The Karkloof Blue Butterfly Nature Reserve Management Plan

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MANAGEMENT PLAN APPROVAL PROCESS

Herewith the revised integrated management plan for The Karkloof Blue Butterfly Nature Reserve as compiled by the appointed management authority (SAPPI Southern Africa (Pty) Ltd) and Conservation Outcomes.

Authorisation

Title	Name	Signature and Date
KwaZulu-Natal MEC: Department of Economic Development, Tourism and Environmental Affairs		
Management Authority		

Review Date: 2035

Contents

APPENDICES

APPENDIX A: Copy of the Final Gazette Notice

APPENDIX B: List of statutes to which the nature reserve is subject.

APPENDIX C: Species lists for The Karkloof Blue Butterfly Nature Reserve

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

APO	Annual Plan of Operation
CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Area
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMA	Catchment Management Authority
CR	Critically Endangered
CREW	Custodians of Rare and Endangered Wildflowers
DFFE	Department of Environment, Forestry and Fisheries
DAERL	Department of Agriculture, Environmental Affairs, Rural Development and Land Reform
DWA	National Department of Water Affairs
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EN	Endangered
ESA	Ecological Support Area
EKZNW	Ezemvelo KZN Wildlife
FEPA	Freshwater Ecosystem Priority Area
FPA	Fire Protection Association
GIS	Geographical Information System
IDP	Integrated Development Plan (Municipal)
IUCN	International Union for the Conservation of Nature
LC	Least Concern
LT	Least Threatened
MA	Management Authority
MCA	Mountain Catchment Area
MEC	Member of the Executive Council
METT	Management Effectiveness Tracking Tool

MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NBA	National Biodiversity Assessment
NEM:BA	National Environmental Management: Biodiversity Act
NEM:PAA	National Environmental Management: Protected Areas Act
NEMA	National Environmental Management Act
NFEPA	National Freshwater Ecosystem Priority Area
NGO	Non-governmental Organisation
NPAES	National Protected Area Expansion Strategy
NR	Nature Reserve
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act
ONA	Other Natural Area
PA	Protected Area
PAMP	Protected Area Management Plan
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SDF	Municipal Spatial Development Framework
SMME	Small, Micro and Medium Enterprises
SMP	Strategic Management Plan
VU	Vulnerable

1 BACKGROUND

1.1 Purpose of the plan

A protected area management plan is a legal requirement (National Environmental Management: Protected Areas Act No. 57 of 2003) which aims to ensure the protection, conservation, and management of protected areas in accordance with the objectives of this Act. A management plan for a protected area is a strategic and practical document, which provides the framework for the development and operation of the site. It informs management at all levels, including landowners, the management authority, and environmental authorities across all spheres of government.

Specifically, the purpose of the management plan is to:

- Provide the primary strategic tool for management of the protected area.
- Justify the need for specific programmes and operational procedures.
- Provide for future thinking and continuity of management.
- Enable the Management Authority to develop and manage the protected area in a way that protects,
    - its values; and
    - the purpose for which it was established.

1.2 Structure of the Plan

Table 1: The structure and content of the Management plan sections.

Section 1:	Introduction and background to the Management Plan and The Karkloof Blue Butterfly Nature Reserve.
Section 2:	Strategic Management Framework of The Karkloof Blue Butterfly Nature Reserve detailing the Purpose, Vision, and Key Performance Areas.
Section 3:	Description of The Karkloof Blue Butterfly Nature Reserve.
Section 4:	Zonation Plan of The Karkloof Blue Butterfly Nature Reserve.
Section 5:	Administrative Structure of The Karkloof Blue Butterfly Nature Reserve.
Section 6:	Operational Management Framework which sets out the management targets that must be achieved in managing the Nature Reserve.
Section 7:	Management Plan Implementation, Review and Annual Plan of Operation for The Karkloof Blue Butterfly Nature Reserve.

The Management Plan development sequence is from top to bottom (Strategic management framework; Operational management framework and the Annual plan of operations). That is, the Values of the protected area lead to its Vision which in turn lead to its Purposes, and so on. This ends with the specific Management Actions. The implementation sequence acts from bottom to top. That is, implementing Management Actions ensures Key Deliverables are achieved which in turn achieve Objectives, Purposes and Vision.

1.3 Adaptive Management

This management plan is based on the concept and guiding principles of adaptive management. This is a structured and iterative process (Figure 1). The aim is to ensure decisions are based on the best available information. This is achieved by monitoring performance. By doing so, unexpected changes can be detected. The management plan can then be adapted. Management therefore remains relevant and effective.

Adaptive management enables landowners and managers to:

- Learn through experience.
- Take account of, and respond to, changes that affect the protected area.
- Develop or refine management processes.
- Adopt best practices and new innovations in biodiversity conservation management; and
- Demonstrate that management is appropriate and effective.

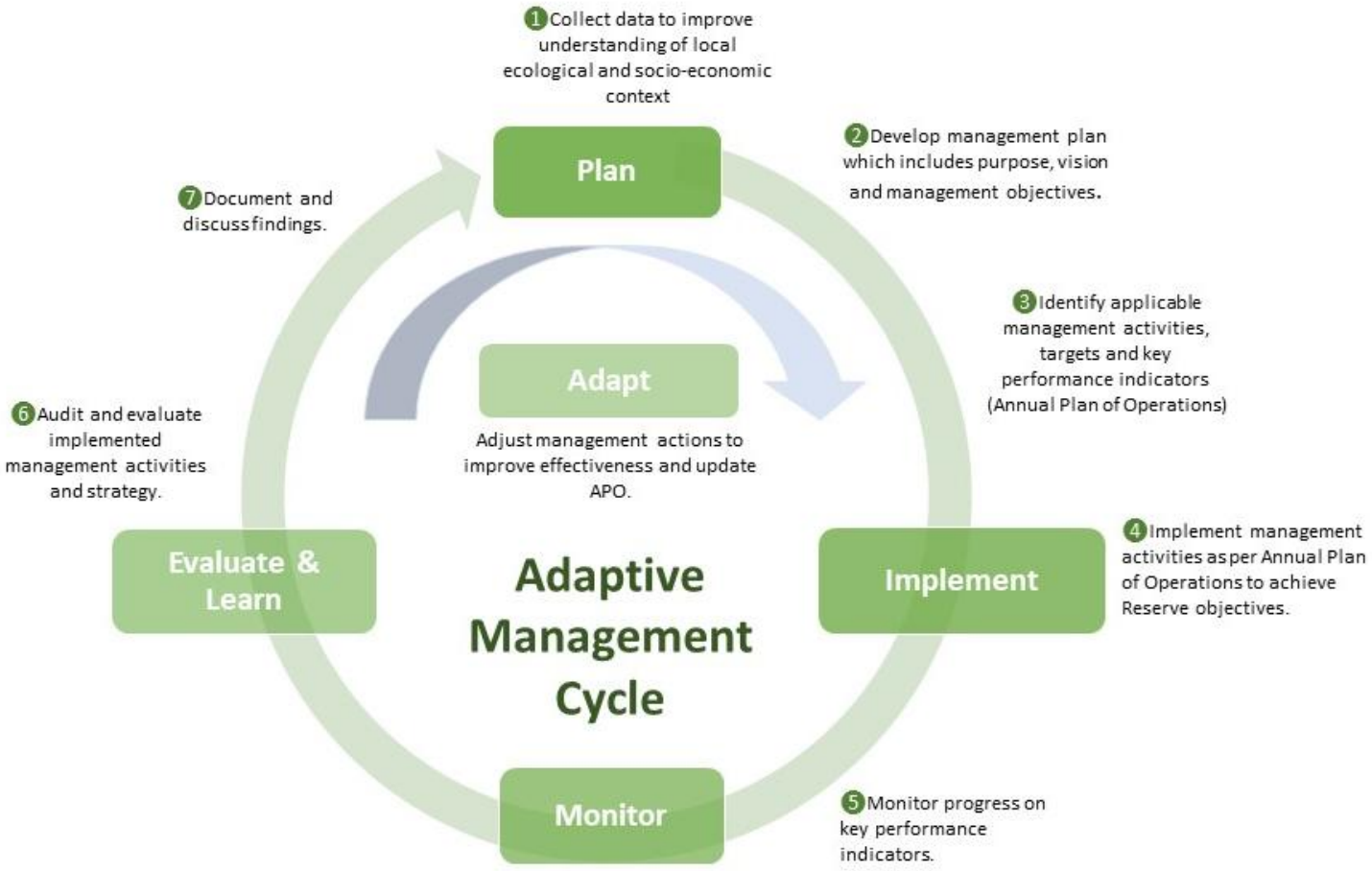

Figure 1: The adaptive management cycle

1.4 Introduction and Context

The Karkloof Blue Butterfly Nature Reserve, which is …. hectares in extent, is located in the Karkloof valley, north of Howick. (Figure 2) The reserve is small but has been declared because it is one of the last remaining breeding sites for the Karkloof Blue Butterfly (*Orachrysops ariandne)*, which is critically endangered.

The property was assessed on the 10th of May 2024 and approved for Nature Reserve status by the KZN Biodiversity Stewardship Review Panel on 4th of June 2024. The Karkloof Blue Butterfly Nature Reserve was declared on the …. (Gazette Notice …). A copy of the protected area declaration is found in Appendix A.

The Management Authority of the Karkloof Blue Butterfly Nature Reserve is SAPPI Southern Africa (Pty) Ltd, which also owns the reserve. The reserve is a portion of a larger property, all of which is owned and managed by SAPPI Southern Africa (Pty) Ltd. The declaration diagram for the reserve was approved by the SG on … with the number ….

Table 2: Property description for The Karkloof Blue Butterfly Nature Reserve

Property	Area Declared
Portion 2 of the Farm The Karkloof Blue Butterfly, no. 15458, registration division FT, Province of KwaZulu-Natal, measuring 358.3343 (Three hundred and fifty eight comma three three four three) hectares and held under title T27458/981.	26 ha

Through its proclamation, The Karkloof Blue Butterfly Nature Reserve is subject to the provisions of the Protected Areas Act. The Act requires that the management authority of the Nature Reserve must, within 12 months of the proclamation, submit a strategic management plan for the Nature Reserve to the Honourable MEC, for approval with periodic management plan review every ten years. This document forms the foundation for the management of The Karkloof Blue Butterfly Nature Reserve and was developed and reviewed in fulfilment of requirements of the Protected Areas Act.

1.4.1 Location

The Karkloof Blue Butterfly Nature Reserve is in the Karkloof region of the KwaZulu-Natal midlands. It falls within the Umgungundlovu District Municipality and the uMngeni Local Municipality and is directly adjacent to an existing protected area, namely: Denleigh Protected Environment.

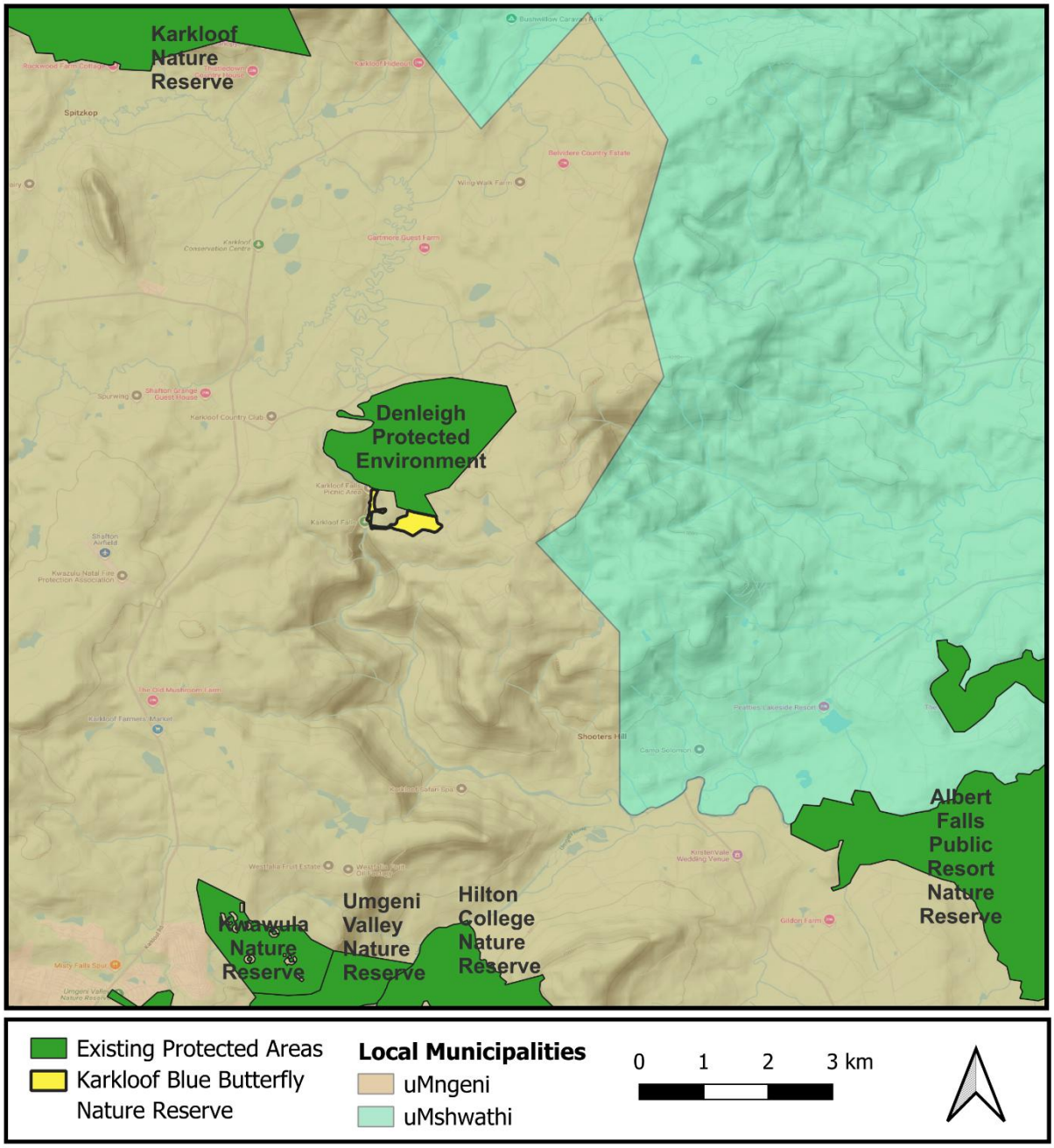

Figure 2: Regional location of The Karkloof Blue Butterfly Nature Reserve

1.5 Key Values

Values of a site are primarily those remarkable attributes that led to it being identified as a priority for the KZN Biodiversity Stewardship Programme and Protected Areas Expansion Strategy. The values are important in planning and management and are the features of the site that must be protected.

The values of the The Karkloof Blue Butterfly Nature Reserve are summarised as follows:

Socio-economic values	▪ The Karkloof Blue Butterfly Nature Reserve provides benefits to its landowners flowing from non-consumptive resource use.

Habitat and species values	▪ The Karkloof Blue Butterfly Nature Reserve is one of the last remaining breeding sites for the critically endangered *Orachrysops ariandne*.
Ecosystem function values	▪ The Karkloof Blue Butterfly Nature Reserve provides connection to surrounding natural habitat and other protected areas. ▪ The Karkloof Blue Butterfly Nature Reserve protects a stretch of the Karkloof River, a significant tributary of the Umgeni River.
Scenic values	▪ The Karkloof Blue Butterfly Nature Reserve is a place of beauty that makes an important contribution to the sense of place of the region.

1.6 Summary of the Management Challenges, Issues and Opportunities

A summary of the key management challenges, issues and opportunities addressed in the management plan are highlighted in the table below.

Table 3: Management challenges, issues, and opportunities

Key Performance Area	Issue	Opportunity	Challenge
Governance and institutional arrangements	Declaration of The Karkloof Blue Butterfly Nature Reserve	Formal declaration of The Karkloof Blue Butterfly Nature Reserve in terms of Section 23 of NEM:PAA.	Without a legal declaration the properties would be vulnerable to pressures such as land use change.
		Establishment of SAPPI Southern Africa as Management Authority to oversee the management of The Karkloof Blue Butterfly Nature Reserve.	Ensuring that regular communication between the management authority
	Landowners and Neighbouring communities	Ensuring the establishment of structures and processes that allow for meaningful engagement and participation of neighbours and neighbouring communities in the operations and benefits associated with the nature reserve.	Uncertainty about the nature reserve and the benefits associated with it, which may lead to a combative relationship with neighbours, particularly regarding fire, grazing and illegal hunting.
	Servitude register	Develop a detailed register of all servitudes and rights of way within the nature reserve.	Uncertainty or ignorance of servitudes and their legal status.
	Zonation	Ensure any infrastructure developments and use by staff and visitors is aligned with the nature reserve's zonation plan.	Development and use of the nature reserve is not aligned with the zonation plan resulting in the possible irreversible damage of sensitive habitats and threats to protected species.
Regional Management	Alignment with local and regional planning in determining appropriate buffers and land uses around the nature reserve.	Collaboration with EKZNW and other protected areas, surrounding landowners, and the local municipality to ensure appropriate land uses surrounding the nature reserve.	Ensuring the nature reserve is properly reflected in planning instruments and that impacting land uses do not affect the ecology or species of the reserve.
	Identification of a zone of influence for the reserve.	Identification of a zone of influence which can be discussed with the local authorities to ensure appropriate land use and activities in the regions around the reserve.	Inappropriate land use and activities in the areas around the reserve.
	Protected area expansion.	Achieving improved management effectiveness and ecological functioning on a regional scale by exploring collaborative management options with surrounding protected areas.	Enhancing the ecological viability and connectivity across the landscape.
	Partnerships and relationships are fostered with neighbours and other protected areas in the region.	Alignment with neighbouring nature reserves and regional initiatives to further biodiversity conservation in the region.	Achievement of shared ecological, biodiversity and socio-economic goals at a landscape scale.

Key Performance Area	Issue	Opportunity	Challenge
	Water use planning and management that considers the ecological needs of the The Karkloof Blue Butterfly Nature Reserve	Participation in catchment management planning processes.	Non-existent or inappropriate catchment management that leads to detrimental impacts.
PA financial viability	Ensure that The Karkloof Blue Butterfly Nature Reserve is adequately catered for in the overall SAPPI budget.	Effectively capture and motivate for finances within the SAPPI budget, such that the Nature Reserve is effectively managed.	Ensuring that budget is adequately prioritised.
Socio-economic management	Fostering positive relationships with neighbouring properties and communities.	Foster positive community relationships through open communication, appropriate support, and appropriate access to the Nature Reserve.	Inappropriate access from the public that negatively impacts the biodiversity or security of the site.
	Participating in regional socio-economic development initiatives.	Creating links with the broader protected area network.	Contributing towards sustainable economic development in the region.
Operational Management	Environmental management.	Ensuring effective environmental management of the timber and avocado operations, such that the potential for pollution or other forms of environmental harm are minimised.	Pollution, environmental harm and ecological degradation associated with farming activities occur within the nature reserve.
	Cycle tracks and hiking paths.	Effective management of the sections of Karkloof Club Trails within the Nature Reserve are used and maintained in a responsible manner.	Abuse of the Karkloof Club Trail system that results in erosion, littering and, or pollution.
	Human resource management systems.	Ensuring there are adequate personnel to effectively manage the nature reserve.	Implementation of ad hoc staff performance and skills development approaches.
	Ensuring compliance with the Occupational Health and Safety Act.	Ensuring the health and safety of staff and visitors within the reserve.	Legal liability and risk associated with non-compliance with the Occupational Health and Safety Act.
	Data management.	The information relating to the Nature Reserve is adequately stored in the larger SAPPI IT system and accessible by the appropriate staff members.	Ensuring that data is collated and appropriately utilised to inform management decisions and interventions.
	Annual reserve budget	Developing a realistic budget that is clearly linked to the reserve's APO, therefore creating agency for the reserve (forestry) manager.	Developing a realistic budget with limited and/or ad hoc historical information.
Law enforcement	Access control	Ensuring appropriate access to the nature reserve through designated access points.	Potential issues associated illegal exit and entry points into The Karkloof Blue Butterfly Nature Reserve. Unplanned fire, poaching, and illegal plant harvesting.
	Law enforcement within the nature reserve.	Jointly addressing security issues in collaboration with neighbouring landowners, EKZNW, local security companies and SAPS, etc	Ensuring adequate security within the nature reserve.
Ecological management	Vegetation management	Implementation of appropriate monitoring and surveillance programmes to determine species composition in the colony area.	Ecological degradation resulting from historical and current inappropriate management practices, which negatively impacts the occurrence of the Karkloof Blue Butterfly host plant.
	Implementing a fire regime based on ecological principles.	Implementation of an ecologically based fire regime, which maintains heterogeneity, ecological functioning of the habitats within the reserve and integrate with neighbouring landowners.	Balancing the requirements for ecological management, timber plantation safety, and insurance requirements.
	Management of protected and threatened species on the reserve.	Developing and maintain specific monitoring and management requirements for the Karkloof blue butterfly.	Maintaining effective standard of monitoring and protection of the Karkloof blue butterfly.
	Species inventories	Efforts must be made to identify and document the species within the nature reserve.	Activities or management practices within the nature reserve that may unintentionally be negatively impacting on unknown species.
	Water resource management	Implementation of catchment management measures that maintain the integrity of the water resources and their ecological functions within the nature reserve.	Potential impacts on water quality and quantity, as well as issues such as the encroachment of invasive alien species,

Key Performance Area	Issue	Opportunity	Challenge
			resulting from inappropriate catchment management.
	Erosion control	Identifying areas that are susceptible to erosion and implementing measures to address human induced soil erosion.	Monitoring of plant basal cover in the nature reserve at key susceptible locations.
	Control of infestations of invasive and alien plant species listed in terms of the Biodiversity Act and CARA	Development of a comprehensive invasive species control plan that that is effective in controlling invasive and alien species on the nature reserve.	Threat of encroachment and infestations of species if effective control measures are not implemented.
Heritage management	Documentation of historic and archaeological artefacts should they occur on the nature reserve.	Establishing inventories of artefacts within the nature reserve and implementing appropriate measures to protect them should any be discovered.	Integrating cultural, historic and archaeological attributes of the region in tourism and other commercial activities, where appropriate.
Research	Aligning research with key nature reserve management and operational issues.	Encouragement and support of research and monitoring programmes and projects that can inform key management issues.	Collaboration with tertiary institutions that are implementing research programmes relevant to the nature reserve.

2 STRATEGIC MANAGEMENT FRAMEWORK

The strategic management framework is the basis for the protection, development, and operation of The Karkloof Blue Butterfly Nature Reserve over a ten-year period. It consists of the Vision, Purpose and Objectives of The Karkloof Blue Butterfly Nature Reserve.

2.1 Purpose of The Karkloof Blue Butterfly Nature Reserve

The purpose of the Nature Reserve is the foundation on which all future actions are based and it is in line with the key ecological attributes of the reserve and the overall management philosophy of the management authority. According to Section 17 of the National Environmental Management: Protected Areas Act, the purpose of declaring Protected Areas is:

1. To protect ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes in a system of protected areas.
2. To preserve the ecological integrity of those areas.
3. To conserve biodiversity in those areas.
4. To protect areas representative of all ecosystems, habitats and species naturally occurring in South Africa.
5. To protect South Africa's threatened or rare species.
6. To protect an area which is vulnerable or ecologically sensitive.
7. To assist in ensuring the sustained supply of environmental goods and services.
8. To provide for the sustainable use of natural and biological resources.
9. To create or augment destinations for nature-based tourism.
10. To manage the interrelationship between natural environmental biodiversity, human settlement and economic development.
11. Generally, to contribute to human, social, cultural, spiritual and economic development.
12. To rehabilitate and restore degraded ecosystems and promote the recovery of endangered and vulnerable species.

PURPOSE

In light of the above, The Karkloof Blue Butterfly Nature Reserve strives to protect South Africa's threatened or rare species and to conserve biodiversity.

In summary, there are five main reasons for the declaration of The Karkloof Blue Butterfly Nature Reserve.

1. It is essential for the conservation of the Karkloof Blue Butterfly, being one of three remaining, known, breeding colonies.
2. It is an important ecological linkage in the landscape.
3. It falls within a Strategic Water Source Area and protects a stretch of the Karkloof river, an important tributary of the Umgeni River.
4. It comprises a vegetation type classified as Endangered.

2.2 Vision of The Karkloof Blue Butterfly Nature Reserve

The vision statement below describes the desired long-term, over-arching outcome that is a result of the effective management of the reserve.

To safeguard critical habitat for threatened and endemic species, particularly the iconic Karkloof Blue Butterfly, exemplifying a committed corporate contribution to biodiversity conservation and environmental stewardship.

2.3 Objectives and Strategic Outcomes

An objective has been identified for each of The Karkloof Blue Butterfly Nature Reserve's key performance areas, which follow from the management challenges, issues and opportunities, and relate to the important functions and activities necessary to protect, develop and manage it effectively. The objectives have then been translated into strategic outcomes, which form the basis for the management activities and targets set out in the operational management framework, described in Section 6 below. Table 4 sets out the key performance areas, the objective for each key performance area and the strategic outcomes, required to realise the objectives.

In the Annual Plan of Operation (APO), the objectives below are prioritised in terms of importance and urgency and detailed management actions are described that will deliver the desired outcomes under each objective.

Table 4: Objectives and strategic outcomes for The Karkloof Blue Butterfly Nature Reserve

Key Performance Area	Objective	Strategic Outcome
Governance and institutional arrangements	Appropriate administrative and management structures and processes are in place to ensure The Karkloof Blue Butterfly Nature Reserve is effectively protected and conserved.	• Administrative and oversight structures are established and maintained to enable cooperation between the Management Authority and management staff within the nature reserve.
Compliance	Comply with and enforce legislation pertaining to the protection, development, and management of The Karkloof Blue Butterfly Nature Reserve	• The Karkloof Blue Butterfly Nature Reserve has been legally declared and all relevant documentation has been submitted and title deeds have been endorsed and declaration of The Karkloof Blue Butterfly Nature Reserve has been gazetted with the correct property descriptions. • The boundaries of The Karkloof Blue Butterfly Nature Reserve are accurately known. • Standard operating procedures are in place as part of a disaster risk management strategy. • All management activities within The Karkloof Blue Butterfly Nature Reserve are compliant with the provisions of NEM:PAA, NEMA and the KZN Nature Conservation Ordinance (15 of 1974). • A servitude register is developed for The Karkloof Blue Butterfly Nature Reserve. • Adequate fire safety within the nature reserve is ensured.
Regional Management	Explore opportunities to consolidate and expand The Karkloof Blue Butterfly Nature Reserve's boundaries and promote compatible land uses in the areas surrounding the nature reserve.	• The Karkloof Blue Butterfly Nature Reserve is integrated within local and regional land-use planning frameworks. • Opportunities to expand The Karkloof Blue Butterfly Nature Reserve are explored and, where feasible, acted upon. • Identification of a zone of influence which can be discussed with the local authorities to ensure appropriate land use and activities in the regions around the reserve.
PA financial viability	Ensure that the nature reserve is adequately catered for in the overall SAPPI budget, and that commercial operations are done in a way that mitigates impacts on the nature reserve.	• Income is generated for The Karkloof Blue Butterfly Nature Reserve in an environmentally responsible manner. • Management costs for the reserve are effectively captured and motivated for.
Socio-economic Management	Foster strong community relationships with stakeholders and neighbours to ensure strong support for the reserve and meaningful socio-economic benefits to the surrounding communities.	• Foster cooperation and collaboration with neighbours and neighbouring communities in the region. • Community relations and communication on issues impacting The Karkloof Blue Butterfly Nature Reserve and neighbours is maintained and improved.
Operational Management	Systems are in place to ensure the effective management of infrastructure, staff, and administration such that the nature reserve can operate optimally.	• There is sufficient equipment to enable staff to effectively manage the reserve. • Activities undertaken in and around the nature reserve are carried out in an environmentally responsible manner.
		• There are sufficient and adequately qualified staff to carry out the management functions of The Karkloof Blue Butterfly Nature Reserve. • There are effective administration systems implemented to carry out the management functions of The Karkloof Blue Butterfly Nature Reserve.

Key Performance Area	Objective	Strategic Outcome
Law Enforcement	Ensure adequate safety and security within The Karkloof Blue Butterfly Nature Reserve to combat illegal activities.	• There is effective access control to The Karkloof Blue Butterfly Nature Reserve. • There is effective security and law enforcement within The Karkloof Blue Butterfly Nature Reserve.
Ecological Management	Protect the ecosystem functioning and habitat of The Karkloof Blue Butterfly Nature Reserve to ensure its long-term ecological integrity and the maintenance of its species and species assemblages.	• Critical ecological processes and functions are maintained within The Karkloof Blue Butterfly Nature Reserve. • Fire management is undertaken based on ecological principles, the recommendations of studies undertaken, and the consideration of landscape-level and important species issues. • The Karkloof Blue Butterfly Nature Reserve has no areas that are actively eroding at rates more than would be expected in a natural environment. • Water resource management is undertaken in a pragmatic manner that considers implications at a landscape-level. • Invasive alien (and indigenous) plant species control measures are planned and implemented in a systematic manner.
Cultural Heritage management	Protect the sense of place, natural character, historic and cultural heritage of The Karkloof Blue Butterfly Nature Reserve.	• Any cultural, historical, and living heritage of the area is documented and safeguarded. • Threats to sense of place (natural impairments including visual and auditory) are minimised, i.e., the original character of the reserve is retained.
Research	Encourage and support research that informs key management interventions and improves knowledge and understanding of the reserve's ecology, species, and habitats	• Research occurring on the reserve, improves the knowledge and understanding of key management issues and interventions within The Karkloof Blue Butterfly Nature Reserve.

3 DESCRIPTION OF THE KARKLOOF BLUE BUTTERFLY NATURE RESERVE

3.1 History of The Karkloof Blue Butterfly Nature Reserve

The Karkloof Blue Butterfly Nature Reserve is situated on the farm known as The Start, which is owned by SAPPI Pty, a large-scale timber company. Initially, the farm was used for agricultural purposes but eventually transitioned to plantation forestry under SAPPI's ownership. Over time, a portion of the land has been set aside as a conservation area, preserving valuable natural habitats.

One of the significant conservation efforts on The Start is the preservation of a grassland area, which serves as the breeding site for the critically endangered Karkloof Blue Butterfly (Orachrysops ariadne). This butterfly species is highly dependent on specific grassland habitats, and its survival is closely tied to the maintenance of these ecosystems. SAPPI's commitment to conservation has helped protect this fragile habitat, contributing to efforts to safeguard the butterfly's future.

Today, while the majority of The Start is used for plantation forestry, this grassland area remains a crucial conservation asset, underscoring the balance between commercial forestry and biodiversity preservation.

3.2 Legislative basis for management of The Karkloof Blue Butterfly Nature Reserve

There is a large body of legislation that is relevant to the management of protected areas. However, the primary legislation is the National Environmental Management: Protected Areas Act (No.57 of 2003). This will be 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 KwaZulu-Natal, Ezemvelo KZN Wildlife is the Provincial Conservation Authority and the provincial Biodiversity Stewardship Programme facilitates the establishment and management of protected areas on private land.

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

3.2.1 Specific requirements of the Act (Section 41)

Section 41 of the Act specifies what must and may be included in a Management Plan.

Section 41(1) The object of a management plan is to ensure the protection, conservation and management of the protected area concerned in a manner which is consistent with the objectives of this Act and the purpose for which the area was declared.

Section 41(2) A management plan must contain at least:

(a) the terms and conditions of any applicable biodiversity management plan.
(b) a co-ordinated policy framework.
(c) such planning measures, controls and performance criteria as may be prescribed.
(d) a programme for the implementation of the plan and its costing.
(e) procedures for public participation, including participation by the owner (if applicable), any local community or other interested party;

(f) where appropriate, the implementation of community-based natural resource management; and
(g) a zoning of the area indicating what activities may take place in different sections of the area, and the conservation objectives of those sections.

Section 39 of the Act deals with the requirements to be met when preparing a Management Plan

Section 39(1) The Minister or the MEC may make an assignment in terms of section 38(1) or (2) only with the concurrence of the prospective management authority.

Section 39(2) The management authority assigned in terms of section 38(1) or (2) must, within 12 months of the assignment, submit a management plan for the protected area to the Minister or the MEC for approval.

Section 39(3) When preparing a management plan for a protected area, the management authority concerned must consult municipalities, other organs of state, local communities and other affected parties which have an interest in the area.

Section 39(4) A management plan must consider any applicable aspects of the integrated development plan of the municipality in which the protected area is situated.

3.2.2 Proclamation Status

The Karkloof Blue Butterfly Nature Reserve was declared on the … (Gazette Notice …). A copy of the protected area declaration is found in Appendix A.

3.2.3 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 Section 6 of this management plan.

3.3 Regional and Local Planning

The Karkloof Blue Butterfly Nature Reserve falls within the … District Municipality and the … Local Municipality, which set the regional and local planning frameworks.

The … Local Municipality SDF of 20… acknowledges …. as the two formally protected areas within their jurisdiction. It also highlights the … Macro-ecological corridor, which cuts across the municipality on an east-west axis. It acknowledges that these are sensitive areas that should be restricted for development.

It is important to ensure that The Karkloof Blue Butterfly Nature Reserve is registered on the respective Municipalities' databases as a formally protected area.

3.3.1 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) (DEA 2018) 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 KwaZulu-Natal Protected Area Expansion Strategy (KZN PAES) 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 National Protected Areas Expansion Strategy (NPAES). There are areas within the reserve which have been identified as priorities for the National Protected Areas Expansion strategies (Figure 3)

In addition, The Karkloof Blue Butterfly Nature Reserve is south of the … Macro-ecological corridor, identified by Ezemvelo KZN Wildlife, which provides an important stepping-stone for biodiversity conservation in the area.

At a landscape level this means that the Karkloof Blue Butterfly Nature Reserve is important in linking other protected areas, in enabling large-scale ecological processes across the region and in enabling climate change adaptation through facilitating the movement of wide-ranging species across different areas and habitat types.

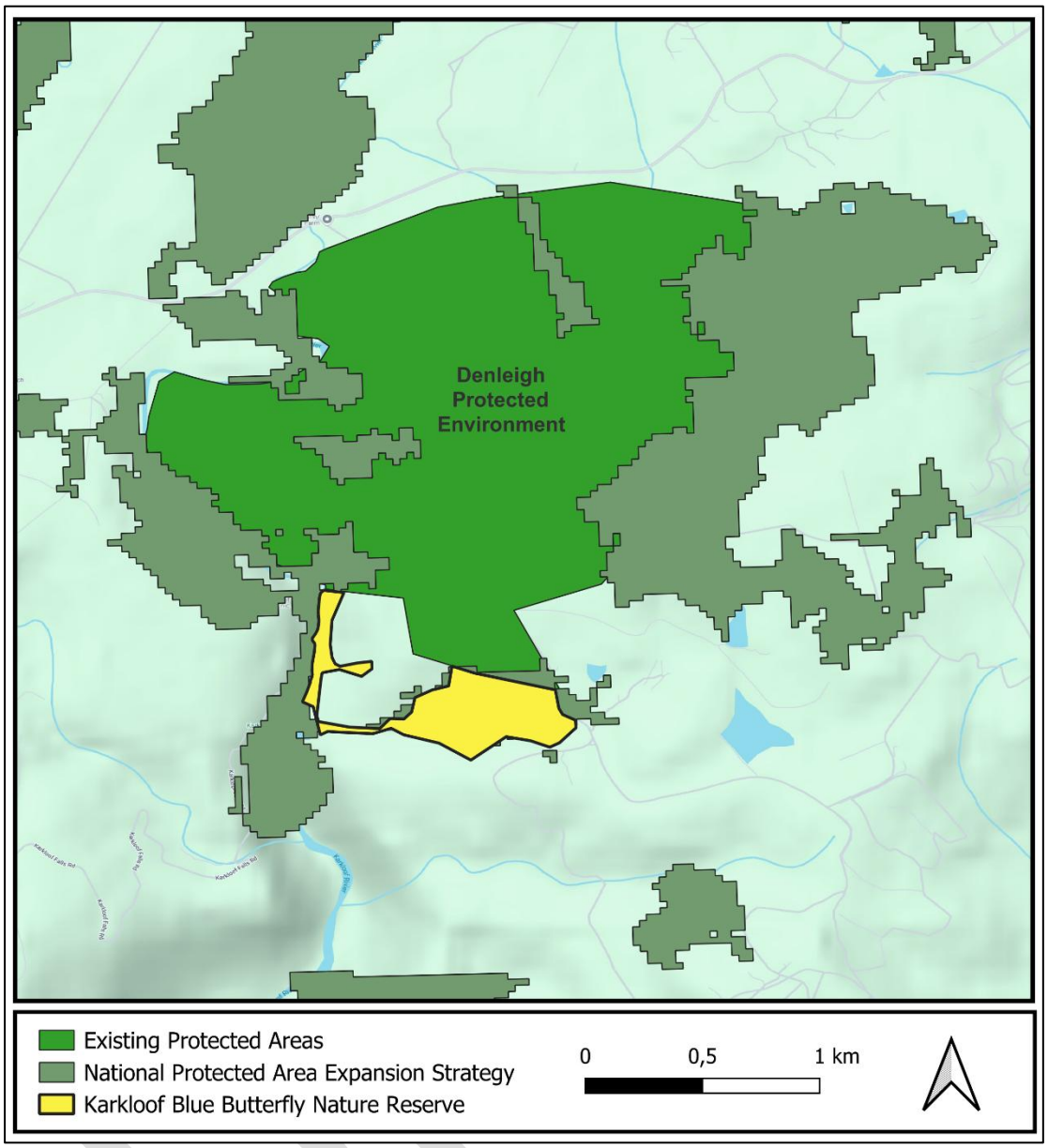

Figure 3: National and KZN Protected Area Expansion Priorities

3.4 Surrounding Area Land Use and Land Modification

The surrounding land use is predominantly characterized by timber plantations and commercial agriculture. The fertile soils and favorable climate make it an ideal location for both industries. Large-scale timber plantations, primarily for commercial forestry, are a dominant feature of the landscape, with companies like SAPPI Pty and others managing extensive areas of pine and eucalyptus plantations.

In addition to forestry, commercial agriculture plays a significant role in the region's economy. The area supports a variety of farming activities, including livestock grazing, crop production, and horticulture. Agricultural practices in the Karkloof are typically intensive, with a focus on maximizing productivity while maintaining the area's agricultural viability.

Despite the widespread use of the land for timber and agriculture, pockets of natural vegetation and conservation areas, like the Karkloof Blue Butterfly Nature Reserve, are important for preserving biodiversity and maintaining ecological balance. These conservation efforts are increasingly critical in regions where development pressures from both the timber and agricultural sectors continue to grow.

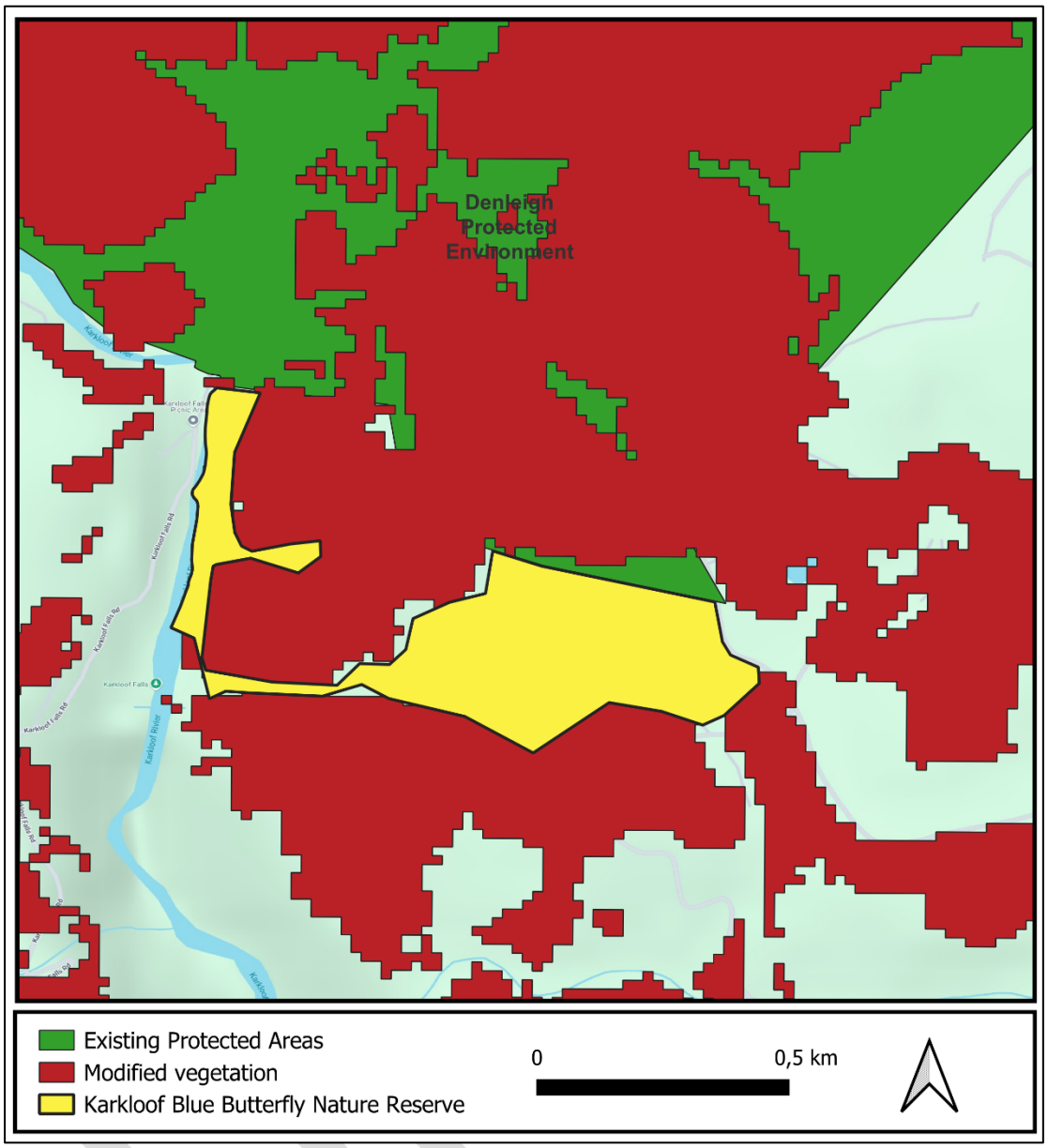

Figure 4: Habitat transformation surrounding The Karkloof Blue Butterfly Nature Reserve

3.5 Ecological Context of The Karkloof Blue Butterfly Nature Reserve

3.5.1 Climate and Weather

The Karkloof area experiences a subtropical climate characterized by moderate temperatures and high rainfall. The region's climate is influenced by its elevation, with temperatures generally ranging from 15°C to 25°C throughout the year. Summers are warm and humid, with rainfall peaking from October to March, often in the form of afternoon thunderstorms, contributing to an average annual rainfall of approximately 1,200 mm. Winters are mild and dry, with cooler temperatures, particularly during the evenings and early mornings. This seasonal variation in temperature and precipitation supports a rich and diverse ecosystem, making the area suitable for a wide range of flora and fauna. However, the region's vulnerability to extreme weather events, such as heavy rainfall and occasional droughts, necessitates careful monitoring and adaptive management to ensure the protection and resilience of its natural resources.

3.5.2 Topography, Geology and Soils

The nature reserve features a relatively gentle altitudinal gradient, with the highest point reaching just over 1,120 meters above sea level (ASL) and the lowest at 1,040 meters ASL where it meets the Karkloof River. Given its modest elevation range, the reserve is primarily underlain by shale soils, which result from the weathering and erosion of rock formations at higher elevations. These shale-derived soils are typically clay-rich and provide an ideal substrate for the Karkloof Blue Butterfly's host plant, *Indigofera woodii*. This plant thrives in well-drained, nutrient-rich, and slightly acidic soils, which are well-supported by the reserve's soil conditions.

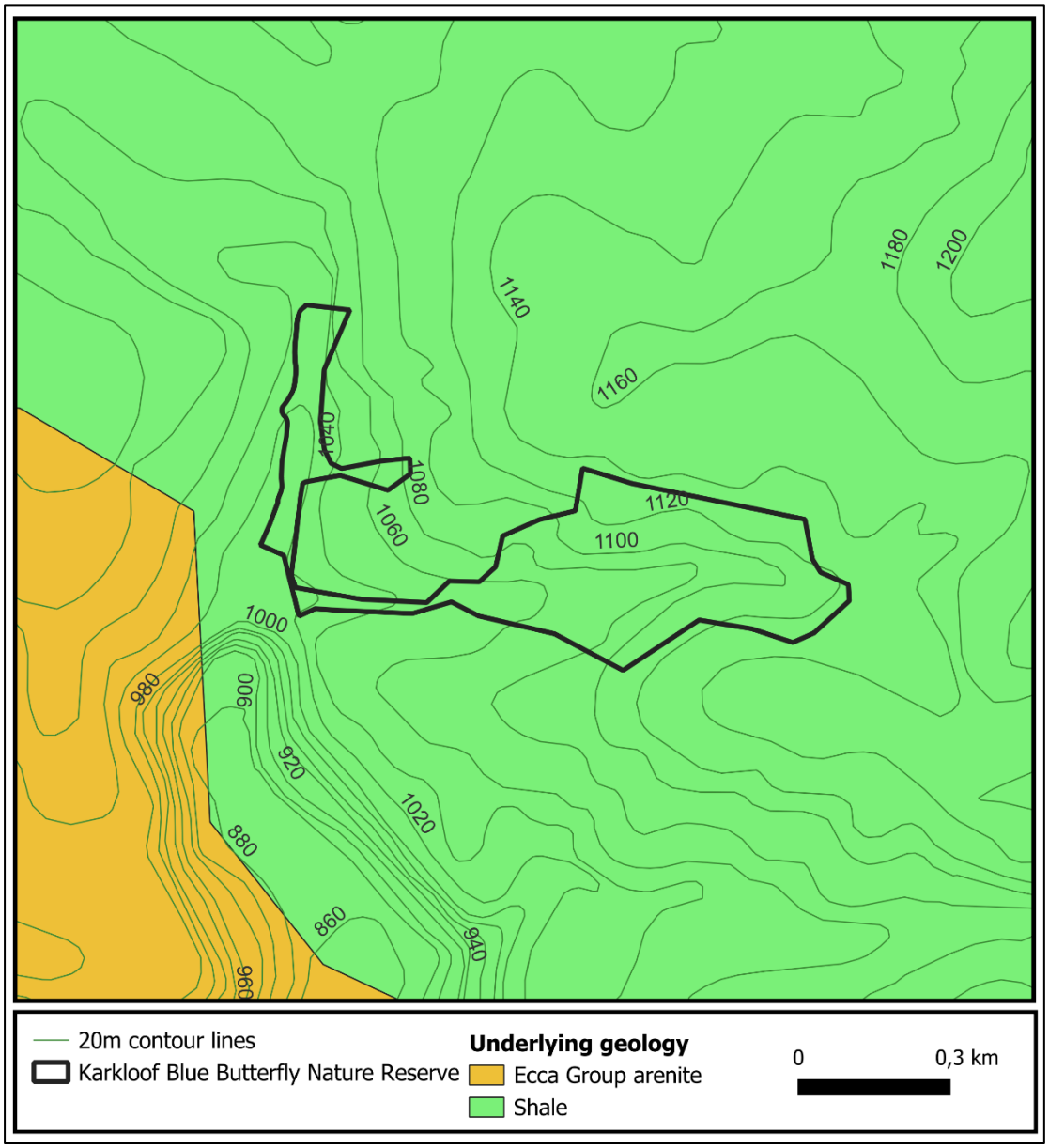

Figure 5: Topographical map of The Karkloof Blue Butterfly Nature Reserve

3.5.3 Hydrology

The eastern portion of the Karkloof Blue Butterfly Nature Reserve is defined by a valley that runs east to west, draining westward into the Karkloof River. While there are no National Freshwater Ecosystem Priority Areas (NFEPA) wetlands within the reserve, the Karkloof River itself is classified as a NFEPA river and serves as a vital tributary to the Umgeni River

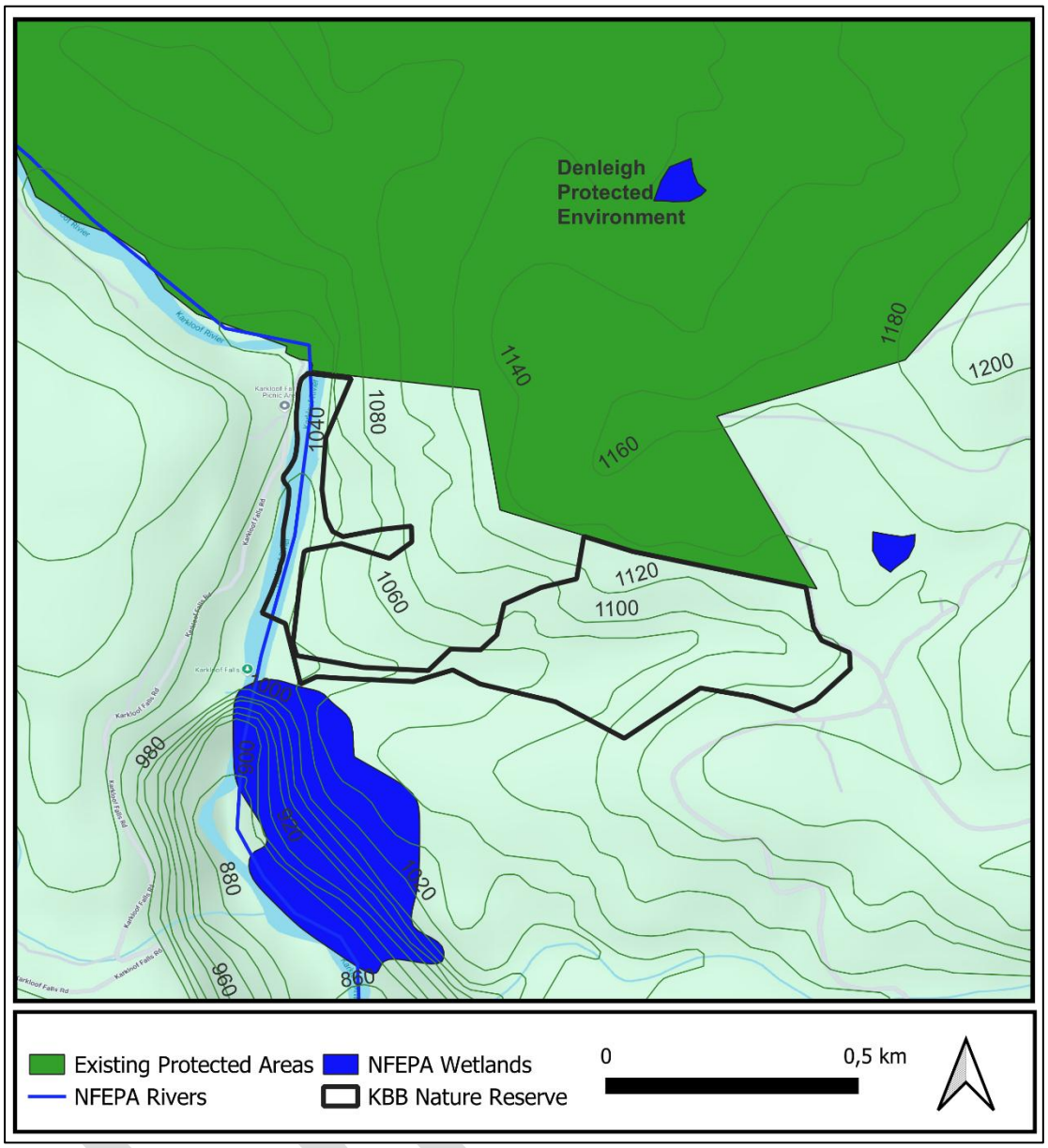

Figure 6: Hydrology of The Karkloof Blue Butterfly Nature Reserve

3.5.4 Vegetation

The updated KZN vegetation layer, which has refined the vegetation types identified by Mucina and Rutherford's (2006) national layer, has identified three vegetation types within The Karkloof Blue Butterfly Nature Reserve, namely: Midlands Mistbelt Grassland, Eastern Mistbelt Forests, and Dry Coast Hinterland Grassland (Figure 7).

Table 5 is a summary of their respective sizes, threat statuses and contributions to the provincial conservation targets.

Table 5:Vegetation types in The Karkloof Blue Butterfly and their contribution towards protected area targets

Vegetation type	Threat status	Extent of vegetation within the reserve (ha)	Proportion of provincial extent of	Contribution to biodiversity targets

			veg type within the reserve	
Dry Coast Hinterland Grassland	Vulnerable	2,8	0,002%	0,004%
Eastern Mistbelt Grassland	Endangered	2,1	0,007%	0,007%
Midlands Mistbelt Grassland	Endangered	21,1	0,016%	0,017%

Midlands Mistbelt Grassland is the dominant vegetation type within the reserve, covering approximately 21 ha of the total 26 ha. Classified as Endangered, this grassland has experienced a loss of nearly 80% of its original extent. The remaining patches are highly fragmented due to development pressures, particularly from timber production and commercial agriculture. Typically, the grassland is characterized by tall, forb-rich, sour Themeda triandra grasslands, which have been altered by the invasive spread of native Ngongoni grass (Aristida junciformis subsp. junciformis).

Dry Coast Hinterland Grassland is a sparse, wiry grassland dominated by the unpalatable *Ngongoni grass* (*Aristida junciformis*), which results in low species diversity due to its monodominance. In areas of good condition, this grassland type is primarily dominated by *Themeda triandra* and *Tristachya leucothrix*. Wooded areas are typically found in the valleys at lower altitudes, as is evident in the Karkloof Blue Butterfly Nature Reserve. According to the KZN Vegetation Layer (EKZNW 2011), this vegetation type is classified as vulnerable.

Eastern Mistbelt Forest

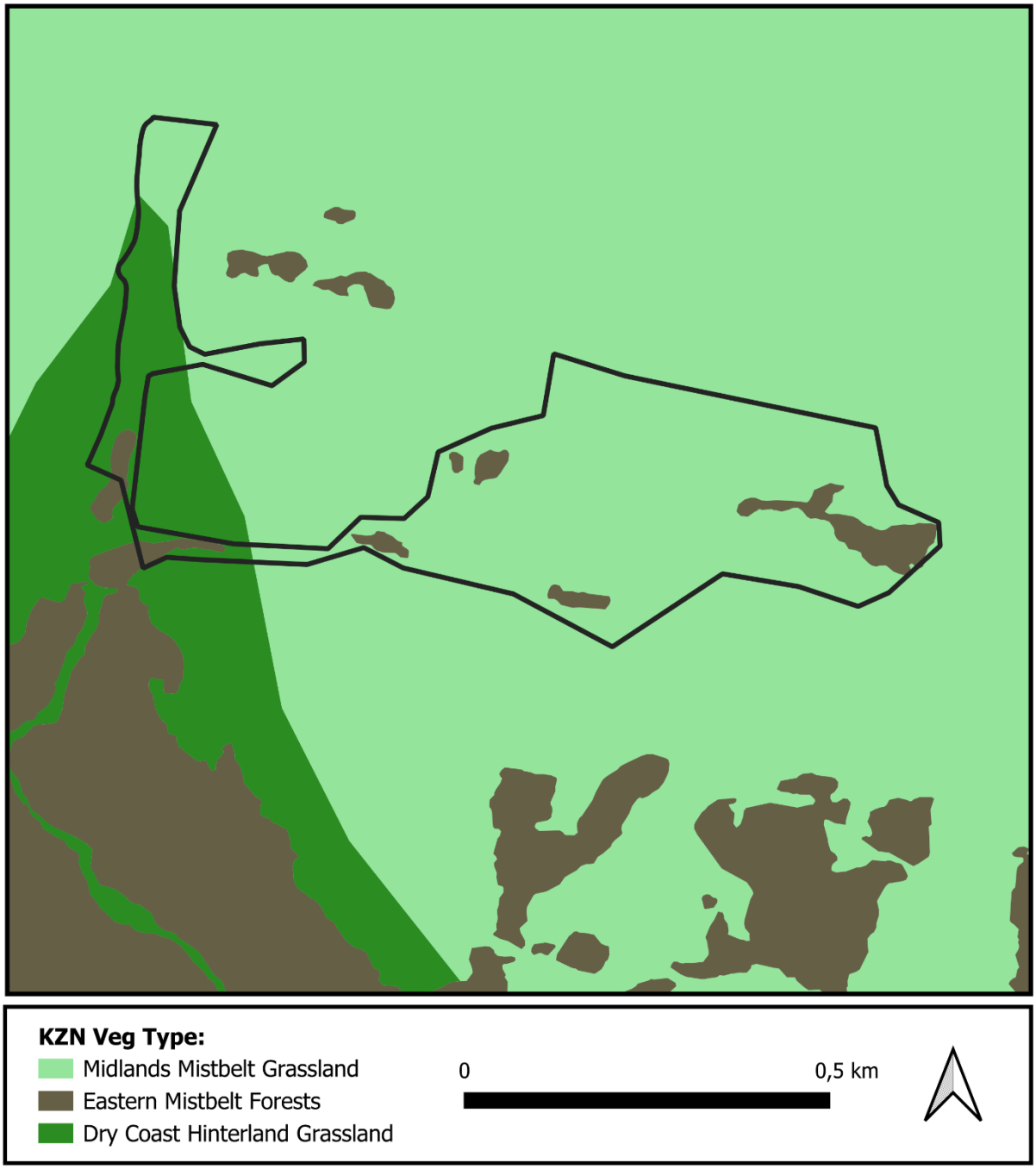

Figure 7: Vegetation of The Karkloof Blue Butterfly Nature Reserve

3.5.5 Threatened and Endemic Plant Species

There are a number of confirmed threatened and endemic plant species that occur within The Karkloof Blue Butterfly Nature Reserve (Table 6). However, there have been no extensive vegetation surveys done on the reserve, therefore this list should be viewed as a starting point.

Table 6:Threatened and endemic plant species present within Karkloof Blue Butterfly Nature Reserve

Scientific name	Status
Species to be confirmed	

A comprehensive plant list is included in Appendix C.

3.5.6 Threatened and Endemic Animal Species

There are a number of confirmed threatened and endemic animal species that occur within The Karkloof Blue Butterfly Nature Reserve (Table 7).

Table 7:Threatened and animal endemic species present within The Karkloof Blue Butterfly Nature Reserve

Species	Common name	Threat status	Endemic status
Orachrysops Ariadne	Karkloof Blue Butterfly	Endangered	KZN Endemic
Species to be confirmed			

3.5.7 Mammals

The Karkloof Blue Butterfly Nature Reserve is home to small, free-roaming mammals, such as common reedbuck, common duiker, aardvark, porcupine and black-backed Jackal. The reserve is not fenced, and game is not managed. However, an effort is made to remove any snares and discourage poaching through regular security patrols.

Preliminary species lists are included in Appendix C.

3.5.8 Avifauna

The Karkloof region is known for a number of threatened bird species, including all three species of crane and the Cape Parrot. There are no in-house bird lists for the reserve, so an action to develop species lists has been included in the management objectives.

Preliminary species lists are given in Appendix C.

3.5.9 Reptiles, Amphibians, Insects and Invertebrates

There has been a considerable amount of research on the reserve into the invertebrate species, because of the Karkloof Blue Butterfly and consequent monitoring by Ezemvelo KZN Wildlife. (Dr Armstrong to provide species lists)

Preliminary species lists are given in Appendix C.

3.5.10 Fire Regime

Fire is fundamental to ecological processes in the grassland biome, and has important effects on vegetation composition, primary productivity, and nutrient cycling. Importantly, fire is a primary driver in the competition between grasses and tree seedlings and thus the structure of a grassland or savanna system.

The extent of woody cover in grassland and savanna systems largely boils down to how variation in rainfall and fire affect the competition between grasses and tree seedlings. The grass layer, which builds during the wet season, becomes dry enough to burn in late winter and forms the main fuel for fires. The grasses recover quickly from fires, while tree seedlings are damaged or killed, thus fire acts to keep grasslands open. If this system is out of balance, for example there is reduced fire frequency and/or intensity, or there is reduced fuel load as a result of over-grazing, the vegetation will shift to a more closed system.

Since the Karkloof Blue Butterfly Nature Reserve is located within a commercial timber farm, there are specific safety, legal, and insurance requirements that must be considered when conducting burns. Additionally, ongoing management of invasive alien plant species is essential. As such, fire will play a crucial role in the vegetation management strategy for the Karkloof Blue Butterfly Nature Reserve.

In implementing an effective fire regime, 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 mosaic of burnt and un-burnt areas should be maintained.
- 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).

3.5.11 Alien and Invasive Plant Species

Invasive Alien Plant Species:

Invasive alien plant species have a significant negative impact on the environment by causing direct habitat destruction, increasing the risk and intensity of wildfires, and reducing surface and sub surface water. Landowners are under legal obligation to control invasive alien plants occurring on their properties.

In terms of the National Environmental Management: Biodiversity Act (No.10 of 2004 – NEMBA) and the Conservation of Agricultural Resources Act (No.43 of 1983 – CARA), landowners are required to control and eradicate listed invasive alien species on their land and must incorporate an invasive species control plan in the protected area management plan. NEMBA categorises such plants on the following basis:

Category 1a: Prohibited - a person in control of a Category 1a Listed Invasive Species must comply with the provisions of section 73(2) of NEMBA; immediately take steps to combat or eradicate listed invasive species in compliance with sections 75(1), (2) and (3) of NEMBA; and allow an authorised official from DEA to enter onto land to monitor, assist with or implement the combatting or eradication of the listed invasive species.

Category 1b: Prohibited/exempted if in possession or under control – a person in control of a Category 1b Listed Invasive Species must control the listed invasive species in compliance with sections 75(1), (2) and (3) of NEMBA. A person contemplated in sub-regulation (2) must allow an authorised official from DEA to enter onto the land to monitor, assist with or

implement the control of the listed invasive species, or compliance with the Invasive Species Management Programme contemplated in section 75(4) of the Act.

Category 2: Permit required - Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the notice or an area specified in the permit. A landowner on whose land a Category 2 Listed Invasive Species occurs or person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land, or the area specified in the notice or permit. Unless otherwise specified in the notice, any species listed as a Category 2 Listed Invasive Species that occurs outside the specified area contemplated in sub-regulation (1), must, for purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to Regulation 3. Persons or organ of state must ensure that the specimens of such Listed Invasive Plant Species do not spread outside of the land over which they have control.

Category 3: Prohibited - Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of NEMBA, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of the Act, as specified in the notice. Any plant species identified as a Category 3 Listed Invasive Species that occurs in riparian areas, must, for the purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to regulation 3.

The Karkloof Blue Butterfly Nature Reserve has an alien plant removal plan, which has been in implementation for a number of years and is a key component of SAPPI's FSC requirements.

The reserve falls within an area highly susceptible to invasion by *Solanum mauritianum* (bug weed), which originates from South America. It is a rapidly spreading perennial plant that forms dense stands and is extremely difficult to eradicate.

A variety of invasive alien plant species are known to occur within the reserve (Table 8).

Table 8:Identified listed invasive alien plant species that must be controlled within the reserve in terms of NEMBA

Common name	Scientific name	NEMBA category
Bug weed	*Solanum mauritianum*	1b
Pine	*Pinus pinaster*	2
American bramble	*Rubus odoratus*	1b

3.6 Cultural Heritage Context of The Karkloof Blue Butterfly Nature Reserve

The Karkloof Blue Butterfly Nature Reserve has not had any formal assessments done for their cultural, archaeological or paleontological resources, therefore very little is known. Given it's small size and underlying geology, it is unlikely that anything of significance would occur within the reserve's boundary.

3.7 Socio-economic Context

The Karkloof area is shaped by its mix of rural communities, agricultural activities, and natural resources. The region is known for its scenic landscapes, rich biodiversity, and agricultural productivity, particularly in timber, dairy farming, and horticulture. The area has experienced moderate economic development, with Howick acting as the local hub for commerce and services. Tourism, driven by its natural beauty and the presence of nature reserves, plays an increasingly important role in the local economy, creating jobs in hospitality, guiding, and conservation.

However, the Karkloof also faces challenges typical of rural areas, including limited infrastructure, economic disparity, and unemployment, especially among marginalized communities.

The Karkloof Blue Butterfly Nature Reserve is relatively small, with no formal tourism infrastructure and limited public access, meaning it does not have a direct, significant impact on the local economy or community. However, the surrounding commercial timber operation, managed by SAPPI, plays a major role in providing local employment.

The reserve features a public picnic area and a section of mountain bike trails, both managed by the Karkloof Country Club. Through these recreational offerings, it indirectly contributes to the local economy by attracting visitors and enhancing the area's appeal.

4 ZONATION PLAN

The aim of the Karkloof Blue Butterfly Nature Reserve zonation plan is to provide spatial guidelines which inform the various management and usage activities which can take place within the Nature Reserve, while ensuring that these activities do not contradict each other, or the values of The Karkloof Blue Butterfly Nature Reserve. It is, furthermore, also a requirement of the National Environmental Management act (No. 57 of 2003), that the management plan for a protected area includes a zonation plan, which indicates which activities are allowed on the property.

4.1 Infrastructure

Given that the Karkloof Blue Butterfly Nature Reserve (Figure 8) is a portion of a much larger timber farm, and that the declaration is limited to the natural areas, there is no infrastructure within the reserve, barring an access road.

4.2 Guiding Principles for Zonation

The guiding principles are that zonation:

- Is the foundation of all planning and development within a protected area, with the aim of ensuring its long-term sustainability.
- Ensures the integrity of The Karkloof Blue Butterfly Nature Reserve's scenic quality by limiting human intrusions into the landscape.
- Accommodates a range of opportunities for experiences of solitude and nature-based recreation which do not conflict with the desired social and environmental states.
- Confines development to areas that are robust enough to tolerate development and without detracting from the "sense of place".
- Channels access into the reserve and movement within it.
- Sets the limits of acceptable change to minimize the loss of biodiversity and to reduce conflict between reserve uses.

The zonation scheme serves as a broad guideline for the planning and management of The Karkloof Blue Butterfly Nature Reserve. Regardless of the zonation adopted, due process must be followed for development proposals. The establishment of roads, buildings and other built infrastructure must be carefully considered, particularly in identified sensitive areas

4.3 The Zoning System

There are two zones within the nature reserve, namely: limited use zone, and a key protected node (Figure 9). The Key Protection Node is specifically in place to delineate and protect the Karkloof Blue Butterfly colony.

Zonation within The Karkloof Blue Butterfly Nature Reserve is based on the following zones:

Limited Use Zone	An area where the ecotourism principles of low human impact will prevail. This area is largely free of any built infrastructure.

Key Protection Node	This is a node within the limited use zone, which demarcates the Karkloof Blue Butterfly colony.

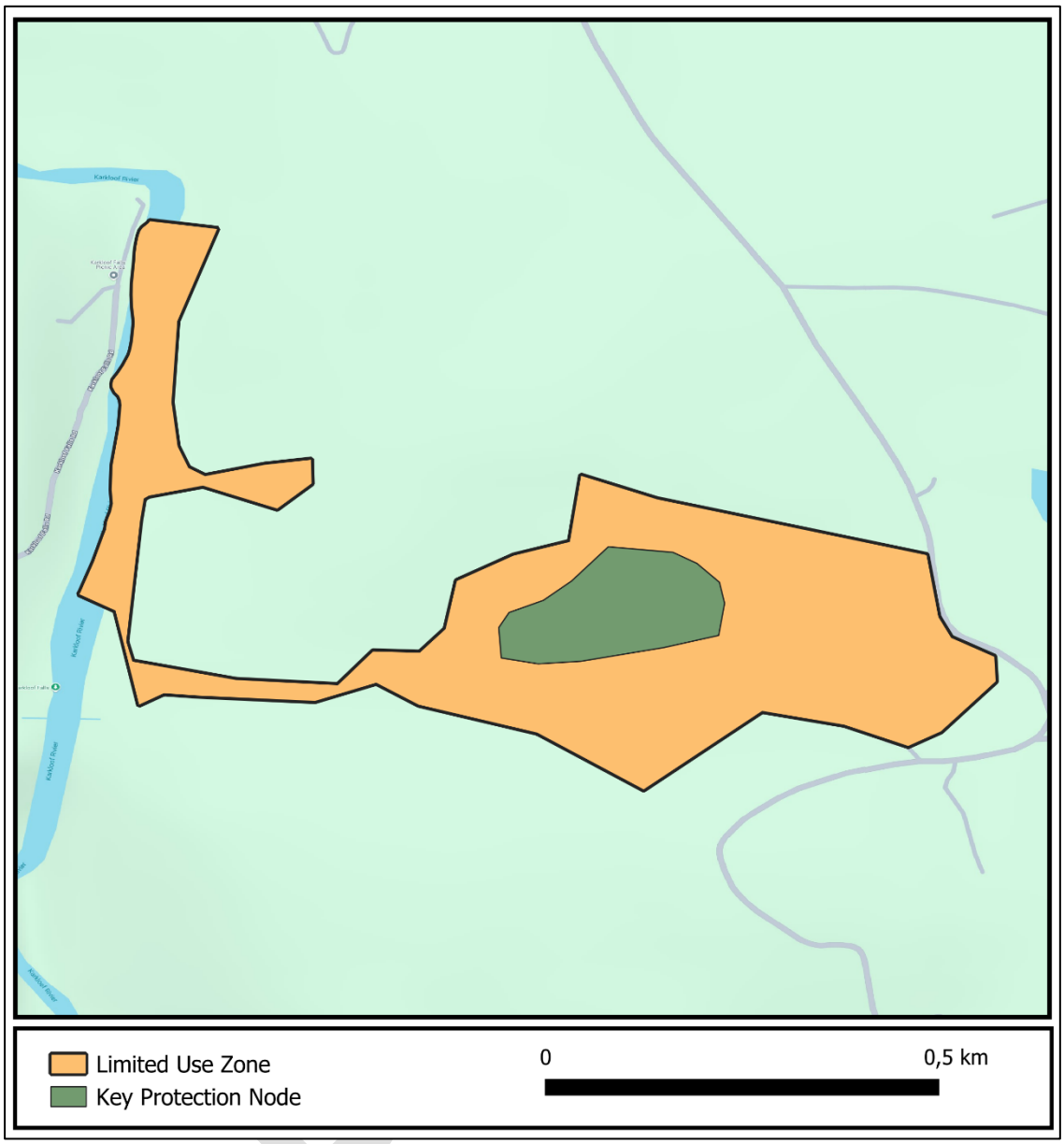

Figure 8: Zonation map of The Karkloof Blue Butterfly Nature Reserve

The table below gives guidelines on each of the two zonation types for information.

Table 9: Zonation guidelines

Zone	Limited Use	Key Protection Node
General Characteristics	This zone is designated for areas in which activities are to be limited to low-impact ecotourism uses and conservation management interventions. Motor vehicle access into parts of The Karkloof Blue Butterfly Nature Reserve, for management purposes is allowed in this zone, together with visitor access. Access in this zone is limited to landowners and their implementing agents.	This node demarcates the Karkloof Blue Butterfly colony, with specific restrictions to ensure minimal disturbance.
Objectives	The objective of this conservation-orientated zone is to provide a relative sense of solitude and relaxation in an environment that may be exposed to some sights and sounds of human activities. Although it is a place of quietness and naturalness, there may be some interaction between users. To provide a further level of protection to protected species.	To ensure the Karkloof Blue Butterfly colony continues to thrive and that management actions don't unintentionally impact it.
Limits of Acceptable Change: Biophysical	Some deviation from a natural/pristine state through the creation of management roads and tracks, and limited buildings such as bird or game viewing hides, or rustic picnic and camping sites is allowed but care should be taken to restrict the extent of these. No protected species lost or damaged.	Acceptable change is limited to *improvements* in grassland health.
Limits of Acceptable Change: Aesthetic and Recreational	Activities which impact on the relatively natural appearance and character of the area should be restricted. Any roads and tracks should be carefully designed with due consideration to issues such as sensitive vegetation, drainage and hydrology. Noise and light pollution should be kept to a minimum.	There will be no infrastructure or facilities developed in this node.
Access and Roads	Access is for a low number of vehicles at a time to allow for operational and visitor activities. Heavy machinery such as trucks or large numbers of vehicles are only allowed along designated routes for limited periods of time and may not leave the road surface.	Access is only allowed on foot in this node.
Permissible activities	• Guided walks • Brush cutting sites • Development of operational management and visitor infrastructure such as 4x4 vehicle trails and field ranger outposts.	• Guided walks • Limited herbicide usage (with pre-approved herbicides), only if curry's post and/or bramble infestation worsens.

Zone	Limited Use	Key Protection Node
Non-permissible activities	• Clearing of new areas for recreational activities without prior approval from the Management Authority. • Development of infrastructure other than 4x4 vehicle trails, field ranger outposts, or hides. • The possession or use of firearms unless authorised by reserve management. • Landscaping or gardening. • Introduction (temporary or permanent) of domestic pets such as dogs or cats, unless authorised by the management authority.	• Removal of indigenous plants without the necessary permits. • Mowing. • Mechanised clearing of plants. • Introduction of any plant species not naturally found within the reserve for landscaping purposes. • Introduction (temporary or permanent) of domestic pets such as dogs or cats, unless authorised by the management authority. • The possession or use of firearms unless authorised by reserve management.

5 ADMINISTRATIVE STRUCTURE

An indicative organisational structure for the The Karkloof Blue Butterfly Nature Reserve is set out in Figure 10. The figure identifies the role of the site's landowners, the management authority and its managerial staff. As is indicated in the organogram, the security and anti-poaching is an outsourced third party.

{to be added}

Figure 9: The Karkloof Blue Butterfly Nature Reserve Governance arrangements

6 OPERATIONAL MANAGEMENT FRAMEWORK

This section outlines the strategic framework and technical guidelines for the drafting of each objective and corresponding strategic outcomes as listed in Section 2, above. The detailed management actions below will be used to inform the Annual Plan of Operation (APO), as well as the resources which will be required for the implementation thereof. The operational management framework will form the basis for the effective management of The Karkloof Blue Butterfly Nature Reserve.

6.1 Governance and Institutional Arrangements

It is essential that there are appropriate institutional structures in place that enable the effective management of The Karkloof Blue Butterfly Nature Reserve. This includes ensuring that the requirements of the National Environmental Management: Protected Areas Act (NEM:PAA) are met, that cooperative arrangements are addressed between key stakeholders and partners within the nature reserve, that there are adequate staff and resources to manage the nature reserve and that there is adequate oversight in its management.

SAPPI Southern Africa (Pty) Ltd is the Management Authority of The Karkloof Blue Butterfly Nature Reserve.

In fulfilling this role, SAPPI Southern Africa (Pty) Ltd will adhere to the following guiding principles:

- Law enforcement efforts should be coordinated with the relevant authorities - particularly Ezemvelo KZN Wildlife and the South African Police Service in addressing offences and breaches of the law.

6.1.1 Declaration Process

The Karkloof Blue Butterfly Nature Reserve was declared a Nature Reserve on the … (Gazette Notice …). A copy of the protected areas declaration is found in Appendix A.

It is important to ensure that the title deeds for The Karkloof Blue Butterfly Nature Reserve have been endorsed, and the protected area is correctly captured on the Protected Areas database. In terms of the Act a Management Authority must be appointed for The Karkloof Blue Butterfly Nature Reserve (SAPPI Southern Africa (Pty) Ltd), a Management Plan developed, an Annual Plan of Operation (APO) be compiled, and a report submitted to the provincial conservation authority on an annual basis.

6.1.2 Management Support

The provision of management support to The Karkloof Blue Butterfly Nature Reserve by an independent ecological management specialist should be strongly considered. An agreement of this nature will ensure the following:

- That The Karkloof Blue Butterfly Nature Reserve is managed in accordance with its purpose and its management plan.
- To ensure that the provisions of NEM:PAA and all other relevant legislation are met in managing the nature reserve.

- To participate and to offer advice and guidance in decisions about the development, management, and operation of The Karkloof Blue Butterfly Nature Reserve.
- To establish mechanisms that ensure appropriate accountability in the management of the nature reserve and the implementation of its management plan.

6.1.3 Administrative and Oversite Structures within Karkloof Blue Butterfly Nature Reserve

It is important that processes be implemented within the overall The Karkloof Blue Butterfly Nature Reserve management structure to ensure that the Karkloof Blue Butterfly Nature Reserve is managed appropriately and according to its management plan to ensure that the provisions of NEM:PAA and all other relevant legislation are met.

Table 10: Management framework for governance and institutional arrangements

High-level Objective	Strategic Outcome	Management Action	Responsibility	Portfolio of Evidence	Timeframe
Appropriate administrative and management structures and processes are in place to ensure The Karkloof Blue Butterfly Nature Reserve is effectively protected.	Administrative and oversight structures are established and maintained to enable cooperation between the Management Authority and management entities within the nature reserve.	An annual plan of operation (APO) for the management of the nature reserve must be developed.	SAPPI Southern Africa (Pty) Ltd	APO	Annually
		The costs associated with the annual plan of operation must be identified and a budget must be developed for its implementation.	SAPPI Southern Africa (Pty) Ltd	Annual Budget	Annually
		An annual review of the implementation of the management plan must be undertaken and a report that complies with the provisions of NEM:PAA on the achievement of the management objectives must be submitted to EKZNW.	SAPPI Southern Africa (Pty) Ltd	Annual Report	Annually
		In developing the APO, a schedule of meetings for the management of The Karkloof Blue Butterfly Nature Reserve must be agreed to.	SAPPI Southern Africa (Pty) Ltd	Meeting Minutes	Annually
		All parties on the Advisory Committee must participate in processes to identify the resources necessary to manage the nature reserve, sources of funding for them and in any required fund-raising activities.	Advisory Committee	Annual Budgets	Annually

6.2 Compliance

There are numerous laws, regulations and policies that must be complied with in managing the Karkloof Blue Butterfly Nature Reserve and ensuring its effective biodiversity conservation. It is important that the reserve is properly and legally secured, and any legal risks and liabilities are appropriately addressed and managed.

The following guiding principles apply:

- All reasonable efforts must be made to ensure the effective conservation of biodiversity within and on the boundaries of the nature reserve.
- Wildlife risks to people and infrastructure, both within the reserve and in neighbouring areas, will be managed and minimised to ensure that all minimum legal requirements are met and exceeded.

Table 11: Management framework for compliance

High-level Objective	Strategic Outcome	Management Action	Responsibility	Portfolio of Evidence	Timeframe
Comply with and enforce legislation pertaining to the protection, development, and management of The Karkloof Blue Butterfly Nature Reserve.	The Karkloof Blue Butterfly Nature Reserve has been legally declared and all relevant documentation has been submitted and title deeds have been endorsed and declaration of XXX has been gazetted with the correct property descriptions.	All declaration documents submitted and up-to-date. Notarial Deed with title deed restrictions registered with the Notary and Surveyor General against the property.	SAPPI Southern Africa (Pty) Ltd	Declaration documentation	Year 1
	The boundaries of The Karkloof Blue Butterfly Nature Reserve are accurately known.	A process to determine the exact boundaries and to identify any deviations from them must be undertaken and if any deviations are identified, these must be addressed through formal agreements between The Karkloof Blue Butterfly Nature Reserve and the neighbouring landowners.	SAPPI Southern Africa (Pty) Ltd	Accurate delineation of the reserve's boundary.	Year 1
	Standard operating procedures are developed as part of a disaster risk management strategy.	Standard operating procedures must be regularly reviewed and updated to address risks, procedures and compensation associated with emergency events.	SAPPI Southern Africa (Pty) Ltd	Standard operating procedures	As required
	All management activities within The Karkloof Blue Butterfly Nature Reserve are compliant with the provisions of NEM:PAA, NEMA and EKZNW.	The Management Authority must undertake its management activities in accordance with its Protected Area Management Plan and any conditions prescribed in terms of NEM:PAA.	SAPPI Southern Africa (Pty) Ltd.	Independent audits	Annually

High-level Objective	Strategic Outcome	Management Action	Responsibility	Portfolio of Evidence	Timeframe
	A servitude register is developed for The Karkloof Blue Butterfly Nature Reserve.	A servitude register should be developed, which identifies all servitudes and rights of way and fully defines access into and use of the nature reserve.	SAPPI Southern Africa (Pty) Ltd	Servitude register	Year 1
	Adequate fire safety within the nature reserve is ensured.	Membership must be maintained with the relevant Fire Protection Association.	SAPPI Southern Africa (Pty) Ltd	Membership	Annually
		Staff should receive adequate training in fire management and there must be adequate firefighting equipment available in the reserve.		Training and asset registers	As required
		An emergency fire response plan must be in place to handle any unplanned fires.	SAPPI Southern Africa (Pty) Ltd	Emergency plan	Year 3
		Draw up Firebreak Agreements with neighbours and amend when necessary.		Firebreak Agreements	Year3

6.3 Regional Management

6.3.1 Regional Land Use Planning

To safeguard its biodiversity and to counter threatening processes or edge effects, appropriate and compatible land uses in the surrounds of The Karkloof Blue Butterfly Nature Reserve should be encouraged. Actions may be taken to secure the boundaries and surrounds of the reserve through engagement with neighbours and other protected areas within the district, and participation in local and regional planning processes. This requires engagement, planning and implementation into relevant planning processes such as municipal and bioregional planning, including the revision of Spatial Development Frameworks (SDFs), Integrated Development Plans (IDPs) and Environmental Management Frameworks (EMFs). The guiding principles for regional land use planning will be to:

- Collaborate and take appropriate actions collectively with protected areas in the district, to manage threatening land uses and activities within the region.
- Buffer zone considerations for the nature reserve must be captured in local and regional plans.
- Endeavour to assist the local and district municipalities in determining appropriate land uses and development strategies in the areas surrounding the reserve.
- Endeavour to align the nature reserve's plans and strategies with the programmes and strategies of the local and district municipality, where appropriate.

6.3.2 Zone of influence

The Management Effectiveness Tracking Tool (METT SA Version 3a) describes a zone of influence as "an external planning domain" or a "non-legislated area drawn on a map to inform the site manager as to where he/she should be involved in land and water use planning. It differs from the legislated EIA Buffer Zone, which is an arbitrary 5km line drawn around a protected area."

6.3.3 Protected Area Expansion

The Karkloof Blue Butterfly Nature Reserve is bordered by Denleigh Protected Environment, and Karkloof Nature Reserve is also nearby. The Karkloof Blue Butterfly Nature Reserve already engages with these neighbours and should continue to formalise the concept of collaborative protected area management on a broader scale to improve protected area connectivity and ecological functioning, which will always remain a priority. This also assists ultimately in improving connectivity between the various protected areas. To ensure that expansion efforts are focussed in the right areas, open communication between relevant stakeholders is essential.

Table 12: Management framework for regional management

High-level Objective	Strategic Outcome	Management Action	Responsibility	Portfolio of Evidence	Timeframe
Explore opportunities to consolidate and expand The Karkloof Blue Butterfly Nature Reserve's boundaries and promote compatible land uses in the areas surrounding the nature reserve	The Karkloof Blue Butterfly Nature Reserve is integrated within local and regional land-use planning frameworks.	Inputs must be made into the development of local and district municipality IDPs, SDFs and LUMS to ensure compatible land uses in the areas around the reserve.	SAPPI Southern Africa (Pty) Ltd	IDPs, SDFs and LUMS.	As required
		Engage with uMgeni Local Municipality to ensure the nature reserve is correctly reflected in the IDPs and SDFs.	SAPPI Southern Africa (Pty) Ltd	IDPs, SDFs and LUMS.	Year 1
	Identification of a zone of influence which can be discussed with the local authorities to ensure appropriate land use and activities in the regions around the reserve.	Identify and map the zone of influence for the reserve	SAPPI Southern Africa (Pty) Ltd	Map	Year 1
		Continue to foster good relations with neighbouring reserves and identify opportunities for mutually beneficial collaboration	SAPPI Southern Africa (Pty) Ltd	Meeting minutes	As required

6.4 Protected Area Financial Viability

The Karkloof Blue Butterfly Nature Reserve is funded by SAPPI Pty Ltd, which runs a commercial timber and avocado operation on the farm and neighbouring properties. These commercial activities allow for the protection and management of the Nature Reserve.

The following guiding principles apply for The Karkloof Blue Butterfly Nature Reserve's commercial operations:

- The commercial operations must be carried out in an environmentally responsible manner.
- Foresters and reserve staff must be made aware of the nature reserve and its management requirements.

Table 13: Management framework for protected area financial viability

High-level Objective	Strategic Outcome	Management Action	Responsibility	Portfolio of Evidence	Timeframe
Ensure that the nature reserve is adequately catered for in the overall SAPPI budget, and that commercial operations are done in a way that mitigates impacts on the nature reserve.	Income is generated for The Karkloof Blue Butterfly Nature Reserve through environmentally responsible revenue generating operations.	Include the relevant Head Office staff in the annual plan of operation.	SAPPI Southern Africa (Pty) Ltd	Minutes	Annually
		Manage the surrounding timber plantations in line with FSC requirements and in such a manner that does not negatively impact the nature reserve.		FSC audit	Ongoing

6.5 Socio-Economic Management

Constructive relationships with adjacent landowners and neighbouring communities are an important aspect of the effective conservation of protected areas. Efforts should be aimed at developing a strong sense of partnership between the neighbours and communities around the reserve and its managers. The following guiding principles should be adhered to:

- A common understanding of the issues that affect both the nature reserve, neighbours and local communities should be developed and efforts to resolve them should be undertaken cooperatively.
- Wherever possible, support local businesses, service providers and produce.
- Wherever possible, recruitment for new positions should be carried out locally first.
- Prioritise the importance of communication channels between the neighbouring community and reserve managers.

Table 14: Management framework for socio-economic management

High-level Objective	Strategic Outcome	Management Action	Responsibility	Portfolio of Evidence	Timeframe
Foster strong relationships with stakeholders and neighbours to ensure strong support for	Foster cooperation and collaboration with neighbours and neighbouring communities in the region.	Foster good, mutually beneficial relationships with neighbouring properties.	SAPPI Southern Africa (Pty) Ltd	Meeting minutes	As required
	Community relations and communication on	Continue to employ a community liaison officer that is active in the local community.	SAPPI Southern Africa (Pty) Ltd	Socio-economic projects	As required

the reserve and meaningful socio-economic benefits to the surrounding communities.	issues impacting The Karkloof Blue Butterfly Nature Reserve and neighbours is maintained and improved.	Maintain a relationship with the Karkloof Country Club, which enables the use of the picnic site for the public.	SAPPI Southern Africa (Pty) Ltd	Agreement	As required

6.6 Operational Management

For The Karkloof Blue Butterfly Nature Reserve to operate appropriately, adequate infrastructure and equipment needs to be provided and maintained for management purposes. Likewise, The Karkloof Blue Butterfly Nature Reserve cannot be effectively managed without adequate sustained funding or budget knowledge. Developing a reserve budget directly linked to the reserve's APO will enable reserve management to make effective decisions and provide a sense of agency to the reserve manager.

Linked to this, developing an IT system that enables effective data storage and usage will assist with record keeping and adaptive management decisions, both of which are important in developing and using the APO and the development of a realistic budget. An effective IT system will take into account the need to make data accessible and usable to the applicable staff members, but at the same time ensuring the safety of sensitive data (particularly around threatened species).

Lastly, no reserve can operate effectively without adequate and properly trained staff. Having HR systems in place that provide structured performance reviews and skills development in a healthy and safe environment, will ensure an effective team for the operational management of the reserve.

Table 15: Management framework for operational management

High-level Objective	Strategic Outcome	Management Action	Responsibility	Portfolio of Evidence	Timeframe
Systems are in place to ensure the effective management of infrastructure, staff, and administration such that the nature reserve can operate optimally.	There are sufficient facilities, infrastructure, and equipment to enable staff to effectively manage the reserve and infrastructure and equipment in the reserve are adequately maintained.	Sufficient facilities and equipment are provided to staff to enable them to undertake their assigned activities.	Reserve Manager	Asset register	As required
		Regular scheduled maintenance of all equipment must be undertaken.		Maintenance schedule	Annually
		Road maintenance must be done systematically.		Road maintenance schedule	Annually
	Activities undertaken in or adjacent to the nature reserve do not cause	The management of timber plantations must be carried out in an environmentally responsible way, especially those adjacent to the nature reserve.	SAPPI Southern Africa (Pty) Ltd	FSC (or equivalent) audit	Annually

High-level Objective	Strategic Outcome	Management Action	Responsibility	Portfolio of Evidence	Timeframe
	environmental harm				
	There are sufficient and adequately qualified and motivated staff to carry out the management functions of the PA.	Human resource management systems that allow for staff performance reviews and structured skills development are instituted.	SAPPI Southern Africa (Pty) Ltd	HR records	Annual
		Measures are instituted to ensure that The Karkloof Blue Butterfly Nature Reserve complies with and implements the Occupational Health and Safety Act.		HR Records	Annual
	There are effective administration systems implemented to carry out the management functions of the PA.	An information database is established that allows data to be collated and appropriately utilised to inform management decisions and interventions.	SAPPI Southern Africa (Pty) Ltd	IT system	Year 1
		Relevant standard operating procedures are in place to ensure a consistent approach to key management interventions, issues, and incidents.		SOPs	As required
		The reserve management budget should link with the Annual Plan of Operation and should provide the reserve manager adequate agency to implement his/her role effectively.	SAPPI Southern Africa (Pty) Ltd	Annual budget	Annual

6.7 Law Enforcement

SAPPI Southern Africa (Pty) Ltd is the Management Authority of the Karkloof Blue Butterfly Nature Reserve while Ezemvelo KZN Wildlife is the Provincial Nature Conservation Authority for KZN. SAPPI Southern Africa (Pty) Ltd is responsible for key aspects of the management of The Karkloof Blue Butterfly Nature Reserve. As the Management Authority, SAPPI Southern Africa (Pty) Ltd has been mandated to enforce laws related to the conservation of the site. In fulfilling this role, SAPPI Southern Africa (Pty) Ltd will adhere to the following guiding principles:

- Law enforcement efforts should be coordinated with the relevant authorities - particularly Ezemvelo KZN Wildlife 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.

A security strategy is required to ensure the safety of biodiversity resources on the Karkloof Blue Butterfly Nature Reserve. The strategy should place emphasis on managing access control to prevent any illegal and un-authorised activities from taking place. Access management should be implemented through the strategic placement of appropriate signage, controlled entry points and boundary demarcations.

Table 16: Management framework for law enforcement

High-level Objective	Strategic Outcome	Management Action	Responsibility	Portfolio of Evidence	Timeframe
Ensure adequate safety and security within The Karkloof Blue Butterfly Nature Reserve to combat illegal activities.	There is effective access control into The Karkloof Blue Butterfly Nature Reserve.	Enforce applicable legislation to prevent and deter trespassing, and illegal activities such as poaching and illegal plant harvesting, illegal grazing in The Karkloof Blue Butterfly Nature Reserve.	SAPPI Southern Africa (Pty) Ltd	Schedule of patrols and reports	As required
	There is effective security and law enforcement within The Karkloof Blue Butterfly Nature Reserve.	Develop an integrated security strategy for the nature reserve, which ensures collaboration with EKZNW, SAPS and private security in neighbouring properties.	SAPPI Southern Africa (Pty) Ltd	Security protocols and standard operating procedures.	Ongoing
		Cooperate with key partners and neighbours, including SAPS and local security companies in the prosecution of offenders caught committing an offence.		Case numbers, Court Rulings	As required

6.8 Ecological Management

The health of the naturally occurring vegetation types and their associated species populations and plant communities is the foundation of biodiversity conservation and ecosystem function in the reserve. The Management Authority should thus aim to ensure the overall conservation of the floral species on The Karkloof Blue Butterfly Nature Reserve, by improving understanding of the vegetation types, as well as overall veld condition. The following interventions will allow for the accurate interpretation of observations and monitoring data and to adapt management practices accordingly.

6.8.1 Vegetation Management

An important consideration for vegetation management at the Karkloof Blue Butterfly Nature Reserve is its small size, which is further complicated by its location amidst surrounding commercial timber operations. This limited area makes it challenging to replicate natural grassland ecological processes, necessitating careful management of both fire and vegetation. Additionally, the nearby timber plantations have strict safety and insurance protocols concerning fire management.

The reserve has infestations of *Pteridium aquilinum* (brackenfern) and *Phymaspermum acerosum: Asteraceae* (curry's post weed), which although indigenous, can have significant impacts on grassland health. These infestations will need to be monitored and managed if they are detrimental to the host plant for the Karkloof Blue Butterfly.

Vegetation management interventions must not have a negative effect on any protected species on the Nature Reserve.

6.8.2 Fire Management

Fire plays an important role in the ecological dynamics of grassland and savanna ecosystems, and has important effects on vegetation composition, primary productivity, and nutrient cycling. Importantly,

fire is a primary driver in the competition between grasses and tree seedlings and thus the structure of a grassland or savanna system.

In developing burning and fire management strategies for The Karkloof Blue Butterfly Nature Reserve, the following guiding principles should be adhered to:

- Burning should be undertaken in such a way that it maintains spatial and temporal heterogeneity of the vegetation within the landscape.
- As far as possible and considering fire risk, a patch mosaic of burnt and un-burnt areas should be maintained.
- Burning must be undertaken with due consideration to the biodiversity conservation requirements of the Nature Reserve.
- 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.

In terms of Section 17 of the National Veld and Forest Fire Act No. 101 of 1998, a landowner/management entity (in this case SAPPI Southern Africa (Pty) Ltd) must have sufficient firefighting equipment, protective clothing and trained personnel for extinguishing fires as may be prescribed or, if not prescribed, reasonably required in the circumstances.

It is therefore necessary to consider the following in relation to firefighting:

- The need to maintain a system of firebreaks to enable the management of controlled burns and to effectively fight and be protected from wildfires.
- The need to develop and maintain a Fire Response Plan in the event of wildfires emanating from or threatening the Reserve.
- The size and terrain of the Nature Reserve and the requirements necessary to access different areas in the event of a wildfire. This relates to both roads and vehicles.
- The number of personnel necessary to effectively fight wildfires.
- The equipment necessary to effectively fight wildfires. This would include:
    - Firefighting equipment mounted on the backs of vehicles.
    - Backpack sprayers.
    - Beaters.
    - Personal Protective Equipment (PPE) for personnel involved in firefighting.

It will be important to manage the fuel loads on the Nature Reserve – particularly in times of above average rainfall as the grass component is not subjected to grazing and utilisation by herbivores of any significant numbers and fuel loads will build. It is recommended that the fuel load not exceed 3500 – 4000 kg/ha. A minimum fuel load of 1500 – 2000 kg/ha is needed to sustain a fire in mesic grassland or savanna.

General fire management guiding principles pertaining to The Karkloof Blue Butterfly Nature Reserve:

- Frequency: The interval between fires should be determined by the growth rate of indigenous plants. Fire should not be used as a management tool for fuel loads below 2000 kg/ha. Fire frequency under natural conditions is between 2-4 years in these vegetation types.

- Season: When using fire for ecological management reasons, selected areas should be burnt at the end of winter or early spring just before the first summer rains and before the grass sward starts greening up. Generally, this is during the months of August and September but can be as early as mid to late July. It is acceptable to burn at any time between the onset of frost and the advent of warmer weather at the end of winter. When using fire to control bush encroachment, it is ideal to burn after the trees have used their stored resources to produce new leaves, but before the grass regrowth starts.

- Intensity: Intensity is influenced by the fuel load, fuel moisture, relative humidity, gradient and wind speed. The intensity can be manipulated by selecting wind conditions and point of ignition relative to slope that will lead to the desired type of fire. It is preferred to use a mix of different intensities over time, should prescribed burns take place.

  If the primary objective is to remove moribund material, a "cool" fire is preferred and can be achieved under the following conditions:
    - Sufficient fuel available > 1,500kg/ha grass;
    - Grass is wilted to 20% moisture;
    - Air temperature below 20°C;
    - Relative humidity higher than 50%;
    - Steady wind present to propagate an even head fire; and
    - Preferably after first spring rains, but before new growth has commenced.

  If the primary objective is to control bush encroachment, a "hot fire" is preferred and can be achieved under the following set of circumstances:
    - Permission is required from local extension office;
    - Sufficient fuel load available > 4000kg/ha grass;
    - Air temperature above 25 °C;
    - Relative humidity lower than 30%;
    - Moderate to steady wind present to create updraft; and
    - Trees actively growing and grass still dormant.

- Alien vegetation can increase the temperature of fire to an undesirable level and should be removed prior to veld burning.

- Proportion of area burnt: It is vital to maintain a mosaic of different vegetation ages within a property (a variety of approved burning practices and veld ages is the best way to maintain species diversity) as far as possible.

- Risk to neighbouring properties: All fires should be extinguished as far as possible should it become apparent that the fire is likely to spread and pose a risk to neighbouring properties.

- General:

- Inform neighbours of your intention to burn at least two weeks prior to the event.

- Have property maps, detailing access roads, firebreaks, inhabited homesteads / labourers houses etc. available to give to fire fighters should a fire break out on the Nature Reserve
- Ensure firefighting equipment is maintained and in good working order before The Karkloof Blue Butterfly of each fire season.
- Keep accurate records of fire, using a map of veld age as a basis. Note the date and time of ignition, weather conditions, etc. This information is important to plan and manage fire in The Karkloof Blue Butterfly Nature Reserve and surrounding areas.

Fire Protection Associations (FPA's)

- FPA's are voluntary associations formed by landowners to jointly prevent, predict, manage and extinguish veld fires.
- The main advantage of an FPA is that no presumption of negligence can be used in civil proceedings due to fire damage if a landowner belongs to a FPA, even if the fire started on that landowner's property.
- Furthermore, resources can be combined with other landowners to manage fires more effectively and firebreaks can be placed where best for the area as a whole, not just one property.

Fire breaks

- Every property must have a system of fire breaks in place. The breaks must be on the boundary of the property unless there is an exemption granted by the Minister or an agreement with the adjoining landowner that the firebreak be located somewhere else if a FPA exists.
- Firebreaks must be located strategically to control the spread of wildfires, but mainly serve as an access road from which to fight a fire.
- Fire tracer lines may not be hoed or created using a non-selective herbicide (e.g. Glyphosate); should be created using an appropriate defoliant (Gramoxone) or brush cut.
- A sensible firebreak width in mountainous, mesic grassland areas such as The Karkloof Blue Butterfly Nature Reserve is approximately 50m, with a wider boundary firebreak (up to 100m) possibly needed adjacent to infrastructure.
- SAPPI Southern Africa (Pty) Ltd should ensure that firebreaks are positioned and prepared in such a way as to cause the least disturbance to soil and biodiversity. For example, and where relevant, it would be better to burn away from indigenous forest patches than into them as this damages the forest margins and degrades the area.
- If burning is going to be used for making a firebreak, or senescent veld is going to be burnt, a landowner must either agree with his/her neighbours on a date for burning or give neighbours and local fire officers written notice of intention to burn at least 2 weeks prior to burning.
- The Reserve Manager, or somebody properly delegated, must be present at the burning with enough people and sufficient equipment to control the fire.
- Burning may not be carried out when conditions are not suitable, or the fire danger rating is high.

- When a fire occurs that poses a danger to life or property, a landowner must immediately inform the fire protection officer and neighbours and do everything in his power to combat the fire and prevent it from spreading.

6.8.3 Alien and Invasive Plant Control

In terms of the National Environmental Management: Biodiversity Act (No.10 of 2004 – NEMBA) and the Conservation of Agricultural Resources Act (No.43 of 1983 – CARA), landowners are required to control and eradicate listed invasive alien species on their land and must incorporate an invasive species control plan in the protected area management plan.

Currently, invasive alien plant species present on The Karkloof Blue Butterfly Nature Reserve occur at low densities and are mostly found in the areas of historical disturbance. There is an IAP Plan in place, which is being implemented by the reserve management team.

The overarching management objective is to ensure that there are no new infestations of alien plant species within The Karkloof Blue Butterfly Nature Reserve the levels of alien and invasive plants on The Karkloof Blue Butterfly Nature Reserve reduced to a density of below 1%. This is considered "maintenance phase".

Annual budgets must be assigned, and a structured invasive and alien plant control plan implemented to effectively control alien and invasive species across the Nature Reserve.

When controlling both alien and indigenous invasive plants on The Karkloof Blue Butterfly Nature Reserve, the following principles will apply.

General clearing principles

- Alien and invasive species control programs are long-term management projects and a clearing plan, which includes follow up actions for rehabilitation of the cleared area, is essential. This will save time, money and significant effort.
- As a minimum, the plan should include a map showing the alien density and indicating dominant alien species in each area.
- Areas less infested (i.e. with young/ immature, less dense infestation) should be cleared first to prevent the build-up of seed banks. Starting with less dense areas will also require fewer resources and have greater impact in the long term. In the case of alien species confined to the upper drainage line areas, it is ideal to start at the headwaters and move downstream, thereby removing the source of re-infestation.
- Dense mature stands should ideally be left for last, as they probably won't increase in density or pose a greater threat than they already do.
- Collective management and planning with neighbours allows for more cost effective clearing and maintenance, considering alien seeds are easily dispersed across boundaries by wind or water courses.
- Fire with the appropriate management is a cost-effective clearing method, but untimely and uncontrolled fires easily and often defeat the purpose of mechanical clearing. Follow up after fire with manual seedling removal is essential, or in extreme cases where there is little other vegetation, herbicide spraying could be considered.

- All clearing actions should be monitored and documented on an annual basis to keep track of which areas are due for follow-up clearing the following year.

Use of herbicides for alien control

Environmental Safety: Most alien vegetation control operations are carried out in environmentally sensitive areas. To minimise the impact of the operation on the natural environment and importantly to protected plant species on The Karkloof Blue Butterfly Nature Reserve, the following must be observed:

- Area contamination must be minimised by careful, accurate application with the minimum amount of herbicide needed to achieve good control.
- Care must be taken to prevent contamination of any water bodies. This includes due care in storage, application, cleaning equipment and disposal of containers, product and spray mixtures.
- Equipment should be washed where there is no danger of contaminating water sources and killing indigenous and protected tree species and washings carefully disposed of at a suitable site.
- Coarse droplet nozzles should be fitted to avoid drift onto neighbouring vegetation.
- To avoid damage to indigenous or other desirable vegetation, products should be selected that will have the least effect on non-target vegetation.

6.8.4 Rehabilitation and Restoration

The management objective is to have no natural areas in The Karkloof Blue Butterfly Nature Reserve that are actively eroding at rates more than would be expected in a natural environment. The Karkloof Blue Butterfly Nature Reserve should have an erosion control plan to prioritise re-vegetation of the most serious problem areas first, i.e. areas that are impacting on the quality of water resources or that are growing bigger.

All existing erosion problem areas should be re-vegetated using appropriate measures and species to at least to the state where the soil is stabilised. The basal cover and other components that maintain the soil integrity of The Karkloof Blue Butterfly Nature Reserve must be maintained through appropriate fire management.

The rehabilitation strategy for The Karkloof Blue Butterfly Nature Reserve will include monitoring actions to evaluate the effectiveness of any control measures implemented.

Table 17: Management framework for ecological management

High-level Objective	Strategic Outcome	Management Action	Responsibility	Portfolio of Evidence	Timeframe
Protect the ecosystem functioning and habitat of The Karkloof	Critical ecological processes and functions are maintained within The Karkloof Blue	Develop a vegetation map of the reserve.	SAPPI Southern Africa (Pty) Ltd	Map	Year 1
		Actively monitor the densities and spread of indigenous invasive species on the Nature Reserve.		Reports	Annually

High-level Objective	Strategic Outcome	Management Action	Responsibility	Portfolio of Evidence	Timeframe
Blue Butterfly Nature Reserve to ensure its long-term ecological integrity and the maintenance of its species and species assemblages.	Butterfly Nature Reserve	Conduct periodic (every 5 years) rangeland condition assessments, to monitoring composition and grass species and inform carrying capacities		VCA Report	5-yearly
	Fire management is based on ecological principles, the recommendations of studies undertaken for the site and the consideration of landscape-level and important species issues.	Develop a Fire Management Plan that takes into consideration the maintenance of grassland species composition and basal cover on the reserve.	SAPPI Southern Africa (Pty) Ltd	Maps and Reports	Year 1
		A system of management blocks must be developed and mapped to facilitate fire management and record keeping.			Year 1
		Conduct fire breaks annually, as per the legislated requirements.			Annually
		Conduct annual pre-burn assessments, to inform burning based on fuel loads, proportion of moribund grass, previous fires and rainfall.			Annually (March – May)
		Conduct management burns at appropriate intervals and time of year.			Annually
		Burns must be annually recorded and mapped and integrated with past information on burning.			Annually (after fire season)
	The Karkloof Blue Butterfly Nature Reserve has no areas that are actively eroding at rates more than would be expected in a natural environment.	Identify, rehabilitate and monitor erosion sites.	SAPPI Southern Africa (Pty) Ltd	Map	Annually
		Develop an erosion map for The Karkloof Blue Butterfly Nature Reserve.		Rehabilitation Plan and progress.	
		Roads, and tracks are delineated and properly maintained to minimise erosion and unnecessary tracks.		Maintenance programme	
		Address any erosion issues along tracks, roads and trails.		Fixed point photographs	
	Water resource management is undertaken in a pragmatic manner that considers implications at a landscape-level.	Undertake water quality assessments every 5 years from drainage lines and overall catchment.	SAPPI Southern Africa (Pty) Ltd	Report	5-yearly
	Invasive alien plant species control measures are planned and implemented in a systematic manner.	Continue to implement the alien plant removal plan.	SAPPI Southern Africa (Pty) Ltd	Maps and reports, registers up to date.	Annually
		Continue to map areas that are cleared and recording effort and herbicide usage.			
		Comply with the health and safety requirements for herbicide usage.			

High-level Objective	Strategic Outcome	Management Action	Responsibility	Portfolio of Evidence	Timeframe
		Order herbicide twice annually and submit herbicide assistance applications when required.			
		Maintain the herbicide register.			

6.9 Cultural Heritage Management

The Karkloof Blue Butterfly Nature Reserve has not had any formal assessments done for their cultural, archaeological or paleontological resources, therefore very little is known. Given it's small size and underlying geology, it is unlikely that anything of significance would occur within the reserve's boundary, however it is important to manage them accordingly, should any be found.

Table 18: Management framework for cultural heritage management

High-level Objective	Strategic Outcome	Management Action	Responsibility	Portfolio of Evidence	Timeframe
Protect the sense of place, natural character, historic and cultural heritage of The Karkloof Blue Butterfly Nature Reserve.	Any cultural, historical, and living heritage of the area is documented and safeguarded.	Develop an SOP in the event any cultural, historical, or palaeontological items are found.	SAPPI Southern Africa (Pty) Ltd	Research projects and maps	As required.
	Threats to sense of place are minimised and the original character of the reserve is retained.	Any further infrastructure or landscape developments are planned such that the "sense of place" is maintained.		Agricultural/landscape plans	As required.

6.10 Research

The Karkloof Blue Butterfly Nature Reserve has had numerous research projects and monitoring programmes as a result of the Karkloof Blue Butterfly colony. EKZNW has been actively monitoring the population since… Research can be beneficial to the management of the reserve, if the projects are chosen well. Therefore, the following guiding principles will apply:

- Any monitoring and/or scientific research will primarily be undertaken to assist in improving the knowledge and understanding of species, habitats and key ecological drivers within the nature reserve, thus providing for more informed management interventions.
- Mandatory monitoring of priority species should be optimised for research use, where possible.

Table 19: Management framework for Research

High-level Objective	Strategic Outcome	Management Action	Responsibility	Portfolio of Evidence	Timeframe
Encourage and support research that informs key management	Research occurring on the reserve, improves the knowledge	Develop a list of priority research and monitoring projects needed to inform the management of The Karkloof Blue Butterfly Nature Reserve.	SAPPI Southern Africa (Pty) Ltd	Research project list	As required

interventions and improves knowledge and understanding of the reserve's ecology, species, and habitats.	and understanding of key management issues and interventions within The Karkloof Blue Butterfly Nature Reserve.	Partake in conferences, seminars and workshops hosted by conservation organisations.		Number of seminars and conferences attended.	
		A register of research projects done in The Karkloof Blue Butterfly Nature Reserve should be kept and copies of all publications emanating from any research done kept on file.		Research project register	

7 MANAGEMENT PLAN IMPLEMENTATION, REVIEW AND ANNUAL PLAN OF OPERATION

7.1 Annual Plan of Operation

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.

The Annual Plan of Operation (APO) forms and integral part of the Protected Area Management Plan. The APO gives life to the Operational Management Framework in the Strategic Management Plan by listing specific management actions.

To facilitate effective review, each management action comprises the following components:

- The Key Performance Area (KPA), and its various sub-sections.
- The KPA Objective.
- The plan for this year.
- A description of the management actions.
- The budget assigned to the activity.
- The evidence of the management action.
- The person responsible for implementation of the management action.
- Priority ranking and status of each management action.
- The deadline for completion.

The APO for The Karkloof Blue Butterfly Nature Reserve will be captured in a separate Excel document which is directly linked to the management plan and will be one of the main tools used to measure management effectiveness during annual audits and evaluations and providing the framework for the annual report. Pending the findings of these audits and reviews, the management entity will draft a list of management activities to be included in the next year's APO with revised KPI targets, budgets, deadlines, and responsible persons. The Karkloof Blue Butterfly Nature Reserve's NGO partner/s and EKZNW will assist the management entity in this regard.

Drafting the next year's APO

Either as part of the review process or directly after the review, the reserve management team should compile the list of management actions for the following years APO.

The following steps should be taken:

- Review performance of previous year's management actions under each Management KPA. Make note of actual performance relative to the KPI objectives set. Discuss challenges experienced and ways to overcome them.
- Revise the KPA Objectives, Person responsible, Budget and Deadlines if necessary. If the KPA Objective used previously was found to be an ineffective indicator, specify a new KPA Objective.
- Systematically work through the APO in this manner one KPA at a time.

7.2 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 five-year plan.

7.3 Five-year Costing Plan

Below is the template breakdown of management costs for each management objective over the ten-year period of this Strategic Management Plan. These figures are an estimate, based on current operational costs and exclude staff costs. These will be adjusted when the reserve does the first APO and detailed budgets in the successive Annual Plan of Operation will override this costing estimate.

Table 20: Estimated annual management cost breakdown (SAPPI to provide)

Key Performance Area	2025	2026	2027	2028	2029
GOVERNANCE AND INSTATUTIONAL ARRANGEMENTS					
COMPLIANCE					
REGIONAL MANAGEMENT					
FINANCIAL VIABILITY					
SOCIO-ECONOMIC BENEFITS					
RESERVE MAINTENANCE					
LAW ENFORCEMENT					
ECOLOGICAL MANAGEMENT					
HERITAGE MANAGEMENT					
GENERAL ADMINISTRATION					
TOTAL	R	R	R	R	R

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Add: Karkloof NR PAMP

APPENDIX A: Copy of the Final Gazette Notice

(to be added)

APPENDIX B: List of statutes to which the 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]
- 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:

- Companies Act [No.71 of 2008]
- Promotion of Access to Information Act [No. 2 of 2000]
- Occupational Health and Safety Act [No. 85 of 1993]
- 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]
- Water Services Act [No. 108 of 1997]

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.

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. 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.

Fire 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:

i. Maintaining the production potential of land;
ii. Combating and preventing erosion;
iii. Preventing the weakening or destruction of water sources;
iv. Protecting the vegetation; and
v. Combating weeds and invader plants.

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)
- Environment Conservation Act No 73 of 1989
- 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)
- Mountain Catchment Areas Act, 1970 (Act No. 63 of 1970)
- The administration of the Act has been assigned to the Board by virtue of Act 3 of 2000 as published in Provincial Gazette Extraordinary No. 5442 dated 24 March 2000
- Land Use Planning Ordinance 15/1985 (section 29)

There may be other legislation applicable to The Karkloof Blue Butterfly Nature Reserve and it is the landowner's/Management Authority's responsibility to identify and comply with applicable legislation.

APPENDIX C: Species Lists for The Karkloof Blue Butterfly Nature Reserve

Bird Species List

Provisional bird species list for The Karkloof Blue Butterfly Nature Reserve, to be confirmed

Common Group	Common Species	Genus	Species
Apalis	Rudd's	*Apalis*	*ruddi*
Apalis	Yellow-breasted	*Apalis*	*flavida*
Apalis	Bar-throated	*Apalis*	*thoracica*
Babbler	Arrow-marked	*Turdoides*	*jardineii*
Barbet	Black-collared	*Lybius*	*torquatus*
Barbet	Crested	*Trachyphonus*	*vaillantii*
Barbet	Acacia Pied	*Tricholaema*	*leucomelas*
Bateleur	Bateleur	*Terathopius*	*ecaudatus*
Batis	Chinspot	*Batis*	*molitor*
Batis	Cape	*Batis*	*capensis*
Bee-eater	Little	*Merops*	*pusillus*
Bee-eater	European	*Merops*	*apiaster*
Bee-eater	White-fronted	*Merops*	*bullockoides*
Bishop	Southern Red	*Euplectes*	*orix*
Bokmakierie	Bokmakierie	*Telophorus*	*zeylonus*
Boubou	Southern	*Laniarius*	*ferrugineus*
Brownbul	Terrestrial	*Phyllastrephus*	*terrestris*
Brubru	Brubru	*Nilaus*	*afer*
Bulbul	Dark-capped	*Pycnonotus*	*tricolor*
Bunting	Cinnamon-breasted	*Emberiza*	*tahapisi*
Bunting	Golden-breasted	*Emberiza*	*flaviventris*
Bushshrike	Gorgeous	*Telophorus*	*viridis*
Bushshrike	Orange-breasted	*Chlorophoneus*	*sulfureopectus*
Bushshrike	Grey-headed	*Malaconotus*	*blanchoti*
Bushshrike	Olive	*Chlorophoneus*	*olivaceus*
Bustard	Black-bellied	*Lissotis*	*melanogaster*
Buttonquail	Common	*Turnix*	*sylvaticus*
Buzzard	Common	*Buteo*	*buteo*
Buzzard	Jackal	*Buteo*	*rufofuscus*
Buzzard	Lizard	*Kaupifalco*	*monogrammicus*
Camaroptera	Green-backed	*Camaroptera*	*brachyura*
Canary	Yellow-fronted	*Crithagra*	*mozambica*
Canary	Brimstone	*Crithagra*	*sulphurata*
Chat	Mocking Cliff	*Thamnolaea*	*cinnamomeiventris*
Cisticola	Croaking	*Cisticola*	*natalensis*
Cisticola	Rattling	*Cisticola*	*chiniana*
Cisticola	Zitting	*Cisticola*	*juncidis*
Cisticola	Lazy	*Cisticola*	*aberrans*
Cisticola	Red-faced	*Cisticola*	*erythrops*
Cisticola	Desert	*Cisticola*	*aridulus*

Common Group	Common Species	Genus	Species
Coot	Red-knobbed	*Fulica*	*cristata*
Cormorant	Reed	*Microcarbo*	*africanus*
Cormorant	White-breasted	*Phalacrocorax*	*lucidus*
Coucal	Burchell's	*Centropus*	*burchellii*
Crake	Black	*Zapornia*	*flavirostra*
Crombec	Long-billed	*Sylvietta*	*rufescens*
Crow	Pied	*Corvus*	*albus*
Cuckoo	Black	*Cuculus*	*clamosus*
Cuckoo	Diederik	*Chrysococcyx*	*caprius*
Cuckoo	Red-chested	*Cuculus*	*solitarius*
Cuckoo	African	*Cuculus*	*gularis*
Cuckoo	African Emerald	*Chrysococcyx*	*cupreus*
Cuckoo	Jacobin	*Clamator*	*jacobinus*
Cuckoo	Klaas's	*Chrysococcyx*	*klaas*
Cuckooshrike	Black	*Campephaga*	*flava*
Darter	African	*Anhinga*	*rufa*
Dove	Cape Turtle	*Streptopelia*	*capicola*
Dove	Emerald-spotted Wood	*Turtur*	*chalcospilos*
Dove	Laughing	*Spilopelia*	*senegalensis*
Dove	Red-eyed	*Streptopelia*	*semitorquata*
Dove	Tambourine	*Turtur*	*tympanistria*
Drongo	Fork-tailed	*Dicrurus*	*adsimilis*
Drongo	Common Square-tailed	*Dicrurus*	*ludwigii*
Duck	African Black	*Anas*	*sparsa*
Duck	White-faced Whistling	*Dendrocygna*	*viduata*
Duck	Yellow-billed	*Anas*	*undulata*
Eagle	African Fish	*Haliaeetus*	*vocifer*
Eagle	Brown Snake	*Circaetus*	*cinereus*
Eagle	Crowned	*Stephanoaetus*	*coronatus*
Eagle	Wahlberg's	*Hieraaetus*	*wahlbergi*
Eagle	Black-chested Snake	*Circaetus*	*pectoralis*
Eagle	Martial	*Polemaetus*	*bellicosus*
Eagle	Tawny	*Aquila*	*rapax*
Eagle	Booted	*Hieraaetus*	*pennatus*
Eagle	Lesser Spotted	*Clanga*	*pomarina*
Egret	Western Cattle	*Bubulcus*	*ibis*
Egret	Great	*Ardea*	*alba*
Egret	Little	*Egretta*	*garzetta*
Eremomela	Burnt-necked	*Eremomela*	*usticollis*
Falcon	Lanner	*Falco*	*biarmicus*
Falcon	Peregrine	*Falco*	*peregrinus*
Falcon	Amur	*Falco*	*amurensis*
Firefinch	Red-billed	*Lagonosticta*	*senegala*
Firefinch	African	*Lagonosticta*	*rubricata*
Firefinch	Jameson's	*Lagonosticta*	*rhodopareia*

Common Group	**Common Species**	**Genus**	**Species**
Fiscal	Southern	*Lanius*	*collaris*
Flufftail	Red-chested	*Sarothrura*	*rufa*
Flycatcher	African Paradise	*Terpsiphone*	*viridis*
Flycatcher	Spotted	*Muscicapa*	*striata*
Flycatcher	African Dusky	*Muscicapa*	*adusta*
Flycatcher	Ashy	*Muscicapa*	*caerulescens*
Flycatcher	Pale	*Melaenornis*	*pallidus*
Flycatcher	Southern Black	*Melaenornis*	*pammelaina*
Flycatcher	Fiscal	*Melaenornis*	*silens*
Francolin	Coqui	*Peliperdix*	*coqui*
Francolin	Crested	*Dendroperdix*	*sephaena*
Goose	Egyptian	*Alopochen*	*aegyptiaca*
Goose	Spur-winged	*Plectropterus*	*gambensis*
Goshawk	African	*Accipiter*	*tachiro*
Grebe	Little	*Tachybaptus*	*ruficollis*
Greenbul	Sombre	*Andropadus*	*importunus*
Greenbul	Yellow-bellied	*Chlorocichla*	*flaviventris*
Greenshank	Common	*Tringa*	*nebularia*
Guineafowl	Crested	*Guttera*	*pucherani*
Guineafowl	Helmeted	*Numida*	*meleagris*
Hamerkop	Hamerkop	*Scopus*	*umbretta*
Harrier-Hawk	African	*Polyboroides*	*typus*
Hawk-eagle	African	*Aquila*	*spilogaster*
Helmetshrike	White-crested	*Prionops*	*plumatus*
Heron	Grey	*Ardea*	*cinerea*
Heron	Black-headed	*Ardea*	*melanocephala*
Heron	Striated	*Butorides*	*striata*
Heron	Goliath	*Ardea*	*goliath*
Heron	Purple	*Ardea*	*purpurea*
Heron	Squacco	*Ardeola*	*ralloides*
Honeybird	Brown-backed	*Prodotiscus*	*regulus*
Honeyguide	Greater	*Indicator*	*indicator*
Honeyguide	Lesser	*Indicator*	*minor*
Honeyguide	Scaly-throated	*Indicator*	*variegatus*
Hoopoe	African	*Upupa*	*africana*
Hornbill	Crowned	*Lophoceros*	*alboterminatus*
Hornbill	Trumpeter	*Bycanistes*	*bucinator*
Hornbill	Southern Yellow-billed	*Tockus*	*leucomelas*
Ibis	Hadada	*Bostrychia*	*hagedash*
Ibis	Southern Bald	*Geronticus*	*calvus*
Ibis	African Sacred	*Threskiornis*	*aethiopicus*
Indigobird	Dusky	*Vidua*	*funerea*
Jacana	African	*Actophilornis*	*africanus*
Kingfisher	African Pygmy	*Ispidina*	*picta*
Kingfisher	Brown-hooded	*Halcyon*	*albiventris*

Common Group	**Common Species**	**Genus**	**Species**
Kingfisher	Striped	*Halcyon*	*chelicuti*
Kingfisher	Giant	*Megaceryle*	*maxima*
Kingfisher	Grey-headed	*Halcyon*	*leucocephala*
Kingfisher	Half-collared	*Alcedo*	*semitorquata*
Kingfisher	Malachite	*Corythornis*	*cristatus*
Kingfisher	Pied	*Ceryle*	*rudis*
Kingfisher	Woodland	*Halcyon*	*senegalensis*
Kite	Yellow-billed	*Milvus*	*aegyptius*
Kite	Black-winged	*Elanus*	*caeruleus*
Korhaan	Red-crested	*Lophotis*	*ruficrista*
Lapwing	African Wattled	*Vanellus*	*senegallus*
Lapwing	Black-winged	*Vanellus*	*melanopterus*
Lapwing	Blacksmith	*Vanellus*	*armatus*
Lapwing	Crowned	*Vanellus*	*coronatus*
Lark	Rufous-naped	*Mirafra*	*africana*
Lark	Sabota	*Calendulauda*	*sabota*
Lark	Red-capped	*Calandrella*	*cinerea*
Longclaw	Yellow-throated	*Macronyx*	*croceus*
Mannikin	Bronze	*Spermestes*	*cucullata*
Martin	Rock	*Ptyonoprogne*	*fuligula*
Martin	Brown-throated	*Riparia*	*paludicola*
Martin	Common House	*Delichon*	*urbicum*
Moorhen	Common	*Gallinula*	*chloropus*
Mousebird	Red-faced	*Urocolius*	*indicus*
Mousebird	Speckled	*Colius*	*striatus*
Myna	Common	*Acridotheres*	*tristis*
Neddicky	Neddicky	*Cisticola*	*fulvicapilla*
Nicator	Eastern	*Nicator*	*gularis*
Nightjar	Fiery-necked	*Caprimulgus*	*pectoralis*
Nightjar	Freckled	*Caprimulgus*	*tristigma*
Oriole	Black-headed	*Oriolus*	*larvatus*
Ostrich	Common	*Struthio*	*camelus*
Owl	African Wood	*Strix*	*woodfordii*
Owl	Western Barn	*Tyto*	*alba*
Oxpecker	Red-billed	*Buphagus*	*erythrorynchus*
Pigeon	African Green	*Treron*	*calvus*
Pigeon	Speckled	*Columba*	*guinea*
Pipit	Striped	*Anthus*	*lineiventris*
Pipit	African	*Anthus*	*cinnamomeus*
Pipit	Bushveld	*Anthus*	*caffer*
Plover	Three-banded	*Charadrius*	*tricollaris*
Prinia	Tawny-flanked	*Prinia*	*subflava*
Puffback	Black-backed	*Dryoscopus*	*cubla*
Pytilia	Green-winged	*Pytilia*	*melba*
Quail	Common	*Coturnix*	*coturnix*

Common Group	**Common Species**	**Genus**	**Species**
Quail	Harlequin	*Coturnix*	*delegorguei*
Quelea	Red-billed	*Quelea*	*quelea*
Robin-Chat	Red-capped	*Cossypha*	*natalensis*
Robin-Chat	White-throated	*Cossypha*	*humeralis*
Robin-Chat	Cape	*Cossypha*	*caffra*
Robin-Chat	White-browed	*Cossypha*	*heuglini*
Roller	European	*Coracias*	*garrulus*
Roller	Lilac-breasted	*Coracias*	*caudatus*
Sandpiper	Common	*Actitis*	*hypoleucos*
Sandpiper	Wood	*Tringa*	*glareola*
Saw-wing	Black (Southern Africa)	*Psalidoprocne*	*pristoptera holomelas*
Scimitarbill	Common	*Rhinopomastus*	*cyanomelas*
Scrub Robin	White-browed	*Cercotrichas*	*leucophrys*
Scrub Robin	Bearded	*Cercotrichas*	*quadrivirgata*
Secretarybird	Secretarybird	*Sagittarius*	*serpentarius*
Seedeater	Streaky-headed	*Crithagra*	*gularis*
Shrike	Red-backed	*Lanius*	*collurio*
Sparrow	House	*Passer*	*domesticus*
Sparrow	Yellow-throated Bush	*Gymnoris*	*superciliaris*
Sparrow	Southern Grey-headed	*Passer*	*diffusus*
Sparrowhawk	Little	*Accipiter*	*minullus*
Spoonbill	African	*Platalea*	*alba*
Spurfowl	Natal	*Pternistis*	*natalensis*
Spurfowl	Swainson's	*Pternistis*	*swainsonii*
Starling	Black-bellied	*Notopholia*	*corusca*
Starling	Cape	*Lamprotornis*	*nitens*
Starling	Red-winged	*Onychognathus*	*morio*
Starling	Violet-backed	*Cinnyricinclus*	*leucogaster*
Starling	Wattled	*Creatophora*	*cinerea*
Stonechat	African	*Saxicola*	*torquatus*
Stork	Woolly-necked	*Ciconia*	*episcopus*
Stork	Yellow-billed	*Mycteria*	*ibis*
Stork	White	*Ciconia*	*ciconia*
Sunbird	Amethyst	*Chalcomitra*	*amethystina*
Sunbird	Collared	*Hedydipna*	*collaris*
Sunbird	Purple-banded	*Cinnyris*	*bifasciatus*
Sunbird	Scarlet-chested	*Chalcomitra*	*senegalensis*
Sunbird	White-bellied	*Cinnyris*	*talatala*
Sunbird	Greater Double-collared	*Cinnyris*	*afer*
Sunbird	Marico	*Cinnyris*	*mariquensis*
Sunbird	Grey	*Cyanomitra*	*veroxii*
Swallow	Barn	*Hirundo*	*rustica*
Swallow	Lesser Striped	*Cecropis*	*abyssinica*
Swallow	Red-breasted	*Cecropis*	*semirufa*
Swallow	Greater Striped	*Cecropis*	*cucullata*

Common Group	**Common Species**	**Genus**	**Species**
Swallow	Wire-tailed	*Hirundo*	*smithii*
Swamphen	African	*Porphyrio*	*madagascariensis*
Swift	White-rumped	*Apus*	*caffer*
Swift	African Black	*Apus*	*barbatus*
Swift	African Palm	*Cypsiurus*	*parvus*
Swift	Little	*Apus*	*affinis*
Swift	Alpine	*Tachymarptis*	*melba*
Tchagra	Black-crowned	*Tchagra*	*senegalus*
Tchagra	Brown-crowned	*Tchagra*	*australis*
Thick-knee	Spotted	*Burhinus*	*capensis*
Thick-knee	Water	*Burhinus*	*vermiculatus*
Thrush	Kurrichane	*Turdus*	*libonyana*
Thrush	Cape Rock	*Monticola*	*rupestris*
Thrush	Groundscraper	*Turdus*	*litsitsirupa*
Tinkerbird	Red-fronted	*Pogoniulus*	*pusillus*
Tinkerbird	Yellow-rumped	*Pogoniulus*	*bilineatus*
Tit	Southern Black	*Melaniparus*	*niger*
Tit	Grey Penduline	*Anthoscopus*	*caroli*
Tit-Flycatcher	Grey	*Myioparus*	*plumbeus*
Trogon	Narina	*Apaloderma*	*narina*
Turaco	Purple-crested	*Gallirex*	*porphyreolophus*
Twinspot	Pink-throated	*Hypargos*	*margaritatus*
Vulture	White-backed	*Gyps*	*africanus*
Vulture	Cape	*Gyps*	*coprotheres*
Wagtail	African Pied	*Motacilla*	*aguimp*
Wagtail	Cape	*Motacilla*	*capensis*
Wagtail	Mountain	*Motacilla*	*clara*
Warbler	Willow	*Phylloscopus*	*trochilus*
Warbler	Chestnut-vented	*Curruca*	*subcoerulea*
Warbler	Lesser Swamp	*Acrocephalus*	*gracilirostris*
Warbler	Little Rush	*Bradypterus*	*baboecala*
Waxbill	Blue	*Uraeginthus*	*angolensis*
Waxbill	Common	*Estrilda*	*astrild*
Waxbill	Grey	*Glaucestrilda*	*perreini*
Waxbill	Orange-breasted	*Amandava*	*subflava*
Waxbill	Swee	*Coccopygia*	*melanotis*
Weaver	Southern Masked	*Ploceus*	*velatus*
Weaver	Spectacled	*Ploceus*	*ocularis*
Weaver	Village	*Ploceus*	*cucullatus*
Weaver	Dark-backed	*Ploceus*	*bicolor*
Weaver	Lesser Masked	*Ploceus*	*intermedius*
Weaver	Thick-billed	*Amblyospiza*	*albifrons*
White-eye	Cape	*Zosterops*	*virens*
Whydah	Pin-tailed	*Vidua*	*macroura*
Whydah	Long-tailed Paradise	*Vidua*	*paradisaea*

Common Group	Common Species	Genus	Species
Widowbird	Fan-tailed	*Euplectes*	*axillaris*
Widowbird	Red-collared	*Euplectes*	*ardens*
Widowbird	White-winged	*Euplectes*	*albonotatus*
Wood Hoopoe	Green	*Phoeniculus*	*purpureus*
Woodpecker	Bearded	*Chloropicus*	*namaquus*
Woodpecker	Golden-tailed	*Campethera*	*abingoni*
Woodpecker	Cardinal	*Dendropicos*	*fuscescens*
Wren-Warbler	Stierling's	*Calamonastes*	*stierlingi*
Wryneck	Red-throated	*Jynx*	*ruficollis*

Mammal Species List

Provisional mammal species list for The Karkloof Blue Butterfly Nature Reserve (to be added)

Common Name	Family	Genus	Species
Aardvark	Orycteropodidae	*Orycteropus*	*afer*
Bat, Blasius's Horseshoe	Rhinolophidae	*Rhinolophus*	*blasii*
Bat, Egyptian Free-tailed	Molossidae	*Tadarida*	*aegyptiaca*
Bat, Egyptian Slit-faced	Nycteridae	*Nycteris*	*thebaica*
Bat, Geoffroy's Horseshoe	Rhinolophidae	*Rhinolophus*	*clivosus*
Bat, Lesser Long-fingered	Vespertilionidae	*Miniopterus*	*fraterculus*
Bat, Natal Long-fingered	Vespertilionidae	*Miniopterus*	*natalensis*
Bat, Sundevall's Leaf-nosed	Hipposideridae	*Hipposideros*	*caffer*
Bat, Wahlberg's Epauletted Fruit	Pteropodidae	*Epomophorus*	*wahlbergi*
Bat, Yellow-bellied House	Vespertilionidae	*Scotophilus*	*dinganii*
Bushbuck	Bovidae	*Tragelaphus*	*scriptus*
Caracal	Felidae	*Caracal*	*caracal*
Duiker, Bush	Bovidae	*Sylvicapra*	*grimmia*
Genet, Cape Large-spotted	Viverridae	*Genetta*	*tigrina*
Hare, Scrub	Leporidae	*Lepus*	*saxatilis*
Hog, Red River	Suidae	*Potamochoerus*	*porcus*
Hyrax, Cape Rock	Procaviidae	*Procavia*	*capensis capensis*
Jackal, Black-backed	Canidae	*Canis*	*mesomelas*
Leopard	Felidae	*Panthera*	*pardus*
Mongoose, Banded	Herpestidae	*Mungos*	*mungo*
Mongoose, Marsh	Herpestidae	*Atilax*	*paludinosus*
Mongoose, White-tailed	Herpestidae	*Ichneumia*	*albicauda*
Mongoose, Yellow	Herpestidae	*Cynictis*	*penicillata*
Rat, Greater Cane	Thryonomyidae	*Thryonomys*	*swinderianus*
Rat, KwaZulu Vlei	Muridae	*Otomys*	*laminatus*
Rat, Southern African Vlei	Muridae	*Otomys*	*auratus*
Reedbuck, Southern	Bovidae	*Redunca*	*arundinum*
Slender Mongoose	Herpestidae	*Herpestes*	*sanguineus*

Amphibian Species List

Provisional reptile and amphibian species list for The Karkloof Blue Butterfly Nature Reserve (to be confirmed)

Common Name	Family	Genus	Species
Caco, Bronze	*Pyxicephalidae*	*Cacosternum*	*nanum*
Frog, Banded Rubber	*Microhylidae*	*Phrynomantis*	*bifasciatus*
Frog, Delalande's River	*Pyxicephalidae*	*Amietia*	*delalandii*
Frog, Dwarf Puddle	*Phrynobatrachidae*	*Phrynobatrachus*	*mababiensis*
Frog, Natal Sand	*Pyxicephalidae*	*Tomopterna*	*natalensis*
Frog, Painted Reed	*Hyperoliidae*	*Hyperolius*	*marmoratus*
Frog, Passmore's Rain	*Brevicipitidae*	*Breviceps*	*passmorei*
Frog, Plain Grass	*Ptychadenidae*	*Ptychadena*	*anchietae*
Frog, Sharpnosed Grass	*Ptychadenidae*	*Ptychadena*	*oxyrhynchus*
Frog, Snoring Puddle	*Phrynobatrachidae*	*Phrynobatrachus*	*natalensis*
Frog, Southern Foam Nest	*Rhacophoridae*	*Chiromantis*	*xerampelina*
Frog, Tinker Reed	*Hyperoliidae*	*Hyperolius*	*tuberilinguis*
Frog, Tremelo Sand	*Pyxicephalidae*	*Tomopterna*	*cryptotis*
Kassina, Bubbling	*Hyperoliidae*	*Kassina*	*senegalensis*
Platanna, Common	*Pipidae*	*Xenopus*	*laevis*
Toad, Guttural	*Bufonidae*	*Sclerophrys*	*gutturalis*
Toad, Red	*Bufonidae*	*Schismaderma*	*carens*