750 m north-east of Trig. Survey Beacon 66 (Bothmaskop).

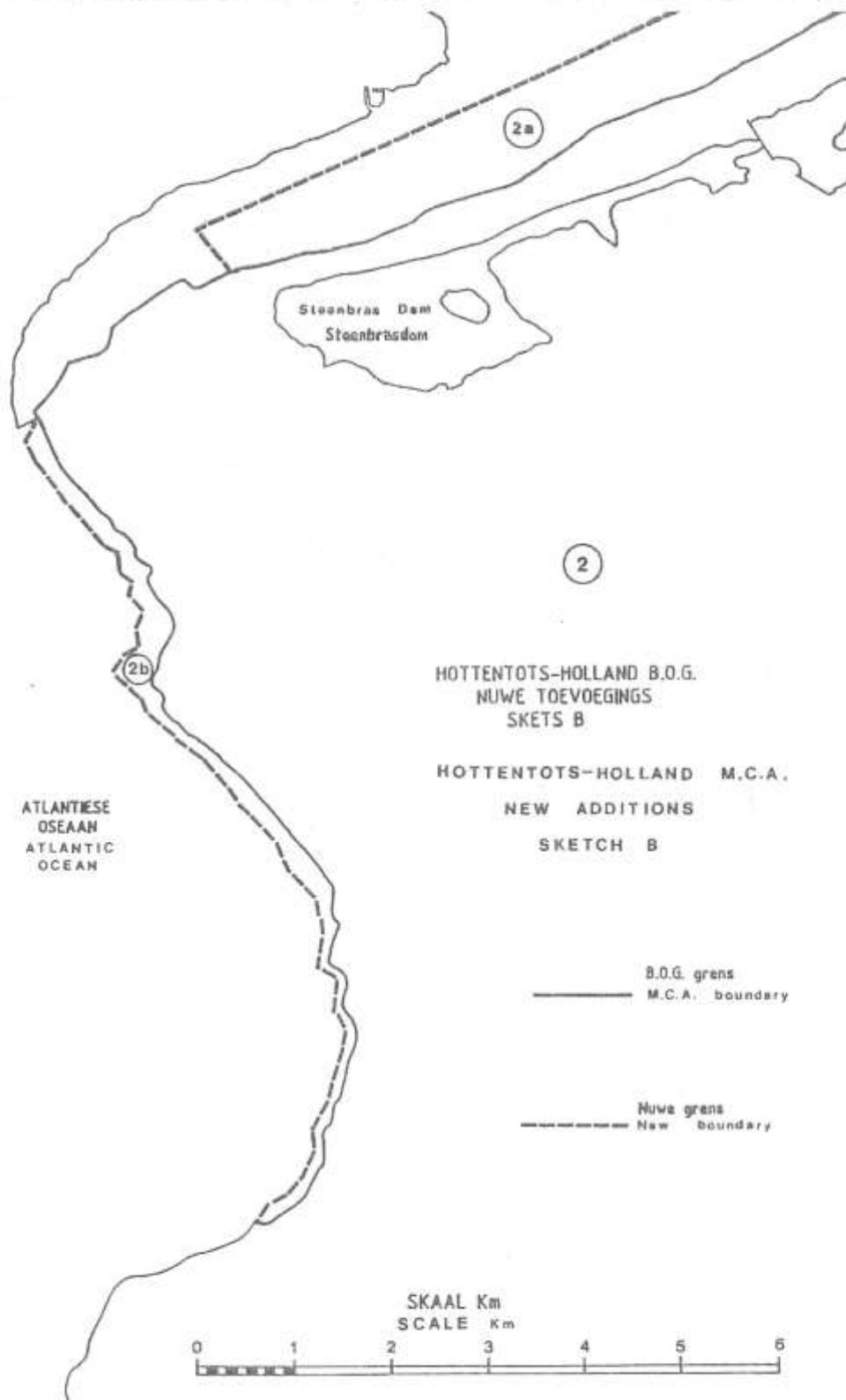
HH32. Situated on the common boundary of Farms 923/1 and 851 in the Division of Stellenbosch, approximately 2 250 m south-west of Trig. Survey Beacon 114 (Moordenaarskop), and 5 500 m west of Trig. Survey Beacon 86.

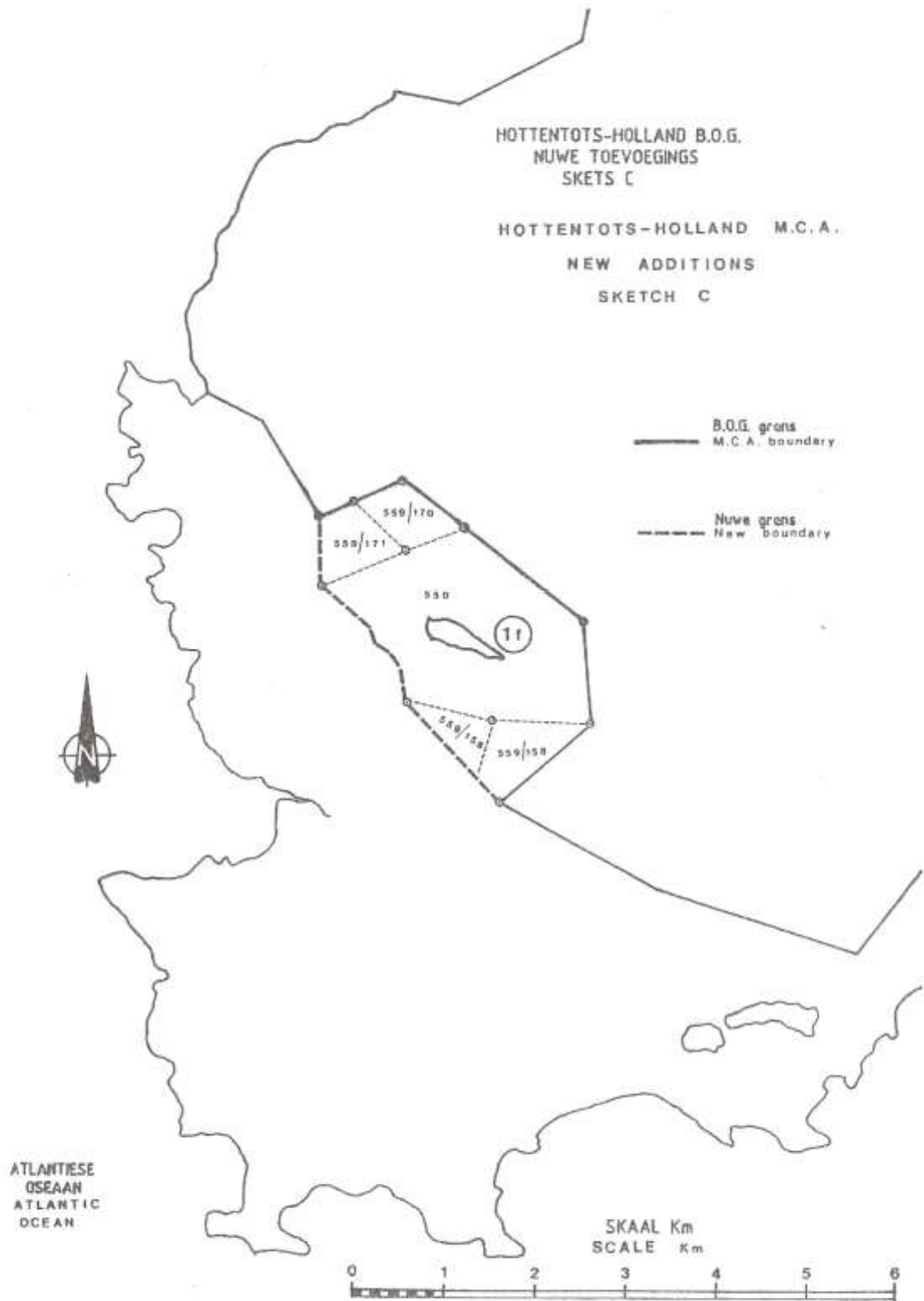
HH33. On the common boundary of Erf 1, Gordon's Bay, and Farm 933 in the Division of Stellenbosch, approximately 2 500 m west of Trig. Survey Beacon 112 and 1 800 m north-east of Trig. Survey Beacon 58.

HOTTENTOTSHOLLAND BERGOPVANGGEBIED MOUNTAIN CATCHMENT AREA







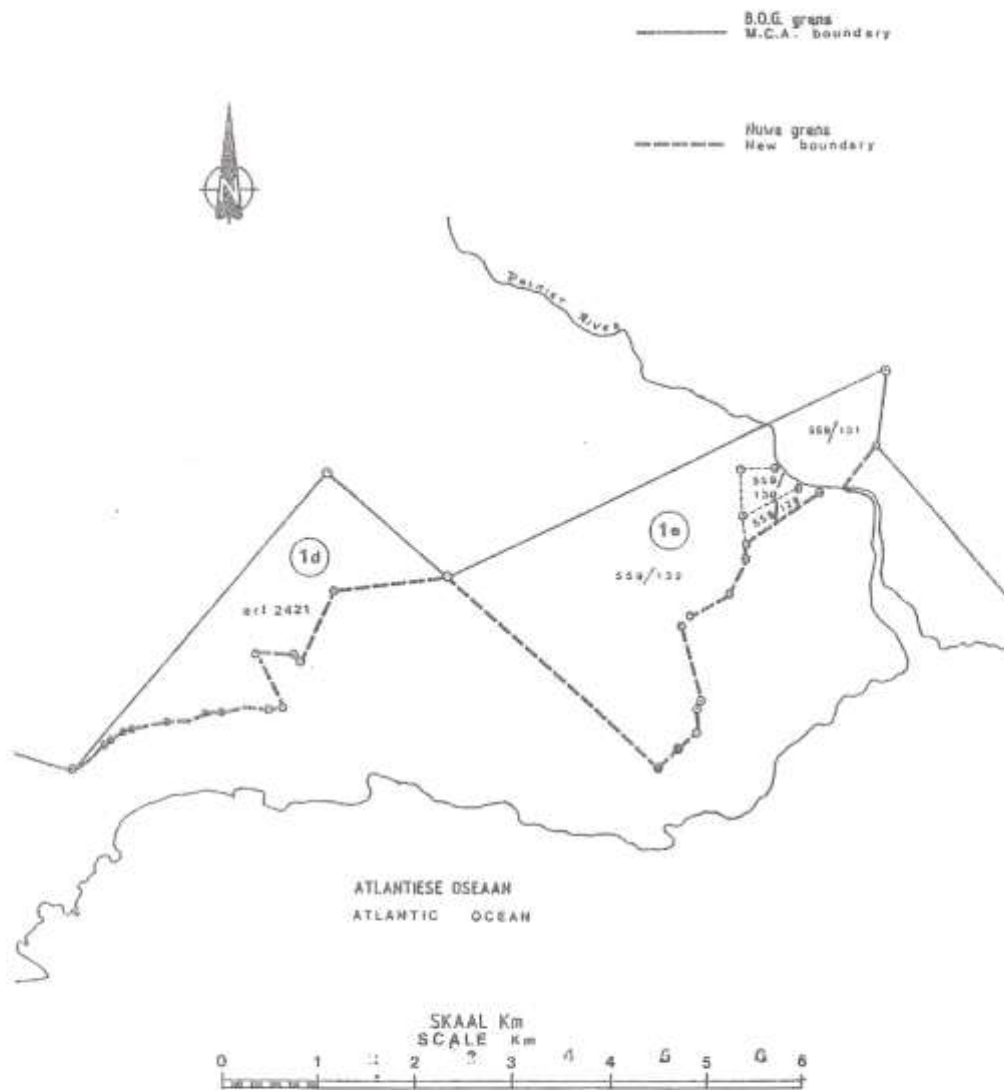


HOTTENTOTS-HOLLAND B.O.G.
NUWE TOEVOEGINGS
SKETS D

HOTTENTOTS-HOLLAND M.C.A.

NEW ADDITIONS

SKETCH D



HOTTENTOTS-HOLLAND M.C.A.

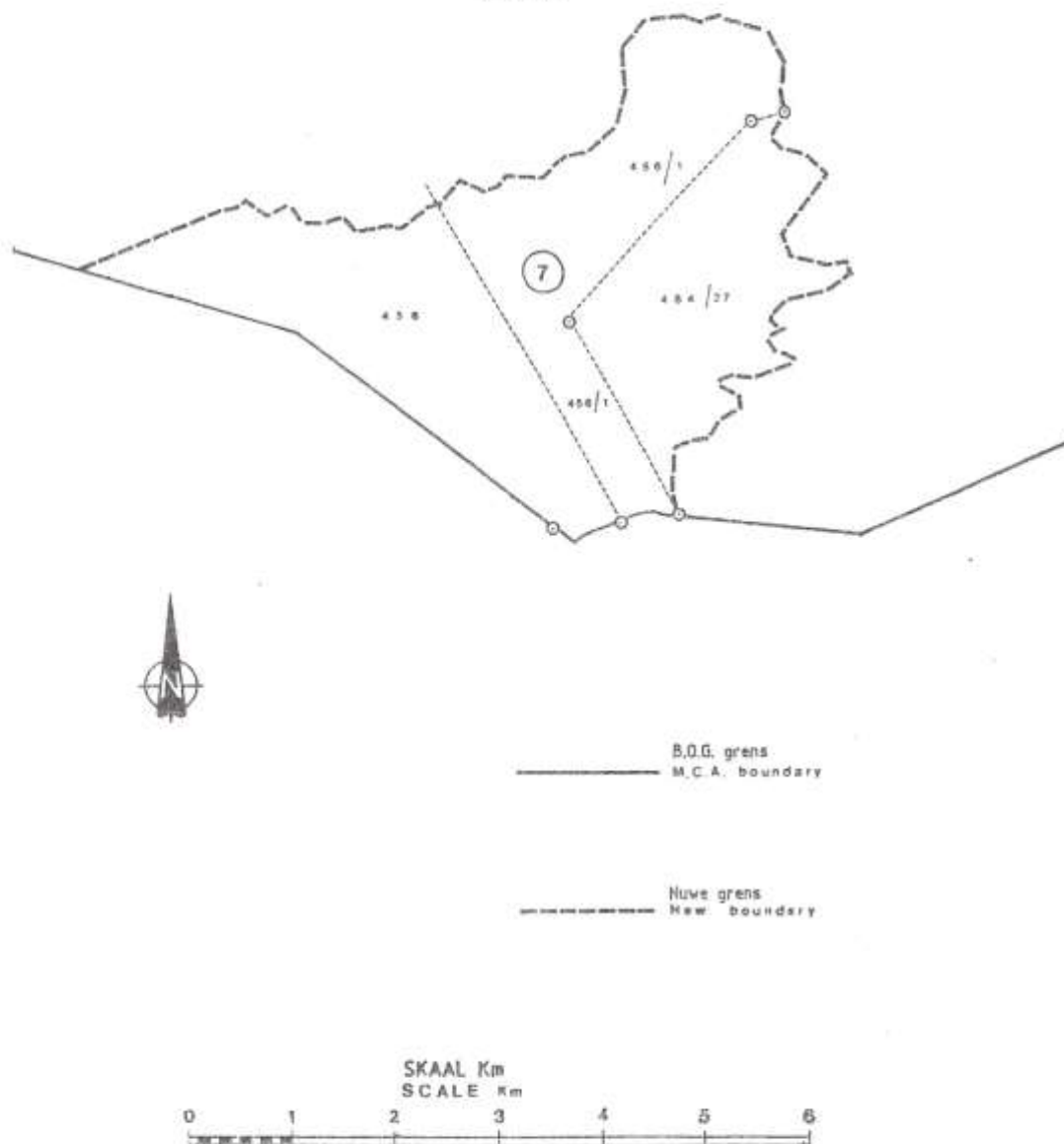
NEW ADDITIONS

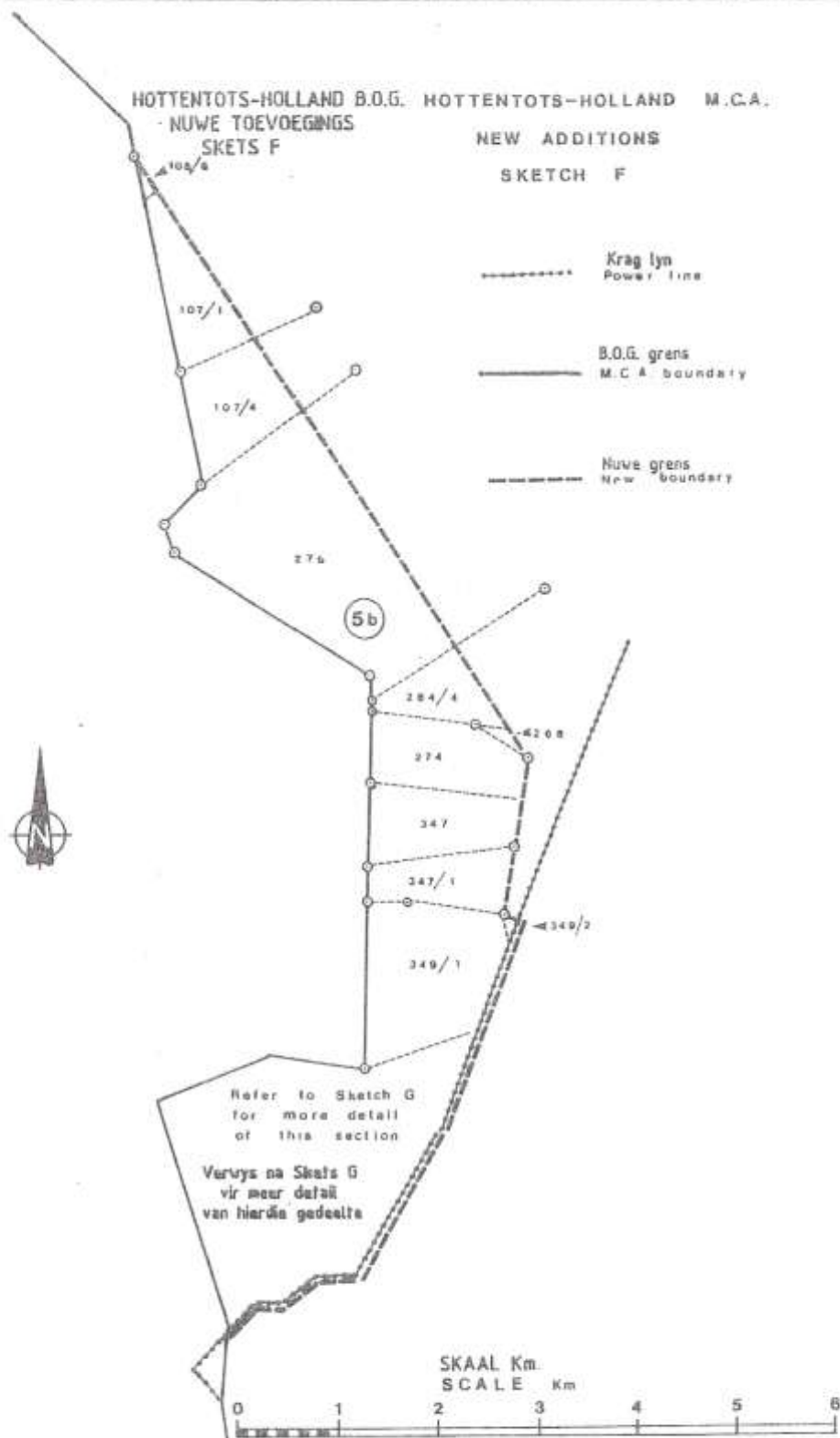
SKETCH E

HOTTENTOTS-HOLLAND B.O.G.

NUWE TOEVOEGINGS

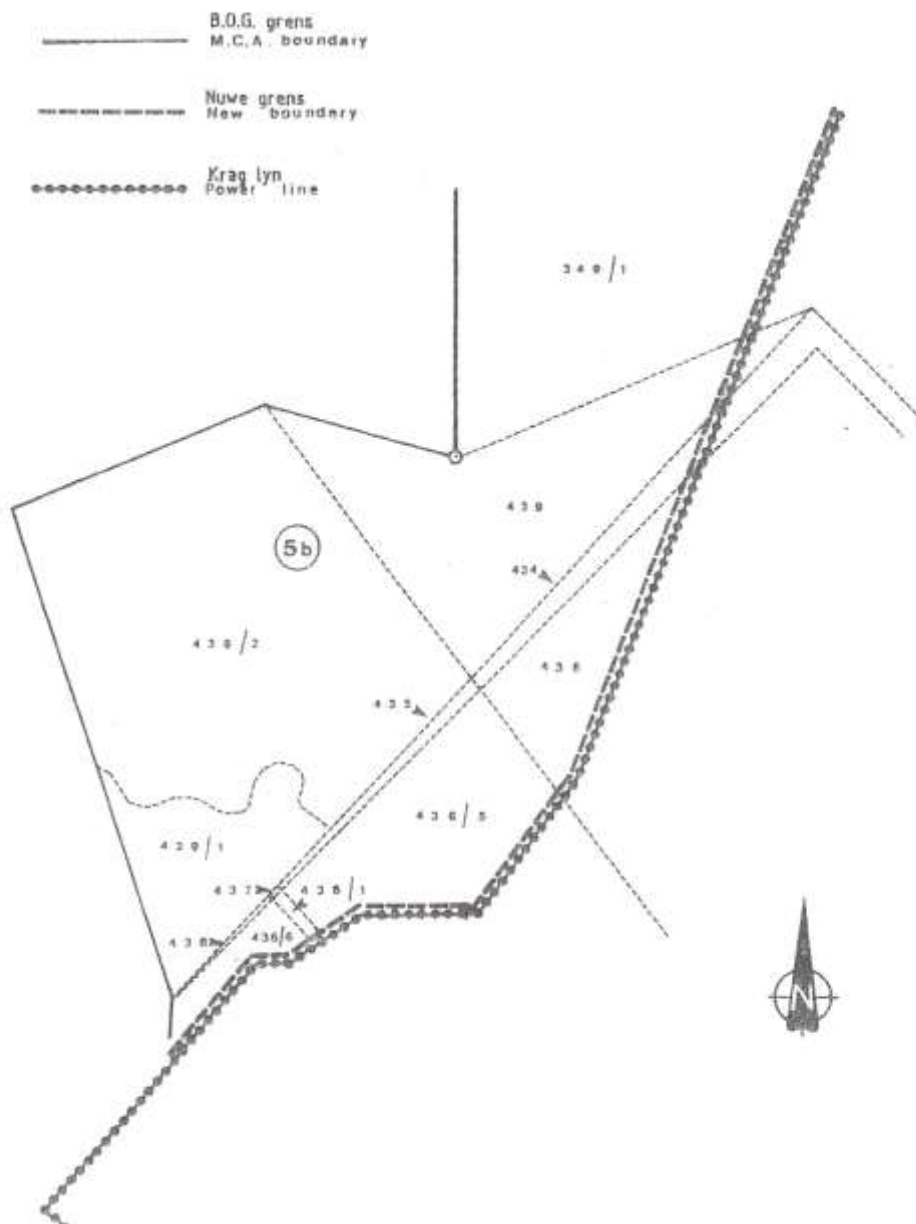
SKETS E





HOTTENTOTS-HOLLAND B.O.G.
NUWE TOEVOEGINGS
SKETS G

HOTTENTOTS-HOLLAND M.C.A.
NEW ADDITIONS
SKETCH G



HOTTENTOTS-HOLLAND M.C.A.

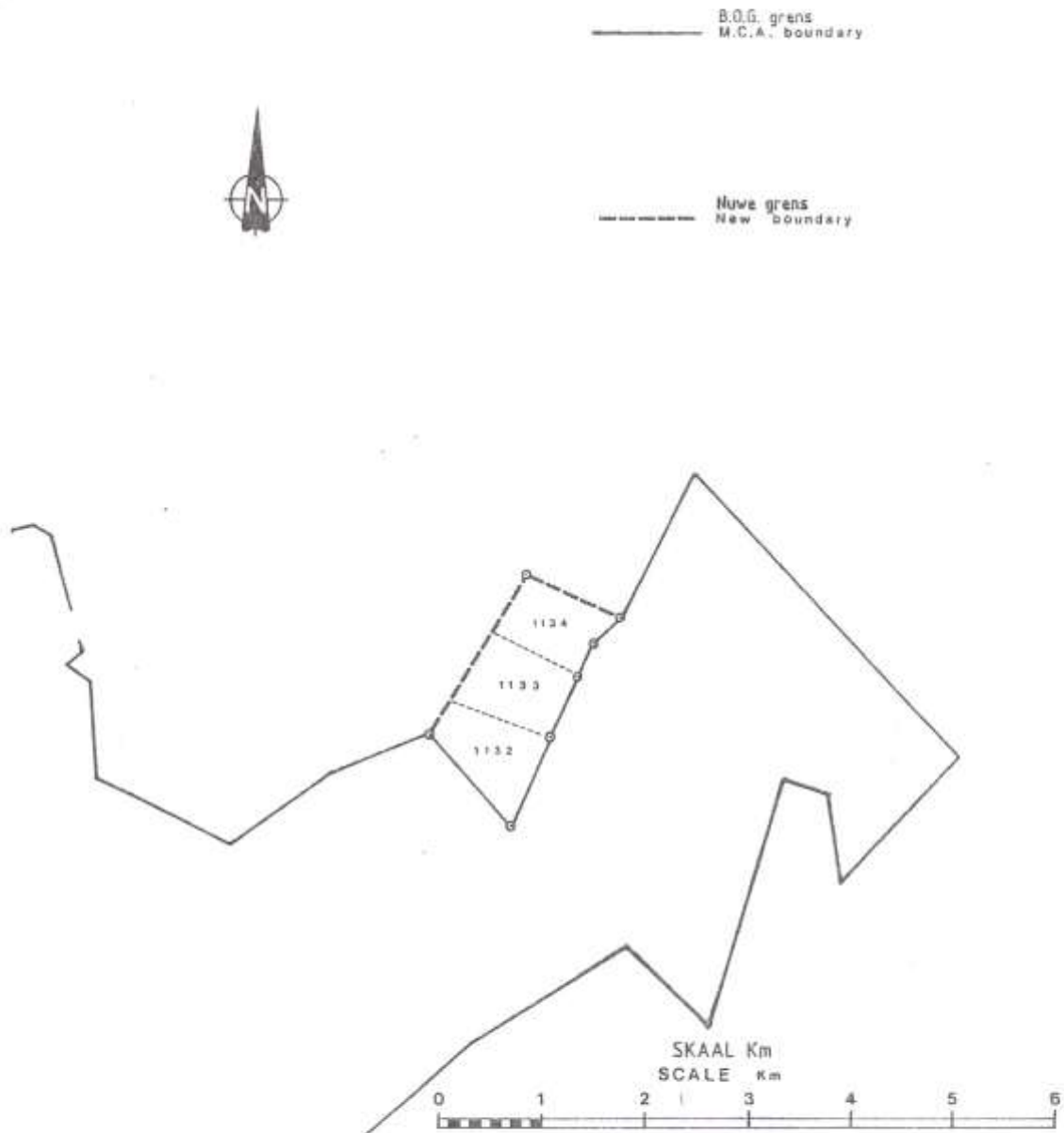
NEW ADDITIONS

SKETCH H

HOTTENTOTS-HOLLAND B.O.G.

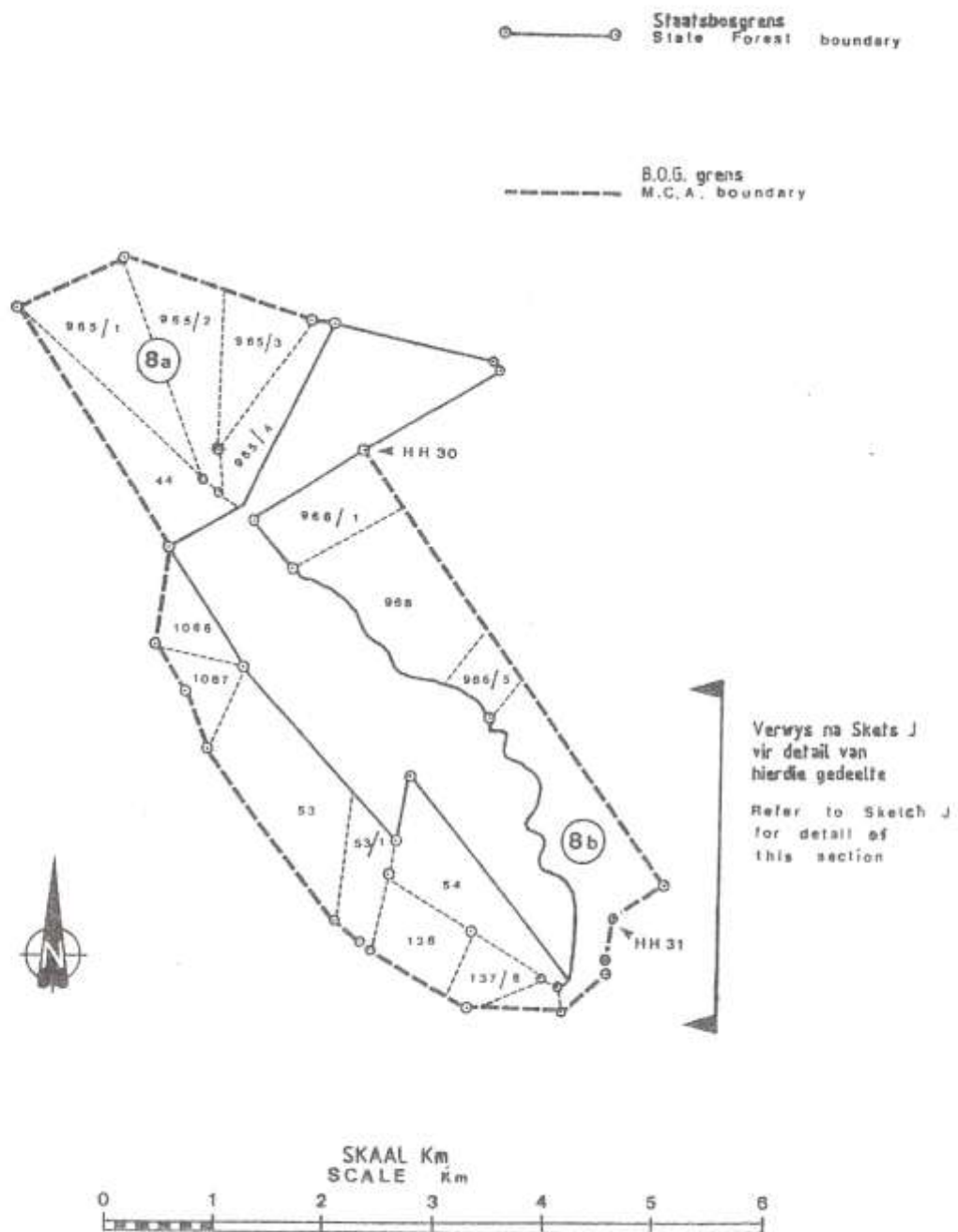
NUWE TOEVOEGINGS

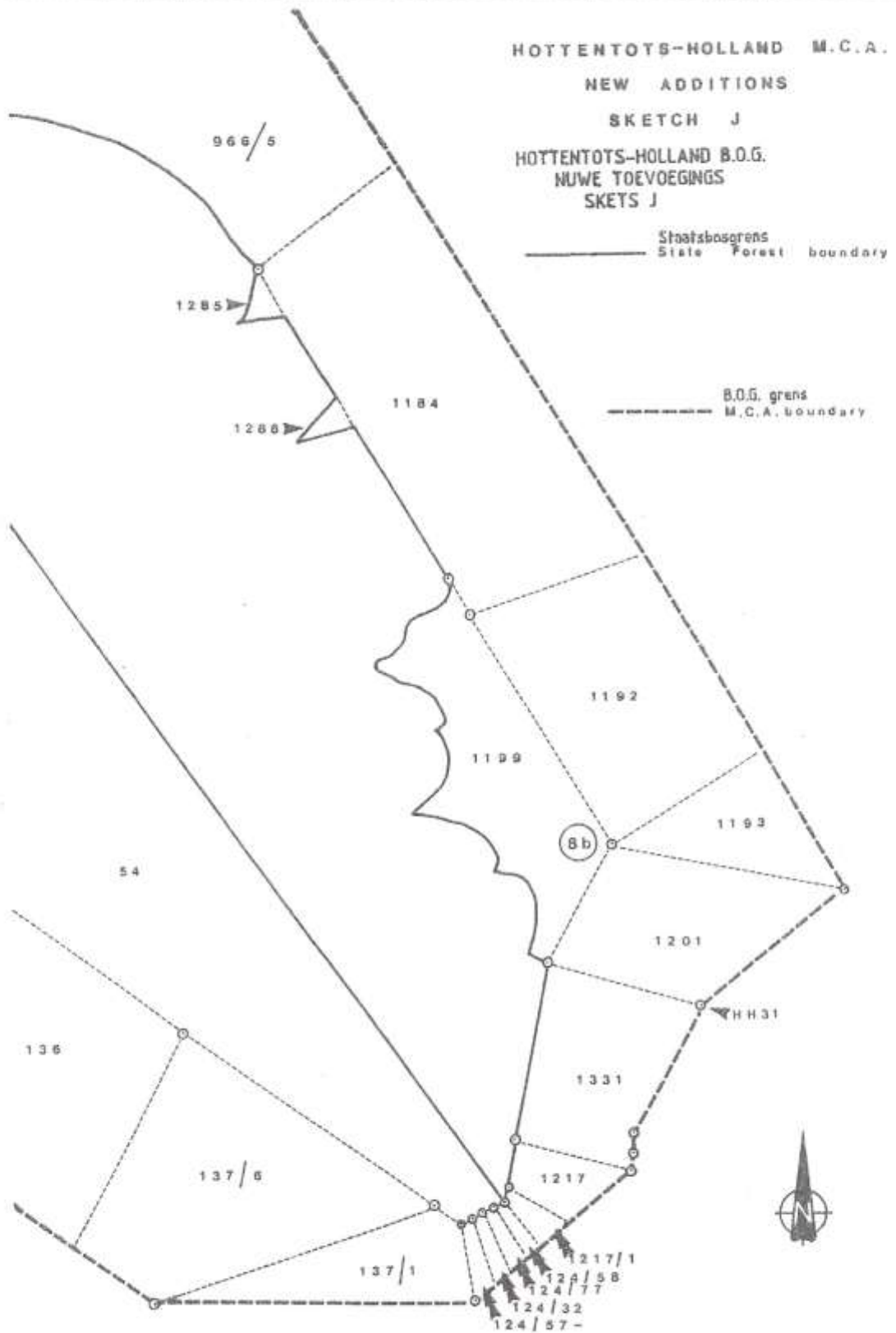
SKETS H



HOTTENTOTS-HOLLAND B.O.G.
NUWE TOEVOEGINGS
SKETS I

HOTTENTOTS-HOLLAND M.C.A.
NEW ADDITIONS
SKETCH I





Appendix 2: Plant Species List

Kogelberg Biosphere Reserve Plant Species List			
Family	Species	Common Name	Red Data Status
AGAPANTHACEAE	<i>Agapanthus africanus</i>		
AGAPANTHACEAE	<i>Agapanthus walshii</i>		R
AIZOACEAE	<i>Aizoon sarmentosum</i>		
AIZOACEAE	<i>Tetragonia decumbens</i>		
ALLIACEAE	<i>Tulbaghia alliacea</i>		
AMARANTHACEAE	<i>Bassia diffusa</i>		
AMARANTHACEAE	<i>Sarcocornia littorea</i>		
AMARANTHACEAE	<i>Sarcocornia natalensis</i>		
AMARYLLIDACEAE	<i>Brunsvigia orientalis</i>		
AMARYLLIDACEAE	<i>Cyrtanthus angustifolius</i>		
AMARYLLIDACEAE	<i>Cyrtanthus leucanthus</i>		R
AMARYLLIDACEAE	<i>Cyrtanthus ventricosus</i>		
AMARYLLIDACEAE	<i>Haemanthus canaliculatus</i>		V
AMARYLLIDACEAE	<i>Haemanthus coccineus</i>		
AMARYLLIDACEAE	<i>Haemanthus sanguineus</i>		
AMARYLLIDACEAE	<i>Nerine sarniensis</i>		
ANACARDIACEAE	<i>Heeria argentea</i>		
ANACARDIACEAE	<i>Laurophyllus capensis</i>		
ANACARDIACEAE	<i>Rhus angustifolia</i>		
ANACARDIACEAE	<i>Rhus crenata</i>		
ANACARDIACEAE	<i>Rhus cuneifolia</i>		
ANACARDIACEAE	<i>Rhus laevigata</i>		
ANACARDIACEAE	<i>Rhus lucida</i>		

ANACARDIACEAE	<i>Rhus rosmarinifolia</i>		
ANACARDIACEAE	<i>Rhus scytophylla</i>		
ANACARDIACEAE	<i>Rhus tomentosa</i>		
ANACARDIACEAE	<i>Rhus undulata</i>		
APIACEAE	<i>Arctopus echinatus</i>		
APIACEAE	<i>Chamarea capensis</i>		
APIACEAE	<i>Dasispermum suffruticosum</i>		
APIACEAE	<i>Glia gummifera</i>		
APIACEAE	<i>Hermas ciliata</i>		
APIACEAE	<i>Hermas quinquedentata</i>		
APIACEAE	<i>Hermas villosa</i>		
APIACEAE	<i>Itasina filifolia</i>		
APIACEAE	<i>Lichtensteinia lacera</i>		
APIACEAE	<i>Peucedanum galbaniopse</i>		
APIACEAE	<i>Peucedanum polyactinum</i>		
APIACEAE	<i>Peucedanum strictum</i>		
APOCYNACEAE	<i>Astephanus triflorus</i>		
APOCYNACEAE	<i>Cynanchum africanum</i>		
APOCYNACEAE	<i>Cynanchum ellipticum</i>		
APOCYNACEAE	<i>Cynanchum obtusifolium</i>		
APOCYNACEAE	<i>Gomphocarpus cancellatus</i>		
APOCYNACEAE	<i>Gomphocarpus physocarpus</i>		
APOCYNACEAE	<i>Microloma tenuifolium</i>		
APOCYNACEAE	<i>Oncinema lineare</i>		
APOCYNACEAE	<i>Orbea variegata</i>		
APOCYNACEAE	<i>Secamone alpinii</i>		
APONOGETONACEAE	<i>Aponogeton distachyos</i>		
AQUIFOLIACEAE	<i>Ilex mitis</i>		
ARACEAE	<i>Zantedeschia aethiopica</i>		

ARALIACEAE	<i>Centella affinis</i>		
ARALIACEAE	<i>Centella asiatica</i>		
ARALIACEAE	<i>Centella caespitosa</i>		
ARALIACEAE	<i>Centella calliodus</i>		
ARALIACEAE	<i>Centella capensis</i>		
ARALIACEAE	<i>Centella difformis</i>		
ARALIACEAE	<i>Centella eriantha</i> var. <i>eriantha</i>		
ARALIACEAE	<i>Centella macrocarpa</i>		
ARALIACEAE	<i>Centella restioides</i>		
ARALIACEAE	<i>Centella scabra</i>		
ARALIACEAE	<i>Centella tridentata</i>		
ARALIACEAE	<i>Centella triloba</i>		
ARALIACEAE	<i>Centella virgata</i>		
ARALIACEAE	<i>Cussonia thyrsiflora</i>		
ARALIACEAE	<i>Hydrocotyle verticillata</i>		
ASPARAGACEAE	<i>Asparagus aethiopicus</i>		
ASPARAGACEAE	<i>Asparagus asparagoides</i>		
ASPARAGACEAE	<i>Asparagus capensis</i>		
ASPARAGACEAE	<i>Asparagus compactus</i>		
ASPARAGACEAE	<i>Asparagus declinatus</i>		
ASPARAGACEAE	<i>Asparagus lignosus</i>		
ASPARAGACEAE	<i>Asparagus rubicundus</i>		
ASPARAGACEAE	<i>Asparagus scandens</i>		
ASPARAGACEAE	<i>Asparagus stipulaceus</i>		
ASPHODELACEAE	<i>Aloe succotrina</i>		
ASPHODELACEAE	<i>Bulbine cepacea</i>		
ASPHODELACEAE	<i>Bulbine favosa</i>		
ASPHODELACEAE	<i>Bulbine filifolia</i>		
ASPHODELACEAE	<i>Bulbinella triquetra</i>		

ASPHODELACEAE	<i>Kniphofia tabularis</i>		
ASPHODELACEAE	<i>Kniphofia uvaria</i>		
ASPHODELACEAE	<i>Trachyandra ciliata</i>		
ASPHODELACEAE	<i>Trachyandra divaricata</i>		
ASPHODELACEAE	<i>Trachyandra hirsuta</i>		
ASPHODELACEAE	<i>Trachyandra hirsutiflora</i>		
ASPHODELACEAE	<i>Trachyandra revoluta</i>		
ASPHODELACEAE	<i>Trachyandra tabularis</i>		
ASPLENIACEAE	<i>Asplenium adiantum-nigrum</i>		
ASTERACEAE	<i>Alciope lanata</i>		K
ASTERACEAE	<i>Alciope tabularis</i>		
ASTERACEAE	<i>Amellus asteroides</i>		
ASTERACEAE	<i>Anaxeton asperum</i> subsp. <i>asperum</i>		
ASTERACEAE	<i>Anaxeton laeve</i>		
ASTERACEAE	<i>Anaxeton nycthemerum</i>		
ASTERACEAE	<i>Anaxeton virgatum</i>		K
ASTERACEAE	<i>Arctotheca calendula</i>		
ASTERACEAE	<i>Arctotheca populifolia</i>		
ASTERACEAE	<i>Arctotis acaulis</i>		
ASTERACEAE	<i>Arctotis angustifolia</i>		K
ASTERACEAE	<i>Arctotis flaccida</i>		
ASTERACEAE	<i>Athanasia crithmifolia</i>		
ASTERACEAE	<i>Athanasia trifurcata</i>		
ASTERACEAE	<i>Athrixia heterophylla</i> subsp. <i>heterophylla</i>		
ASTERACEAE	<i>Atrichantha</i> cf. <i>gemmifera</i>		
ASTERACEAE	<i>Berkheya barbata</i>		
ASTERACEAE	<i>Berkheya herbacea</i>		
ASTERACEAE	<i>Brachylaena neriifolia</i>		
ASTERACEAE	<i>Bryomorphe lycopodioides</i>		

ASTERACEAE	<i>Chrysanthemoides monilifera</i>		
ASTERACEAE	<i>Chrysocoma coma-aurea</i>		
ASTERACEAE	<i>Cineraria geifolia</i>		
ASTERACEAE	<i>Conyza pinnatifida</i>		
ASTERACEAE	<i>Conyza scabrida</i>		
ASTERACEAE	<i>Conyza ulmifolia</i>		
ASTERACEAE	<i>Corymbium africanum subsp. africanum</i>		
ASTERACEAE	<i>Corymbium africanum subsp. scabridum</i>		
ASTERACEAE	<i>Corymbium congestum</i>		
ASTERACEAE	<i>Corymbium cymosum</i>		
ASTERACEAE	<i>Corymbium glabrum</i>		
ASTERACEAE	<i>Corymbium glabrum var. glabrum</i>		Us
ASTERACEAE	<i>Corymbium villosum</i>		
ASTERACEAE	<i>Cotula turbinata</i>		
ASTERACEAE	<i>Cullumia setosa var. araneosa</i>		
ASTERACEAE	<i>Cullumia setosa var. setosa</i>		
ASTERACEAE	<i>Cullumia squarrosa</i>		
ASTERACEAE	<i>Dimorphotheca nudicaulis var. graminifolia</i>		
ASTERACEAE	<i>Dimorphotheca nudicaulis var. nudicaulis</i>		
ASTERACEAE	<i>Dimorphotheca walliana</i>		K
ASTERACEAE	<i>Disparago anomala</i>		
ASTERACEAE	<i>Disparago ericoides</i>		
ASTERACEAE	<i>Disparago laxifolia</i>		
ASTERACEAE	<i>Edmondia pinifolia</i>		
ASTERACEAE	<i>Edmondia sesamoides</i>		
ASTERACEAE	<i>Elytropappus gnaphaloides</i>		
ASTERACEAE	<i>Elytropappus longifolius</i>		

ASTERACEAE	<i>Elytropappus rhinocerotis</i>		
ASTERACEAE	<i>Euryops abrotanifolius</i>		
ASTERACEAE	<i>Euryops indecorus</i>		R
ASTERACEAE	<i>Euryops rupestris</i>		
ASTERACEAE	<i>Felicia aethiopica</i> subsp. <i>aethiopica</i>		
ASTERACEAE	<i>Felicia amelloides</i>		
ASTERACEAE	<i>Felicia bergerana</i>		
ASTERACEAE	<i>Felicia fruticosa</i>		
ASTERACEAE	<i>Gazania pectinata</i>		
ASTERACEAE	<i>Gazania serrata</i>		
ASTERACEAE	<i>Gerbera crocea</i>		
ASTERACEAE	<i>Gerbera linnaei</i>		
ASTERACEAE	<i>Gerbera tomentosa</i>		
ASTERACEAE	<i>Gibbaria ilicifolia</i>		
ASTERACEAE	<i>Haplocarpha lanata</i>		
ASTERACEAE	<i>Helichrysum asperum</i> var. <i>asperum</i>		
ASTERACEAE	<i>Helichrysum crispum</i>		
ASTERACEAE	<i>Helichrysum cymosum</i>		
ASTERACEAE	<i>Helichrysum dasyanthum</i>		
ASTERACEAE	<i>Helichrysum foetidum</i>		
ASTERACEAE	<i>Helichrysum helianthemifolium</i>		
ASTERACEAE	<i>Helichrysum indicum</i>		
ASTERACEAE	<i>Helichrysum litorale</i>		
ASTERACEAE	<i>Helichrysum niveum</i>		
ASTERACEAE	<i>Helichrysum pandurifolium</i>		
ASTERACEAE	<i>Helichrysum patulum</i>		
ASTERACEAE	<i>Helichrysum retortum</i>		
ASTERACEAE	<i>Helichrysum rutilans</i>		Us
ASTERACEAE	<i>Helichrysum spiralepis</i>		

ASTERACEAE	<i>Helichrysum teretifolium</i>		
ASTERACEAE	<i>Helichrysum tinctum</i>		
ASTERACEAE	<i>Heterolepis aliena</i>		
ASTERACEAE	<i>Hippia frutescens</i>		
ASTERACEAE	<i>Hippia pilosa</i>		
ASTERACEAE	<i>Hymenolepis indivisa</i>		
ASTERACEAE	<i>Hymenolepis parviflora</i>		
ASTERACEAE	<i>Lachnospermum umbellatum</i>		
ASTERACEAE	<i>Mairia coriacea</i>		
ASTERACEAE	<i>Metalasia bodkinii</i>		K
ASTERACEAE	<i>Metalasia brevifolia</i>		
ASTERACEAE	<i>Metalasia cephalotes</i>		
ASTERACEAE	<i>Metalasia confusa</i>		
ASTERACEAE	<i>Metalasia densa</i>		
ASTERACEAE	<i>Metalasia lichtensteinii</i>		
ASTERACEAE	<i>Metalasia muricata</i>		
ASTERACEAE	<i>Metalasia quinqueflora</i>		
ASTERACEAE	<i>Metalasia riparia</i>		
ASTERACEAE	<i>Metalasia seriphiifolia</i>		K
ASTERACEAE	<i>Metalasia tenuifolia</i>		
ASTERACEAE	<i>Nidorella foetida</i>		
ASTERACEAE	<i>Oedera imbricata</i>		
ASTERACEAE	<i>Oldenburgia intermedia</i>		
ASTERACEAE	<i>Osmitopsis afra</i>		
ASTERACEAE	<i>Osmitopsis asteriscoides</i>		
ASTERACEAE	<i>Osmitopsis parvifolia</i>		
ASTERACEAE	<i>Osteospermum ciliatum</i>		
ASTERACEAE	<i>Osteospermum imbricatum</i>		
ASTERACEAE	<i>Osteospermum junceum</i>		

ASTERACEAE	<i>Osteospermum rotundifolium</i>		
ASTERACEAE	<i>Othonna bulbosa</i>		
ASTERACEAE	<i>Othonna dentata</i>		
ASTERACEAE	<i>Othonna multicaulis</i>		
ASTERACEAE	<i>Othonna parviflora</i>		
ASTERACEAE	<i>Othonna perfoliata</i>		
ASTERACEAE	<i>Othonna quinqueidentata</i>		
ASTERACEAE	<i>Phaenocoma prolifera</i>		
ASTERACEAE	<i>Plecostachys serpyllifolia</i>		
ASTERACEAE	<i>Polyarrhena reflexa</i> subsp. <i>reflexa</i>		
ASTERACEAE	<i>Pseudognaphalium luteo-album</i>		
ASTERACEAE	<i>Pseudognaphalium undulatum</i>		
ASTERACEAE	<i>Pteronia camphorata</i>		
ASTERACEAE	<i>Pulicaria scabra</i>		
ASTERACEAE	<i>Senecio arniciflorus</i>		
ASTERACEAE	<i>Senecio asperulus</i>		
ASTERACEAE	<i>Senecio bipinnatus</i>		
ASTERACEAE	<i>Senecio burchellii</i>		
ASTERACEAE	<i>Senecio coleophyllus</i>		K
ASTERACEAE	<i>Senecio crassulaefolius</i>		
ASTERACEAE	<i>Senecio elegans</i>		
ASTERACEAE	<i>Senecio halimifolius</i>		
ASTERACEAE	<i>Senecio hastifolius</i>		
ASTERACEAE	<i>Senecio laevigatus</i>		
ASTERACEAE	<i>Senecio maritimus</i>		
ASTERACEAE	<i>Senecio matricariifolius</i>		
ASTERACEAE	<i>Senecio paniculatus</i>		
ASTERACEAE	<i>Senecio pinifolius</i>		
ASTERACEAE	<i>Senecio pterophorus</i>		

ASTERACEAE	<i>Senecio puberulus</i>		K
ASTERACEAE	<i>Senecio pubigerus</i>		
ASTERACEAE	<i>Senecio rigidus</i>		
ASTERACEAE	<i>Senecio rosmarinifolius</i>		
ASTERACEAE	<i>Senecio speciosus</i>		
ASTERACEAE	<i>Senecio triqueter</i>		
ASTERACEAE	<i>Senecio umbellatus</i>		
ASTERACEAE	<i>Senecio variifolius</i>		
ASTERACEAE	<i>Stoebe aethiopica</i>		
ASTERACEAE	<i>Stoebe capitata</i>		
ASTERACEAE	<i>Stoebe cinerea</i>		
ASTERACEAE	<i>Stoebe cyathuloides</i>		K
ASTERACEAE	<i>Stoebe incana</i>		
ASTERACEAE	<i>Stoebe plumosa</i>		
ASTERACEAE	<i>Stoebe spiralis</i>		
ASTERACEAE	<i>Stoebe vulgaris</i>		
ASTERACEAE	<i>Syncarpha argyropsis</i>		
ASTERACEAE	<i>Syncarpha canescens</i>		
ASTERACEAE	<i>Syncarpha canescens subsp. canescens</i>		
ASTERACEAE	<i>Syncarpha gnaphaloides</i>		
ASTERACEAE	<i>Syncarpha speciosissima</i>		
ASTERACEAE	<i>Syncarpha speciosissima subsp. speciosissima</i>		
ASTERACEAE	<i>Syncarpha variegata</i>		
ASTERACEAE	<i>Syncarpha vestita</i>		
ASTERACEAE	<i>Syncarpha zeyheri</i>		
ASTERACEAE	<i>Tarchonanthus camphoratus</i>		
ASTERACEAE	<i>Thaminophyllum multiflorum</i>		K
ASTERACEAE	<i>Thaminophyllum mundii</i>		R

ASTERACEAE	<i>Trichogyne ambigua</i>		
ASTERACEAE	<i>Tripteris clandestina</i>		
ASTERACEAE	<i>Ursinia dentata</i>		
ASTERACEAE	<i>Ursinia eckloniana</i>		
ASTERACEAE	<i>Ursinia nudicaulis</i>		
ASTERACEAE	<i>Ursinia paleacea</i>		
ASTERACEAE	<i>Ursinia quinquepartita</i>		
ASTERACEAE	<i>Vellereophyton dealbatum</i>		
ASTERACEAE	<i>Zyrphelis foliosa</i>		
ASTERACEAE	<i>Zyrphelis microcephala</i>		
ASTERACEAE	<i>Zyrphelis taxifolia</i>		
BALANOPHORACEAE	<i>Mystroptalon thomii</i>		
BLECHNACEAE	<i>Blechnum attenuatum</i> var. <i>giganteum</i>		
BLECHNACEAE	<i>Blechnum capense</i>		
BLECHNACEAE	<i>Blechnum punctulatum</i>		
BLECHNACEAE	<i>Blechnum tabulare</i>		
BORAGINACEAE	<i>Lobostemon montanus</i>		
BRASSICACEAE	<i>Heliophila africana</i>		
BRASSICACEAE	<i>Heliophila coronopifolia</i>		
BRASSICACEAE	<i>Heliophila diffusa</i> var. <i>flacca</i>		
BRASSICACEAE	<i>Heliophila linearis</i> var. <i>linearifolia</i>		
BRASSICACEAE	<i>Heliophila meyeri</i>		
BRASSICACEAE	<i>Heliophila pusilla</i>		
BRASSICACEAE	<i>Heliophila scoparia</i> var. <i>scoparia</i>		
BRASSICACEAE	<i>Berzelia abrotanoides</i>		
BRASSICACEAE	<i>Berzelia</i> cf. <i>burchellii</i>		
BRASSICACEAE	<i>Berzelia dregeana</i>		R
BRASSICACEAE	<i>Berzelia ecklonii</i>		R

BRASSICACEAE	<i>Berzelia lanuginosa</i>		
BRASSICACEAE	<i>Brunia albiflora</i>		
BRASSICACEAE	<i>Brunia alopecuroides</i>		
BRASSICACEAE	<i>Brunia laevis</i>		
BRASSICACEAE	<i>Brunia noduliflora</i>		
BRASSICACEAE	<i>Brunia stokoei</i>		
BRASSICACEAE	<i>Lonchostoma monogynum</i>		
BRASSICACEAE	<i>Lonchostoma purpureum</i>		R
BRASSICACEAE	<i>Nebelia fragarioides</i>		
BRASSICACEAE	<i>Nebelia paleacea</i>		
BRASSICACEAE	<i>Pseudobaeckea africana</i>		
BRASSICACEAE	<i>Pseudobaeckea cordata</i>		
BRASSICACEAE	<i>Raspalia microphylla</i>		
BRASSICACEAE	<i>Raspalia virgata</i>		
BRASSICACEAE	<i>Staavia brownii</i>		E
BRASSICACEAE	<i>Staavia radiata</i>		
CAMPANULACEAE	<i>Cyphia bulbosa</i>		
CAMPANULACEAE	<i>Cyphia digitata</i>		
CAMPANULACEAE	<i>Cyphia volubilis</i>		
CAMPANULACEAE	<i>Grammatotheca bergiana</i>		
CAMPANULACEAE	<i>Grammatotheca bergiana</i> var. <i>bergiana</i>		
CAMPANULACEAE	<i>Lobelia anceps</i>		
CAMPANULACEAE	<i>Lobelia capillifolia</i>		
CAMPANULACEAE	<i>Lobelia chamaepitys</i>		
CAMPANULACEAE	<i>Lobelia comosa</i>		
CAMPANULACEAE	<i>Lobelia coronopifolia</i>		
CAMPANULACEAE	<i>Lobelia erinus</i>		Us
CAMPANULACEAE	<i>Lobelia humifusa</i>		K
CAMPANULACEAE	<i>Lobelia jasionoides</i>		

CAMPANULACEAE	<i>Lobelia linearis</i>		
CAMPANULACEAE	<i>Lobelia pinifolia</i> var. <i>pinifolia</i>		Us
CAMPANULACEAE	<i>Lobelia pubescens</i>		
CAMPANULACEAE	<i>Lobelia setacea</i>		
CAMPANULACEAE	<i>Lobelia stenosisiphon</i>		
CAMPANULACEAE	<i>Lobelia tomentosa</i>		
CAMPANULACEAE	<i>Lobelia valida</i>		I
CAMPANULACEAE	<i>Merciera brevifolia</i>		
CAMPANULACEAE	<i>Merciera tenuifolia</i> var. <i>azurea</i>		
CAMPANULACEAE	<i>Merciera tenuifolia</i> var. <i>tenuifolia</i>		
CAMPANULACEAE	<i>Microcodon glomeratum</i>		
CAMPANULACEAE	<i>Monopsis debilis</i>		
CAMPANULACEAE	<i>Monopsis lutea</i>		
CAMPANULACEAE	<i>Prismatocarpus cordifolius</i>		R
CAMPANULACEAE	<i>Prismatocarpus diffusus</i>		
CAMPANULACEAE	<i>Prismatocarpus nitidus</i>		
CAMPANULACEAE	<i>Prismatocarpus sessilis</i> var. <i>sessilis</i>		
CAMPANULACEAE	<i>Roella ciliata</i>		
CAMPANULACEAE	<i>Roella compacta</i>		
CAMPANULACEAE	<i>Roella dregeana</i>		
CAMPANULACEAE	<i>Roella incurva</i>		
CAMPANULACEAE	<i>Roella maculata</i>		
CAMPANULACEAE	<i>Roella muscosa</i>		
CAMPANULACEAE	<i>Roella triflora</i>		
CAMPANULACEAE	<i>Siphocodon spartioides</i>		
CAMPANULACEAE	<i>Treichelia longebracteata</i>		
CAMPANULACEAE	<i>Wahlenbergia axillaris</i>		
CAMPANULACEAE	<i>Wahlenbergia capensis</i>		
CAMPANULACEAE	<i>Wahlenbergia capillaris</i>		

CAMPANULACEAE	<i>Wahlenbergia cernua</i>		
CAMPANULACEAE	<i>Wahlenbergia exilis</i>		
CAMPANULACEAE	<i>Wahlenbergia obovata</i>		
CAMPANULACEAE	<i>Wahlenbergia parvifolia</i>		
CAMPANULACEAE	<i>Wahlenbergia procumbens</i>		
CAMPANULACEAE	<i>Wahlenbergia rubioides</i>		
CAMPANULACEAE	<i>Wahlenbergia subulata</i>		
CAMPANULACEAE	<i>Wahlenbergia tenella</i>		
CAMPANULACEAE	<i>Wimmerella bifida</i>		
CAMPANULACEAE	<i>Wimmerella pygmaea</i>		
CAMPANULACEAE	<i>Wimmerella secunda</i>		
CARYOPHYLLACEAE	<i>Corrigiola litoralis</i>		
CARYOPHYLLACEAE	<i>Silene crassifolia</i>		
CARYOPHYLLACEAE	<i>Silene pilosellifolia</i>		
CARYOPHYLLACEAE	<i>Silene undulata</i>		
CELASTRACEAE	<i>Cassine peragua</i>		
CELASTRACEAE	<i>Cassine peragua subsp. barbara</i>		
CELASTRACEAE	<i>Cassine schinoides</i>		
CELASTRACEAE	<i>Maurocenia frangula</i>		
CELASTRACEAE	<i>Maytenus acuminata</i>		
CELASTRACEAE	<i>Maytenus lucida</i>		
CELASTRACEAE	<i>Maytenus oleoides</i>		
CELASTRACEAE	<i>Pterocelastrus rostratus</i>		
CELASTRACEAE	<i>Pterocelastrus tricuspidatus</i>		
CELASTRACEAE	<i>Putterlickia pyracantha</i>		
CELASTRACEAE	<i>Robsonodendron maritimum</i>		
CELASTRACEAE	<i>Androcymbium eucomoides</i>		
CELASTRACEAE	<i>Baeometra uniflora</i>		
CELASTRACEAE	<i>Onixotis punctata</i>		

CELASTRACEAE	<i>Wurmbea recurva</i>		
CELASTRACEAE	<i>Commelina africana</i>		
CONVALLARIACEAE	<i>Eriospermum cernuum</i>		
CONVALLARIACEAE	<i>Eriospermum pumilum</i>		Us
CONVALLARIACEAE	<i>Eriospermum cf. schlechteri</i>		
CONVALLARIACEAE	<i>Cuscuta angulata</i>		
CONVALLARIACEAE	<i>Cuscuta nitida</i>		
CONVALLARIACEAE	<i>Falkia repens</i>		
CORNACEAE	<i>Curtisia dentata</i>		
CRASSULACEAE	<i>Cotyledon orbiculata</i>		
CRASSULACEAE	<i>Crassula capensis</i>		
CRASSULACEAE	<i>Crassula coccinea</i>		
CRASSULACEAE	<i>Crassula fascicularis</i>		
CRASSULACEAE	<i>Crassula cf. filiformis</i>		
CRASSULACEAE	<i>Crassula glomerata</i>		
CRASSULACEAE	<i>Crassula natans</i>		
CRASSULACEAE	<i>Crassula nudicaulis</i> var. <i>nudicaulis</i>		
CRASSULACEAE	<i>Crassula obtusa</i>		
CRASSULACEAE	<i>Crassula cf. pellucida</i> subsp. <i>marginalis</i>		
CRASSULACEAE	<i>Crassula rupestris</i>		
CRASSULACEAE	<i>Crassula subulata</i> var. <i>subulata</i>		
CRASSULACEAE	<i>Crassula tetragona</i>		
CUCURBITACEAE	<i>Kedrostis nana</i>		
CUNONIACEAE	<i>Cunonia capensis</i>		
CUNONIACEAE	<i>Platylophus trifoliatus</i>		
CUPRESSACEAE	<i>Widdringtonia nodiflora</i>		Us
CYATHEACEAE	<i>Cyathea capensis</i>		Us
CYPERACEAE	<i>Carex clavata</i>		

CYPERACEAE	<i>Carpha glomerata</i>		
CYPERACEAE	<i>Chrysithrix capensis</i>		
CYPERACEAE	<i>Chrysithrix junciformis</i>		
CYPERACEAE	<i>Cyathocoma hexandra</i>		
CYPERACEAE	<i>Cyperus denudatus</i>		
CYPERACEAE	<i>Cyperus sphaerospermus</i>		
CYPERACEAE	<i>Cyperus thunbergii</i>		
CYPERACEAE	<i>Epischoenus complanatus</i>		
CYPERACEAE	<i>Epischoenus gracilis</i>		
CYPERACEAE	<i>Epischoenus lucidus</i>		
CYPERACEAE	<i>Epischoenus quadrangularis</i>		
CYPERACEAE	<i>Epischoenus villosus</i>		
CYPERACEAE	<i>Ficinia acuminata</i>		
CYPERACEAE	<i>Ficinia albicans</i>		
CYPERACEAE	<i>Ficinia anceps</i>		
CYPERACEAE	<i>Ficinia angustifolia</i>		
CYPERACEAE	<i>Ficinia brevifolia</i>		
CYPERACEAE	<i>Ficinia bulbosa</i>		
CYPERACEAE	<i>Ficinia capillifolia</i>		
CYPERACEAE	<i>Ficinia capitella</i>		
CYPERACEAE	<i>Ficinia deusta</i>		
CYPERACEAE	<i>Ficinia dunensis</i>		
CYPERACEAE	<i>Ficinia ecklonea</i>		
CYPERACEAE	<i>Ficinia elatior</i>		
CYPERACEAE	<i>Ficinia gracilis</i>		
CYPERACEAE	<i>Ficinia indica</i>		
CYPERACEAE	<i>Ficinia ixioides</i>		
CYPERACEAE	<i>Ficinia lateralis</i>		
CYPERACEAE	<i>Ficinia levynsiae</i>		

CYPERACEAE	<i>Ficinia minutiflora</i>		
CYPERACEAE	<i>Ficinia monticola</i>		
CYPERACEAE	<i>Ficinia nigrescens</i>		
CYPERACEAE	<i>Ficinia nodosus</i>		
CYPERACEAE	<i>Ficinia oligantha</i>		
CYPERACEAE	<i>Ficinia pallens</i>		
CYPERACEAE	<i>Ficinia pallens</i> var. <i>lithosperma</i>		
CYPERACEAE	<i>Ficinia pinguior</i>		
CYPERACEAE	<i>Ficinia radiata</i>		
CYPERACEAE	<i>Ficinia ramosissima</i>		
CYPERACEAE	<i>Ficinia stolonifera</i>		
CYPERACEAE	<i>Ficinia tenuifolia</i>		
CYPERACEAE	<i>Ficinia trichodes</i>		
CYPERACEAE	<i>Ficinia tristachya</i>		
CYPERACEAE	<i>Ficinia zeyheri</i>		
CYPERACEAE	<i>Fuirena hirsuta</i>		
CYPERACEAE	<i>Hellmuthia membranacea</i>		
CYPERACEAE	<i>Isolepis cernua</i>		
CYPERACEAE	<i>Isolepis digitata</i>		
CYPERACEAE	<i>Isolepis fluitans</i>		
CYPERACEAE	<i>Isolepis incomtula</i>		
CYPERACEAE	<i>Isolepis marginata</i>		
CYPERACEAE	<i>Isolepis prolifer</i>		
CYPERACEAE	<i>Isolepis tenuissima</i>		
CYPERACEAE	<i>Isolepis venustula</i>		
CYPERACEAE	<i>Mariscus congestus</i>		
CYPERACEAE	<i>Neesenbeckia punctoria</i>		
CYPERACEAE	<i>Pycnus polystachyos</i>		
CYPERACEAE	<i>Schoenoplectus scirpoideus</i>		

CYPERACEAE	<i>Schoenoxiphium lanceum</i>		
CYPERACEAE	<i>Schoenus nigricans</i>		
CYPERACEAE	<i>Tetraria bolusii</i>		
CYPERACEAE	<i>Tetraria brachyphylla</i>		K
CYPERACEAE	<i>Tetraria brevicaulis</i>		
CYPERACEAE	<i>Tetraria bromoides</i>		
CYPERACEAE	<i>Tetraria capillacea</i>		
CYPERACEAE	<i>Tetraria compar</i>		
CYPERACEAE	<i>Tetraria crinifolia</i>		
CYPERACEAE	<i>Tetraria cuspidata</i>		
CYPERACEAE	<i>Tetraria exilis</i>		
CYPERACEAE	<i>Tetraria eximia</i>		
CYPERACEAE	<i>Tetraria fasciata</i>		
CYPERACEAE	<i>Tetraria fimbriolata</i>		
CYPERACEAE	<i>Tetraria flexuosa</i>		
CYPERACEAE	<i>Tetraria microstachys</i>		
CYPERACEAE	<i>Tetraria sylvatica</i>		
CYPERACEAE	<i>Tetraria thermalis</i>		
DENNSTAEDTIACEAE	<i>Histiopteris incisa</i>		
DENNSTAEDTIACEAE	<i>Pteridium aquilinum</i>		
DIPSACACEAE	<i>Scabiosa columbaria</i>		
DROSERACEAE	<i>Drosera aliciae</i>		
DROSERACEAE	<i>Drosera capensis</i>		
DROSERACEAE	<i>Drosera cistiflora</i>		
DROSERACEAE	<i>Drosera glabripes</i>		
DROSERACEAE	<i>Drosera hilaris</i>		
DROSERACEAE	<i>Drosera trinervia</i>		
DRYOPTERIDACEAE	<i>Rumohra adiantiformis</i>		
EBENACEAE	<i>Diospyros glabra</i>		

EBENACEAE	<i>Euclea polyandra</i>		
EBENACEAE	<i>Euclea racemosa</i>		
ERICACEAE	<i>Erica amphigena</i>		
ERICACEAE	<i>Erica anguliger</i>		
ERICACEAE	<i>Erica articularis</i>		
ERICACEAE	<i>Erica axillaris</i>		
ERICACEAE	<i>Erica azaleifolia</i>		
ERICACEAE	<i>Erica banksia</i>		
ERICACEAE	<i>Erica barbigeroides</i>		
ERICACEAE	<i>Erica cf. benthamiana</i>		
ERICACEAE	<i>Erica bibax</i>		
ERICACEAE	<i>Erica borboniifolia</i>		
ERICACEAE	<i>Erica brachialis</i>		
ERICACEAE	<i>Erica brevifolia</i>		
ERICACEAE	<i>Erica bruniades</i>		
ERICACEAE	<i>Erica cabernetea</i>		
ERICACEAE	<i>Erica caffra</i>		
ERICACEAE	<i>Erica calycina</i> var. <i>periplociflora</i>		
ERICACEAE	<i>Erica campanularis</i>		
ERICACEAE	<i>Erica capillaris</i>		
ERICACEAE	<i>Erica cerinthoides</i>		
ERICACEAE	<i>Erica chiroptera</i>		
ERICACEAE	<i>Erica cincta</i>		
ERICACEAE	<i>Erica coccinea</i>		
ERICACEAE	<i>Erica comptonii</i>		R
ERICACEAE	<i>Erica corifolia</i>		
ERICACEAE	<i>Erica corydalis</i>		
ERICACEAE	<i>Erica cristata</i>		
ERICACEAE	<i>Erica cruenta</i>		

ERICACEAE	<i>Erica cunoniensis</i>		
ERICACEAE	<i>Erica curviflora</i>		
ERICACEAE	<i>Erica curvirostris</i>		
ERICACEAE	<i>Erica cygnea</i>		
ERICACEAE	<i>Erica desmantha</i>		
ERICACEAE	<i>Erica discolor</i>		
ERICACEAE	<i>Erica distorta</i>		
ERICACEAE	<i>Erica duthieae</i>		
ERICACEAE	<i>Erica equisetifolia</i>		
ERICACEAE	<i>Erica ericoides</i>		
ERICACEAE	<i>Erica eriocephala</i>		
ERICACEAE	<i>Erica exleeana</i>		
ERICACEAE	<i>Erica extrusa</i>		
ERICACEAE	<i>Erica fascicularis</i>		
ERICACEAE	<i>Erica fastigiata</i>		
ERICACEAE	<i>Erica fervida</i>		K
ERICACEAE	<i>Erica filiformis</i>		
ERICACEAE	<i>Erica foliacea</i>		
ERICACEAE	<i>Erica genistifolia</i>		
ERICACEAE	<i>Erica georgica</i>		
ERICACEAE	<i>Erica glabripes</i>		
ERICACEAE	<i>Erica globiceps</i>		
ERICACEAE	<i>Erica gnaphaloides</i>		
ERICACEAE	<i>Erica guthriei</i>		
ERICACEAE	<i>Erica gysbertii</i>		
ERICACEAE	<i>Erica hispidula</i>		
ERICACEAE	<i>Erica holosericea</i>		
ERICACEAE	<i>Erica humidicola</i>		R
ERICACEAE	<i>Erica imbricata</i>		

ERICACEAE	<i>Erica intervallaris</i>		
ERICACEAE	<i>Erica kogelbergensis</i>		
ERICACEAE	<i>Erica krugeri</i>		
ERICACEAE	<i>Erica labialis</i>		
ERICACEAE	<i>Erica laeta</i>		
ERICACEAE	<i>Erica laevigata</i>		
ERICACEAE	<i>Erica lananthera</i>		
ERICACEAE	<i>Erica cf. lateralis</i>		
ERICACEAE	<i>Erica leucotrachela</i>		
ERICACEAE	<i>Erica longifolia</i>		
ERICACEAE	<i>Erica longifolia</i> var. <i>amplicata</i>		
ERICACEAE	<i>Erica lowryensis</i>		R
ERICACEAE	<i>Erica lutea</i>		
ERICACEAE	<i>Erica lycopodiastrium</i>		
ERICACEAE	<i>Erica macowanii</i>		
ERICACEAE	<i>Erica macroloma</i>		
ERICACEAE	<i>Erica mammosa</i>		
ERICACEAE	<i>Erica massonii</i>		
ERICACEAE	<i>Erica melastoma</i>		
ERICACEAE	<i>Erica monadelpha</i>		
ERICACEAE	<i>Erica multiflexuosa</i>		
ERICACEAE	<i>Erica multumbellifera</i>		
ERICACEAE	<i>Erica muscosa</i>		
ERICACEAE	<i>Erica nana</i>		R
ERICACEAE	<i>Erica nivea</i>		
ERICACEAE	<i>Erica notholeeana</i>		
ERICACEAE	<i>Erica nudiflora</i>		
ERICACEAE	<i>Erica obliqua</i>		
ERICACEAE	<i>Erica obtusata</i>		

ERICACEAE	<i>Erica oreophila</i>		
ERICACEAE	<i>Erica pageana</i>		
ERICACEAE	<i>Erica palliiflora</i>		
ERICACEAE	<i>Erica parviflora</i>		
ERICACEAE	<i>Erica patersonia</i>		R
ERICACEAE	<i>Erica paucifolia</i>		
ERICACEAE	<i>Erica perspicua</i>		
ERICACEAE	<i>Erica petrophila</i>		
ERICACEAE	<i>Erica pillansii</i>		V
ERICACEAE	<i>Erica pinea</i>		
ERICACEAE	<i>Erica placentiflora</i>		
ERICACEAE	<i>Erica plukenetii</i>		
ERICACEAE	<i>Erica plumigera</i>		
ERICACEAE	<i>Erica porteri</i>		V
ERICACEAE	<i>Erica pulchella</i>		
ERICACEAE	<i>Erica pycnantha</i>		
ERICACEAE	<i>Erica quadrangularis</i>		
ERICACEAE	<i>Erica retorta</i>		
ERICACEAE	<i>Erica rhopalantha</i>		
ERICACEAE	<i>Erica rigidula</i>		
ERICACEAE	<i>Erica saxicola</i>		
ERICACEAE	<i>Erica serrata</i>		
ERICACEAE	<i>Erica sessiliflora</i>		
ERICACEAE	<i>Erica sexfaria</i>		
ERICACEAE	<i>Erica similis</i>		
ERICACEAE	<i>Erica sitiens</i>		
ERICACEAE	<i>Erica sonderiana</i>		
ERICACEAE	<i>Erica sp. nov. (autumnalis complex)</i>		
ERICACEAE	<i>Erica sp. nov. (gysbertii complex)</i>		

ERICACEAE	<i>Erica sp. nov. (intervallaris complex)</i>		
ERICACEAE	<i>Erica sp. nov. (retorta complex)</i>		
ERICACEAE	<i>Erica spumosa</i>		
ERICACEAE	<i>Erica stokoei</i>		
ERICACEAE	<i>Erica subdivaricata</i>		
ERICACEAE	<i>Erica tenax</i>		
ERICACEAE	<i>Erica tenella/sitiens complex</i>		
ERICACEAE	<i>Erica tenuifolia</i>		
ERICACEAE	<i>Erica thomae</i>		
ERICACEAE	<i>Erica transparens</i>		
ERICACEAE	<i>Erica trichroma</i>		
ERICACEAE	<i>Erica triflora</i>		
ERICACEAE	<i>Erica tristis</i>		
ERICACEAE	<i>Erica truncata</i>		
ERICACEAE	<i>Erica turbiniflora var. aristata</i>		
ERICACEAE	<i>Erica urceolata</i>		
ERICACEAE	<i>Erica utriculosa</i>		
ERICACEAE	<i>Erica vallisaraneorum</i>		R
ERICACEAE	<i>Erica velitaris</i>		Ex
EUPHORBIACEAE	<i>Adenocline pauciflora</i>		Us
EUPHORBIACEAE	<i>Clutia alaternoides</i>		
EUPHORBIACEAE	<i>Clutia alaternoides var. alaternoides</i>		
EUPHORBIACEAE	<i>Clutia alaternoides var. brevifolia</i>		
EUPHORBIACEAE	<i>Clutia alaternoides var. major</i>		
EUPHORBIACEAE	<i>Clutia ericoides</i>		
EUPHORBIACEAE	<i>Clutia polifolia</i>		
EUPHORBIACEAE	<i>Clutia polygonoides</i>		
EUPHORBIACEAE	<i>Clutia pulchella</i>		
EUPHORBIACEAE	<i>Euphorbia erythrina</i>		

EUPHORBIACEAE	<i>Euphorbia silenifolia</i>		
FABACEAE	<i>Amphithalea cf. biovulata</i>		V
FABACEAE	<i>Amphithalea bowiei</i>		V
FABACEAE	<i>Amphithalea ericifolia</i>		
FABACEAE	<i>Amphithalea oppositifolia</i>		E
FABACEAE	<i>Amphithalea tomentosa</i>		V
FABACEAE	<i>Amphithalea virgata</i>		E
FABACEAE	<i>Argyrobium filiforme</i>		
FABACEAE	<i>Argyrobium cf. lunare</i>		
FABACEAE	<i>Argyrobium tuberosum</i>		
FABACEAE	<i>Aspalathus abietina</i>		
FABACEAE	<i>Aspalathus acanthiloba</i>		K
FABACEAE	<i>Aspalathus aciphylla</i>		
FABACEAE	<i>Aspalathus angustifolia</i> subsp. <i>angustifolia</i>		
FABACEAE	<i>Aspalathus araneosa</i>		
FABACEAE	<i>Aspalathus aspalathoides</i>		
FABACEAE	<i>Aspalathus biflora</i>		
FABACEAE	<i>Aspalathus caledonensis</i>		
FABACEAE	<i>Aspalathus callosa</i>		
FABACEAE	<i>Aspalathus ciliaris</i>		
FABACEAE	<i>Aspalathus concava</i>		K
FABACEAE	<i>Aspalathus cordata</i>		
FABACEAE	<i>Aspalathus crassisepala</i>		
FABACEAE	<i>Aspalathus crenata</i>		
FABACEAE	<i>Aspalathus cymbiformis</i>		
FABACEAE	<i>Aspalathus cf. dasyantha</i>		
FABACEAE	<i>Aspalathus divaricata</i> subsp. <i>divaricata</i>		
FABACEAE	<i>Aspalathus dunsdoniana</i>		

FABACEAE	<i>Aspalathus ericifolia</i> subsp. <i>ericifolia</i>		
FABACEAE	<i>Aspalathus excelsa</i>		R
FABACEAE	<i>Aspalathus filicaulis</i>		
FABACEAE	<i>Aspalathus forbesii</i>		
FABACEAE	<i>Aspalathus fusca</i>		
FABACEAE	<i>Aspalathus globosa</i>		
FABACEAE	<i>Aspalathus globulosa</i>		I
FABACEAE	<i>Aspalathus hispida</i> subsp. <i>hispida</i>		
FABACEAE	<i>Aspalathus intervallaris</i>		
FABACEAE	<i>Aspalathus juniperina</i> subsp. <i>juniperina</i>		
FABACEAE	<i>Aspalathus linearis</i>		
FABACEAE	<i>Aspalathus linguiloba</i>		
FABACEAE	<i>Aspalathus macrantha</i>		I
FABACEAE	<i>Aspalathus marginata</i>		
FABACEAE	<i>Aspalathus monosperma</i>		
FABACEAE	<i>Aspalathus neglecta</i>		
FABACEAE	<i>Aspalathus oblongifolia</i>		
FABACEAE	<i>Aspalathus pachyloba</i> subsp. <i>villicaulis</i>		R
FABACEAE	<i>Aspalathus ramulosa</i>		E
FABACEAE	<i>Aspalathus retroflexa</i>		R
FABACEAE	<i>Aspalathus sericea</i>		R
FABACEAE	<i>Aspalathus serpens</i>		R
FABACEAE	<i>Aspalathus stenophylla</i>		
FABACEAE	<i>Aspalathus stokoei</i>		
FABACEAE	<i>Aspalathus subtingens</i>		
FABACEAE	<i>Aspalathus ternata</i>		
FABACEAE	<i>Bolusafra bituminosa</i>		
FABACEAE	<i>Cyclopia capensis</i>		

FABACEAE	<i>Cyclopia genistoides</i>		
FABACEAE	<i>Cyclopia maculata</i>		
FABACEAE	<i>Cyclopia meyeriana</i>		
FABACEAE	<i>Dipogon lignosus</i>		
FABACEAE	<i>Hypocalyptus coluteoides</i>		
FABACEAE	<i>Hypocalyptus oxalidifolius</i>		
FABACEAE	<i>Indigofera cf. alopecuroides var. alopecuroides</i>		
FABACEAE	<i>Indigofera angustifolia</i>		
FABACEAE	<i>Indigofera brachystachya</i>		
FABACEAE	<i>Indigofera cf. candolleana</i>		
FABACEAE	<i>Indigofera capillaris</i>		
FABACEAE	<i>Indigofera cytisoides</i>		
FABACEAE	<i>Indigofera filicaulis</i>		
FABACEAE	<i>Indigofera filifolia</i>		
FABACEAE	<i>Indigofera filiformis</i>		
FABACEAE	<i>Indigofera glomerata</i>		
FABACEAE	<i>Indigofera guthriei</i>		
FABACEAE	<i>Indigofera hamulosa</i>		
FABACEAE	<i>Indigofera heterophylla</i>		
FABACEAE	<i>Indigofera humifusa</i>		
FABACEAE	<i>Indigofera incana</i>		
FABACEAE	<i>Indigofera cf. ionii</i>		
FABACEAE	<i>Indigofera ovata</i>		
FABACEAE	<i>Indigofera sarmentosa</i>		
FABACEAE	<i>Indigofera stricta</i>		
FABACEAE	<i>Indigofera cf. trita subsp. subulata</i>		
FABACEAE	<i>Lebeckia cf. carnososa</i>		
FABACEAE	<i>Lebeckia wrightii</i>		
FABACEAE	<i>Lessertia cf. capensis</i>		

FABACEAE	<i>Lessertia frutescens</i>		
FABACEAE	<i>Liparia angustifolia</i>		
FABACEAE	<i>Liparia boucheri</i>		
FABACEAE	<i>Liparia calycina</i>		
FABACEAE	<i>Liparia myrtifolia</i>		
FABACEAE	<i>Liparia rafnioides</i>		
FABACEAE	<i>Liparia splendens subsp. comantha</i>		
FABACEAE	<i>Liparia vestita</i>		R
FABACEAE	<i>Lotononis cf. involucrata</i>		
FABACEAE	<i>Lotononis prostrata</i>		
FABACEAE	<i>Otholobium cf. bracteolatum</i>		
FABACEAE	<i>Otholobium cf. obliquum</i>		
FABACEAE	<i>Otholobium rotundifolium</i>		V
FABACEAE	<i>Otholobium virgatum</i>		
FABACEAE	<i>Otholobium zeyheri</i>		V
FABACEAE	<i>Paraserianthes cf. laphantha subsp. laphantha</i>		
FABACEAE	<i>Podalyria biflora</i>		
FABACEAE	<i>Podalyria calypttrata</i>		
FABACEAE	<i>Podalyria cordata</i>		R
FABACEAE	<i>Podalyria cf. hirsuta</i>		
FABACEAE	<i>Podalyria cf. racemulosa</i>		
FABACEAE	<i>Podalyria speciosa</i>		
FABACEAE	<i>Podalyria cf. tomentosa</i>		
FABACEAE	<i>Psoralea aculeata</i>		R
FABACEAE	<i>Psoralea affinis</i>		
FABACEAE	<i>Psoralea aphylla</i>		
FABACEAE	<i>Psoralea asarina</i>		
FABACEAE	<i>Psoralea cf. cordata</i>		
FABACEAE	<i>Psoralea imbricata</i>		R

FABACEAE	<i>Psoralea laxa</i>		
FABACEAE	<i>Psoralea pinnata</i>		
FABACEAE	<i>Psoralea repens</i>		V
FABACEAE	<i>Psoralea restioides</i>		R
FABACEAE	<i>Rafnia cuneifolia</i>		
FABACEAE	<i>Rafnia elliptica</i>		
FABACEAE	<i>Rafnia lancea</i>		
FABACEAE	<i>Rafnia perfoliata</i>		
FABACEAE	<i>Rafnia triflora</i>		
FABACEAE	<i>Rhynchosia chrysoscias</i>		
FABACEAE	<i>Rhynchosia ferulifolia</i>		
FABACEAE	<i>Rhynchosia leucoscias</i>		
FABACEAE	<i>Virgilia oroboides</i>		
FUMARIACEAE	<i>Cysticapnos cracca</i>		
GENTIANACEAE	<i>Chironia baccifera</i>		
GENTIANACEAE	<i>Chironia decumbens</i>		
GENTIANACEAE	<i>Chironia jasminoides</i>		
GENTIANACEAE	<i>Chironia linoides</i> subsp. <i>linoides</i>		
GENTIANACEAE	<i>Chironia linoides</i> subsp. <i>nana</i>		
GENTIANACEAE	<i>Chironia melampyrifolia</i>		
GENTIANACEAE	<i>Chironia stokoei</i>		
GENTIANACEAE	<i>Chironia tetragona</i>		
GENTIANACEAE	<i>Orphium frutescens</i>		
GENTIANACEAE	<i>Sebaea aurea</i>		
GENTIANACEAE	<i>Sebaea minutiflora</i>		
GENTIANACEAE	<i>Sebaea zeyheri</i>		
GERANIACEAE	<i>Erodium</i> cf. <i>botrys</i>		
GERANIACEAE	<i>Erodium</i> cf. <i>malacoides</i>		
GERANIACEAE	<i>Geranium</i> cf. <i>flanaganii</i>		

GERANIACEAE	<i>Geranium incanum</i>		
GERANIACEAE	<i>Pelargonium betulinum</i>		
GERANIACEAE	<i>Pelargonium candicans</i>		
GERANIACEAE	<i>Pelargonium capillare</i>		
GERANIACEAE	<i>Pelargonium capitatum</i>		
GERANIACEAE	<i>Pelargonium carneum</i>		
GERANIACEAE	<i>Pelargonium chamaedryfolium</i>		
GERANIACEAE	<i>Pelargonium cucullatum</i>		
GERANIACEAE	<i>Pelargonium cucullatum</i> subsp. <i>cucullatum</i>		
GERANIACEAE	<i>Pelargonium dipetalum</i>		
GERANIACEAE	<i>Pelargonium elongatum</i>		
GERANIACEAE	<i>Pelargonium grossularioides</i>		
GERANIACEAE	<i>Pelargonium incarnatum</i>		
GERANIACEAE	<i>Pelargonium longifolium</i>		
GERANIACEAE	<i>Pelargonium moniliforme</i>		
GERANIACEAE	<i>Pelargonium multicaule</i>		
GERANIACEAE	<i>Pelargonium myrrhifolium</i>		
GERANIACEAE	<i>Pelargonium pinnatum</i>		
GERANIACEAE	<i>Pelargonium setulosum</i>		
GERANIACEAE	<i>Pelargonium tabulare</i>		
GERANIACEAE	<i>Pelargonium triste</i>		
GESNERIACEAE	<i>Charadrophila capensis</i>		V
GLEICHENIACEAE	<i>Gleichenia polypodioides</i>		
GRUBBIACEAE	<i>Grubbia rosmarinifolia</i>		
GRUBBIACEAE	<i>Grubbia rourkei</i>		R
GRUBBIACEAE	<i>Grubbia tomentosa</i>		
HAEMODORACEAE	<i>Dilatis pillansii</i>		
HAEMODORACEAE	<i>Dilatis viscosa</i>		
HAEMODORACEAE	<i>Wachendorfia multiflora</i>		

HAEMODORACEAE	<i>Wachendorfia paniculata</i>		
HAEMODORACEAE	<i>Wachendorfia thyrsiflora</i>		
HALORAGACEAE	<i>Lauremburgia repens</i>		
HALORAGACEAE	<i>Lauremburgia repens subsp. brachypoda</i>		
HEMEROCALLIDACEAE	<i>Caesia contorta</i>		
HYACINTHACEAE	<i>Albuca cooperi</i>		
HYACINTHACEAE	<i>Albuca flaccida</i>		
HYACINTHACEAE	<i>Drimia convallarioides</i>		
HYACINTHACEAE	<i>Drimia exuviata</i>		
HYACINTHACEAE	<i>Drimia filifolia</i>		Us
HYACINTHACEAE	<i>Drimia modesta</i>		Us
HYACINTHACEAE	<i>Lachenalia bulbifera</i>		
HYACINTHACEAE	<i>Lachenalia orchiorides</i>		
HYACINTHACEAE	<i>Lachenalia peersii</i>		
HYACINTHACEAE	<i>Lachenalia rosea</i>		
HYACINTHACEAE	<i>Ornithogalum graminifolium</i>		
HYACINTHACEAE	<i>Ornithogalum hispidum subsp. bergii</i>		
HYACINTHACEAE	<i>Ornithogalum juncifolium</i>		
HYACINTHACEAE	<i>Ornithogalum thyrsoides</i>		
HYACINTHACEAE	<i>Trachyandra esterhuysenae</i>		
HYMENOPHYLLACEAE	<i>Hymenophyllum capense</i>		
HYMENOPHYLLACEAE	<i>Hymenophyllum tunbridgense</i>		
HYPOXIDACEAE	<i>Empodium plicatum</i>		
HYPOXIDACEAE	<i>Pauridia minuta</i>		
HYPOXIDACEAE	<i>Spiloxene capensis</i>		
HYPOXIDACEAE	<i>Spiloxene curculigoides</i>		
HYPOXIDACEAE	<i>Spiloxene flaccida</i>		
HYPOXIDACEAE	<i>Spiloxene monophylla</i>		
HYPOXIDACEAE	<i>Spiloxene serrata</i>		

ICACINACEAE	<i>Apodytes dimidiata</i>		
IRIDACEAE	<i>Aristea africana</i>		
IRIDACEAE	<i>Aristea bakeri</i>		
IRIDACEAE	<i>Aristea cantharophila</i>		
IRIDACEAE	<i>Aristea cuspidata</i>		
IRIDACEAE	<i>Aristea juncifolia</i>		
IRIDACEAE	<i>Aristea major</i>		
IRIDACEAE	<i>Aristea oligocephala</i>		
IRIDACEAE	<i>Aristea racemosa</i> var. <i>racemosa</i>		
IRIDACEAE	<i>Aristea recisa</i>		K
IRIDACEAE	<i>Aristea spiralis</i>		
IRIDACEAE	<i>Babiana nana</i> var. <i>maculata</i>		
IRIDACEAE	<i>Babiana stricta</i>		
IRIDACEAE	<i>Bobartia aphylla</i>		
IRIDACEAE	<i>Bobartia gladiata</i> subsp. <i>gladiata</i>		
IRIDACEAE	<i>Bobartia indica</i>		
IRIDACEAE	<i>Bobartia longicyma</i>		K
IRIDACEAE	<i>Chasmanthe aethiopica</i>		
IRIDACEAE	<i>Chasmanthe floribunda</i>		
IRIDACEAE	<i>Ferraria crispa</i> subsp. <i>crispa</i>		Us
IRIDACEAE	<i>Geissorhiza aspera</i>		
IRIDACEAE	<i>Geissorhiza bolusii</i>		
IRIDACEAE	<i>Geissorhiza cateractarum</i>		
IRIDACEAE	<i>Geissorhiza hesperanthoides</i>		
IRIDACEAE	<i>Geissorhiza imbricata</i> subsp. <i>imbricata</i>		
IRIDACEAE	<i>Geissorhiza inflexa</i>		
IRIDACEAE	<i>Geissorhiza juncea</i>		
IRIDACEAE	<i>Geissorhiza lithicola</i>		R
IRIDACEAE	<i>Geissorhiza nubigena</i>		

IRIDACEAE	<i>Geissorhiza ornithogaloides</i>		
IRIDACEAE	<i>Geissorhiza ovata</i>		
IRIDACEAE	<i>Geissorhiza ramosa</i>		
IRIDACEAE	<i>Geissorhiza umbrosa</i>		
IRIDACEAE	<i>Gladiolus alatus</i>		
IRIDACEAE	<i>Gladiolus blommesteinii</i>		Us
IRIDACEAE	<i>Gladiolus brevifolius</i>		
IRIDACEAE	<i>Gladiolus brevifolius</i>		R
IRIDACEAE	<i>Gladiolus bullatus</i>		
IRIDACEAE	<i>Gladiolus cardinalis</i>		Us
IRIDACEAE	<i>Gladiolus carinatus</i>		
IRIDACEAE	<i>Gladiolus carmineus</i>		R
IRIDACEAE	<i>Gladiolus carneus</i>		
IRIDACEAE	<i>Gladiolus cunonius</i>		
IRIDACEAE	<i>Gladiolus debilis</i> var. <i>cochleatus</i>		
IRIDACEAE	<i>Gladiolus debilis</i> var. <i>debilis</i>		
IRIDACEAE	<i>Gladiolus gracilis</i>		
IRIDACEAE	<i>Gladiolus hyalinus</i>		
IRIDACEAE	<i>Gladiolus liliaceus</i>		
IRIDACEAE	<i>Gladiolus maculatus</i>		Us
IRIDACEAE	<i>Gladiolus martleyi</i>		
IRIDACEAE	<i>Gladiolus nerineoides</i>		R
IRIDACEAE	<i>Gladiolus permeabilis</i> subsp. <i>permeabilis</i>		
IRIDACEAE	<i>Gladiolus priorii</i>		
IRIDACEAE	<i>Gladiolus punctulatus</i> var. <i>punctulatus</i>		Us
IRIDACEAE	<i>Gladiolus subcaeruleus</i>		Us
IRIDACEAE	<i>Gladiolus undulatus</i>		
IRIDACEAE	<i>Gladiolus vigilans</i>		R
IRIDACEAE	<i>Hesperantha falcata</i>		

IRIDACEAE	<i>Hesperantha radiata</i>		
IRIDACEAE	<i>Ixia dubia</i>		
IRIDACEAE	<i>Ixia flexuosa</i>		
IRIDACEAE	<i>Ixia micrandra</i> var. <i>minor</i>		
IRIDACEAE	<i>Ixia odorata</i>		
IRIDACEAE	<i>Ixia paniculata</i>		
IRIDACEAE	<i>Ixia polystachya</i> var. <i>lutea</i>		
IRIDACEAE	<i>Klattia partita</i>		R
IRIDACEAE	<i>Klattia stokoei</i>		
IRIDACEAE	<i>Lapeirousia corymbosa</i> subsp. <i>alta</i>		Us
IRIDACEAE	<i>Lapeirousia micrantha</i>		
IRIDACEAE	<i>Melasphaerula ramosa</i>		
IRIDACEAE	<i>Micranthus alopecuroides</i>		
IRIDACEAE	<i>Micranthus junceus</i>		
IRIDACEAE	<i>Moraea angusta</i>		
IRIDACEAE	<i>Moraea anomala</i>		
IRIDACEAE	<i>Moraea bellendenii</i>		
IRIDACEAE	<i>Moraea bituminosa</i>		
IRIDACEAE	<i>Moraea collina</i>		
IRIDACEAE	<i>Moraea fugax</i>		
IRIDACEAE	<i>Moraea gawleri</i>		
IRIDACEAE	<i>Moraea inconspicua</i>		
IRIDACEAE	<i>Moraea longistyla</i>		
IRIDACEAE	<i>Moraea lurida</i>		
IRIDACEAE	<i>Moraea neglecta</i>		
IRIDACEAE	<i>Moraea ochroleuca</i>		Us
IRIDACEAE	<i>Moraea pyrophila</i>		
IRIDACEAE	<i>Moraea ramosissima</i>		
IRIDACEAE	<i>Moraea tricuspidata</i>		

IRIDACEAE	<i>Moraea tripetala</i>		
IRIDACEAE	<i>Moraea umbellata</i>		
IRIDACEAE	<i>Moraea unguiculata</i>		
IRIDACEAE	<i>Moraea vallisavium</i>		R
IRIDACEAE	<i>Moraea viscaria</i>		R
IRIDACEAE	<i>Nivenia levynsiae</i>		Us
IRIDACEAE	<i>Nivenia stokoei</i>		R
IRIDACEAE	<i>Pillansia templemannii</i>		
IRIDACEAE	<i>Romulea flava</i> var. <i>flava</i>		
IRIDACEAE	<i>Romulea rosea</i> var. <i>reflexa</i>		
IRIDACEAE	<i>Romulea rosea</i> var. <i>rosea</i>		
IRIDACEAE	<i>Romulea triflora</i>		
IRIDACEAE	<i>Sparaxis grandiflora</i> subsp. <i>violacea</i>		
IRIDACEAE	<i>Thereianthus bracteolatus</i>		
IRIDACEAE	<i>Thereianthus juncifolius</i>		
IRIDACEAE	<i>Thereianthus minutus</i>		
IRIDACEAE	<i>Thereianthus spicatus</i> var. <i>linearifolius</i>		
IRIDACEAE	<i>Tritonia lacerata</i>		
IRIDACEAE	<i>Tritoniopsis antholyza</i>		
IRIDACEAE	<i>Tritoniopsis burchellii</i>		
IRIDACEAE	<i>Tritoniopsis caffra</i>		
IRIDACEAE	<i>Tritoniopsis caledonensis</i>		
IRIDACEAE	<i>Tritoniopsis lata</i>		
IRIDACEAE	<i>Tritoniopsis nervosa</i>		
IRIDACEAE	<i>Tritoniopsis parviflora</i> var. <i>parviflora</i>		
IRIDACEAE	<i>Tritoniopsis pulchella</i> var. <i>pulchella</i>		
IRIDACEAE	<i>Tritoniopsis pulchra</i>		
IRIDACEAE	<i>Tritoniopsis ramosa</i> var. <i>ramosa</i>		
IRIDACEAE	<i>Tritoniopsis ramosa</i> var. <i>unguiculata</i>		

IRIDACEAE	<i>Tritoniopsis triticea</i>		
IRIDACEAE	<i>Tritoniopsis unguicularis</i>		
IRIDACEAE	<i>Watsonia angusta</i>		
IRIDACEAE	<i>Watsonia cf. borbonica</i>		Us
IRIDACEAE	<i>Watsonia borbonica subsp. borbonica</i>		Us
IRIDACEAE	<i>Watsonia coccinea</i>		
IRIDACEAE	<i>Watsonia distans</i>		Ex
IRIDACEAE	<i>Watsonia humilis</i>		E
IRIDACEAE	<i>Watsonia marginata</i>		
IRIDACEAE	<i>Watsonia meriana</i>		
IRIDACEAE	<i>Watsonia paucifolia</i>		
IRIDACEAE	<i>Watsonia schlechteri</i>		
IRIDACEAE	<i>Watsonia stenosphon</i>		
IRIDACEAE	<i>Watsonia zeyheri</i>		
IRIDACEAE	<i>Witsenia maura</i>		R
JUNCACEAE	<i>Juncus capensis</i>		
JUNCACEAE	<i>Juncus dregeanus</i>		
JUNCACEAE	<i>Juncus effusus</i>		
JUNCACEAE	<i>Juncus kraussii</i>		Us
JUNCACEAE	<i>Juncus lomatophyllus</i>		
JUNCACEAE	<i>Juncus oxycarpus</i>		
JUNCAGINACEAE	<i>Triglochin bulbosa</i>		
KIGGELARIACEAE	<i>Kiggelaria africana</i>		
LAMIACEAE	<i>Leonotis ocymifolia</i>		
LAMIACEAE	<i>Mentha aquatica</i>		
LAMIACEAE	<i>Salvia africana-lutea</i>		
LAMIACEAE	<i>Stachys aethiopica</i>		
LAMIACEAE	<i>Stachys thunbergii</i>		
LANARIACEAE	<i>Lanaria lanata</i>		

LAURACEAE	<i>Cassytha ciliolata</i>		
LAURACEAE	<i>Cryptocarya angustifolia</i>		K
LAURACEAE	<i>Ocotea bullata</i>		Us
LENTIBULARIACEAE	<i>Utricularia bisquamata</i>		
LINACEAE	<i>Linum acuticarpum</i>		
LINACEAE	<i>Linum africanum</i>		
LINACEAE	<i>Linum thunbergii</i>		
LOMARIOPSIDACEAE	<i>Elaphoglossum acrostichoides</i>		
LOMARIOPSIDACEAE	<i>Elaphoglossum conforme</i>		
LYCOPODIACEAE	<i>Huperzia gnidioides</i>		
LYCOPODIACEAE	<i>Lycopodiella caroliniana</i>		
LYCOPODIACEAE	<i>Lycopodiella cernua</i>		
LYCOPODIACEAE	<i>Lycopodium clavatum</i>		
MALVACEAE	<i>Anisodonteia scabrosa</i>		
MALVACEAE	<i>Hermannia hyssopifolia</i>		
MALVACEAE	<i>Hermannia rudis</i>		I
MALVACEAE	<i>Hermannia salviifolia</i>		
MALVACEAE	<i>Hermannia ternifolia</i>		
MENISPERMACEAE	<i>Cissampelos capensis</i>		
MENYANTHACEAE	<i>Nymphoides indica</i>		
MENYANTHACEAE	<i>Villarsia capensis</i>		
MESEMBRYANTHEMACEAE	<i>Carpobrotus acinaciformis</i>		
MESEMBRYANTHEMACEAE	<i>Cleretum herrei</i>		
MESEMBRYANTHEMACEAE	<i>Delosperma guthriei</i>		V
MESEMBRYANTHEMACEAE	<i>Drosanthemum floribundum</i>		
MESEMBRYANTHEMACEAE	<i>Erepsia anceps</i>		
MESEMBRYANTHEMACEAE	<i>Erepsia inclaudens</i>		
MESEMBRYANTHEMACEAE	<i>Lampranthus aestivus</i>		

MESEMBRYANTHEACEAE	<i>Lampranthus aurantiacus</i>		
MESEMBRYANTHEACEAE	<i>Lampranthus falciformis</i> var. <i>falciformis</i>		
MESEMBRYANTHEACEAE	<i>Lampranthus reptans</i>		
MESEMBRYANTHEACEAE	<i>Lampranthus stenus</i>		R
MESEMBRYANTHEACEAE	<i>Ruschia sarmentosa</i>		
MESEMBRYANTHEACEAE	<i>Ruschia schollii</i>		
MESEMBRYANTHEACEAE	<i>Skiatophytum tripolium</i>		
MOLLUGINACEAE	<i>Pharnaceum cordifolium</i>		
MOLLUGINACEAE	<i>Pharnaceum elongatum</i>		
MONTINIACEAE	<i>Montinia caryophyllacea</i>		
MYRICACEAE	<i>Morella cordifolia</i>		
MYRICACEAE	<i>Morella diversifolia</i>		
MYRICACEAE	<i>Morella kraussiana</i>		
MYRICACEAE	<i>Morella quercifolia</i>		
MYRICACEAE	<i>Morella serrata</i>		
MYRSINACEAE	<i>Myrsine africana</i>		
MYRSINACEAE	<i>Rapanea melanophloeos</i>		
MYRTACEAE	<i>Metrosideros angustifolia</i>		
OLEACEAE	<i>Chionanthus</i> cf. <i>foveolatus</i> subsp. <i>tomentellus</i>		
OLEACEAE	<i>Olea capensis</i> subsp. <i>capensis</i>		
OLEACEAE	<i>Olea europaea</i> subsp. <i>africana</i>		
OLEACEAE	<i>Olea exasperata</i>		
OLINIACEAE	<i>Olinia</i> cf. <i>ventosa</i>		
ONAGRACEAE	<i>Epilobium hirsutum</i>		
ORCHIDACEAE	<i>Acrolophia capensis</i>		Us
ORCHIDACEAE	<i>Acrolophia lamellata</i>		R
ORCHIDACEAE	<i>Acrolophia micrantha</i>		Us

ORCHIDACEAE	<i>Bartholina etheliae</i>		E
ORCHIDACEAE	<i>Bonatea speciosa</i>		V
ORCHIDACEAE	<i>Ceratandra atrata</i>		
ORCHIDACEAE	<i>Ceratandra bicolor</i>		
ORCHIDACEAE	<i>Ceratandra globosa</i>		R
ORCHIDACEAE	<i>Ceratandra harveyana</i>		R
ORCHIDACEAE	<i>Ceratandra venosa</i>		Ex
ORCHIDACEAE	<i>Corycium bicolourum</i>		R
ORCHIDACEAE	<i>Corycium bifidum</i>		
ORCHIDACEAE	<i>Corycium carnosum</i>		
ORCHIDACEAE	<i>Corycium excisum</i>		
ORCHIDACEAE	<i>Disa atricapilla</i>		
ORCHIDACEAE	<i>Disa atrorubens</i>		
ORCHIDACEAE	<i>Disa bivalvata</i>		
ORCHIDACEAE	<i>Disa bodkinii</i>		
ORCHIDACEAE	<i>Disa bolusiana</i>		
ORCHIDACEAE	<i>Disa brachyceras</i>		
ORCHIDACEAE	<i>Disa bracteata</i>		
ORCHIDACEAE	<i>Disa brevipetala</i>		
ORCHIDACEAE	<i>Disa caulescens</i>		
ORCHIDACEAE	<i>Disa cernua</i>		
ORCHIDACEAE	<i>Disa cornuta</i>		
ORCHIDACEAE	<i>Disa cylindrica</i>		
ORCHIDACEAE	<i>Disa densiflora</i>		
ORCHIDACEAE	<i>Disa fasciata</i>		
ORCHIDACEAE	<i>Disa ferruginea</i>		
ORCHIDACEAE	<i>Disa forficaria</i>		
ORCHIDACEAE	<i>Disa glandulosa</i>		
ORCHIDACEAE	<i>Disa graminifolia</i>		

ORCHIDACEAE	<i>Disa harveiana</i> subsp. <i>harveiana</i>		
ORCHIDACEAE	<i>Disa hians</i>		
ORCHIDACEAE	<i>Disa lineata</i>		
ORCHIDACEAE	<i>Disa micropetala</i>		Us
ORCHIDACEAE	<i>Disa neglecta</i>		R
ORCHIDACEAE	<i>Disa obtusa</i> subsp. <i>hottentotica</i>		
ORCHIDACEAE	<i>Disa obtusa</i> subsp. <i>obtusata</i>		Us
ORCHIDACEAE	<i>Disa ophrydea</i>		
ORCHIDACEAE	<i>Disa pillansii</i>		Us
ORCHIDACEAE	<i>Disa purpurascens</i>		
ORCHIDACEAE	<i>Disa pygmaea</i>		R K
ORCHIDACEAE	<i>Disa racemosa</i>		
ORCHIDACEAE	<i>Disa reticulata</i>		
ORCHIDACEAE	<i>Disa richardiana</i>		
ORCHIDACEAE	<i>Disa rufescens</i>		
ORCHIDACEAE	<i>Disa sabulosa</i>		R
ORCHIDACEAE	<i>Disa tenuicornis</i>		Us
ORCHIDACEAE	<i>Disa tenuifolia</i>		
ORCHIDACEAE	<i>Disa tenuis</i>		R
ORCHIDACEAE	<i>Disa tripetaloides</i>		Us
ORCHIDACEAE	<i>Disa uncinata</i>		
ORCHIDACEAE	<i>Disa uniflora</i>		
ORCHIDACEAE	<i>Disa vaginata</i>		
ORCHIDACEAE	<i>Disperis capensis</i>		
ORCHIDACEAE	<i>Disperis paludosa</i>		
ORCHIDACEAE	<i>Eulophia aculeata</i> subsp. <i>aculeata</i>		
ORCHIDACEAE	<i>Eulophia litoralis</i>		I
ORCHIDACEAE	<i>Evotella rubiginosa</i>		R
ORCHIDACEAE	<i>Holothrix cernua</i>		

ORCHIDACEAE	<i>Holothrix villosa</i> var. <i>condensata</i>		Us
ORCHIDACEAE	<i>Holothrix villosa</i> var. <i>villosa</i>		
ORCHIDACEAE	<i>Liparis capensis</i>		
ORCHIDACEAE	<i>Pachites bodkinii</i>		R
ORCHIDACEAE	<i>Pterygodium acutifolium</i>		
ORCHIDACEAE	<i>Pterygodium alatum</i>		
ORCHIDACEAE	<i>Pterygodium cafferum</i>		
ORCHIDACEAE	<i>Pterygodium catholicum</i>		
ORCHIDACEAE	<i>Satyrium bicallosum</i>		
ORCHIDACEAE	<i>Satyrium bicornis</i>		
ORCHIDACEAE	<i>Satyrium bracteatum</i>		
ORCHIDACEAE	<i>Satyrium carneum</i>		I
ORCHIDACEAE	<i>Satyrium coriifolium</i>		
ORCHIDACEAE	<i>Satyrium foliosum</i>		R
ORCHIDACEAE	<i>Satyrium hallackii</i> subsp. <i>hallackii</i>		E
ORCHIDACEAE	<i>Satyrium humile</i>		
ORCHIDACEAE	<i>Satyrium ligulatum</i>		
ORCHIDACEAE	<i>Satyrium lupulinum</i>		
ORCHIDACEAE	<i>Satyrium odorum</i>		
ORCHIDACEAE	<i>Satyrium pygmaeum</i>		
ORCHIDACEAE	<i>Satyrium retusum</i>		
ORCHIDACEAE	<i>Satyrium rhynchanthum</i>		R
ORCHIDACEAE	<i>Satyrium stenopetalum</i> subsp. <i>brevicalcaratum</i>		
ORCHIDACEAE	<i>Schizodium obliquum</i> subsp. <i>clavigerum</i>		
ORCHIDACEAE	<i>Schizodium</i> cf. <i>obliquum</i> subsp. <i>obliquum</i>		V
OROBANCHACEAE	<i>Alectra lurida</i>		
OROBANCHACEAE	<i>Alectra sessiliflora</i>		
OROBANCHACEAE	<i>Harveya bolusii</i>		

OROBANCHACEAE	<i>Harveya capensis</i>		
OROBANCHACEAE	<i>Harveya coccinea</i>		
OROBANCHACEAE	<i>Harveya purpurea</i>		
OROBANCHACEAE	<i>Hyobanche sanguinea</i>		
OSMUNDACEAE	<i>Osmunda regalis</i>		
OSMUNDACEAE	<i>Todea barbara</i>		
OXALIDACEAE	<i>Oxalis commutata</i>		
OXALIDACEAE	<i>Oxalis eckloniana</i> var. <i>sonderi</i>		
OXALIDACEAE	<i>Oxalis fergusonae</i>		
OXALIDACEAE	<i>Oxalis glabra</i>		
OXALIDACEAE	<i>Oxalis heterophylla</i>		
OXALIDACEAE	<i>Oxalis incarnata</i>		
OXALIDACEAE	<i>Oxalis lanata</i> var. <i>lanata</i>		
OXALIDACEAE	<i>Oxalis lanata</i> var. <i>rosea</i>		
OXALIDACEAE	<i>Oxalis livida</i> var. <i>livida</i>		
OXALIDACEAE	<i>Oxalis luteola</i>		
OXALIDACEAE	<i>Oxalis pes-caprae</i>		
OXALIDACEAE	<i>Oxalis polyphylla</i>		
OXALIDACEAE	<i>Oxalis truncatula</i>		
PENAEACEAE	<i>Penaea cneorum</i> subsp. <i>cneorum</i>		
PENAEACEAE	<i>Penaea mucronata</i>		
PENAEACEAE	<i>Saltera sarcocolla</i>		
PENAEACEAE	<i>Sonderothamnus petraeus</i>		R
PENAEACEAE	<i>Stylapterus micranthus</i>		E
PIPERACEAE	<i>Peperomia retusa</i>		
PLANTAGINACEAE	<i>Plantago crassifolia</i> var. <i>crassifolia</i>		
PLUMBAGINACEAE	<i>Limonium scabrum</i>		
POACEAE	<i>Andropogon appendiculatus</i>		

POACEAE	<i>Anthoxanthum tongo</i>		
POACEAE	<i>Aristida junciformis</i>		
POACEAE	<i>Aristida junciformis</i> subsp. <i>junciformis</i>		
POACEAE	<i>Brachypodium flexum</i>		
POACEAE	<i>Cymbopogon marginatus</i>		
POACEAE	<i>Cynodon dactylon</i>		
POACEAE	<i>Ehrharta bulbosa</i>		
POACEAE	<i>Ehrharta calycina</i>		
POACEAE	<i>Ehrharta dura</i>		
POACEAE	<i>Ehrharta erecta</i>		
POACEAE	<i>Ehrharta microlaena</i>		
POACEAE	<i>Ehrharta ottonis</i>		
POACEAE	<i>Ehrharta ramosa</i> subsp. <i>aphylla</i>		
POACEAE	<i>Ehrharta rehmannii</i>		
POACEAE	<i>Ehrharta rehmannii</i> subsp. <i>filiformis</i>		
POACEAE	<i>Ehrharta rupestris</i> subsp. <i>dodii</i>		
POACEAE	<i>Ehrharta rupestris</i> subsp. <i>tricostata</i>		
POACEAE	<i>Ehrharta setacea</i> subsp. <i>uniflora</i>		
POACEAE	<i>Ehrharta villosa</i>		
POACEAE	<i>Eragrostis capensis</i>		
POACEAE	<i>Eragrostis curvula</i>		
POACEAE	<i>Eragrostis elatior</i>		
POACEAE	<i>Eragrostis sabulosa</i>		
POACEAE	<i>Eragrostis sarmentosa</i>		
POACEAE	<i>Eragrostis trichophora</i>		
POACEAE	<i>Festuca scabra</i>		
POACEAE	<i>Helictotrichon hirtulum</i>		
POACEAE	<i>Hyparrhenia filipendula</i> var. <i>pilosa</i>		
POACEAE	<i>Imperata cylindrica</i>		

POACEAE	<i>Merxmuellera cincta</i>		
POACEAE	<i>Merxmuellera lupulina</i>		
POACEAE	<i>Merxmuellera rufa</i>		
POACEAE	<i>Panicum maximum</i>		
POACEAE	<i>Panicum schinzii</i>		
POACEAE	<i>Paspalum distichum</i>		
POACEAE	<i>Pennisetum macrourum</i>		
POACEAE	<i>Pentameris macrocalycina</i>		
POACEAE	<i>Pentameris obtusifolia</i>		
POACEAE	<i>Pentameris thurarii</i>		
POACEAE	<i>Pentaschistis acinosa</i>		
POACEAE	<i>Pentaschistis ampla</i>		
POACEAE	<i>Pentaschistis aristoides</i>		
POACEAE	<i>Pentaschistis aspera</i>		
POACEAE	<i>Pentaschistis capensis</i>		
POACEAE	<i>Pentaschistis capillaris</i>		
POACEAE	<i>Pentaschistis colorata</i>		
POACEAE	<i>Pentaschistis curvifolia</i>		
POACEAE	<i>Pentaschistis eriostoma</i>		
POACEAE	<i>Pentaschistis holciformis</i>		
POACEAE	<i>Pentaschistis malouinensis</i>		
POACEAE	<i>Pentaschistis pallescens</i>		
POACEAE	<i>Pentaschistis pallida</i>		Us
POACEAE	<i>Pentaschistis patula</i>		
POACEAE	<i>Pentaschistis pusilla</i>		
POACEAE	<i>Pentaschistis tysonii</i>		
POACEAE	<i>Pentaschistis viscidula</i>		
POACEAE	<i>Phragmites australis</i>		
POACEAE	<i>Polypogon strictus</i>		

POACEAE	<i>Pseudopentameris brachyphylla</i>		R
POACEAE	<i>Pseudopentameris macrantha</i>		
POACEAE	<i>Pseudopentameris obtusifolia</i>		K
POACEAE	<i>Setaria sphacelata</i> var. <i>sphacelata</i>		
POACEAE	<i>Sporobolus africanus</i>		
POACEAE	<i>Sporobolus fimbriatus</i>		
POACEAE	<i>Sporobolus virginicus</i>		
POACEAE	<i>Stenotaphrum secundatum</i>		
POACEAE	<i>Stipa dregeana</i>		
POACEAE	<i>Stipagrostis zeyheri</i>		
POACEAE	<i>Themeda triandra</i>		
POACEAE	<i>Thinopyrum distichum</i>		
POACEAE	<i>Tribolium hispidum</i>		
POACEAE	<i>Tribolium uniolae</i>		
PODOCARPACEAE	<i>Podocarpus elongatus</i>		
PODOCARPACEAE	<i>Podocarpus latifolius</i>		
POLYGALACEAE	<i>Muraltia alopecuroides</i>		
POLYGALACEAE	<i>Muraltia aspalatha</i>		
POLYGALACEAE	<i>Muraltia capensis</i>		K
POLYGALACEAE	<i>Muraltia chamaepitys</i>		R
POLYGALACEAE	<i>Muraltia ericoides</i>		
POLYGALACEAE	<i>Muraltia filiformis</i> var. <i>caledonensis</i>		
POLYGALACEAE	<i>Muraltia heisteria</i>		
POLYGALACEAE	<i>Muraltia minuta</i>		
POLYGALACEAE	<i>Muraltia mutabilis</i>		
POLYGALACEAE	<i>Muraltia oxysepala</i>		
POLYGALACEAE	<i>Muraltia paludosa</i>		
POLYGALACEAE	<i>Muraltia pauciflora</i>		
POLYGALACEAE	<i>Muraltia rosmarinifolia</i>		

POLYGALACEAE	<i>Muraltia rubeacea</i>		
POLYGALACEAE	<i>Muraltia satyroides</i>		
POLYGALACEAE	<i>Muraltia vulpina</i>		
POLYGALACEAE	<i>Nylandtia spinosa</i>		
POLYGALACEAE	<i>Polygala bracteolata</i>		
POLYGALACEAE	<i>Polygala garcinii</i>		
POLYGALACEAE	<i>Polygala meridionalis</i>		
POLYGALACEAE	<i>Polygala myrtifolia</i>		
POLYGALACEAE	<i>Polygala nematocaulis</i>		
POLYGALACEAE	<i>Polygala pappeana</i>		
POLYGALACEAE	<i>Polygala refracta</i>		
POLYGONACEAE	<i>Persicaria serrulata</i>		
POLYGONACEAE	<i>Rumex acetosella</i>		
POLYGONACEAE	<i>Rumex acetosella subsp. angiocarpus</i>		
POLYGONACEAE	<i>Rumex cordatus</i>		
POLYPODIACEAE	<i>Pleopeltis macrocarpa</i>		
PRIMULACEAE	<i>Samolus porosus</i>		
PRIONIACEAE	<i>Prionium serratum</i>		Us
PROTEACEAE	<i>Aulax cancellata</i>		
PROTEACEAE	<i>Aulax umbellata</i>		
PROTEACEAE	<i>Brabejum stellatifolium</i>		
PROTEACEAE	<i>Diastella divaricata subsp. montana</i>		
PROTEACEAE	<i>Diastella fraterna</i>		R
PROTEACEAE	<i>Diastella thymelaeoides subsp. meridiana</i>		R
PROTEACEAE	<i>Diastella thymelaeoides subsp. thymelaeoides</i>		R
PROTEACEAE	<i>Leucadendron coniferum</i>		
PROTEACEAE	<i>Leucadendron gandogerii</i>		
PROTEACEAE	<i>Leucadendron laurifolium</i>		

PROTEACEAE	<i>Leucadendron microcephalum</i>		
PROTEACEAE	<i>Leucadendron salicifolium</i>		
PROTEACEAE	<i>Leucadendron salignum</i>		
PROTEACEAE	<i>Leucadendron sessile</i>		
PROTEACEAE	<i>Leucadendron spissifolium subsp. spissifolium</i>		
PROTEACEAE	<i>Leucadendron xanthoconus</i>		
PROTEACEAE	<i>Leucospermum bolusii</i>		Us
PROTEACEAE	<i>Leucospermum conocarpodendron subsp. viridum</i>		
PROTEACEAE	<i>Leucospermum cordatum</i>		R
PROTEACEAE	<i>Leucospermum cordifolium</i>		
PROTEACEAE	<i>Leucospermum oleifolium</i>		
PROTEACEAE	<i>Leucospermum prostratum</i>		
PROTEACEAE	<i>Leucospermum truncatulum</i>		
PROTEACEAE	<i>Mimetes arboreus</i>		R
PROTEACEAE	<i>Mimetes capitulatus</i>		R
PROTEACEAE	<i>Mimetes cucullatus</i>		
PROTEACEAE	<i>Mimetes hirtus</i>		V
PROTEACEAE	<i>Mimetes hottentoticus</i>		R
PROTEACEAE	<i>Mimetes stokoei</i>		Ex
PROTEACEAE	<i>Orothamnus zeyheri</i>		R
PROTEACEAE	<i>Paranomus sceptrum-gustavianus</i>		
PROTEACEAE	<i>Paranomus sp. nova kogelberg</i>		V
PROTEACEAE	<i>Paranomus spicatus</i>		R
PROTEACEAE	<i>Protea acaulos</i>		
PROTEACEAE	<i>Protea angustata</i>		V
PROTEACEAE	<i>Protea caespitosa</i>		Us
PROTEACEAE	<i>Protea cordata</i>		
PROTEACEAE	<i>Protea cynaroides</i>		

PROTEACEAE	<i>Protea grandiceps</i>		
PROTEACEAE	<i>Protea lepidocarpodendron</i>		
PROTEACEAE	<i>Protea longifolia</i>		Us
PROTEACEAE	<i>Protea lorea</i>		
PROTEACEAE	<i>Protea mundii</i>		
PROTEACEAE	<i>Protea neriifolia</i>		
PROTEACEAE	<i>Protea nitida</i>		
PROTEACEAE	<i>Protea repens</i>		
PROTEACEAE	<i>Protea scabra</i>		
PROTEACEAE	<i>Protea speciosa</i>		
PROTEACEAE	<i>Protea stokoei</i>		
PROTEACEAE	<i>Protea subulifolia</i>		
PROTEACEAE	<i>Serruria adscendens</i>		
PROTEACEAE	<i>Serruria deluvialis</i>		V
PROTEACEAE	<i>Serruria elongata</i>		
PROTEACEAE	<i>Serruria fasciflora</i>		
PROTEACEAE	<i>Serruria flagellifolia</i>		R
PROTEACEAE	<i>Serruria inconspicua</i>		Us
PROTEACEAE	<i>Serruria phyllicoides</i>		R
PROTEACEAE	<i>Serruria rubricaulis</i>		
PROTEACEAE	<i>Sorocephalus clavigerus</i>		
PROTEACEAE	<i>Sorocephalus palustris</i>		E
PROTEACEAE	<i>Sorocephalus tenuifolius</i>		Ex
PROTEACEAE	<i>Spatalla curvifolia</i>		
PROTEACEAE	<i>Spatalla longifolia</i>		
PROTEACEAE	<i>Spatalla mollis</i>		
PROTEACEAE	<i>Spatalla prolifera</i>		E
PROTEACEAE	<i>Spatalla racemosa</i>		
PROTEACEAE	<i>Spatalla setacea</i>		

PTERIDACEAE	<i>Adiantum aethiopicum</i>		
PTERIDACEAE	<i>Adiantum capillus-veneris</i>		
PTERIDACEAE	<i>Cheilanthes viridis</i> var. <i>glauca</i>		
PTERIDACEAE	<i>Pellaea calomelanos</i>		
PTERIDACEAE	<i>Pellaea pteroides</i>		
RANUNCULACEAE	<i>Anemone tenuifolia</i>		
RANUNCULACEAE	<i>Knowltonia capensis</i>		
RANUNCULACEAE	<i>Knowltonia vesicatoria</i> subsp. <i>vesicatoria</i>		
RESTIONACEAE	<i>Anthochortus crinalis</i>		
RESTIONACEAE	<i>Askidiosperma nitidum</i>		
RESTIONACEAE	<i>Askidiosperma rugosum</i>		
RESTIONACEAE	<i>Calopsis aspera</i>		
RESTIONACEAE	<i>Calopsis clandestina</i>		
RESTIONACEAE	<i>Calopsis filiformis</i>		
RESTIONACEAE	<i>Calopsis fruticosa</i>		
RESTIONACEAE	<i>Calopsis hyalina</i>		
RESTIONACEAE	<i>Calopsis membranacea</i>		
RESTIONACEAE	<i>Calopsis nudiflora</i>		
RESTIONACEAE	<i>Calopsis paniculata</i>		
RESTIONACEAE	<i>Cannomois congesta</i>		
RESTIONACEAE	<i>Cannomois parviflora</i>		
RESTIONACEAE	<i>Cannomois virgata</i>		
RESTIONACEAE	<i>Ceratocaryum argenteum</i>		
RESTIONACEAE	<i>Ceratocaryum fistulosum</i>		I
RESTIONACEAE	<i>Chondropetalum deustum</i>		
RESTIONACEAE	<i>Chondropetalum ebracteatum</i>		
RESTIONACEAE	<i>Chondropetalum hookerianum</i>		
RESTIONACEAE	<i>Chondropetalum marlothii</i>		
RESTIONACEAE	<i>Chondropetalum microcarpum</i>		

RESTIONACEAE	<i>Chondropetalum mucronatum</i>		
RESTIONACEAE	<i>Chondropetalum nudum</i>		
RESTIONACEAE	<i>Chondropetalum tectorum</i>		
RESTIONACEAE	<i>Elegia asperiflora</i>		
RESTIONACEAE	<i>Elegia atratiflora</i>		
RESTIONACEAE	<i>Elegia caespitosa</i>		
RESTIONACEAE	<i>Elegia capensis</i>		
RESTIONACEAE	<i>Elegia cuspidata</i>		
RESTIONACEAE	<i>Elegia equisetacea</i>		
RESTIONACEAE	<i>Elegia filacea</i>		
RESTIONACEAE	<i>Elegia fistulosa</i>		
RESTIONACEAE	<i>Elegia intermedia</i>		
RESTIONACEAE	<i>Elegia juncea</i>		
RESTIONACEAE	<i>Elegia neesii</i>		Us
RESTIONACEAE	<i>Elegia persistens</i>		
RESTIONACEAE	<i>Elegia prominens</i>		V
RESTIONACEAE	<i>Elegia racemosa</i>		Us
RESTIONACEAE	<i>Elegia spathacea</i>		
RESTIONACEAE	<i>Elegia squamosa</i>		
RESTIONACEAE	<i>Elegia stipularis</i>		
RESTIONACEAE	<i>Elegia thyrsefera</i>		
RESTIONACEAE	<i>Elegia vaginulata</i>		
RESTIONACEAE	<i>Hypodiscus albo-aristatus</i>		
RESTIONACEAE	<i>Hypodiscus alternans</i>		R
RESTIONACEAE	<i>Hypodiscus argenteus</i>		
RESTIONACEAE	<i>Hypodiscus aristatus</i>		
RESTIONACEAE	<i>Hypodiscus laevigatus</i>		
RESTIONACEAE	<i>Hypodiscus rugosus</i>		Us
RESTIONACEAE	<i>Hypodiscus willdenowia</i>		

RESTIONACEAE	<i>Ischyrolepis capensis</i>		
RESTIONACEAE	<i>Ischyrolepis curviramis</i>		
RESTIONACEAE	<i>Ischyrolepis eleocharis</i>		
RESTIONACEAE	<i>Ischyrolepis feminea</i>		
RESTIONACEAE	<i>Ischyrolepis fraterna</i>		
RESTIONACEAE	<i>Ischyrolepis cf. gaudichaudiana</i>		
RESTIONACEAE	<i>Ischyrolepis laniger</i>		
RESTIONACEAE	<i>Ischyrolepis ocreata</i>		
RESTIONACEAE	<i>Ischyrolepis paludosa</i>		
RESTIONACEAE	<i>Ischyrolepis sieberi</i>		
RESTIONACEAE	<i>Ischyrolepis subverticillata</i>		
RESTIONACEAE	<i>Ischyrolepis tenuissima</i>		
RESTIONACEAE	<i>Mastersiella digitata</i>		
RESTIONACEAE	<i>Mastersiella spathulata</i>		
RESTIONACEAE	<i>Nevillea obtusissima</i>		
RESTIONACEAE	<i>Platycaulos callistachyus</i>		
RESTIONACEAE	<i>Platycaulos cascadiensis</i>		
RESTIONACEAE	<i>Platycaulos compressus</i>		
RESTIONACEAE	<i>Restio ambiguus</i>		
RESTIONACEAE	<i>Restio bifarius</i>		
RESTIONACEAE	<i>Restio bifidus</i>		
RESTIONACEAE	<i>Restio bifurcus</i>		
RESTIONACEAE	<i>Restio brachiatus</i>		
RESTIONACEAE	<i>Restio burchellii</i>		
RESTIONACEAE	<i>Restio confusus</i>		
RESTIONACEAE	<i>Restio corneolus</i>		
RESTIONACEAE	<i>Restio debilis</i>		
RESTIONACEAE	<i>Restio dispar</i>		
RESTIONACEAE	<i>Restio cf. distichus</i>		

RESTIONACEAE	<i>Restio egregius</i>		
RESTIONACEAE	<i>Restio cf. ejuncidus</i>		
RESTIONACEAE	<i>Restio festuciformis</i>		V
RESTIONACEAE	<i>Restio filiformis</i>		
RESTIONACEAE	<i>Restio fusiformis</i>		R
RESTIONACEAE	<i>Restio multiflorus</i>		
RESTIONACEAE	<i>Restio occultus</i>		
RESTIONACEAE	<i>Restio pachystachyus</i>		
RESTIONACEAE	<i>Restio pedicellatus</i>		
RESTIONACEAE	<i>Restio cf. pillansii</i>		
RESTIONACEAE	<i>Restio purpurascens</i>		
RESTIONACEAE	<i>Restio sarcocladus</i>		
RESTIONACEAE	<i>Restio similis</i>		
RESTIONACEAE	<i>Restio stokoei</i>		
RESTIONACEAE	<i>Restio triticeus</i>		
RESTIONACEAE	<i>Restio versatilis</i>		
RESTIONACEAE	<i>Rhodocoma fruticosa</i>		
RESTIONACEAE	<i>Staberoha aemula</i>		
RESTIONACEAE	<i>Staberoha banksii</i>		
RESTIONACEAE	<i>Staberoha cernua</i>		
RESTIONACEAE	<i>Thamnochortus arenarius</i>		
RESTIONACEAE	<i>Thamnochortus dumosus</i>		V
RESTIONACEAE	<i>Thamnochortus erectus</i>		
RESTIONACEAE	<i>Thamnochortus fraternus</i>		Us
RESTIONACEAE	<i>Thamnochortus fruticosus</i>		
RESTIONACEAE	<i>Thamnochortus gracilis</i>		
RESTIONACEAE	<i>Thamnochortus guthrieae</i>		R
RESTIONACEAE	<i>Thamnochortus lucens</i>		
RESTIONACEAE	<i>Thamnochortus pellucidus</i>		V

RESTIONACEAE	<i>Thamnochortus pulcher</i>		
RESTIONACEAE	<i>Thamnochortus sporadicus</i>		
RESTIONACEAE	<i>Willdenowia arescens</i>		
RESTIONACEAE	<i>Willdenowia glomerata</i>		
RESTIONACEAE	<i>Willdenowia humilis</i>		
RESTIONACEAE	<i>Willdenowia rugosa</i>		
RESTIONACEAE	<i>Willdenowia teres</i>		
RETZIACEAE	<i>Retzia capensis</i>		
RHAMNACEAE	<i>Phylica atrata</i>		
RHAMNACEAE	<i>Phylica buxifolia</i>		
RHAMNACEAE	<i>Phylica ericoides</i>		
RHAMNACEAE	<i>Phylica gracilis</i>		
RHAMNACEAE	<i>Phylica humilis</i>		
RHAMNACEAE	<i>Phylica imberbis</i>		
RHAMNACEAE	<i>Phylica lasiocarpa</i>		
RHAMNACEAE	<i>Phylica minutiflora</i>		
RHAMNACEAE	<i>Phylica parviflora</i>		
RHAMNACEAE	<i>Phylica plumosa</i>		
RHAMNACEAE	<i>Phylica selaginoides</i>		
RHAMNACEAE	<i>Phylica spicata</i>		
RHAMNACEAE	<i>Phylica strigulosa</i>		
RHAMNACEAE	<i>Trichocephalus stipularis</i>		
RORIDULACEAE	<i>Roridula gorgonias</i>		R
ROSACEAE	<i>Cliffortia apiculata</i>		
ROSACEAE	<i>Cliffortia atrata</i>		
ROSACEAE	<i>Cliffortia cf. carinata</i>		K
ROSACEAE	<i>Cliffortia complanata</i>		
ROSACEAE	<i>Cliffortia cuneata</i>		
ROSACEAE	<i>Cliffortia eriocephalina</i>		

ROSACEAE	<i>Cliffortia exilifolia</i>		
ROSACEAE	<i>Cliffortia ferruginea</i>		
ROSACEAE	<i>Cliffortia filicaulis</i>		
ROSACEAE	<i>Cliffortia graminea</i>		
ROSACEAE	<i>Cliffortia grandifolia</i>		
ROSACEAE	<i>Cliffortia heterophylla</i>		
ROSACEAE	<i>Cliffortia hirsuta</i>		
ROSACEAE	<i>Cliffortia odorata</i>		
ROSACEAE	<i>Cliffortia pedunculata</i>		
ROSACEAE	<i>Cliffortia reticulata</i>		K
ROSACEAE	<i>Cliffortia ruscifolia</i>		
ROSACEAE	<i>Cliffortia strobilifera</i>		
ROSACEAE	<i>Cliffortia subsetacea</i>		
ROSACEAE	<i>Cliffortia tenuis</i>		
ROSACEAE	<i>Cliffortia tuberculata</i>		
ROSACEAE	<i>Cliffortia viridis</i>		
ROSACEAE	<i>Rubus fruticosus</i>		
RUBIACEAE	<i>Anthospermum aethiopicum</i>		
RUBIACEAE	<i>Anthospermum bergianum</i>		
RUBIACEAE	<i>Anthospermum ericifolium</i>		
RUBIACEAE	<i>Anthospermum galioides</i>		
RUBIACEAE	<i>Anthospermum prostratum</i>		
RUBIACEAE	<i>Carpacoe heteromorpha</i>		Us
RUBIACEAE	<i>Carpacoe spermacoea</i>		
RUBIACEAE	<i>Carpacoe vaginellata</i>		
RUBIACEAE	<i>Galium rourkei</i>		
RUBIACEAE	<i>Galium tomentosum</i>		
RUBIACEAE	<i>Nenax acerosa</i> subsp. <i>acerosa</i>		
RUPPIACEAE	<i>Ruppia maritima</i>		

RUTACEAE	<i>Acmadenia nivea</i>		V
RUTACEAE	<i>Adenandra acuta</i>		
RUTACEAE	<i>Adenandra brachyphylla</i>		
RUTACEAE	<i>Adenandra coriacea</i>		
RUTACEAE	<i>Adenandra multiflora</i>		I
RUTACEAE	<i>Adenandra uniflora</i>		
RUTACEAE	<i>Adenandra villosa subsp. orbicularis</i>		
RUTACEAE	<i>Adenandra villosa subsp. robusta</i>		R
RUTACEAE	<i>Adenandra villosa subsp. villosa</i>		
RUTACEAE	<i>Agathosma anomala</i>		
RUTACEAE	<i>Agathosma bifida</i>		
RUTACEAE	<i>Agathosma ciliaris</i>		
RUTACEAE	<i>Agathosma crenulata</i>		
RUTACEAE	<i>Agathosma glandulosa</i>		V
RUTACEAE	<i>Agathosma hookeri</i>		
RUTACEAE	<i>Agathosma imbricata</i>		
RUTACEAE	<i>Agathosma serpyllacea</i>		Us
RUTACEAE	<i>Agathosma stokoei</i>		R
RUTACEAE	<i>Agathosma tabularis</i>		
RUTACEAE	<i>Coleonema album</i>		
RUTACEAE	<i>Coleonema juniperinum</i>		
RUTACEAE	<i>Coleonema nubigenum</i>		
RUTACEAE	<i>Diosma hirsuta</i>		
RUTACEAE	<i>Diosma oppositifolia</i>		
RUTACEAE	<i>Empleurum unicapsulare</i>		
RUTACEAE	<i>Euchaetis elata</i>		
RUTACEAE	<i>Euchaetis glabra</i>		
RUTACEAE	<i>Euchaetis linearis</i>		Us
SANTALACEAE	<i>Osyris compressa</i>		

SANTALACEAE	<i>Osyris speciosa</i>		
SANTALACEAE	<i>Thesidium fragile</i>		
SANTALACEAE	<i>Thesidium fruticosum</i>		
SANTALACEAE	<i>Thesium bathyschistum</i>		
SANTALACEAE	<i>Thesium capitatum</i>		
SANTALACEAE	<i>Thesium capitellatum</i>		
SANTALACEAE	<i>Thesium capituliflorum</i>		
SANTALACEAE	<i>Thesium carinatum</i>		
SANTALACEAE	<i>Thesium commutatum</i>		
SANTALACEAE	<i>Thesium ericifolium</i>		
SANTALACEAE	<i>Thesium euphorbioides</i>		
SANTALACEAE	<i>Thesium funale</i>		
SANTALACEAE	<i>Thesium micropogon</i>		
SANTALACEAE	<i>Thesium pinifolium</i>		
SANTALACEAE	<i>Thesium pseudovirgatum</i>		
SANTALACEAE	<i>Thesium quinqueflorum</i>		
SANTALACEAE	<i>Thesium spicatum</i>		
SANTALACEAE	<i>Thesium spinulosum</i>		
SANTALACEAE	<i>Thesium strictum</i>		
SANTALACEAE	<i>Thesium virgatum</i>		
SANTALACEAE	<i>Thesium viridifolium</i>		
SAPOTACEAE	<i>Sideroxylon inerme</i>		
SCHIZAEACEAE	<i>Schizaea pectinata</i>		
SCROPHULARIACEAE	<i>Dischisma ciliatum</i> subsp. <i>ciliatum</i>		
SCROPHULARIACEAE	<i>Dischisma ciliatum</i> subsp. <i>erinoides</i>		
SCROPHULARIACEAE	<i>Halleria elliptica</i>		
SCROPHULARIACEAE	<i>Halleria lucida</i>		
SCROPHULARIACEAE	<i>Hebenstretia cordata</i>		
SCROPHULARIACEAE	<i>Hemimeris racemosa</i>		Us

SCROPHULARIACEAE	<i>Manulea cheiranthus</i>		
SCROPHULARIACEAE	<i>Manulea rubra</i>		
SCROPHULARIACEAE	<i>Microdon dubia</i>		
SCROPHULARIACEAE	<i>Nemesia affinis</i>		
SCROPHULARIACEAE	<i>Nemesia barbata</i>		
SCROPHULARIACEAE	<i>Nemesia diffusa</i>		
SCROPHULARIACEAE	<i>Nemesia macrocarpa</i>		
SCROPHULARIACEAE	<i>Oftia africana</i>		
SCROPHULARIACEAE	<i>Pseudoselago ascendens</i>		
SCROPHULARIACEAE	<i>Pseudoselago quadrangularis</i>		
SCROPHULARIACEAE	<i>Pseudoselago serrata</i>		
SCROPHULARIACEAE	<i>Pseudoselago spuria</i>		
SCROPHULARIACEAE	<i>Pseudoselago verbenacea</i>		
SCROPHULARIACEAE	<i>Selago corymbosa</i>		
SCROPHULARIACEAE	<i>Selago scabrada</i>		
SCROPHULARIACEAE	<i>Sutera hispida</i>		
SCROPHULARIACEAE	<i>Teedia lucida</i>		
SCROPHULARIACEAE	<i>Zaluzianskya capensis</i>		
SOLANACEAE	<i>Solanum americanum</i>		
SOLANACEAE	<i>Solanum guineense</i>		
SOLANACEAE	<i>Solanum linnaeanum</i>		
STILBACEAE	<i>Campylostachys cernua</i>		
STILBACEAE	<i>Kogelbergia verticillata</i>		
STILBACEAE	<i>Stilbe albiflora</i>		
STILBACEAE	<i>Stilbe ericoides</i>		
STILBACEAE	<i>Stilbe rupestris</i>		
STILBACEAE	<i>Stilbe vestita</i>		
TECOPHILAEACEAE	<i>Cyanella hyacinthoides</i>		
THELYPTERIDACEAE	<i>Thelypteris confluent</i>		

THYMELAEACEAE	<i>Gnidia anomala</i>		
THYMELAEACEAE	<i>Gnidia cf. decurrens</i>		
THYMELAEACEAE	<i>Gnidia cf. flanaganii</i>		
THYMELAEACEAE	<i>Gnidia galpinii</i>		
THYMELAEACEAE	<i>Gnidia humilis</i>		
THYMELAEACEAE	<i>Gnidia juniperifolia</i>		
THYMELAEACEAE	<i>Gnidia laxa</i>		
THYMELAEACEAE	<i>Gnidia oppositifolia</i>		
THYMELAEACEAE	<i>Gnidia penicillata</i>		
THYMELAEACEAE	<i>Gnidia pinifolia</i>		
THYMELAEACEAE	<i>Gnidia cf. subulata</i>		
THYMELAEACEAE	<i>Gnidia tomentosa</i>		
THYMELAEACEAE	<i>Lachnaea densiflora</i>		
THYMELAEACEAE	<i>Lachnaea eriocephala</i>		R
THYMELAEACEAE	<i>Lachnaea filicaulis</i>		
THYMELAEACEAE	<i>Lachnaea grandiflora</i>		
THYMELAEACEAE	<i>Lachnaea laxa</i>		R
THYMELAEACEAE	<i>Passerina burchellii</i>		R
THYMELAEACEAE	<i>Passerina ericoides</i>		
THYMELAEACEAE	<i>Passerina paleacea</i>		
THYMELAEACEAE	<i>Passerina rigida</i>		
THYMELAEACEAE	<i>Passerina vulgaris</i>		
THYMELAEACEAE	<i>Struthiola ciliata</i>		
THYMELAEACEAE	<i>Struthiola ciliata subsp. angustifolia</i>		
THYMELAEACEAE	<i>Struthiola dodecandra</i>		
THYMELAEACEAE	<i>Struthiola eckloniana</i>		
THYMELAEACEAE	<i>Struthiola leptantha</i>		
THYMELAEACEAE	<i>Struthiola martiana</i>		
THYMELAEACEAE	<i>Struthiola myrsinites</i>		

THYMELAEACEAE	<i>Struthiola striata</i>		
THYMELAEACEAE	<i>Struthiola tomentosa</i>		
TYPHACEAE	<i>Typha capensis</i>		
URTICACEAE	<i>Didymodoxa capensis</i>		
URTICACEAE	<i>Droguetia cf. ambigua</i>		
VIOLACEAE	<i>Viola decumbens</i> var. <i>decumbens</i>		
VIOLACEAE	<i>Viola decumbens</i> var. <i>scrotiformis</i>		
VISCACEAE	<i>Viscum capense</i>		
VISCACEAE	<i>Viscum pauciflorum</i>		
XYRIDACEAE	<i>Xyris capensis</i>		
ZYGOPHYLLACEAE	<i>Zygophyllum flexuosum</i>		
ZYGOPHYLLACEAE	<i>Zygophyllum fulvum</i>		
ZYGOPHYLLACEAE	<i>Zygophyllum spinosum</i>		

Appendix 3: Mammal Species List

Steenbras Nature Reserve Mammals Species List

Family	Scientific Name	Common Name	Red Data Status
Soricidae	Myosorex varius	<i>Forest shrew</i>	
Soricidae	Sancus varilla	<i>Lesser dwarf shrew</i>	
Soricidae	Crocidura cyanea	<i>Reddish-grey musk shrew</i>	
Soricidae	Crocidura flavescens	<i>Greater musk shrew</i>	
Chrysochloridae	Chrysochloris asiatica	<i>Cape golden mole</i>	
Chrysochloridae	Amblysomus hottentotus	<i>Hottentot golden mole</i>	
Macroscelidea	Elephantulus rupestris	<i>Smith's rock elephant-shrew</i>	
Macroscelidea	Elephantulus edwardii	<i>Cape rock elephant-shrew</i>	
Chiroptera	Rousettus aegyptiacus	<i>Egyptian fruit bat</i>	
Chiroptera	Tadarida aegyptiaca	<i>Egyptian free-tailed bat</i>	
Chiroptera	Miniopterus schreibersii	<i>Schreiber's long-fingered bat</i>	
Chiroptera	Myotis lesueri	<i>Lesuer's hairy bat</i>	
Chiroptera	Myotis tricolor	<i>Temminck's hairy bat</i>	
Chiroptera	Eptesicus capensis	<i>Cape Serotine bat</i>	
Chiroptera	Rhinolophus clivosus	<i>Geoffry's horseshoe bat</i>	
Chiroptera	Rhinolophus capensis	<i>Cape horseshoe bat</i>	
Cercopithecidae	Papio ursinus	<i>Chacma baboon</i>	
Leporidae	Lepus capensis	<i>Cape hare</i>	
Leporidae	Lepus saxatalis	<i>Scrub hare</i>	
Leporidae	Pronolagus rupestris	<i>Smith's red rock rabbit</i>	
Bathyergidae	Bathyergus suillus	<i>Cape dune mole</i>	
Bathyergidae	Cryptomys hottentotus	<i>Common mole</i>	
Bathyergidae	Georchus capensis	<i>Cape mole</i>	

Hystriidae	<i>Hystrix africaeaustralis</i>	<i>Cape Porcupine</i>	
Gliridae	<i>Graphiurus ocularis</i>	<i>Spectacled dormouse</i>	
Sciuridae	<i>Sciurus carolinensis</i>	<i>Grey squirrel</i>	
Muridae	<i>Otomys laminatus</i>	<i>Laminate vlei rat</i>	
Muridae	<i>Otomys saundersiae</i>	<i>Saunders' vlei rat</i>	
Muridae	<i>Otomys irroratus</i>	<i>Vlei rat</i>	
Muridae	<i>Otomys unisulcatus</i>	<i>Karoo bush rat</i>	
Muridae	<i>Acomys subspinosus</i>	<i>Cape spiny mouse</i>	
Muridae	<i>Rhabdomys pumilio</i>	<i>Striped mouse</i>	
Muridae	<i>Dasymys incomtus</i>	<i>Water rat</i>	
Muridae	<i>Mus musculus</i>	<i>House mouse</i>	
Muridae	<i>Mus minutoides</i>	<i>Pygmy mouse</i>	
Muridae	<i>Myomyscus verreauxii</i>	<i>Verreaux's mouse</i>	
Muridae	<i>Aethomys namaquensis</i>	<i>Namaqua rock mouse</i>	
Muridae	<i>Rattus rattus</i>	<i>House rat</i>	
Muridae	<i>Rattus norvegicus</i>	<i>Brown rat</i>	
Muridae	<i>Gerbillurus pabea</i>	<i>Hairy-footed gerbil</i>	
Muridae	<i>Tatera afra</i>	<i>Cape gerbil</i>	
Muridae	<i>Mystromys albicaudatus</i>	<i>White-tailed mouse</i>	
Muridae	<i>Malacothrix typica</i>	<i>Large-eared mouse</i>	
Muridae	<i>Dendromus melantos</i>	<i>Grey pygmy climbing mouse</i>	
Muridae	<i>Dendromus mesomelas</i>	<i>Brant's climbing mouse</i>	
Muridae	<i>Steatomys krebsii</i>	<i>Kreb's fat mouse</i>	
Proteridae	<i>Proteles cristatus</i>	<i>Aardwolf</i>	
Felidae	<i>Panthera pardus</i>	<i>Leopard</i>	
Felidae	<i>Caracal caracal</i>	<i>Caracal</i>	
Felidae	<i>Felis lybica</i>	<i>African wild cat</i>	
Felidae	<i>Felis catus</i>	<i>Domestic cat</i>	
Canidae	<i>Vulpes chama</i>	<i>Cape fox</i>	

Mustelidae	Aonyx capensis	<i>Cape clawless otter</i>	
Mustelidae	Mellivora capensis	<i>Honey Badger</i>	
Mustelidae	Ictonyx striatus	<i>Striped polecat</i>	
Viverridae	Genetta genetta	<i>Small-spotted genet</i>	
Viverridae	Genetta tigrina	<i>Large-spotted genet</i>	
Viverridae	Herpestes ichneumon	<i>Large grey mongoose</i>	
Viverridae	Galerella pulverulenta	<i>Small grey mongoose</i>	
Viverridae	Atilax paludinosus	<i>Water mongoose</i>	
Otaridae	Arctocephalus pusillus	<i>Cape fur seal</i>	
Phocidae	Mirounga leonina	<i>Southern elephant seal</i>	
Orycteropodidae	Orycteropus afer	<i>Aardvark</i>	
Procaviidae	Procavia capensis	<i>Rock dassie</i>	
Bovidae	Sylvicapra grimmia	<i>Common duiker</i>	
Bovidae	Oreotragus oreotragus	<i>Klipspringer</i>	
Bovidae	Raphicerus campestris	<i>Steenbok</i>	
Bovidae	Raphicerus melanotis	<i>Grysbok</i>	
Bovidae	Pelea capreolus	<i>Grey Rhebok</i>	

Appendix 4: Bird Species List

Steenbras Nature Reserve Avifauna Speceis List

Scientific Name	Common Name	Red data status
<i>Acrocephalus palustris</i>	(European) Marsh-Warbler	
<i>Tricholaema leucomelas</i>	Acacia Pied Barbet	RA
<i>Anas sparsa</i>	African Black Duck	UA
<i>Haematopus moquini</i>	African Black Oystercatcher	
<i>Apus barbatus</i>	African Black Swift	C
<i>Anhinga rufa</i>	African Darter	V
<i>Muscicapa adusta</i>	African Dusky Flycatcher	US
<i>Haliaeetus vocifer</i>	African Fish-Eagle	RA
<i>Accipiter tachiro</i>	African Goshawk	UA
<i>Polyboroides typus</i>	African Harrier-Hawk	UA
<i>Upupa africana</i>	African Hoopoe	RA
<i>Actophilornis africanus</i>	African Jacana	
<i>Circus ranivorus</i>	African Marsh Harrier	
<i>Columba arquatrix</i>	African Olive-Pigeon	RA
<i>Terpsiphone viridis</i>	African Paradise-Flycatcher	
<i>Spheniscus demersus</i>	African Penguin	
<i>Ortygospiza atricollis</i>	African Quailfinch	
<i>Rallus caerulescens</i>	African Rail	C
<i>Acrocephalus baeticatus</i>	African Reed Warbler	C
<i>Threskiornis aethiopicus</i>	African Sacred Ibis	CA
<i>Gallinago nigripennis</i>	African Snipe	RA
<i>Platalea alba</i>	African Spoonbill	
<i>Strix woodfordii</i>	African Wood-Owl	RA

<i>Tachymarptis melba</i>	<i>Alpine Swift</i>	CS
<i>Sterna vittata</i>	<i>Antarctic Tern</i>	
<i>Myrmecocichla formicivora</i>	<i>Anteater Chat</i>	
<i>Sterna paradisaea</i>	<i>Arctic Tern</i>	
<i>Thalassarche chlororhynchos</i>	<i>Atlantic Yellow-nosed</i>	
<i>Porzana pusilla</i>	<i>Baillon's Crake</i>	C
<i>Riparia cincta</i>	<i>Banded Martin</i>	
<i>Phalacrocorax neglectus</i>	<i>Bank Cormorant</i>	
<i>Tyto alba</i>	<i>Barn Owl</i>	
<i>Hirundo rustica</i>	<i>Barn Swallow</i>	CS
<i>Limosa lapponica</i>	<i>Bartailed Godwit</i>	
<i>Apalis thoracica</i>	<i>Barthroated Apalis</i>	RA
<i>Amauornis flavirostra</i>	<i>Black Crake</i>	C
<i>Corvus capensis</i>	<i>Black Crow</i>	
<i>Cuculus clamosus</i>	<i>Black Cuckoo</i>	C
<i>Campephaga flava</i>	<i>Black Cuckooshrike</i>	U
<i>Circus maurus</i>	<i>Black Harrier</i>	V
<i>Eupodotis afra</i>	<i>Black Korhaan</i>	
<i>Psilidoprocne holomelaena</i>	<i>Black Saw-wing</i>	V
<i>Accipiter melanoleucus</i>	<i>Black Sparrowhawk</i>	U
<i>Ciconia nigra</i>	<i>Black Stork</i>	
<i>Nectarinia amethystina</i>	<i>Black Sunbird</i>	
<i>Chlidonias niger</i>	<i>Black Tern</i>	
<i>Thalassarche melanophris</i>	<i>Blackbrowed Albatross</i>	
<i>Prinia flavicans</i>	<i>Blackchested Prinia</i>	
<i>Nycticorax nycticorax</i>	<i>Blackcrowned Night Heron</i>	
<i>Serinus alario</i>	<i>Black-headed (& Damara) Canary</i>	
<i>Ardea melanocephala</i>	<i>Blackheaded Heron</i>	CA

<i>Oriolus larvatus</i>	<i>Blackheaded Oriole</i>	
<i>Podiceps nigricollis</i>	<i>Black-necked Grebe</i>	
<i>Elanus caeruleus</i>	<i>Blackshouldered Kite</i>	UA
<i>Vanellus armatus</i>	<i>Blacksmith Lapwing</i>	C
<i>Himantopus himantopus</i>	<i>Blackwinged Stilt</i>	
<i>Anthropoides paradiseus</i>	<i>Blue Crane</i>	
<i>Trochocercus cyanomelas</i>	<i>Blue-mantled Crested Flycatcher</i>	
<i>Telophorus zeylonus</i>	<i>Bokmakierie</i>	CA
<i>Aquila pennatus</i>	<i>Booted Eagle</i>	V
<i>Crithagra sulphuratus</i>	<i>Brimstone Canary</i>	CA
<i>Pachyptila vittata</i>	<i>Broadbilled Prion</i>	
<i>Prodotiscus regulus</i>	<i>Brown-backed Honeybird</i>	U
<i>Halcyon albiventris</i>	<i>Brownhooded Kingfisher</i>	
<i>Riparia paludicola</i>	<i>Brownthroated Martin</i>	C
<i>Sarothrura elegans</i>	<i>Buffspotted Flufftail</i>	C
<i>Centropus burchellii</i>	<i>Burchell's Coucal</i>	RA
<i>Cursorius rufus</i>	<i>Burchell's Courser</i>	
<i>Batis capensis</i>	<i>Cape Batis</i>	V
<i>Pycnonotus capensis</i>	<i>Cape Bulbul</i>	CA
<i>Emberiza capensis</i>	<i>Cape Bunting</i>	CA
<i>Serinus canicollis</i>	<i>Cape Canary</i>	CA
<i>Mirafrapa apiata</i>	<i>Cape Clapper Lark</i>	UA
<i>Phalacrocorax capensis</i>	<i>Cape Cormorant</i>	
<i>Morus capensis</i>	<i>Cape Gannet</i>	
<i>Sphenoeacus afer</i>	<i>Cape Grassbird</i>	CA
<i>Certhilauda curvirostris</i>	<i>Cape Long-billed Lark</i>	
<i>Macronyx capensis</i>	<i>Cape Longclaw</i>	UA
<i>Anthoscopus minutus</i>	<i>Cape Penduline Tit</i>	

<i>Cossypha caffra</i>	<i>Cape Robin-Chat</i>	CA
<i>Chaetops frenatus</i>	<i>Cape Rockjumper</i>	CA
<i>Monticola rupestris</i>	<i>Cape Rockthrush</i>	UA
<i>Anas smithii</i>	<i>Cape Shoveller</i>	C
<i>Crithagra totta</i>	<i>Cape Siskin</i>	CA
<i>Passer melanurus</i>	<i>Cape Sparrow</i>	RA
<i>Pternistes capensis</i>	<i>Cape Spurfowl</i>	CA
<i>Promerops cafer</i>	<i>Cape Sugarbird</i>	CA
<i>Anas capensis</i>	<i>Cape Teal</i>	RA
<i>Streptopelia capicola</i>	<i>Cape Turtle Dove</i>	CA
<i>Gyps coprotheres</i>	<i>Cape Vulture</i>	
<i>Motacilla capensis</i>	<i>Cape Wagtail</i>	CA
<i>Ploceus capensis</i>	<i>Cape Weaver</i>	UA
<i>Bubo capensis</i>	<i>Cape-Eagle Owl</i>	U
<i>Oenanthe pileata</i>	<i>Capped Wheatear</i>	
<i>Dendropicos fuscescens</i>	<i>Cardinal Woodpecker</i>	C
<i>Sterna caspia</i>	<i>Caspian Tern</i>	
<i>Bubulcus ibis</i>	<i>Cattle Egret</i>	RA
<i>Charadrius pallidus</i>	<i>Chestnutbanded Plover</i>	
<i>Parisoma subcaeruleum</i>	<i>Chestnut-vented Tit-Babbler</i>	
<i>Emberiza tahapisi</i>	<i>Cinnamon-breasted Bunting</i>	
<i>Cisticola textrix</i>	<i>Cloud Cisticola</i>	CA
<i>Cuculus canorus</i>	<i>Common Cuckoo</i>	
<i>Lanius collaris</i>	<i>Common Fiscal</i>	UA
<i>Delichon urbicum</i>	<i>Common House-Martin</i>	V
<i>Gallinula chloropus</i>	<i>Common Moorhen</i>	
<i>Struthio camelus</i>	<i>Common Ostrich</i>	
<i>Coturnix coturnix</i>	<i>Common Quail</i>	RS

<i>Charadrius hiaticula</i>	<i>Common Ringed Plover</i>	
<i>Actitis hypoleucos</i>	<i>Common Sandpiper</i>	
<i>Sterna hirundo</i>	<i>Common Tern</i>	
<i>Estrilda astrild</i>	<i>Common Waxbill</i>	CA
<i>Numenius phaeopus</i>	<i>Common Whimbrel</i>	
<i>Phalacrocorax coronatus</i>	<i>Crowned Cormorant</i>	
<i>Vanellus coronatus</i>	<i>Crowned Lapwing</i>	
<i>Calidris ferruginea</i>	<i>Curlew Sandpiper</i>	
<i>Pycnonotus tricolor</i>	<i>Dark-capped Bulbul</i>	
<i>Neotis denhami</i>	<i>Denham's Bustard</i>	
<i>Chrysococcyx caprius</i>	<i>Diederik Cuckoo</i>	C
<i>Alopochen aegyptiacus</i>	<i>Egyptian Goose</i>	CA
<i>Numenius arquata</i>	<i>Eurasian Curlew</i>	
<i>Oriolus oriolus</i>	<i>Eurasian Golden Oriole</i>	CV
<i>Falco subbuteo</i>	<i>Eurasian Hobby</i>	U
<i>Sturnus vulgaris</i>	<i>Eurasian Starling</i>	
<i>Merops apiaster</i>	<i>European Bee-eater</i>	
<i>Caprimulgus europaeus</i>	<i>European Nightjar</i>	
<i>Coracias garrulus</i>	<i>European Roller</i>	
<i>Hydrobates pelagicus</i>	<i>European Storm-Petrel</i>	
<i>Stenostira scita</i>	<i>Fairy Flycatcher</i>	
<i>Cercomela familiaris</i>	<i>Familiar Chat</i>	CA
<i>Caprimulgus pectoralis</i>	<i>Fierynecked Nightjar</i>	C
<i>Sigelus silens</i>	<i>Fiscal Flycatcher</i>	UA
<i>Buteo trizonatus</i>	<i>Forest Buzzard</i>	V
<i>Crithagra scotops</i>	<i>Forest Canary</i>	
<i>Dicrurus adsimilis</i>	<i>Forktailed Drongo</i>	V
<i>Melierax gabar</i>	<i>Gabar Goshawk</i>	

<i>Megaceryle maximus</i>	Giant Kingfisher	UA
<i>Plegadis falcinellus</i>	Glossy Ibis	
<i>Lamprotornis nitens</i>	Glossy Starling	
<i>Podiceps cristatus</i>	Great Crested Grebe	
<i>Puffinus gravis</i>	Great Shearwater	
<i>Casmerodius albus</i>	Great White Egret	
<i>Pelecanus onocrotalus</i>	Great White Pelican	
<i>Cinnyris afer</i>	Greater Doublecollared Sunbird	
<i>Phoenicopterus ruber</i>	Greater Flamingo	
<i>Indicator indicator</i>	Greater Honeyguide	U
<i>Falco rupicoloides</i>	Greater Kestrel	
<i>Rostratula benghalensis</i>	Greater Painted-snipe	
<i>Hirundo cucullata</i>	Greater Striped Swallow	US
<i>Pterodroma macroptera</i>	Greatwinged Petrel	
<i>Tringa nebularia</i>	Greenshank	
<i>Ardea cinerea</i>	Grey Heron	CA
<i>Pluvialis squatarola</i>	Grey Plover	
<i>Cisticola subruficapilla</i>	Greybacked Cisticola	CA
<i>Eremopterix verticalis</i>	Greybacked Finchlark	
<i>Larus cirrocephalus</i>	Greyheaded Gull	
<i>Scleroptila africanus</i>	Grey-winged Francolin	CA
<i>Geocolaptes olivaceus</i>	Ground Woodpecker	UA
<i>Bostrychia hagedash</i>	Hadedda Ibis	UA
<i>Alcedo semitorquata</i>	Halfcollared Kingfisher	U
<i>Scopus umbretta</i>	Hamerkop	UA
<i>Larus hartlaubii</i>	Hartlaub's Gull	
<i>Numida meleagris</i>	Helmeted Guineafowl	CA
<i>Apus horus</i>	Horus Swift	

<i>Turnix hottentottus</i>	<i>Hottentot Buttonquail</i>	
<i>Anas hottentota</i>	<i>Hottentot Teal</i>	
<i>Passer domesticus</i>	<i>House Sparrow</i>	UA
<i>Buteo rufofuscus</i>	<i>Jackal Buzzard</i>	UA
<i>Clamator jacobinus</i>	<i>Jacobin Cuckoo</i>	
<i>Prinia maculosa</i>	<i>Karoo Prinia</i>	CA
<i>Cercotrichas coryphaeus</i>	<i>Karoo Scrub-Robin</i>	RA
<i>Larus dominicanus</i>	<i>Kelp Gull (and Cape Gull)</i>	
<i>Charadrius pecuarius</i>	<i>Kittlitz's Plover</i>	
<i>Chrysococcyx klaas</i>	<i>Klaas's Cuckoo</i>	U
<i>Bradypterus sylvaticus</i>	<i>Knysna Warbler</i>	R
<i>Falco biarmicus</i>	<i>Lanner Falcon</i>	V
<i>Galerida magnirostris</i>	<i>Large-billed Lark</i>	C
<i>Emberiza impetواني</i>	<i>Lark-like Bunting</i>	
<i>Streptopelia senegalensis</i>	<i>Laughing Dove</i>	UA
<i>Aplopelia larvata</i>	<i>Lemon Dove</i>	
<i>Phoenicopterus minor</i>	<i>Lesser Flamingo</i>	
<i>Indicator minor</i>	<i>Lesser Honeyguide</i>	RA
<i>Falco naumanni</i>	<i>Lesser Kestrel</i>	
<i>Acrocephalus gracilirostris</i>	<i>Lesser Swamp-Warbler</i>	RA
<i>Cisticola tinniens</i>	<i>Levaillant's Cisticola</i>	CA
<i>Ixobrychus minutus</i>	<i>Little Bittern</i>	CS
<i>Egretta garzetta</i>	<i>Little Egret</i>	CA
<i>Tachybaptus ruficollis</i>	<i>Little Grebe</i>	RA
<i>Bradypterus baboecala</i>	<i>Little Rush-Warbler</i>	C
<i>Calidris minuta</i>	<i>Little Stint</i>	
<i>Apus affinis</i>	<i>Little Swift</i>	
<i>Sterna albifrons</i>	<i>Little Tern</i>	

<i>Sylvietta rufescens</i>	<i>Longbilled Crombec</i>	RA
<i>Anthus similis</i>	<i>Longbilled Pipit</i>	RA
<i>Oxyura maccoa</i>	<i>Maccoa Duck</i>	
<i>Alcedo cristata</i>	<i>Malachite Kingfisher</i>	RA
<i>Nectarinia famosa</i>	<i>Malachite Sunbird</i>	CA
<i>Asio capensis</i>	<i>Marsh Owl</i>	
<i>Tringa stagnatilis</i>	<i>Marsh Sandpiper</i>	
<i>Polemaetus bellicosus</i>	<i>Martial Eagle</i>	
<i>Oenanthe monticola</i>	<i>Mountain Wheatear</i>	
<i>Oena capensis</i>	<i>Namaqua Dove</i>	RS
<i>Pterocles namaqua</i>	<i>Namaqua Sandgrouse</i>	
<i>Phragmacia substriata</i>	<i>Namaqua Warbler</i>	
<i>Cisticola fulvicapillus</i>	<i>Neddicky</i>	UA
<i>Macronectes halli</i>	<i>Northern Giant Petrel</i>	
<i>Telophorus olivaceus</i>	<i>Olive Bush Shrike</i>	
<i>Turdus olivaceus</i>	<i>Olive Thrush</i>	UA
<i>Dendropicos griseocephalus</i>	<i>Olive Woodpecker</i>	C
<i>Zosterops pallidus</i>	<i>Orange River White-eye</i>	
<i>Anthobaphes violacea</i>	<i>Orangebreasted Sunbird</i>	CA
<i>Pandion haliaetus</i>	<i>Osprey</i>	
<i>Stercorarius parasiticus</i>	<i>Parasitic Jaeger</i>	
<i>Hirundo dimidiata</i>	<i>Pearlbreasted Swallow</i>	C
<i>Falco peregrinus</i>	<i>Peregrine Falcon</i>	UA
<i>Recurvirostra avosetta</i>	<i>Pied Avocet</i>	
<i>Corvus albus</i>	<i>Pied Crow</i>	RA
<i>Ceryle rudis</i>	<i>Pied Kingfisher</i>	UA
<i>Spreo bicolor</i>	<i>Pied Starling</i>	C
<i>Daption capense</i>	<i>Pintado Petrel</i>	

<i>Vidua macroura</i>	<i>Pintailed Whydah</i>	RA
<i>Anthus leucophrys</i>	<i>Plainbacked Pipit</i>	CA
<i>Stercorarius pomarinus</i>	<i>Pomarine Skua</i>	
<i>Crithagra leucopterus</i>	<i>Protea Seed-eater</i>	U
<i>Porphyrio porphyrio</i>	<i>Purple Gallinule</i>	
<i>Ardea purpurea</i>	<i>Purple Heron</i>	UA
<i>Calidris canutus</i>	<i>Red Knot</i>	
<i>Quelea quelea</i>	<i>Redbilled Quelea</i>	
<i>Anas erythrorhyncha</i>	<i>Red-billed Teal</i>	RA
<i>Calandrella cinerea</i>	<i>Redcapped Lark</i>	C
<i>Cuculus solitarius</i>	<i>Redchedsted Cuckoo</i>	RS
<i>Sarothrura rufa</i>	<i>Redchedsted Flufftail</i>	C
<i>Streptopelia semitorquata</i>	<i>Redeyed Dove</i>	UA
<i>Urocolius indicus</i>	<i>Redfaced Mousebird</i>	RA
<i>Fulica cristata</i>	<i>Redknobbed Coot</i>	RA
<i>Scleroptila levaillantii</i>	<i>Redwing Francolin</i>	
<i>Onychognathus morio</i>	<i>Redwinged Starling</i>	CA
<i>Phalacrocorax africanus</i>	<i>Reed Cormorant</i>	CA
<i>Columba livia</i>	<i>Rock Dove</i>	
<i>Falco rupicolus</i>	<i>Rock Kestrel</i>	UA
<i>Hirundo fuligula</i>	<i>Rock Martin</i>	CA
<i>Arenaria interpres</i>	<i>Ruddy Turnstone</i>	
<i>Philomachus pugnax</i>	<i>Ruff</i>	
<i>Accipiter rufiventris</i>	<i>Rufous-chested Sparrowhawk</i>	UA
<i>Riparia riparia</i>	<i>Sand Martin</i>	CS
<i>Calidris alba</i>	<i>Sanderling</i>	
<i>Sterna sandvicensis</i>	<i>Sandwich Tern</i>	
<i>Sagittarius serpentarius</i>	<i>Secretarybird</i>	

<i>Monticola explorator</i>	<i>Sentinel Rockthrush</i>	RA
<i>Thalassarche cauta</i>	<i>Shy Albatross</i>	
<i>Cercomela sinuata</i>	<i>Sicklewinged Chat</i>	
<i>Pterodroma mollis</i>	<i>Softplumaged Petrel</i>	
<i>Andropadus importunus</i>	<i>Sombre Bulbul</i>	
<i>Puffinus griseus</i>	<i>Sooty Shearwater</i>	
<i>Tadorna cana</i>	<i>South African Shelduck</i>	
<i>Laniarius ferrugineus</i>	<i>Southern Boubou</i>	CA
<i>Cinnyris chalybeus</i>	<i>Southern Double-collared Sunbird</i>	CA
<i>Macronectes giganteus</i>	<i>Southern Giant Petrel</i>	
<i>Passer diffusus</i>	<i>Southern Grey-headed Sparrow</i>	
<i>Ploceus velatus</i>	<i>Southern Masked-Weaver</i>	
<i>Netta erythrophthalma</i>	<i>Southern Pochard</i>	
<i>Tchagra tchagra</i>	<i>Southern Tchagra</i>	
<i>Colius striatus</i>	<i>Speckled Mousebird</i>	CA
<i>Columba guinea</i>	<i>Speckled Pigeon</i>	CA
<i>Muscicapa striata</i>	<i>Spotted Flycatcher</i>	
<i>Burhinus capensis</i>	<i>Spotted Thick-knee</i>	UA
<i>Bubo africanus</i>	<i>Spotted-Eagle Owl</i>	UA
<i>Plectropterus gambensis</i>	<i>Spurwinged Goose</i>	UA
<i>Ardeola ralloides</i>	<i>Squacco Heron</i>	
<i>Buteo vulpinus</i>	<i>Steppe Buzzard</i>	CS
<i>Saxicola torquata</i>	<i>Stonechat</i>	CS
<i>Crithagra gularis</i>	<i>Streaky-headed Seedeater</i>	
<i>Sarothrura affinis</i>	<i>Striped Flufftail</i>	V
<i>Catharacta antarctica</i>	<i>Subantarctic Skua</i>	
<i>Coccyzygia melanotis</i>	<i>Sweet Waxbill</i>	C
<i>Sterna bergii</i>	<i>Swift Tern</i>	

<i>Xenus cinereus</i>	<i>Terek Sandpiper</i>	
<i>Charadrius tricollaris</i>	<i>Threebanded Plover</i>	UA
<i>Aquila verreauxii</i>	<i>Verreaux's Eagle</i>	UA
<i>Cryptillas victorini</i>	<i>Victorin's Warbler</i>	C
<i>Burhinus vermiculatus</i>	<i>Water Thick-knee</i>	C
<i>Creatophora cinerea</i>	<i>Wattled Starling</i>	
<i>Chlidonias hybridus</i>	<i>Whiskered Tern</i>	
<i>Ciconia ciconia</i>	<i>White Stork</i>	
<i>Thalassornis leuconotus</i>	<i>Whitebacked Duck</i>	
<i>Colius colius</i>	<i>Whitebacked Mousebird</i>	RA
<i>Phalacrocorax lucidus</i>	<i>White-breasted Cormorant</i>	CA
<i>Procellaria aequinoctialis</i>	<i>Whitechinned Petrel</i>	
<i>Charadrius marginatus</i>	<i>White-fronted Plover</i>	
<i>Corvus albicollis</i>	<i>Whitenecked Raven</i>	UA
<i>Apus caffer</i>	<i>Whiterumped Swift</i>	CS
<i>Pogonocichla stellata</i>	<i>White-starred Robin</i>	
<i>Crithagra albogularis</i>	<i>Whitethroated Canary</i>	
<i>Hirundo albigularis</i>	<i>Whitethroated Swallow</i>	V
<i>Chlidonias leucopterus</i>	<i>Whitewinged Tern</i>	
<i>Phylloscopus trochilus</i>	<i>Willow Warbler</i>	C
<i>Oceanites oceanicus</i>	<i>Wilson's Storm-Petrel</i>	
<i>Tringa glareola</i>	<i>Wood Sandpiper</i>	
<i>Crithagra flaviventris</i>	<i>Yellow Canary</i>	UA
<i>Eremomela icteropygialis</i>	<i>Yellowbellied Eremomela</i>	
<i>Anas undulata</i>	<i>Yellowbilled Duck</i>	UA
<i>Egretta intermedia</i>	<i>Yellowbilled Egret</i>	V
<i>Milvus aegyptius</i>	<i>Yellow-billed Kite</i>	V
<i>Cisticola juncidis</i>	<i>Zitting Cisticola</i>	RA

Appendix 5: Amphibian Species List

Steenbras Nature Reserve Amphibian List

Family Name	Common Name	Scientific Name	Red Data Status
	Cape Ghost Frog	<i>Heleophryne purcelli</i>	
	Arum Lily Reed Frog	<i>Hyperolius horstocki</i>	
	Cape Mountain Rain Frog	<i>Breviceps montanus</i>	
	Sand Rain Frog	<i>Breviceps rosei</i>	
	Strawberry Rain Frog	<i>Breviceps acutirostris</i>	
	Roses Mountain Toadlet	<i>Capensibufo Rosei</i>	Vulnerable
	Raucous Toad	<i>Bufo rangeri</i>	
	Banded Stream Frog	<i>Strongylopus bonaspei</i>	
	Cicking Stream Frog	<i>Strongylopus grayii</i>	
	Cape River Frog	<i>Afrana fuscigula</i>	
	Landroskop moss frog	<i>Arthroleptella landrosii</i>	Near threatened
	Drew's Moss Frog	<i>Arthroleptella drewsii</i>	
	De Villier's Moss Frog	<i>Arthroleptella villiersi</i>	
	Bronze Caco	<i>Cacosternum nanum</i>	
	Montain Marsh Frog	<i>Poyntonia paludicola</i>	Near Threatened
	Common Platnnas	<i>Xenopus laevis</i>	Endangered

Appendix 6: Reptile Species List

Steenbras Nature Reserve Reptile Species List			
Family Name	Scientific Name	Common Name	Red Data Status
	<i>Rhinotyphlops lalandei</i>	Delalande's Beaked Blind Snake	
	<i>Ramphotyphlops braminus</i>	Flowerpot Snake	
	<i>Leptotyphlops nigricans</i>	Cape Worm Snake	
	<i>Homoroselaps lacteus</i>	Spotted Harlequin Snake	
	<i>Lycodonomorphus rufulus</i>	Common Water Snake	
	<i>Lamprophis capensis</i>	Brown House Snake	
	<i>Lamprophis inornatus</i>	Olive House Snake	
	<i>Lamprophis guttatus</i>	Spotted House Snake	
	<i>Lamprophis aurora</i>	Aurora House Snake	
	<i>Lamprophis fuscus</i>	Yellow-bellied House Snake	
	<i>Duberria lutrix</i>	Common Slug-eaters	
	<i>Pseudaspis cana</i>	Mole Snake	
	<i>Amplorhinus mutimaculatus</i>	Many-spotted Snake	
	<i>Prosymna sundevalli</i>	Sundevall's Shovel-snout	
	<i>Psammophylax rhombeatus</i>	Rhombic Skaapsteker	
	<i>Psammophis leightoni</i>	Cape Whip Snake	
	<i>Psammophis crucifer</i>	Crossed Whip Snake	
	<i>Dasypeltis scabra</i>	Rhombic Egg-eater	
	<i>Crotaphopeltis hotamboeia</i>	Herald/ Red-lipped Snake	
	<i>Dispholidus typus</i>	Boomslang	
	<i>Aspidelaps lubricus</i>	Coral Shield Cobra	
	<i>Naja nivea</i>	Cape Cobra	
	<i>Hemachatus haemachatus</i>	Rinkhals	

	<i>Pelamis platura</i>	Yellow-bellied Sea Snake	
	<i>Bitis arietans</i>	Puff Adder	
	<i>Bitis atropos</i>	Berg Adder	
	<i>Lycophidion capense</i>	Cape Wolf Snake	
	<i>Bitis armata</i>	Southern Adder	
	<i>Agama atra atra</i>	Southern Rock Agama	
	<i>Pedioplanis burchelli</i>	Burchell's Sand Lizard	
	<i>Pedioplanis lineocellata</i>	Spotted Sand Lizard	
	<i>Tropidosaura gularis</i>	Cape Mountain Lizard	
	<i>Tropidosaura montana</i>	Common Mountain Lizard	
	<i>Acontias meleagris</i>	Cape Legless Skink	
	<i>Scelotes bipes</i>	Silvery Dwarf Burrowing Skink	
	<i>Mabuya capensis</i>	Cape Skink	
	<i>Mabuya homalocephala</i>	Red-sided Skink	
	<i>Cordylus cordylus</i>	Cape Girdled Lizard	
	<i>Pseudocordylus microlepidotus</i>	Cape Crag Lizard	
	<i>Chamasaura anguina</i>	Cape Grass Lizard	
	<i>Tetradactylus tetradactylus</i>	Common Long-tailed Seps	
	<i>Tetradactylus seps</i>	Short-legged Seps	
	<i>Gerrhosaurus flavigularis</i>	Yellow-throated Plated Lizard	
	<i>Bradypodion pumilum</i>	Cape Dwarf Chameleon	
	<i>Afroedura hawequensis</i>	Hawequa Flat Gecko	
	<i>Afrogecko porphyreus</i>	Marbled Leaf-toed Gecko	
	<i>Pachydactylus geitje</i>	Ocellated Thick-toed Gecko	
		Parrot Beaked Padlooper	
		Angulate Tortoise	

CITY OF CAPE TOWN

BIODIVERSITY MANAGEMENT BRANCH

Executive Brief

Comprehensive Security Audit of the Biodiversity Management Branch of the City of Cape Town

MARCH 2010



THORN-EX

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1.1 INTRODUCTION

The City of Cape Town' Biodiversity Management Branch, in wishing to ensure the safety of visitors and staff, requested assistance on conducting a security audit of all (25) its managed (and envisaged) Nature Reserves.

The need was based on the following assumptions:

- That the areas are poorly managed
- Security Agencies are inefficient in their operations
- The lack of tools to measure management effectiveness
- Safety and security of visitors as well as that of personnel are threatened.

Plan-It, in collaboration with Thorn-Ex and Titan Security, agreed to undertake the project. Owing to the budgetary constraints, it was agreed that the audit would encompass 12 priority Reserves, as selected by the Biodiversity Management Branch.

The following outcomes were proposed and accepted:

- A desktop exercise to evaluate existing information and identify gaps
- A physical Audit of the listed facilities
- Consultation with public user groups
- Recommendations in respect of security technology and infrastructure
- A comprehensive report on all findings
- A basic entry level conservation security training session for staff

The project was to be completed by the end of April 2010.

1.2 APPROACH

The focus was to be on the safety and security of staff working in the different reserves, of visitors to these reserves and of the biodiversity within the reserves.

The audit was to involve the reserve managers, site managers and any other staff the Biodiversity Management Branch deemed necessary to provide information for the audit.

The Project commenced with the Branch being approached to supply maps of each reserve with as much information as possible on all types of infrastructure, bio-physiographic information etc e.g. boundaries of reserves and kind of fence along these, access points, roads, tracks, paths, power lines, telephone lines, buildings, cell phone towers, masts, aerials, bridges, streams, rivers, contours, vegetation, adjacent land use, habitation or settlements in close proximity.

Questionnaires were then drawn up and sent to all the Reserve Managers as well as separate questionnaires which were sent to the various public interest groups, via the Reserve Managers.

Upon receipt of the above the project team drafted a preliminary working document to guide and focus the audit.

The audit commenced on the 15th of February 2010 with a workshop with the various Managers and a presentation of the findings from the questionnaires to the Biodiversity Branch.

The audits commenced on the 16th of February 2010 with a visit to each Reserve..

During each audit the manager and staff were interviewed and a physical inspection of infrastructure was conducted. The audits focused on existing security systems, security infrastructure, activities, incidents, job descriptions, training and manpower

In addition to the audits workshops were scheduled, via the Reserve Manager with relevant external safety and security institutions and public interest groups. The workshops were then held with various District and Reserve-specific public interest groups.

On conclusion of the audit phase, the security technology specialist visited the Reserves to inspect the systems and infrastructure in place at each reserve. Based on and with reference to the initial draft Audit Report, the specialist undertook an assessment of technology shortcomings in order to arrive at feasible recommendations for practicable improvements.

The completed report was then circulated to all the Reserve Managers as a Draft Report for comment, prior to the Final Comprehensive Report incorporating such comment being presented to the Branch.

The Project was then concluded with a basic entry level security training session for nominated staff covering aspects such as:

- Information gathering and reporting
- Patrol structuring, planing and safety
- Preparedness and response
- Handling of transgressors (armed or un-armed)
- Incident handling
- Charge office procedures
- Evidence and Statements
- Record keeping and dossier development

1.3 EXECUTIVE SUMMARY

A safety and security audit was carried out on twelve Reserves under the jurisdiction of the Biodiversity Branch of the Directorate Environmental Resource Management.

The Audit was aimed at doing a rapid and verifiable analysis of the current security situation, security services, infrastructure, staffing, and social contexts. The information allowed for a “threat” level to be determined for each reserve.

Information acquired through a questionnaire survey with the Reserve Managers, and information provided by the Branch was used as a baseline to guide and provide focus for the individual Reserve audits.

The Audits very quickly revealed that the location of the various reserves with their own unique social contexts primarily dictated the level of threat of each Reserve.

Some Reserves perceived as being “dangerous” were found to be “safe” with very low key incidents actually occurring. Although social ills do tend to spill over into Reserves the occurrence thereof is very localised and relate to prostitution, substance abuse, theft and illegal plant harvesting for the muti trade.

General security observations revealed that any metal infrastructure or equipment and solar panels are at greatest risk and are stolen on a regular basis. Trespassing, vagrants traversing the reserves and the harvesting of plants for the commercial flower industry and commercially driven herbal medicine /”muthi” industry are linked to an associated threat to staff and visitors. However incidents of visitors and staff being accosted by vagrants are rare.

Security activities were generally viewed as an add-on function when incidents are reported, with some Reserve Managers and Field staff trying to fit security patrols and activities into their management work schedule. The Visitor Controller Officers, on the other hand are essentially Access Control Officers who may be called on to perform some Law Enforcement function if their training enables them to do so. However staff does carry out combined operations with Law Enforcement bodies like Marine and Coastal Management, SAPS or City Law Enforcement when activities in the vicinity of the reserves warrant this in the interests of conservation.

One of the most evident security shortcomings found was that Reserves were “abandoned”, for all practical purposes, after hours, on weekends and on public holidays.

The investigation also found that very few Reserves actively patrol the Reserve and fences on a regular basis.

The Findings of each audit, including the responses received from the public interest groups were used to determine the threat level of each Reserve. The threat levels are based on a

combination of factors which may affect security to the reserve, its staff and visitors as well as these threats in relation to other reserves.

The threat levels low, medium, and high reflects the safety threat to visitors, staff, and infrastructure. Further to which the threat level provides an indication in respect of intervention priority (staffing, infrastructure, equipment).

The results were as follow:

Reserve	Threat Level	Threat	Primary Cause
Witzands ACA	Medium	Illegal Access / Trespassing	Lack of fencing
Blaauwberg CA	Medium	Illegal Access / Trespassing	Lack of coverage
Rietvlei WR	Low	Illegal Access / Trespassing	Lack of coverage
Durbanville NR	Low	Theft	Lack of presence
Bracken NR	Low	Trespassing	Lack of coverage
Tygerberg NR	High	Trespassing / poaching	Lack coverage
Zandvlei NR	Low	Illegal Access / Trespassing	State of infrastructure
Falls Bay EP	High	Violent crime	Lack of fencing /coverage
Edith Stephens WP	Low	Theft	Lack of fencing
Wolfgat & Macassar NR	Severe	Violent crime	Location & Social
Kogelberg NR	Medium	Illegal Access / Trespassing	Extent / coverage
Helderberg NR	Low	Illegal Access / Trespassing	Lack coverage

Understaffing and poor or non-existent boundaries were found to be the primary cause of compromised Reserve security. The provision of “feet on the ground” or a management presence is therefore viewed as the first step towards improving the current situation.

The Investigation did conclude that technology solution options entailed fairly low key equipment such as Day-Night or Peak Inversion monitoring cameras, basic building alarm systems, external building detection beams, lighting, etc.

Infrastructure requirements were predominantly in respect of fencing.

Fencing is not always the preferred solution for safeguarding and demarcating an urban Reserve. However, it is suggested that failure to demarcate the boundaries of a Reserve compromises the authority’s ability to manage a designated area and severely limits the authority’s ability to prosecute transgressors. Simple in-expensive measures such as signage and markers will greatly aid in addressing these matters.

The relative “newness” of the Branch was found create various generic management challenges which negatively affect the efficiency and effective of Reserve management.

The aforesaid institutional matters included:

- Lack in consistency of staff designations
- Lack of consistency in functional content (job descriptions)
- Lack of career pathing and skills development program
- Lack of measurable performance standards
- Lack of training and capacity building
- Lack of uniform operational procedures and protocols
- Un-clear performance objectives of Advisory Boards
- Jurisdictional uncertainties in respect of cooperation with other environmental law enforcement agencies
- Lack of memorandums of Understanding with Utility Service Branches active in Reserves

The apparent absence of a clear and definitive Branch Policy on Reserve Safety and Security was viewed as a contributing shortcoming. Further to which, no consistency was found in respect of operational procedures or protocols. Some stations had a Management Plan whilst others were still going to develop such plans. Some stations had developed their own safety procedures.

In respect of Procedures and Protocols it is suggested that the Biodiversity branch consider the developing the following procedures and protocols;

- Incident response (poaching, trespassing, theft, fire, attack, medical emergency, land invasion, pollution, un-wanted pets)
- Reserve patrols
- Fence and gate security
- Visitor control

It is suggested that the above procedures and protocols be developed in conjunction with an auditable reserve management system which is linked to the personnel and finance performance requirements. It is also recommended that the Branch conduct an Institutional “Governance Audit” to guide the above protocols, relationships with other government institutions and law enforcement bodies as well as the Branch’s legal obligations.

Consultation with public interest groups and reserve managers highlighted the benefits of “friend” groups. Some stations financial ability and conservation maintenance activities were greatly enhanced by such “friends” groups. Further to which, the social role that urban reserves play as “safe areas” for people to walk their pets, have picnics or conduct social

functions was highlighted at several public meetings. It was also mentioned that in some areas where “gang turf” issues were dominant the reserves were viewed as “neutral” territories.

Advisory Boards are a requirement in terms of reserves proclaimed under the Protected Areas Act although no clarity could be defined with respect to the extent, role and responsibilities of the various Reserves Advisory Boards. Some Reserves indicated that they played an active role whilst others were not aware of their existence. The development of clear responsibilities and objectives for each Board is viewed as imperative to contributing to the achievement of the Reserve objectives whilst providing a formal link to neighbouring communities and local government.

Most Reserves have other City Utility Departments executing functions within the Reserve, share boundaries with them, or manage large tracts of land under their jurisdiction. None of the Reserves were aware of any Memorandums of Understanding which clarify joint management matters. This was viewed as institutional shortcoming requiring attention at higher level.

A variety of Security Service providers render various levels of security to Reserves. These services vary from private security firms providing uniformed guards to provide a static or gate control service to services where such guards are used as Bushrangers. It was the investigation’s conclusion that each District or Reserve negotiates their own contract conditions with such service providers, a situation which does not contribute to clear and measurable security service provisioning.

The City Law Enforcement Services and structures were generally viewed as not being able to respond to conservation related incidents. Only a few Reserves reported adequate responses to call-outs or incidents with most Reserves saying they rely on the local SAPS for assistance. Reserves which have installed alarm systems linked to the City Law Enforcement Control Rooms, reported that in the event of alarm activation the Reserve manager is phoned to investigate. No direct service benefit could be found in respect City Law Enforcement.

What was most evident during the investigation was the risk posed by staff acting outside their areas of jurisdiction. These transgressions are not through ill intent and staff is not necessarily aware that they are exceeding their authority. Urgent attention should be paid to the authority necessary for the role staff plays in enforcing provincial conservation laws, fisheries laws, and National laws. This should be done in cognisance of the criminal Procedures Act. It is further suggested that cooperation agreements and execution delegations be formalised with other environmental and conservation agencies.

Due to several reserves having a coastal boundary and the ever present activities of highly organised and dangerous Abalone poaching gangs the involvement of staff in curbing these activities need to be clearly defined and coordinated. It is suggested that this should be the preserve of a highly trained and well equipped District based Law Enforcement Component

conducting their duties in collaboration with other authorities and with the necessary jurisdiction.

It is the opinion of this investigation team that the establishment of a District based Law Enforcement Component will greatly contribute in addressing some of the security shortcomings highlighted. In addition, such a component will also alleviate some of the external enforcement requirements placed on Reserve staff thus allowing them to focus on reserve management and security.

1.4 CONCLUSION AND GENERIC RECOMMENDATIONS

The audit results correlated closely with the location and management capacity of each Reserve. High concentrations of un-employed people living in dense informal settlements adjacent to reserves do pose a greater risk to the Reserves. Staff was found to be more exposed to violent crimes in such circumstances than those located in rural or medium to high income areas.

Although social ills do tend to spill over into Reserves the occurrence thereof is very localised and relates to prostitution, substance abuse, theft and illegal plant harvesting for the muti trade.

The Findings of each audit, including the responses received from the public interest groups were used to determine the threat level of each Reserve.

The threat levels low, medium, and high reflects the safety threat to visitors, staff, and infrastructure. Further to which the threat level provides an indication in respect intervention priority (staffing, infrastructure, equipment).

The results were as follow:

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Understaffing and poor or non-existent boundaries were found to be the primary cause of compromised Reserve security. The provision of “feet on the ground” or a management presence is therefore viewed as the first step towards improving the current situation.

The Investigation did conclude that technology solutions entail fairly low key equipment such as Day-Night or Peak Inversion monitoring cameras, basic building alarm systems, external building detection beams, lighting, etc.

Infrastructure requirements were predominantly in respect of fencing.

Fencing is not always the preferred solution for safeguarding and demarcating an urban Reserve. However, it is suggested that failure to demarcate the boundaries of a Reserve compromises the authority’s ability to manage a designated area and severely limits the authority’s ability to prosecute transgressors. Simple in-expensive measures such as signage and markers will greatly aid in addressing these matters.

In areas where fencing is vandalised on a regular basis the use of electric fencing (long distances, or Diamond Razor Mesh (short distances) is recommended. However it is recommended that spring-steel barb wire be used in all other instances.

The relative “newness” of the Branch was found to create various generic management challenges which negatively affect the efficiency and effective of Reserve management.

The apparent absence of a clear and definitive Branch Policy on Reserve Safety and Security was viewed as a contributing shortcoming.

A great inconsistency was found in staff designations, with some staff fulfilling similar conservation functions being called Conservation Officers whilst other were called Site Managers or Assistant Managers. The same problem was evident within the junior staff ranks. On some stations “labourers” conducted similar duties to those of Bushrangers.

The appointment and use of Contract staff was found to be a management challenge to most Reserves. Contract staff are generally employed by an external service provider whilst The Branch is responsible for the day to day management of said staff including the provision of uniforms and training. The opinion is held that the cost of these services could very well be such that the Branch could employ these contract staff directly to a greater benefit.

Several instances were found of junior staff being employed for several years as “Small Plant operators” or “Foreman” and having developed a keen interest and expertise in various

conservation matters. The provision of career pathing opportunities to staff will not only contribute to the goals of the Branch but also provide an incentive to junior staff.

No evidence was found of a clear skills development program for officers and the impression was created that each officer arranges and sees to his or her own training. This was especially evident with some officers having been trained as Peace officers and appointed whilst others had been trained but not appointed and some still needed to be trained. Some Officers were also expressing the need to be appointed as Fisheries Officers whilst other believed they should be trained and appointed as Environmental Inspectors.

Most reserves had Conservation Students and Interns fulfilling a variety of roles and responsibilities, in some instances un-paid. The rotation of Students and interns was thought to be a good means of exposing them to various experiences and opportunities.

The investigation also found that most staff lacked basic equipment such as binoculars, handcuffs, batons or mace thereby limiting their ability to execute their duties.

The apparent lack of a dress code was viewed as a factor which contributed to the public's sense of security or respect when coming into contact with officers. The wearing of T-shirts, overalls, or golf shirts should not be promoted whilst on duty in the public eye.

No consistency was found in respect of operational procedures or protocols. Some stations had a Management Plan whilst others were still going to develop such plans. Some stations had developed their own safety procedures.

One of the most evident security shortcomings found was that Reserves were “abandoned”, for all practical purposes, after hours, on weekends and on public holidays. It is understood that staff work standard working hours. However, the provision of accommodation, which most Reserves have, to either Site managers or Bushrangers are seen as a simple cost effective measure. Where there are operational staff resident on the Reserves (mostly students) it acts as a definite deterrent to illegal activities. Staff stationed on Reserves can then work on a “conservation standard” shift schedule of 20 days on 5 days off.

The investigation also found that very few Reserves actively patrol the Reserve and fences on a regular basis. Although staff shortage is a contributing factor, careful planning and allocation of available resources will ensure that Reserves are patrolled on a regular basis. It is further suggested that the sharing of resources between Reserves will allow for more frequent patrols.

With regard to Procedures and Protocols it is suggested that the Biodiversity branch consider developing the following;

- Incident response (poaching, trespassing, theft, fire, attack, medical emergency, land invasion, pollution, un-wanted pets)
- Reserve patrols
- Fence and gate security

- Visitor control

It is suggested that the above procedures and protocols be developed in conjunction with an auditable Reserve management system which includes a personnel and finance performance aspect.

Consultation with public interest groups and reserve managers highlighted the benefits of “friend” groups. Some stations’ financial ability and conservation maintenance activities were greatly enhanced by such “friends” groups. It is accepted that not all Reserves have the opportunity to have well capacitated “friends”. However, the neighbouring community’s sense of ownership was found to be a primary contributor to a Reserves state of security.

Further to which the social role that urban reserves play as “safe areas” for people to walk their pets, have picnics or conduct social functions was highlighted at several public meetings. It was also mentioned that in some areas where “gang turf” issues was dominant the reserves were viewed as “neutral” territories.

Advisory Boards are a requirement in terms of reserves proclaimed under the Protected Areas Act. The aim of which is to allow participation by interested parties and to ensure their continual engagement. With regard to reserves not yet proclaimed under the Protected Areas Act but which have Advisory Boards their role is much the same with the possible addition of raising and allocation of funds. This investigation could not clearly define the extent, role and responsibilities of the various Reserves Advisory Boards. Some Reserves indicated that they played an active role whilst others were not aware of their existence. The development of a clear responsibilities and objectives for each Board is viewed as imperative to contributing to the achievement of the Reserve objectives whilst providing a formal link to neighbouring communities and local government.

The removal of Spare tyres from Reserve vehicles by the Transport Sections should be halted as it poses a significant risk to staff operating in remote areas or providing law enforcement services.

Most Reserves have other City Utility Departments executing functions within the Reserve, share boundaries with them, or manage large tracts of land under their jurisdiction. None of the Reserves were aware of any Memorandums of Understanding which clarify joint management matters. This was viewed as institutional shortcoming requiring attention at higher level.

A variety of Security Service providers render various levels of security to Reserves. These services vary from private security firms providing uniformed guards to providing a static or gate control service to services where such guards are used as Bushrangers. It was the investigations conclusion that each District or Reserve negotiates their own contract conditions with such service providers, a situation which does not contribute to clear and measurable security service provisioning.

The City Law Enforcement Services and structures were generally viewed as not being able to respond to conservation related incidents. Only a few Reserves reported adequate responses to call-outs or incidents with most Reserves saying they rely on the local SAPS for assistance. Reserves which have installed alarm systems linked to the City Law Enforcement Control Rooms, reported that in the event of an alarm activation, the Reserve manager is phoned to investigate. No direct service benefit could be found in respect of City Law Enforcement.

What was most evident during the investigation was the risk posed by staff acting outside their areas of jurisdiction. These transgressions are not through ill intent and staff are not necessarily aware that they are exceeding their authority. Urgent attention should be paid to necessary authority and the role staff play in enforcing provincial conservation laws, fisheries laws, and National laws. This should be done in cognisance of the criminal Procedures Act. It is further suggested that cooperation agreements and execution delegations be formalised with other environmental and conservation agencies.

Due to several reserves having a coastal boundary and the ever present activities of highly organised and dangerous Abalone poaching gangs, the involvement of staff in curbing these activities need to be clearly defined and coordinated. It is the opinion of this team that this should be the preserve of a highly trained and well equipped District based Law Enforcement Component conducting their duties in collaboration with other authorities and with the necessary jurisdiction.

It is the opinion of this investigation team that the establishment of a District based Law Enforcement Component will greatly contribute in addressing some of the security shortcomings highlighted. In addition, such a component will also alleviate some of the external enforcement requirements placed on Reserve staff thus allowing them to focus on reserve management and security. The current practice of Law enforcement staff working a daily night shift is questioned as no evidence could be found on its effectiveness. It is suggested that through information gathering, coordination with other authorities and planning, such nightly activities could take place on a sporadic basis with much greater successes.

The investigation team was also of opinion that the management requirements of the various Reserves need to be included in the Municipal Spatial Development Framework so as to ensure that the Reserve - Neighbourhood interface receive adequate attention.

1.5 SUMMARY OF RECOMMENDATIONS

INSTITUTIONAL		
Aspect	Issue	Recommendation
Governance	1. Relationship with other National & Provincial Conservation/Environmental institutions 2. Relationship with other City Institutions 3. Obligations in respect of By-laws, Municipal Systems Act (2000) and the Municipal Finance Management Act (2003) 4. Working agreements with other Utility Services	1. Conduct Institutional Governance Audit 2. Draft MOU's
Policy Procedures &	1. Management Policies, Goals, Objectives 2. Operational Procedures & Protocols	1. Develop management Policies Goals & Objectives 2. Develop Procedures and Protocols
Management	1. Consistency in personnel designations 2. Consistency in personnel functional content 3. Career pathing 4. Skills development 5. Reserve Management Standards	1. Develop consistent Job Descriptions 2. Develop Skills Development and career pathing Protocol 3. Develop Auditable Reserve Management System linked to Personnel & Financial Performance Management System

Reserve	Additional Staffing	Security and Equipment	Infrastructure
NORTH			
Witzands	1. 3x Bushrangers 2. Small labor team 3. Staff must be trained in 4 wheel driving 4. Officers appointed as Peace Officers	1. Establish a MOU with Bulk Water 2. Replace damaged fences 3. Monitor Wood cutter activities 4. Permits must contain more information 5. Reserve map required 6. Curb illegal access 7. Regular perimeter patrols.	1. 4x4 vehicle in good condition 2. Office Trellidor and burglar bars 3. Demarcation of boundaries 4. Erect signage 5. Electric fence along north and north-eastern boundary 6. Basic staff equipment
Blaauwberg	6. 6x Bushrangers (2 x3-member teams) 7. 2 x Permanent Visitor Controller Off's 8. Officers appointed as Peace Officers 9. Station District Law Enforcement Component	4. Staff be appointed as Peace Officers 5. Law Enforcement Component duties expanded to cover "hot spots" in district. 6. Daily night shifts limited to conduct patrols across district and do ad hoc night time	1. Link present alarm system to security service provider. 2. Mount Day-Night camera to cover main resort area. 3. Active Monitor to monitor activities during peak periods. 4. Erect signage 5. Basic staff equipment
Rietvlei	1. 2 x Bushrangers 2. Officers appointed as Peace Officers	1. Regular perimeter patrols 2. Co-ordinate with MCM	1. Fence along R27 road. 2. Alarm systems at new facilities 3. Peak Inversion camera with recording facility for main gate 4. Fence open residential property boundaries 5. Patrol boat 6. Basic staff equipment
CENTRAL			
Bracken	1. 1x EE Officer/Community Officer. 2. 1x Labourer	1. Visible patrols 2. Liaison with Everite Hostel.	1. Ablutions at gate 2. Day-night camera for main access area. 3. Removal of derelict buildings 4. Guard monitoring 5. Clear alien vegetation along

			fences 6. Basic staff equipment
Durbanville	1. 2x Visitor Controller Officers 2. Officers appointed as Peace Officers	1. Boundary fence cleared of vegetation 2. Erect signage iro handling of unwanted pets	1. Steel gate at offices to be kept locked, and fitted with buzzer and solenoid access control 2. Video monitor for door 3. Service counter inside front door 4. Alarm system to include response 5. Long-range mobile panic buttons 6. Lighting at offices and main gate 7. Peak Inversion camera for main gate 8. Guard Monitoring system 9. Basic staff equipment
Tygerberg	1. Employ current 3 Contract Bushrangers 2. 2x Bushrangers 3. 1x Site Manager 4. 1x Foreman 5. 5x Labourers 6. 1x Additional EE Officer/Community Liaison 7. 2x Visitor Controller Officers 8. Officers appointed as Peace Officers 9. Station District Law Enforcement Component	1. Attend Community Police Forum and Crime Watch meetings. 2. Bushrangers obtain drivers licenses 3. Staff presence over week-ends and after hours 4. All gate remotes currently issued be recovered immediately and re-issued under a new access signal code 5. Keys handed out should be retrieved and locks changed. 6. Kanonberg be afforded controlled access in the event of a fire.	1. Replace existing camera at main entrance gate with a Peak Inversion camera with recording facility 2. Present cameras be replaced with Day-Night cameras. 3. Platteklouf and Quarry area be re-fenced with electric fence 4. Perimeter road should be constructed where feasible 5. Flatrap razer coils installed on top of all fences and along bottom of select fences 6. Accommodation for Bushranger teams 7. Installation of trigger operated floodlight in darker area of parking 8. Additional mountain bike 9. Basic staff equipment
SOUTH			
Zandvlei	1. 3x Visitor Controller Officers 2. 3x Bushrangers 3. 4x Labourers 4. Officers appointed as Peace Officers	1. Cease involvement in public amenity facilities on eastern side 2. Formal gate control required during open hours 3. Formalise relationship with Mountain Men Security Services 4. Evening security at offices by private security service provider 5. Introduce ad hoc evening patrols 6. Formalise co-operation with Marine and Coastal Management regarding control at the estuary.	1. Northern access well designated and controlled access point 2. Signage at the entrance, parking areas & along the water 3. Re-fence office area with Diamond Razor Mesh 4. Provide appropriate security lighting 5. Replaced northern and western fence with Diamond Razor Mesh fence 6. New offices need to be completed & fitted with monitored alarm system and BX Outdoor Beams 7. Guard Monitoring system 8. Motorized boat 9. Basic staff equipment
False Bay	1. 9x Bushrangers 2. 4x Static Guards 3. Officers appointed as Peace Officers 4. Station District Law Enforcement Component	1. Regular patrols supported 2. Bushrangers and Visitor Control officers should be circulated & deployed to cover peak periods of public use within the Park. 3. Change permanent night shift to a planned basis during periods of specific risk or in response to specific incidents 4. Co-ordinate night activities with other law enforcement bodies 5. Visitor Controller Officers patrol Zeekoevlei picnic area during	1. Establish two or three Bushranger bases 2. Re-fence southern and eastern boundary electric fence 3. Motorised patrol 4. 2x Quad 5. Install Guard Patrol Monitoring system 6. Fence Rondevlei offices and EE Centre with Diamond Razor Mesh Install additional trigger 7. Install flood lights at all

		peak periods.	facilities 8. Day-Night camera to Rondevlei Viewing Tower for office and entrance area 9. Upgrade all existing cameras to Day-Night cameras with recording 10. Additional cameras for Zeekoevlei entrance gate and new office complex 11. Buildings should be alarmed with a siren and linked to a security service provider 12. Buildings which do not have security staff at night should be fitted with BX80 13. Erect signage 14. Basic staff equipment
Edith Stephens	1. Replace "small plant operator" with a fence maintenance post.	1. The reserve fence needs to be patrolled daily or at least twice a week 2. Walk-in access should be controlled and documented at the gate 3. Office gate should remain locked	1. Northern and southern fences must be replaced with Razor Diamond Mesh be considered or electric fence using spring steel wire 2. Management track should be created along the fence 3. Basic staff equipment
EAST			
Wolfgat & Macassar	1. 8 x Bushrangers. 2. 3x District Law Enforcement Officers 3. 2 x Community Liaison Officers 5. Officers appointed as Peace Officers 6. Station District Law Enforcement Component	1. Weltevreden office security system should include a response system 2. City employed private security with mobile support to patrol coastal road esp. parking areas 3. Investigate sand mining permits	1. Demarcate reserve using cement poles 2. Erect signage 3. Move Macassar Gate 4. Basic staff equipment
Kogelberg	1. 1x Visitor Controller Officer 2. 3x Bushrangers 3. Officers appointed as Peace Officers	1. Improve communication services	1. Construct Bushranger camp 2. Erect signage 3. Fence Erf 19 and north-west boundary using electric fence 4. Install alarm at all buildings 5. Install trigger lighting 6. Install depot fence at rear 7. Install Reed Switches for solar panels 8. Peak Inversion Camera for entrance gate to depot 9. Basic staff equipment
Helderberg	1. 6 existing Labourers trained to level of Bushrangers 2. Officers appointed as Peace Officers	1. Develop system for evening monies 2. Regular perimeter patrols	1. Erect signage 2. Electric fence be retained 3. Peak Inversion camera at main gate 4. Day –Night camera to cover parking area 5. Basic staff equipment

1.6 COSTING

The equipment costing listed below are based on actual quotes provided.

Fencing:

Diamond Razor mesh fencing installed per 100m R 440,00/meter

1,8m, 12 strand electric fencing installed at 100m (Au Alloy wire) R 55,00/meter

12 Joule Nemtek energizer with built in fence monitor R 3400,00 excl

Alarm Equipment:

To supply and install an 8-zone alarm Paradox alarm system complete with battery back-up, keypad, 15 watt siren, four internal infra red passives, two fixed panic buttons and two reed switches. Alarm system can be zone doubled to a 16 zone system.

R 3600,00 excl.

To supply and install one outdoor BX80 beam

R 1500,00 excl.

GSM 4 channel radio, programmed to four cellular phone numbers and linked to fence energizers, Alarm systems, Solar panels and standalone panic systems

R 1800,00 excl

Long Range remote panic – one long range remote

R 250,00 excl.

Long Range receiver – installed

R 1100,00 excl.

Cameras:

To supply and install one gate camera – Peak inversion camera, auto-iris lens, 40m co-axial cable, power supply, 4-channel embedded digital recorder (250 G) hard drive and one 17 inch monitor. Price includes camera housing and installation

R 11 900,00

excl.

To supply and install one day/night camera – Day/Night camera, auto-iris lens, 40m co-axial cable, power supply, 4-channel embedded digital recorder (250 G) hard drive and one 17 inch colour monitor. Price includes housing and installation

R 12 900,00

excl.

Report on Sensitivity-Value Analysis and Zonation Process for the Boland Reserve Complex

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April 2008

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Report on Sensitivity Value Analysis and Zonation Process for the Boland Reserve Complex

1. Executive summary

The sensitivity-value approach to biodiversity analysis as used within SANParks and other protected area management agencies was applied to the Boland Reserve Complex. The sensitivity-value process has been developed to ensure that land-use, development and zoning decisions within protected areas are based on best possible landscape-level biodiversity informants. It is a decision support tool for spatial planning that is designed to integrate best available biodiversity, landscape and heritage information into a format that allows for defensible and transparent decisions to be made. The process is expert based and is geared at providing acceptably robust answers within tight planning deadlines. The process is based on the principle that the acceptability of development at a site is based on the site's conservation value (evaluated in terms of its contribution to the national conservation estate) and its sensitivity (vulnerability to a variety of types of disturbance).

The zoning process is consensus based and is aimed at developing a unified view between the major sectors involved in reaching landuse and development decisions within a Protected Area, viz. scientific services, park management and tourism development.

The sensitivity-value analysis and zoning exercise can be divided into six stages:

Stage one: Data synthesis and compilation

Summary data layers are for key biodiversity informants.

Stage Two: Layer interpretation

Summary layers are subject to an expert based process that forces specialists to make assessments on sensitivity and value based on best available information and experience.

Stage Three: Sensitivity-value analysis

Preparation of a summary layer which allows all the input layers to be easily accessed, interrogated, combined in a range of weightings, and then used as a decision support tool in a workshop situation.

Stage Four: Workshopping of first draft zonation

The workshopping process involves using the outputs of the sensitivity-value analysis as well as a range of other inputs from development plans, park management plans, park managers etc to compile a preliminary zoning. The SANParks/DEAT zone definitions were used. The draft zonation was developed with CapeNature staff including representatives from Scientific Services, park management (all reserve managers in the complex) and Tourist Development. Underlying decision making rules used in the zonation process:

1. The zonation process is aimed at striking a balance between environmental protection and the development required to meet the broader economic and social objectives of the park.
2. The zoning process takes into account existing development footprints and tourism access routes.
3. Where existing development nodes, tourist sites and access routes occur in areas with high sensitivity-value, then the broad use zoning aims to keep the development footprint as small possible.
4. Where possible, sites with high biodiversity sensitivity-value are put into stronger protection zones.
5. Peripheral development is favoured.
6. The need for linkages increased access to the reserve is recognized.

Stage Five: Refinement of draft zonation

The draft zonation was refined by the consultants and circulated for comment from all the CapeNature units involved in the process.

Stage Six: Final zonation.

A final zonation was prepared incorporating comments from CapeNature. It should be noted that the product can only be considered to be completed when it is formally accepted as part of the reserve's management plan.

Way forward:

Key remaining steps include:

- Appropriate consultation with other stakeholders and the public by CapeNature.
- Finalization of management guidelines for Special Management Areas by CapeNature Scientific services staff.
- Investigation of the Remote areas in the Boland complex by CapeNature Scientific services, and if appropriate, formally proclaim such areas as Wilderness according to Section 22 of the Protected areas Act.
- Future detailed planning will need to take place in Forest Exit Areas and around the Berg River Dam to identify any potential high use areas while protecting sensitive habitats. This would be the responsibility of the Ecological Planner and Scientific Services.

Update cycle:

- The zonations will need to be reviewed every five years when the reserve management plans are updated, and at that stage any new relevant data that becomes available can be included and be utilized to review the current zonation.

2. Introduction

The sensitivity-value process has been developed within SANParks to ensure that land-use, development and zoning decisions within national protected areas are based on best possible landscape-level biodiversity informants. Specifically the process has grown in response to the requirements of the Protected Areas Act. The sensitivity-value analysis is the landscape analysis portion of a broader Conservation Development Framework, which incorporates a variety of inputs (tourism plans, development plans, park management requirements, regional planning informants etc). Although the sensitivity-value and CDF processes were developed within SANParks, their development occurred in close consultation with national government (Department of Environmental Affairs and Tourism) and have been adopted and applied by various conservation agencies including Mpumalanga and East Cape Park's Boards.

The sensitivity-value process is a decision support tool for spatial planning that is designed to integrate best available biodiversity information into a format that allows for defensible and transparent decisions to be made. The process is expert based and is geared at providing acceptably robust answers within tight planning deadlines. The process is based on the principle that the acceptability of development at a site is based on the site's conservation value (evaluated in terms of its contribution to the national conservation estate) and its sensitivity (vulnerability to a variety of types of disturbance).

The sensitivity-value approach to biodiversity analysis, and the consensus based zoning approach, was applied to the Boland Reserve Complex. The data, analysis and interpretation of the biodiversity and landscape inputs into the zoning process are outlined in the remainder of this document.

A draft zonation workshop was held during the period 10 to 11 March 2008 during which the outputs from the initial biodiversity sensitivity-value analysis were combined with informants from conceptual tourism plans, as well as existing tourism nodes/axes and infrastructure footprints. This resulted in a use zonation for the Boland Reserve Complex. A number of further steps have to take place before the product can be considered final and a full Conservation Development Framework compiled:

- Appropriate consultation with other stakeholders and the public by CapeNature.

- Finalization of management guidelines for Special Management Areas by CapeNature Scientific services staff.
- Investigation of the Remote areas in the Boland complex by CapeNature Scientific services, and if appropriate, formally proclaim such areas as Wilderness according to Section 22 of the Protected areas Act.

Two key points need to be emphasized:

- The sensitivity-value analysis and the zonation plan are all part of an adaptive management system. Although they are strategic documents with legal implications (once accepted and officially approved as part of the management plan of the reserve), they will grow and change with time as the park develops and our understanding of the landscape and system improves.
- The analysis is at a fairly broad scale, and in no way replaces the need for detailed site and precinct planning, as well as full EIA compliance.

Update cycle:

- The zonations will need to be reviewed every five years when the reserve management plans are updated, and at that stage any new relevant data that becomes available can be included and be utilized to review the current zonation.
- Future detailed planning will need to take place in Forest Exit Areas and around the Berg River Dam to identify any potential high use areas while protecting sensitive habitats. This would be the responsibility of the Ecological Planner and Scientific Services.

3. Zoning Process

This section briefly outlines the process undertaken for the sensitivity-value analysis and zoning exercise.

Stage one: Data synthesis and compilation

A systematic evaluation of available and required datasets was done in conjunction with CapeNature staff. The data synthesis and compilation process is detailed in Section 4 of the report. Three key decisions were made to streamline the data collation process:

1. The sensitivity-value analysis was undertaken within a fairly broad area including the entire Boland Reserve Complex, Mountain Catchment Areas, some adjacent forestry exit areas as well as other potential areas that may become part of the reserve (e.g. surrounds of Berg River Dam) plus a broad buffer area. However, certain elements of the analysis (e.g. the expert analysis and sections of the transformation layer) were either not undertaken outside of the reserves or were undertaken at a broader scale.
2. The zoning process was undertaken for the Boland Reserve Complex only, and did not formally look at Mountain Catchment Areas or forest exit areas.
3. The basic habitat units were based on data from the SANBI New National Vegetation Map, rather than on deliberately created finer scale vegetation maps.
4. The Special Species information was based on existing datasets, and no new data were collected.
5. SANParks methods for a number of the data layers (used in similar parks with similar data) were applied to the Boland Reserve Complex data.

Stage Two: Layer interpretation

The details of this process are outlined in Section 4. The Layer interpretation stage is critical to the success or failure of the sensitivity-value process.

Stage Three: Sensitivity-value analysis

This stage involves the iterative exploration of the input layers, using a variety of different weightings and options. Different weightings and combinations need to be explored, the degree of double-counting within the input layers needs to be determined, and the

robustness of the sensitivity-value analyses needs to be examined. It is at this stage when the overall understanding of spatial patterns of biodiversity across the landscape is first reached.

Stage Four: Workshopping of first draft

The workshopping process involves using the outputs of the sensitivity-value analysis as well as a range of other inputs from development plans, park management plans, park managers etc to compile a preliminary zoning. The SANParks/DEAT zone definitions were used. The draft zonation was developed with CapeNature staff including representatives from Scientific Services, park management (all reserve managers in the complex) and Tourist Development.

Stage Five: Refinement of draft zonation

The draft zonation was refined by the consultants and circulated for comment from all the CapeNature units involved in the process.

Stage Six: Final zonation.

A final zonation was prepared incorporating comments from CapeNature. It should be noted that the product can only be considered to be completed when it is formally accepted as part of the reserve's management plan. The zonations will need to be reviewed every five years when the reserve management plans are updated, and at that stage any new relevant data that becomes available can be included and be utilized to review the current zonation.

4. Input layers

4.1. Biodiversity

4.1.1. Habitat Value

Broad Rationale

The habitat unit as defined by a particular vegetation community is our broad proxy for biodiversity. Although there are limitations to this approach, it represents the pragmatic choice, as this is usually the best available summary of the distribution of distinct subsets of biodiversity across a landscape.

- The value that we assign to a habitat unit should reflect the contribution that vegetation type makes to the national (and also international) conservation estate.
- Typically, this value would reflect the rarity of the habitat, the level of transformation that had occurred within that habitat type, species richness and diversity, habitat heterogeneity, and contribution to national conservation targets. Ideally this should be done within a systematic conservation planning framework.
- It should also take into account the gap analysis (i.e. how much is in reserves). We should more strongly protect the habitats that are largely outside the remainder of the formal and informal protected area network.
- Importantly this value excludes everything else that is dealt with separately in the analysis - value to special species, hydrological value/sensitivity etc.

Where appropriate, these "national" level values need to be modified to reflect regional and park priorities:

- There are other important criteria like regional and in-park rarity of a habitat. As we are trying to have as diverse an area protected within a park with its associated

broader range of biodiversity, it makes sense to accord greater importance to habitats that are not common in the park or region.

However, broad habitat value is a poor indication of the value of a particular site if a park has a history of significant transformation. Where a park includes transformed and/or degraded areas then we need to adjust the broad habitat conservation value to reflect:

- The level and type of transformation that has occurred at a particular site. Key transformation types include alien infestation, pine and other alien plantations, transformation associated with dams, administrative and tourism infrastructure, regional roads etc.
- The rehabilitation potential of a site. Areas that are likely to return reasonably quickly or easily to a natural or quasi-natural state should be rate above areas without that potential.

Data Inputs (GIS methods and sources)

Base habitat map:

The recently completed (2005) SANBI Vegmap was used as the basis for the habitat map and value assessment for this planning exercise.

Mucina, L. and Rutherford, M.C., (eds.), 2005, *Vegetation Map of South Africa, Lesotho and Swaziland*, National Botanical Institute, Cape Town.

Transformation map:

Three data sets were combined to form a composite Transformation Layer for the BM Complex:

- 1) The detailed (1:10 000) transformation layer of the Zonation Domain (within the Nature Reserves) produced by Theresa Forsyth (CN) using heads up digitizing from SPOT 5 imagery and aerial photographs.
- 2) The transformation component of Donovan Kirkwood's (CN) integrated Biodiversity Layer of the Province covered the buffer area around the ZD. This layer was built using the NLC and a range of other sources.
- 3) The alien invasive plant data was generated by merging all the IAP management plan data from the reserves (provided by CN) and selecting areas with greater than 75% infestation level (Note, no detailed IAP data was available for Limietberg and coarse IAP data was used for this area).

The Transformation Classes were simplified into Waterbodies, Agriculture, Structures, Forestry, Transformed and IAP. The shapefile was simplified using the dissolve function in ET3.6 (AV 3.2). The shapefile was visually checked using SPOT 5 imagery as a back-drop. The transformation within the ZD is very accurately mapped, but the buffer area tends to have transformation over estimated. No errors in the buffer area transformation were corrected. The Classes were assigned values as follows. Transformed, Agriculture, Structures, Waterbodies = -99; IAP and Forestry = -5.

The final transformation layer is D:\Boland Data Archive\ Input layer\ BM_Transformation_29jan08_dd.shp with the value being in the attribute field [VALUE] and transformation type in attribute field [TRANSCLAS].

Scoring, logic, rationale

The Habitat Value of a site was determined on the basis of the following elements:

- The Conservation Status of the vegetation type as determined in the systematic conservation assessment undertaken for the NSBA. Values assigned are detailed in the following tables, and ranged from 4 for Least Threatened through to 10 for Critically Endangered.
- This status was updated on the basis of habitats that are likely to receive an adjusted conservation status under the "Criterion D" listing of threatened ecosystems (SANBI/Tammy Smith, pers comm.). This reflects vegetation types with high numbers of rare and endangered plant species. Values assigned are detailed in the following tables, and ranged from 4 for Least Threatened through to 10 for Critically Endangered. These values replace the NSBA Conservation Status and were not used in addition to them.
- A gap analysis was undertaken of the area required to meet National Protected Area Conservation targets. This systematic analysis calculated the irreplaceability of the vegetation types present in and around the reserve in order to meet National Protected areas targets. These targets were based on the work undertaken for the National Protected Areas Conservation assessment (Holness *et al*, 2008). Where targets had not yet been met, the analysis examined the availability of untransformed and unfragmented areas to meet them. Values assigned ranged from 5 for completely irreplaceable vegetation types (where insufficient area remains to meet Protected area Targets), through to -1 where the Protected Area target has been met, and -2 where the full biodiversity target has been exceeded. Note that the Protected Area Target is approximately 54% of the full Biodiversity Target.
- An analysis was undertaken on the rarity of each vegetation type within the reserve complex, on the basis that one would want to avoid developing rare vegetation types and would have more scope for development of common vegetation types. Values were adjusted from 2 up (for extremely rare vegetation types where less than 100ha of the vegetation type was conserved in the Boland Reserve Complex or where the vegetation type is not present in the reserve complex) to 1 down for extremely common vegetation types (more than 5000ha in the reserve).
- The value of a site was modified by the transformation state of the site. Transformation (e.g. dams, urban infrastructure, arable agriculture) and heavily degraded sites (e.g. High density aliens and forestry areas) were taken into account. Transformed sites were reduced in value by 10 and degraded sites were reduced by 6, with 0 being the absolute minimum value allowed.
- Once these values were determined, values were converted to a 0-10 range using a linear conversion method.

Habitat Value Summary table

Type	Source	Category	Value	Note
Base Values	NSBA Conservation Status	Critically endangered	10	
		Endangered	8	
		Vulnerable	6	
		Least Threatened	4	
	Criterion D status: Habitats with high concentration of Red Listed Species	Critically endangered	10	Note that where a habitat type is proposed for increased listing under criterion D, the anticipated Criterion D status over-rides the NSBA conservation status
		Endangered	8	
		Vulnerable	6	
		Least Threatened	4	
Broad adjusters	Gap Analysis: Requirement to meet national protected area targets	Completely in placeable	5	Insufficient remaining natural areas to meet Protected Area targets Loss of habitat unacceptable
	New calculation:	High in placeability	4	More than 50% of remaining natural (untransformed and unfragmented) areas required in order to meet PA target
		Medium in placeability	3	Between 20 and 50% of remaining natural (untransformed and unfragmented) areas required in order to meet PA target
		Low in placeability	2	Less than 20% of remaining natural (untransformed and unfragmented) areas required in order to meet PA target
		Protected area targets exceeded	-1	Note: PA targets are approximately 54% of the total Biodiversity Target
		Full biodiversity targets exceeded	-2	Full biodiversity targets exceeded Some loss of areas to support broader conservation goals acceptable
	Priority in park: GIS calculation (Newcastle)	Extremely rare habitat in reserve	2	Under 100ha in Boland Nature Reserve complex (or not conserved in BHR)
		Rare habitat in reserve	1	100 to >1000ha in Boland Nature Reserve complex
		Common habitat in reserve	No adjustment	1000 to 5000ha in Boland Nature Reserve complex
		Very common habitat in reserve	-1	More than 5000ha in Boland Nature Reserve complex

Transformation adjustment - site specific		Adjustment value
Transformed sites:	Artificial water bodies, urban infrastructure, arable agriculture	-10
Heavily degraded sites:	Forestry, High density alien	-5

Base values : Ecosystem Status

Vegetation Type	NSBA Conservation Status	NSBA Conservation Status - Score	Criterion D Status	Criterion D score	Vegetation type in Boland Reserve Complex
Atlantis Sand Fynbos	Vulnerable	8	Endangered	8	Peripheral veg type
Boland Granite Fynbos	Endangered	8	Endangered	8	Core veg type
Breda Alluvium Fynbos	Endangered	8			Core veg type
Breda Alluvium Renosterveld	Endangered	8			Peripheral veg type
Breda Quartzite Fynbos	Least threatened	4			Peripheral veg type
Breda Sand Fynbos	Vulnerable	6			Core veg type
Breda Shale Fynbos	Vulnerable	6	Vulnerable	6	Core veg type
Breda Shale Renosterveld	Vulnerable	6	Vulnerable	6	Non-core
Cape Coastal Lagoons	Least threatened	4			Core veg type
Cape Flats Dune Strandveld	Endangered	8			Peripheral veg type
Cape Flats Sand Fynbos	Critically endangered	10			Peripheral veg type
Cape Lowland Freshwater Wetlands	Least threatened	4			Core veg type
Cape Seashore Vegetation	Least threatened	4			Core veg type
Cape Winelands Shale Fynbos	Endangered	8			Core veg type
Elgin Shale Fynbos	Critically endangered	10			Core veg type
Elim Fynbos	Endangered	8			Core veg type
Hanglip Sand Fynbos	Vulnerable	6	Vulnerable	6	Core veg type
Hawequas Sandstone Fynbos	Least threatened	4	Endangered	8	Core veg type
Kogelberg Sandstone Fynbos	Least threatened	4	Endangered	8	Core veg type
Laurenson Alluvium Fynbos	Critically endangered	10			Non-core
North-Sonderend Sandstone Fynbos	Least threatened	4	Vulnerable	6	Peripheral veg type
Overberg Dune Strandveld	Least threatened	4	Vulnerable	6	Core veg type
Overberg Sandstone Fynbos	Least threatened	4	Critically endangered	10	Peripheral veg type
Robertson Karoo	Least threatened	10			Peripheral veg type
Ruimsig Renosterveld	Critically endangered	4			Non-core
South-Sonderend Sandstone Fynbos	Least threatened	4	Vulnerable	6	Peripheral veg type
Southern Afrotemperate Forest	Least threatened	4			Core veg type
Southern Coastal Forest	Least threatened	4			Peripheral veg type
Swartland Alluvium Fynbos	Critically endangered	10			Core veg type
Swartland Granite Renosterveld	Critically endangered	10			Peripheral veg type
Swartland Shale Renosterveld	Critically endangered	10			Core veg type
Swartland Silcrete Renosterveld	Critically endangered	10			Peripheral veg type
Western Afromontane Sandstone Fynbos	Least threatened	4			Core veg type
Western Coastal Shale Sand Vegetation	Least threatened	4	Vulnerable	6	Core veg type
Western Ruimsig Renosterveld	Critically endangered	10			Non-core
Winterhoek Sandstone Fynbos	Least threatened	4			Non-core

Vegetation Type	Area of vegetation type in Boland Mountain Reserve Complex (ha)	Proportion of the Boland Mountain Reserve Complex (%)	Vegetation rarity score	Vegetation type in Boland Reserve Complex
Atlantic Sand Fynbos	0	Not in reserve	0	Peripheral veg type
Boland Granite Fynbos	4745	4.05	2	Care veg type
Bredde Alluvium Fynbos	26	0.02	2	Care veg type
Bredde Alluvium Renosterveld	0	Not in reserve	2	Peripheral veg type
Bredde Quartzite Fynbos	0	Not in reserve	2	Peripheral veg type
Bredde Sand Fynbos	140	0.12	1	Care veg type
Bredde Shale Fynbos	23	0.02	2	Care veg type
Bredde Shale Renosterveld	0	Not in reserve	2	Non-care
Cape Coastal Lagoon	26	0.02	2	Care veg type
Cape Flats Dune Strandveld	0	Not in reserve	2	Peripheral veg type
Cape Flats Sand Fynbos	0	Not in reserve	2	Peripheral veg type
Cape Lowland Freshwater Wetland	72	0.06	2	Care veg type
Cape Seashore Vegetation	11	0.01	2	Care veg type
Cape Winterveld Shale Fynbos	4015	3.43	1	Care veg type
Elgin Shale Fynbos	0	0.01	0	Care veg type
Elgin Fynbos Fynbos	18	0.01	2	Care veg type
Hangklip Sand Fynbos	190	0.16	1	Care veg type
Hawequas Sandstone Fynbos	90354	42.99	-1	Care veg type
Kogelberg Sandstone Fynbos	52416	44.75	-1	Care veg type
Luxemburg Alluvium Fynbos	0	Not in reserve	2	Non-care
North-Sonderend Sandstone Fynbos	0	Not in reserve	2	Peripheral veg type
Overberg Dune Strandveld	19	0.02	2	Care veg type
Overberg Sandstone Fynbos	0	Not in reserve	2	Peripheral veg type
Riverside Renosterveld	0	Not in reserve	2	Non-care
Robinson Karoo	0	Not in reserve	2	Peripheral veg type
South-Sonderend Sandstone Fynbos	0	Not in reserve	2	Peripheral veg type
Southern Akrotirgite Forest	120	0.11	1	Care veg type
Southern Coastal Forest	0	Not in reserve	2	Peripheral veg type
Swartland Alluvium Fynbos	20	0.02	2	Care veg type
Swartland Granite Renosterveld	0	Not in reserve	2	Peripheral veg type
Swartland Shale Renosterveld	3	0.00	2	Care veg type
Swartland Shale Renosterveld	0	Not in reserve	2	Peripheral veg type
Swartland Shale Renosterveld	0	0.07	2	Care veg type
Western Akrotirgite Sandstone	83	3.50	0	Care veg type
Western Coastal Shale Sand Veld	4102	3.50	0	Non-care
Western Rivers Shale Renosterveld	0	Not in reserve	2	Non-care
Wynhook Sandstone Fynbos	0	Not in reserve	2	Non-care

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Habitat Value summary for each vegetation type before adjustment for transformation

Vegetation Type	NSBA Conservation Status - Score	Criterion D score	Gap analysis scores	Vegetation rarity score	Unmodified score
Atlantis Sand Fynbos	6	8	5	2	15
Boland Granite Fynbos	8	8	-1	0	7
Breede Alluvium Fynbos	8		5	2	15
Breede Alluvium Renosterveld	8		5	2	15
Breede Quartzite Fynbos	4		3	2	9
Breede Sand Fynbos	6		5	1	12
Breede Shale Fynbos	6	6	0	2	8
Breede Shale Renosterveld	6	6	3	2	11
Cape Coastal Lagoons	4		2	2	8
Cape Flats Dune Strandveld	8		4	2	14
Cape Flats Sand Fynbos	10		5	2	17
Cape Lowland Freshwater Wetlands	4		-1	2	5
Cape Seashore Vegetation	4		-1	2	5
Cape Winelands Shale Fynbos	8		-1	1	8
Elgin Shale Fynbos	10		5	0	15
Elim Fynbos	8		5	2	15
Hangklip Sand Fynbos	8	6	0	1	7
Hawesquas Sandstone Fynbos	4	8	-1	-1	6
Kogelberg Sandstone Fynbos	4	8	-1	-1	6
Lourensford Alluvium Fynbos	10		0	2	12
North Sonderend Sandstone Fynbos	4	6	-1	2	7
Overberg Dune Strandveld	4	6	-1	2	7
Overberg Sandstone Fynbos	4	10	2	2	14
Robertson Karoo	10		2	2	14
Ruens Silcrete Renosterveld	4		5	2	11
South Sonderend Sandstone Fynbos	4	6	-1	2	7
Southern Afrotemperate Forest	4		-1	1	4
Southern Coastal Forest	4		-1	2	5
Swartland Alluvium Fynbos	10		5	2	17
Swartland Granite Renosterveld	10		5	2	17
Swartland Shale Renosterveld	10		5	2	17
Swartland Silcrete Renosterveld	10		5	2	17
Western Altmontane Sandstone Fynbos	4		-1	2	5
Western Coastal Shale Band Vegetation	4	6	-1	0	5
Western Ruens Shale Renosterveld	10		5	2	17
Winterhoek Sandstone Fynbos	4		-1	2	5

Outputs

See Jpeg on following page.

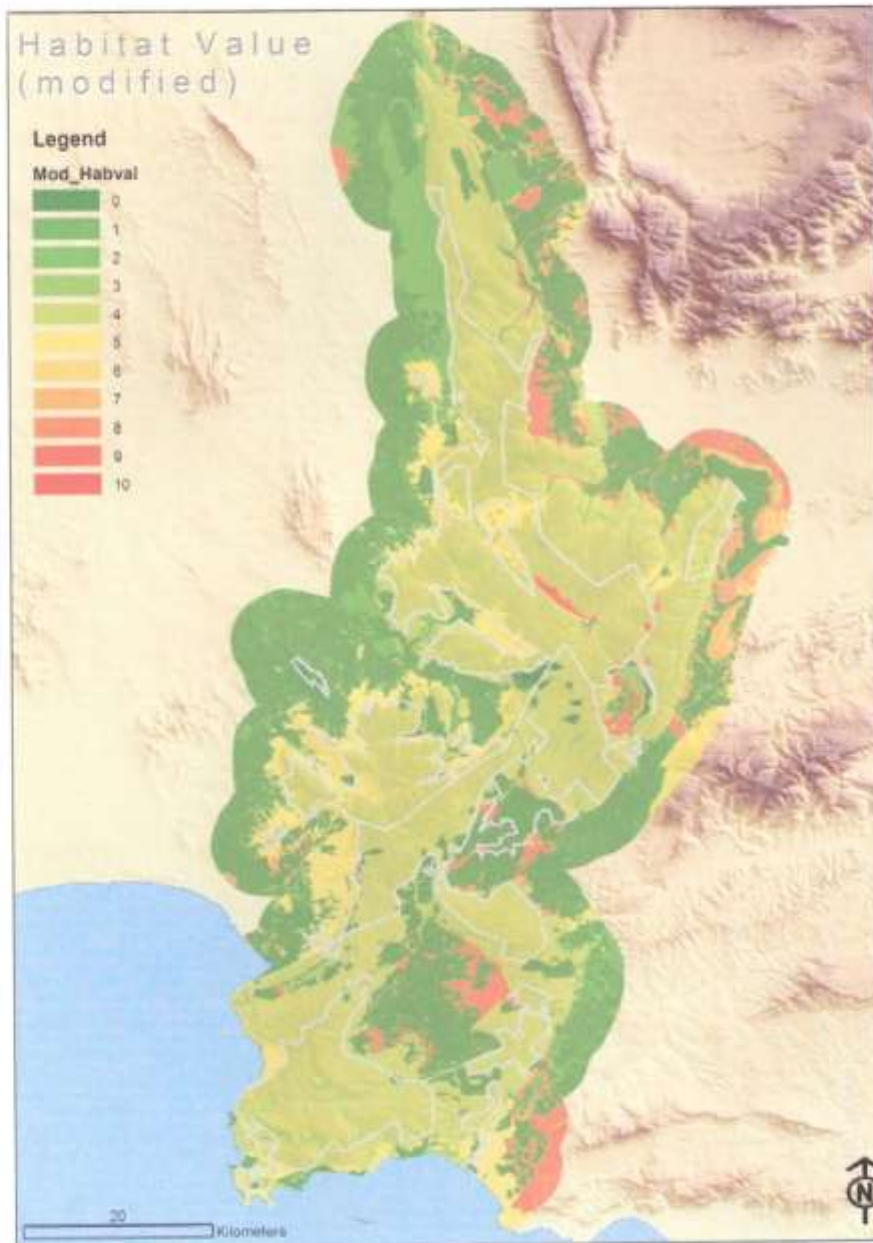


Figure 1: Boland Reserve Complex, habitat values. 0 values are transformed sites. Values range from dark green indicating low habitat Value to reds indicating highest value.

Interpretation in local context

A key issue in examining the habitats of the Boland Reserve Complex, is that even though a vegetation type might be seen as fairly common and unimportant within the reserve complex, on a global scale these vegetation types would still be of international significance. Extreme caution needs to be exercised when any activity is anticipated that may impact on intact areas of any of the vegetation types within the Boland Reserve Complex.

The main difficulty of the Habitat Value section of the sensitivity value analysis is that although it is possible to identify critical habitat types (see below), it is very problematic differentiating between the two common vegetation types (Hawequa Sandstone Fynbos and Kogelberg Sandstone Fynbos) which dominate the upland areas of the reserve. It is essentially not possible to differentiate between these two types in terms of the factors examined (Conservation status, Criterion D, Gap analysis, rarity in reserve etc.).

A number of critical vegetation types are present within the planning domain. These are mainly heavily transformed lowland vegetation types which include Cape Flats Sand Fynbos, Swartland Alluvium Fynbos, Swartland Granite Renosterveld, Swartland Shale Renosterveld, Swartland Silcrete Renosterveld, and Western Ruens Shale Renosterveld. Other critical vegetation types are the Lourensford Alluvium Fynbos, Robertson Karoo and Elgin Shale Fynbos. Overberg Sandstone Fynbos is likely to be flagged as Critically Endangered based on the Criterion D process.

Show stoppers/fatal flaws

Development of greenfield sites within any Critically Endangered vegetation type should be approached with extreme caution, as by definition one cannot afford further biodiversity loss in these areas:

- Cape Flats Sand Fynbos, Swartland Alluvium Fynbos, Swartland Granite Renosterveld, Swartland Shale Renosterveld, Swartland Silcrete Renosterveld, Western Ruens Shale Renosterveld, Lourensford Alluvium Fynbos, Robertson Karoo and Elgin Shale Fynbos. Note that most of these vegetation types are either currently outside the Reserve Complex itself or very small portions in the reserve.

Overberg Sandstone Fynbos is a problematic vegetation type, as it is fairly intact as a unit, but is likely to be flagged as Critically Endangered based on the Criterion D process (red Listed Species). Whether development is acceptable in this vegetation type is debateable depending on how seriously one takes the Criterion D listing and data. Nevertheless, loss of habitat within this vegetation type should be approached with extreme caution due to the high concentrations of Red Listed Species.

Data archiving

The final habitat value layer is D:\Boland Data Archive\Output layer\HabitatValuewgs84.shp, with the vegetation name in "Name_1", values that have not yet been adjusted for transformation in the attribute field "Unmodhabva" and the final adjusted Habitat Values in "habvalfin". The field "transform" includes the transformation modifier.

4.1.2. Special Habitat Value

Broad Rationale

The value of some areas of a park to the biodiversity estate may not be fully reflected by the habitat proxy. It is critical that we identify these areas properly. However, we must ensure that the final result fairly reflects the biodiversity values of the park, and is not skewed by flawed data, selective data availability, perceptions, and species/taxa bias within management agencies. It is key that this layer is well considered; its contribution is critically evaluated, and is not included just for the sake of it.

Key aspects that should be taken into account in this layer:

- Habitats important for supporting populations of special species.
 - Care must be taken to ensure that this input fairly reflects the distribution of special species across the reserves
 - Where detailed and comprehensive data are available this can be based on actual distributions, but in all likelihood this will be based on expert assessment of likely habitat requirements for identified special species.
- Areas containing significant biodiversity assets such as Leopard or Black Eagles that are not specifically linked to entire habitats.
- Other habitats that have significant biodiversity value that have been omitted from the broad habitat conservation value layer as a result of scale issues:

Data Inputs (GIS methods and sources)

The Special habitats layers was dependent on two key inputs:

1. Species data from CN in the form of State of Biodiversity Report database, linked to Red lists (SANBI) and IUCN Redlists (for non plant taxa).
2. Additional special plant species data sourced from CREW on the distribution of Red Data Book listed plant species.
3. Expert mapped special habitats provided by CN, including a score (1-10) which is a subjective importance score for the habitat.
4. The transformation data as described in the previous section.

All point species data was buffered at 200m and 400m, using the buffer with attributes extension in AV3.2.

Scoring, logic, rationale

The scoring process was undertaken as follows: 1.) Assign values to buffers of special species as per table; 2.) Assign values to expert mapped areas as per table ; 3.) Reduce value of all areas with permanent transformation "overriding values" to 0; and 4.) Adjust values of areas with other transformation types accordingly (subtract 5 from areas with forestry or high alien infestation).

Special habitat value

Type	Source	Category	Value	Note
Base Values	CN SoB database plant and animal point localities (including CREW data) (2007)	Critically endangered 200m buffer	10	Highest value taken if over lap
		Critically endangered 400m buffer	8	Highest value taken if over lap
		Endangered 200m buffer	8	Highest value taken if over lap
		Endangered 400m buffer	6	Highest value taken if over lap
		Vulnerable 200m buffer	6	Highest value taken if over lap
		Vulnerable 400m buffer	4	Highest value taken if over lap
		Rare 200m buffer	3	Highest value taken if over lap
		Rare 400m buffer	1	Highest value taken if over lap
	CN Expert Mapped Special Habitats	Expert Score 10	8	Highest value taken if over lap
		Expert Score 8 or 9	6	Highest value taken if over lap
		Expert Score 6 or 7	5	Highest value taken if over lap
		Expert score 5	4	Highest value taken if over lap
Modifiers	Modifiers - Land Cover			
	Overriding values	Artificial water bodies	0	Value reduced to 0
		Urban/Built Up	0	Value reduced to 0
		Mines/Quarries	0	Value reduced to 0
		Intensive agriculture	0	Value reduced to 0
	Adjusting values	High density alien infestation	-5	No values below 0
		Plantations	-5	No values below 0

Procedure	
1	Link State of Biodiversity Data provided by CN and CREW point locality info for animals and plants to Red Data Lists (SANBI and IUCN)
2	Create new layer by extracting all Rare Endangered, Critically Endangered, species in Buffer of the Planning domain.
3	Assign values to the different types of points and areas as listed above
4	Buffer each point at 200m and 400m, merge these buffers and dissolve overlaps etc. retaining the point attribute of the highest value (use buffer with attributes extension in AV, and ET3.6 advanced merge)
5	Merge with expert mapped special habitats
6	Reduce value of all areas with permanent transformation "overriding values" to 0
7	Adjust values of areas with other transformation types according to maximum transformation value assigned, with 0 being the absolute minimum value.
8	Dissolve adjacent polygons with same value to simplify the coverage.

Outputs

See Jpeg on following page.

Interpretation in local context

The layer reflects the high plant and animal biodiversity of certain mountain peaks and the sensitivity of the high altitude seeps and wetlands.

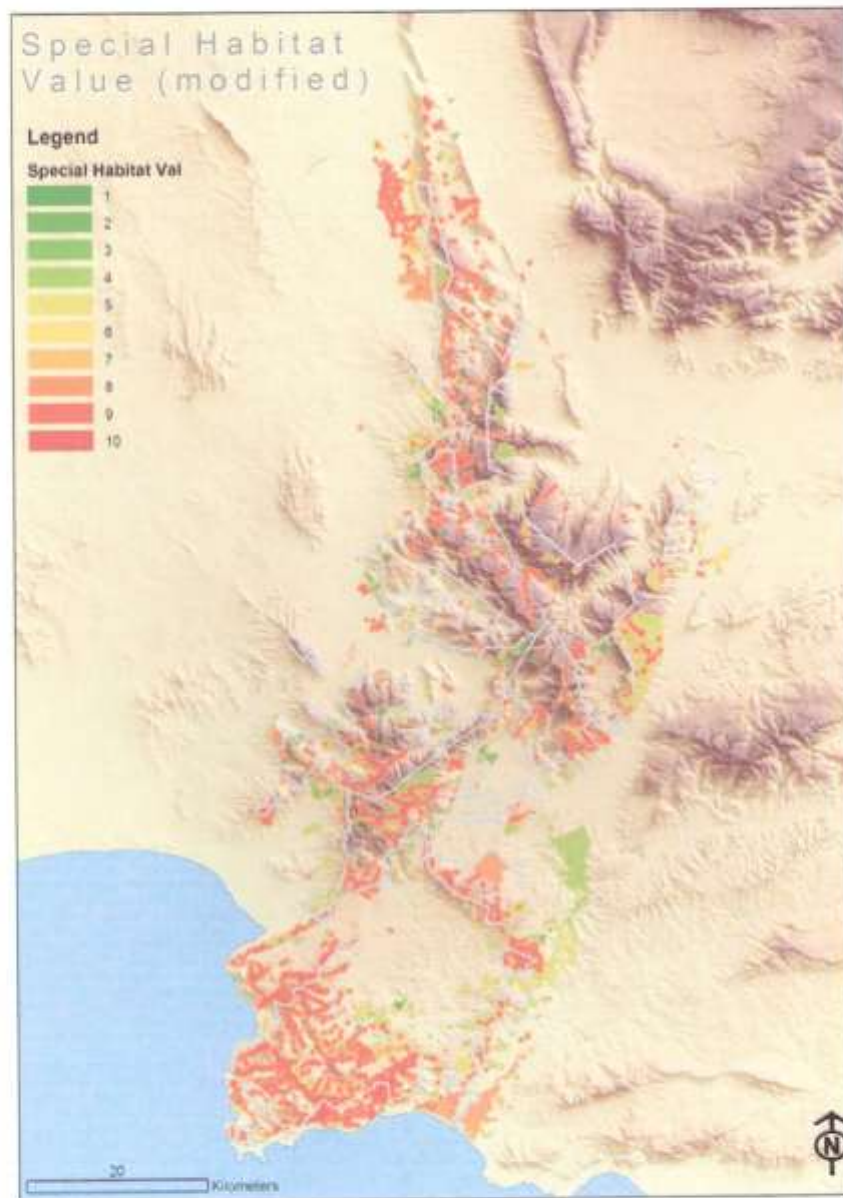
Show stoppers/fatal flaws and Special Management Area Informants

Typical show stoppers would include buffered areas where specially protected flora species, narrow range endemics and endangered wildlife occur.

Data archiving

The final habitat value layer is D:\Boland Data Archive\ Output layer\ [BM_Special_Habitat_Value_Modified_dd.shp] with the values in the attribute field [VALUE]. The file [BM_Special_habitat_value_11Feb08.shp] has also been included as it contains the original species and expert polygon data fields.

Figure 2: Boland Reserve Complex, Special habitat values.. Values range from dark green indicating low habitat value to red indicating highest value.



4.1.3. Topographic Sensitivity

Broad Rationale

This layer is used to identify areas:

- Steep slopes where significant additional impacts are likely during construction
- Areas with geological and geomorphological characteristics that make them prone to events such as landslides

Data Inputs (GIS methods and sources)

This layer is derived from the 10m digital elevation model supplied by CapeNature. Slope angles were calculated within an appropriate spatial modeling package (IDRISI).

Scoring, logic, rationale

Slope angles were split into categories that relate to identified impacts and limits of effective construction without significant cut and fill. See table for categories and sensitivities:

Topographic sensitivity

Source	Category	Value	Note
Slope angles calculated from 20m DEM			
	0° - <5°	0	No special topographical sensitivity
	5° - <10°	2	Areas with low sensitivity.
	10° - <15°	4	Moderate risk of erosion following disturbance, no cut and fill.
	15° - <25°	6	High risk of erosion following disturbance, potential slope instability, increased engineering requirements with cut and fill etc resulting in greater impacts.
	25° - <45°	8	Strong potential for erosion and slope instability. Very difficult areas for construction, increased engineering requirements with cut and fill etc resulting in greater impacts.
	45° - <90°	10	Effectively off-limits for construction as impacts and engineering requirements excessive.

Outputs

Jpeg on following page.

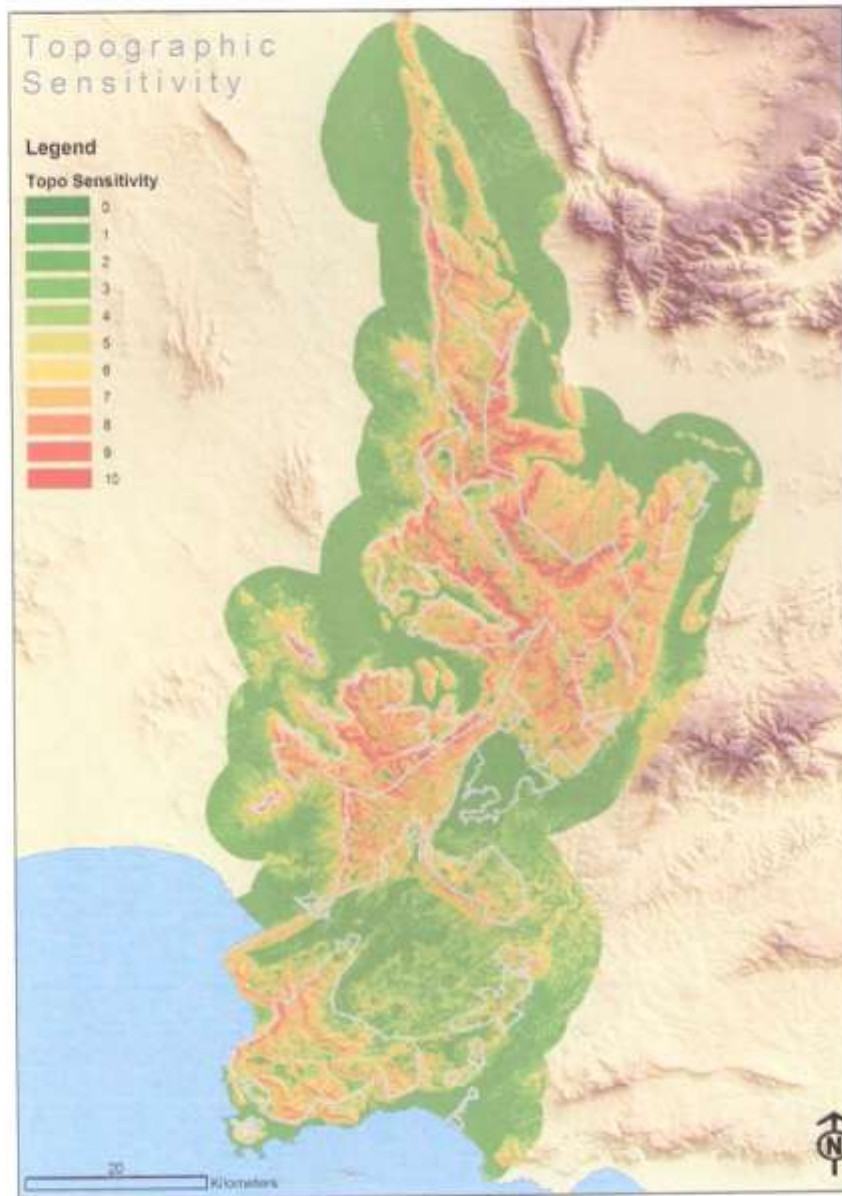


Figure 2: Topographic Sensitivity: Boland Mountain Complex.

Interpretation in local context

Not necessary.

Show stoppers/fatal flaws and Special Management Area Informants

No Special Management Areas are anticipated, but it is likely that areas with excessively high slope angles (perhaps over 45°) would be unsuitable for certain types of development such as roads and buildings.

Data archiving

The final topographic sensitivity layer is D:\Boland Data Archive\ Output layer\topographic_sensitivity.shp, with the values in the attribute field "toposens".

4.1.4. Soil Sensitivity

A soil sensitivity layer was not used in this planning process due to the lack of suitable data within the planning timeline. This is unlikely to be a serious flaw as most soils are sandstone based. However, care needs to be taken when dealing with shale and granite based soils in some sections of the reserve complex.

4.1.5. Hydrological Sensitivity

Broad Rationale

This layer has two purposes:

- Identify areas important for maintaining hydrological processes
- Identify areas where inappropriate infrastructure could be damaged by fluvial action.

Data Inputs (GIS methods and sources)

The footprint within which hydrological sensitivity is determined is defined by buffering river and wetland features by pre-determined distances. The advantage of this method is its ease of application and broad availability of acceptable quality datasets (typically at 1:50 000 scale). The choice of this method was based on pragmatic considerations such as data availability and time constraints.

River, dam and wetland data were sourced from the 1: 50 000 the national topocadastral series. The sensitive wetland data were sourced from CN and high altitude seeps were mapped by Therese Forsyth (CN) for the project.

Scoring, logic, rationale

These layers were reclassified into artificial wetlands (including dams), natural wetlands, perennial rivers and non perennial rivers, and buffered and scored and combined as detailed in the table.

Hydrological sensitivity

Source	Category	Value	Note
CN layers combined			
	Natural wetlands, seeps and pans - Actual area plus 50m	10	Actual wetland area - potential for direct disturbance
	Wetlands, seeps and pans - 200m buffer	8	High sensitivity to disruption of hydrological and sediment transfer processes
National datasets			
1:50 000 toposheets			
	Perennial rivers - Actual area plus 100m	10	Includes areas with potential flood risk.
	Perennial rivers - 200m buffer	6	Areas where disruptions could impact on hydrological processes.
	Artificial waterbodies - actual area plus 100m	5	Buffer to accommodate spatial extent of potential water level fluctuations.
	Artificial waterbodies - 200m buffer	4	As above, bit lower sensitivity as further away.
	Non-perennial rivers - 100m buffer	3	Similar to perennial rivers but smaller footprint as likely to be in smaller valley.
Procedure			
1	River data sets from CDSM, natural wetland data sets provided by CN, and seeps data provided by CN were cleaned and used to generate buffers as separate polygons, at distances and with values as listed above.		
2	Each buffer polygon was simplified by removing overlapping areas and merging adjacent areas		
3	The Buffer polygons were then merged with priority (advanced merge in ET3.6) such that higher value polygons were dominant and underlying lower value polygons were removed.		
4	The resulting merged polygon shapefile was simplified by dissolving adjacent features with same values.		

Outputs

See Jpeg.

Interpretation in local context

Note that due to the pragmatic approach taken in this analysis, identified buffer areas are generous, and considerable refinement could occur at a site level.

Show stoppers/fatal flaws and Special Management Area Informants

- Wetland areas may need to be identified for appropriate management. A Special Conservation Area may be required.
- Detailed determination of 1 in 50 year flood lines may be required for infrastructure development.

Data archiving

The final hydrological sensitivity layer is D:\Boland Data Archive\ Output layer\ [BM_Hydrology_final_dd.shp], with the values in the attribute field [VALUE].

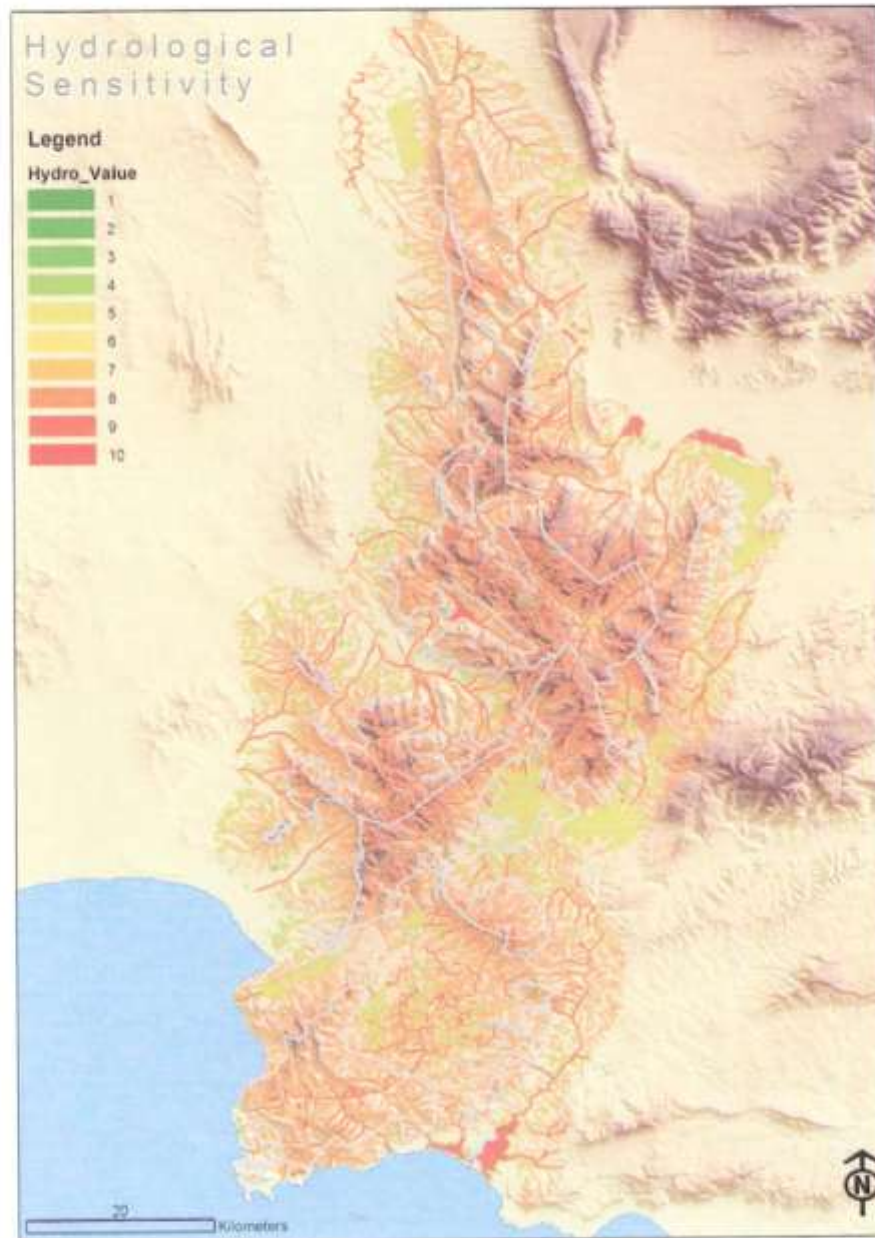


Figure 3: Hydrological sensitivity.

4.1.6. Vegetation Vulnerability to Physical Disturbance

This layer was not used in the planning process as consultation with CapeNature's botanists suggested that the vegetation responses to physical disturbances across the planning domain were fairly similar. Hence there was little value in attempting to differentiate between the fynbos vegetation types

4.2. Aesthetic

4.2.1. Visual Sensitivity

Broad Rationale

The Visual Sensitivity layer examines how visually intrusive a development will be in a landscape. Similar to the other sensitivity layers, the visual sensitivity of a portion of a landscape (or viewshed) is rated in the range 0 (low sensitivity) to 10 (extreme sensitivity).

Data Inputs (GIS methods and sources)

- All analyses were undertaken within IDRISI on the 10m DEM supplied by CapeNature.
- Final outputs were converted to shapefiles for ease of data integration.

Scoring, logic, rationale

The visual analysis examined how visually intrusive a development would be at a particular site. Three separate variables were calculated:

- Slope steepness was calculated based on the same DEM as the topographic sensitivity layer. Slope angles were divided into 10 equal width categories (the range was 0°-40°). These were scored in the range 0-10.
- An analysis of the visibility of each site from every other site in the reserve was undertaken. A 250m square grid of points within the reserve was used to define 18720 viewpoints. A 2m viewing height and 10km maximum search distance were used. The analysis examined (on a proportional basis) which sites were most visible. Similar to the slope steepness, these values were divided into ten equal width categories and scored on a 0-10 basis. Maximum values were equivalent to sites visible from 2.5% of all points in the park.
- An analysis of visibility from all tourist viewpoint, infrastructure and public roads was undertaken. This includes visibility from all current trails and other tourist facilities. The analysis parameters used were similar to the above except for the viewpoints used. Similarly to the above, the proportional values generated were converted to ten integer based classes with the maximum values equating to visibility from approximately 5% of park viewpoints.
- These values were added together and reclassified in the range 0-10 to ensure compatibility with other layers.

○ Outputs

See Jpeg on following pages.

Visual Sensitivity

Source/Process	Category	Value	Note
1. Slope Steepness 10m DEM Slope modelled in IDRISI (Slope model coarsened (3x pixel aggregation)) Slopes reclassified	0° to 40°, ten equal width categories Scored 1 to 10	0-10	Slope angles calculated from 20m DEM Values converted into ten integer based classes, with the maximum value equivalent to slopes of over 40°
2. Grid visibility 10m DEM 250m square grid of Protected Areas used as viewpoints 10/20 Viewpoints 2m viewing height 10km search distance Proportional analysis of most visible sites Reclassified	0 to 0.025, ten equal width categories	0-10	Analysis based on Idrisi DEM used in topographic analysis. Values converted into ten integer based classes, with the maximum value equivalent to visibility from 2.5% of park viewpoints
3. Tourist viewpoint, infrastructure and public road visibility 20m DEM All tourist roads, trails and facilities, as well as major public through-roads used as viewpoints 2m viewing height 10km search distance Proportional analysis of most visible sites Reclassified	0 to 0.05, ten equal width categories	0-4	Analysis based on Idrisi DEM used in topographic analysis. Values converted into ten integer based classes, with the maximum value equivalent to visibility from 5% of park viewpoints
4. Combined visual sensitivity Layers 1-3 added together Reclassified Slope model coarsened (2x pixel thinning) Converted to vector ESRI shapefile	3 to 20, ten equal width categories		

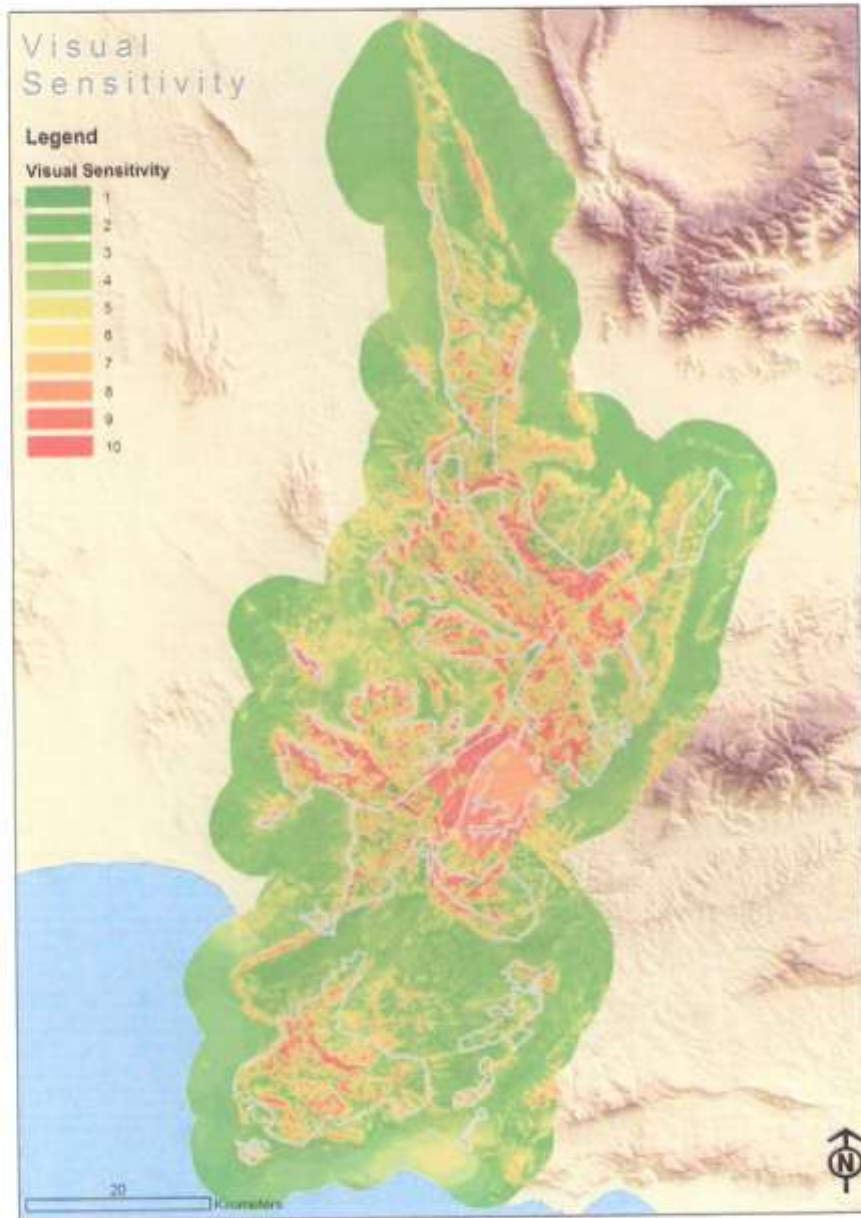


Figure 4: Visual sensitivity.

Show stoppers/fatal flaws and Special Management Area Informants

None anticipated, but detailed investigations would be required at an EIA stage for any project.

Data archiving

The final visual sensitivity layer is D:\Boland Data Archive\ Output layer\visual_sensitivity.shp, with the values in the attribute field "visual sen". Note that the values are only valid with the reserve complex.

4.3. Heritage

4.3.1. Heritage Value

Broad Rationale

This layer summarizes the value or significance of a heritage site. The significance of a site to a large extent determines the level of protection and management measures required for a site, and hence needs to be taken into account when doing spatial planning. The value assigned to a site would be modified by the current condition of the site, with damaged sites generally receiving a lower ranking than undisturbed sites. A site which was significantly disturbed (pot shard in ploughed field) would have lower value than a pristine original condition stone-age site.

Data Inputs (GIS methods and sources)

Cultural heritage sites were identified in an expert mapping process undertaken by CapeNature Scientific Services and park management staff. It is recognized that this dataset is incomplete, and would be significantly improved by a systematic survey.

Scoring, logic, rationale

Values were assigned to these expert mapped sites by Stephen Holness, based largely on the sort of values used in other reserves for similar sites and artefacts. In essence, high values were given to the stone-age sites and lower values were given to all the more modern sites.

Cultural heritage value

Site	Heritage sensitivity
Bushman painting	10
Bushman paintings at Tweede Tol	10
Cultural site - Assegaaibosch manor house	5
Cultural site - Prisoner of War camp (Italians)	5
Cultural site - old Silvermine mine (Simonsberg)	3
Cultural site - old manganese mine	5
Cultural site - ruin of a Shackleton	5
Cultural site of old fort (Fortsnek)	3

Outputs

See Jpeg on following page.

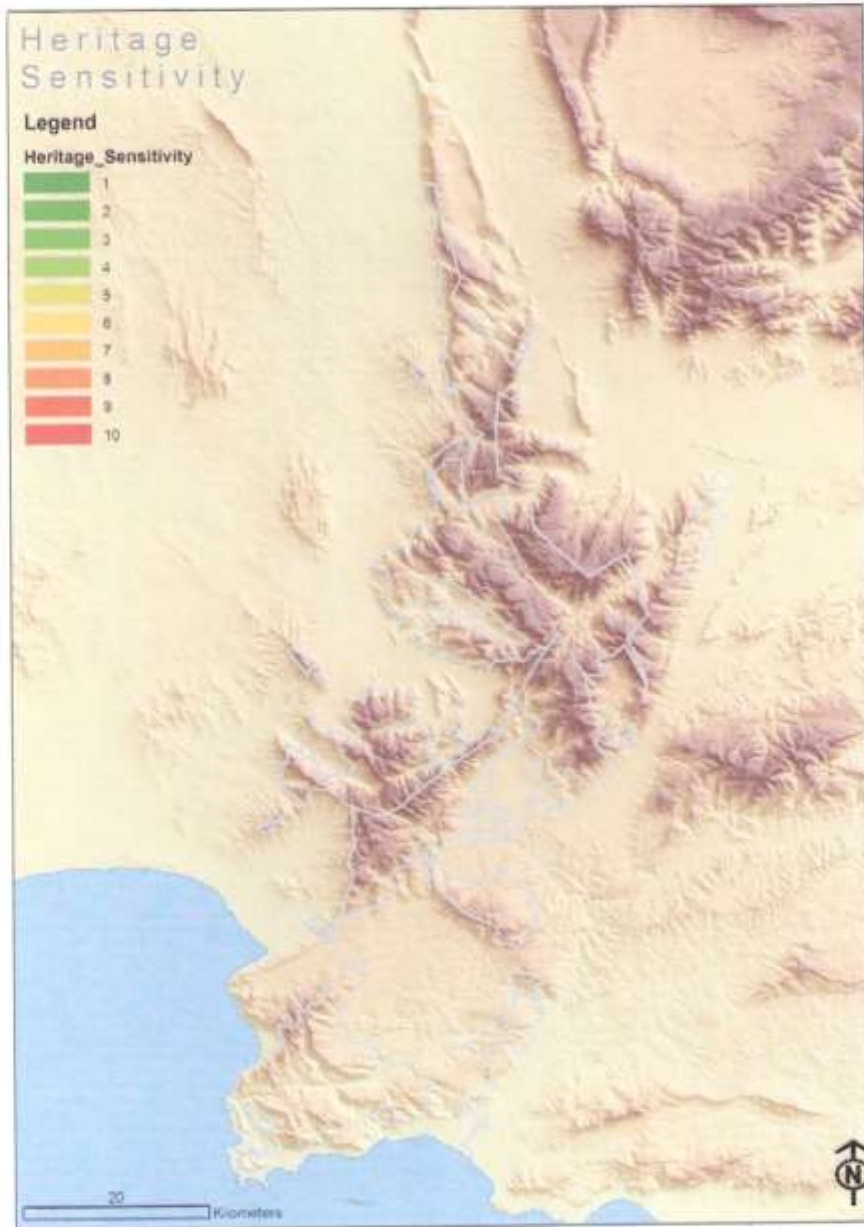


Figure 5: Boland Reserve Complex, heritage sensitivity/value

Interpretation in local context

With the exception of the San paintings, it appears that there is relatively little of major cultural significance within the Boland Reserve Complex. It is however, quite possible that this is purely a result of our current poor state of knowledge of these resources. This layer needs updating for the future.

Show stoppers/fatal flaws and Special Management Area Informants

Note that as this is a preliminary layer based on reconnaissance level information, and that significant further work would be helpful. It does not appear that at a broad planning level, that this lack of detailed knowledge will have a significant impact on the outcome of this process. However, potential exists that show-stopping heritage constraints may be identified in the detailed work at site or EIA level.

Data archiving

The final heritage sensitivity layer is D:\Boland Data Archive\ Output layer\heritage_sensitivity.shp, with the values in the attribute field "heritage_s".

5. Sensitivity-Value Analysis process (including weightings) and summary layers

Broad Rationale

The sensitivity-value analysis process has two key parts:

- The preparation of the input layers in a consistent and easily to analyze format (as outlined in the previous sections).
- The preparation of a summary layer which allows all the input layers to be easily accessed, interrogated, combined in a range of weightings, and then used as a decision support tool in a workshop situation.

The data summary process used in the sensitivity-Value analysis is hierarchical in nature (see diagram). This allows easy access to an appropriate level of base input or summary data during a workshop situation.

Data Inputs (GIS methods and sources)

The GIS process is geared to keeping the dataset flexible enough for use in a workshop situation. For this reason all input and summary data need to be available within a single vector shapefile. The GIS method is as follows:

1. Clip all input summary datasets to spatial footprint of smallest layer. It is critical that all final clipped layers have the same extent, even though not all the area within a layer may be included within a polygon. Areas outside the polygons receive a 0 value in the unioning process so it is critical that these represent true 0 values and not gaps in the dataset.
2. Union all datasets. This produces a composite vector shapefile containing all the data from the underlying summary layers.
3. Delete all unnecessary attribute fields from the unioned shapefile.
4. Summary information is calculated for each of the fragmented polygons using simple field calculations. A new attribute field is added for each summary weighting. Values are calculated using the field calculator. Complex

calculations are saved as expressions. Details of the summary calculations are given in the table.

Scoring, logic, rationale

Sensitivity-Value Weightings

Name	Expression	Expression	Rationale
Linear summary	Linear	Habitat Value + Special Habitat Value + Topographic Sensitivity + Hydrological Sensitivity + Visual sensitivity + Heritage Sensitivity	Equal weighted summary of all the inputs layers
Biodiversity Value	Biodiv_val	Habitat Value + Special Habitat Value	Equal weighted summary of biodiversity value layers
Biodiversity sensitivity value	Biodivsen	2*(Habitat Value) + 2*(Special Habitat Value)+ Topographic Sensitivity + Hydrological Sensitivity	Equal weighted summary of biodiversity value and sensitivity layers
Biodiversity Value Driven Summary	BioValHabit	4*(Habitat Value) + 4*(Special Habitat Value)+ Hydrological Sensitivity + Visual sensitivity + Heritage Value	Layer which emphasizes the biodiversity value of a site, and hence is strongly influenced by the distribution of rare and threatened habitats and species, as well as by patterns of transformation across the landscape
Balanced Summary	Balanced	2*(Habitat Value) + 2*(Special Habitat Value) + Topographic Sensitivity + Hydrological Sensitivity + Visual sensitivity + Heritage Sensitivity	This is the favoured layer which emphasizes biodiversity value and aesthetic considerations, and de-emphasizes biodiversity sensitivities (where some double counting occurs and where certain impacts can be mitigated against).
Max	Max	Habitat Value + Special Habitat Value + Topographic Sensitivity + Hydrological Sensitivity + Visual sensitivity + Heritage Sensitivity	Select on all input layer fields to get max value for a polygon (not cumulative)

Outputs

See Jpegs on the next few pages.

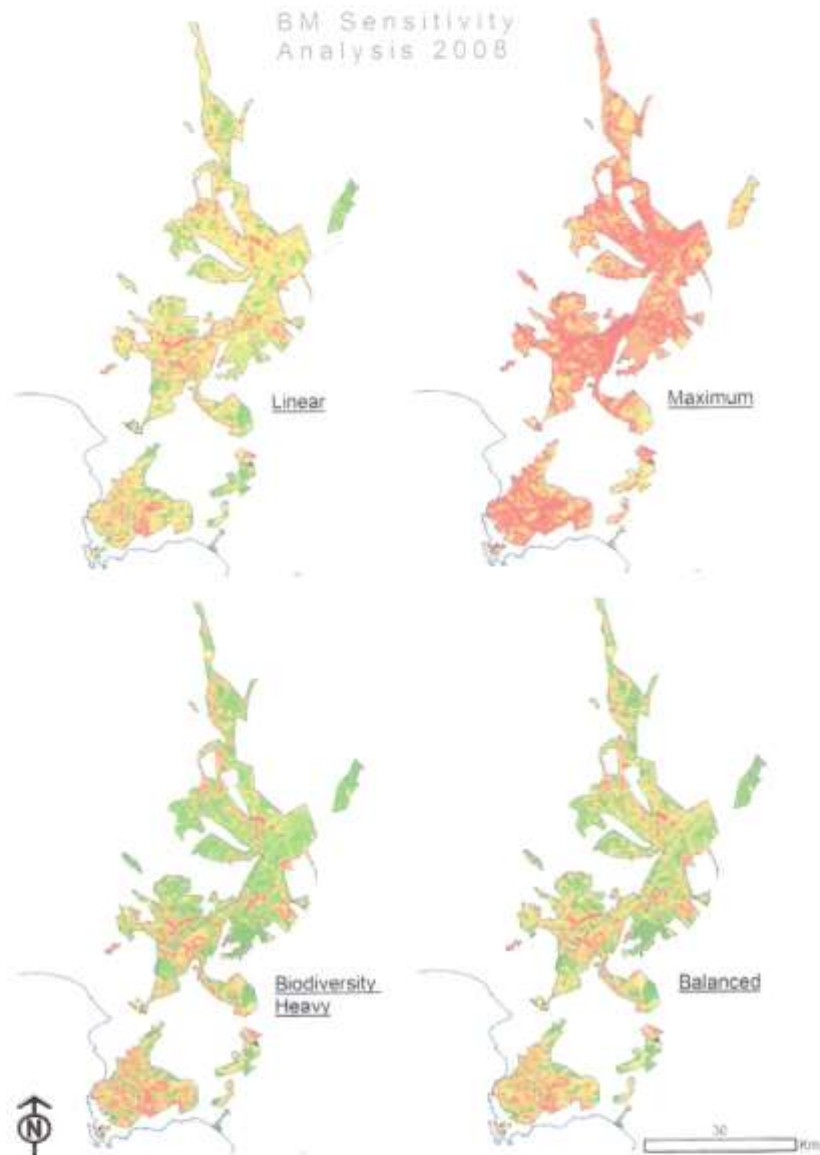


Figure 6: Examples of the outputs from the sensitivity value analysis process using different weightings. See table for weightings.

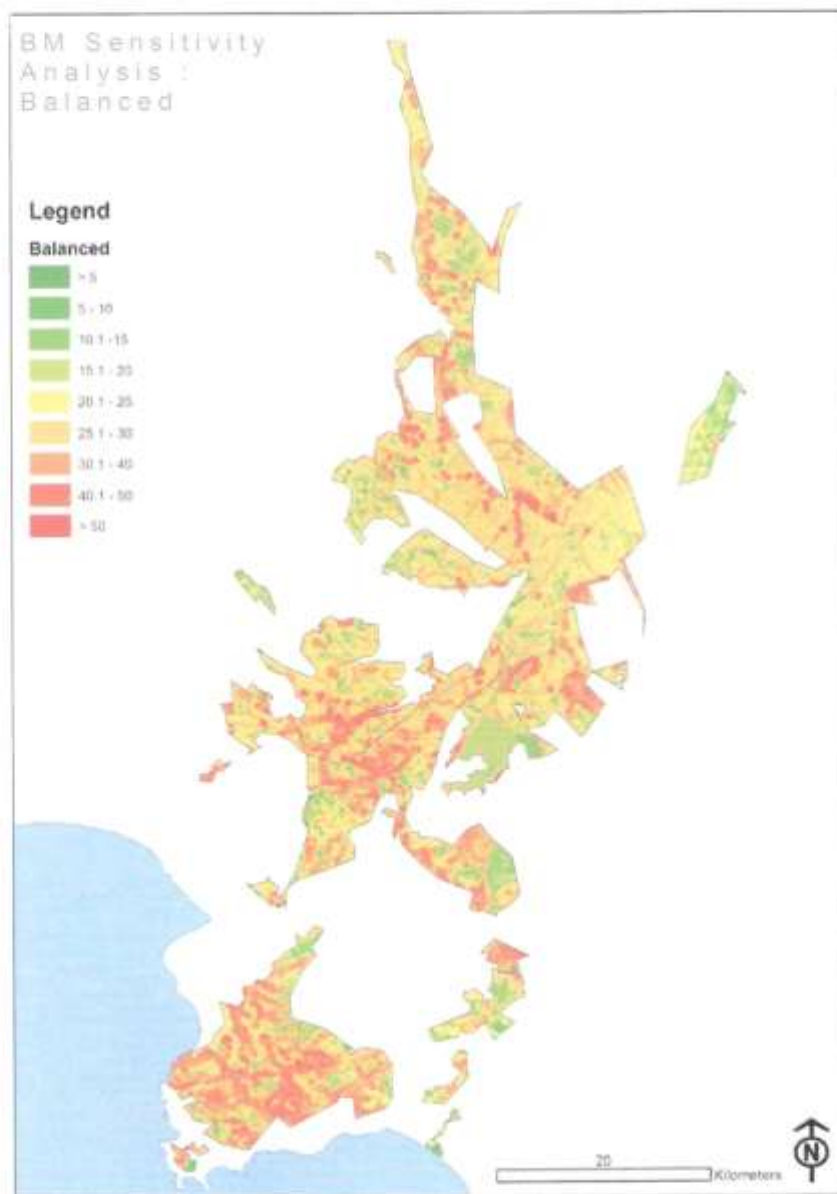


Figure 7: Balanced sensitivity value analysis outputs. This version was used as the basis for the zonation process.

Interpretation in local context

The combined range of weightings presented in the table and Figures 8 indicate no significant difference in outcome of the summary of layers, except for the Maximum Value layer which tends to highlight entire landscapes except in extremely low sensitivity environments such as savanna. This is a typical scenario for an area with high levels of biodiversity related sensitivity and also large topographic variability. Therefore use of any of the summary layers as base layer for the zonation will probably result in a similar or even identical zoning. However, in order to align closely with reserve objectives, the balanced summary (Figure 8) which emphasizes biodiversity value considerations was considered appropriate to use during the actual zoning exercise.

General points raised by the summary include:

- Within the reserve complex, the overall sensitivity-value of a site is heavily influenced by the Special Species layer. This is the result of it being difficult to differentiate at a broad level between some of the major vegetation types present within the reserve.
- Transformation largely drives the sensitivity-values at a landscape level. Remaining fragments of heavily transformed vegetation types are of highest value.
- Large portions of the reserve complex are essentially unsuitable for development due to the rugged nature of the terrain found in the reserve.

Show stoppers/fatal flaws and Special Management Area Informants

None anticipated as would have been covered in the individual summary input layers.

Data archiving

The final combined sensitivity value summary layer is D:\Boland Data Archive\ Output layer\BM_Integrated_Layer_dd.shp. Attribute field names for the individual summary layers are given in the previous sections, with the summary layer field names given in the table in this section.

6. Zoning Informants

This section briefly outlines the values underlying the identification of broad tourism use zones. It is important to remember that the landscape/biodiversity analysis is just one of the informants in the zonation process. Although the biodiversity analysis is intrinsically a relatively objective scientific process, other informants to the zoning process are not. Although every attempt is made to place high sensitivity-value sites into more protected zones where possible, the zoning process is in its essence a compromise between environment and development. In particular, often the identified high value sites are the key biodiversity assets that need to be made available in an appropriate manner to the ecotourism market. Direct links between the biodiversity layers and the spatial management of the reserve are made during the identification of special management areas. Even within broad high tourist use zones, there are likely to be areas subject to very tight conservation controls (potentially including complete exclusion of human impacts from an area).

Underlying decision making rules used in the zonation process:

1. The zonation process is aimed a *balance* between environmental protection and the development required to meet the broader economic and social objectives of the park.
2. The zoning process takes into account existing development footprints and tourism access routes.

- This is based on the underlying principle that all else being equal, an existing transformed site is preferable to a greenfields site from a biodiversity perspective.
 - Infrastructure costs are dramatically increased when developments take place away from existing infrastructure.
 - Existing tourism nodes and access routes are a reality of the economic landscape, and it is would not be possible to shut down existing tourism sites compromising the development objectives of the park.
3. Where existing development nodes, tourist sites and access routes occur in areas with high sensitivity-value, then the broad use zoning aims to keep the development footprint as small as is realistically possible, preferably within the existing transformed site.
 4. Where possible, sites with high biodiversity sensitivity-value are put into stronger protection zones.
 5. Peripheral development is favoured.

Two key points need to be emphasized:

- The designation of a broad use zone does not imply that all sites within that zone would be suitable for all the development types anticipated within that use zone. Detailed site level planning is still required, and many sites may prove to be unsuitable at a site/precinct/EIA level of planning.
- Special Management Areas/Overlays need to be formalized and the links made to the management plans.

7. Draft Zoning Outputs

A draft zonation workshop was held during the period 10 to 11 March 2008 during which the outputs from the initial biodiversity sensitivity-value analysis were combined with informants from conceptual tourism plans, as well as existing tourism nodes/axes and infrastructure footprints. This resulted in a use zonation for the Boland Reserve Complex. The outputs from the zoning exercise are shown in Figure 9.

Data archiving

The zonation is D:\Boland Data Archive\ Output layer\BM_zonation_final_dd.shp. More detailed versions for each section of the Boland Complex are included on the data cd.

8. Zoning Definitions and description

ZONE 1 WILDERNESS AREA

These areas are formally proclaimed as Wilderness under Section 22 of the Protected Areas Act. This zone is not currently used within the Boland Reserve Complex, and hence is not described in detail. It will be appropriate for CapeNature's Scientific Services to consider the Remote areas in the Boland complex, and if appropriate, formally proclaim such areas as Wilderness according to Section 22 of the Protected areas Act.

ZONE 2 REMOTE

Characteristics.

- This is an area retaining an intrinsically wild appearance and character, or capable of being restored to such, and which is undeveloped and roadless. There are no permanent improvements or any form of human habitation. It provides outstanding opportunities for solitude with awe inspiring natural characteristics. If present at all, sight and sound of human habitation and activities are barely discernable and at a far distance. The zone also serves to protect sensitive environments from development impacts and tourism pressure. This zone provides the experience of solitude and wildness expected of a Wilderness Area, but either does not fully comply with the criteria for legal designation as Wilderness Area or has not yet been declared a Wilderness Area. The character is essentially pristine and natural, with opportunities for solitude and the longer term potential to upgrade to Wilderness Area.

Objectives of the zone (Limits of acceptable change):

- **Biophysical environment:** Deviation from a natural/pristine state should be minimized, and existing impacts should be reduced.
- **Aesthetics and recreational environment:** Activities which impact on the intrinsically wild appearance and character of the area, or which impact on the wilderness characteristics of the area (solitude, remoteness, wildness, serenity, peace etc) will not be tolerated.

Visitor activities and experience.

- **Activities:** The principle of "No-trace-left" must inform all activities. Guided or unguided nature observation on defined or non-defined hiking routes, research, bird watching are typical activities. The "pack it in and pack it out" principle is strictly applied. Notwithstanding its important biodiversity conservation role, a Remote Area serves the function of providing visitors with an opportunity to consciously immerse themselves in a sense of isolation and a return to basic essentials. Determining factors will be areas wherein there is complete absence of signs of visible and audible human habitation. Beaconed or defined hiking routes may be provided, with limited construction of paths where necessary. Several groups may be in area at the same time, but interaction between groups must be kept to a minimum.
- **Interaction with other users:** Several groups may be in area at the same time, but there should be no or minimal interaction between groups. The numbers of groups and numbers of visitors per group must be set as part of the management guidelines for the park.

Facilities

- **Type and size.** No facilities are provided. The facilities serving the zone are placed in adjoining zones, particularly in the Primitive zone. Some pre-existing heritage structures e.g. "shepherds" huts, may be present in the zone.

- **Sophistication of facilities.** No facilities except portable tents. Park policy should define rules for washing, ablution and cooking.
- **Communication structures:** None. Over time the CapeNature High Points Policy should be aligned with the park zonation.

Access and roads.

- Public access is non-motorized. Beacons or defined hiking routes may be provided, but with limited construction of paths. Vehicular access and parking is provided in the adjoining Primitive zone. Limited management access under strictly controlled levels of use is obtained by way of two wheeled tracks.

Sustainable use.

- Sustainable use would not be appropriate within this zone.

Management guidelines.

- Where possible the impacts of visible and audible human activities impacting from outside the zone need to be mitigated. No new accommodation (e.g. hiking huts etc) should be constructed. However, existing cultural buildings could be used in line with guidelines set by SAHRA.

Location in Reserve.

- As a result of both the rugged and inaccessible nature of large portions of the Boland Reserve Complex, as well as the highly sensitive environments found in the reserve, the Remote zone was used as the default or background zone in the zoning process. The Remote zone strongly protects these environments from almost all types of development. Unless otherwise described all high altitude and difficult access areas were zoned Remote. Further, significant areas with high environmental sensitivity/value were included into this zone.

ZONE 3 PRIMITIVE

Characteristics

- The prime characteristic of the zone is the experience of wilderness qualities with the accent on controlled access. Access is controlled in terms of numbers, frequency and size of groups. The zone shares the wilderness qualities of Wilderness Areas and Remote zones, but with the provision of basic self-catering facilities and access. It also provides access to the Remote zone and Wilderness Area. Views of human activities and development outside of the park may be visible from this zone.

This zone has the following functions:

- It provides the basic facilities and access to serve Wilderness Areas and Remote zones.
- It contains concession sites and other facilities where impacts are managed through strict control of the movement and numbers of tourists, for example if all tourists are in guided groups or in concession safari vehicles.
- It serves to buffer Remote and Wilderness Areas from impacts from outside the park or from high use zones within the park.
- It serves to protect sensitive environments from high levels of development.

Objectives of the zone (Limits of acceptable change):

- **Biophysical environment:** Deviation from a natural/pristine state should be small and limited to restricted impact footprints. Existing impacts should be reduced. Any facilities constructed in these areas, and activities undertaken here should be done in a way that

limits environmental impacts. Road and infrastructure specifications should be designed to limit impacts.

- **Aesthetics and recreational environment:** Activities which impact on the intrinsically wild appearance and character of the area, or which impact on the wilderness characteristics of the area (solitude, remoteness, wildness, serenity, peace etc) should be restricted and impacts limited to the site of the facility. Ideally visitors should only be aware of the facility or infrastructure that they are using, and this infrastructure/facility should be designed to fit in with the environment within which it is located in order to avoid aesthetic impacts.

Visitor activities and experience:

- **Activities:** Access is controlled in terms of numbers, frequency and size of groups. Activities include hiking, 4x4 drives and game viewing. Access is controlled either through only allowing access to those with bookings for specific facilities, or alternatively through a specific booking or permit for a particular hiking trail or 4x4 route. Several groups may be in area at the same time, but access should be managed to minimize interaction between groups if necessary.
- **Interaction with other users.** Interaction between groups of users is low, and care must be taken in determining the number and nature of facilities located in the area in order to minimize these interactions.

Facilities:

- **Type and size:** Facilities are small (less than 15 beds) "touch the earth lightly" camps, often very basic, and are distributed to avoid contact between users. Alternatively facilities designed for high levels of luxury, but limited visitor numbers can be accommodated here (e.g. controlled access private camps or concession sites).
- **Sophistication of facilities:** Generally facilities are small, basic and self-catering, though concession facilities may be significantly more sophisticated. Basic facilities using gas/solar/fire for heating and cooking.
- **Communication structures:** Communications structures can be allowed within the Primitive Zone. These need to be controlled by the CapeNature High Points Policy.

Access and roads

- Controlled access is limited to users of the facilities. Access may be on foot, cycle, sedan cars or 4x4. Access may be accompanied or unaccompanied on designated routes. Established footpaths are provided to avoid erosion and braiding.

Sustainable use.

- Sustainable use may be appropriate within this zone, but would only be allowed under controlled circumstances subject to formal application and consideration according to CapeNature's Draft Policy on Consumptive Utilization of Natural Resources from Nature Reserves and Surrounds.

Management guidelines.

- Management must ensure that interaction between users is limited and that only users of facilities are given access.

Location in Reserve.

- In the Boland Reserve Complex, Primitive areas were designated to buffer Remote areas and to protect most of the remaining sensitive areas from high levels of tourist activity.

Primitive areas were also designated in areas with relatively low environmental sensitivity to allow access into Remote mountainous areas. Controlled access trail areas (such as the Boland hiking trail) fall within this zone.

Large Primitive sections were designated north and south of the Bain's Kloof Road to allow for current (largely to the north) and future (extended to the south) controlled hiking access to the mountain areas. These areas also include controlled access to canoeing and flyfishing resources in this valley and also up the Wit River Valley. A similar pattern of Primitive zones were identified in along the N1/Molenaars Valley. The areas accessed by fishermen, the controlled access trails north and south of the roads, and the sports-climbing site at Hellfire, all fall within this zone. The access route to Stettynskloof Dam, as well as the dam itself, were zoned Primitive. Once again a similar pattern of zoning was applied around the Franschhoek Pass, with buffers of Primitive being applied on both sides of the pass. Large portions of the more accessible sections of the Hottentots Holland Nature Reserve (including the controlled access Boland Trail and Suicide Gorge areas) were include within this zone, as were areas around Theewaterkloof Dam. The designated Primitive areas around the dam and in the lower sections of Hottentots Holland are sufficient to contain the anticipated controlled access bushcamp or smaller mountain hut tourism facilities provisionally identified for these two areas. The forest exit area at Nuweberg was flagged for potential future inclusion as Primitive. The potentially accessible and moderate sensitivity lower areas of Groenlandberg Nature Reserve were flagged as Primitive, and can accommodate controlled access (potentially including 4x4, ATV and mountain bike access on specific routes). A small area around the masts at Simonsberg, as well as the tarred access routes to the masts north of the N2 were designated Primitive to accommodate controlled (mostly official) access. Similarly, the ESKOM/DWAF access areas in the north of Kogelberg were zoned Primitive to ensure specific access control on these areas. The less sensitive southern sections of the Houwhoek Nature Reserve as well as the entire Mt Hebron Nature Reserve were zoned Primitive to encourage various forms of controlled access to these sections. The anticipated new eastern access development node for Kogelberg was zoned Primitive to accommodate the potential controlled access or concession development at this site. The boundaries of the identified area were defined by topographic and environmental sensitivity constraints.

ZONE 4 QUIET

Characteristics.

- This zone is characterized by unaccompanied non-motorized access without specific access control and permits. Visitors are allowed unaccompanied (or accompanied) access, mainly on foot, for a wide range of experiences. Larger numbers of visitors are allowed than in the Primitive zone and contact between visitors is frequent. The main accent is on unaccompanied non-motorized access. Larger numbers of visitors are allowed and contact between visitors is frequent.

Objectives of the zone (Limits of acceptable change):

- **Biophysical environment:** Some deviation from a natural/pristine state is allowed, but care should be taken to restrict the development footprint. Infrastructure, especially paths and viewpoints should be designed to limit the impacts of large numbers of visitors on the biophysical environment.
- **Aesthetics and recreational environment:** Activities which impact on the relatively natural appearance and character of the area should be restricted, though the presence of larger numbers of visitors and the facilities they require, may impact on the feeling of "wildness" found in this zone.

Visitor activities and experience

- **Activities:** Non-motorized activities such as hiking, mountain biking, bird watching, on self guided constructed trails and walks. Where possible, rock climbing and canoeing are appropriate within this zone.
- **Interaction with other users:** Frequent

Facilities

- **Type and size.** Hiking trails, footpaths, bird hides. No accommodation. Ablution facilities may be provided in high use areas. Heritage structures may be used for recreation purposes.
- **Sophistication of facilities.** Where provided these should be basic.
- **Communication structures:** Communications structures can be allowed within the Primitive Zone. These need to be controlled by the CapeNature High Points Policy.

Access and roads

- Essentially pedestrian access, but in certain areas mountain bikes can be accommodated. Water areas within this zone would be accessed by non-motorized craft only. No access for tourists by vehicle. The only roads are essential two wheeled management tracks.

Sustainable use.

- Sustainable use may be appropriate within this zone, but would only be allowed under controlled circumstances subject to formal application and consideration according to CapeNature's Draft Policy on Consumptive Utilization of Natural Resources from Nature Reserves and Surrounds. Care would be required to avoid conflict with other users.

Management guidelines.

- Due to the intense use frequent safety patrols are essential. Regular and frequent footpath maintenance. Note that management use of vehicles is not restricted in this zone.

Location in Reserve.

- In the Boland Reserve Complex, Quiet areas were designated to encourage non-motorized access to a variety of recreational areas as well as to protect sensitive environments from damage resulting from the construction of accommodation and other infrastructure. In Limietberg, the high use daytrails around Tweed Tol were accommodated in a Quiet zone. In Limietberg Nature Reserve, an extensive Quiet area was designated in Zachariahshoek specifically aimed at mountain bike usage. The continued route up from the Stettynskloof Dam was also designated Quiet, to allow access, but to preclude development of this sensitive section of the reserve. Around Jonkershoek, large sections of the Horseshoe and the area just above Assegaaibosch were designated as Quiet to accommodate high levels of non-motorized recreational access. Areas at Assegaaiboschkloof and Skelmhoek were designated Quiet in order to facilitate pedestrian access from potential intensive development sites located in the Forest exit areas and around the Berg River dam Basin. The inlet areas of the Theewaterskloof Dam were zoned Quiet to allow non-motorized access by canoes and sailing vessels, but to exclude motorized vessels. The entire Helderberg Nature Reserve as well as the accessible walking areas of Hottentots Holland Nature Reserve around the N2 (including the Wagon Road) were designated Quiet to allow high levels of pedestrian access. The sensitive northern sections of Houwhoek Nature Reserve, as well as large sections of Rooisand nature Reserve were zoned Quiet. The largest Quiet areas zoned were the southern sections of Kogelberg (including the Brodie and Sonchem areas), in order to encourage only non-motorized access and strictly limited development in this highly sensitive environment. A narrow band along the western shore of Kogelberg was

also flagged as Quiet in order to accommodate the realities of high levels of recreational access without encouraging increased development or infrastructure.

ZONE 5 LOW INTENSITY LEISURE

Characteristics.

- The underlying characteristic of this zone is motorized self-drive access with basic self-catering facilities. The numbers of visitors are higher than in the Remote and Primitive zones. These camps are without modern facilities such as shops and restaurants. Relatively comfortable facilities are positioned in the landscape retaining the inherent natural and visual quality which enhances the visitor experience of a more natural and self providing experience. Access roads are low key, preferably gravel roads and/or tracks to provide a more wild experience. Facilities along roads are limited to basic self-catering picnic sites with toilet facilities. At some major access points, busses, mini-busses, safari and overland vehicles would be appropriate.

Objectives of the zone (Limits of acceptable change):

- **Biophysical environment:** Deviation from a natural/pristine state should be minimized and limited to restricted impact footprints as far as possible. However, it is accepted that some damage to the biophysical environment associated with tourist activities and facilities will be inevitable.
- **Aesthetics and recreational environment:** Although it is inevitable that activities and facilities will impact on the wild appearance and reduce the wilderness characteristics of the area (solitude, remoteness, wildness etc), these should be managed and limited to ensure that the area still provides a relatively natural outdoor experience.

Visitor activities and experience:

- **Activities:** Camping, self drive motorized game viewing, picnicking, walking, cycling, rock climbing, hiking, adventure activities.
- **Interaction with other users.** Moderate to high

Facilities:

- **Type and size.** Education centres, picnic sites, view sites, information centres, ablution facilities, parking areas. Small self-catering (including camping) camps of low to medium density (25-35 beds). Additional facilities can include swimming pools. Trails for 4x4 trails can also be provided.
- **Sophistication of facilities.** Self contained self catering units with bathroom facilities. Camp sites will include ablution facilities.
- **Communication structures:** Communications structures can be allowed within the Low Intensity Leisure Zone. These need to be controlled by the CapeNature High Points Policy.

Access and roads

- In the Boland Reserve Complex, there is limited scope for visitors to drive in their own vehicles, and typically the Low Intensity Leisure areas are access and accommodation nodes. However, where possible, motorised self-drive sedan car access on designated routes is allowed. Generally busses or "safari" vehicles may be permitted at major access points. Roads are secondary gravel tourist roads or minor tar roads.

Sustainable use.

- Sustainable use may be appropriate within this zone, but would only be allowed under controlled circumstances subject to formal application and consideration according to CapeNature's Draft Policy on Consumptive Utilization of Natural Resources from Nature Reserves and Surrounds. Care would be required to avoid conflict with other users.

Management guidelines

- Management aimed at mitigating impacts of high numbers of tourist found in this zone.

Location in Reserve.

- Limited Low Intensity Leisure areas were identified in the Boland Complex owing to the sensitive environment and the limited opportunities for reasonable access. In Limietberg NR, the Tweede Tol site was designated as Low Intensity leisure in order to accommodate the existing tourist usage.
- Around Jonkershoek, Low Intensity Leisure areas were zoned at Assegaibosch and in limited areas of Jonkershoek NR to accommodate existing day visitor sites and motorized access routes. The area zoned Low Intensity Leisure along the Jonkershoek Horseshoe road around Kleinplasie Dam has been kept as narrow as possible. Note that certain high value habitats (especially wetlands) in this area are protected by the Special Habitat Overlay.
- At Theewaterskloof large area of Low Intensity Leisure was designated on most of the dam and surrounding area managed by CapeNature. It is felt that significant opportunities exist for promoting recreational access to this environment which is attractive for recreational use but essentially of low environmental sensitivity and value. The area around the current access point and management infrastructure into Hottentots-Holland NR was designated Low Intensity. It was noted that although the area is still subject to negotiations around land management responsibilities (DWAF, CapeNature, local authority), that the overall desired state for the area was that it would be a Low Intensity node.
- In the southern sections of the reserve complex, Low Intensity Leisure areas were designated around the existing management complex at Kogelberg, the dam at the Kogelberg Somchem link reserve and at the anticipated environmental education node at Rooisand in the Bot River NR.

ZONE 6 HIGH INTENSITY LEISURE

This zone is characterized by high density tourist development nodes with modern amenities such as restaurants and shops. Significant cumulative impacts on biodiversity are experienced. This zone is not currently used or anticipated within the Boland Complex. However, potential exists outside the current park in certain Forest Exit areas that must be identified separately. However, it should be emphasized that although some Forest Exit areas may provide opportunities for high intensity leisure, others are of high biodiversity value and so will not provide opportunities for utilization. Zonation of these Forest Exit areas will be part of the responsibilities of the Ecological Planner (Reserve Zoner). This also hold for identifying specific areas for utilization areas around the Berg River dam to accommodate high use areas without significant impact on the Reserve itself.

SPECIAL MANAGEMENT OVERLAYS

Overlay zones are applied to specific areas of a park requiring special management intervention. Overlay management zones are applied to areas of national, regional or park-based significance. These may be specific landscapes, RAMSAR sites or highly sensitive cultural sites. The potential special management overlays are:

1. HERITAGE

This overlay does not appear to be specifically required within the Boland Complex as the Heritage sites are limited in extent and importance. However, should this be seen as required, then CapeNature's Scientific Services could make use of the Heritage Layer to designate the Heritage Special Management Areas.

2. SPECIAL CONSERVATION

Special species (particularly Red Listed plant species) form a key portion of the biodiversity assets that the Boland Complex conserves. The sensitivity-value analysis identified areas of extreme sensitivity with exceptionally high levels of diversity, endemism and rarity that are important on a global scale.

A Special Conservation Overlay is proposed that would include all areas with a sensitivity-value score for the special species layer of 8 and above. These areas include a 400m buffer around known sites with Critically Endangered species, 200m around Endangered Species sites and the expert identified areas with the highest values. It should be noted that there is a strong correlation between areas with access (especially trails in the Kogelberg and Hottentots Holland) and areas with identified special species. In all likelihood as the reserves become better known from a biological point of view, significant additional special species rich areas will be identified. The currently well explored areas where high levels of special species have been identified may in fact turn out to be no richer than other areas of the reserve. Nevertheless, known areas of high concentrations of red listed clearly need to be taken into account when undertaking and planning or infrastructure development.

CapeNature's Scientific Services would need to develop appropriate guidelines in order to control/regulate development and management activities in these areas. These areas do not necessarily exclude tourist activities, but where access to the area is allowed; it must be managed and controlled appropriately. In particular, new infrastructure development in these areas (particularly trail construction) should be approached with great care.

3. REHABILITATION

This overlay does not appear to be specifically required within the Boland Complex as rehabilitation in the form of removal of alien vegetation is taking place across the whole reserve. It is therefore not useful to define a Special Management Overlay.

9. Way forward

The process to date has produced a sensitivity-value analysis and a zonation plan. Key remaining steps include:

- Appropriate consultation with other stakeholders and the public by CapeNature.
- Finalization of management guidelines for Special Management Areas by CapeNature Scientific services staff. Although a recommendation has been made for a Special Management Zone to be applied to a subset of the Special Habitat Layer in order to protect Red Listed Species, this requires detailed interrogation by Scientific services staff (as well as additional informants and data sources where required). This layer only has value if it is combined with specific guidelines in an approved management plan.
- Investigation of the Remote areas in the Boland complex by CapeNature Scientific services, and if appropriate, formally proclaim such areas as Wilderness according to Section 22 of the Protected areas Act.
- Improvement of key datasets where data have been identified as insufficient within the initial process.
- Future detailed planning will need to take place in Forest Exit Areas and around the Berg River Dam to identify any potential high use areas while protecting sensitive habitats. This would be the responsibility of the Ecological Planner and Scientific Services.

Ongoing refinement and updating:

The sensitivity-value analysis is an ongoing process, and it is anticipated that CapeNature will update the summary layers as well as sensitivity-value analysis. In particular, due to the

time constraints available to the current process as well as data existence and availability issues, certain input layers would benefit from refinement:

- Habitat map:
 - A finer scale vegetation map would significantly improve the product.
- Special Habitat layer:
 - This layer should be updated as additional locations and species are identified.
- Soil sensitivity
 - This layer was not used due to lack of data availability within the timelines required by the project. Although this is not seen as a fatal flaw, the robustness of the analysis would be improved by the addition of soil data.
- Heritage layers
 - The layers used in this analysis were preliminary layers based on reconnaissance level information; further work will be required. Potential exists that show-stopping heritage constraints may be identified in the detailed work at site or EIA level.
- Hydrological layers:
 - Refinement of the buffer distance within the hydrological layer may be justified at site level, and detailed hydrological investigations may be required. The combination of a pragmatic GIS approach and use of the precautionary principle resulted in significantly larger areas being identified as potentially vulnerable to hydrological disturbance than can realistically be expected within human timeframes.

Finally, two key points need to be emphasized. Firstly, the sensitivity-value analysis and the zonation plan are all part of an adaptive management system. Although they are strategic documents with legal implications, they will grow and change with time as the park develops and our understanding of the landscape and system improves. The zonations will need to be reviewed every five years when the reserve management plans are updated, and at that stage any new relevant data that becomes available can be included and be utilized to review the current zonation. Secondly, the analysis is broad scale, and in no way replaces the need for detailed site and precinct planning as well as EIA compliance.

10. References

Note: Electronic data sources are referenced in each section in "Data Inputs (GIS methods and sources)"

Holness, S., Jonas, Z., Bradshaw, P., & Nel, J., 2008, *Conservation assessment for the National Protected Areas Expansion Strategy*, Pretoria.

National Botanical Institute, 2004, *National Conservation Assessment*, Cape Town.

South African National Parks, January 2005, *Conservation Development Framework (CDF) Manual: A guide to preparing a CDF for a National Park*, Pretoria.

11. Disclaimer

Work undertaken for this project for CapeNature was entirely in a private capacity by Stephen Holness. It was undertaken with during formal leave from South African National Parks (or outside of normal work days). South African National Parks was informed of the scope and nature of his involvement in the project.

Appendix 9: City of Cape Town Nature Reserves and Conservation Areas: Land Use Zoning - Desired State* & Experiential Qualities													
Experience	Zone	Desired State*	Conservation objectives	Secondary objective	Experiential Qualities	Activities	Interaction between users	Frequency of use	Group size	Sophistication and type of facilities	Primary user movement within the zone	Roads & footpaths	Equivalent Provincial zone
Close To Nature Activities tend to be at landscape level	Primary conservation	Natural or near-natural areas (or areas that can be rehabilitated to this state) that are managed primarily for biodiversity conservation. The experience is one of relative solitude and wildness. The nature of the experience is dependant on the quality of the natural environment. The main accent of management is biodiversity conservation and "Pack it in Pack it out" principles are applied to all activities including management. There may be some signs of infrastructure mainly of a heritage nature. In the longer term, unused utility infrastructure (e.g. reservoirs) should be phased out and the site rehabilitated.	Natural areas should be kept intact in order to protect habitat required to meet biodiversity targets for various vegetation types and to provide undisturbed habitat for a range of species. Where possible degraded areas should be rehabilitated.	Managed to provide visitor experiences in a way that does not impact on the biodiversity objective. Where appropriate heritage values are managed as required	Relative sense of isolation	Controlled access** Research and monitoring. Accompanied small groups. The size and frequency of groups to be specified for each reserve.	None or very low	None -Very low	Small	No new facilities. Existing structures should be phased out where appropriate. Heritage assets are managed where appropriate	Pedestrian access in accompanied small groups Motorised for essential management only.	Absolutely essential management tracks and footpaths in accordance with the foot path and road management plan Ongoing restoration of old paths/roads to be prioritized and monitored.	Quiet
	Conservation	Natural or near-natural areas (or areas that can be rehabilitated to this state) that are managed for biodiversity conservation. This zone provides experiences of a relative sense of relaxation in an environment that is openly exposed to the sights and sounds of the city. Although it is a place of quietness and naturalness, there will be more interaction between users than in the Primary Conservation Zone. The quality of the experience is less dependant on the quality of the natural environment.	Natural areas should be kept intact in order to protect habitat required to meet biodiversity targets for various vegetation types and to provide undisturbed habitat for a range of species. Where possible degraded areas should be rehabilitated.	Managed to provide visitor experiences in a way that does not impact on the biodiversity objective.	Relaxation	Self guided hiking, non-motorised access ***, bird watching, etc. In reserves where access to water bodies is allowed, this area is limited to non-motorized vessels only in accordance with the Vlei By-Laws.	Moderate	Moderate	Small	Low impact, eco-friendly facilities that facilitate ecologically sustainable activities and visitor experiences may be permitted under certain circumstances. These are strictly for achieving the social and development objectives of the reserve where appropriate and are subject to a stringent internal approval process and must be inline with an approved reserve management plan.	Pedestrian Non motorised Motorised access for management only.	Management tracks/roads and footpaths. Minimal footpath construction to prevent ecological damage. Boardwalks may be permitted where appropriate to protect sensitive areas. The footpath system should be designed so as to control access into the Primary Conservation zone. Off road wheelchair access may be provided where appropriate.	
Outdoor Natural Experience Activities tend to be at precinct level	Low Intensity leisure	Natural, near-natural or managed landscapes which are primarily managed to promote recreational and educational objectives. The main accent is on recreational activities which are more reliant on the quality of the facilities provided than in a Conservation Zone. By their nature these zones are placed in more transformed landscapes. Interaction and socialisation are an integral part of the experience.	Although some areas will be impacted by a range of activities and limited infrastructure, most areas should be kept largely intact and ecological processes should remain functioning. Where possible degraded areas should be rehabilitated.	Recreation and education Managed to provide a largely natural outdoor area to support the recreational and education objectives of the reserve.	Socialisation	Walking, non-motorised access, bird watching. In reserves where access to water bodies is allowed, motorized vessels are only allowed under strict control (e.g. no waterskiing, low speed limits and wake-free zones) in accordance with the Vlei By-Laws.	Frequent	Moderate -high	Small- moderate	Low-Medium impact, eco-friendly facilities that facilitate ecologically sustainable activities and visitor experiences. E.g. Benches, bird hides, informative signage, lookouts. Parking for access to this and other zones.	Pedestrian Non motorised Motorised access for management only	Appropriate foot paths with directional signage Boardwalks should facilitate access and protect sensitive areas. Normal wheelchair access where appropriate Parking with no facilities for access to this and other zones	Low intensity leisure
	High Intensity Use	High use landscapes, which are often largely transformed, which are managed largely to support visitor activities more dependent on facilities, education and administrative functions of reserves. High intensity visitor facilities with modern commercialised amenities with very concentrated, activities. The quality of the visitor experience is heavily dependant of the quality of the facilities which enable the visitor to experience the environment with a minimum of effort. Due to the high impacts these are concentrated at specific nodes. These nodes are generally situated at existing facilities including historic buildings and precincts. The main focus of management is to ensure a high quality visitor experience whilst ensuring that the activities have a minimal impact on the surrounding environment and that heritage resources are respected and celebrated.	The activities and infrastructure in these areas should be managed to minimize impacts on biodiversity and visitor experience in other zones. Where feasible, non-crucial infrastructure should over time be removed from the reserve and the sites rehabilitated.	Facilities are managed to facilitate and promote appropriate visitor activities and educational use of the reserve. Administration; provides appropriate management infrastructure to facilitate other objectives of the reserve.	Entertainment	Events, self guided walks, wheelchair accessible trails, parking, picnicking. In reserves where access to water bodies is allowed, this area is appropriate for high intensity uses such as power boating and waterskiing in accordance with the Vlei By-Laws.	Very frequent	Very high	Small - Large	Picnic areas, parking areas, restaurants, information centers, ablutions, environmental education facilities, nurseries etc. Provides parking from which pedestrian access is gained to other zones.	Motorised Access People movers & Pedestrian access	Access roads and associated parking. Footpaths constructed to a higher standard for the comfort of the user. Design standards to be set in the footpath and road management plan Wheelchair access encouraged in this zone.	High Intensity Leisure
Site Specific Level	Utility zone	Area used for utility functions such as bulk water provision, landfill sites within the protected /conservation areas etc.	The activities and infrastructure in these areas should be managed to minimize impacts on biodiversity and visitor experience in other zones. Where feasible, non-crucial infrastructure should over time be removed from the reserve and the sites rehabilitated.	Administration Conservation where appropriate	Utility	Determined at site	Determined at site	Determined at site	Determined at site	Determined at site	Determined at site level	Access roads and associated parking as required by the Utility Function	
* Note. The "Desired State" is the long term objective of the zone and these desired conditions may not actually exist at the time of zoning. Achieving the "Desired State" will be informed by many factors and may only be reached after many years.													
** Accompanied access refers to controlled access. The level and type of control is determined at reserve level.													
*** Non-motorised access refers to mountain bikes, horses, paragliding etc. These activities are reserve specific and reference must be made to the reserve management plan for a list of acceptable activities per reserve.													

**REPORTING
PROGRESS IN URBAN
PROTECTED AREAS**

*A Site-level rapid assessment tool based
on the World Bank & WWF's
"Management Effectiveness Tracking
Tool"*

Prepared for the
City of CapeTown

by
Howard Langley & Paul Britton
22 May 2007

Kogelberg
Biosphere Reserve

REPORTING PROGRESS AT PROTECTED AREA SITES: DATA SHEET

Name of protected area	Kogelberg Biosphere Reserve		
Location of protected area (country and if possible, map reference)	South Africa, Western Cape, Gordon's Bay, Clarence Drive R44		
Date of establishment (distinguish between agreed and gazetted)	Agreed N/A	Gazetted N/A	
Ownership details (i.e. owner, tenure rights etc.)	City of Cape Town		
Management Authority	City of Cape Town		
Protected area size (ha)	approximately 2100ha		
Staff numbers	Permanent 7	Temporary 1(+2 students)	
Budget	0		
Designation (ICUN category), World Heritage, Ramsar etc	Biosphere Reserve		
Reason for designation	Forms part of the greater Kogelberg Biosphere Reserve, Mountain Fynbos		
Brief detail of World Bank funded project or projects in PA	N/A		
Brief detail of WWF funded project or projects in PA	N/A		
Brief detail of other relevant projects in PA	N/A		
List two of the primary protected area objectives			
Objective 1	Protection of Scenic Landscape qualities along Clarence Drive		
Objective 2	Protection of Mountain Fynbos Biodiversity		
List the top two most important threat to the PA (and indicate reasons why they are selected)			
Threat 1	Inadequate budget		
Threat 2	Invasive Alien Species		
List top two critical management activities			
Activity 1	Proactive management of the Steenbras River Gorge		
Activity 2	Management of Alien Invasive species		

MANAGEMENT EFFECTIVENESS TRACKING TOOL

1: Context : Where are we now?	Criteria	Value	Score	Comments	Next steps
1.1 Legal status Does the PA have secure permanent conservation legal status?	The PA's permanent legal conservation status is not secured by its current legal status eg Public Open Space.	0	0	Only protection includes the management of the area as a nature reserve as well as the inclusion of the area within the greater Kogelberg Biosphere Reserve.	Agreement that area needs to be proclaimed and then proceed with step towards proclamation.
	There is a formal agreement that the PA should be afforded the highest possible legal protection, but the process has not yet begun.	1			
	The PA is in the process of being afforded the highest possible legal protection.	2			
	The PA has Local Authority Nature Reserve status, or a higher level of legal protection.	3			
1.2. Protected Area regulations	There are no legal mechanisms for controlling inappropriate land use and activities in the PA	0		No specific regulations however general municipal bylaws can be used. No trained staff to enforce regulations.	Draw up regulations specific for area
	Legal mechanisms for controlling inappropriate land use activities in the PA exist but are not being implemented.	1			
	Legal mechanisms for controlling inappropriate land use and activities in the PA exist but there are some problems in effectively implementing them	2	2		
	Legal mechanisms for controlling inappropriate land use and activities in the PA exist and are being effectively implemented	3			
1.3. Law enforcement PA has capacity/resources to enforce regulations & bylaws well enough?	PA has no effective capacity/resources to enforce regulations & bylaws	0		No staff to enforce regulations	Key staff need to be identified and trained
	There are major deficiencies in capacity/resources to enforce regulations & bylaws (e.g. lack of skills, no patrol budget)	1	1		
	PA has acceptable capacity/resources to enforce regulations & bylaws but some deficiencies remain	2			
	PA has excellent capacity/resources to enforce regulations & bylaws	3			
1.4. Protected Area boundary demarcation Is the boundary known and demarcated?	The boundary of the PA is not known by the management authority or local residents/neighbouring land users	0		Eriks are known but boundaries are not well demarcated	An appropriate method of demarcating boundaries must be decided on
	The boundary of the PA is known by the management authority but is not known by local residents/neighbouring land users	1			
	The boundary of the PA is known by both the management authority and local residents but is not appropriately demarcated	2	2		
	The boundary of the PA is known by the management authority and local residents and is appropriately demarcated	3			
1.5. Resource inventory Do you have enough information to manage the area?	There is little or no information available on critical habitats, species and cultural values of the PA	0		Information is scattered and needs to be consolidated.	Consolidation of information resources is necessary. Survey and monitoring needs to be determined and incorporated into a monitoring and evaluation programme.
	Information on critical habitats, species and cultural values of the PA is not sufficient to support planning and decision making	1			
	Information on critical habitats, species and cultural values of the PA is sufficient for key areas of planning/decision making but the necessary survey work is not being maintained	2	2		
	Information concerning critical habitats, species and cultural values of the PA is sufficient to support planning and decision making and is being maintained	3			

MANAGEMENT EFFECTIVENESS TRACKING TOOL

Subtotal: Context	15	7	
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MANAGEMENT EFFECTIVENESS TRACKING TOOL

2: Planning: Where do we want to be?	Criteria	Value	Score	Comments	Next steps
2.1. Protected area design Does the protected area need enlarging, corridors etc to meet its objectives?	Inadequacies in design mean achieving the PA's major management objectives is impossible	0		Current area under management forms only a part of the Steenbras Catchment area. Other portions are currently managed by other departments (ie: Bulk Water).	Consolidation of all City land under one department.
	Inadequacies in design mean that achievement of major objectives are constrained to some extent	1			
	Design is not significantly constraining achievement of major objectives, but could be improved	2	2		
	Reserve design features are particularly aiding achievement of major objectives of the PA	3			
2.2 Management plan Is there a management plan (compliant with Protected Areas Act) and is it being implemented?	There is no standard Management Plan for the PA	0	0	Standard Format for Management Plan to be determined	Draw up Management Plan and get Approved
	A standard Management Plan is being prepared or has been prepared, but is not yet approved.	1			
	An approved Management Plan exists and is being implemented, but has not been updated/reviewed during the past five years.	2			
	An approved Management Plan exists, is being implemented and has been updated/reviewed during the past three years	3			
2.3. Conservation Development Framework (CDF) Is there a visitor use zoning system indicating position and nature of operation & visitor infrastructure?	There is no CDF for the PA	0	0	No CDF exists for the PA	To be drawn up with the management plan
	A CDF is being prepared or has been prepared but is not being implemented	1			
	An approved CDF exists but it is only being partially implemented because of funding constraints or other problems	2			
	An approved CDF exists and is being implemented	3			
Supplementary items	The planning process allows adequate opportunity for key stakeholders to influence the management plan	1			
	There is an established schedule and process for periodic review and updating of the management plan	1			
	The results of monitoring, research and evaluation are routinely incorporated into planning	1			
Subtotal Score: Planning		12	2		

MANAGEMENT EFFECTIVENESS TRACKING TOOL

3: Inputs: What do we need?	Criteria	Value	Score	Comments	Next steps
3.1. Research Is there a programme of management-orientated research work?	Research needs have not been identified nor is any research work taking place in the PA	0	0	No research programmes apart from small scale projects underway by 3rd year conservation students.	Identify research needs
	Research needs have been identified, but other than for ad hoc research, no management orientated research is being done.	1			
	There is considerable research work but only limited "management" orientated research is being done.	2			
	There is considerable research work being undertaken, which is relevant to management needs	3			
3.2. Human Resource capacity Does the PA have sufficient HR capacity to manage the protected area?	The PA has no HR capacity	0		Deficiencies in Visitor Management and Law Enforcement. Law enforcement could be addressed on an area basis and not necessarily restricted to the reserve.	Appoint access control staff.
	HR capacity is inadequate for critical management activities	1			
	HR capacity is sufficient, but there are deficiencies in necessary skills for critical management activities	2	2		
	HR capacity and expertise is adequate for management needs	3			
3.3. Current budget Is the current budget sufficient?	There is no dedicated budget for the PA	0	0	An area budget is available with an agreed percentage dedicated to the PA.	Try an establish a dedicated budget for the PA.
	The available budget is inadequate for basic management needs and presents a serious constraint to the capacity to manage	1			
	The available budget is acceptable, but could be further improved to fully achieve effective management	2			
	The available budget is sufficient and meets the full management needs of the PA	3			
Supplementary items	The budget is secure/guaranteed for the PA on an annual cycle	1			
	The budget is secure/guaranteed on a three year cycle	2			
	The PA is not reliant on external funding	2			
Subtotal		14	2		

MANAGEMENT EFFECTIVENESS TRACKING TOOL

4.7. Education and awareness programme Is there a planned education programme?	There is no education and awareness programme	0		Related to staff constraints currently not a priority.	
	There is a limited and ad hoc education and awareness programme, but no overall planning for this	1	1		
	There is a planned education and awareness programme but there are still serious gaps	2			
	There is a planned & effective education & awareness programme fully linked to the objectives and needs of the PA	3			
4.8. Government & commercial neighbours Is there co-operation with adjacent land users?	There is no contact between managers and neighbouring official or corporate land users	0		Active communication between local business, NGOs and other PA's? <i>Implementing</i>	Relevant officials and area of co-operation need to be identified before setting up regular meetings.
	There is limited contact between managers and neighbouring official or corporate land users	1	1		
	There is regular contact between managers and neighbouring official or corporate land users, but only limited co-operation	2			
	There is regular contact between managers and neighbouring official or corporate land users, & substantial co-operative management	3			
4.9. Advisory committee/forum An Advisory Committee of local representatives and specialists advises on PA management & development issues.	There is no Advisory Committee/forum	0	0	No advisory committee exists	Determine whether there is a need.
	An Advisory Committee/forum is in the process of being established	1			
	An Advisory Committee/forum exists, but does not contribute significantly to the management/development of the PA	2			
	A well represented Advisory Committee/forum contributes significantly to the proper management/development of the PA	3			
4.10. Community partners Do community partners have input to management decisions via the Advisory Committee?	Community partners have no input into decisions relating to the management of the PA	0	0	No partnerships exist	Potential partnerships need to be identified.
	Community partners have limited input into the PA's management decisions via local governance structures	1			
	Community partners contribute to some decisions relating to management via the PA's Advisory Committee	2			
	Community partners are fully representative on the PA's Advisory Committee and directly participate decisions making	3			
4.11. Commercial tourism Do commercial tour operators contribute to protected area management?	There is little or no contact between managers and tourism operators using the PA	0		Informal relationship exists between Absent Africa, currently under review.	Formalize agreements between relevant operators.
	There is contact between managers and tourism operators but this is largely confined to administrative or regulatory matters	1	1		
	There is limited co-operation between managers and tourism operators to enhance visitor experiences and maintain conservation values	2			
	There is excellent co-operation between managers and tourism operators to enhance visitor experiences, protect values and resolve conflicts	3			
4.12. Monitoring & evaluation	There is no monitoring and evaluation in the PA	0	0	No monitoring programme within PA	Identify relevant monitoring and evaluation programmes and create the capacity to complete such programmes.
	There is some ad hoc monitoring & evaluation, but no overall strategy and/or no regular collection of results	1			
	There is an agreed and implemented monitoring & evaluation system but results are not systematically used for management	2			
	A good monitoring & evaluation system exists, is well implemented and used in adaptive management	3			
Supplementary items	There is open communication and trust between local stakeholders and PA managers	1			
Subtotal		37	11		

MANAGEMENT EFFECTIVENESS TRACKING TOOL

4: Process : How do we go about it?	Criteria	Value	Score	Comments	Next steps
4.1. Annual Plan of Operation (APO) Is there an annual work plan/APO that is approved by the organisation?	No approved/standardised APO exists	0	0	Management processes/program are not outlined/exists	An APO for the PA needs to be drawn up
	An approved APO exists but activities are not monitored against the plan's targets	1			
	An approved APO exists and actions are monitored against the plan's targets, but many activities are not completed	2			
	Actions are monitored against the approved APO's targets and most or all prescribed activities are completed	3			
4.2. Resource management Is the protected area adequately managed (e.g. for fire, invasive species, poaching)?	Requirements for active management of critical ecosystems, species and cultural values have not been assessed	0		Critical species have not been assessed	PA needs to be assessed in terms of critical ecosystems species
	Requirements for active management of critical ecosystems, species and cultural values are known but are not being addressed	1			
	Requirements for active management of critical ecosystems, species and cultural values are only being partially addressed	2	2		
	Requirements for active management of critical ecosystems, species and cultural values are substantially or fully addressed	3			
4.3. Staff training Is there enough training for staff?	Staff are untrained	0		No comprehensive skills audit has been completed. Training needs have been identified on an adhoc basis	A complete skills audit and training needs must be developed for each staff member.
	Staff training and skills are low relative to the needs of the PA	1	1		
	Staff training and skills are adequate, but could be further improved to fully achieve the objectives of management	2			
	Staff training and skills are in line with the management needs of the PA, and with anticipated future needs	3			
4.4. Budget management Is the budget managed to meet critical management needs?	Budget management is poor and significantly undermines effectiveness	0		Inherited a poor budget with no direct control as budget is centralized at an area level	Percentage allocation for PA to be implemented as of new financial year. See budget comments.
	Budget management is poor and constrains effectiveness	1	1		
	Budget management is adequate but could be improved	2			
	Budget management is excellent and aids effectiveness	3			
4.5. Operational equipment & infrastructure (as required for operational management purposes, but excluding tourism/visitor facilities)	There is little or no operational equipment & infrastructure	0		A full inventory list has been completed which identifies gaps in equipment. Current equipment remains in fairly good conditions. Major gaps in office technology and alien clearing equipment ie loppers, power tools.	Purchase additional equipment according to needs
	There is some equipment & infrastructure but these are wholly inadequate	1			
	There is equipment and infrastructure, but still some major gaps that constrain management	2	2		
	There is adequate operational equipment and infrastructure	3			
4.6 Maintenance of equipment & infrastructure Is equipment & infrastructure (including tourism/visitor facilities) adequately maintained?	There is no approved Maintenance Plan and no maintenance is taking place	0		Needs have been identified and are being addressed as budget becomes available	To acquire necessary equipment and infrastructure
	There is no Maintenance Plan and maintenance is taking place to an unsatisfactory standard	1			
	There is no Maintenance Plan, but maintenance is taking place to a satisfactory standard	2	2		
	There is an approved Maintenance Plan that is being fully implemented to a high standard	3			

MANAGEMENT EFFECTIVENESS TRACKING TOOL

8. Outputs/Outcomes: What were the results/achievements?	Criteria	Value	Score	Comments	Next steps
5.1. Visitor facilities	There are no visitor facilities and services	0		Kogelbay Resort managed by Sport and Rec department, situated within protected area and requires facility upgrade.	Complete review of Steenbras River Gorge and implement.
Are visitor/tourist facilities good enough and sufficient to prevent damage to the PA?	Visitor facilities and services are inappropriate for current levels of visitation or are under construction	1	1	Carrying capacity within Steenbras River Gorge currently under review and maintenance plan for area under way.	
	Visitor facilities and services are adequate for current levels of visitation but could be improved	2			
	Visitor facilities and services are excellent for current levels of visitation	3			
Additional points	There are active programmes for restoration of degraded areas within the PA and/or in associated buffer zone	1	1	Restoration work within identified areas including Steenbras River Gorge and	Complete a list of degraded area and formulate a work plan
5.2. Ecological & Cultural condition assessment	Important biodiversity, ecological and cultural values are being severely degraded in the PA	0	0	Critical areas need to be identified however degradation of indigenous forest pockets have already been noted.	Identify critical elements
Is the protected area being managed consistent to its objectives?	Some biodiversity, ecological and cultural values are being severely degraded	1			
	Some biodiversity, ecological and cultural values are being partially degraded but the most important values have not been significantly impacted	2			
	Biodiversity, ecological and cultural values are predominantly intact	3			
5.3. Access assessment	Protection systems (patrols, permits etc) are ineffective in controlling access or use of the PA in accordance with designated objectives	0		Permit system for Steenbras River gorge only partially effective due to uncertainty around Carrying Capacity and lack of Visitor management staff	Increase staff capacity, numbers and training
Are the available management mechanisms working to control access or use?	Protection systems are only partially effective in controlling access or use of the PA in accordance with designated objectives	1	1		
	Protection systems are moderately effective in controlling access or use of the PA in accordance with designated objectives	2			
	Protection systems are largely or wholly effective in controlling access or use of the PA in accordance with designated objectives	3			
5.4. Economic benefit assessment	The existence of the PA has reduced the options for economic development of the local communities	0		Is some flow however constrained due to procurement system and budgetary constraint.	To properly quantify the economic benefit of the area and identify other opportunities.
Is the Protected Area providing economic benefits to local communities?	The existence of the PA has neither damaged nor benefited the economy of the local economy	1			
	There is some flow of economic benefits to local communities from the existence of the PA but this is of minor significance to the regional economy	2	2		
	There is a significant or major flow of economic benefits to local communities from activities in and around the PA (e.g. employment of locals, locally operated commercial tours etc)	3			
5.5. Community benefit assessment (other than economic) e.g. recreation & education facilities, community hall, sport facilities etc.	The existence of the PA has not delivered any direct or indirect community benefits	0		Recreational opportunities through Steenbras River Gorge, Sunbird Lodge and Rocky Bay and Kogelbay resort draw water from area. Scenic route is maintained.	Draw up inventory of benefits.
	The existence of the PA has delivered some minor short term community benefits	1			
	The PA delivers some quantifiable long term community benefits that make a difference to the lives of local communities	2	2		
	The PA delivers considerable quantifiable long term community benefits that make a real difference to the lives of local communities	3			
Subtotal Score: Outcomes		16	7		

1: CONTEXT	VALUE	SCORE
1.1. Legal status	3	0
1.2. Protected Area regulations	3	2
1.3. Law enforcement	3	1
1.4. Protected area demarcation	3	2
1.5. Resource Inventory	3	2
Subtotal	15	7
2: PLANNING		
2.1. Protected area design	3	2
2.2. Management plan	3	0
2.3. Conservation Development Framework	3	0
Supplementary items	3	0
Subtotal	12	2
3: INPUTS		
3.1. Research	3	0
3.2. Staff numbers	3	2
3.3. Current budget	3	0
Supplementary items	5	0
Subtotal	14	2
4: PROCESS		
4.1. Annual Plan of Operation	3	0
4.2. Resource management	3	2
4.3. Staff training	3	1
4.4. Budget management	3	1
4.5. Operational equipment & infrastructure	3	2
4.6. Maintenance of equipment & infrastructure	3	2
4.7. Education & awareness	3	1
4.8. Government & commercial neighbours	3	1
4.9. Advisory committee	3	0
4.10. Community partners	3	0
4.11. Commercial Tourism	3	1
4.12. Monitoring & Evaluation	3	0
Supplementary items	1	0
Subtotal	37	11
5: OUTPUTS/OUTCOMES		
5.1. Visitor facilities	3	1
5.2. Condition assessment	3	0
5.3. Access assessment	3	1
5.4. Economic benefit assessment	3	2
5.5. Community benefit assessment	3	2
Supplementary items	1	1
Subtotal	16	7
TOTAL SCORE	94	29

31%

Summary and comment on score. The area has very high biodiversity and aesthetic values and accompanying recreational values. The low score is indicative of the lack of a legal status and management planning. The visitor facilities in the adjoining coastal recreational area not managed by the PA authority are poorly maintained and managed. This detracts from the standards that should be maintained for a potential international destination.