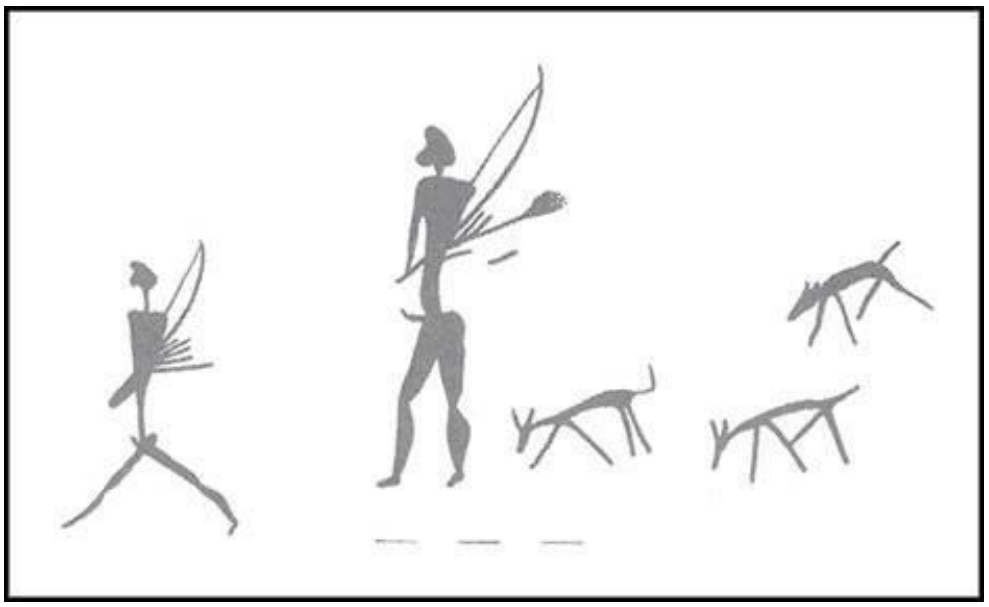
Jakkalsdans Nature Reserve

Western Cape
South Africa



Management Plan

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CapeNature Biodiversity Stewardship Programme

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AUTHORISATION

This Integrated Management Plan for the Jakkalsdans Nature Reserve was drafted and recommended by the *Jakkalsdans Trust.*

Supported by:
CapeNature Off-Reserve Conservation, Karoo Landscape

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Table of Contents

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

AIS	Alien Invasive Species
APO	Annual Plan of Operations
AVM	Alien vegetation management
CBA	Critical Biodiversity Area
CN	CapeNature
DFFE	Department of Forestry, Fisheries and the Environment
ESA	Ecological Support Area
FMU	Fire Management Unit
FPA	Fire Protection Association
GIS	Geographical Information System
GRDM	Garden Route District Municipality
IDP	Municipal Integrated Development Plan
KPA	Key Performance Area
MA	Management Authority
MASL	Meters above sea level
MEC	Member of the Executive Council
METT	Management Effectiveness Tracking Tool
NEMA	National Environmental Management Act
NEMBA	National Environmental Management Biodiversity Act
NEM:PAA	National Environmental Management Protected Areas Act
NPAES	National Protected Area Expansion Strategy
NR	Nature Reserve
NRM	Natural Resource Management
ONA	Other Natural Area
SDF	Municipal Spatial Development Framework
TMF	Table Mountain Fund
WHS	World Heritage Site
WWF	Word Wildlife Fund

1 BACKGROUND

1.1 Purpose of the plan

Management plans for biodiversity stewardship sites are strategic documents that provide the framework for the development and operation of biodiversity stewardship sites. They inform management at all levels, from the landowner through to support staff within CapeNature. The purpose of the management plan is to:

- Provide the primary strategic tool for management of Jakkalsdans NR, informing the need for specific programmes and operational procedures.
- Provide for capacity building, future thinking and continuity of management.
- Enable the landowner to develop and manage Jakkalsdans NR in such a way that its values and the purpose for which it has been established are protected.

1.2 Structure of the plan

	n introduction and background to the management plan and Jakkalsdans NR.
	the vision and objectives for the biodiversity stewardship site.
	s the context of the biodiversity stewardship site, providing the basis for the operational management framework that follows.
	he zonation of the biodiversity stewardship site, outlining the land uses in particular zones.
	the administrative structure that has been established for Jakkalsdans NR.
	Management Framework - Sets out the management targets that must be achieved in managing the nature reserve.
	of Operation and Review

1.3 Adaptive management

The preparation of this management plan has been undertaken based on the guiding principles of adaptive management, which is a structured, iterative process in which decisions are made using the best available information, with the aim of obtaining better information through monitoring of performance (Figure 1). In this way, decision making is aimed at achieving the best outcome based on current understanding, whilst accruing the information needed to improve future management. Adaptive management can lead to revision of a part or if necessary, the whole management plan.

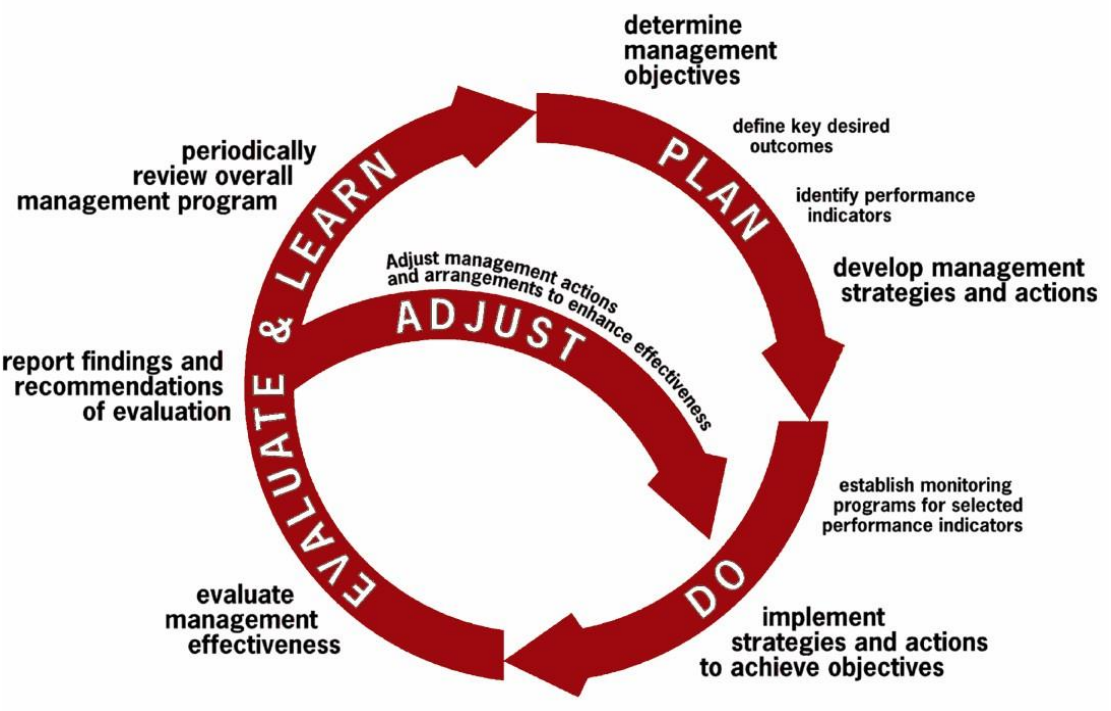

Figure 1. The adaptive management cycle (Management Strategy Evaluation, 2009)

Adaptive management enables landowners and managers to:

i) Learn through experience.

ii) Take account of, and respond to, changing factors that affect the biodiversity stewardship site.

iii) Develop or refine management processes.

iv) Adopt best practices and new innovations in biodiversity conservation management.

v) Demonstrate that management is appropriate and effective.

1.4 Introduction

The Gamkaberg World Heritage Site and Nature Reserve Complex is one of the core areas of the Gouritz Biosphere and it presently includes the Rooiberg, Gamkaberg, Paardeberg, Groenefontein, Fontein, Zebraskop, Heimersrivier and Vaalhoek as its formal conservation areas. Conservation corridors with private landowners are presently in the process of being formalised via the CapeNature Stewardship Programme. The Jakkalsdans property is one of the key elements in this regard as it forms a link between Rooiberg Nature Reserve, Groenefontein Nature Reserve and Vaalhoek Nature Reserve, all part of the Gamkaberg WHS and Nature Reserve Complex. The reserve, 7068ha in extent, is situated in the Kannaland Municipality, Division of Garden Route District Municipality, Western Cape Province. Jakkalsdans Nature Reserve consists of six farm portions (The Farm Aanlokking no.175, The Farm Rooi Grond no. 191, Remainder of the Farm Groot Kloof no. 176, Remainder of Portion 1 of the Farm Boschberg no 198, 0.919296 Share in Portion 1 of the farm Platte Rug no. 219 and 0.080705 Share in Portion 1 of the Farm Platte Rug no. 210. A small part of the eastern section of the reserve falls within the Oudtshoorn Municipality. The closest towns are Vanwyksdorp in the east and Ladismith in the west (Figure 2).

At a national level, Jakkalsdans NR contains South Rooiberg Sandstone Fynbos, North Rooiberg Sandstone Fynbos, Central Inland Shaleband vegetation, Western Gwarrieveld and Gamka Thicket. At a regional level it contains fifteen vegetation variants i.e. Gamka River and Floodplain Gouritsrivier River and Floodplain, Calitzdorp Arid Spekboomveld, Calitzdorp Valley Spekboomveld, Vaalhoek Arid Spekboomveld, Gourits Asbos Gwarrieveld, Dwars-in-die-weg Pruimveld, Dwars-in-die-weg Sandolienveld, Rooiberg Arid Asteraceous Fynbos, Rooiberg Arid Proteoid Fynbos, Rooiberg Arid Restioid Fynbos, Rooiberg Fynbos-Spekboomveld, Rooiberg Waboomveld, Rooiberg Perennial stream and Rooiberg Mesic Proteoid Fynbos.

Jakkalsdans falls within the Protected Area category of the Critical Biodiversity Areas map and is partly situated within a Declared Mountain Catchment Area. The key ecological features of the reserve are:

(a) High diversity of habitats and vegetation variants;
(b) Seasonal wet patches;
(c) A north-south transition;
(d) Diverse topography;
(e) Abuts the Gamkaberg WHS and NR Complex on the western, southern and northern boundaries;
(f) High biodiversity value;
(g) The provision of environmental goods and services.

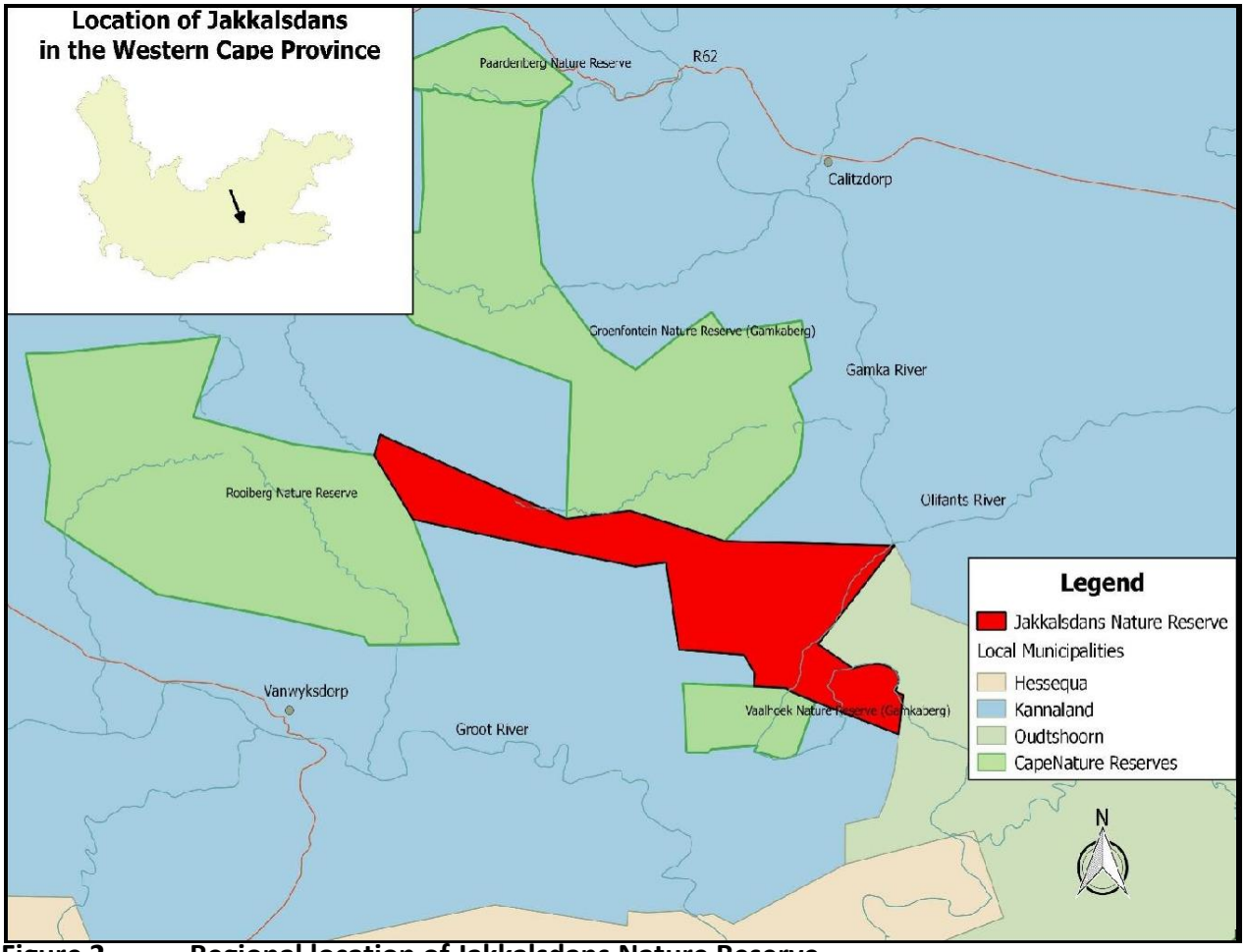

Figure 2. Regional location of Jakkalsdans Nature Reserve

1.5 The values of Jakkalsdans Nature Reserve

The values of a site are those remarkable attributes that led to it being identified as a priority for the Biodiversity Stewardship Programme. The values are important in planning and management, as they are the aspects of the place that must be protected. The values of Jakkalsdans NR include:

Natural values	• Unique biodiversity and high endemism. • Contains flora of conservation concern. • Large area (7068ha). • Low density of alien infestation that is being managed. • Unpolluted night skies. • Falls with an area where three globally recognised biodiversity hotspots converge (Fynbos, Sub- tropical Thicket, Succulent Karoo). • The property falls within the Protected Area category of the Critical Biodiversity Areas and is part of a Declared Private Mountain Catchment Area.

	• Contributes to the Protected Area network within the United Nations Educational, Scientific and Cultural Organization (UNESCO) Gouritz Cluster Biosphere Reserve.
Ecosystem service values	• Potential for connectivity. • Part of the core and buffer area of the Gouritz Cluster Biosphere Reserve. • Provision of ecosystem services (water, carbon, pollination, etc.). • Important water catchment area.
Cultural and historic values	• Richness in archaeological and marine paleontological sites.
Eco-tourism values	• Existing infrastructure. • Natural and scenic beauty. • Peace and tranquility • Contains wilderness attributes.

The biodiversity value of Jakkalsdans Nature Reserve has been the direct result of the low land capability of the nature reserve, making it unsuitable for any agricultural purposes (Figure 3).

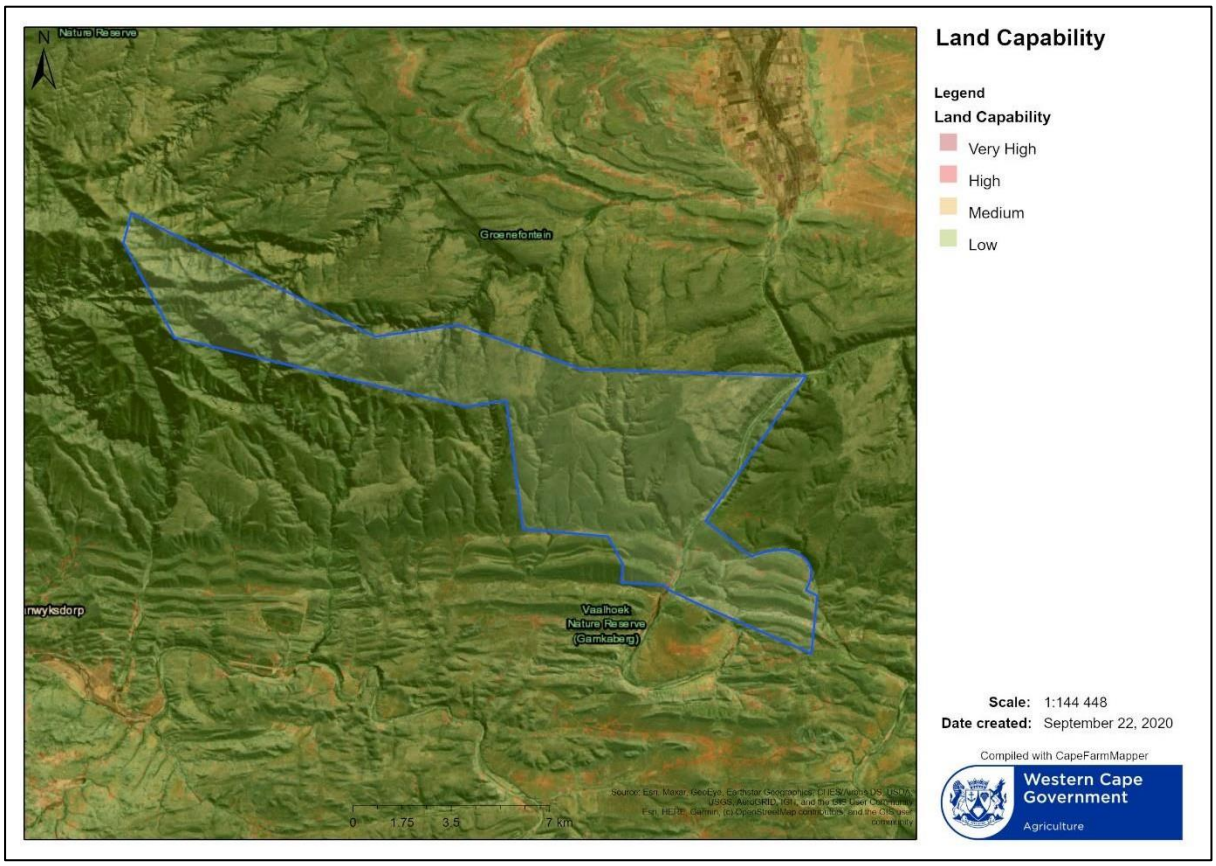

Figure 3. Land capability map of Jakkalsdans Nature Reserve. Land Capability is determined by the collective effects of soil, terrain and climate features, and indicates the most intensive long-term use of land for rain-fed agriculture as well as the permanent limitations associated with various land-use classes.

1.6 Summary of management challenges and opportunities

Jakkalsdans Nature Reserve's key management challenges are associated with typical Fynbos Biome characteristics, such as unplanned or out-of-season wildfires that occur in areas where they could have undesirable ecological effects, susceptibility to invasive alien plants and floods. Opportunities are the conservation and habitat protection of the Cape Leopard.

Table 1. Management challenges and opportunities

Key performance area	Challenges and Opportunities
Fire management	Challenge: Unplanned or out-of-season wildfires. Opportunity: Employment opportunities for fire- fighters.
Invasive vegetation management	Challenge: Maintaining near pristine character, low density of *Hakea sericea.* Opportunity: Employment opportunities for alien plant control teams.
Wildlife management	Challenge: Adequate fencing, patrolling and prevention of poaching Opportunity: Providing prime habitat for Cape leopard .
Erosion prevention and control	Challenge: The mountainous terrain is prone to floods, especially access routes/footpaths. Opportunity: Employment opportunities for erosion control teams.
Monitoring and Baseline data collection	Opportunity: Potentially discovering new plant species and archaeological sites.
Biodiversity security	Opportunity: Contribute to the conservation of low- land habitats and water catchments.
Legal compliance	Opportunity: Comply with NEMA and relevant environmental legislation.
Management effectiveness	Opportunity: Implement management actions and partake in annual audits.
Infrastructure	Challenge: Rehabilitation and maintenance of access road due to floods. Opportunity: Employment opportunities for road repair and maintenance teams.
Access Control	Challenge: Illegal access to the river by fisherman. Opportunity: Allow club fishing on Vaalhoek.

2 STRATEGIC MANAGEMENT FRAMEWORK

The strategic management framework is aimed at providing the basis for the protection, development and operation of the protected area over a five-year period. It consists of the vision, purpose and objectives of Jakkalsdans Nature Reserve. It has been prepared collaboratively through a process involving the landowner (Management Authority), site manager and CapeNature.

2.1 Jakkalsdans Nature Reserve Vision and Purpose

The Vision

"Our vision is to ensure the long term protection of the site through appropriate management actions. The management of Jakkalsdans NR will strive to continually improve all aspects of the way in which the Reserve is managed - environmentally, socially and economically."

Purpose

The purpose is the foundation on which all future actions are based and is in line with the overall management philosophy of the nature reserve.

According to S17 of NEM:PAA, the purpose of declaring an area as a protected area are:

a) to protect ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes in a system of protected areas;
b) to preserve the ecological integrity of those areas;
c) to conserve biodiversity in those areas;
d) to protect areas representative of all ecosystems, habitats and species naturally occurring in South Africa;
e) to protect South Africa's threatened or rare species;
f) to protect an area which is vulnerable or ecologically sensitive;
g) to assist in ensuring the sustained supply of environmental goods and services;
h) to provide for the sustainable use of natural and biological resources;
i) to create or augment destinations for nature-based tourism;
j) to manage the interrelationship between natural environmental biodiversity, human settlement and economic development;
k) generally, to contribute to human, social, cultural, spiritual and economic development; or
l) to rehabilitate and restore degraded ecosystems and promote the recovery of endangered and vulnerable species.

Jakkalsdans Nature Reserve serves in the protection of South Africa's threatened and rare species, provides protection to ecosystems and preserves ecological integrity. Benefits of appropriate nature based economic activities may be utilised to promote human, social, cultural and economic development while protecting ecosystems that are vulnerable and ecologically sensitive.

2.2 Objectives

The objectives were derived from the vision and purpose and are grouped into Key Performance Areas (KPA) in which achievement must be obtained in order to support the management intention. Objectives are then prioritised through the development of action plans which are set out in the Operational Management Framework.

The prioritised objectives for Jakkalsdans NR are to:

1. Protect and maintain the natural character of the environment, biodiversity, associated natural and cultural resources and the provision of environmental goods and services;
2. Maintain the ecological processes and systems of the Gamkaberg WHS & NR Complex, with the focus on endemic and indicator species as well as habitat integrity;
3. Maintain the optimal delivery of water of the best possible quality;
4. Ensuring the conservation of important archaeological, palaeontological and cultural history heritage sites.
5. Establish partnerships with statutory bodies, research institutions, conservationists and/or other initiatives that promote awareness towards the conservation of the natural environment (Local FMU, FPA, CapeNature, Neighbouring landowners).

Table 2. Objectives and Key Deliverables for Jakkalsdans Nature Reserve

Key Performance Area	Objective	Key Deliverable
Biodiversity Management		
Fire management	To ensure conservation of species and processes by maintaining and improving ecosystem functioning. To allow for natural fire processes to occur without impacting on safety and infrastructure. To implement effective Integrated Catchment Management.	Reduce/Prevent the Spread of Fires. Maintain Partnerships to Improve Fire Management. Determine and Implement Thresholds of Potential Concern.
Invasive vegetation management	To enhance biodiversity protection and conservation. To ensure conservation of species and processes by maintaining and improving ecosystem functioning.	Eradicate Alien and Invasive Species. Prevent Further Introduction of Aliens. Manage Alien Invasive species.
Wildlife management	To ensure effective conservation of species and processes by maintaining and improving ecosystem functioning. To enhance biodiversity protection and conservation.	Prevent the introduction of alien fauna species. Control invasive alien fauna.
Erosion prevention and control	To ensure implementation of effective conservation management interventions. To enhance biodiversity protection and conservation.	Prevent and mitigate soil erosion.
Monitoring and Baseline data collection	To manage biodiversity knowledge to ensure effective conservation management. To implement measures to ensure resilience and persistence of biodiversity in light of climate change. To ensure the implementation of effective conservation management interventions. To ensure conservation of species and processes by maintaining and improving ecosystem functioning.	Create a Biodiversity Resource Inventory. Implement Monitoring Programme. Implement Research Programme. Protection of Flora of Conservation Concern. Conservation of Threatened and Endemic Fauna.
Biodiversity security	To enhance biodiversity protection and conservation. To ensure conservation of species and processes by maintaining and improving ecosystem functioning.	Improved security and safety of the biodiversity assets on the Nature Reserve.
Development		
Development of tourism opportunities	To evaluate potential tourism opportunities. To implement effective management systems. To ensure legal compliance and implementation of authorised development plans.	Development of appropriate and sustainable tourism opportunities that generate revenue for the Nature Reserve following the correct process.
Operational Management		
Legal compliance	To ensure legal compliance to all relevant legislation and policies. To implement access control.	Ensure that all legal requirements are met. Ensure that no illegal access takes place.
Management effectiveness	To implement effective management systems.	Conduct annual audits. Auditing systems inform management and management plan revision.
Infrastructure	To ensure the implementation of effective conservation management interventions. To enhance biodiversity protection and conservation. To ensure conservation of species and processes by maintaining and improving ecosystem functioning.	All infrastructure on the Reserve is adequately maintained.

3 DESCRIPTION OF JAKKALSDANS NATURE RESERVE AND ITS CONTEXT

3.1 The legislative basis for the management of Jakkalsdans Nature Reserve

There is a large body of legislation that is relevant to the management of Jakkalsdans NR, but the primary legislation guiding the management of protected areas is the National Environmental Management: Protected Areas Act (No.57 of 2003) (Hereafter referred to as the Act).

The Act establishes the legal basis for the creation and administration of protected areas in South Africa, as its objectives include provisions "for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes". The Act sets out the mechanisms for the declaration of protected areas and the requirements for their management.

In the Western Cape, CapeNature is the Provincial Conservation Authority and its Biodiversity Stewardship Programme facilitates the establishment and management of protected areas on private land.

A detailed list of relevant legislation is provided in Appendix A. Landowners should familiarise themselves with the purpose and contents of the statutes and their subsequent amendments and regulations.

3.1.1 Proclamation status of Jakkalsdans Nature Reserve

Jakkalsdans NR is proclaimed under Section 23(1) of the National Environmental management: Protected Areas Act (Act 57 of 2003). See Appendix B.

3.1.2 Invasive species control in terms of the Biodiversity Act

In terms of Section 76 of the National Environmental Management: Biodiversity Act (No.10 of 2004), the management authority of a protected area must incorporate an invasive species control plan in the protected area management plan. This is addressed in Sections 6 and 8 below.

3.2 The regional and local planning context of Jakkalsdans Nature Reserve

3.2.1 The Protected Area Expansion Strategy and Implementation Plan

The Protected Area Expansion Strategy and Implementation Plan is a response to the National Protected Area Expansion Strategy (NPAES) (DFFE, 2016) which calls on provinces to develop implementation plans in support of the NPAES and in support of provincial conservation efforts and priorities. The NPAES, which provides a broad national framework for Protected Area expansion in South Africa, also identifies areas of importance to be targeted for Protected Area expansion in the country, and mechanisms to achieve this.

The draft Western Cape Protected Area Expansion Strategy (CapeNature, 2021) addresses the formal proclamation of priority natural habitats as protected areas to secure biodiversity and ecosystem services for future generations. This strategy is aligned to the concepts and goals of the (NPAES) (DFFE, 2016) but does identify some different spatial priorities.

3.2.2 *Municipal* Biodiversity Assessment

The Biodiversity Assessment of the Kannaland and Oudtshoorn Local Municipality and Garden Route District Management Area (Uniondale) (Skowno et al., 2010) points out that this region is unique because of its location in the Succulent Karoo Biome. Twelve habitat types in the region are threatened, and urbanization and agriculture are the main drivers of biodiversity loss. Stewardship is mentioned as a means for conserving threatened habitats outside formal protected areas (Skowno et al., 2010). According to the 2017 Western Cape Biodiversity Spatial Plan (Pool-Stanvliet et al., 2017), more than half of Jakkalsdans NR falls in Critical Biodiversity Area (CBA) (Figure 4). CBAs are areas required to meet biodiversity pattern and/or process thresholds. The management objective for CBA is to maintain natural land or rehabilitate degraded land to a natural or near natural state, and to prevent further degradation. Drainage lines are classified as Ecological Support Area (ESA) (Figure 4). ESAs are areas required to prevent degradation of CBAs and Protected Areas, and the management objective for ESAs is to maintain ecological processes. The rest of the nature reserve is classified as Other Natural Area (ONA) (Figure 4). These are areas that retain most of their natural character and the aim for these is to maximise ecological functionality.

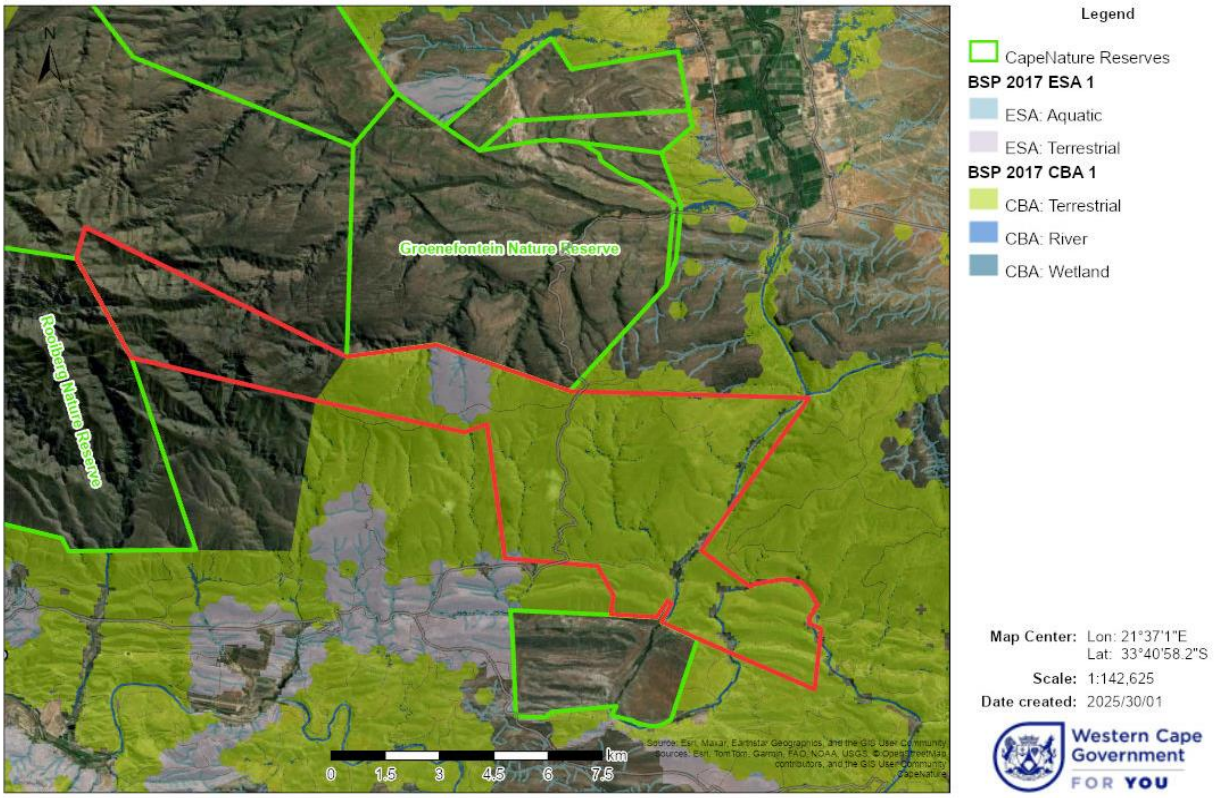

Figure 4 Critical Biodiversity Area map of Jakkalsdans Nature Reserve

3.2.3 *Municipal Plans*

The Strategic Development Framework (GRDM, 2017) and Integrated Development Plan (GRDM, 2022)

This refers to the Integrated Development Plans (IDP), Spatial Development Frameworks (SDF)

and Land Use Management Systems (LUMS) of the district and local municipalities within which the protected area falls.
Garden Route District, also known as the as the "Garden Route" is situated on the southern-eastern coast of the Western Cape Province is currently the third largest district municipality within the Western Cape. With a total earth surface coverage of approximately 23 332 km², the municipality shares its borders with four other district municipalities namely Cacadu District in the Eastern Cape, Overberg and Cape Winelands in the west and to the north the boundary with the Central Karoo District Municipality runs along the Swartberg mountains. In the east, the municipality runs up to the Eastern Cape provincial boundary. Oudtshoorn is the largest inland town, located along the R62 and N12 linking smaller inland towns of Ladismith, Calitzdorp, De Rust and Uniondale.

The inland areas of the Garden Route District are characterised by a strongly rural setting with dispersed farming hamlets and small towns, which in some cases are isolated due to transport and social service delivery costs. Along the coast, the dominant port industrial town of Mossel Bay is functionally linked inland with George, the services centre of the District, as well as along the N2 to the tourism and lifestyle driven settlements of Knysna and Bitou to the East. To the west of Mossel Bay, the towns of Riviersonderend and Riversdale are gateways to the Garden Route and South to the coastal towns of Witsand, Stilbaai and Gouritzmond.

The IDP and SDF of the Garden Route Municipality recognise the importance of being part of the Cape Floristic Region which is classified to be a global biodiversity hotspot. These documents note that the Garden Route's outstanding natural beauty is made up of diverse wilderness and agricultural landscapes, estuaries and lagoons, mountain backdrops and coastal settings, including the verdant landscapes of the Garden Route.

As a result of the natural beauty, the area is well known for its tourism. As it is stated that the Southern Cape coastal belt has been identified as a significant leisure, tourism, lifestyle and retirement economic destination, driven largely by the quality of life and climatic advantages of the region. The district's natural capital and its varied scenic and cultural resources are the attractions that make the Western Cape the country's premier tourism destination (SDF, 2020). Keeping the natural environment, wetlands, lakes and rivers in a pristine condition is key to future security in the future of the region.

3.2 The history of Jakkalsdans Nature Reserve

There is currently no historical information on the previous land use of the site.

3.3 Ecological context of Jakkalsdans Nature Reserve

This section reflects the ecological conditions of Jakkalsdans NR.

3.4.1 Climate and weather

Jakkalsdans NR receives rain throughout the year and the average annual rainfall for the Gamkaberg area is 365mm per annum. This is measured from 16 different CapeNature rainguages situated in different habitats and altitudes. One such rain gauge, Klipmuur is situated on

Jakkalsdans and is monitored manually. Surrounding high altitude rain gauges such as Ararat measures on average 556 mm rainfall per annum and Bailey's Peak on the Rooiberg, 407 mm per annum (Barry et al., 2015). Rainfall average is much higher in the higher lying catchment areas of the nature reserve.

The hottest months on the reserve are December to February with maximum temperatures recorded of up to 45˚C. The coldest months are June and July with minimum temperatures reaching -4˚C. Occasional snowfalls occur on the Rooiberg Mountains during winter (Barry et al., 2015). Refer to Figures 5(a & b).

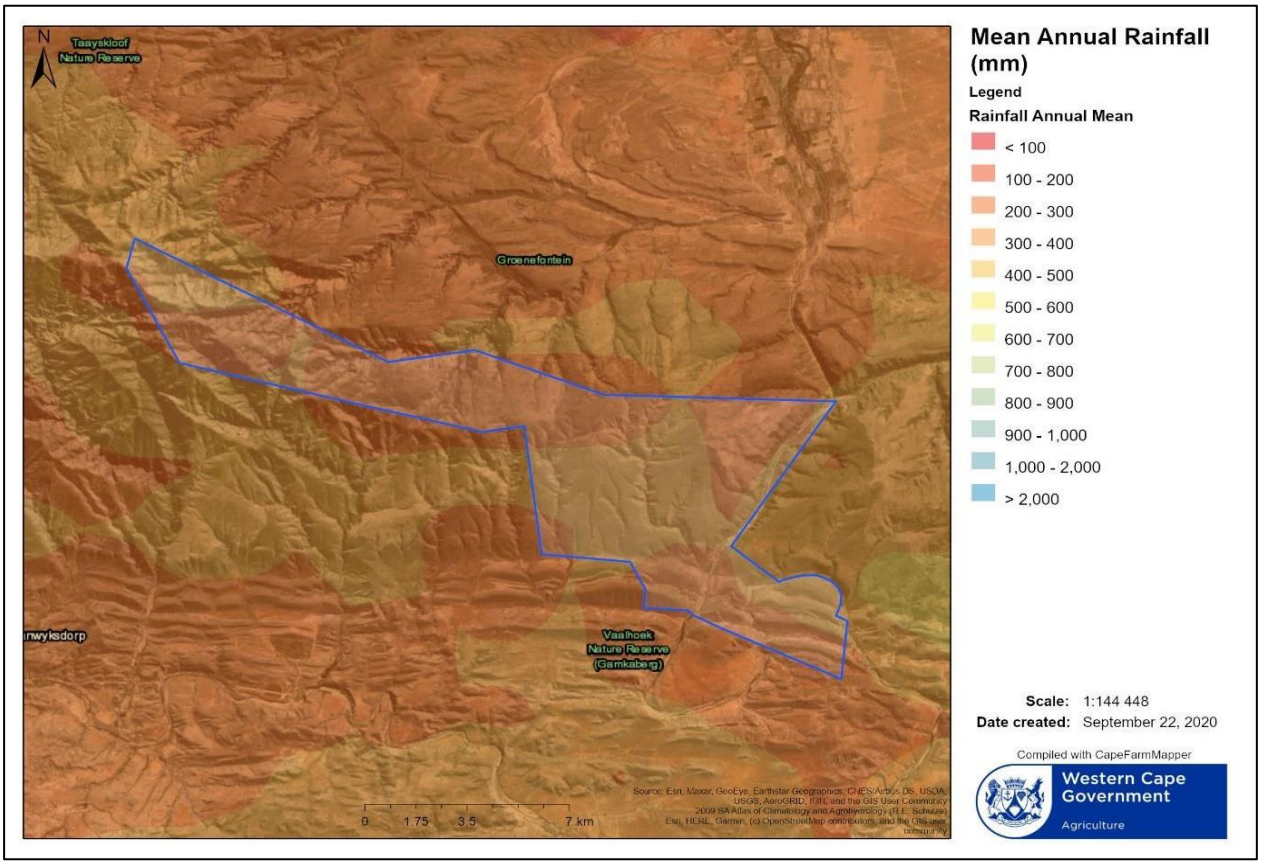

Figure 5a The mean annual rainfall (mm) of Jakkalsdans Nature Reserve.

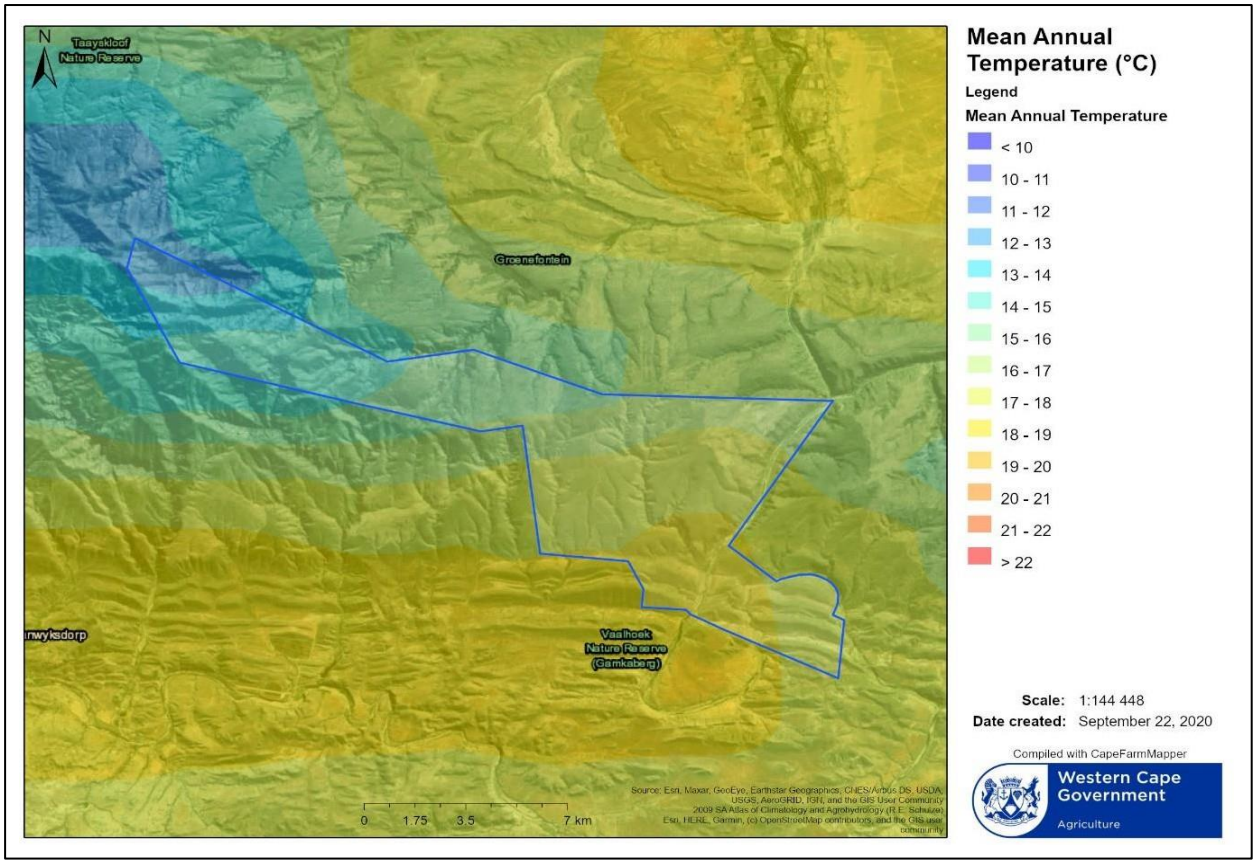

Figure 5b The mean annual temperature (°C) of Jakkalsdans Nature Reserve.

3.4.2 Topography

The western section of the reserve is situated at a high altitude narrow east-west linkage on top of Rooiberg, and the eastern section is an upland-lowland north-south linkage, on the southern slopes of the Rooiberg Massive.

The 54 Roodeberg trigonometric beacon is at the highest peak of the reserve, measuring at 1 489.6 metres above sea level (masl), situated at the most western point of the reserve. The lowest elevation occurs where the Gouritz River exits through the Rooiberg Mountain, the southwestern section of the reserve and is approximately 181 masl [Figure 6(a, b & c)].

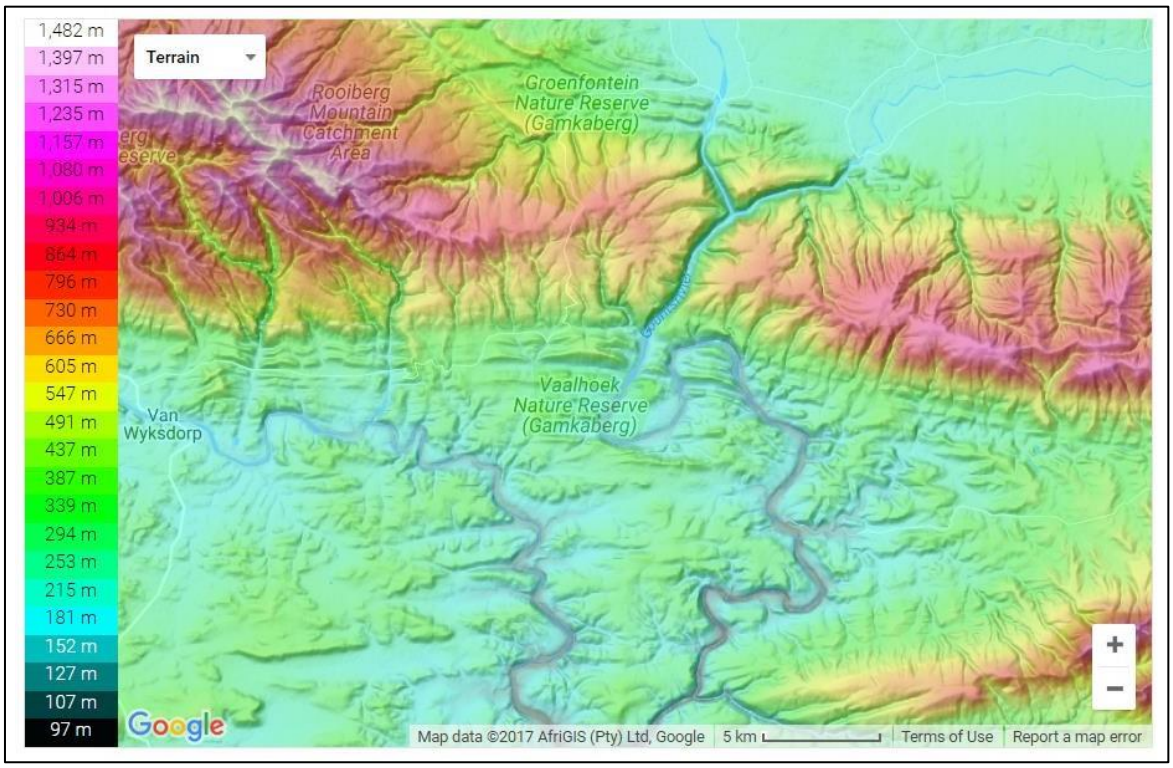

Figure 6a **Topography of Jakkalsdans Nature Reserve surrounds.** Map generated by Topographic-map.com, http://en-za.topographic-map.com/. Accessed 08 February 2017.

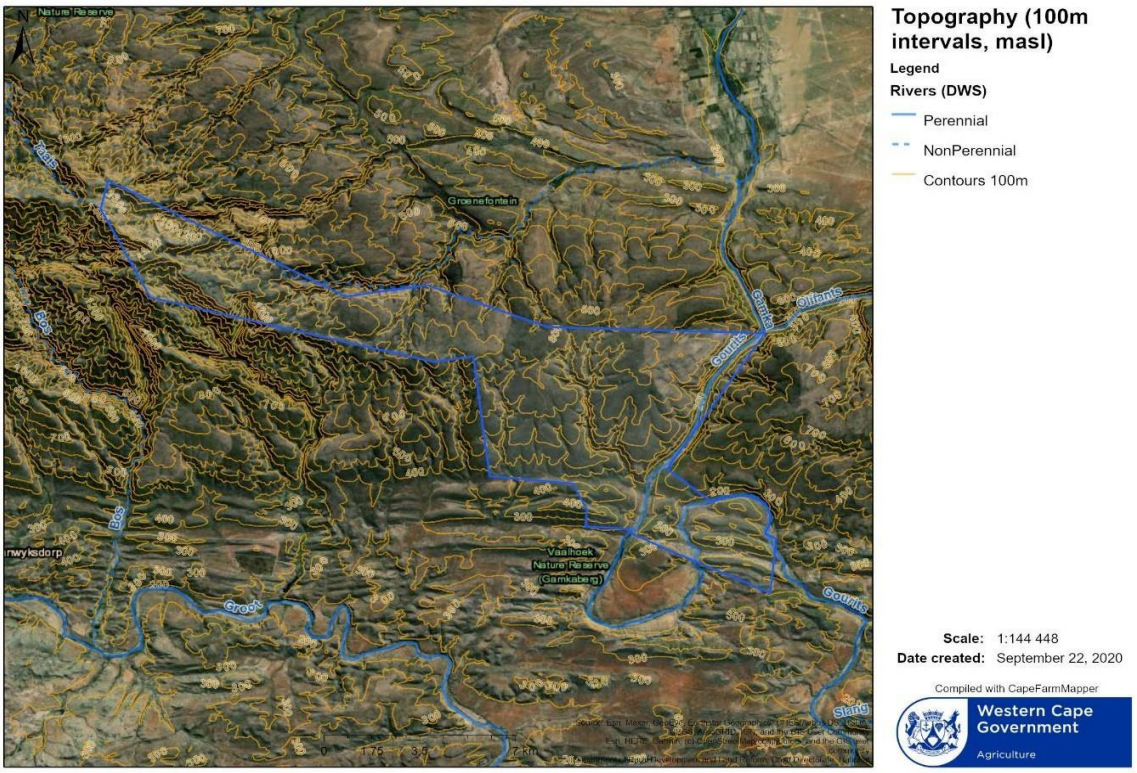

Figure 6b **Topography of Jakkalsdans Nature Reserve**.

3.4.3 Geology and soils

The Rooiberg Mountain is one of the prominent east-west trending ranges comprising the southern branch of the Cape Fold Belt. It was formed as a result of north-south oriented compressive stress during the Cape Orogeny 123-200 million years ago. This mountain range comprises almost exclusively the resistant quartz arenites of the Table Mountain Group, overlain on the lower slopes by the shale of the Bokkeveld group.

The reserve comprises an anticline exposing the four formations of the Table Mountain Group. The sandstones, siltstones and shales of the Cedarberg, Goudini and Skurweberg Formations are all present and overly the Peninsula Formation, however due to the anticline, the older formations are exposed at higher elevations than the younger formations.

Jakkalsdans Nature Reserve is located on an anticline (axis not shown on geological map) with the older rocks occurring at higher altitudes than the younger rocks. The synclinal axis is located along the southern boundary of Vaalhoek Nature Reserve, south (adjacent) of Jakkalsdans. In the west, the upper formations of the Table Mountain Group and the lower formations (Gydo to Boplaas Formations) of the Bokkeveld Group are exposed, whereas in the east, the exposures are limited to the Table Mountain Group and the Bokkeveld Group respectively. Refer to Figure 6c.

Soils generally form a thin (<1 m) veneer of silty sands/sandy silts as a result of the steep slopes of the Rooiberg Mountain and predominantly quartzitic rocks. Locally clayey soils occur in association with weathered shale horizons, and in particular the Cederberg Formation. Although soils are shallow, infertile, and acidic, have minimal B-horizon development with a low water retention capacity, this geology supports the highly diverse Cape flora. The soil is deeper at the foot of the mountain in kloofs and along the southern aspects where a fairly deep red-yellow sandy to sandy loam soil occurs (Hutton, Clovely and Griffin forms), (Barry et al. 2015). Refer to Figure 6(c).

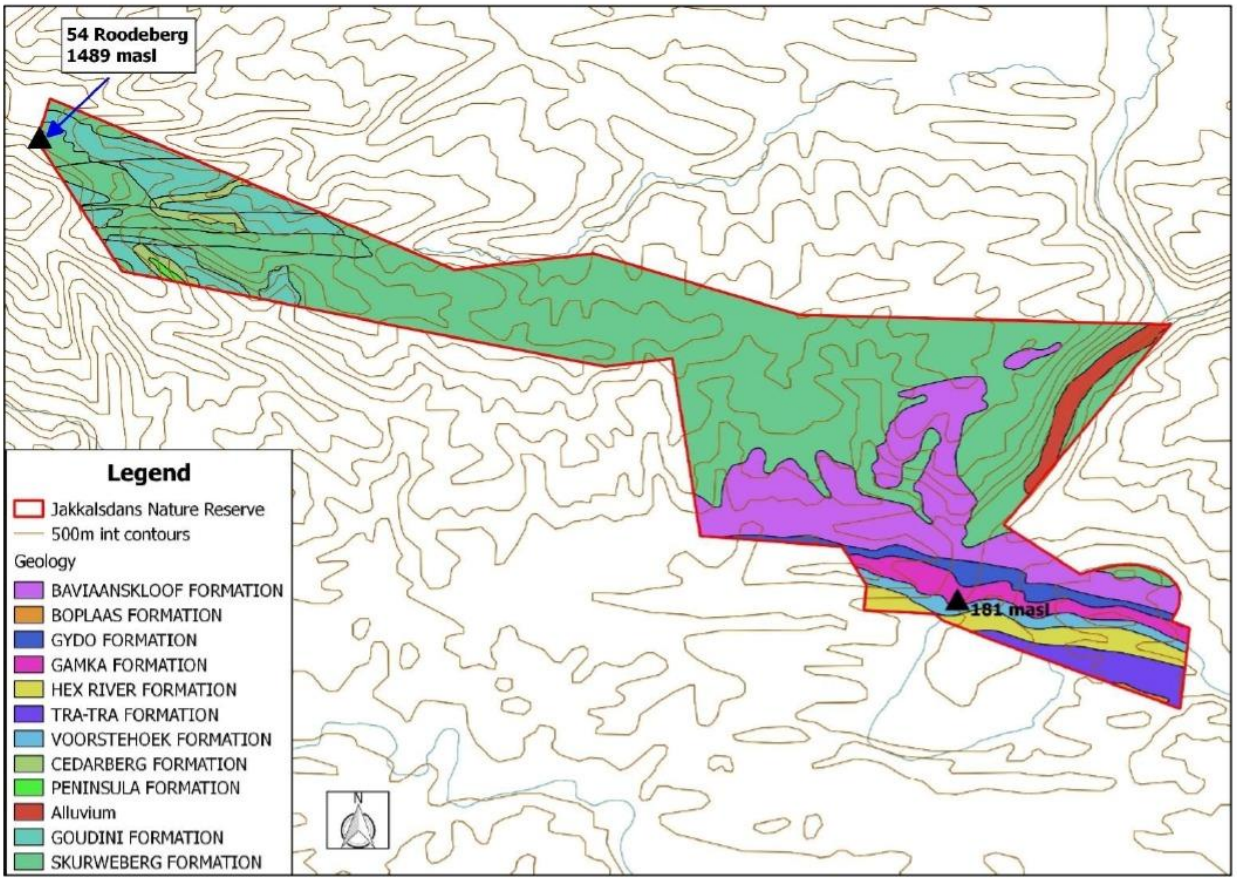

Figure 6c Topography and Geology of Jakkalsdans Nature Reserve

3.4.4 Soil interfaces

Where two soil types meet there is often a "tension zone". Different soils support different vegetation types and the meeting point is known as an ecotone. The vegetation here is often a unique combination of both parent types. These ecotones are biologically important because they are often areas of active speciation. For this reason, disturbance in this zone must be avoided and it is preferable to buffer it with at least 30m of vegetation on either side.

3.4.5 Hydrology

Jakkalsdans Nature Reserve, falls within the catchment and southern slopes of the Rooiberg Massive which drains into the Groot River in the south and Gouritz River in the east. The Gouritz River, the only perennial river, flows through the property

The rocks of the Table Mountain Group possess essentially no primary porosity, and groundwater flow is restricted to fractures in joint and fault zones. Groundwater flow in these fractures is controlled by fracture characteristics such as connectivity, openness and geometry. Groundwater recharge takes place predominantly in the highest topographic parts of the Rooiberg Mountain Range. The precipitation percolates into fractures of varying orientation and scale. Migration of the groundwater under the influence of gravity into larger deeper fractures leads ultimately to the water table where it becomes part of the regional groundwater flow system and is discharged toward the foot of the mountain as springs and baseflow in river courses. Discharge in rivers occurs where there is good interconnection between fractures and the riverbed (Barry et al. 2015). Refer to Figure 7.

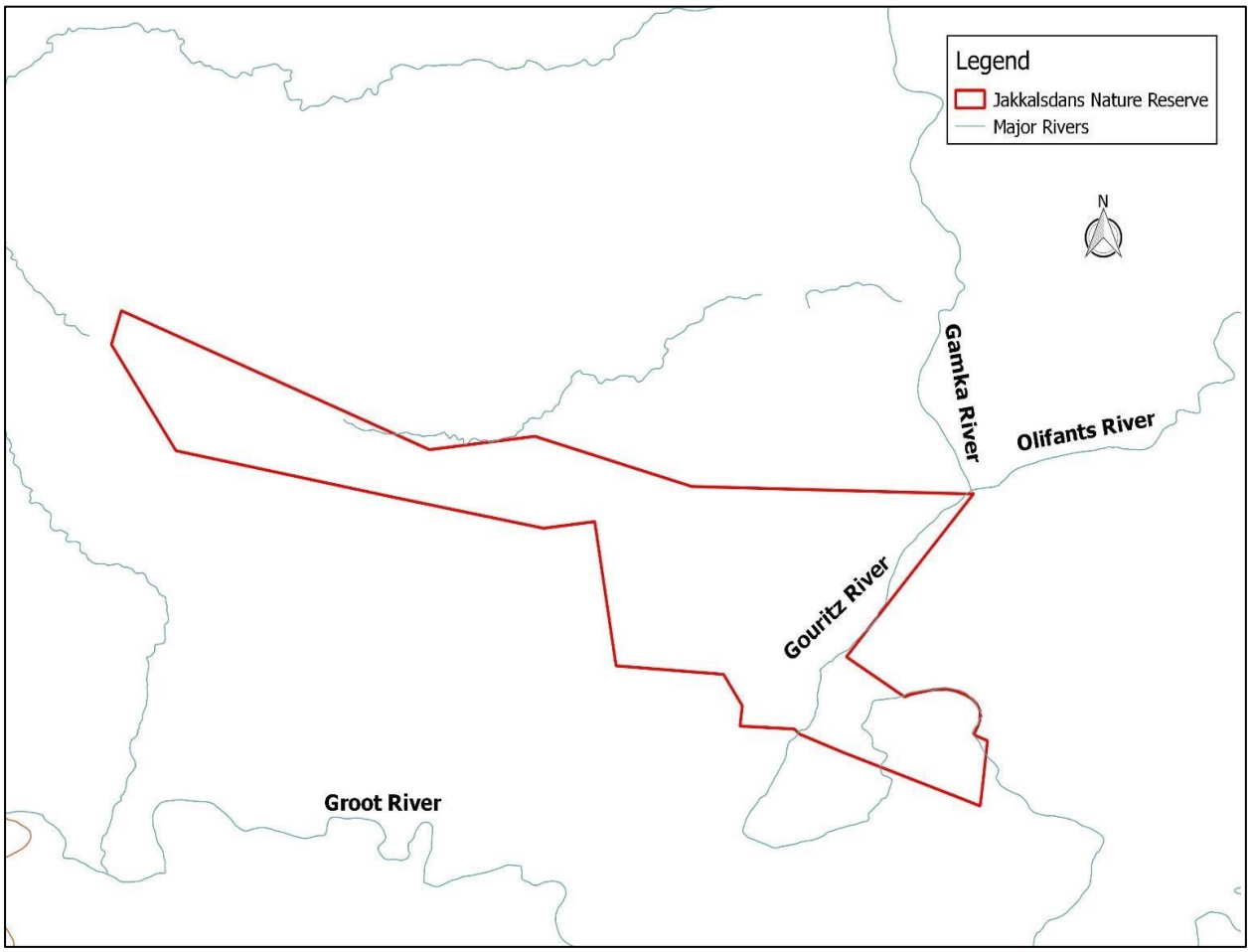

Figure 7. Hydrology of Jakkalsdans Nature Reserve

3.4.6 Vegetation

The Cape Floristic Kingdom, one of six world floral kingdoms, is internationally renowned for its special rich flora containing an estimated 9 000 species of vascular plants of which almost 69% are endemic (restricted to the region). This makes it one of the richest regions in the world in terms of botanical diversity. It is characterized by five endemic families and by the conspicuous presence of, amongst others, species belonging to the families Aizoaceae, Ericaceae, Fabaceae, Iridaceae, Orchidaceae, Proteaceae, Restionaceae, Rutaceae and Scrophulariaceae (Goldblatt & Manning, 2000).

There is a diversity of habitats and vegetation types on the reserve, because of the enormous upland-lowland gradient that the property captures (north-south linkage from Fynbos to Succulent Karoo).

At a national level, Jakkalsdans contains South Rooiberg Sandstone Fynbos (Least Threatened and well protected), North Rooiberg Sandstone Fynbos (Least Threatened and well protected), Central Inland Shaleband vegetation (Least Threatened and well protected), Western Gwarrieveld (Least Threatened, moderately protected) and Gamka Thicket (Least Threatened, poorly protected).

At a regional level the reserve contains fifteen vegetation variants of which 13 is Least

Threatened, i.e. Calitzdorp Arid Spekboomveld, Calitzdorp Valley Spekboomveld, Vaalhoek Arid Spekboomveld, Dwars-in-die-weg Pruimveld, Dwars-in-die-weg Sandolienveld, Rooiberg Arid Asteraceous Fynbos, Rooiberg Arid Proteoid Fynbos, Rooiberg Arid Restioid Fynbos, Rooiberg Fynbos-Spekboomveld, Rooiberg Waboomveld, Rooiberg Perennial stream and Rooiberg Mesic Proteoid Fynbos. Gamka River and Floodplain Gouritsrivier River and Floodplain are Vulnerable and Gourits Asbos Gwarrieveld is Critically Endangered. Refer to Figure 8.

There are some highly localised species, e.g. *Leucospermum pluridens, Alonsoa peduncularis, Amphithalea flava, Freylinia vlokii*, possibly also *Aspalathus karooica*, *Haworthia blackburnii, Freesia fergussoniae* and most probably several more species. The only known location of *Metalasia tricolor* is on Jakkalsdans Nature Reserve. An undescribed species of *Romulea* also occurs there.

<u>The vegetation units are described by Vlok et al. 2005 as follows:</u>

"The **Calitzdorp Arid Spekboomveld** is structurally very similar and share most of its common species with the Swartberg Arid Spekboomveld, but it can be easily recognized by having Noors (*Euphorbia coerulescens*) present and often locally abundant. It also has a number of other species present that are more typical of the Eastern Cape (e.g. *Barleria obtusa*) that are absent from all the other Little Karoo units. Rare and localized endemic species known from this unit include *Crotalaria lebeckioides*, *Eriospermum rhizomatum*, *Huernia guttata var. calitzdorpensis* and *Huernia pillansii*."

"The **Calitzdorp Valley Spekboomveld** may be mistaken with the Calitzdorp Arid Spekboomveld as Spekboom (*Portulacaria afra*) is abundant and prominent amongst woody trees and shrubs such *as Carissa haematocarpa*, *Euclea undulata*, *Gymnosporia szyszylowiczii*, *Rhigozum obovatum*, *Rhus longispina* and *Rhus undulata*, but it can easily be recognized by having Pappea capensis also abundant. Other stem- and leaf succulents are also abundant, including species such as *Aloe ferox*, *Aloe microstigma*, *Aloe speciosa*, *Crassula rupestris*, *Dioscorea hemicryptica*, *Euphorbia heptagona*, *Gasteria brachyphylla*, *Pachypodium bispinosum*, *Pachypodium succulentum*, *Pelargonium teragonum* and *Sarcostemma viminale*. Grasses are present (e.g. *Agrostis lachnantha*, *Cenchrus ciliaris*, *Fingerhuthia africana*, *Panicum coloratum*, *Panicum deustum*, *Sporobolus africanus*, *Stipa dregeana*, *Tribolium uniolae*, etc.), but they are only prominent after good summer rain. No rare species are known from this unit, but the localized endemic *Tylecodon cacalioides* is present."

"The **Vaalhoek Arid Spekboomveld** unit corresponds in many respects to the Vanwyksdorp Arid Spekboomveld, but it differs in having outcrops of calcrete on the tops of hills where unusual Succulent Karoo communities occur with species of *Aizoon*, *Eriocephalus*, *Jamesbrittenia*, *Muraltia*, *Pentashistis*, *Ruschia* and *Selago* prominent. Here patches of Gannaveld are also present in the small valleys between the hills, they are typical of the Grootrivier Gannaveld in the species present. No rare or localized endemic species are known from this unit, but the unit has been poorly surveyed."

"The **Dwars-in-die-weg Pruimveld** unit is somewhat similar to the Hartbeesvlakte Spekboomveld as Spekboom (*Portulacaria afra*) is occasionally also abundant amongst the woody trees, such as Gwarrie (*Euclea undulata*), Spalkpendoring (*Gloveria integrifolia*), Koeniebos (*Rhus undulata*) and Doppruim (*Pappea capensis*), that are predominant on the north facing slopes and in having the south facing slopes quite different with Renosterbos (*Elytropappus rhinocerotis*), Sandolien

(*Dodonaea angustifolia*), Chinese lantern bush (*Nymannia capensis*) and some Fynbos elements (e.g. *Rhodocoma arida*) the dominant species. It differs mostly in often having small strips of Gannaveld (where species such as *Salsola aphylla*, *Drosanthemum giffenii*, *Pentzia incana*, etc.) present along the lower water drainage areas. Bitter Aloe (*Aloe ferox*) is often abundant in disturbed sites in this unit. No rare or localised endemic species are known from this unit."

"**Dwars-in-die-weg Sandolienveld** is not very rich in species, but it is never the less an interesting unit as it bridges the gap between the Subtropical Thicket of the lowlands and the Fynbos in the uplands of the Rooiberg, It is thus an ecotonal unit in which Sandolien (*Dodonaea angustifolia*) is the dominant species but other shrubs such as *Acmadenia sheiliae*, *Diosma prama*, *Felicia filifolia*, *Heliophila glauca*, *Metalasia pungens* and *Passerina obtusifolia* are also abundant. Some grasses are present, (e.g. *Cymbopogon validus*) but they are never very abundant. The only known rare species present is *Alonsoa peduncularis*."

"The **Rooiberg Arid Asteraceous Fynbos** also occurs in rocky sandy to loamy soils in an arid environment, mostly on north facing slopes, but occasionally also on south facing slopes. Ericaceae and Proteaceae are rare here, but this unit is rich in Rutaceae. The vegetation is also dominated by drought resistant shrubs, such as *Acmadenia sheiliae*, *Agathosma capensis*, *Agathosma mundii*, *Agathosma recurvifolia*, *Aspalathus hystrix*, *Cliffortia crenata*, *Diosma apetala*, *Diosma prama*, *Dolichothrix ericoides*, *Erica maesta*, *Eriocephalus africanus*, *Heliophila glauca*, *Hermannia flammula*, *Metalasia massonii*, *Metalasia pulcherrima*, *Metalasia pungens*, *Muraltia lignosa*, *Oedera imbricata*, *Osteospermum polygaloides*, *Passerina obtusifolia*, *Pelargonium laevigatum*, *Pelargonium tricolor*, *Phylica mundii*, *Phylica purpurea*, *Pteronia fascicularis*, *Selago pulchra*, *Stoebe spiralis* and *Thesium virgatum*. Grasses (*Merxmuellera arundinacea*, *Merxmuellera stricta*, *Pentashistis eriostoma*) are present but uncommon, the same holds for the Restios (*Hypodiscus striatus*, *Ishyrolepis capensis*, *Ischyrolepis gaudichaudiana*, *Rhodocoma arida*). Succulents (e.g. *Aloe comptonii*, *Cerochlamys pachyphylla* and many Crassula spp.) are also abundant in rocky sites, of which two (*Crassula rupestris ssp. marnierana* and *Haworthia blackburniae*) are uncommon species. Other rare species known in this unit are *Apodolirion lanceolatum*, *Lotononis dahlgrenii* and *Muraltia cliffortiifolia*."

"The **Rooiberg Mesic Proteoid Fynbos** can be easily differentiated from the Rooiberg Arid Proteoid Fynbos in having proteoid shrubs such as *Aulax cancellata*, *Leucadendron album*, *Leucadendron eucalyptifolium*, *Mimetes cucullatus*, *Protea eximia*, *Protea neriifolia* and *Protea punctata* present. This combination of species clearly indicates that this unit is intermediate between the Mesic Proteoid units that occur on the coastal and inland mountain ranges. This unit is also rich in other species, with the following species recorded from here; *Acmadenia sheiliae*, *Acmadenia wittebergensis*, *Agathosma bifida*, *Agathosma roodebergensis*, *Anthoxanthum ecklon*ii, *Arctotis campanulata*, *Aristea pusilla*, *Aristea spiralis*, Aspalathus aspalathoides, *Athanasia linifolia*, *Corymbium africanum*, *Dimorphotheca montana*, *Diosma recurva*, *Disa bracteata*, *Disa comosa*, *Dolichothrix ericoides*, *Ehrharta capensis*, *Ehrharta ottonis*, *Elegia filacea*, *Elegia galpinii*, *Erica anguliger*, *Erica calycina*, *Erica maximilianii*, *Erica melanomontana*, *Erica recta*, *Erica spectabilis*, *Ficinia stolonifera*, *Gladiolus floribundus*, *Helichrysum spiralepis*, *Holothrix villosa*, *Hypodiscus albo-aristatus*, *Ischyrolepis capensis*, *Ixia orientalis*, *Leucadendron salignum*, *Leucospermum cuneiforme*, *Mastersiella purpurea*, *Metalasia massonii*, *Metalasia pungens*, *Paranomus dispersus*, *Paranomus dregei*, *Pelargonium fruticosum*, Pentashistis pyrophylla, *Phylica axillaris*, *Phylica purpurea*, *Phylica imberbis*, *Phylica mundii*, *Rafnia capensis*, *Selago gracilis*, *Stoebe alopecuroides*, *Struthiola eckloniana*, *Tetraria bromoides*, *Tritoniopsis antholyza*, *Watsonia schlechteri* and *Zyrphelis microcephala*. Rare and localized endemic species known to

occur here are; *Acmadenia baileyensis*, *Argyrolobium harveyanum*, *Disa arida*, *Lachnaea glomerata*, *Lampranthus scaber* and *Nivenia argentea*."

"The **Rooiberg Arid Proteoid Fynbos** unit also has Proteas, Ericas and Restios abundant, but it has quite distinctive combination of species. The species present indicate a relationship with the Arid Proteoid Fynbos that occur on both the coastal and inland mountain ranges. These species include *Acmadenia sheiliae*, *Acmadenia wittebergense*, *Aspalathus hirta*, *Aspalathus hystrix*, *Aspalathus rubens*, *Aulax cancellata*, *Brachycarpaea juncea*, *Cannamois scirpoides*, *Cliffortia arcuata*, *Diosma apetala*, *Diosma prama*, *Erica melanthera*, *Erica spectabilis*, *Hermannia flammula*, *Lachnaea ruscifolia*, *Leucadendron comosum*, *Leucadendron ericifolium*, *Leucadendron rubrum*, *Leucadendron tinctum*, *Leucospermum cuneiforme*, *Leucospermum wittebergense*, *Merxmuellera stricta*, *Metalasia massonii*, *Metalasia pulcherrima*, *Muraltia horrida*, *Paranomus dispersus*, *Paranomus roodebergensis*, *Pelargonium fruticosum*, *Pelargonium tricolor*, *Phylica axillaris*, *Polygala fruticosa*, *Protea repens*, *Protea lorifolia*, *Rhodocoma fruticosa*, *Selago pulchra*, *Struthiola argentea*, *Syncarpha ferruginea*, *Syncarpha paniculata* and *Zygophyllum sessilifolium*. Rare and localized endemic species present and that renders it different to all the other units are *Acmadenia baileyensis*, *Aspalathus karrooensis* and *Nivenia argentea*."

"The **Rooiberg Arid Restioid Fynbos** unit is easy to recognize as it also has *Rhodocoma arida* abundant to dominant in places. It is richer in species than most of the other Arid Restioid Fynbos units with the following species recorded in this unit; *Acmadenia sheiliae*, *Agathosma capensis*, *Agathosma mundii*, *Aspalathus rubens*, *Centella virgata*, *Cliffortia crenata*, *Diascia patens*, *Diosma apetala*, *Diosma prama*, *Diospyros dichrophylla*, *Euryops erectus*, *Euryops rehmannii*, *Lobostemon decorus*, *Lobostemon paniculatus*, *Muraltia dispersa*, *Muraltia ericaefolia*, *Muraltia scoparia*, *Paranomus roodebegensis*, *Pelargonium caucalifolium*, *Pelargonium tricolor*, *Pentashistis airoides*, *Pentashistis eriostoma*, *Pentzia dentata*, *Pentzia elegans*, *Phylica lanata*, *Phylica willdenowiana*, *Polygala microlopha*, *Polygala wittebergensis*, *Protea humiflora*, *Pteronia fasciculata*, *Pteronia membranacea*, *Rafnia racemosa*, *Relhania calycina*, *Senecio juniperinus*, *Sutera subnuda*, *Thamnochortus rigidus*, *Ursinia heterodonta*, *Zygophyllum fulvum* and *Zygophyllum sessilifolium*. Several rare and localized endemic species are known from this unit, including *Agathosma lanata*, *Alonsoa peduncularis*, *Haworthia blackburniae var. blackburniae*, *Muraltia cliffortiifolia* and *Senecio muirii*."

"The **Rooiberg Fynbos-Spekboomveld** is structurally similar to the Meiringspoort Spekboom Thicket and Voorsorg Fynbos-Spekboomveld as they share many common and even uncommon species such as *Lachnostylis bilocularis*, but it differs in lacking the distinctive species of the other two units and having its own uncommon species present, such as *Crassula rupestris ssp. marnierana* and *Haworthia blackburniae var. blackburniae*."

"The **Rooiberg Waboomveld** unit is most similar to the Gamkaberg Waboomveld as it also has Waboom (*Protea nitida*) prominent in the vegetation, along with most of the common species recorded in the Gamkaberg Waboomveld. It differs in lacking some of the Gamkaberg Waboomveld local endemics (e.g. *Mimetes chrysanthus*) and by having its own local endemic species, such as *Aspalathus karooensis* and *Metalasia tricolor*. It is perhaps most easily distinguished by having other more common species more prominent, such as *Acmadenia sheiliae* and *Paranomus dispersus*."

"The **Rooiberg Perennial Stream** unit is most similar to the vegetation of the Central Swartberg

Perennial stream unit in having *Calopsis paniculata*, *Cannamois virgata*, *Erica caffra*, *Hypocalyptus sophoroides*, *Rhodocoma capensis* and several *Psoralea* species abundant along the streambank, but it differs in lacking its localized endemic species present. Rare species in the upper seepage area, such as *Nivenia argentea*, indicate a relationship also with the Langeberg flora. Patches of Afro-montane forests also occur here in fire-protected sites, also with Ilex mitis, *Maytenus acuminata* and *Pterocelastrus tricuspidatus* as the most abundant trees, with ferns such as *Asplenium* and *Blechnum* species abundant in the understorey."

"The vegetation of the **Gamka River and floodplain unit** is most similar to the Touws River unit as it also has its main catchment in the Nama Karoo. There are not many freshwater streams feeding into this river and it thus naturally carried less fresh water. Periodic floods deposited deep silt beds from the Great Karoo in the floodplain, where Sweet Thorn trees (*Acacia karoo*) and grasses such as *Cynodon dactylon* and *Stipagrostis namaquensis* are prominent amongst Ganna (*Salsola aphylla*). Some interesting annuals occur in the floodplain, such as *Manulea chysantha*, some of these annuals and other herbs are more typical of the Nama Karoo from which their seed is periodically washed during floods. It remains a mystery why they are not more abundant in the adjacent river systems. The main stream is currently badly infested with *Nerium oleander* and *Tamarix chinensis* and *Tamarix ramosissima* are also abundant in certain sites. *Tromotriche choanantha* is a rare succulent that occurs on the vertical cliffs where this river cuts through the Rooiberg."

"The **Gouritsrivier River and floodplain** unit is the recipient of all the waters from the other riverine units and it is thus no surprise that it shares characters and species with all the other riverine units. I have little doubt that in pre-European days it had a perennial flow of fresh water, only periodically punctuated with floods from the Nama Karoo. In places the vegetation on the riverbanks still contains typical fresh-water dependent plants such as *Cliffortia strobilifera* and *Salix mucronata*, but they are now uncommon. The floodplain vegetation is often dominated by *Acacia karoo*, Salsola *aphylla* and *Suaeda fruticosa*, but many of the embankments are sandy with a fairly well developed grass cover (*Cynodon dactylon*, *Ehrharta ramosa*, *Stipagrostis namaquensis*, etc.). These sandy embankments are often rich in annual species after rain. The steep cliff embankments just above the 1:100 year flood line have a rich assemblage of succulent species, some being local endemics such as *Cotyledon tomentosa ssp. ladismithiensis* it probably also harbors a number of interesting *Haworthia* species."

"In the **Gourits Asbos-Gwarrieveld** woody trees and shrubs (e.g. *Carissa haematocarpa*, *Euclea undulata*, *Nymannia capensis*, *Rhus glauca*, *Rhus undulata*, etc.) are quite abundant, along with a few Spekboom (*Portulacaria afra*) on the northern slopes. Succulents (*Aloe ferox*, *Drosanthemum giffenii*, *Euphorbia mauritanica*, etc.) are also abundant and some of those present, such as *Delosperma asperulum*, *Delosperma pageanum*, *Drosanthemum albiflorum* and *Drosanthemum bicolor* are uncommon species. Asbos (*Pteronia incana*) and Renosterbos (*Elytropappus rhinocerotis*) are the dominant shrubs on the south facing slopes, with *Lebeckia cytisoides* and *Polygala pinifolia* sometimes also prominent. Patches of woody trees (e.g. *Buddleja saligna*, *Olea europaea*, etc.) occur sometimes in the water drainage areas on southern slopes. Grasses (e.g. *Ehrharta calycina*, *Ehrharta erecta*, *Pentashistis airoides*, etc.) and geophytes (e.g. *Lapeirousia pyramidalis*, *Tritonia securigera*, etc.) are sporadically also abundant on the south facing slopes. *Apodolirion lanceolatum* is the only rare species known from this unit."

Figure 8. Vegetation variants (regional level) found on Jakkalsdans Nature Reserve (Vlok et al, 2005).

A plant species list from Gamkaberg WHS & NR Complex and surrounding areas (Barry et al. 2015) is in Appendix C.

3.4.7 Fire regime

The overall goals of fire management in the Western Cape are as follows:

- The maintenance of the optimum levels of biodiversity in all regions managed either directly or indirectly by CapeNature.
- The conservation of all natural processes within the Fynbos Biome.
- The conservation of hydrological systems that deliver a sustained yield of stream flow in all Mountain Catchment Areas.
- The reduction of fire risk and hazard in all protected and neighbouring areas. The aims of fire management include:
- The maintenance of fire as a vital ecological process in fynbos ecosystems.

- The integration of Fire Management into programmes aimed at the reduction and control of invasive alien plan species.
- The minimisation of the occurrence and extent of ecologically undesirable or otherwise potentially damaging wildfires.

The mountainous area of the reserve falls within Declared Private Mountain Catchment Area, where a Natural Fire Burning Zone strategy has been implemented in the past: i.e. fires that are caused through natural ignitions (e.g. lightning strikes, rock falls) are left to burn until they burn out or are extinguished as a result of rainfall. Fires resulting from human induced causes (e.g. arson, negligence) are fortunately very rare. In cases where infrastructure (e.g. fences) on neighbouring properties or livelihoods are threatened, every effort is made to avoid damage from occurring. Fortunately, the majority of the area with burnable vegetation is located in areas where there is very little threat of damage to infrastructure. Furthermore, because of the arid climate of the Klein Karoo the fire return interval is quite long, probably around 18-20 years (Barry *et al*. 2015).

A recent analysis conducted by CapeNature, suggests that the Natural Fire Burning Zone Strategy be revised to an Adaptive Interference Strategy for the foreseeable future until a healthier veld age mosaic is achieved.

For Gamkaberg WHS and NRC, a total of 68.7% of the veld is up to 10 years old and 31% is older veld and considered good for sugarbirds (Figure 9). Young veld threshold for Rooiberg and Gamkaberg is <18 years.

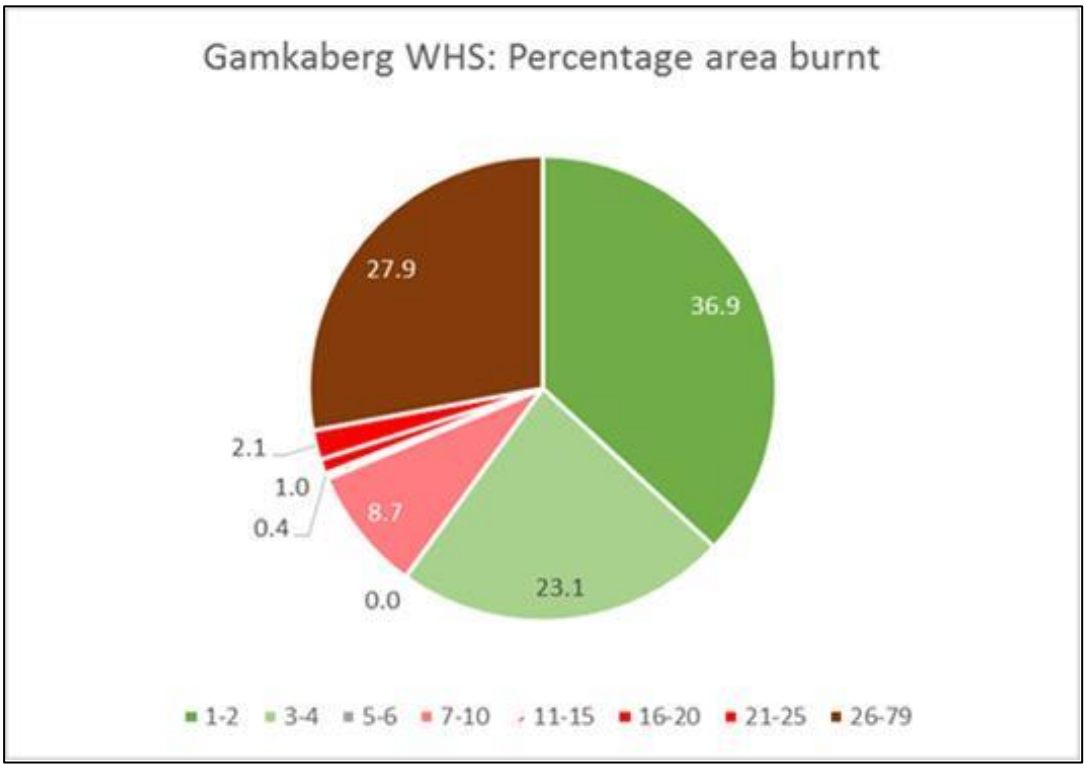

Figure 9. Veld age of Gamkaberg WHS and Nature Reserve Complex.

From this analysis, it can be seen that young veld dominates the landscape and it is imperative that fires in veld younger than the thresholds must be managed aggressively and fires must be extinguished as soon as possible. All relevant CapeNature staff must be aware of this strategy and manage accordingly.

Jakkalsdans NR will therefore aim to reduce / avoid the spread of fires into unwanted areas and as far as possible minimize accidental/deliberate fires within the reserve and allow for natural fire processes to occur without negatively impacting on safety and infrastructure. See figure 10 for veld age map.

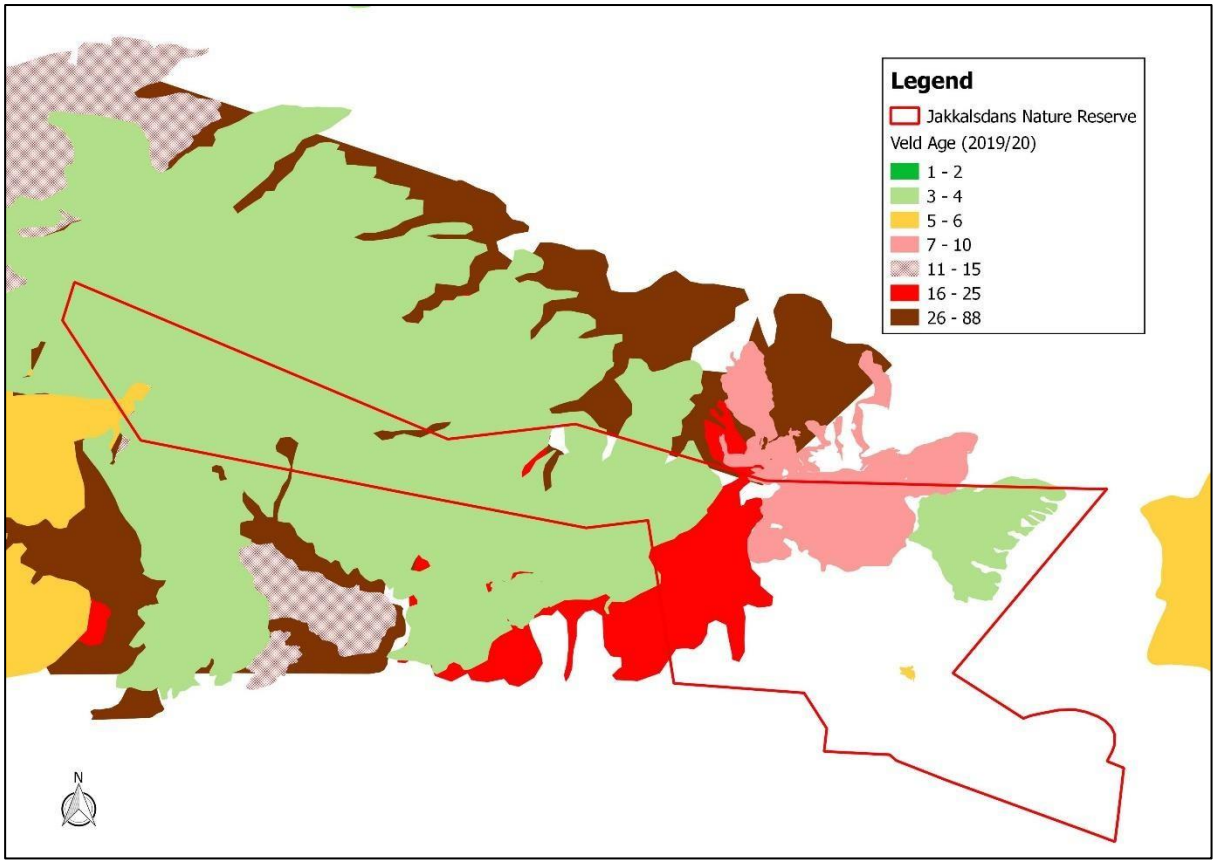

Figure 10. Veld Age map of Jakkalsdans Nature Reserve.

3.4.8 Alien Invasive Management

Only a few species (*) listed as invasive alien plant species have been recorded on Jakkalsdans in very low densities (less than 0.01%). All other invasive plant species are confined to the Gouritz River. See Table 3 for the list of invasive plant species.

Table 3. Invasive alien plant species on Jakkalsdans Nature Reserve.

Scientific name	Vernacular name	Family	Category (NEMBA AIS Regulations)	Density
Eucalyptus spp.	Bluegums/Bloekom	Myrtaceae	Category 1b	Less than 0.01%
**Hakea sericea*	Silky Hakea/Syerige hakea	Proteaceae	Category 1b	Less than 0.01%
Nicotiana glauca	Wild Tobacco/Wildetabak	Solanaceae	Category 1b	Less than 0.01%
**Opuntia ficus- indica*	Prickly pear/Turksvy	Cactaceae	Category 1 b	Less than 0.01%
Nerium oleander	Oleander/Selonsroos	Apocynaceae	Category 1b	Medium
Tamarix spp.	Pink Tamarisk/ Perstamariske	Tamaricaceae	Category 1b	Medium
Alhagi maurorum	Camel thorn bush/ Kameeldoringbos	Fabaceae	Category 1b	Medium
Arundo donax	Spanish Reed/ Spaanse riet	Poaceae	Category 1b	Low
Datura stramonium	Downy thorn-apple/ Gewone stinkblaar	Solanaceae	Category 1b	Low
Agave americana	Century plant/ Garingboom	Asperagaceae	Category 3	Low
Xanthium sp	Spiny cocklebur/ Boetebossie	Asteraceae	Category 1b	Low
Ricinus communis	Caster-oil plant/ Kasterolieboom	Euphorbiaceae	Category 2	Low

The management intervention required at this stage is the monitoring of the veld, especially after fires, to check for any new or additional alien vegetation species that may occur. No attempt will be made to irradicate the invasive species in the river below the highwater mark. Periodical flooding will remove most of the species during such an event.

The scattered alien vegetation is being eradicated by Gamkaberg WHS & NR management, according to a management clearing unit plan. Funding is obtained through the DEFF (NRM) programme as well as the CapeNature Integrated Catchment Management project. CapeNature can also assist Stewardship sites with gaining access to funding for AVM from the Table Mountain Fund (TMF) which is administered by Conservation at Work.

3.4.9 Mammalian fauna

Large mammals have largely been absent from fynbos for almost two centuries and we can only speculate as to their effects on the vegetation. Fynbos, however, has evolved with animals and is reliant on them for its fundamental processes such as pollination and dispersal.

According to the CapeNature State of Biodiversity Database a total of 66 indigenous terrestrial mammal species have been recorded for the adjacent Gamkaberg WHS & NR complex, based on specimen and observation records. These range from the tiny pygmy mouse (*Mus minutoides*) to the eland (*Taurotragus oryx*). The likelihood of these species also occurring on Jakkalsdans is very good. A number of small antelope species such as common duiker (*Sylvicapra grimmia grimmia*), steenbok (*Raphicerus campestris*), klipspringer (*Oreotragus oreotragus*), Cape grysbok (*Raphicerus melanotis*) and grey rhebok (*Pelea capreolus*) should occur on the reserve. Small rodents, insectivores and bat species should also occur on the reserve (Barry et al.2015).

Various predators including the Cape leopard (*Panthera pardus*), caracal (*Caracal caracal*) and black-backed jackal (*Canis mesomelas*) are also present on the reserve and the surrounding area. Mammal Species list for QDS 3321CB is included in Appendix C.

3.4.10 Avifauna

The upper part of the reserve falls within the area identified for nectarivore processes. A number of bird habitats occur within the reserve including mountain fynbos, succulent karoo and subtropical thicket. Adjacent Gamkaberg Nature Reserve Complex has recorded 179 species of birds. Most of the birds occurring there, should be present on Jakkalsdans NR.

Twelve of the species recorded in the Gamkaberg Nature Reserve Complex are listed threatened species. Some of the species (e.g. Ludwig's Bustard (*Neotis ludwigii*) and Secretarybird (*Sagittarius serpentarius*) are irregular visitors to the area. Bird Species list for QDS 3321CB is included in Appendix C.

3.4.11 Herpetofauna (reptiles and amphibians)

There are 46 reptile species recorded for the adjacent Gamkaberg Nature Reserve Complex. Only one, the Namaqua plated lizard (*Gerrhosaurus typicus*) is considered 'Rare' according to Branch (1988). The revised threat status for reptiles is yet to be published (Barry et al. 2015).

There are seven amphibian species recorded for the Gamkaberg Nature Reserve Complex. None of these are listed as Threatened (Minter et al. 2004). The amphibian species list for the area is updated through baseline data collection and input from research and data is submitted to the CapeNature State of Biodiversity database (Barry et al. 2015). Herpetofauna Species list for QDS 3321CB is included in Appendix C.

3.4.12 Invertebrates

The identification and collection of invertebrate species on the reserve has not yet taken place. It is assumed that most of the species that has been recorded on Rooiberg by CapeNature, will also be present on Jakkalsdans NR. Invertebrate Species list for QDS 3321CB is included in Appendix C.

3.4 Cultural Heritage context of Jakkalsdans Nature Reserve

The Vanwyksdorp area is rich in archaeological, paleontological and cultural history. Various rock art, Stone Age tool, grave and fossil sites are found throughout area.

3.5 Socio- economic context

Jakkalsdans is situated in the Garden Route District Municipality and Kannaland Local Municipality. The closest town is Vanwyksdorp, one of Garden Route District Municipality's poverty nodes. There are very high levels of unemployment in the area, and very limited development. Work opportunities are created through various projects managed by CapeNature. These include the Working for Water alien vegetation management and Integrated Catchment Management fire break maintenance projects. The Gouritz Cluster Biosphere Reserve also implements the Jobs4Carbon project that has resulted in the upliftment of livelihoods in

Vanwyksdorp. Although these projects only provide temporary work opportunities, they also contribute to contractor and skills development.

The Garden Route District currently has a population of 622 664, meaning it is the Third most populous municipal district in the Cape, after the Cape Winelands' and City of Cape Town. The total population is estimated to increase to 643 134 by 2023 which equates to 0.8 per cent average annual growth. In 2017, the Garden Route District economy was dominated by finance, insurance, real estate and business services (R10.733 billion; 24.9 per cent), wholesale and retail trade, catering and accommodation (R7.811 billion; 18.1 per cent) and manufacturing sectors (R6.312 billion; 14.6 per cent). Combined, these top three sectors contributed R24.856 billion (or 57.6 per cent) to the Garden Route District's economy, estimated to be worth R43.153 billion in 2017.

The wholesale and retail trade, catering and accommodation sector contributed the most jobs to the area in 2017 (55 985; 24.7 per cent), followed by the finance, insurance, real estate and business services sector (39 233; 17.3 per cent) and the community, social and personal services (35 255; 15.5 per cent) sector. Combined, these three sectors contributed 130 473 or 57.5 per cent of the 226 789 jobs in 2017. The unemployment rate in the Garden Route District has been rising steadily since 2015, falling back slightly to 15.2 per cent in 2018. This is slightly lower than the Provincial rate of 17.7 per cent.

Unemployment remains a key challenge for the Garden Route District area, with rising population numbers. Income inequality in the Garden Route District has worsened between 2012 and 2018, with the gini coefficient increasing from 0.585 in 2012 to 0.614 in 2018. There are 140 informal settlements in the District, together amounting to 15% of all households and the housing waiting list amounts to 65 000 households. Roughly, 80% of the district's population lives in urban areas along the coast.

4 ZONATION PLAN

The purpose of the zonation of Jakkalsdans is to control the intensity and type of use within it, in efforts to ensure the main goal of biodiversity conservation is met. On this basis, within some zones, the permissible intensity of use will be relatively higher than in others.

Figure 11 below indicates the on Jakkalsdans NR. A small section between the Natural Resource Access (used for grazing) and the Nature Access zone is zoned for development. The majority of Jakkalsdans NR is zoned as Primitive and Nature Access.

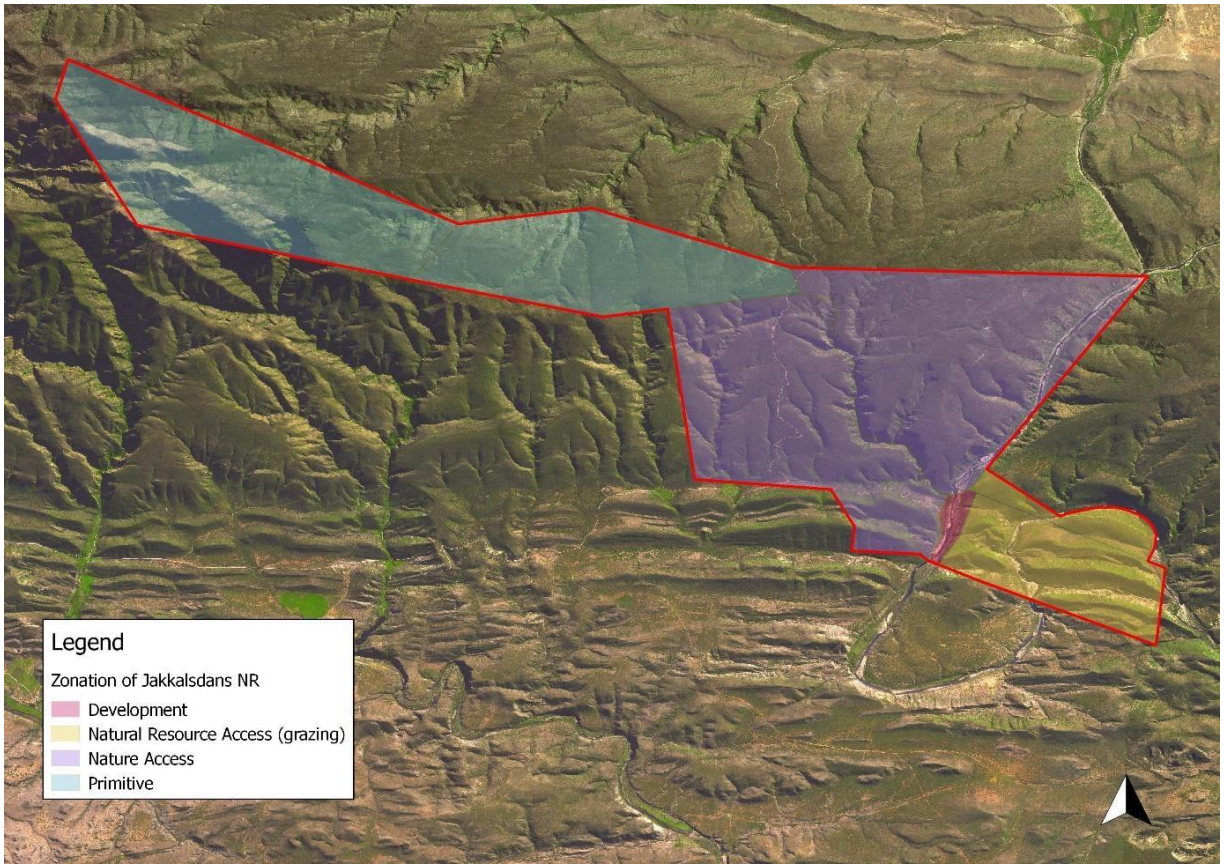

Figure 11. Zonation map of Jakkalsdans Nature Reserve.

Table 4. Conceptual development guidelines

Zone	Zone Objective	Characteristics	Visitor Activities	Facilities / Infrastructure	Visitor Access	Management Guidelines
Primitive	***Conservation:*** To limit visitor use, numbers and infrastructure to minimise impact in sensitive environments. To reduce need for management of users and visitor impacts. Allows for minimal or more intensive biodiversity management intervention. *Include extensive areas of sensitive or threatened habitats & species in this low use zone when sites do not meet the criteria for wilderness* ***Users:*** To provide an experience of solitude in natural landscapes with little nearby evidence of human presence. Can provide access to and buffer Wilderness Zones	Intrinsically wild appearance & character. Areas where users will seldom encounter other human groups or presence. Any visible human impact or infrastructure inside the zone is unobtrusive. Human activities outside zone may be audible or visible in places. Areas remote from management centres, or otherwise difficult or expensive to access for management. Areas that might not meet the criteria for Wilderness but can serve as undeveloped visual buffers for Wilderness. Areas that may have natural burning regimes, with no active fire management and road/firebreak infrastructure OR areas that require active fire management to stay within thresholds of concern.	Guided or unguided nature observation Primarily intended for hiking or walking access. Only allows for 4x4 routes and if specifically considered and noted. Only allows for non-hiking accommodation node if specifically considered and noted.	Deviation from the natural and/or pristine state to be minimised[2] No visible infrastructure in Wilderness viewsheds. May provide isolated, small, unobtrusive accommodation facilities for up to 16 guests on restricted footprints, particularly for overnight hiking trails. May have defined or beaconed hiking routes, management access roads, tracks and firebreaks. Roads for visitor use may only be existing roads or new routes that also allow access for essential management needs. All roads, tracks or trails should be located and constructed to reduce maintenance, visibility and erosion. Where unsurfaced tracks will result in erosion, use double concrete strip or interlocking pavers to stablise. Re-route unstable or erosion-prone road sections if this will lower long-term visual and environmental impact. Avoid full width tarred or surfaced roads or roads and tracks wider than required for a single vehicle.[3]	Visitor access only by permit. Control of visitor numbers, frequency and group sizes to meet zone objectives. Only users of facilities/activities will access to this zone. Defined or non-defined hiking and day trail routes On foot always, or by bicycle, 2x4 or 4x4 vehicle on designated routes. --- No access without zone permit	***Visitor Management:*** Manage to conserve natural and cultural resources, ecological processes and wild appearance & character. Restrict numbers of visitors and allow for no-use rest periods if required. All facilities will be small, very basic, self-catering and distributed to avoid contact between users There should be limited if any interaction between groups Since visitor use usually cannot be intensively managed, re-route trails away from any areas with sensitive local habitats or plant and animal species. Trail layout, design and construction must reduce maintenance requirements. Visible & audible human impacts from adjacent zones should be mitigated ***Conservation Management:*** Habitats with lower or higher management requirements. May be natural burning zones. Prevent or restore visible trampling or any other visitor impact. Rehabilitate non-useful roads to natural vegetation. ***Consumptive Use:*** Sustainable use can be appropriate under controlled circumstances subject to a formal assessment and applicatoin in accordance with CapeNature policies.

[2] CapeNature should embark on a work shopping exercise to determine more explicit thresholds for development, including road infrastructure in this and other zones. Until this time, take a precautionary approach to maintain the zone objective and characteristics.

3 But do consider the safety requirements for access of more than one vehicle at a time for fire-fighting or rescue operations. Where a dedicated escape route might be required for tourism infrastructure, consider whether the additional road impact now or in the future is warranted.

Zone	Zone Objective	Characteristics	Visitor Activities	Facilities / Infrastructure	Visitor Access	Management Guidelines
Nature Access	***Conservation:*** To manage and direct visitor use, and plan infrastructure to minimise impact on sensitive environments. To actively manage users and visitor impacts. Allows for minimal or more intensive biodivesrity management intervention. *Provide additional protection to sensitive or threatened habitats, species or other features by Special Management Overlays* ***Users:*** To provide easy access to natural landscapes with low expectation of solitude at all times. Can buffer wilderness or Primitive Zone.	Areas with extensive lower senstivity habitats: Areas able to accommodate higher numbers of visitors regularly, with no identified sensitive or regionally rare biodiversity. Extensive areas able to accommodate roads, trails and tracks without high risk of erosion and degradation. Areas accessible for regular management of roads and trails Areas where roads and trail infrastructure can be located with low visibility from the surrounding landscape, particularly from adjacent Primitive or Wilderness Zones. Usually areas that require active fire management with firebreaks to stay within thresholds of concern, but may also include natural burning regimes.	Guided or unguided nature observation. Day hiking trails and/or short trails. Bird hides, canoeing, mountain biking & rock-climbing where appropriate. Other activities if specifically considered and approved as part of specific reserve zoning scheme. Motorised 2x4 self-drive access on designated routes. No accommodation or camping. Frequent interaction with other users.	Some deviation from natural/pristine state allowed particularly on less sensitive or already disturbed/transformed sites. No accommodation; but ablution facilities may be provided. May have defined or beaconed hiking routes, tourism and management access roads, and management tracks and firebreaks. Infrastructure should be designed to reduce impacts of higher visitor numbers. Roads open to the public should be accessible by 2x4 sedan. Full width tarred or surfaced roads or roads and tracks to accommodate two vehicles are appropriate. Unsurfaced roads may be surfaced if a road planning exercise has confirmed that the location is suitable.	No special access control or permits required for this zone. Will cater for larger number of visitors than primitive zone Vehicle access on dedicated routes, with pedestrian access from parking areas or adjacent Development Zones. On water – only non-motorised crafts allowed	***Visitor Management:*** More frequent monitoring of these areas are necessary to prevent damage or degradation. More frequent footpath maintenance must be scheduled for busy routes, with particular attention paid to use of railings or other access control to prevent damage to sensitive areas. Unless visitor access can definitely be intensively guided and managed, re-route trails away from any sensitive local habitats or plant and animal species. Trail layout, design and construction must be specified to reduce maintenance requirements under higher use. Visible & audible human impacts to adjacent Primitive or Wilderness Zones should be mitigated ***Conservation Management:*** Habitats with lower or higher management requirements. May be natural burning zones. Prevent or restore visible trampling or any other visitor impact. Rehabilitate non-useful roads to natural vegetation. ***Consumptive Use:*** Sustainable use may be appropriate subject to a formal assessment and applicatoin in accordance with CapeNature policies.

Zone	Zone Objective	Characteristics	Visitor Activities	Facilities / Infrastructure	Visitor Access	Management Guidelines
Development – Low Intensity	***Conservation:*** To locate the zone and infrastructure to minimise impact on sensitive environments. To actively manage users and visitor impacts on adjacent sensitive areas. *Provide additional protection to sensitive or threatened habitats, species or other features by Special Management Overlays* ***Users:*** To provide access to adjacent natural landscapes with little expectation of solitude. To provide primarily self-catering accommodation or camping. Can provide for Environmental Education accommodation and access into surrounding landscapes.	Areas with extensive degraded or transformed footprints. Natural or semi-natural habitats only when use of these areas is essential to minimise infrastructure/use impacts over whole reserve. Areas able to accommodate high numbers of visitors regularly, with no identified sensitive or regionally rare biodiversity. Areas able to accommodate roads, trails and accommodation infrastructure without risk of erosion or degradation. Areas easily accessible from reserve management centre. Areas where risk of fire damage to infrastructure is low or can be mitigated without unacceptable impacts on surrounding environment. Areas not visible from Primitive or Wilderness Zones. Areas where new infrastructure can be located with low visibility from the surrounding landscape. Areas with available potable water, and not sensitive to disposal of treated wastewater via soak away.	Picnicking. Walking or bicycle access into adjacent areas. Self-catering accommodation and camping. Meeting, workshops or mini-conference activities for no more than the number of people that can be accommodated overnight in the zone. Can provide for Environmental Education accommodation and access into surrounding landscapes, but this must be carefully planned not to conflict with visitor use.	Reception offices. Self-catering accommodation and camping for up to 100 guests in total at any time[4] No more than 6-8 beds per unit. Single small lodges for up to 30 guests are permissible if all facilities are contained in a compact footprint, this represents the total accommodation for the zone, and any restaurant or catering facilities are for overnight guests only. If possible roads should be narrow with separate incoming and outgoing routes, otherwise double vehicle width roads are strongly advisable for safety and usability. Roads in this zone should be surfaced wherever possible to reduce management cost and environmental impacts. Development and infrastructure may take up a significant proportion of the zone, but planning should ensure that area still provides relatively natural outdoor experience.	Motorised self-drive 2x4 sedan car access. Tour bus access Parking areas This zone should be used to provide parking and walk-in access for day visitors to adjacent Nature Access zone if possible.	***Visitor Management:*** Use built and infrastructure solutions to such as railings, hard surfacing and boardwalks to manage undesirable visitor impacts. Accept some impact on natural habitats in this zone unless these are specifically addressed in a Special Management Overlay. Frequent footpath and road maintenance must be scheduled for high impact routes. Visible impacts to adjacent Zones should be mitigated ***Conservation Management:*** Provide access and generate revenue. Management should aim to mitigate the impacts of the high number of visitors. L largely transformed habitats with lower management requirements. Usually fire exclusion areas. Prevent or restore visible trampling or any other visitor impact. Plan for a compact overall development footprint, avoiding dispersed infrastructure that will increase fire risk and/or environmental footprint. This is most critical in fire-prone environments. ***Consumptive Use:*** Sustainable use may be appropriate subject to a formal assessment and applicatoin in accordance with CapeNature policies.

[4] Although this sounds high this is still in line with many CapeNature sites that would fall within this zone definition and e.g. configured as 10 x 4-sleeper self-catering units and 15 campsites this seems completely reasonable.

Table 5. Special Management overlays

Special Management overlays	Objective of zone	Characteristics	Type of Activities	Facilities / Infrastructure	Type of Access	Management Guidelines
Cultural Feature protection	Protection of localised identified important Cultural Feature	Could overlap any other zone, Permanent, temporary or temporal zone to manage important cultural or heritage features	Specific activities dependent on ability to manage activity and feature in question.	Usually none, but specific infrastructure dependent on feature in question.	Specific access dependent on ability to manage access and feature in question.	Feature specific – as required
Species/Habitat protection	Protection of localised identified important Biodiversity Feature	Could overlap any other zone, Permanent, temporary or temporal zone to manage important cultural or heritage features	Specific activities dependent on ability to manage activity and feature in question.	Usually none, but specific infrastructure dependent on feature in question.	Specific access dependent on ability to manage access and feature in question.	Feature specific – as required
Visual protection	Protection of localised sensitive viewsheds and particularly for Wilderness Zone viewsheds	Sensitive viewsheds and particularly for areas within Wilderness Zone viewsheds	Specific activities dependent on ability to manage activity and feature in question.	No roads, firebreaks or buildings. No visible infrastructure Trails may be appropriate	Walking access is likely to be appropriate	Feature specific – as required
Natural Resource Access Grazing of goats	Access to identified sustainable consumptive use resources as per resource management plant	Areas with identified natural resources formally assessed as not sensitive to harvesting and provided with a sustainable harvesting plan.	Harvesting of identified resources	None	Specific access dependent on the features in question.	Feature specific – as required
Rehabilitation		This should fall under specific management objectivesfor any zone.				

Research is permissible in all zones, except Species/Habitat protection or Cultural Protection where it may be considered on a case by case basis. Research that requires extensive destructive harvesting, or manipulation of more than a few square meters of habitat should not be considered in any of the Protection overlays, except where research outputs are considered essential for management of that ecosystem research cannot be done at an equivalent site elsewhere, and research results are certain to contribute substantially to management objective

5 ADMINISTRATIVE STRUCTURE

The Jakkalsdans Trust is appointed as the management authority for the Nature Reserve as agreed to in the Management Agreement concluded between CapeNature and the Jakkalsdans Trust.

Where applicable, Management decisions are made collaboratively between the Management Authority and CapeNature.

The role of the conservation agency, CapeNature, is to provide support, advice and assist with the implementation of the management plan of the Nature Reserve as agreed upon.

CapeNature is also responsible for conducting an annual audit as well as a Management Effective Tracking Tool (METT) evaluation of the Nature Reserve and assisting with the update of the Management Plan accordingly.

6 OPERATIONAL MANAGEMENT FRAMEWORK

This section translates the strategic framework described in Section 2 above into Key Deliverables and Management Activities, which will be used to inform annual plans of operation and the resources required to implement them. The management targets will form the basis for monitoring of performance in implementing the plan and are thus measurable.

6.1 Biodiversity management

6.1.1 Fire management

Fire plays an important role in southern African ecology, and has important effects on vegetation composition, primary productivity and nutrient cycling. In developing a fire management strategy for the site, the following guiding principles should be adhered to:

- Burning should be undertaken in such a way that it maintains spatial and temporal heterogeneity within the landscape.
- A patch mosaic of burnt and un-burnt areas should be maintained.
- The burning of areas should be undertaken in such a way that promotes patchy burns (i.e. within the block being burnt, some patches will remain un-burnt rather than aiming for a complete burn).
- Burning must be undertaken with consideration of the biodiversity conservation requirements of the site and the need to protect rare and endangered species.
- Burning and fire management must be undertaken in a safe manner that is legally compliant with the National Veld and Forest Fire Act (No.101 of 1998).

Jakkalsdans Nature Reserve will maintain an adaptive interference strategy until a healthier veld age mosaic is achieved, in partnership with the local FMU, FPA and Gamkaberg Nature Reserve Complex.

That entails the reducing / avoidance of the spread of fires across the reserve borders and minimize accidental/deliberate fires within the reserves and to allow for natural fire processes to occur without negatively impacting on safety and infrastructure.

Note:

- All efforts will be made to keep fires to a minimum size.
- All fire will be suppressed immediately unless agreed otherwise by the Incident Management Team or Unified Command

Table 6.1 Operational Management Framework: Fire management

FIRE MANAGEMENT			
Objectives	• To ensure conservation of species and processes by maintaining and improving ecosystem functioning. • To implement effective Integrated Catchment management. • To allow for natural fire processes to occur without impacting on safety and infrastructure. • To implement an adaptive interference strategy where fires are kept to a minimum size in order to achieve a healthier veld mosaic.		
Key Deliverables	**Management Activities**	**Responsibility**	**Timeframe**
Reduce/Prevent the Spread of Fires.	- Construct Priority Firebreaks according to Schedule. - Negotiate Firebreak Agreement with Neighbours. - Fuel Reduction around Infrastructure to minimise risk. - Mapping of all Fires and Capture on GIS. - If a fire occurs on the Jakkalsdans property CapeNature and the FPA will assist in containing the fire so that it does not spread into any unwanted areas.	Management Authority, CapeNature & FPA	Annually
Maintain Partnerships to Improve Fire Management.	- Join FPA and attend Local FMU Meetings when available. - Maintain Firebreak Agreements with neighbours if applicable.	Management Authority	Annually
Reduce Wildfires due to Human Negligence.	- Create Fire Awareness for visitors - Eradication and Control of Alien Vegetation infestations where necessary (see AVM management)	Management Authority	Annually

6.1.2 Invasive vegetation management

A listed invasive species means any species, which is listed in terms of section 70 of the Biodiversity Act, whose establishment and spread occurs outside of its natural distribution range. In undertaking invasive plant control, the following guiding principles will be adhered to:

3.5.9.1 Invasive plant control will require an ongoing programme that prioritises key infestations along water courses, drainage lines and upper catchment areas.

3.5.9.2 Initial clearing efforts should focus on containing infestations that are most likely to spread into new areas.

3.5.9.3 All follow-up requirements must be strictly adhered to otherwise the problem will be exacerbated.

3.5.9.4 Strategic partnerships and poverty relief programmes such as the Working for Water programme should be utilised.

Table 6.2 Alien Species, Density and Age on Jakkalsdans Nature Reserve

Man Comp	Dom Spec	Dom Den	Dom Age	Sec Species	Sec Den	Sec Age	Other Species	Other Den	Other Age
JD01	Hakea sericia	0.01	Y	None	-	-	None	-	-
JD02	Hakea sericia	0.5	Y	Pinus halepensis	0.01	Y	None	-	-
JD03	Hakea sericia	0.02	Y	Pinus halepensis	0.01	Y	None	-	-
JD04	Hakea sericia	0.01	A	Pinus halepensis	0.01	A	Opuntia ficus-indica	0.01	A
JD05	Hakea sericia	0.02	Y	Pinus halepensis	0.01	Y	None	-	-
JD06	Hakea sericia	0.02	Y	Pinus halepensis	0.01	Y	Opuntia ficus-indica	0.01	A
JD07	Hakea sericia	0.01	Y	Opuntia ficus-indica	0.01	Y	None	-	-
JD08	Hakea sericia	0.01	A	Eucalyptus cladocalyx	0.01	A	Opuntia ficus-indica Nerium oleander	0.01 tbc	A tbc
JD09	Opuntia ficus-indica	0.01	Y	Nerium oleander	tbc	tbc	None	-	-
JD10	Opuntia ficus-indica	0.01	Y	None	-	-	Nerium oleander	tbc	tbc
JD11	Opuntia ficus-indica	0.02	Y	Arundu donax	0.01	Y	Nerium oleander	tbc	tbc

JD12	Opuntia ficus-indica	0.02	Y	Arundo donax	0.01	Y	Nerium oleander	tbc	tbc
River course	Nerium oleander	0.02	A	Arundo donax	1.00	A	Tammarix ramosissima	0.51	A

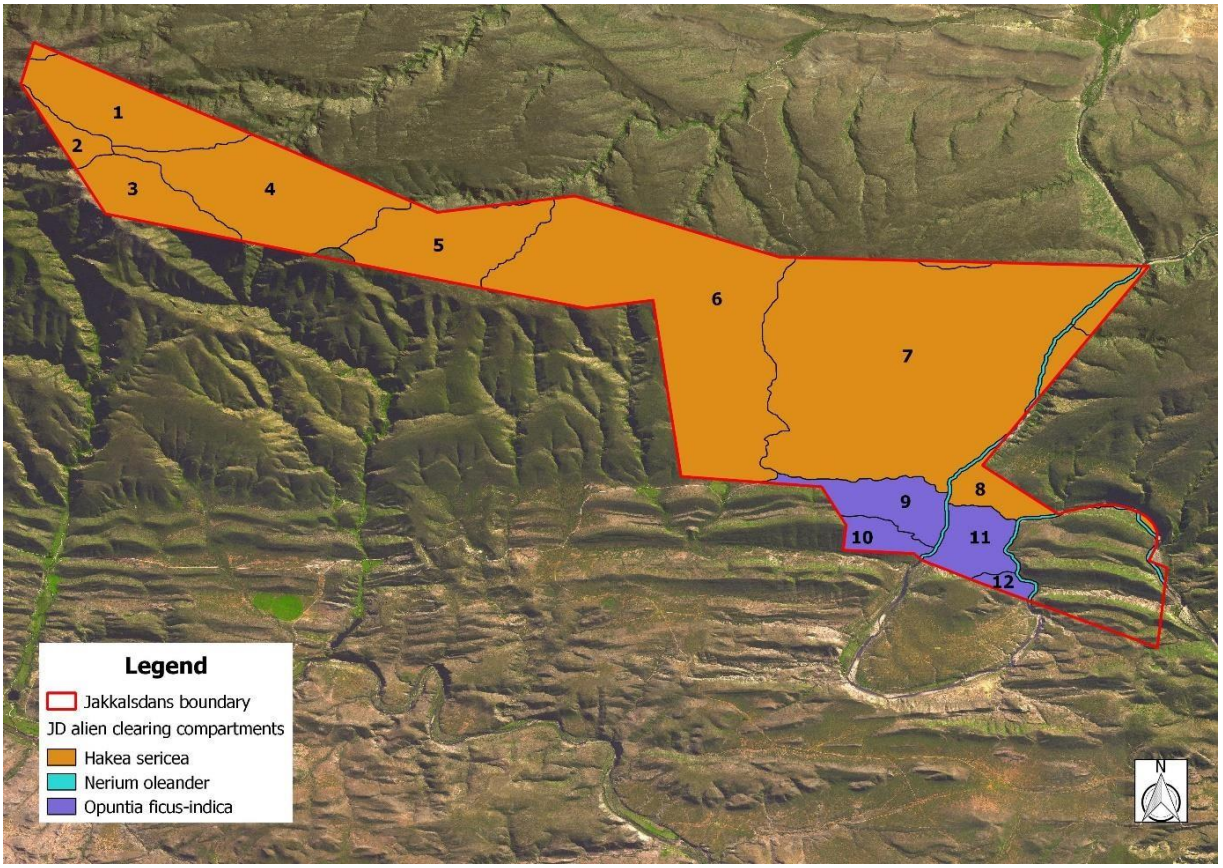

Figure 12. Invasive Vegetation Management Map and alien clearing compartments (1- 13) for Jakkalsdans Nature Reserve

Table 6.3 Operational management framework: Invasive vegetation management

INVASIVE VEGETATION MANAGEMENT			
Objectives	· To enhance biodiversity protection and conservation. · To ensure conservation of species and processes by maintaining and improving ecosystem functioning. · To implement effective Integrated Catchment Management.		
Key Deliverables	**Management Activities**	**Responsibility**	**Timeframe**
Eradicate Alien and Invasive Species	- Draw up an Alien Vegetation Management plan with CapeNature input. - Implementation of alien vegetation management schedule. - Opportunistic removal of scattered alien plants (Hakea and Pine). - Apply for funding from TMF (Conservation at Work) to carry out AVM tasks.	Management Authority, CapeNature	Ongoing
Prevent Further Introduction of Aliens	- Ensure surrounding landowners are aware of Relevant Legislation.	Management Authority, CapeNature	Ongoing

6.1.3 Wildlife Management

To promote the conservation of indigenous fauna as an important component contributing to and maintaining ecosystem functioning.

Small antelope (Cape Grysbok, Common (Grey) Duiker, Steenbok and Grey Rhebok) occur naturally in the area, and move freely between farms. Since 2004 kudu have made a reappearance in the area and are now fairly common. Gemsbok have also moved onto the property from introductions on the neighbouring farms. There is currently no need to manage these populations but there is a risk of attracting illegal hunters.

6.1.3.1 Reintroduction of Game

Before reintroduction the following points need to be considered:

- Was the desired species naturally resident in the area?
- Why did the animal become extinct in the area?
- Is that causal factor still a threat?
- Is the habitat still suitable for the species?
- What are the potential negative effects of the reintroduction?
- Where is the nearest existing population?

Commission a reintroduction policy and plan for species that used to occur in the area and the suitable carrying capacities. Investigate the potential for reintroductions, specifically small game, which may have previously occurred naturally in the area. Herbivores are essential for biodiversity and ecosystem processes to persist.

The careful reintroduction of species can enhance the conservation value of the area and increase the marketability of the Nature Reserve. All reintroductions must be based on sound ecological principles. CapeNature must be consulted on the translocation and reintroduction of all fauna.

Table 6.4 Operational management framework: Wildlife management

WILDLIFE MANAGEMENT			
Objectives	· To enhance biodiversity protection and conservation. · To ensure conservation of species and processes by maintaining and improving ecosystem functioning. · To implement effective Integrated Catchment Management.		
Key Deliverables	**Management Activities**	**Responsibility**	**Timeframe**
Prevent the introduction of alien species	- Formulate guidelines regarding Domestic Animals in the Reserve. - No introduction of alien fish species into river systems. - Consult CapeNature regarding the introduction of any wildlife onto the reserve.	CapeNature	Ongoing
Control Alien and Invasive Species	- Identify the Occurrence of Alien Fauna on Nature Reserve. - Implement Control Measures where appropriate. - Measure Success of Control Methods utilised.	Management Authority / CapeNature	Ongoing
Manage the introduction of fauna on the Reserve. (Specifically the grazing of Goats by A Britz)	A Britz has an agreement with the owner to graze goats in certain sectors (JD8, 11 and 12). The agreement stipulates that a maximum of 400 goats may be grazed for a period of 2 months. No predators may be hunted non-lethal predator control regarding the protection of domestic stock must be practiced.	Management Authority	ongoing

6.1.4 Erosion Prevention and Control

In addressing soil erosion, the following guiding principles should be adhered to:

- Areas impacted by soil erosion should be stabilised and re-vegetated with indigenous plant species to prevent the spread of listed invasive plant species.
- Areas susceptible to soil erosion or showing early signs of soil erosion such as loss of vegetation cover, must be managed to prevent soil erosion.

Table 6.5 Operational management framework: Erosion prevention and control

EROSION PREVENTION AND CONTROL			
Objectives	• To stabilise and re-vegetate degraded/eroded veld with indigenous plant species. • To prevent soil erosion where vegetation cover was lost. • To identify and manage sites showing early signs of soil erosion.		
Key Deliverables	**Management Activities**	**Responsibility**	**Timeframe**
Prevent and Mitigate Soil Erosion	- Monitor the veld for potential erosion sites. - Monitor entrance road for potential erosion. - Maintenance of road for high clearance 4x4 vehicles. - Pitting can be used as a restoration method if required in degraded arid veld. - Map areas of concern.	Management Authority CapeNature	Ongoing

6.1.5 Monitoring and Baseline Data Collection

Information on the locality of Rare, Endangered and Endemic species is necessary to ensure effective management and monitoring of populations. This objective aims to improve the biological knowledge base through the implementation and promotion of effective baseline data collection and research opportunities.

Table 6.6 Operational management framework: Monitoring and baseline data collection

MONITORING AND BASELINE DATA COLLECTION			
Objectives	· To manage biodiversity knowledge to ensure effective conservation management. · To implement measures to ensure resilience and persistence of biodiversity in light of climate change. · To ensure the implementation of effective conservation management interventions. · To ensure conservation of species and processes by maintaining and improving ecosystem functioning.		
Key Deliverables	**Management Activities**	**Responsibility**	**Timeframe**
Create a Biodiversity Resource Inventory	Ad hoc updating of species lists and recording of sightings.	Management Authority/CN	Annually

6.1.6 Biodiversity and security

Develop an integrated security strategy for the Nature Reserve. Access to the Nature Reserve needs to be controlled and conditions of entry for visitors into the Nature Reserve should be clearly stipulated on signboards at access points.

Table 6.7 Operational management framework: Biodiversity and security

BIODIVERSITY SECURITY			
Objectives	· To enhance biodiversity protection and conservation. · To ensure conservation of species and processes by maintaining and improving ecosystem functioning.		
Key Deliverables	**Management Activities**	**Responsibility**	**Timeframe**
Improved security and safety of the biodiversity assets on the Nature Reserve	Ensure Notarial Deed with surveyor diagram and title deed restrictions are registered with the Notary and Surveyor General against the property.	Management Authority/CapeNature	Once off
	Ensure Conservation Area is rezoned to appropriate conservation zoning, e.g. Open Space III. Conservation Area is rezoned to appropriate conservation zoning, e.g. Open Space III.	Management Authority	Once off
	Ensure appropriate signage at access points.	Management Authority/CapeNature	Once off

6.2 Tourism development

In developing tourism within the biodiversity stewardship site, the following guiding principles should be adhered to:

- Tourism products must be appropriate to the site's values and must not threaten its biodiversity or ecological function.
- In developing tourism products, requirements for environmental authorisation must be considered and adhered to.
- Tourism products should be designed to capitalise on the unique beauty and biodiversity features of the site.

- Tourism products should be developed in response to tourism market demands and opportunities within the site and should be carefully assessed to determine their viability.

Table 6.8 Operational management framework: Tourism development

TOURISM DEVELOPMENT			
Objectives	· To evaluate potential tourism opportunities. · To implement effective management systems. · To ensure legal compliance and implementation of authorised development plans.		
Key Deliverables	**Management Activities**	**Responsibility**	**Timeframe**
Development of appropriate and sustainable tourism opportunities that generate revenue for the Nature Reserve following the correct process.	- Planning and development of hiking routes, mountain bike trails, and basic facilities to cater for visitors to the nature Reserve. - Development of a business plan for tourism accommodation facilities. - Development according to approved Zonation for Tourism Activities	Management Authority	As required

6.3 Operational Management

6.3.1 Legal Compliance

Through the landowners of the biodiversity stewardship site, the management authority has been mandated to enforce laws related to the conservation of the site, which prohibit activities. In fulfilling this role, the managers of Jakkalsdans will adhere to the following guiding principles:

- Law enforcement efforts should be coordinated with the relevant authorities including CapeNature and the South African Police Service in addressing offences and breaches of the law.
- Law enforcement at the site will be undertaken through surveillance, monitoring and appropriate reaction in the event of an offence.

Table 6.9 Operational management framework: Legal compliance

LEGAL COMPLIANCE			
Objectives	To ensure legal compliance with all relevant legislation and policies.		
Key Deliverable	**Management Activities**	**Responsibility**	**Timeframe**
Ensure that all legal requirements are met.	- All development needs to be done according to the NEMA principles and follow the applicable legislation and procedures of all relevant stakeholders. - All water management within the Reserve must comply with the National Water Act (No 36 of 1998). - Abstraction of water from water sources originating in the Reserve must not affect the biodiversity of the Reserve	Management Authority	Ongoing

6.3.2 Management Effectiveness

Table 6.10 Operational management framework: Management effectiveness

MANAGEMENT EFFECTIVENESS			
Objectives	· To implement effective management systems.		
Key Deliverable	**Management Activities**	**Responsibility**	**Timeframe**
Annual audit completed. Auditing systems inform management	- Conduct annual audits and METT where applicable. - Implementation, annual review and update of management plan - Compile detailed Annual Plan of Operation identifying specific targets for achieving management objectives.	Management Authority/ CapeNature	Annually

6.3.3 Infrastructure development and management

In order for Jakkalsdans to operate appropriately, adequate infrastructure needs to be developed and maintained both for management and tourism purposes. In addressing infrastructure needs at the site, the following guiding principles will be adhered to:

- Infrastructure must be maintained to avoid any damage to the environment and ensure the safety of staff and visitors to the site.
- Infrastructure must be provided to ensure the effective management and operation of the nature reserve. There is only one access road into the reserve, leading to the private area.

Table 6.11 Operational management framework: Infrastructure development and management

INFRASTRUCTURE DEVELOPMENT AND MANAGEMENT			
Objectives	· To ensure the implementation of effective conservation management interventions. · To enhance biodiversity protection and conservation. · To ensure conservation of species and processes by maintaining and improving ecosystem functioning.		
Key Deliverable	**Management Activities**	**Responsibility**	**Timeframe**
All infrastructures on the Reserve are adequately maintained.	- Maintain facilities and infrastructure in a condition that meet relevant environmental, health and safety requirements. (Maintain fences and gates where necessary)	Management Authority	Ongoing

7 ANNUAL PLAN OF OPERATION AND REVIEW

Monitoring and reporting enable the effective assessment of management interventions. If necessary, it can be used to direct modifications of management to achieve the outcomes required.

7.1 Five-year Costing Plan

Below is an estimated breakdown of management costs for each management objective over a five-year period of this Strategic Management Plan. The figures listed below are realistic in-terms of the Management Authorities forecasted budget at the time of drafting this plan. The detailed budgets in the successive Annual Plans of Operation will override this costing estimate.

Table 7.1 Estimated annual management cost breakdown.

Management objectives	2025	2026	2027	2028	2029
1. Fire management	R 10 000	R 2 000	R 2 700	R 2 800	R 2 900
2. Invasive vegetation management	R 10 000	R 10 500	R 11 000	R 11 500	R 12 000
3. Wildlife management	R 500	R 550	R 600	R 650	R 700
4. Erosion prevention and control	R0	R0	R0	R0	R0
5. Research, monitoring and Baseline data collection	R 500	R 550	R 600	R 650	R 700
6. Tourism, Social development and Environmental Education	R0	R0	R0	R0	R0
7. Biodiversity security	R 1000	R 1 100	R 1 200	R 1 300	R 1 400
8. Management effectiveness	R0	R0	R0	R0	R0
9. Infrastructure management	R 6 000	R 7 000	R 7 000	R 8 000	R 8 000
Estimated Annual Management Cost:	R 27 000	R 22 300	R 23 100	R 24 900	R 25 700

7.2 Annual Plan of Operation

The Annual Plan of Operation (APO) (Appendix D) gives life to the Operational Management Framework on an annual basis and allows for progress to be tracked.

7.3 Management Plan Review

The purpose of undertaking an annual review of implementation of the protected area management plan will be to:

- Determine how effectively the management plan has been implemented.

- Assist in determining the focus for the annual plan of operation and the setting of appropriate time frames and budgets.
- Enable effective adaptive management by identifying changes and modifying management interventions.

The annual audit will form the basis of the management plan review. This should include records of recommendations for update/changes to the annual revision of the management schedules as well as the ten-year plan.

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LIST OF STATUTES TO WHICH THE JAKKALSDANS NATURE RESERVE IS SUBJECT

Biodiversity and Cultural Resource Management and Development:

- Animals Protection Act [No. 71 of 1962]
- Atmospheric Pollution Prevention Act [No. 45 of 1965]
- Conservation of Agricultural Resources Act [No. 43 of 1983]
- Constitution of the Republic of South Africa [No. 108 of 1996]
- Criminal Procedures Act [1977]
- Environment Conservation Act [No. 73 of 1989]
- Forest Act [No. 122 of 1984]
- Hazardous Substances Act [No. 15 of 1973]
- Western Cape Heritage Management Act [No. 10 of 1997]
- Western Cape Nature Conservation Management Act [No. 9 of 1997]
- National Environmental Management Act [No. 107 of 1998]
- National Environmental Management: Biodiversity Act [No. 10 of 2004]
- National Environmental Management: Protected Areas Act [No. 57 of 2003]
- National Forests Act [No. 84 of 1998]
- National Heritage Resources Act [No. 25 of 1999]
- National Water Act [No. 36 of 1998]
- National Water Amendment Act [No. 45 of 1999]
- National Veld and Forest Fire Act [No 101 of 1998]
- Nature Conservation Ordinance [No. 15 of 1974]

General Management:

- Development Facilitation Act [No. 67 of 1995]
- Disaster Management Act [No. 57 of 2002]
- Fire Brigade Services Act [No. 99 of 1987]
- Local Government: Municipal Systems Act [No. 32 of 2000]
- National Road Traffic Act [No. 93 of 1996]
- National Building Standards Act [No. 103 of 1977]
- Occupational Health and Safety Act [No. 85 of 1993]
- Western Cape Planning and Development Act [No. 5 of 1998]
- Water Services Act [No. 108 of 1997]

Financial Management:

- Public Finance Management Act [No. 1 of 1999]

Human Resource Management:

- Basic Conditions of Employment Act [No. 75 of 1997]
- Broad-Based Black Economic Empowerment Act [No. 53 of 2003]

- Compensation for Occupational Injuries and Diseases Act [No. 130 of 1993]
- Employment Equity Act [No. 55 of 1998]
- Labour Relations Act [No. 66 of 1995]
- Occupational Health and Safety Act [No. 85 of 1993]
- Pension Funds Act [No. 24 of 1956]
- Skills Development Act [No. 97 of 1998]
- Skills Development Levies Act [No. 9 of 1999]
- Unemployment Insurance Act [No. 63 of 2001]

A brief summary of the most applicable legislation:

Protected Areas are proclaimed under section 23(1) of the National Environmental Protected Areas Act, 57 of 2003, ("the Protected Areas Act").

- **Protected Areas Act (Act No. 57 of 2003)**

The *[Minister/MEC]* is empowered, under section 23(1) of the National Environmental Protected Areas Act, 57 of 2003, ("the Protected Areas Act") to declare an area as a Conservation Area if:

1 It has significant natural features or biodiversity;

2 Is in need of long-term protection for the maintenance of its biodiversity or for the provision of environmental goods and services.

Both of the above criteria pertain to the De Rust Nature Reserve and are discussed in detail under "Conservation Significance".

Biodiversity management agreements

The Minister may enter into a biodiversity management agreement with the person, organization or organ of state identified in terms of section 43(2), or any other suitable person, organization or organ of state, regarding the implementation of a biodiversity management plan, or any aspect of it.

- **Biodiversity Act (Act No. 10 0f 2004)**

Objectives of Act

(a) within the framework of the National Environmental Management Act, to provide for—

(i) the management and conservation of biological diversity within the Republic and of the components of such biological diversity;

(ii) the use of indigenous biological resources in a sustainable manner; and

(iii) the fair and equitable sharing among stakeholders of benefits arising

from bio-prospecting involving indigenous biological resources;
(b) to give effect to ratified international agreements relating to biodiversity which are binding on the Republic;
(c) to provide for co-operative governance in biodiversity management and conservation; and
(d) to provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.

- **National Veld and Forest Fire Act (Act No. 101 of 1998)**

Purpose

'The purpose of the Act is to prevent and combat veld, forest and mountain fires throughout the Republic.''

Firebreaks

In terms of section 12 and 14 every landowner must prepare and maintain a firebreak as determined in section 13. Failure to do so is an offence in terms of section 25(3), unless he has been exempted by the Minister in terms of section 15.

Fighting Preparedness

There is also a further duty on landowners to have equipment, protective clothing and trained personnel available in the eventuality that there may be fire on their property (section 17). Failure to meet this requirement is an offence in terms of section 25(4).

- **Conservation of Agricultural Resources Act, 1983 (No 43 of 1983)**

Purpose

CARA is an act of the National Department of Agriculture and makes provision for the conservation of the natural agricultural resources of South Africa through:

1. Maintaining the production potential of land;
2. Combating and preventing erosion;
3. Preventing the weakening or destruction of water sources;
4. Protecting the vegetation; and
5. Combating weeds and invader plants.

Applicable CapeNature policies

- Nature Conservation Ordinance (19/1974)
- Western Cape Biodiversity Act 6 of 2023

- Western Cape Nature Conservation Board Act No 15 of 1998
- Nature and Environmental Conservation Regulations (Provincial Notice 955/1975)
- CapeNature Veldfire Management Guidelines
- Baseline and monitoring manual
- Cape Mountain Zebra Biodiversity Management Plan
- SOP certificates of adequate enclosure
- Hunting Proclamation
- National Water Act, 1998 (No 36 of 1998)

Other Relevant Legislation:

- Municipal Systems Act
- National Water Act, 1998 (No 36 of 1998)
- Constitution of the Republic of South Africa Act, 1996 (No 108 of 1996)
- Forest Act No 122 of 1984
- National Environmental Management Act, 1998 (No 107 of 1998)
- National Heritage Resources Act, 1999 (No 25 of 1999)
- World Heritage Convention Act, 1999 (No 109 of 1999)
- Western Cape Tourism Act, No. 3 of 1997
- Mountain Catchment Areas Act, 1970 (Act No. 63 of 1970)
- Western Nature Conservation Laws Amendment Act 3 of 2000
- Land Use Planning Ordinance 15/1985 (section 29)

There might be other legislation applicable to the contract nature reserve and it is the landowner's responsibility to determine this if necessary.

Appendix B

COPY OF JAKKALSDANS NATURE RESERVE PROCLAMATION

PROVINCIAL NOTICE

P.N. 134/2020 4 December 2020

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING

NATIONAL ENVIRONMENTAL MANAGEMENT: PROTECTED AREAS ACT, 2003 (ACT 57 OF 2003)

DECLARATION OF JAKKALSDANS NATURE RESERVE

I, Anton Wilhelm Bredell, Provincial Minister of Local Government, Environmental Affairs and Development Planning in the Western Cape, under section 23(1)*(a)*(i) of the National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003), declare a nature reserve on:

1. The Farm Aanlokking No. 175, situated in the Kannaland Municipality, Division of Ladismith, Province of the Western Cape;
   In extent: 1858, 1748 (One Thousand Eight Hundred and Fifty-Eight comma One Seven Four Eight) hectares;
   Held by Deeds of Transfer Nos. T117619/2003 and T117620/2003;
2. The Farm Rooi Grond No. 181, situated in the Kannaland Municipality, Division of Ladismith, Province of the Western Cape;
   In extent: 1566, 1588 (One Thousand Five Hundred and Sixty-Six comma One Five Eight Eight) hectares;
   Held by Deed of Transfer No. T117620/2003;
3. Remainder of the Farm Groot Kloof No. 176, situated in the Kannaland Municipality, Division of Ladismith, Province of the Western Cape;
   In extent: 1645, 1996 (One Thousand Six Hundred and Forty-Five comma One Nine Nine Six) hectares;
   Held by Deed of Transfer No. T117619/2003;
4. Remainder of Portion 1 of the Farm Boschberg No. 198, situated in the Oudtshoorn Municipality, Division of Oudtshoorn, Province of the Western Cape;
   In extent: 194, 8297 (One Hundred and Ninety-Four comma Eight Two Nine Seven) hectares;
   Held by Deed of Transfer No. T95333/2007;
5. 0,919296 (Zero comma Nine One Nine Two Nine Six) share in Portion 1 of the Farm Platte Rug No. 219, situated in the Kannaland Municipality, Division of Ladismith, Province of the Western Cape;
   In extent: 924, 1438 (Nine Hundred and Twenty-Four comma One Four Three Eight) hectares;
   Held by Deed of Transfer No. T95333/2007; and
6. 0,080705 (Zero comma Zero Eight Zero Seven Zero Five) share in Portion 1 of the Farm Platte Rug No. 219, situated in the Kannaland Municipality, Division of Ladismith, Province of the Western Cape;
   In extent: 924, 1438 (Nine Hundred and Twenty-Four comma One Four Three Eight) hectares;
   Held by Deed of Transfer No. T3252/2007.

I assign the name "Jakkalsdans Nature Reserve" to the reserve, of which the boundaries are reflected on the Surveyor-General Diagrams Nos. 319/1909, 580/1909, 1085/1887, 1086/1887 and 1088/1887 as set out in the Schedule. The Surveyor-General Diagrams may also be viewed at https://www.capenature.co.za/care-for-nature/stewardship/.

Signed at Cape Town on this 29th day of October 2020.

AW BREDELL
PROVINCIAL MINISTER OF LOCAL GOVERNMENT, ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING

PROVINSIALE KENNISGEWING

P.K. 134/2020 4 Desember 2020

DEPARTEMENT VAN OMGEWINGSAKE EN ONTWIKKELINGSBEPLANNING

"NATIONAL ENVIRONMENTAL MANAGEMENT: PROTECTED AREAS ACT, 2003" (WET 57 VAN 2003)

VERKLARING VAN JAKKALSDANS NATUURRESERVAAT

Ek, Anton Wilhelm Bredell, Provinsiale Minister van Plaaslike Regering, Omgewingsake en Ontwikkelingsbeplanning in die Wes-Kaap, kragtens artikel 23(1)*(a)*(i) van die "National Environmental Management: Protected Areas Act, 2003" (Wet 57 van 2003), verklaar 'n natuurreservaat op:

1. Die Plaas Aanlokking Nr. 175, geleë in die Kannaland Munisipaliteit, Afdeling Ladismith, Provinsie Wes-Kaap;
   Groot: 1858, 1748 (Een Duisend Ag Honderd Ag-en-Vyftig komma Een Sewe Vier Ag) hektaar;
   Gehou kragtens Transportakte Nrs. T117619/2003 en T117620/2003;
2. Die Plaas Rooi Grond Nr. 181, geleë in die Kannaland Munisipaliteit, Afdeling Ladismith, Provinsie Wes-Kaap;
   Groot: 1566, 1588 (Een Duisend Vyf Honderd Ses-en-Sestig komma Een Vyf Ag Ag) hektaar;
   Gehou kragtens Transportakte Nr. T117620/2003;
3. Restant van die Plaas Groot Kloof Nr. 176, geleë in die Kannaland Munisipaliteit, Afdeling Ladismith, Provinsie Wes-Kaap;
   Groot: 1645, 1996 (Een Duisend Ses Honderd Vyf-en-Veertig komma Een Nege Nege Ses) hektaar;
   Gehou kragtens Transportakte Nr. T117619/2003;
4. Restant van Gedeelte 1 van die Plaas Boschberg Nr. 198, geleë in die Oudtshoorn Munisipaliteit, Afdeling Oudtshoorn, Provinsie Wes-Kaap;
   Groot: 194, 8297 (Een Honderd Vier-en-Neëntig komma Ag Twee Nege Sewe) hektaar;
   Gehou kragtens Transportakte Nr. T95333/2007;
5. 0,919296 (Nul komma Nege Een Nege Twee Nege Ses) aandeel in Gedeelte 1 van die Plaas Platte Rug Nr. 219, geleë in the Kannaland Munisipaliteit, Afdeling Ladismith, Provinsie Wes-Kaap;
   Groot: 924, 1438 (Nege Honderd Vier-en-Twintig komma Een Vier Drie Ag) hektaar;
   Gehou kragtens Transportakte Nr. T95333/2007; en
6. 0,080705 (Nul komma Nul Ag Nul Sewe Nul Vyf) aandeel in gedeelte 1 van die Plaas Platte Rug Nr. 219, geleë in the Kannaland Munisipaliteit, Afdeling Ladismith, Provinsie Wes-Kaap;
   Groot: 924, 1438 (Nege Honderd Vier-en-Twintig komma Een Vier Drie Ag) hektaar;
   Gehou kragtens Transportakte Nr. T3252/2007.

Ek ken die naam "Jakkalsdans Natuurreservaat" toe aan die reservaat, waarvan die grense weergegee word op die Landmeter-generaaldiagramme Nrs. 319/1909, 580/1909, 1085/1887, 1086/1887 en 1088/1887 soos uiteengesit in die Bylae. Die Landmeter-generaaldiagramme kan ook by https://www.capenature.co.za/care-for-nature/stewardship/ gevind word.

Geteken te Kaapstad op hede die 29ste dag van Oktober 2020.

AW BREDELL
PROVINSIALE MINISTER VAN PLAASLIKE REGERING, OMGEWINGSAKE EN ONTWIKKELINGSBEPLANNING

SPECIES LISTS AS PER QDS 3321CB

PLANT LIST

Plant species list from Gamkaberg Reserve Complex and surrounding areas (Barry et al. 2015).

SPECIES	FAMILY
Anacamperos albidiflora	ANACAMPSEROTEACEAE
Aptosimum procumbens	SCROPHULARIACEAE
Abutilon sonneratianum	MALVACEAE
Acacia karroo	FABACEAE
Acmadenia baileyensis	RUTACEAE
Acmadenia sheilae	RUTACEAE
Acmadenia wittebergensis	RUTACEAE
Adromischus maculatus	CRASSULACEAE
Adromischus cf. mammillaris	CRASSULACEAE
Adromischus triflorus	CRASSULACEAE
Agathosma barnesiae	RUTACEAE
Agathosma bifida	RUTACEAE
Agathosma capensis	RUTACEAE
Agathosma cerefolium	RUTACEAE
Agathosma mundii	RUTACEAE
Agathosma ovata (Thunb.) Pillans	RUTACEAE
Agathosma recurvifolia Sond.	RUTACEAE
Agathosma roodebergensis Compton	RUTACEAE
Albuca glandulosa Baker	HYACINTHACEAE
Albuca maxima	HYACINTHACEAE
Albuca setosa (I think this is the one!?)	HYACINTHACEAE
Albuca sp.	HYACINTHACEAE
Alepidea capensis var. capensis	APIACEAE
Aloe comptonii	ASPHODELACEAE
Aloe ferox	ASPHODELACEAE
Aloe longistyla	ASPHODELACEAE
Aloe microstigma	ASPHODELACEAE
Aloe striata	ASPHODELACEAE
Aloe variegata	ASPHODELACEAE
Alonsoa peduncularis	SCROPHULARIACEAE
Amellus strigosus subsp. strigosus	ASTERACEAE
Amphithalea flava (Granby) A.L.Schutte	FABACEAE
Amphithalea micrantha	FABACEAE
Amphithalea muirii	FABACEAE
Amphithalea violacea (E.Mey.) Benth.	FABACEAE
Anacampseros papyracea	ANACAMPSEROTEACEAE
Anacampseros telephiastrum	ANACAMPSEROTEACEAE
Anchusa capensis Thunb.	BORAGINACEAE
Andromischus sp.	CRASSULACEAE
Anginon difforme (L.) B.L.Burtt	APIACEAE
Anisodontea reflexa	MALVACEAE
Anisodontea triloba (Thunb.) Bates	MALVACEAE

Anthospermum aethiopicum	RUBIACEAE
Anthospermum ciliare L.	RUBIACEAE
Anthospermum dregei Sond.	RUBIACEAE
Anthospermum galioides subsp. galioides	RUBIACEAE
Anthospermum spathulatum subsp. spathulatum	RUBIACEAE
Anthoxanthum ecklonii	POACEAE
Aptosimum indivisum (Karoo violet)	SCROPHULARIACEAE
Aptosimum procumbens var. procumbens	SCROPHULARIACEAE
Arctopus echinatus	APIACEAE
Arctotheca calendula (L.) Levyns	ASTERACEAE
Arctotis cuneata DC.	ASTERACEAE
Arctotis virgata Jacq.	ASTERACEAE
Aristea cuspidata	IRIDACEAE
Aristea dichotoma (Thunb.) Ker Gawl.	IRIDACEAE
Aristea pusilla subsp. pusilla	IRIDACEAE
Aristida diffusa	POACEAE
Aristida diffusa Trin.	POACEAE
Artemisia afra	ASTERACEAE
Aspalathus acanthes Eckl. & Zeyh.	FABACEAE
Aspalathus candicans Aiton f.	FABACEAE
Aspalathus chortophila Eckl. & Zeyh.	FABACEAE
Aspalathus ciliaris L.	FABACEAE
Aspalathus collina collina	FABACEAE
Aspalathus collina subsp. collina	FABACEAE
Aspalathus granulata	FABACEAE
Aspalathus granulata R.Dahlgren	FABACEAE
Aspalathus hirta E.Mey.	FABACEAE
Aspalathus hystrix L.f.	FABACEAE
Aspalathus karrooensis	FABACEAE
Aspalathus karrooensis	FABACEAE
Aspalathus kougaensis	FABACEAE
Aspalathus lactea subsp. lactea	FABACEAE
Aspalathus lamarckiana R.Dahlgren	FABACEAE
Aspalathus laricifolia canescens (L.) R.Dahlgren	FABACEAE
Aspalathus pedunculata L'Hér.	FABACEAE
Aspalathus rubens Thunb.	FABACEAE
Aspalathus sceptrum-aureum R.Dahlgren	FABACEAE
Aspalathus shawii subsp. shawii	FABACEAE
Aspalathus sp.	FABACEAE
Aspalathus spinosa subsp. spinosa	FABACEAE
Aspalathus submissa R.Dahlgren	FABACEAE
Aspalathus subtingens Eckl. & Zeyh.	FABACEAE
Asparagus aethiopicus	ASPARAGACEAE
Asparagus capensis L.	ASPARAGACEAE
Asparagus capensis var. capensis	ASPARAGACEAE
Asparagus krebsianus	ASPARAGACEAE
Asparagus lignosus	ASPARAGACEAE
Asparagus multiflorus	ASPARAGACEAE

Asparagus oliveri (Oberm.) Fellingham & N.L.Mey.	ASPARAGACEAE
Asparagus retrofractus	ASPARAGACEAE
Asparagus rubicundus P.J.Bergius	ASPARAGACEAE
Asparagus striatus	ASPARAGACEAE
Asparagus suaveolens	ASPARAGACEAE
Athanasia linifolia	ASTERACEAE
Athanasia pachycephala	ASTERACEAE
Athanasia tomentosa Thunb.	ASTERACEAE
Athanasia trifurcata	ASTERACEAE
Athanasia vestita	ASTERACEAE
Atriplex lindleyi ssp inflata	CHENOPODIACEAE
Atriplex semibaccata R.Br.	CHENOPODIACEAE
Astroloba smutsiana	ASPHODELACEAE
Aulax cancellata	PROTEACEAE
Avonia papyracea	ANACAMPSEROTACEAE
Babiana sambucina (Jacq.) Ker Gawl.	IRIDACEAE
Ballota africana	LAMIACEAE
Bartholina burmanniana (L.) Ker Gawl.	ORCHIDACEAE
Berkheya angustifolia (Houtt.) Merr.	ASTERACEAE
Berkheya carlinoides (Vahl) Willd.	ASTERACEAE
Berkheya cruciata subsp. cruciata	ASTERACEAE
Berkheya cuneata	ASTERACEAE
Berzelia intermedia (D. Dietr.) Schltdl.	BRUNIACEAE
Blepharis capensis	ACANTHACEAE
Bobartia orientalis J.B.Gillett	IRIDACEAE
Bobartia orientalis orientalis	IRIDACEAE
Boophone disticha	AMARYLLIDACEAE
Brachiaria serrata	POACEAE
Brachycarpaea juncea (P.J.Bergius) Marais	BRASSICACEAE
Brachylaena neriifolia	ASTERACEAE
Brunia noduliflora Goldblatt & J.C.Manning	BRUNIACEAE
Brunsvigia striata (Jacq.) Aiton	AMARYLLIDACEAE
Buddleja saligna	BUDDLEJACEAE
Buddleja salviifolia (L.) Lam.	BUDDLEJACEAE
Bulbine alooides	ASPHODELACEAE
Bulbine favosa	ASPHODELACEAE
Bulbine flexicaulis	ASPHODELACEAE
Bulbine frutescens	ASPHODELACEAE
Bulbine longifolia Schinz	ASPHODELACEAE
Bulbine mesembryanthemoides	ASPHODELACEAE
Bulbine sedifolia	ASPHODELACEAE
Bulbine sp. nov.	ASPHODELACEAE
Bulbinella cauda-felis (L.f.) T.Durand & Schinz	ASPHODELACEAE
Cadaba aphyla	BRASSICACEAE
Caesia contorta	HEMEROCALLIDACEAE
Calopsis andreaeana	RESTIONACEAE

Calopsis andreaeana (Pillans) H.P.Linder	RESTIONACEAE
Calopsis marlothii	RESTIONACEAE
Calopsis paniculata	RESTIONACEAE
Calopsis rigida	RESTIONACEAE
Calopsis viminea	RESTIONACEAE
Cannomois nitida	RESTIONACEAE
Cannomois scirpoides	RESTIONACEAE
Cannomois sp.	RESTIONACEAE
Cannomois virgata	RESTIONACEAE
Carissa haematocarpa (Eckl.) A.DC.	APOCYNACEAE
Carpobrotus deliciosus	MESEMBRYANTHEMACEAE
Carpolyza spiralis	AMARYLLIDACEAE
Cassine peragua L.	CELASTRACEAE
Cenchrus ciliaris	POACEAE
Centella virgata (L.f.) Drude	APIACEAE
Cerochlamys pachyphylla	AIZOACEAE
Ceropegia fimbriata	APOCYNACEAE
Ceterach cordatum (Thunb.) Desv.	ASPLENIACEAE
Chamarea capensis	APIACEAE
Cheilanthes multifida multifida	PTERIDACEAE
Cheilanthes parviloba (Sw.) Sw.	PTERIDACEAE
Chironia baccifera L.	GENTIANACEAE
Conophytum truncatum	AIZOACEAE
Chlorophytum comosum	ASPARAGACEAE
Chlorophytum undulatum (Jacq.) Oberm.	ANTHERICACEAE
Chrysanthemoides monilifera (L.) Norl.	ASTERACEAE
Chrysanthemoides monilifera monilifera	ASTERACEAE
Chrysocoma ciliata L.	ASTERACEAE
Chrysocoma valida Ehr.Bayer	ASTERACEAE
Cineraria geifolia (L.) L.	ASTERACEAE
Cineraria lobata L'Hér.	ASTERACEAE
Cissampelos capensis L.f.	MENISPERMACEAE
Clematis brachiata	RANUNCULACEAE
Cliffortia crenata	ROSACEAE
Cliffortia erectisepala	ROSACEAE
Cliffortia eriocephalina	ROSACEAE
Cliffortia glauca	ROSACEAE
Cliffortia ilicifolia var. ilicifolia	ROSACEAE
Cliffortia micrantha Weim.	ROSACEAE
Cliffortia pulchella L.f.	ROSACEAE
Cliffortia ramosissima Schltr.	ROSACEAE
Cliffortia ruscifolia L.	ROSACEAE
Cliffortia strobilifera	ROSACEAE
Cliffortia tuberculata	ROSACEAE
Clutia alaternoides L.	EUPHORBIACEAE
Clutia ericoides	EUPHORBIACEAE
Clutia laxa Eckl. ex Sond.	EUPHORBIACEAE
Clutia polifolia Jacq.	EUPHORBIACEAE

Clutia polygonoides	EUPHORBIACEAE
Clutia rubricaulis Eckl. ex Sond.	EUPHORBIACEAE
Colpoon compressum P.J.Bergius	SANTALACEAE
Convolvulus capensis	CONVOLVULACEAE
Corymbium africanum subsp. africanum	ASTERACEAE
Corymbium glabrum L.	ASTERACEAE
Cotula heterocarpa	ASTERACEAE
Cotyledon orbiculata var. orbiculata	CRASSULACEAE
Cotyledon orbiculata var. spuria	CRASSULACEAE
Crassula arborescens arborescens	CRASSULACEAE
Crassula atropurpurea var. atropurpurea	CRASSULACEAE
Crassula badpoorensis	CRASSULACEAE
Crassula biplanata Haw.	CRASSULACEAE
Crassula campestris var. campestris	CRASSULACEAE
Crassula capitella subsp. capitella	CRASSULACEAE
Crassula capitella subsp. thyrsiflora	CRASSULACEAE
Crassula congesta ssp. laticephala	CRASSULACEAE
Crassula cultrata	CRASSULACEAE
Crassula deltoidea	CRASSULACEAE
Crassula expansa subsp. expansa	CRASSULACEAE
Crassula hemispherica	CRASSULACEAE
Crassula muscosa var. muscosa	CRASSULACEAE
Crassula nemorosa	CRASSULACEAE
Crassula nudicaulis var. nudicaulis	CRASSULACEAE
Crassula obtusa	CRASSULACEAE
Crassula orbicularis	CRASSULACEAE
Crassula perforata	CRASSULACEAE
Crassula pubescens subsp. pubescens	CRASSULACEAE
Crassula pyramidalis	CRASSULACEAE
Crassula rupestris subsp. marnierana	CRASSULACEAE
Crassula rupestris subsp. rupestris	CRASSULACEAE
Crassula saxifraga	CRASSULACEAE
Crassula sebaeoides	CRASSULACEAE
Crassula subaphylla var. subaphylla	CRASSULACEAE
Crassula subulata var. subulata	CRASSULACEAE
Crassula tecta	CRASSULACEAE
Crassula tetragona subsp. tetragona	CRASSULACEAE
Cullumia bisulca (Thunb.) Less.	ASTERACEAE
Cullumia sulcata	ASTERACEAE
Cunonia capensis	CUNONIACEAE
Cussonia spicata	ARALIACEAE
Cyanella lutea L.f.	TECOPHILAEACEAE
Cyclopia intermedia E.Mey.	FABACEAE
Cymbopogon marginatus	POACEAE
Cymbopogon plurinodis (Stapf) Stapf ex Burtt Davy	POACEAE
Cynanchum obtusifolium var. obtusifolium	APOCYNACEAE
Cynodon dactylon (L.) Pers.	POACEAE
Cyphia sylvatica Eckl.	LOBELIACEAE

Cyphia volubilis volubilis	LOBELIACEAE
Cyrtanthus collinus Ker Gawl.	AMARYLLIDACEAE
Cysticapnos vesicaria	FUMARIACEAE
Delosperma calitzdorpense	AIZOACEAE
Dianthus caespitosus subsp. caespitosus	CARYOPHYLLACEAE
Dianthus caespitosus subsp. pectinatus	CARYOPHYLLACEAE
Dianthus caespitosus Thunb.	CARYOPHYLLACEAE
Dianthus micropetalus Ser.	CARYOPHYLLACEAE
Diascia bicolor	SCROPHULARIACEAE
Diascia lilacina	SCROPHULARIACEAE
Diascia parviflora Benth.	SCROPHULARIACEAE
Diascia patens	SCROPHULARIACEAE
Diascia sacculata Benth.	SCROPHULARIACEAE
Dicerothamnus adpressus (Harv.) Koekemoer	ASTERACEAE
Dicerothamnus rhinocerotis (L.f.) Koekemoer	ASTERACEAE
Dicoma spinosa	ASTERACEAE
Digitaria eriantha Steud.	POACEAE
Dimorphotheca acutifolia Hutch.	ASTERACEAE
Dimorphotheca cuneata	ASTERACEAE
Dimorphotheca montana	ASTERACEAE
Dimorphotheca nudicaulis nudicaulis	ASTERACEAE
Dimorphotheca nudicaulis auct. non DC., Dinter	ASTERACEAE
Dioscorea elephantipes	DIOSCOREACEAE
Dioscorea hemicrypta	DIOSCOREACEAE
Diosma apetala (Dummer) I.Williams	RUTACEAE
Diosma prama I.Williams	RUTACEAE
Diosma recurva	RUTACEAE
Diospyros dichrophylla	EBENACEAE
Diospyros lycioides subsp. lycioides	EBENACEAE
Dipcadi spp.	FABACEAE
Dipcadi viride	FABACEAE
Dipogon lignosus	ORCHIDACEAE
Disa arida	ORCHIDACEAE
Disa bracteata	ORCHIDACEAE
Disa comosa	ORCHIDACEAE
Disa filicornis	ORCHIDACEAE
Disa racemosa	ORCHIDACEAE
Disa uncinata	ASTERACEAE
Disparago ericoides (P.J.Bergius) Gaertn.	ASTERACEAE
Disparago kolbei	ASTERACEAE
Disparago tortilis	ORCHIDACEAE
Disperis capensis	SAPINDACEAE
Dodonaea angustifolia	SAPINDACEAE
Dodonaea viscosa angustifolia Benth.	ASTERACEAE
Dolichothrix ericoides	HYACINTHACEAE
Drimia spp.	HYACINTHACEAE
Drimia sp. nov.	HYACINTHACEAE

Drimia anomala	HYACINTHACEAE
Drimia arenicola	HYACINTHACEAE
Drimia intricata	HYACINTHACEAE
Drimia media	HYACINTHACEAE
Drimia sclerophylla	MESEMBRYANTHEMACEAE
Drosanthemum spp.	DROSERACEAE
Drosanthemum hispidum	DROSERACEAE
Drosera aliciae	DROSERACEAE
Duvalia spp.	APOCYNACEAE
Duvalia elegans	APOCYNACEAE
E stolonifera	POACEAE
Ehrharta bulbosa Sm.	POACEAE
Ehrharta calycina Sm.	POACEAE
Ehrharta capensis	POACEAE
Ehrharta erecta var. erecta	POACEAE
Ehrharta erecta var. natalensis	POACEAE
Ehrharta ottonis	POACEAE
Ehrharta ramosa aphylla (Schrad.) Gluckman	POACEAE
Ehrharta ramosa (Thunb.) Thunb.	POACEAE
Ehrharta ramosa subsp. ramosa	POACEAE
Ehrharta rupestris subsp. tricostata	RESTIONACEAE
Elegia asperiflora	RESTIONACEAE
Elegia capensis	RESTIONACEAE
Elegia filacea Mast.	RESTIONACEAE
Elegia galpinii N.E.Br.	RESTIONACEAE
Elegia juncea	ASTERACEAE
Elytropappus adpressus	ASTERACEAE
Elytropappus gnaphaloides	ASTERACEAE
Elytropappus rhinocerotis	POLYGONACEAE
Emex australis	RUTACEAE
Empleurum unicapsulare	HYPOXIDACEAE
Empodium plicatum (Thunb.) Garside	POACEAE
Enneapogon scaber var. scaber	CYPERACEAE
Epischoenus quadrangularis	POACEAE
Eragrostis capensis	POACEAE
Eragrostis curvula (Schrad.) Nees	ERICACEAE
Erica anguliger (N.E.Br.) E.G.H.Oliv.	ERICACEAE
Erica articularis L.	ERICACEAE
Erica articularis var. articularis	ERICACEAE
Erica caffra	ERICACEAE
Erica calycina	ERICACEAE
Erica cerinthoides cerinthoides	ERICACEAE
Erica cerinthoides L.	ERICACEAE
Erica cerinthoides var. cerinthoides	ERICACEAE
Erica coccinea coccinea	ERICACEAE
Erica coccinea L.	ERICACEAE

Erica curviflora	ERICACEAE
Erica discolor	ERICACEAE
Erica fimbriata Andrews	ERICACEAE
Erica fuscescens (Klotzsch) E.G.H.Oliv.	ERICACEAE
Erica glomiflora var. glomiflora	ERICACEAE
Erica hispidula	ERICACEAE
Erica humifusa	ERICACEAE
Erica imbricata	ERICACEAE
Erica karooica	ERICACEAE
Erica madida	ERICACEAE
Erica maximiliani	ERICACEAE
Erica melanthera L.	ERICACEAE
Erica ostiaria Compton	ERICACEAE
Erica quadrangularis	ERICACEAE
Erica rosacea glabrata E.G.H.Oliv.	ERICACEAE
Erica rosacea rosacea	ERICACEAE
Erica setulosa	ERICACEAE
Erica simulans simulans	ERICACEAE
Erica speciosa Andrews	ERICACEAE
Erica spectabilis	ERICACEAE
Erica syngenesia	ERICACEAE
Erica transparens	ERICACEAE
Erica uberiflora	ERICACEAE
Erica versicolor	ERICACEAE
Erica viridiflora primulina (Bolus) E.G.H. Oliv. & I.M.Oliv.	ERICACEAE
Erica wendlandiana Klotzsch	ASTERACEAE
Eriocephalus africanus Burm.	ASTERACEAE
Eriocephalus sp.	CONVALLARIACEAE
Eriospermum capense	CONVALLARIACEAE
Eriospermum paradoxum	GERANIACEAE
Erodium moschatum (L.) L'Hér.	EBENACEAE
Euclea crispa subsp. crispa	EBENACEAE
Euclea polyandra (L.f.) E. Mey. ex Hiern	EBENACEAE
Euclea undulata var. undulata	EUPHORBIACEAE
Euphorbia annea (Please check with Jan! I cannot find this anywhere and may have heard wrong!)	EUPHORBIACEAE
Euphorbia arceuthobioides	EUPHORBIACEAE
Euphorbia atrispina var. atrispina	EUPHORBIACEAE
Euphorbia clandestina	EUPHORBIACEAE
Euphorbia erythrina Link	EUPHORBIACEAE
Euphorbia sp. cf. caterviflora	EUPHORBIACEAE
Euphorbia gamkaensis	EUPHORBIACEAE
Euphorbia heptagona	EUPHORBIACEAE
Euphorbia heptagona var. heptagona	EUPHORBIACEAE
Euphorbia mauritanica mauritanica	EUPHORBIACEAE
Euphorbia tridentata	EUPHORBIACEAE
Euryops erectus (Compton) B.Nord.	ASTERACEAE
Euryops lateriflorus (L.f.) DC.	ASTERACEAE

Euryops rehmannii Compton	ASTERACEAE
Euryops sp.	ASTERACEAE
Euryops spathaceus DC.	ASTERACEAE
Euryops virgineus	ASTERACEAE
Felicia esterhuyseniae	ASTERACEAE
Felicia filifolia bodkinii (Compton) Grau	ASTERACEAE
Felicia filifolia filifolia	ASTERACEAE
Felicia minima	ASTERACEAE
Felicia muricata	ASTERACEAE
Felicia muricata muricata	IRIDACEAE
Ferraria crispa crispa	IRIDACEAE
Ferraria divaricata subsp. australis	CYPERACEAE
Ficinia acuminata	CYPERACEAE
Ficinia compasbergensis	CYPERACEAE
Ficinia deusta	CYPERACEAE
Ficinia gracilis	CYPERACEAE
Ficinia indica indica	CYPERACEAE
Ficinia nigrescens (Schrad.) J.Raynal	CYPERACEAE
Ficinia oligantha	CYPERACEAE
Ficinia petrophila	CYPERACEAE
Ficinia ramosissima Kunth	CYPERACEAE
Ficinia tenuifolia	MORACEAE
Ficus burtt-davyi	MORACEAE
Ficus cordata subsp. cordata	POACEAE
Fingerhuthia africana	IRIDACEAE
Freesia speciosa	SCROPHULARIACEAE
Freesia refracta	SCROPHULARIACEAE
Freylinia decurrens Levyns ex Van Jaarsv.	SCROPHULARIACEAE
Freylinia lanceolata	SCROPHULARIACEAE
Freylinia sp.nov. rooiberg	SCROPHULARIACEAE
Freylinia undulata	AIZOACEAE
Galenia africana	AIZOACEAE
Galenia africana africana	AIZOACEAE
Galenia papulosa var. papulosa	AIZOACEAE
Galenia secunda	RUBIACEAE
Galium tomentosum	ASTERACEAE
Garuleum bipinnatum (Thunb.) Less.	ASTERACEAE
Gazania krebsiana subsp. arctotoides	IRIDACEAE
Geissorhiza heterostyla	IRIDACEAE
Geissorhiza heterostyla L. Bolus	IRIDACEAE
Geissorhiza outeniquensis Goldblatt	IRIDACEAE
Geissorhiza roseoalba (G.J.Lewis) Goldblatt	IRIDACEAE
Gibbaeum nusiforme	AIZOACEAE
Gibbaeum heathii	AIZOACEAE
Gladiolus emiliae L. Bolus	IRIDACEAE
Gladiolus floribundus floribundus	IRIDACEAE
Gladiolus inflatus intermedius G.J.Lewis	IRIDACEAE
Gladiolus inflatus Thunb.	IRIDACEAE

Gladiolus liliaceus	IRIDACEAE
Gladiolus permeabilis edulis (Burch. ex Ker Gawl.) Oberm.	IRIDACEAE
Gladiolus permeabilis subsp. permeabilis	IRIDACEAE
Gladiolus tristis var. tristis	IRIDACEAE
Gladiolus virescens var. lepidus	IRIDACEAE
Glottiphyllum regium N.E.	THYMELAEACEAE
Gnidia deserticola	THYMELAEACEAE
Gnidia deserticola Gilg	THYMELAEACEAE
Gnidia galpinii	THYMELAEACEAE
Gnidia laxa	THYMELAEACEAE
Gnidia meyeri Meisn.	APOCYNACEAE
Gomphocarpus cancellatus (Burm.f.) Bruyns	APOCYNACEAE
Gomphocarpus fruticosus	APOCYNACEAE
Gomphocarpus physocarpus	ASTERACEAE
Gorteria personata L.	MALVACEAE
Grewia occidentalis	HALORAGACEAE
Gunnera perpensa	CELASTRACEAE
Gymnosporia buxifolia	CELASTRACEAE
Haemanthus albiflos	AMARYLLIDACEAE
Haemanthus coccineus	AMARYLLIDACEAE
Haemanthus sanguineus	PROTEACEAE
Hakea sericea Schrad. & J.C.Wendl.	SCROPHULARIACEAE
Halleria lucida	OROBANCHACEAE
Harveya bolusii	OROBANCHACEAE
Harveya capensis Hook.	OROBANCHACEAE
Harveya hyobanchoides Schltr.	ASPHODELACEAE
Haworthia arachnoidea	ASPHODELACEAE
Haworthia blackburniae	ASPHODELACEAE
Haworthia truncata var. maughanii	ASPHODELACEAE
Haworthia truncata var. truncata	ASPHODELACEAE
Haworthia viscosa (L.) Haw.	SCROPHULARIACEAE
Hebenstretia integrifolia	ASTERACEAE
Helichrysum acrophilum	ASTERACEAE
Helichrysum anomalum Less.	ASTERACEAE
Helichrysum cylindriflorum (L.) Hilliard & B.L.Burtt	ASTERACEAE
Helichrysum cymosum subsp. cymosum	ASTERACEAE
Helichrysum excisum	ASTERACEAE
Helichrysum felinum Less.	ASTERACEAE
Helichrysum lancifolium (Thunb.) Thunb.	ASTERACEAE
Helichrysum odoratissimum	ASTERACEAE
Helichrysum petiolare	ASTERACEAE
Helichrysum spiralepis	ASTERACEAE
Helichrysum teretifolium	ASTERACEAE
Helichrysum zeyheri Less.	ASTERACEAE
Helichrysum zwartbergense	BRASSICACEAE
Heliophila carnosa	BRASSICACEAE
Heliophila elongata	BRASSICACEAE

Heliophila glauca Burch. ex DC.	BRASSICACEAE
Heliophila linearis (Thunb.) DC.	BRASSICACEAE
Heliophila pendula	BRASSICACEAE
Heliophila rimicola Marais	BRASSICACEAE
Heliophila scoparia aspera (Schltr.) Marais	BRASSICACEAE
Heliophila scoparia scoparia	BRASSICACEAE
Heliophila suavissima	ASTERACEAE
Helipterum canescens (L.) DC.	ASTERACEAE
Helipterum ferrugineum (Lam.) DC.	ASTERACEAE
Helipterum milleflorum (L.f.) Druce	ASTERACEAE
Helipterum sp.	SCROPHULARIACEAE
Hemimeris racemosa	SCROPHULARIACEAE
Hereroa tenuifolia	STERCULIACEAE
Hermannia angularis Jacq.	STERCULIACEAE
Hermannia cuneifolia cuneifolia	STERCULIACEAE
Hermannia filifolia grandicalyx I.Verd.	STERCULIACEAE
Hermannia flammula Harv.	MALVACEAE
Hermannia holosericea	STERCULIACEAE
Hermannia holosericea Jacq.	STERCULIACEAE
Hermannia incana Cav.	STERCULIACEAE
Hermannia odorata Aiton	MALVACEAE
Hermannia pulverata	MALVACEAE
Hermannia saccifera	STERCULIACEAE
Hermannia salviifolia salviifolia	MALVACEAE
Hermannia salviifolia var. salviifolia	STERCULIACEAE
Hermannia sp.	MALVACEAE
Hermannia stipulacea	STERCULIACEAE
Hermannia stipulacea Lehm. ex Eckl. & Zeyh.	STERCULIACEAE
Hermannia vestita Thunb.	ASTERACEAE
Hertia alata (Thunb.) Kuntze	ASTERACEAE
Hertia kraussii	IRIDACEAE
Hesperantha acuta	IRIDACEAE
Hesperantha falcata (L.f.) Ker Gawl.	IRIDACEAE
Hesperantha radiata	MALVACEAE
Hibiscus pusillus	ASTERACEAE
Hippia frutescens	ASTERACEAE
Hirpicium alienatum	ORCHIDACEAE
Hirpicium integrifolium (Thunb.) Less.	ORCHIDACEAE
Holothrix pilosa	ORCHIDACEAE
Holothrix villosa	ORCHIDACEAE
Holothrix villosa villosa	ORCHIDACEAE
Hoodia spp	APOCYNACEAE
Hoodia flava	APOCYNACEAE
Huernia pillansii	RESTIONACEAE
Hydrophilus rattrayi	ASTERACEAE
Hymenolepis incisa DC.	OROBANCHACEAE
Hyobanche sanguinea	POACEAE
Hyparrhenia hirta	MOLLUGINACEAE

Hypertelis salsoloides	FABACEAE
Hypocalyptus sophoroides (P.J.Bergius) Baill.	RESTIONACEAE
Hypodiscus albo-aristatus	RESTIONACEAE
Hypodiscus aristatus	RESTIONACEAE
Hypodiscus striatus (Kunth) Mast.	RESTIONACEAE
Hypodiscus synchroolepis	AQUIFOLIACEAE
Ilex mitis var. mitis	FABACEAE
Indigofera sp.	FABACEAE
Indigofera declinata	FABACEAE
Indigofera flabellata Harv.	FABACEAE
Indigofera heterophylla Thunb.	FABACEAE
Indigofera meyeriana	FABACEAE
Indigofera mundiana Eckl. & Zeyh.	FABACEAE
Indigofera nigromontana	FABACEAE
Indigofera pappei	FABACEAE
Indigofera spinescens E.Mey.	RESTIONACEAE
Ischyrolepis capensis (L.) H.P.Linder	RESTIONACEAE
Ischyrolepis gaudichaudiana (Kunth) H.P.Linder	RESTIONACEAE
Ischyrolepis hystrix	RESTIONACEAE
Ischyrolepis laniger	RESTIONACEAE
Ischyrolepis marlothii (Pillans) H.P.Linder	RESTIONACEAE
Ischyrolepis schoenoides	RESTIONACEAE
Ischyrolepis sieberi	RESTIONACEAE
Ischyrolepis triflora (Rottb.) H.P.Linder	RESTIONACEAE
Ischyrolepis unispicata	IRIDACEAE
Ixia orientalis	IRIDACEAE
Ixia sp.	SCROPHULARIACEAE
Jamesbrittenia aspalathoides (Benth.) Hilliard	SCROPHULARIACEAE
Jamesbrittenia thunbergii	SCROPHULARIACEAE
Jamesbrittenia tortuosa	OLEACEAE
Jasminum angulare Vahl	OLEACEAE
Jasminum tortuosum	JUNCACEAE
Juncus capensis	ACANTHACEAE
Justica orchioides	ACANTHACEAE
Justicia cuneata cuneata	ACANTHACEAE
Justicia cuneata Vahl	ACANTHACEAE
Justicia orchioides	ACANTHACEAE
Kedrostis nana var. schlechteri	CUCURBITACEAE
Kiggelaria africana	KIGGELARIACEAE
Koeleria capensis	POACEAE
Lachenalia algoensis Schönland	ASPARAGACEAE
Lachnaea glomerata	THYMELAEACEAE
Lachnaea ruscifolia Compton	THYMELAEACEAE
Lachnaea striata (Poir.) Meisn.	THYMELAEACEAE
Lachnostylis bilocularis R.A.Dyer	PHYLLANTHACEAE
Lampranthus furvus	MESEMBRYANTHEMACEAE
Lampranthus godmaniae	MESEMBRYANTHEMACEAE

Lampranthus scaber	MESEMBRYANTHEMACEAE
Lapeirousia pyramidalis (Lam.) Goldblatt	ASTERACEAE
Lasiospermum brachyglossum DC.	FABACEAE
Lebeckia cytisoides Thunb.	FABACEAE
Lebeckia pauciflora	HYACINTHACEAE
Ledebouria undulata	MESEMBRYANTHEMACEAE
Leipoldtia schultzei	LAMIACEAE
Leonotis leonurus	LAMIACEAE
Leonotis ocymifolia ocymifolia	BRASSICACEAE
Lepidium africanum	FABACEAE
Lessertia frutescens	FABACEAE
Lessertia microphylla	PROTEACEAE
Leucadendron album	PROTEACEAE
Leucadendron comosum subsp. comosum	PROTEACEAE
Leucadendron dregei	PROTEACEAE
Leucadendron ericifolium	PROTEACEAE
Leucadendron eucalyptifolium H.Buek ex Meisn.	PROTEACEAE
Leucadendron pubibracteolatum I.Williams	PROTEACEAE
Leucadendron rubrum Burm.f.	PROTEACEAE
Leucadendron salignum P.J.Bergius	PROTEACEAE
Leucadendron spissifolium subsp. fragrans	PROTEACEAE
Leucadendron tinctum I.Williams	PROTEACEAE
Leucospermum cuneiforme (Burm.f.) Rourke	PROTEACEAE
Leucospermum pluridens Rourke	PROTEACEAE
Leucospermum royenifolium (Salisb. ex Knight) Stapf	PROTEACEAE
Leucospermum wittebergense Compton	ASTERACEAE
Leysera gnaphalodes (L.) L.	ASTERACEAE
Leysera tenella	
Limium aethiopicum	LINACEAE
Limonium scabrum	
Linum africanum L.	LOBELIACEAE
Lobelia coronopifolia L.	LOBELIACEAE
Lobelia linearis Thunb.	LOBELIACEAE
Lobelia tomentosa L.f.	BORAGINACEAE
Lobostemon decorus	BORAGINACEAE
Lobostemon echioides	BORAGINACEAE
Lobostemon fruticosus (L.) H.Buek	BORAGINACEAE
Lobostemon glaucophyllus (Jacq.) H.Buek	BORAGINACEAE
Lobostemon lindae	BORAGINACEAE
Lobostemon marlothii	BORAGINACEAE
Lobostemon paniculatus	BORAGINACEAE
Lobostemon strigosus (Lehm.) H.Buek	FABACEAE
Lotononis dahlgrenii	FABACEAE
Lotononis nutans B.-E.van Wyk	FABACEAE
Lotononis pungens	SOLANACEAE
Lycium cinereum	SOLANACEAE
Lycium ferocissimum	SOLANACEAE
Lycium sp.	SCROPHULARIACEAE

Lyperia tristis (L.f.) Benth.	
M sp nova (ask Jan, from Rooiberg pass)	
M spartioides	ASTERACEAE
Macledium spinosum (L.) S.Ortíz	ASTERACEAE
Mairia crenata	MESEMBRYANTHEMACEAE
Malephora lutea	CHENOPODIACEAE
Manochlamys albicans (Aiton) Aellen	HYACINTHACEAE
Massonia depressa	RESTIONACEAE
Mastersiella purpurea	CELASTRACEAE
Maytenus acuminata (L.f.) Loes.	CELASTRACEAE
Maytenus capitata (E.Mey. ex Sond.) Marais	CELASTRACEAE
Maytenus heterophylla (Eckl. & Zeyh.) N.Robson	CELASTRACEAE
Maytenus oleoides	CELASTRACEAE
Maytenus oleoides (Lam.) Loes.	CELASTRACEAE
Maytenus undata (Thunb.) Blakelock	CELASTRACEAE
Melalobium exudans	FABACEAE
Melasphaerula ramosa (L.) N.E.Br.	IRIDACEAE
Melianthus comosus	MELIANTHACEAE
Melolobium candicans	OLEACEAE
Menodora juncea	LAMIACEAE
Mentha longifolia subsp. polyadena	POACEAE
Merxmuellera arundinacea (P.J.Bergius) Conert	POACEAE
Merxmuellera decora	POACEAE
Merxmuellera stricta (Schrad.) Conert	POACEAE
Mesembryanthemum guerichianum	AIZOACEAE
Metalasia acuta	ASTERACEAE
Metalasia densa	ASTERACEAE
Metalasia massonii S.Moore	ASTERACEAE
Metalasia muricata (L.) D.Don	ASTERACEAE
Metalasia pallida Bolus	ASTERACEAE
Metalasia pulcherrima Less.	ASTERACEAE
Metalasia pungens	ASTERACEAE
Metalasia tricolor	ASTERACEAE
Metalasia trivialis	IRIDACEAE
Micranthus alopecuroides	APOCYNACEAE
Microloma sagittatum (L.) R.Br.	PROTEACEAE
Mimetes chrysanthus Rourke	PROTEACEAE
Mimetes cucullatus	ANEMIACEAE
Monechma incanum	GERANIACEAE
Monsonia crassicaule	GERANIACEAE
Monsonia crassicaule (new name for Sarcocaulon crassicuale)	GERANIACEAE
Montinia caryophyllacea Thunb.	GERANIACEAE
Moquiniella rubra (A.Spreng.) Balle	IRIDACEAE
Moraea algoensis Goldblatt	IRIDACEAE
Moraea cookii	IRIDACEAE
Moraea gawleri Spreng.	IRIDACEAE

Moraea polyanthos	IRIDACEAE
Moraea polystachya	IRIDACEAE
Moraea setifolia	IRIDACEAE
Moraea tripetala	IRIDACEAE
Moraea unguiculata	IRIDACEAE
Moraea virgata	MYRICACEAE
Morella serrata	POLYGALACEAE
Muraltia alopecuroides	POLYGALACEAE
Muraltia dispersa	POLYGALACEAE
Muraltia ericaefolia DC.	POLYGALACEAE
Muraltia ericoides (Burm.f.) Steud.	POLYGALACEAE
Muraltia karroica Levyns	POLYGALACEAE
Muraltia lignosa	POLYGALACEAE
Muraltia parvifolia	POLYGALACEAE
Muraltia sp.	POLYGALACEAE
Myrovernix gnaphaloides Koekemoer	MYRSINACEAE
Myrsine africana	SCROPHULARIACEAE
Nemesia affinis	SCROPHULARIACEAE
Nemesia fruticans (Thunb.) Benth.	SCROPHULARIACEAE
Nemesia sp	SCROPHULARIACEAE
Nephrolepis exaltata (L.) Schott	NEPHROLEPIDACEAE
Nerine humilis	AMARYLLIDACEAE
Nivenia argentea	IRIDACEAE
Nylandtia spinosa	POLYGALACEAE
Nymania capensis (Thunb.) Lindb.	MELIACEAE
Ocotea bullata	LAURACEAE
Oedera genistifolia (L.) Anderb. & K.Bremer	ASTERACEAE
Oedera imbricata Lam.	ASTERACEAE
Oedera squarrosa (L.) Anderb. & K.Bremer	ASTERACEAE
Oftia africana (L.) Bocq.	SCROPHULARIACEAE
Olea europaea africana (Mill.) P.S.Green	OLEACEAE
Ornithogalum dubium	ASPARAGACEAE
Ornithogalum graminifolium	ASPARAGACEAE
Ornithogalum juncifolium	ASPARAGACEAE
Ornithogalum sardienii	ASPARAGACEAE
Ornithogalum sp. Nova (small broad leaved rosettes)	ASPARAGACEAE
Ornithogalum suaveolens	ASPARAGACEAE
Ornithoglossum undulatum Sweet	COLCHICACEAE
Osteospermum bolusii (Compton) Norl.	ASTERACEAE
Osteospermum elsieae	ASTERACEAE
Osteospermum glabrum N.E.Br.	ASTERACEAE
Osteospermum imbricatum	ASTERACEAE
Osteospermum junceum P.J.Bergius	ASTERACEAE
Osteospermum pinnatum (Thunb.) Norl.	ASTERACEAE
Osteospermum polygaloides L.	ASTERACEAE
Osteospermum sp.	ASTERACEAE
Osteospermum triquetrum L.f.	ASTERACEAE
Osyris compressa	SANTALACEAE

Othonna amplexifolia	ASTERACEAE
Othonna auriculifolia	ASTERACEAE
Othonna carnosa Less.	ASTERACEAE
Othonna cylindrica	ASTERACEAE
Othonna gymnodiscus (DC.) Sch.Bip.	ASTERACEAE
Othonna osteospermoides	ASTERACEAE
Othonna parviflora P.J.Bergius	ASTERACEAE
Othonna quercifolia DC.	ASTERACEAE
Othonna quinquedentata Thunb.	OXALIDACEAE
Oxalis attaquana T.M.Salter	OXALIDACEAE
Oxalis depressa Eckl. & Zeyh.	OXALIDACEAE
Oxalis heterophylla	OXALIDACEAE
Oxalis obtusa Jacq.	OXALIDACEAE
Oxalis pes-caprae	OXALIDACEAE
Oxalis pes-caprae pes-caprae	OXALIDACEAE
Oxalis pocockiae	OXALIDACEAE
Pachypodium bispinosum	APOCYNACEAE
Pachypodium succulentum	APOCYNACEAE
Papaver aculeatum	PAPAVERACEAE
Pappea capensis Eckl. & Zeyh.	SAPINDACEAE
Paranomus adiantifolius Salisb. ex Knight	PROTEACEAE
Paranomus dispersus Levyns	PROTEACEAE
Paranomus dregei	PROTEACEAE
Paranomus roodebergensis (Compton) Levyns	PROTEACEAE
Paranomus sp. nov. cf. spathulatus	PROTEACEAE
Paranomus spathulatus N.E.Br.	THYMELAEACEAE
Passerina montana	THYMELAEACEAE
Passerina obtusifolia Thoday	THYMELAEACEAE
Passerina vulgaris	THYMELAEACEAE
Pelargonium abrotanifolium (L.f.) Jacq.	GERANIACEAE
Pelargonium alternans J.C.Wendl.	GERANIACEAE
Pelargonium asarifolium	GERANIACEAE
Pelargonium carneum	GERANIACEAE
Pelargonium carnosum	GERANIACEAE
Pelargonium caucalifolium caucalifolium	GERANIACEAE
Pelargonium citronellum	GERANIACEAE
Pelargonium crassipes Harv.	GERANIACEAE
Pelargonium denticulatum Jacq.	GERANIACEAE
Pelargonium exstipulatum	GERANIACEAE
Pelargonium fruticosum (Cav.) Willd.	GERANIACEAE
Pelargonium glutinosum (Jacq.) L'Hér.	GERANIACEAE
Pelargonium grossularioides	GERANIACEAE
Pelargonium heracleifolium Lodd.	GERANIACEAE

Pelargonium hispidum	GERANIACEAE
Pelargonium laevigatum (L.f.) Willd.	GERANIACEAE
Pelargonium laevigatum subsp. laevigatum	GERANIACEAE
Pelargonium longicaule longicaule	GERANIACEAE
Pelargonium longifolium	GERANIACEAE
Pelargonium multicaule subsp. multicaule	GERANIACEAE
Pelargonium myrrhifolium (L.) L'Hér.	GERANIACEAE
Pelargonium ovale subsp. ovale	GERANIACEAE
Pelargonium peltatum	GERANIACEAE
Pelargonium rapaceum	GERANIACEAE
Pelargonium ribifolium	GERANIACEAE
Pelargonium scabrum (Burm.f.) L'Hér.	GERANIACEAE
Pelargonium ternatum	GERANIACEAE
Pelargonium tetragonum	GERANIACEAE
Pelargonium tricolor Curtis	GERANIACEAE
Pelargonium trifidum Jacq.	GERANIACEAE
Pelargonium triste	GERANIACEAE
Pelargonium zonale	SCROPHULARIACEAE
Peliostomum leucorrhizum E. Mey. ex Benth.	PTERIDACEAE
Pellaea leucomelas (Mett. ex Kuhn) Baker	POACEAE
Pentameris distichophylla	POACEAE
Pentameris macrocalycina	POACEAE
Pentaschistis airoides subsp. airoides	POACEAE
Pentaschistis ampla	POACEAE
Pentaschistis aurea	POACEAE
Pentaschistis aurea subsp. aurea	POACEAE
Pentaschistis cirrhulosa	POACEAE
Pentaschistis colorata	POACEAE
Pentaschistis curvifolia	POACEAE
Pentaschistis eriostoma (Nees) Stapf	POACEAE
Pentaschistis juncifolia Stapf	POACEAE
Pentaschistis malouinensis (Steud.) Clayton	POACEAE
Pentaschistis natalensis Stapf	POACEAE
Pentaschistis pallida	POACEAE
Pentaschistis pyrophila	POACEAE
Pentaschistis tortuosa	ASTERACEAE
Pentzia dentata (L.) Kuntze	ASTERACEAE
Pentzia elegans DC.	ASTERACEAE
Pentzia incana	PIPERACEAE
Peperomia retusa	APIACEAE
Peucedanum ferulaceum	APIACEAE
Peucedanum ferulaceum var. ferulaceum	MOLLUGINACEAE
Pharnaceum trigonum Eckl. & Zeyh.	POACEAE
Phragmites australis	RHAMNACEAE
Phylica axillaris	RHAMNACEAE
Phylica axillaris var. axillaris	RHAMNACEAE
Phylica curvifolia Pillans	RHAMNACEAE
Phylica ericoides L.	RHAMNACEAE

Phylica imberbis	RHAMNACEAE
Phylica lanata Pillans	RHAMNACEAE
Phylica mundii	RHAMNACEAE
Phylica paniculata Willd.	RHAMNACEAE
Phylica purpurea Sond.	RHAMNACEAE
Phylica purpurea var. floccosa	RHAMNACEAE
Phylica purpurea var. purpurea	RHAMNACEAE
Phylica rigidifolia	SCROPHULARIACEAE
Phyllopodium elegans	ASTERACEAE
Phymaspermum appressum Bolus	RESTIONACEAE
Piaranthus spp.	
Platycaulos callistachyus	
Plumbago tristis	CARYOPHYLLACEAE
Pollichia campestris Aiton	AIZOACEAE
Polpoda capensis	POLYGALACEAE
Polygala bracteolata L.	
Polygala ephedroides	POLYGALACEAE
Polygala fruticosa P.J.Bergius	POLYGALACEAE
Polygala garcinii DC.	POLYGALACEAE
Polygala gracilipes	POLYGALACEAE
Polygala meridionalis Levyns	POLYGALACEAE
Polygala microlopha microlopha	POLYGALACEAE
Polygala microlopha var. microlopha	POLYGALACEAE
Polygala myrtifolia L.	POLYGALACEAE
Polygala pinifolia	POLYGALACEAE
Polygala sp.	POLYGALACEAE
Polygala teretifolia	POLYGALACEAE
Polygala virgata virgata	POLYGALACEAE
Polygala wittebergensis Compton	HYACINTHACEAE
Polyxena ensifolia	PORTULACACEAE
Portulacaria afra	FABACEAE
Priestleya myrtifolia DC.	ASTERACEAE
Printzia polifolia (L.) Hutch.	CAMPANULACEAE
Prismatocarpus brevilobus	CAMPANULACEAE
Prismatocarpus cliffortioides Adamson	CAMPANULACEAE
Prismatocarpus virgatus Fourc.	PROTEACEAE
Protea eximia (Salisb. ex Knight) Fourc.	PROTEACEAE
Protea humiflora	PROTEACEAE
Protea lorifolia (Salisb. ex Knight) Fourc.	PROTEACEAE
Protea neriifolia R.Br.	PROTEACEAE
Protea nitida Mill.	PROTEACEAE
Protea punctata	PROTEACEAE
Protea repens (L.) L.	FABACEAE
Psoralea pinnata L.	CELASTRACEAE
Pterocelastrus rostratus	CELASTRACEAE
Pterocelastrus tricuspidatus (Lam.) Walp.	ASTERACEAE
Pteronia camphorata (L.) L.	ASTERACEAE
Pteronia fasciculata L.f.	ASTERACEAE

Pteronia flexicaulis	ASTERACEAE
Pteronia incana (Burm.) DC.	ASTERACEAE
Pteronia membranacea	ASTERACEAE
Pteronia pallens L.f.	ASTERACEAE
Pteronia paniculata	ASTERACEAE
Pteronia staehelinoides	ASTERACEAE
Pteronia stricta stricta	FABACEAE
Rafnia capensis (L.) Schinz	FABACEAE
Rafnia racemosa Eckl. & Zeyh.	FABACEAE
Rafnia retroflexa Thunb.	RANUNCULACEAE
Ranunculus multifidus	ASTERACEAE
Relhania calycina apiculata (DC.) K.Bremer	ASTERACEAE
Relhania speciosa	ASTERACEAE
Relhania squarrosa (L.) L'Hér.	RESTIONACEAE
Restio triticeus Rottb.	BIGNONIACEAE
Rhigozum obovatum	RESTIONACEAE
Rhodocoma alpina	RESTIONACEAE
Rhodocoma arida	RESTIONACEAE
Rhodocoma capensis	RESTIONACEAE
Rhodocoma fruticosa (Thunb.) H.P.Linder	RESTIONACEAE
Rhodocoma gigantea	ANACARDIACEAE
Rhus glauca	ANACARDIACEAE
Rhus lancea L.f.	ANACARDIACEAE
Rhus longispina	ANACARDIACEAE
Rhus lucida L.	ANACARDIACEAE
Rhus pallens Eckl. & Zeyh.	ANACARDIACEAE
Rhus rehmanniana var. glabrata	ANACARDIACEAE
Rhus rosmarinifolia	ANACARDIACEAE
Rhus tomentosa L.	ANACARDIACEAE
Rhus undulata Jacq.	ANACARDIACEAE
Ricinus communis L.	EUPHORBIACEAE
Roella secunda H.Buek	CAMPANULACEAE
Romulea jugicola M.P.de Vos	IRIDACEAE
Romulea rosea var. australis	IRIDACEAE
Rubus rigidus	ROSACEAE
Rumex cordatus	POLYGONACEAE
Ruschia bipapillata	AIZOACEAE
Ruschia spinosa	AIZOACEAE
Salix mucronata subsp. capensis	SALICACEAE
Salsola tuberculata	LAMIACEAE
Salvia africana-lutea L.	LAMIACEAE
Salvia namaensis Schinz	APOCYNACEAE
Sarcostemma viminale	ORCHIDACEAE
Satyrium acuminatum	ORCHIDACEAE
Satyrium erectum Sw.	ORCHIDACEAE
Satyrium pygmaeum	DIPSACACEAE

Scabiosa columbaria L.	
Sceletium excuvium	HYACINTHACEAE
Sceletium tortuosum	HYACINTHACEAE
Schizobasis intricata (Baker) Baker	ORCHIDACEAE
Schizodium inflexum	CYPERACEAE
Scirpoides dioecus	APOCYNACEAE
Secamone alpini Schult.	SCROPHULARIACEAE
Selago albida	SCROPHULARIACEAE
Selago albida Choisy	SCROPHULARIACEAE
Selago brevifolia Rolfe	SCROPHULARIACEAE
Selago burchellii Rolfe	SCROPHULARIACEAE
Selago canescens	SCROPHULARIACEAE
Selago eckloniana Choisy	SCROPHULARIACEAE
Selago glomerata	SCROPHULARIACEAE
Selago glutinosa	SCROPHULARIACEAE
Selago luxurians Choisy	SCROPHULARIACEAE
Selago ramulosa E.Mey.	SCROPHULARIACEAE
Selago spinea Link	SCROPHULARIACEAE
Selago triquetra	SCROPHULARIACEAE
Senecio articulatus	ASTERACEAE
Senecio coronatus (Thunb.) Harv.	ASTERACEAE
Senecio erosus L.f.	ASTERACEAE
Senecio ficoides	ASTERACEAE
Senecio ilicifolius	ASTERACEAE
Senecio junceus	ASTERACEAE
Senecio juniperinus L.f.	ASTERACEAE
Senecio laevigatus Thunb.	ASTERACEAE
Senecio lineatus	ASTERACEAE
Senecio muirii	ASTERACEAE
Senecio paniculatus P.J.Bergius	ASTERACEAE
Senecio pinifolius (L.) Lam.	ASTERACEAE
Senecio radicans	ASTERACEAE
Senecio sophioides DC.	ASTERACEAE
Senecio sp.	ASTERACEAE
Senecio striatifolius	ASTERACEAE
Senecio umbellatus	ASTERACEAE
Sericocoma avolans	CARYOPHYLLACEAE
Silene bellidioides	CARYOPHYLLACEAE
Silene burchellii Otth	CARYOPHYLLACEAE
Silene pilosellifolia	CARYOPHYLLACEAE
Smicrostigma viride	AIZOACEAE
Solanum nigrum L.	SOLANACEAE
Solanum tomentosum L.	SOLANACEAE
Spatalla confusa	PROTEACEAE
Spiloxene umbraticola	HYPOXIDACEAE
Sporobolus fimbriatus	POACEAE

Staberoha cernua	RESTIONACEAE
Staberoha distachya	RESTIONACEAE
Stachys aethiopica	LAMIACEAE
Stachys sublobata Skan	LAMIACEAE
Stapelia grandiflora	APOCYNACEAE
Stapelia hirsuta	APOCYNACEAE
Stapelia rufa	POACEAE
Stipa dregeana var. dregeana	ASTERACEAE
Stoebe aethiopica L.	ASTERACEAE
Stoebe gomphrenoides (Lam.) P.J.Bergius	ASTERACEAE
Stoebe intricata Levyns	ASTERACEAE
Stoebe microphylla DC.	ASTERACEAE
Stoebe plumosa (L.) Thunb.	ASTERACEAE
Stoebe saxatilis Levyns	ASTERACEAE
Stoebe spiralis Less.	THYMELAEACEAE
Struthiola argentea	THYMELAEACEAE
Struthiola argentea Lehm.	THYMELAEACEAE
Struthiola ciliata (L.) Lam.	THYMELAEACEAE
Struthiola eckloniana Meisn.	THYMELAEACEAE
Struthiola leptantha	THYMELAEACEAE
Suaeda fruticosa	SCROPHULARIACEAE
Sutera denudata (Benth.) Kuntze	SCROPHULARIACEAE
Sutera foetida Roth	SCROPHULARIACEAE
Sutera revoluta (Thunb.) Kuntze	SCROPHULARIACEAE
Sutera subnuda (N.E.Br.) Hiern	FABACEAE
Sutherlandia frutescens (L.) R.Br.	ASTERACEAE
Syncarpha canescens subsp. canescens	ASTERACEAE
Syncarpha ferruginea	ASTERACEAE
Syncarpha milleflora	ASTERACEAE
Syncarpha paniculata (L.) B.Nord.	
Talinum sp (not sure which sp?)	ASTERACEAE
Tarchonanthus camphoratus	SCROPHULARIACEAE
Teedia lucida (Sol.) Rudolphi	FABACEAE
Tephrosia capensis	AIZOACEAE
Tetragonia fruticosa	AIZOACEAE
Tetragonia sarcophylla Fenzl	CYPERACEAE
Tetraria bromoides	CYPERACEAE
Tetraria capillacea	CYPERACEAE
Tetraria cuspidata (Rottb.) C.B.Clarke	CYPERACEAE
Tetraria fimbriolata	CYPERACEAE
Tetraria fourcadei	CYPERACEAE
Tetraria maculata	CYPERACEAE
Tetraria picta	CYPERACEAE
Tetraria triangularis	CYPERACEAE
Tetraria ustulata	LAMIACEAE
Teucrium africanum	RESTIONACEAE
Thamnochortus cinereus H.P.Linder	RESTIONACEAE
Thamnochortus rigidus	CAMPANULACEAE

Theilera guthriei (L. Bolus) E.Phillips	POACEAE
Themeda triandra	SANTALACEAE
Thesidium fragile	SANTALACEAE
Thesidium microcarpum (A.DC.) A.DC.	SANTALACEAE
Thesium carinatum DC.	SANTALACEAE
Thesium foliosum	SANTALACEAE
Thesium fructicosum	SANTALACEAE
Thesium lineatum L.f.	SANTALACEAE
Thesium nigromontanum Sond.	SANTALACEAE
Thesium penicillatum A.W.Hill	SANTALACEAE
Thesium pubescens DC.	SANTALACEAE
Thesium spicatum	SANTALACEAE
Thesium strictum P.J.Bergius	SANTALACEAE
Thesium virgatum	SANTALACEAE
Todea barbara (L.) T.Moore	OSMUNDACEAE
Trachyandra affinis	ASPHODELACEAE
Trachyandra jacquiniana (Roem. & Schult.) Oberm.	ASPHODELACEAE
Trachyandra revoluta (L.) Kunth	ASPHODELACEAE
Tribolium hispidum	POACEAE
Tribolium uniolae (L.f.) Renvoize	POACEAE
Tribulus terrestris	ZYGOPHYLLACEAE
Trichodiadema spp	ASTERACEAE
Tripteris aghillana aghillana	ASTERACEAE
Tripteris sinuata DC.	POACEAE
Triraphis andropogonoides	POACEAE
Triraphis schinzii Hack.	IRIDACEAE
Tritonia bakeri	IRIDACEAE
Tritonia bakeri subsp. bakeri	IRIDACEAE
Tritonia pallida pallida	IRIDACEAE
Tritonia pallida subsp. taylorae	IRIDACEAE
Tritonia securigera (Aiton) Ker Gawl.	IRIDACEAE
Tritoniopsis antholyza	IRIDACEAE
Tritoniopsis triticea (Burm.f.) Goldblatt	CRASSULACEAE
Tylecodon cacalioides	CRASSULACEAE
Tylecodon paniculatus	CRASSULACEAE
Tylecodon reticulatus subsp. reticulatus	CRASSULACEAE
Tylecodon ventricosus	CRASSULACEAE
Tylecodon wallichii subsp. wallichii	TYPHACEAE
Typha capensis	ASTERACEAE
Ursinia anthemoides	ASTERACEAE
Ursinia anthemoides subsp. anthemoides	ASTERACEAE
Ursinia heterodonta	ASTERACEAE
Ursinia nana nana	ASTERACEAE
Ursinia scariosa scariosa	ASTERACEAE
Ursinia sericea	LENTIBULARIACEAE
Utricularia bisquamata	HYACINTHACEAE
Veltheimia capensis	FABACEAE
Virgilia divaricata	VISCACEAE

Viscum capense subsp. capense	VISCACEAE
Viscum capense subsp. hoolei	VISCACEAE
Viscum continuum E. Mey. ex Sprague	VISCACEAE
Viscum rotundifolium	CAMPANULACEAE
Wahlenbergia desmantha	CAMPANULACEAE
Wahlenbergia guthriei	CAMPANULACEAE
Wahlenbergia neorigida	CAMPANULACEAE
Wahlenbergia nodosa	CAMPANULACEAE
Wahlenbergia rubens (H.Buek) Lammers	CAMPANULACEAE
Wahlenbergia tenella var. tenella	CAMPANULACEAE
Wahlenbergia thunbergiana (H.Buek) Lammers	CAMPANULACEAE
Wahlenbergia undulata	IRIDACEAE
Watsonia fourcadei J.W.Mathews & L. Bolus	IRIDACEAE
Watsonia marlothii	IRIDACEAE
Watsonia schlechteri	IRIDACEAE
Watsonia wilmaniae	RESTIONACEAE
Willdenowia glomerata (Thunb.) H.P.Linder	RESTIONACEAE
Willdenowia teres	SOLANACEAE
Withania somnifera	COLCHICACEAE
Wurmbea spicata spicata	COLCHICACEAE
Wurmbea spicata ustulata (B. Nord.) B.Nord.	COLCHICACEAE
Wurmbea variabilis	SCROPHULARIACEAE
Zaluzianskya capensis	ZYGOPHYLLACEAE
Zygophyllum debile	ZYGOPHYLLACEAE
Zygophyllum flexuosum Eckl. & Zeyh.	ZYGOPHYLLACEAE
Zygophyllum foetidum Schrad. & J.C.Wendl.	ZYGOPHYLLACEAE
Zygophyllum fulvum	ZYGOPHYLLACEAE
Zygophyllum microcarpum Licht. ex Cham. & Schltdl.	ZYGOPHYLLACEAE
Zygophyllum morgsana L.	ZYGOPHYLLACEAE
Zygophyllum pubescens Schinz	ZYGOPHYLLACEAE
Zygophyllum retrofractum	ZYGOPHYLLACEAE
Zyrphelis microcephala	ASTERACEAE

MAMMAL LIST

MammalMAP — Virtual Museum of African Mammals
35 species found for locus = 3321CB. Date filter: Year collected/observed >= 1980

Genus	Species	Common name	Red list category	No. records	Atlas region endemic
Cryptomys	hottentotus	Southern African Mole-rat	Least Concern	2	Yes
Alcelaphus	buselaphus	Hartebeest	Not listed	1	Yes
Hippotragus	niger		Vulnerable	1	
Oreotragus	oreotragus	Klipspringer	Least Concern	218	Yes
Oryx	gazella	Gemsbok	Least Concern	51	Yes
Raphicerus	campestris	Steenbok	Least Concern	8	Yes
Raphicerus	melanotis	Cape Grysbok	Least Concern	17	Yes

Sylvicapra	grimmia	Bush Duiker	Least Concern	70	Yes
Tragelaphus	oryx	Common Eland	Least Concern	10	Yes
Tragelaphus	strepsiceros	Greater Kudu	Least Concern	31	Yes
Canis	mesomelas	Black-backed Jackal	Least Concern	5	Yes
Papio	ursinus	Chacma Baboon	Least Concern	15	Yes
Equus	zebra	Cape Mountain Zebra	Vulnerable	3	
Caracal	caracal	Caracal	Least Concern	25	Yes
Felis	silvestris	Wildcat	Least Concern	11	Yes
Panthera	pardus	Leopard	Least Concern	36	Yes
Herpestes	pulverulentus	Cape Gray Mongoose	Least Concern	7	Yes
Proteles	cristata	Aardwolf	Least Concern	2	Yes
Hystrix	africaeaustralis	Cape Porcupine	Least Concern	24	Yes
Pronolagus	randensis	Jameson's Red Rock Hare	Least Concern	1	Yes
Aethomys	granti	Grant's Rock Mouse	Least Concern	3	
Aethomys	namaquensis	Namaqua Rock Mouse	Least Concern	23	
Gerbilliscus	paeba	Paeba Hairy-footed Gerbil	Least Concern	2	Yes
Mastomys	natalensis	Natal Mastomys	Least Concern	1	
Otomys	unisulcatus	Karoo Bush Rat	Least Concern	3	
Parotomys	brantsii	Brants's Whistling Rat	Least Concern	8	Yes
Rhabdomys	pumilio	Xeric Four-striped Grass Rat	Least Concern	20	Yes
Ictonyx	striatus	Striped Polecat	Least Concern	3	Yes
Mellivora	capensis	Honey Badger	Near Threatened	2	Yes
Petromyscus	collinus	Pygmy Rock Mouse	Least Concern	1	Yes
Saccostomus	campestris	Southern African Pouched Mouse	Least Concern	3	Yes
Orycteropus	afer	Aardvark	Least Concern	21	Yes
Procavia	capensis	Rock Hyrax	Least Concern	7	Yes
Potamochoerus	porcus	Red River Hog	Not listed	2	Yes
Genetta	tigrina	Cape Genet	Least Concern	3	Yes

BIRD LIST

http://birp.adu.org.za/site_summary.php?site=33402125, accessed on 01/06/2016.

Species	**Species**
Egyptian Goose	*Alopochen aegyptiacus*
Lanner Falcon	*Falco biarmicus*
Rock Kestrel	*Falco rupicolus*
Lesser Kestrel	*Falco naumanni*
Black-shouldered Kite	*Elanus caeruleus*
Verreaux's Eagle	*Aquila verreauxii*
Booted Eagle	*Aquila pennatus*

Martial Eagle	*Polemaetus bellicosus*
Jackal Buzzard	*Buteo rufofuscus*
Southern Pale Chanting Goshawk	*Melierax canorus*
Black Harrier	*Circus maurus*
African Harrier-Hawk	*Polyboroides typus*
Grey-winged Francolin	*Scleroptila africanus*
Cape Spurfowl	*Pternistis capensis*
Common Quail	*Coturnix coturnix*
Speckled Pigeon	*Columba guinea*
Red-eyed Dove	*Streptopelia semitorquata*
Cape Turtle-Dove	*Streptopelia capicola*
Laughing Dove	*Streptopelia senegalensis*
Namaqua Dove	*Oena capensis*
African Black Swift	*Apus barbatus*
White-rumped Swift	*Apus caffer*
Little Swift	*Apus affinis*
Alpine Swift	*Tachymarptis melba*
Speckled Mousebird	*Colius striatus*
White-backed Mousebird	*Colius colius*
Red-faced Mousebird	*Urocolius indicus*
European Bee-eater	*Merops apiaster*
Acacia Pied Barbet	*Tricholaema leucomelas*
Ground Woodpecker	*Geocolaptes olivaceus*
Cardinal Woodpecker	*Dendropicos fuscescens*
Large-billed Lark	*Galerida magnirostris*
Barn Swallow	*Hirundo rustica*
White-throated Swallow	*Hirundo albigularis*
Greater Striped Swallow	*Hirundo cucullata*
Rock Martin	*Hirundo fuligula*
Fork-tailed Drongo	*Dicrurus adsimilis*
Pied Crow	*Corvus albus*
Cape Crow	*Corvus capensis*
White-necked Raven	*Corvus albicollis*
Cape Rock-jumper	*Chaetops frenatus*
Cape Bulbul	*Pycnonotus capensis*
Sombre Greenbul	*Andropadus importunus*
Cape Rock-Thrush	*Monticola rupestris*
Sentinel Rock-Thrush	*Monticola explorator*
Mountain Wheatear	*Oenanthe monticola*
Familiar Chat	*Cercomela familiaris*
African Stonechat	*Saxicola torquatus*
Cape Robin-Chat	*Cossypha caffra*
Karoo Scrub-Robin	*Cercotrichas coryphoeus*
African Reed-Warbler	*Acrocephalus baeticatus*
Victorin's Warbler	*Cryptillas victorini*
Cape Grassbird	*Sphenoeacus afer*
Bar-throated Apalis	*Apalis thoracica*
Grey-backed Cisticola	*Cisticola subruficapilla*
Cape Batis	*Batis capensis*
Fairy Flycatcher	*Stenostira scita*
Cape Wagtail	*Motacilla capensis*
African Pipit	*Anthus cinnamomeus*
Common Fiscal	*Lanius collaris*
Southern Boubou	*Laniarius ferrugineus*
Bokmakierie	*Telophorus zeylonus*
Pale-winged Starling	*Onychognathus nabouroup*
Red-winged Starling	*Onychognathus morio*
Pied Starling	*Spreo bicolor*
Cape Sugarbird	*Promerops cafer*
Malachite Sunbird	*Nectarinia famosa*

Orange-breasted Sunbird	*Anthobaphes violacea*
Greater Double-collared Sunbird	*Cinnyris afer*
Southern Double-collared Sunbird	*Cinnyris chalybeus*
Cape Sparrow	*Passer melanurus*
Cape Weaver	*Ploceus capensis*
Yellow Bishop	*Euplectes capensis*
Common Waxbill	*Estrilda astrild*
Cape Siskin	*Crithagra totta*
Cape Canary	*Serinus canicollis*
Black-headed Canary	*Serinus alario*
White-throated Canary	*Crithagra albogularis*
Yellow Canary	*Crithagra flaviventris*
Protea Seedeater	*Crithagra leucopterus*
Cape Bunting	*Emberiza capensis*
Cape White-eye	*Zosterops virens*
Karoo Prinia	*Prinia maculosa*

HERPETOFAUNA (REPTILES AND AMPHIBIANS) LIST

FrogMAP — Frog Atlas of Southern African
6 species found for locus = 3321CB. Date filter: Year collected/observed >= 1980

Genus	Species	Common name	Red list category	No. records	Atlas region endemic
Sclerophrys	capensis	Raucous Toad	Least Concern	2	
Vandijkophrynus	gariepensis	Karoo Toad (subsp. gariepensis)	Not listed	1	
Xenopus	laevis	Common Platanna	Least Concern	1	
Amietia	fuscigula	Cape River Frog	Least Concern	2	
Cacosternum	boettgeri	Common Caco	Least Concern	2	
Strongylopus	grayii	Clicking Stream Frog	Least Concern	1	

ReptileMAP — Reptile Atlas of Southern Africa
21 species found for locus = 3321CB. Date filter: Year collected/observed >= 1980

Genus	Species	Common name	Red list category	No. records	Atlas region endemic
Agama	*atra*	Southern Rock Agama	Least Concern (SARCA 2014)	3	
Bradypodion	*gutturale*	Little Karoo Dwarf Chameleon	Least Concern (SARCA 2014)	3	Yes
Dasypeltis	*scabra*	Rhombic Egg-eater	Least Concern (SARCA 2014)	1	
Cordylus	*cordylus*	Cape Girdled Lizard	Least Concern (SARCA 2014)	7	Yes
Karusasaurus	*polyzonus*	Karoo Girdled Lizard	Least Concern (SARCA 2014)	6	
Pseudocordylus	*microlepidotus*	Cape Crag Lizard	Least Concern (SARCA 2014)	1	Yes

Pseudocordylus	*microlepidotus*	Cape Crag Lizard (subsp. ?)	Not listed	2	
Afrogecko	*porphyreus*	Marbled Leaf-toed Gecko	Least Concern (SARCA 2014)	4	Yes
Chondrodactylus	*bibronii*	Bibron's Gecko	Least Concern (SARCA 2014)	5	
Pachydactylus	*geitje*	Ocellated Gecko	Least Concern (SARCA 2014)	9	Yes
Pachydactylus	*kladaroderma*	Thin-skinned Gecko	Least Concern (SARCA 2014)	2	Yes
Pachydactylus	*oculatus*	Golden Spotted Gecko	Least Concern (SARCA 2014)	1	Yes
Pedioplanis	*burchelli*	Burchell's Sand Lizard	Least Concern (SARCA 2014)	3	Yes
Pedioplanis	*lineoocellata*	Common Sand Lizard	Least Concern (SARCA 2014)	2	
Duberria	*lutrix*	South African Slug-eater	Least Concern (SARCA 2014)	1	Yes
Lamprophis	*guttatus*	Spotted House Snake	Least Concern (SARCA 2014)	1	
Psammophis	*crucifer*	Cross-marked Grass Snake	Least Concern (SARCA 2014)	1	
Psammophylax	*rhombeatus*	Spotted Grass Snake	Least Concern (SARCA 2014)	2	
Trachylepis	*capensis*	Cape Skink	Least Concern (SARCA 2014)	1	
Trachylepis	*homalocephala*	Red-sided Skink	Least Concern (SARCA 2014)	2	Yes
Trachylepis	*sulcata*	Western Rock Skink	Least Concern (SARCA 2014)	5	

INVERTEBRATE LISTS

LepiMAP — Atlas of African Lepidoptera
43 species found for locus = 3321CB. Date filter: Year collected/observed >= 1980

Genus	Species	Common name	Red list category	No. records	Atlas region endemic
Tsitana	*tulbagha*	Tulbagh sylph	Least Concern (SABCA 2013)	2	Yes
Aloeides	*aranda*	Aranda copper	Least Concern (SABCA 2013)	3	
Aloeides	*juana*	Juana copper	Least Concern (SABCA 2013)	4	Yes
Aloeides	*pierus*	Dull copper	Least Concern (SABCA 2013)	2	Yes
Anthene	*amarah*	Black striped hairtail	Least Concern (SABCA 2013)	3	

Anthene	*definita*	Common hairtail	Least Concern (SABCA 2013)	3	
Azanus	*ubaldus*	Velvet-spotted babul blue	Least Concern (SABCA 2013)	1	
Brephidium	*metophis*	Tinktinkie blue	Least Concern (SABCA 2013)	1	
Capys	*alpheus*	Orange banded protea	Least Concern (SABCA 2013)	1	Yes
Chrysoritis	*chrysaor*	Burnished opal	Least Concern (SABCA 2013)	5	Yes
Chrysoritis	*pan*	Henning's opal	Least Concern (SABCA 2013)	1	Yes
Chrysoritis	*plutus*	Plutus' opal	Least Concern (SABCA 2013)	3	Yes
Chrysoritis	*turneri*	Turner's opal	Least Concern (SABCA 2013)	1	Yes
Crudaria	*capensis*	Cape grey	Least Concern (SABCA 2013)	1	Yes
Crudaria	*leroma*	Silver spotted grey	Least Concern (SABCA 2013)	1	
Durbaniella	*clarki*	Clark's rocksitter	Least Concern (SABCA 2013)	1	Yes
Eicochrysops	*messapus*	Cupreous blue	Least Concern (SABCA 2013)	3	
Iolaus	*mimosae*	Mimosa sapphire	Least Concern (SABCA 2013)	5	Yes
Lampides	*boeticus*	Pea blue	Least Concern (SABCA 2013)	1	
Lepidochrysops	*asteris*	Brilliant blue	Least Concern (SABCA 2013)	1	Yes
Lepidochrysops	*robertsoni*	Robertson's blue	Least Concern (SABCA 2013)	1	Yes
Leptomyrina	*lara*	Cape black-eye	Least Concern (SABCA 2013)	2	
Leptotes			Not listed	1	
Lycaena	*clarki*	Eastern sorrel copper	Least Concern (SABCA 2013)	1	Yes
Oraidium	*barberae*	Dwarf blue	Least Concern (SABCA 2013)	1	
Stugeta	*bowkeri*	Bowker's marbled sapphire	Least Concern (SABCA 2013)	3	Yes
Thestor	*brachycerus*	Duke's skolly	Least Concern (SABCA 2013)	2	Yes
Thestor	*rooibergensis*	Rooiberg skolly	Least Concern (SABCA 2013)	12	Yes
Trimenia	*argyroplaga*	Large silver-spotted copper	Least Concern (SABCA 2013)	1	
Trimenia	*macmasteri*	McMaster's silver-spotted copper	Least Concern (SABCA 2013)	2	Yes

Tylopaedia	*sardonyx*	King copper	Least Concern (SABCA 2013)	1	
Virachola	*antalus*	Brown playboy	Least Concern (SABCA 2013)	1	
Charaxes	*jahlusa*	Pearl-spotted charaxes	Least Concern (SABCA 2013)	2	Yes
Charaxes	*pelias*	Protea charaxes	Least Concern (SABCA 2013)	1	Yes
Danaus	*chrysippus*	African monarch, Plain tiger	Least Concern (SABCA 2013)	1	
Pseudonympha	*trimenii*	Trimen's brown	Least Concern (SABCA 2013)	2	Yes
Stygionympha	*irrorata*	Karoo hillside brown	Least Concern (SABCA 2013)	4	
Tarsocera	*fulvina*	Karoo widow	Least Concern (SABCA 2013)	1	Yes
Vanessa	*cardui*	Painted lady	Least Concern (SABCA 2013)	1	
Papilio	*demodocus*	Citrus swallowtail	Least Concern (SABCA 2013)	1	
Belenois	*aurota*	Brown-veined white	Least Concern (SABCA 2013)	1	
Catopsilia	*florella*	African migrant	Least Concern (SABCA 2013)	1	
Pontia	*helice*	Common meadow white	Least Concern (SABCA 2013)	1	

OdonataMAP — Odonata Atlas of Africa
1 species found for locus = 3321CB. Date filter: Year collected/observed >= 1980

Genus	Species	Common name	Red list category	No. records	Atlas region endemic
Ischnura	*senegalensis*	Tropical Bluetail	Not listed	1	

Appendix D

ANNUAL PLAN OF OPERATIONS TEMPLATE FOR JAKKALSDANS NATURE RESERVE