KZN BIODIVERSITY STEWARDSHIP
a programme championed by Ezemvelo KZN Wildlife

EZEMVELO KZN WILDLIFE

RED DESERT NATURE RESERVE

Ezemvelo KZN Wildlife
Stewardship Site no. : P2
May 2013

Hibiscus Coast municipality

Red Desert Nature Reserve, KwaZulu-Natal Province, South Africa

Management Plan

Prepared by
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Hibiscus Coast Municipality
Red Desert Committee
Botanical Society of South Africa

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Recommended:

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ABBREVIATIONS

Amafa	AmafaaKwaZulu-Natali (KwaZulu-Natal Provincial Heritage Agency)
BCOMM	Ezemvelo Biodiversity Conservation Operations Management Meeting
BP	Business Plan
CCA	Community Conservation Area
CDP	Concept Development Plan
CEO	Chief Executive Officer
CRMP	Cultural Resource Management Plan
CMS	Co-management Structure
DAEARD	KwaZulu-Natal Provincial Department of Agriculture, Environmental Affairs and Rural Development
DCO	District Conservation Officer
DEA	National Department of Environmental Affairs
DWA	National Department of Water Affairs
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EWT	Endangered Wildlife Trust
Ezemvelo	Ezemvelo KwaZulu-Natal Wildlife
FPA	Fire Protection Association in terms of the National Veld and Forest Fire Act (No.1 of 1998)
GIS	Geographical Information System
IDP	Municipal Integrated Development Plan
IUCN	International Union for the Conservation of Nature
MCM	National Department of Marine and Coastal Management
MEC	Member of the Executive Council
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NEMA	National Environmental Management Act
NPAES	National Protected Area Expansion Strategy
NSBA	National Spatial Biodiversity Assessment
OIC	Officer in Charge
PA	Protected Area
SAHRA	South African Heritage Resources Agency
SDF	Municipal Spatial Development Framework
SMME	Small, Micro and Medium Enterprises
SMP	Strategic Management Plan
SWOT	Strengths, weaknesses, opportunities and threats analysis
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WWF	Word Wildlife Fund

1) BACKGROUND

1.1 Purpose of the plan

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

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

1.2 Structure of the plan

Section 1:	Provides an introduction and background to the management plan and Red Desert Nature Reserve.
Section 2:	Establishes the context of the biodiversity stewardship site, providing the basis for the strategic and operational management frameworks that follow.
Section 3:	Sets out the vision and objectives for the biodiversity stewardship site.
Section 4:	Sets out the zonation of the biodiversity stewardship site, outlining the land uses in particular zones.
Section 5:	Describes the administrative structure that has been established to assist in managing Red Desert Nature Reserve.
Section 6:	Sets out the management targets that must be achieved in managing the nature reserve.
Section 7:	Sets out the monitoring measures required to determine if management targets are being met.
Section 8:	Describes the components that must be included in the annual plan of operation.

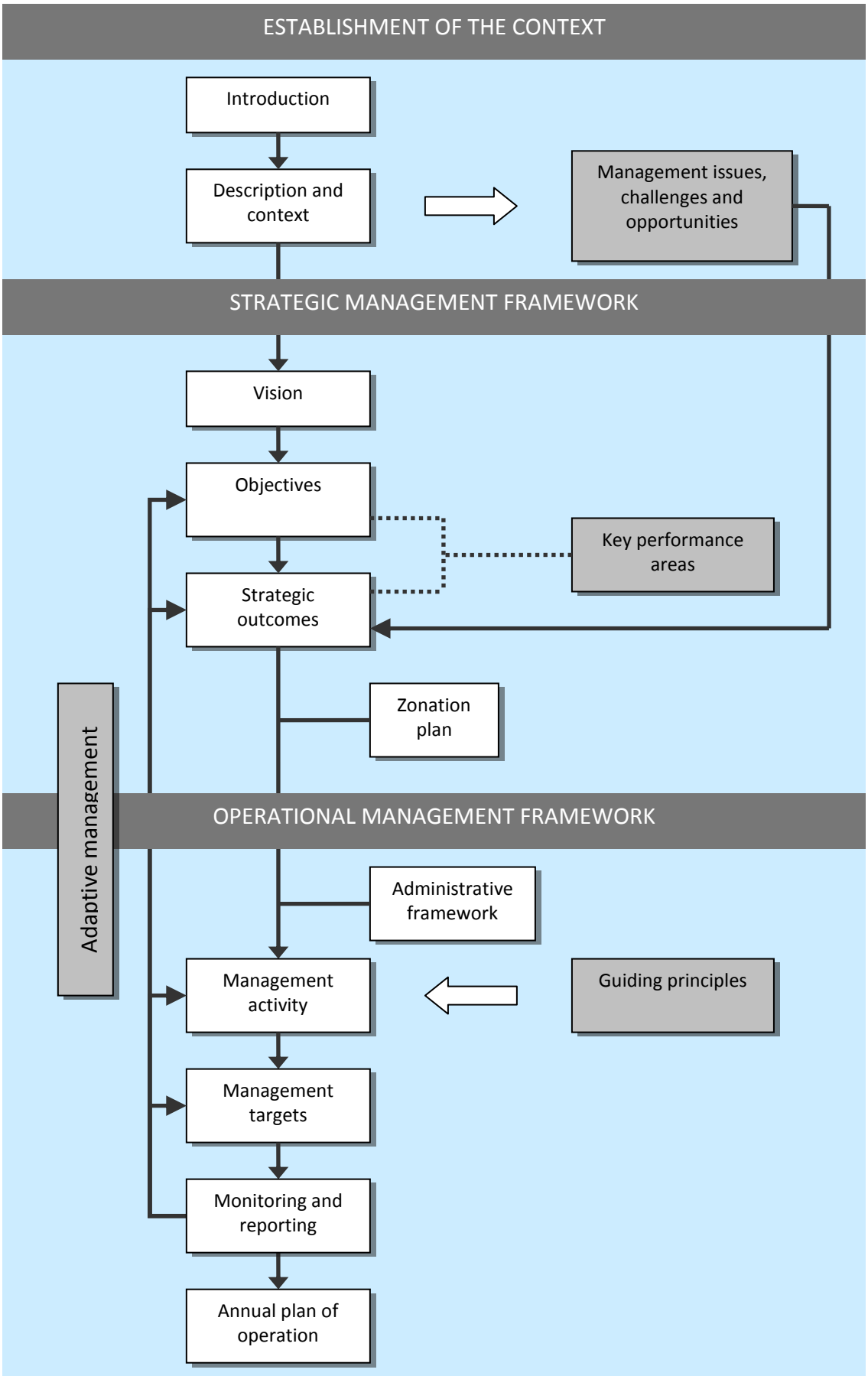

Figure 1.1 Structure of the Management Plan

1.3 Introduction

The Red Desert Nature Reserve (RDNR) is situated to the south west of the town of Port Edward on the KwaZulu-Natal South Coast and falls within the Ugu District Municipality and Hibiscus Coast Local Municipality. The Reserve is made up of two properties totalling 208.9 hectares in area.

Red Desert is essential for the conservation of key vegetation types and habitats. The site contains a significant area of "Critically Endangered" Pondoland-Ugu Sandstone Coastal Sourveld and contributes 1.4 % to the provincial target (31%) for this vegetation type. While this may not seem like much, the significance of the Red Desert site becomes more apparent when one considers that only 5.5 % of this habitat is under formal conservation. This vegetation type forms a critical component of the Pondoland Centre of Plant Endemism of the Maputaland-Pondoland Region, having a significant diversity of endemic plant species found nowhere else in the country.

Red Desert is important for the conservation of key species, particularly the floral component. The grasslands are generally very diverse and form a representative part of the Pondoland Centre of Plant Endemism. In terms of species, the area is notable for the populations of sugarbushes (*Protea* spp.) and *Phylica natalensis*, a rare and vulnerable Pondoland endemic shrub which occurs in the largest known population on the Red Desert.

Red Desert is important for the conservation of the ecological processes that generate and maintain biodiversity. The site is one of the last remaining corridors of natural grassland to the sea on the KZN south coast, and provides an important linkage to Umtanvuna Nature Reserve.

It has considerable scientific, cultural and archaeological significance

The Red Desert Nature Reserve is essential for achieving the KwaZulu-Natal's biodiversity targets and qualifies as a Nature Reserve - the highest status within the KZN Biodiversity Stewardship Programme. This was based on a site assessment conducted in January 2007 to assess the conservation value of the area.

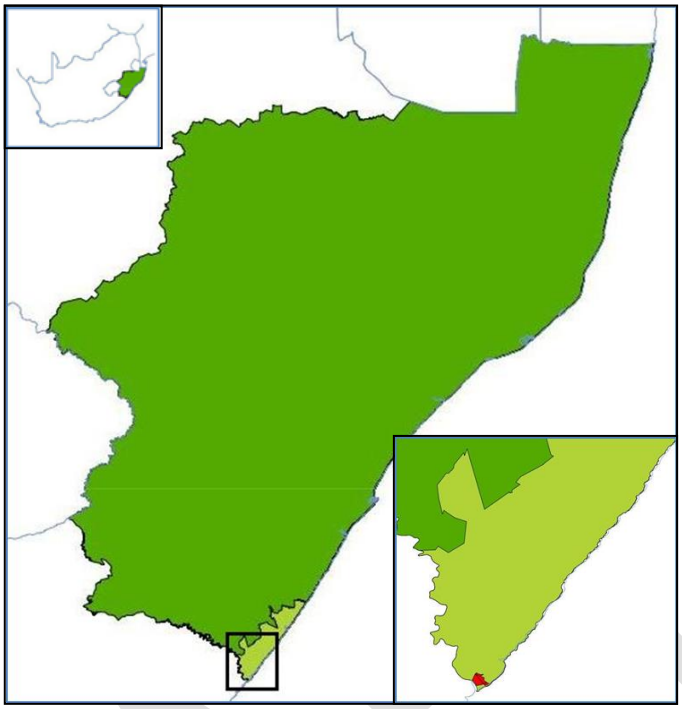

Figure 1.2.1. Regional location of Red Desert Nature Reserve

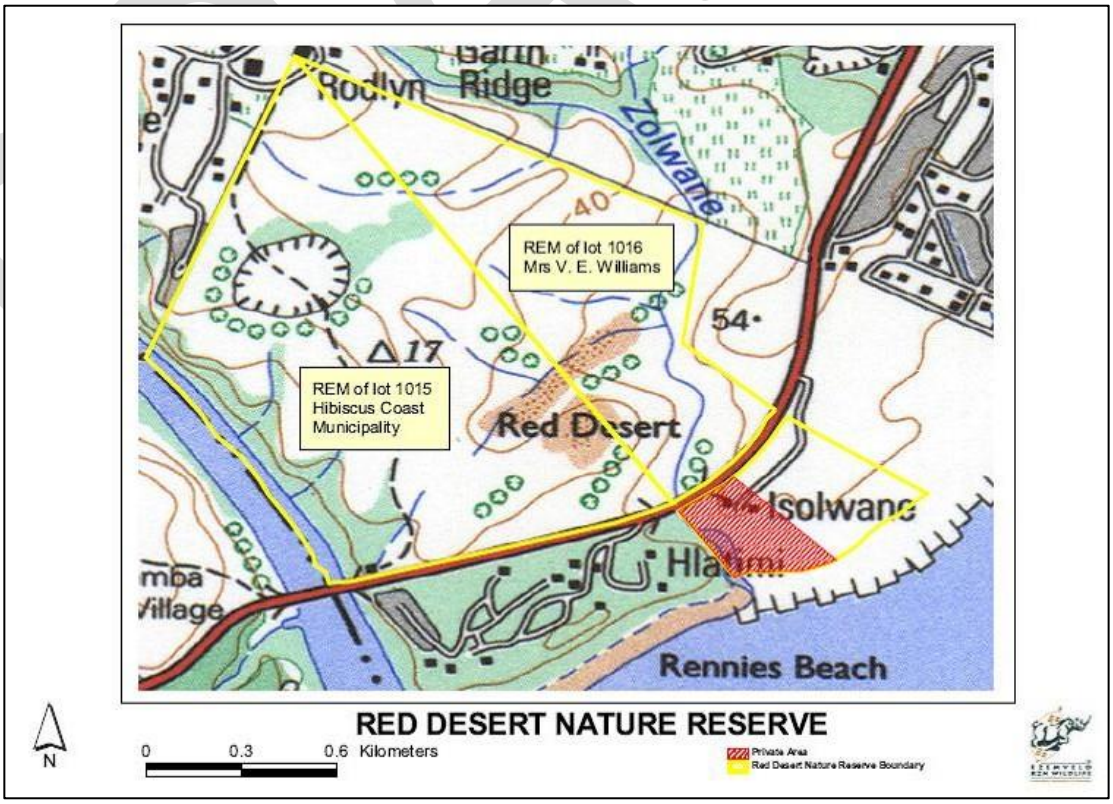

Figure 1.2.2. Location of the Red Desert Nature Reserve

1.4 The values of Red Desert Nature Reserve

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

Natural values	The Red Desert Nature Reserve is situated in the Pondoland centre of endemism and contains a significant diversity of endemic plant species, including the largest known population of *Phylica natalensis* (Vulnerable). The site contains a significant area of the critically endangered and poorly protected 'Pondoland-Ugu Sandstone Coastal Sourveld'. It is one of the last remaining corridors of natural grassland to the sea on the KZN South Coast.
Ecosystem service values	Red Desert is important for the provision of ecosystem services, providing a recreational amenity to the community (environment and cultural experience).
Eco-cultural tourism values	Aesthetically the area gives superb views over the Umtamvuna Gorge and estuary with the stark contrast of the sands of the Red Desert, while the grasslands provide a grand opportunity for walking and mountain-biking.
Cultural and historic values	As an extensive and important cultural landscape of great antiquity, the Red Sands of the KwaZulu-Natal and Transkei coast should be protected and preserved. The RDNR is a well-known tourist site for fossils and artefacts from the Sangoan Industry (ca 300,000 years BP). It is essential that the site is protected and preserved.
Social values	The employment of local communities in alien plant control and ecotourism activities e.g. security and guiding, and stimulating local business development around this protected area. As a catalyst for biodiversity conservation and ecotourism development in the broader environment.

1.5 Adaptive management

The preparation of this management plan has been undertaken based on the guiding principles of adaptive management, which is a structured, iterative process in which decisions are made using the best available information, with the aim of obtaining better information through monitoring of performance (Figure 1.3). In this way, decision making is aimed at achieving the best outcome based on current understanding, whilst accruing the information needed to improve future management. Adaptive management can lead to revision of a part or if necessary the whole management plan.

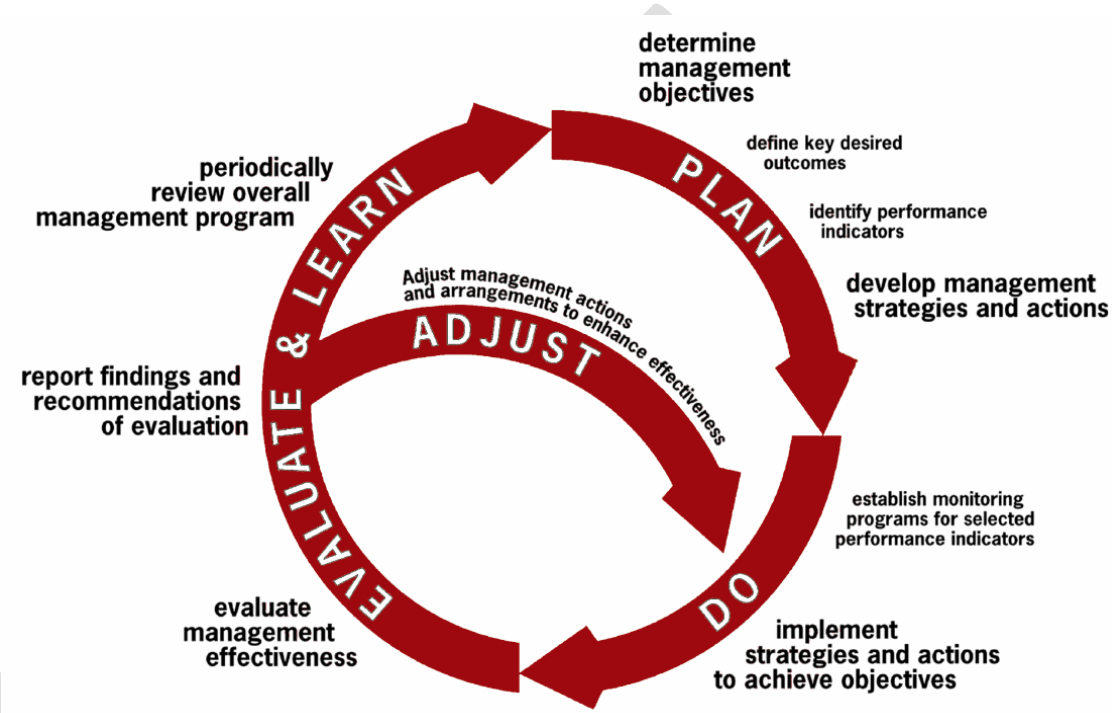

Figure 1.3 The adaptive management cycle (Management Strategy Evaluation, 2009)

Adaptive management enables landowners and managers to:

i) Learn through experience.

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

iii) Develop or refine management processes.

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

v) Demonstrate that management is appropriate and effective.

2) DESCRIPTION OF RED DESERT NATURE RESERVE AND ITS CONTEXT

2.1 The legislative basis for the management of Red Desert Nature Reserve.

There is a large body of legislation that is relevant to the management of Red Desert Nature Reserve, but the primary legislation guiding the management of protected areas is the National Environmental Management: Protected Areas Act (No.57 of 2003).

The Protected Areas 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.

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.

2.1.1 Proclamation status of Red Desert Nature Reserve

The Red Desert Nature Reserve is currently not proclaimed but it is the intention of the landowners / management authority for this area to be declared by the MEC in terms of section 23 of the NEM PAA (Act No. 57 of 2003) and assigned by the MEC as the management authority for its ongoing management in terms of this management plan.

2.1.2 Invasive species control in terms of the Biodiversity Act

In terms of Section 76 of the National Environmental Management: Biodiversity Act (No.10 of 2004), the management authority of a protected area must incorporate an invasive species control plan in the protected area management plan. This is addressed in Sections 3 and 4 below.

2.2 The regional and local planning context of Red Desert Nature Reserve

In accordance with the Local Government: Municipal Demarcation Act (Act No. 27 of 1998) and the Local Government: Municipal Structures Act (Act No. 117 of 1998), the Red Desert Nature Reserve has been demarcated into one District Municipality and one Local Municipality:

- Ugu District Municipality
- Hibiscus Coast Local Municipality

From a regional planning perspective the Red Desert Nature Reserve is important for a number of reasons, including:

- It forms part of an identified critically endangered ecosystem and it falls within a Biodiversity Priority 1 area, giving it the highest possible biodiversity priority in the province.
- It falls within the 20-year priority layer for the provincial Protected Area Expansion Plan.
- It falls within the Ezemvelo KZN Wildlife Umtamvuna macro-ecological corridor, which has been designed to enable the movement of species across the province, in response to climate change.
- It falls within a national freshwater ecosystem priority area and a national wetland freshwater ecosystem priority area, highlighting its national importance for water resource protection.

LAND USE AND ENVRONMENTAL MANAGEMENT

a) Areas of Conservation Significance

The existing conservation areas within the Hibiscus Coast area are the Umtamvuna Nature Reserve and the Trafalgar Marine Reserve. Adjacent to the Western boundary, inland of Port Shepstone is the Oribi Gorge Nature Reserve.

b) Local Agreements, Servitude Arrangements and MOUs

- Access to Portion of Rem. of Lot 1016 is via two registered servitudes, one off the existing R 61 and one via Pringle Rd.
- Access to Rem. of Lot 1015 is via Pringle Rd.
- Eskom power lines pass over Rem. of Lot 1015 and Rem. of Lot 1016 and is supplied to the existing Watson's banana pack shed.
- Ugu regional water supply is available near the Nilsen/Watson homestead and nearby "Eden Crest" residential area and could easily be made available to part of the proposed reserve.

c) Background (brief description of landholding and context)

The two properties detailed below make up the proposed Nature Reserve of 174.7506 ha.

- Rem of Lot 1015 being the "Red Desert area" is 106.0366 ha in extent.
- Rem of Lot 1016 being 73.977 ha in extent, including the whole lower reaches of the Izolwane stream and grassland area between Lots 1014 and 1015.

2.4 Ecological context of Red Desert Nature Reserve

2.4.1 Climate and weather

The climate is predominantly subtropical with an annual mean temperature of around 20 C. The rainfall averages about 1200mm per year with the majority falling from October to March; however effective rainfall can be expected in any month of the year. Conversely, prolonged droughts of several months without effective rainfall may occur. Prevailing winds from the south west may occasionally reach very high velocities of >100kph.

2.4.2 Topography

The topography largely comprises rolling grasslands covering ancient dunes of Berea Red Sands lying over Msikaba Formation sandstone while on the southern side the reserve borders the Umtamvuna River Gorge where Msikaba Formation sandstone outcrops forming the krans above the river. There are two exposures of red sands which have given rise to the name Red Desert; these exposures are notable for the occurrence of Sangoan artefacts. The soils are generally sandy and leached.

2.4.3 Geology and soils

This area is part of the Msikaba Sandstone Formation which extends from north of Port St Johns to Oribi Gorge near Port Shepstone and Berea Red Sands of ancient dunes. The soils are mostly sandy (white). There are occasional outcrops of sandstone and the rocks exposed along the course of the Izolwane are also sandstone.

2.4.4 Geomorphology

The morphology is mostly rolling hills, probably old dunes. During the Cenozoic, sea-level began to fall from the high levels experienced during the Cretaceous. A series of large coast-parallel dune complexes developed along most of the KwaZulu-Natal coastline. In most areas deep weathering of old dunes has produced a dark red coloured sand called the Berea Red Sand. The distinctive red colouration of the sand is the result of weathering in wetter conditions, which releases iron from the silica minerals and turns feldspars to clay. The iron then forms an oxide, like rust, which coats the sand grains, turning it red. This is the 'red sand' of Red Desert. Many people believe the Red Desert was caused by Shaka's army that camped here after raiding Mpondo communities for cattle. The great herds apparently stripped the dunes of vegetation, exposing the sandy soil to wind erosion. Others believe the desert is an entirely natural phenomenon. It is maintained today by wind erosion. The use of motorbikes in this area should be prohibited or strictly monitored to prevent further erosion.

2.4.5 Hydrology

While there are small drainage lines which run into the Umtamvuna River, the principal drainage is to the east and south in the form of the Zolwane River which flows to the sea below the reserve. There is a wetland in the lower reach of the river within the reserve.

2.4.6 Vegetation

The Pondoland Centre of Plant Endemism is a stretch of land from Hibberdene in the north to Port St. Johns in the south along the coastline running inland variously between 5 and 20 km and is congruent with the presence of Msikaba Formation Sandstone. The Red Desert represents a valuable remnant of the Pondoland Centre and contains an important range of endemic species.

The grasslands are generally very diverse and have an excellent range of grasses and other forbs. Under correct management, the spring flush of flowers could easily become a tourist attraction. See Appendix D.

The grasslands and forest margins are notable for the populations of sugarbushes (*Protea* spp.).

The forests contain several of the Pondoland Centre endemic woody species see Appendix D.

Particular note must be taken of *Phylica natalensis*, a rare and vulnerable species which occurs in the largest known population on the Red Desert.

2.4.7 Fire regime

Fire is an important secondary determinant of the presence and extent of the grassland biome in South Africa and plays an important ecological role in the dynamics of grasslands in combination with climate, topography and grazing (O'Connor and Bredenkamp 1997). The biome's biota are well adapted to repeated fires, but community organization and ecosystem functioning are markedly influenced by variation in the fire regime (Mentis and Tainton 1984). In terms of maintaining a fire regime that is beneficial for biodiversity, season of burning has a very strong influence, frequency of burning a strong influence, intensity of burning a weak influence and extent of burning a marginal influence at best. The influence of extent of burn could be moderate to strong if interactive effects with grazing are considered (O'Connor 2005).

The RDNR area has been characterised by numerous uncontrolled arson fires each year. The RDNR will use fire for the purpose of managing the grassland and securing the infrastructure on the property. The Management Authority and Advisory Committee will meet annually before the fire season, where the previous season's burns will be reviewed, and based on the Fire Management Plan, management compartments will be scheduled for burns in the upcoming fire season and will be recorded as the Annual Burning Plan for implementation. Activities on RDNR should focus on the maintenance of firebreaks and developing working arrangements with the local fire department or working on fire teams that can assist in controlled burning of the protected area.

2.4.8 Invasive species

The threat of alien plants to biodiversity occurs on a landscape scale as they can reduce or eliminate either species or habitat. Alien plants, which have been declared weeds or invader plants according to Section 29 of CARA, are a serious threat to the ecological functioning of natural systems as well as water production and must be strictly controlled in terms of the relevant CARA regulations.

The Red Desert consists of areas of grassland, forest, wetland and eroded red sand (the Red Desert) and the cliff face overlooking the Umtamvuna River. Of more particular interest and note though, is the fact that *Phylica natalensis*, a rare species, occurs in the largest known population on the Red Desert, and thus its preservation is paramount. The natural areas on the property are under severe threat from expanding populations of invasive woody alien species as well as alien climbers, the most prominent of which are *Grevillea banksii, Hakea sericea, Pinus patula, Pinus elliottii* and *Casuarina* as well as the ever present prolific grower *Chromolaena odorata* or Triffid weed.

An on-going time-bound programme to effectively control these alien weeds and invader plants within the Nature Reserve must be developed and maintained. State poverty relief programmes such as “Working for Water”, and DAEA’s Alien Invasive Species Programme should be used to full effect to complement the Protected Areas management budget.The threat of alien plants to biodiversity occurs on a landscape scale as they can reduce or eliminate either species or habitat. Alien plants, which have been declared weeds or invader plants according to Section 29 of CARA, are a serious threat to the ecological functioning of natural systems as well as water production and must be strictly controlled in terms of the relevant CARA regulations.

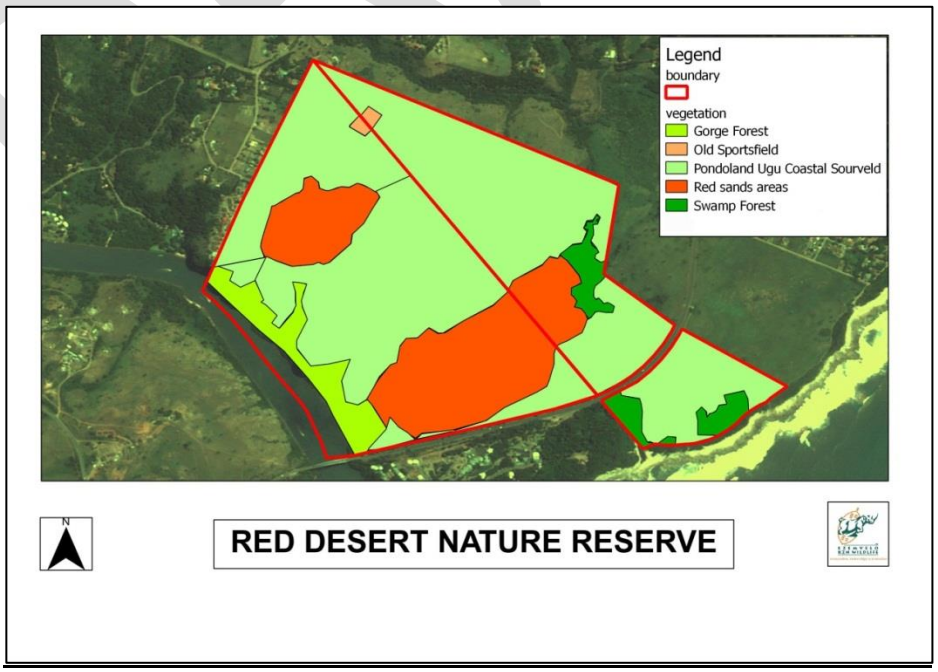

Fig 2.1.1. Detailed map of the specific land use on the RDNR, indicating the Red sands area and habitat types.

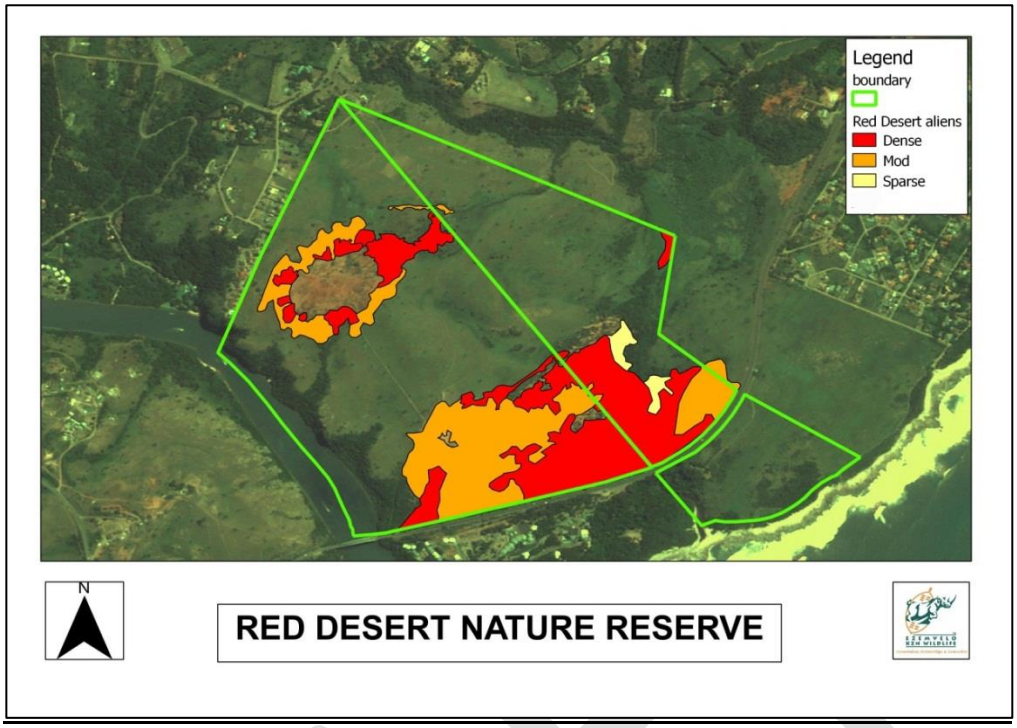

Fig 2.1.2. RDNR detailed map of the alien plant infestation.

2.4.9 Mammalian fauna

The area has a resident population of Reedbuck, Blue and Grey Duiker. Oribi antelope and Samango Monkeys which are classified endangered are visitors to this area. Cape Clawless Otters, Caracal and Rock Dassies have also been sighted.

2.4.10 Avifauna

There are considerable opportunities for birdwatching in this area with approximately 100 birds species recorded. The Southern Ground Hornbill is an occasional visitor to the grasslands. Species list in Appendix D.

2.4.11 Herpetofauna (reptiles and amphibians)

The following reptiles and amphibians occur in the area: Reptiles: Weza dwarf chameleon *Bradypodion wezae* Endemic to KZN), Transkei dwarf chameleon *Bradypodion caffrum* (Endemic to SA), Common slug-eater *Duberria lutrixlutrix* (Endemic to SA)

Amphibians: Natal leaf-folding frog *Afrixalus spinifrons spinifrons* (V, Endemic to SA), Natal tree frog *Leptopelis natalensis* (Endemic to SA, Near-Endemic to KZN), Painted reed frog *Hyperolius marmoratus verrucosus* (Endemic to SA). Species list in Appendix D.

2.4.12 Invertebrates

A number of insects endemic to South Africa are found in the area. See Appendix D.

2.5 Cultural context of Red Desert Nature Reserve

In papers published by Dr Oliver Davies some decades ago, ancient stone artifacts (early stone age) on the KwaZulu-Natal and Transkei Wild Coast were reported to be contained in dune sands, and unpublished site reports in the Natal Museum provide further documentation.

Information taken from a report by Kuman and Clarke, 2005 –

"The Red Desert site is well known by tourists for its prolific artefacts, and similarly we found widespread scatters of artefacts associated with the dunes. Among the surface finds were picks, bifaces such as rough handaxes, choppers, a radial core, and various other flakes and cores. The sands in this area preserve fossil traces of intensive root growth in the form of paler root channels in the red sand that are akin to rhizoliths, indicating that vegetation was once lush, such as is the case in respect of the coastal forests in the region today. Several beach cobbles are eroding from deposits in one of the areas, while a short distance away an old beach level with more numerous cobbles is being exposed through erosion. Artefacts are made on these beach cobbles, which were a ready source of materials. The tool types we observed are consistent and typical of the Sangoan Industry.

As an extensive and important cultural landscape of great antiquity, the Red Sands of the KwaZulu-Natal and Transkei coast should be protected and preserved. The rarity of Sangoan sites in South Africa is a further very strong argument in favour of its protection. Elsewhere in Africa, the Sangoan Industry has been dated to *ca* 300,000 years, a time of pre-modern humans that correlates with the occupation of more challenging habitats. By 200,000 years, modern *Homo sapiens* had evolved. Little is known of the physical appearance of the Sangoan people. The fact that fossil vegetation and animals were found in the Wild Coast surface site holds promise for the recovery of further fossils in better context, possibly even Sangoan hominid remains. Faunal and floral remains would also undoubtedly provide valuable information on past environments."

2.6 Socio-economic context

The average KZN population density is 102 people/km^2, however the HCM population density is 220 people/km^2. Concentrations of populations are located near major towns and traditional authority areas. The HCM population grew by 16% from 2001 to 2007, but future population growth in the Umtamvuna-Port Edward area is estimated at 3.5%. There are differences in age structures of urban and non-urban areas with the youthful population (under 20) concentrated in inland rural areas, and the economically active concentrated along the coastal strip. HCM ranks as one of the less deprived municipalities in the province, but high levels of poverty

and deprivation exist. The Port Edward area is classed as 'least deprived' (Information taken from Hibiscus Coast Municipality IDP 2011-2012).

RDNR is surrounded by middle to upper class residential dwellings on the north and western boundary, the Umtamvuna River on the southern boundary, and the R61 district road, and a holiday resort to the east.

The HCM IDP (2011) states that the municipality should develop a tourism and heritage plan show casing tourism attraction areas (urban and rural), and should restore and protect the natural resources, beautiful scenery and indigenous plants.

2.7 Operational management within Red Desert Nature Reserve

2.7.1 Visitor, tourism and management infrastructure

Little to no infrastructure currently exists on the RDNR for visitor or management use. The RDNR Management Authority intends to develop appropriate infrastructure which will allow easy access and utilisation of the Reserve by the general public. The following infrastructure will be considered:-

- Entrance gate and parking area.
- Guard house and ticket office.
- Visitor centre.
- Appropriate walks and trails.

2.7.2 Operational management

Current activities undertaken at the site include limited tourist and local access.

2.8 Summary of management issues, challenges and opportunities

Table 2.8.1 Management challenges, issues and opportunities

Key performance area	Issue that must be addressed
Law enforcement	Declaration of nature reserve
	Illegal access, including biking
	Illegal grazing

	Illegal muthi plant harvesting
Tourism development	Entrance gate with appropriate facilities
	Construction of access paths and roads
	Establishment of visitor facilities
Conservation management	Controlled access
	Appropriate burning regime
	Wetland and river management
	Forest management
Operational management	Alien plant control
	Soil erosion control
	Funding strategy
	Monitoring

3) STRATEGIC MANAGEMENT FRAMEWORK

The following strategic framework is aimed at providing the basis for the protection, development and operation of the biodiversity stewardship site over the next five years and has been prepared collaboratively through a process involving the landowner, the biodiversity stewardship facilitator and Ezemvelo KZN Wildlife.

The vision describes the overall long-term goal for the operation, protection and development of Red Desert Nature Reserve. The objectives and strategic outcomes that follow are intended to provide the basis for the achievement of the vision. The objectives provide a broad description of the goals for each key performance area. The strategic outcomes, which flow from the objectives, set out what is needed to achieve the objectives, based on the management challenges, issues and opportunities described in Section 2 above.

3.1 Red Desert Nature Reserve vision

To conserve the biodiversity value and bring benefit to the broader public through the proclamation of the Red Desert area as a Nature Reserve as defined in the NEM: Protected Areas Act, and to manage the Nature Reserve in a public-private partnership with the Hibiscus Coast Municipality, Ezemvelo KZN Wildlife and private land owners and other relevant stakeholders.

3.2 Objectives and strategic outcomes

An objective has been identified for each of Red Desert Nature Reserve 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 3.1 sets out the key performance areas, the objective for each key performance area and the strategic outcomes, required to realise the objectives.

The Red Desert Nature Reserve is set aside for the following purposes:

1.1.1. To supplement the system of protected areas in RSA, provincially and nationally.

1.1.2. To protect areas with significant natural features, species, habitats or biotic communities, i.e. the Umtamvuna River, riverine forest, Izolwane stream, waterfall and wetlands, and red desert areas.

1.1.3. To protect a particular site of scientific, cultural, historical or archaeological interest; i.e. Red Desert Area archaeological site, including Shaka / Pondo history.

1.1.4. To conserve significant populations of endemic, rare and threatened plants of the Pondoland Centre of Plant Endemism which otherwise occur largely on unprotected areas.

1.1.5. To make provision for ex situ populations of endangered plant species.

1.1.6. To provide for a sustainable flow (researched and proven) of natural products and services to meet community needs.

1.1.7. To ensure the sense of place (sense of wildness) is maintained and inappropriate development is avoided by managing the interrelationship between natural environmental biodiversity, human settlement and economic development in the area.

1.1.8. To provide for nature based recreation and tourism opportunities i.e. walks, hiking, botanising, birdwatching, dendrology, picnic sites, camping sites, view sites, accommodation, and environmental education.

Table 3.1 Objectives and strategic outcomes for Red Desert Nature Reserve

Key performance area	Objective	Strategic outcome
Legal compliance	Enforce legislation and rules pertaining to the protection and effective management of Red Desert Nature Reserve.	Measures are implemented to curtail illegal activities within Red Desert Nature Reserve.
Visitor use	Visitors to Red Desert Nature Reserve are encouraged through the provision of infrastructure that enables appropriate nature-based activities.	Appropriate infrastructure is installed to allow visitors to access and appreciate the site without causing undue environmental impacts.
Conservation management	Protect the ecological integrity and species of Red Desert Nature Reserve through active management of the site.	Annual planning is undertaken for implementation of the season's burning regime. Adequate fire safety within Red Desert Nature Reserve is ensured. An active alien invasive species control programme is implemented. Implementation of procedures to identify, rehabilitate and manage areas that may potentially be impacted by soil erosion. Implementation of procedures to manage alien animals found within Red Desert Nature Reserve. Rare and endangered species management is undertaken using the best available scientific knowledge. Processes are established to determine the success of management interventions in protecting the ecosystems, communities and species of Red Desert Nature Reserve.
Operational management	Provide adequate human resources, equipment and funding to enable the effective protection and management of Red Desert Nature Reserve.	Red Desert Nature Reserve is adequately staffed for its effective management and operation. All assets, infrastructure and equipment in Red Desert Nature Reserve are adequately maintained. There are sufficient assets, infrastructure and equipment to enable staff to effectively manage RDNR.

4) ZONATION PLAN

The purpose of the zonation of Red Desert Nature Reserve is to control the intensity and type of use within it, in efforts to ensure the overriding goals of production and biodiversity conservation are met. On this basis, within some zones, the permissible intensity of use will be relatively higher than in others.

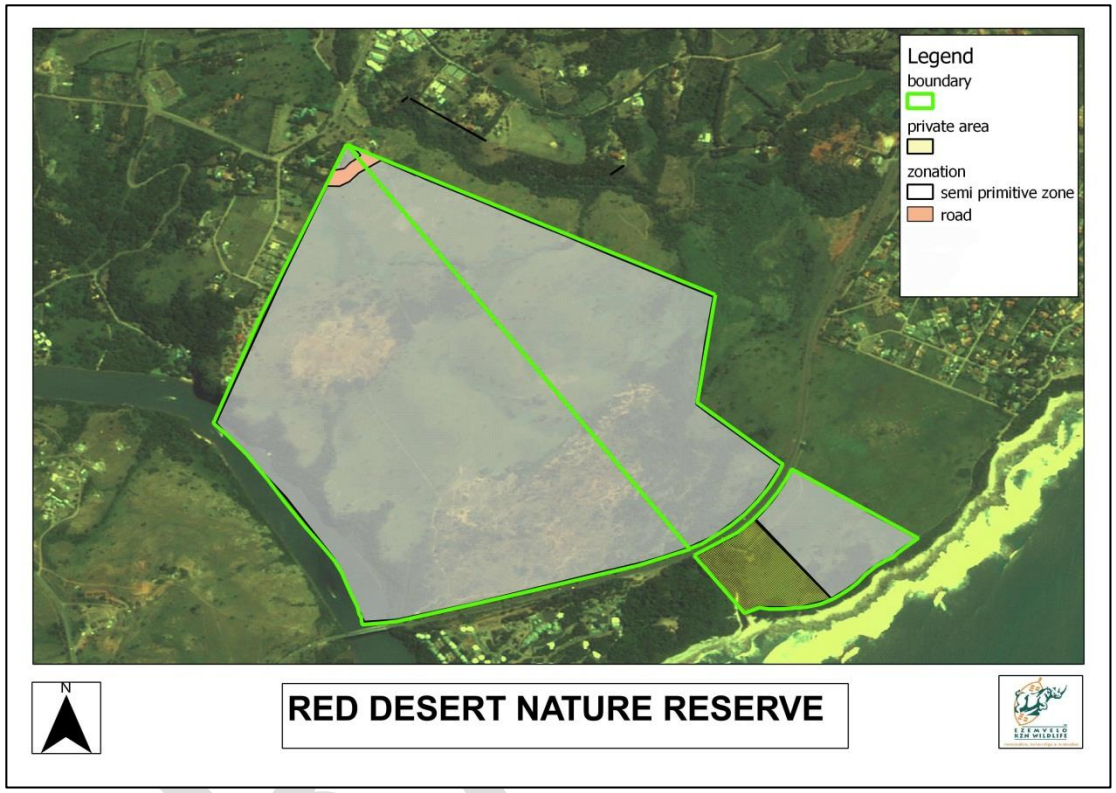

Fig 4.1.1. Red Desert Nature Reserve Zonation Map.

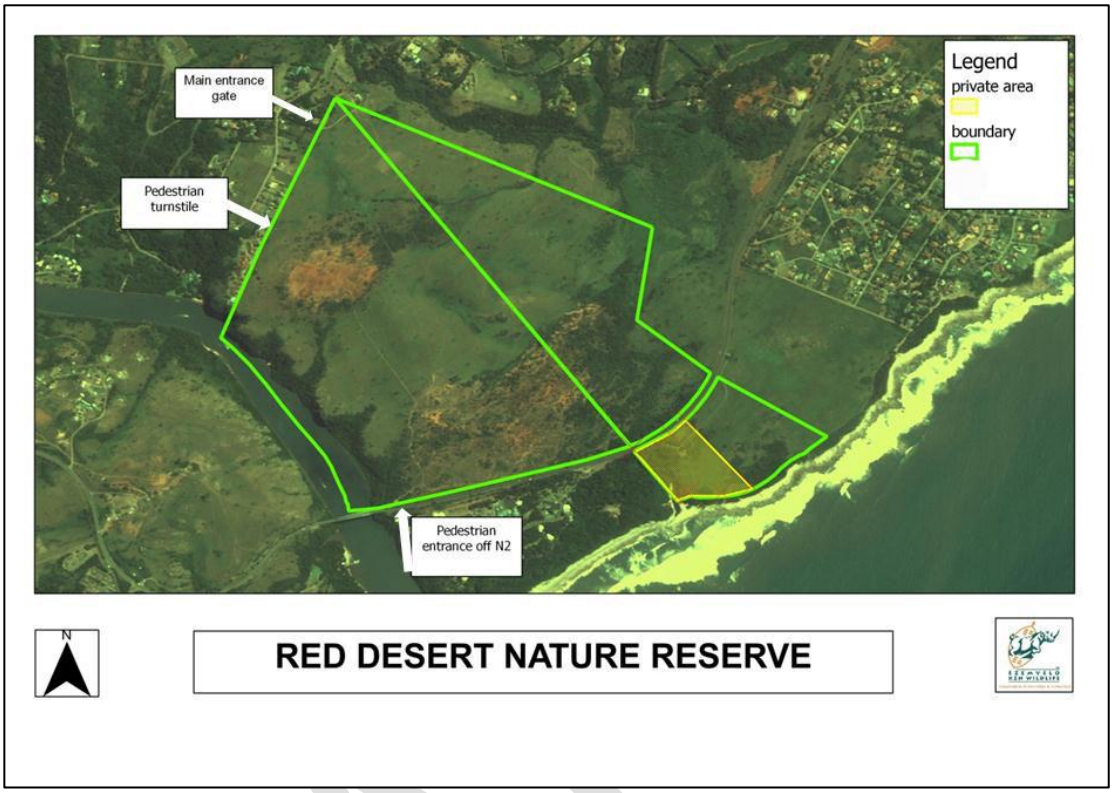

Fig 4.1.2. RDNR Development Zones

4.1 Conceptual development guidelines

4.1.1 Roaded natural zone

This zone covers areas that includes the main entrance to the nature reserve. It is designated for relatively high vehicle usage.

Objectives of the zone:

- Provide the main entrance and visitor thoroughfare to the nature reserve.

Permissible activities:

- Maintenance of the main access point into the nature reserve.
- Development of visitor and management infrastructure.

Non-permissible activities:

- Quad or motorbike access into the nature reserve.

4.1.2 Semi-primitive motorised

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 Nature Reserve, for management purposes is allowed in this zone and it would be suitable for use for hiking trails and

possibly mountain biking. This zone will also be used to designate areas of low level management infrastructure such as trails, bird hides and signage

Objectives of the zone:

- Enable access and usage of the nature reserve whilst limiting the impacts of this.

Permissible activities:

- Medium intensity, guided and self-guided hiking and nature trails, utilising minimal directional signage on formalised pathways.
- Development of low-scale infrastructure such as bird hides.
- Development of operational management infrastructure such as 4x4 vehicle trails.

Non-permissible activities:

- Quad or motorbike use in the nature reserve.

4.1.3. Private Use Area

This zone is designated for areas which have been demarcated for private use by the landowners. While no formal restrictions are applied to these areas, no activities or developments which conflict with conservation practices should be carried out.

5) ADMINISTRATIVE STRUCTURE

A recommended organisational structure for Red Desert Nature Reserve is set out in Figure 5.1. The figure identifies the role of the site's landowners and their staff together with key partners such as Ezemvelo KZN Wildlife.

1.3.2 Administrative structures of the Red Desert Nature Reserve (Institutional Arrangements)

The Red Desert Nature Reserve will be managed by the Management Authority, which will be an association established between the Red Desert Trust (a Trust consisting of the Williams family - Rem. of Lot 1016) and the Hibiscus Coast Municipality. This Association will be established between the three parties to set up the roles and responsibilities for management. This association will have the responsibility of decision-making, while an advisory committee will be established to assist in the management of the reserve. The Association Agreement is shown in Appendix 1.

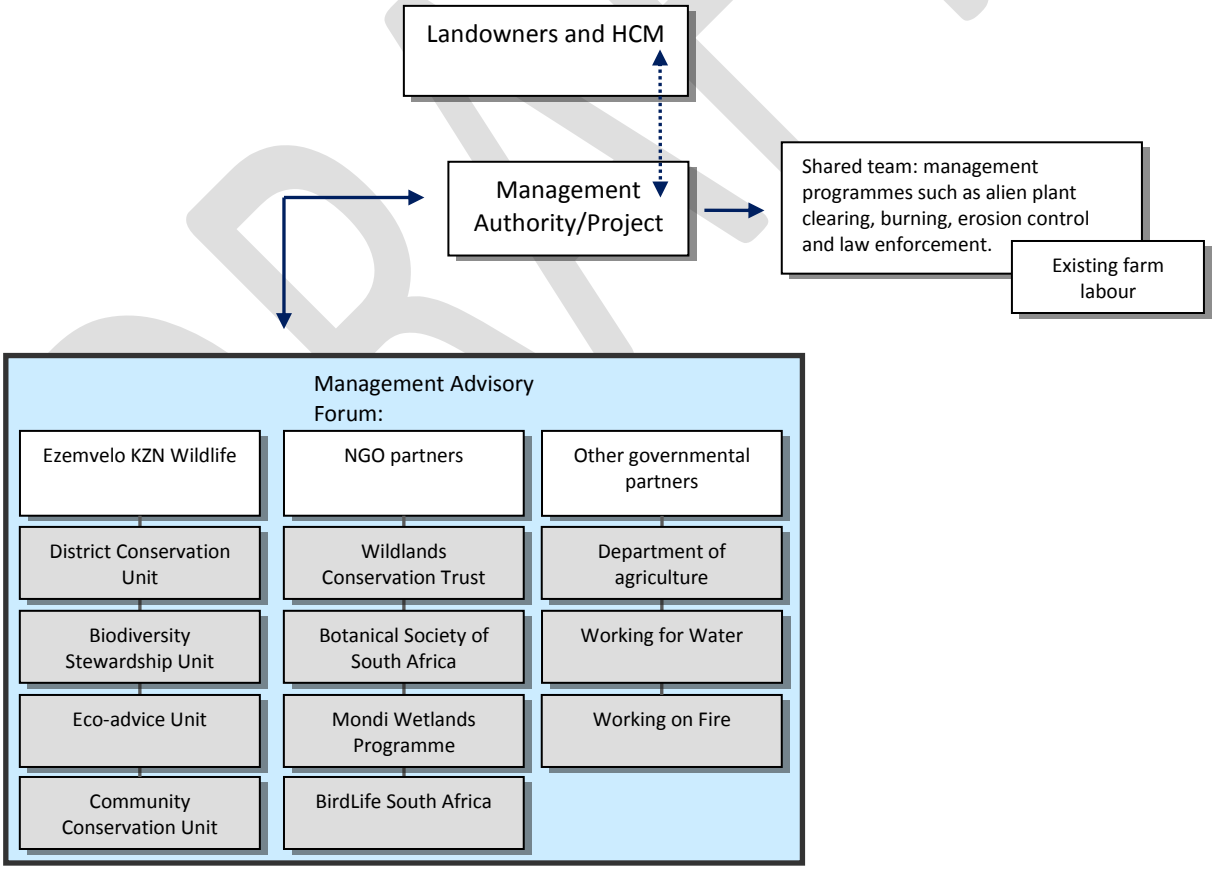

Figure 5.1 Organisational structure for Red Desert Nature Reserve

6) OPERATIONAL MANAGEMENT FRAMEWORK

This section translates the strategic framework described in Section 3 above into management activities and targets, which will be used to inform annual plans of operation and the resources required to implement them. The management targets will form the basis for monitoring of performance in implementing the plan and are thus measurable.

6.1 Legal compliance

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

- Law enforcement efforts should be coordinated with the relevant authorities including 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.

6.2 Visitor use

In encouraging visitors to Red Desert Nature Reserve, the following guiding principles should be adhered to:

- Visitor use and infrastructure must be appropriate to the site's values and must not threaten its biodiversity or ecological integrity.

The operational requirements for legal compliance, and visitor use are set out in Table 6.1 below.

Table 6.1 Framework for law enforcement and tourism development

Strategic outcome	Management activities	Management targets	Indicators of Concern	Timing	Landowner responsibility	Partner responsibility
LEGAL COMPLIANCE						
Measures are implemented to curtail illegal activities within Red Desert Nature Reserve.	Collaborate with relevant institutions and neighbours in addressing security issues and illegal activities in the nature reserve.	Monitoring of the site to identify and respond to trespassing and illegal activities.	Trespassing Presence of unauthorised livestock Recorded losses of muthi plants or rare and endangered plant species Frequent recovery of snares Arson fires	***Year 1 - ongoing***	Implementation of a programme of patrols Development of relationships with neighbours to cooperate in combating illegal activities	Prosecution of offenders caught committing offences
Appropriate infrastructure is installed to allow visitors to access and appreciate the site without causing undue environmental impacts.	Identify the activities that could be developed to meet the nature reserve's visitor requirements. Identify the infrastructure needed to support visitor activities.	Provide infrastructure and facilities to support identified visitor activities.	Development of infrastructure or encouragement of activities that result in environmental or ecological harm to the nature reserve	***Year 3***	Development of infrastructure and facilities.	Provision of advice and support to management authority

	Develop partnerships with organisations and associations involved in nature-based activities in the region in an effort to encourage visitors.	Inclusion of Red Desert Nature Reserve as a destination visited by local and regional nature and wildlife clubs.	Lack of visitor interest in Red Desert Nature Reserve.	***Year 2***	Engagement with local nature and wildlife clubs	Provision of advice and support to management authority

6.3 Conservation management

6.3.1 Fire management

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

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

6.3.2 Invasive plant control

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

- Invasive plant control will require an ongoing programme that prioritises key infestations along water courses, drainage lines and upper catchment areas.
- Initial clearing efforts should focus on containing infestations that are most likely to spread into new areas.
- All follow-up requirements must be strictly adhered to otherwise the problem will be exacerbated.
- Strategic partnerships and poverty relief programmes such as the Working for Water programme should be utilised.

6.3.3 Soil erosion control

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

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

The detailed operational requirements for conservation management are set out in Table 6.2 below.

Table 6.2 Framework for conservation management

Strategic outcome	Management activities	Management targets	Indicators of Concern	Timing	Landowner responsibility	Partner responsibility
FIRE MANAGEMENT						
Adequate fire safety within the nature reserve is ensured.	Maintain a system of firebreaks at the site that are of adequate extent, which are prepared at the correct time of the year under the appropriate weather conditions. Ensure that staff are trained and that adequate fire fighting equipment is available at the site. Become a member of the local Fire Protection Association.	Compliance with the National Veld and Forest Fires Act.	Inadequate personnel, or equipment. Wildfires spreading from the site to neighbouring properties.	***Year 1 - ongoing***	Implementation of the burning regime	Advice in planning the annual burning programme
INVASIVE PLANT CONTROL						
Achievement of a significant reduction in levels of invasive plant infestations in the nature reserve.	Implement concerted, sustained control efforts in identified areas of heavy invasive plant infestation. Undertake suitable rehabilitation measures, including re-vegetation using indigenous plant species, to prevent soil erosion, following clearing of invasive plant species. Develop partnerships with Working for Water and other strategic programmes.	50% reduction in wattle infestation levels in five years. 50% reduction in infestations of all other listed invasive plants in five years.	Spread of existing levels of infestation of listed invasive species. Persistence of existing infestations. New infestations of listed invasive species.	***Year 5***	Implementation of invasive plant control measures	Advice in planning for alien invasive plant control Assistance in the provision of training, equipment and chemicals
SOIL EROSION CONTROL						
Implementation of procedures to identify, rehabilitate and manage areas that have been significantly impacted by soil erosion.	Identify the requirements for soil erosion control and rehabilitation within the site. Implement soil erosion control and rehabilitation measures, focussing on areas that are impacting on watercourses or that are growing larger. Undertake preventative measures in areas with low plant cover that may be at risk of soil erosion.	Implementation of soil erosion control measures in areas in which plant cover is low, which are susceptible to erosion.	Further erosion of impacted areas. Sedimentation impacts in watercourses and wetland areas.	***Year 1 - ongoing***	Implementation of soil erosion control measures	Advice in planning for soil erosion control

6.4 Operational management

6.4.2 Infrastructure development and management

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

No infrastructure currently exists on the RDNR. New infrastructure needs to be planned and developed for the following areas:-

- An entrance gate and its associated facilities (office infrastructure, toilets, security guard hut);

- The development of visitor infrastructure (retail outlets, environmental education centre).

Investigate the need and desirability for the establishment of visitor facilities in the old sheds located on Mr Dave Watson's property.

Roads, Tracks and Paths - The present road network is extremely limited, with the intention of the RDNR to maintain this status quo. In fostering the use of the RDNR by the general public, a system, of well-maintain paths should be explored, maintained in a manner that limits erosion, using the existing network of paths as a starting point. No mechanised vehicle may enter the grassland of the RDNR without permission, and if allowed must remain on established roads / tracks. Exceptions are the traversing rights over the ESKOM servitudes by authorized personnel using prescribed routes.

- Infrastructure must be maintained to avoid any damage to the environment and ensure the safety of staff and visitors to the site.
- Infrastructure must be provided to ensure the effective management and operation of the nature reserve.

The detailed requirements for operational management are set out in Table 6.3 below.

Table 6.3 Framework for operational management

Strategic outcome	Management activities	Management targets	Indicators of Concern	Timing	Landowner responsibility	Partner responsibility
HUMAN AND FINANCIAL RESOURCES						
The site is adequately resourced for its effective management and operation.	Employ sufficient, appropriately skilled staff to meet the management and operational requirements of the site. Undertake regular training and skills development to ensure that staff are able to effectively complete their duties.	Appointment of staff in key positions at the site.	Inadequate staff numbers or skills for the effective management of the site.	***Year 3***	Employment and training of staff	Assistance in conservation training and sourcing of resources to manage the site
INFRASTRUCTURE						
All infrastructure at the site is adequately maintained.	Ensure that the boundary fence is regularly inspected and adequately maintained to ensure security and to contain game species within the site. Develop and implement a schedule maintenance programme to maintain facilities and infrastructure in a condition that meets relevant environmental, health and safety requirements.	Regular scheduled maintenance of all facilities and infrastructure.	Environmental, health or safety incidents associated with inadequately maintained facilities and infrastructure.	***Year 1 - ongoing***	Implementation of a scheduled maintenance programme	Assistance in the provision of equipment such as fencing

7) MONITORING AND REPORTING

Monitoring and reporting is a critical component of the adaptive management cycle. It enables the effective assessment of management interventions and, if necessary, can be used to direct modifications of management in an effort to achieve the outcomes required.

7.1 Annual monitoring

The annual monitoring schedule should be designed to monitor the implementation of aspects of the management plan. It should be designed to be straightforward and relatively easy to implement by on-site staff.

Records should be maintained of key management interventions and of problem events or incidents such as uncontrolled access, poaching, illegal plant collection or uncontrolled/arson fires.

Scientific monitoring programmes may be established to monitor specific management interventions such as measures for the protection of flagship species. Most of the outcomes of the monitoring process will be captured in an annual report, which will be used to inform the following year's annual plan of operation.

On this basis, a monitoring schedule for Red Desert Nature Reserve is set out in Table 7.1.

Table 7.1 Annual monitoring schedule for Red Desert Nature Reserve

Management issue	Parameters to be monitored	Monitoring measures	Monitoring frequency	Responsibility	Reporting requirements
Law enforcement	Schedule of patrols	Written record	Weekly	Landowner	Annual report
	Recovery of snares	Photographs/written record	Weekly		Annual report
	Illegal incidents	Photographs/written record	Per event		Record of event
Tourism	Visitor statistics	Completion of questionnaire	Ongoing	Landowner	Annual report
Fire management	Burning of firebreaks as part of fire management	Written record/map/photography	Annually	Landowner	Annual report
	Burning of blocks as part of controlled burning		Annually		Annual report
	Unplanned wildfires	Written record/map/photography	Per event		Record of event
Invasive plant control	Areas subject to invasive plant control	Photographs/written record	Quarterly	Landowner	Annual report
	State of areas in which invasive plants have been eradicated				
	Records of labour hours/days	Written record	Annually		Annual report
	Herbicide usage	Written record	Annually		Annual report
Soil erosion control	Areas subject to erosion control	Photographs/written record	Quarterly	Landowner	Annual report
	State of rehabilitated areas of erosion				Annual report
Conservation targets	Incidents related to flagship species	Photographs/written record	Per event	Landowner	Record of event
	Status of key rare and endangered species, particularly those for which conservation targets have been set	Monitoring plan	To be determined	Landowner assisted by Eco-advice Unit	Annual report
Human resources	Staffing levels	Number of full-time staff	Annually	Landowner	Annual report
Facilities and infrastructure	State of roads, paths and fences	Photographs/written records	Quarterly	Landowner	Annual report
	State of facilities and service infrastructure	Maintenance schedule/written records	Monthly	Landowner	Annual report
	Pollution events	Photographs/written records	Per event		Record of event

7.2 Annual protected area management plan implementation 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 minutes of the annual management meeting will form the basis of the report on the management plan review. The minutes should include records of recommendations for update/changes to the five-year plan so that when the five-year plan is revised for the subsequent five years, these recommendations can be assessed and included where necessary.

8) RED DESERT NATURE RESERVE ANNUAL PLAN OF OPERATION

Each year an annual plan of operation will be prepared, based on the objectives, strategic outcomes, management activities and targets contained in the management plan.

8.1 Implementation of the management plan

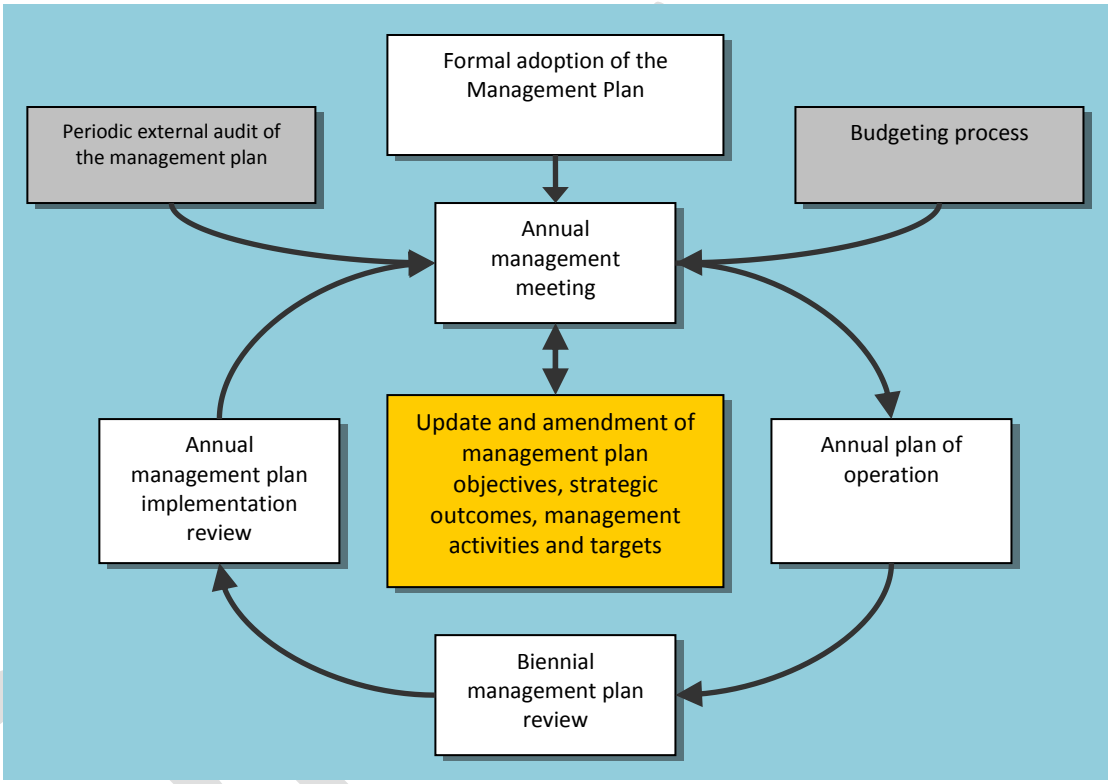

Figure 8.1 Process for the implementation of Management Plans

Each year an annual management meeting is to be held for the biodiversity stewardship site. In terms of the implementation of the management plan, the purpose of the annual management meeting for Red Desert Nature Reserve will be to:

- Finalise the annual report, as part of the annual management plan review described in Section 7.2 above.
- As part of the annual performance review, determine the need to modify or change any of the management plan's objectives, strategic outcomes, management activities or targets.
- Determine management activities for the coming year and to set goals for the year, based on the key performance areas set out in the management plan.

- Determine how budgets will be spent in an effort to achieve the goals for each of the quarters of the coming year.

The minutes and notes of the annual management meeting will be compiled in an annual plan of operation, which will include all of the information, set out above, and will determine what management activities need to be completed for the coming year, based on the management plan. A pro forma annual plan of operation is set out in Appendix E.

8.2 Responsibilities in implementing the protected area management plan

In the tables in the operational management framework, the responsibilities for the completion of management activities are identified. In many cases the people responsible for implementing the activities will be in attendance at the annual management meeting and the requirements for the achievement of the management activities can be discussed and agreed to at the meeting. In some cases, however, the management activities may be required to be referred to an individual within Ezemvelo KZN Wildlife or another partner to ensure that they implement the management activity.

8.3 Red Desert Nature Reserve resource requirements

In developing annual plans of operation for Red Desert Nature Reserve the resource requirements, associated with management activities and targets set out in the operational management framework must be considered and budgeted for. The following section broadly identifies the issues that must be considered in determining adequate human resources, funds and equipment for the site.

8.3.1 Staff and equipment

Annual plans of operation must consider the staff and equipment needs to undertake the following activities:

- Administration and management of the site.
- Patrolling of the site and its boundaries.
- An annual burning programme and fire fighting response to wildfires.
- An ongoing invasive plant species control programme.
- An ongoing soil erosion control and rehabilitation programme.
- Ecological monitoring and data capture.
- Maintenance of roads, paths and fences within the site.
- Maintenance of facilities and infrastructure within the site.
- Capture of visitor information and statistics.
- Admitting visitors to the site and charging entrance fees.
- Community liaison and cooperation.
- Environmental interpretation and education.

8.3.2 Projects

In addition to the requirements for annual recurrent funding for the issues outlined above, there will be a need to identify funding requirements for the following capital projects:

- Installation of communications infrastructure and purchase of equipment to enable effective communication between staff within the site.
- Equipment and infrastructure required to undertake appropriate waste management practices within the site.
- Upgrade of staff houses and administrative facilities within the site.
- Installation of signage directing tourists to the site.
- Installation of directional and interpretive signage within the site.
- The possible re-introduction of game species into the site.

REFERENCES

Acocks, J.P.H. (1975) Veld Types of South Africa. Memoir of the Botanical Survey of South Africa No.40. Department of Agricultural Technical Services, Pretoria.

Carbutt, C. and Goodman, P.S. (2010) Assessing the Management Effectiveness of Stateowned, Land-based Protected Areas in KwaZulu-Natal. Ezemvelo KZN Wildlife unpublished report, Pietermaritzburg. pp. 1-67.

Camp, K.G.T. (1998) The bioresource units of KwaZulu-Natal. Cedara report N/A95/32. KZN Department of Agriculture.

Cowan, G.I. (2006) Guidance for the development of management plans in terms of the National Environmental Management: Protected Areas Act (Act 57 of 2003). Department of Environmental Affairs and Tourism, Pretoria.

Department of Environmental Affairs and Tourism (2008) The National Protected Area Expansion Strategy 2008-2012. Pretoria.

Ezemvelo KZN Wildlife. (2010) KZN Protected Area Expansion Strategy and Action Plan (2009-2028). Ezemvelo KZN Wildlife unpublished report, Pietermaritzburg. pp. 1-63.

Goodman P.S. (2011) Ezemvelo KZN Wildlife Norms and Standards: Surveillance and Monitoring Plans for Biodiversity. Ezemvelo KZN Wildlife unpublished report, Pietermaritzburg.

Hardy, M.B., Barnes, D.L., Moore, A. and Kirkman, K.P. (1999) The management of different types of veld. In Tainton, N.M. (ed) Veld Management in South Africa. University of Natal Press, Pietermaritzburg.

Hibiscus Coast Municipality2011 – 2012 IDP Review

Mucina, L. and Rutherford, M.C. (eds.) (2006). The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19, South African National Biodiversity Institute, Pretoria.

O'Connor, T.G. and Bredenkamp, G.J. (1997) Grassland. In Cowling, R.M., Richardson, D.M. and Pierce, S.M. (eds) Vegetation of Southern Africa. Cambridge University Press, United Kingdom.

O'Connor, T.G. (2005) Influence of land use on plant community composition and diversity in Highland Sourveld grassland in the southern Drakensberg, South Africa. Journal of Applied Ecology, 42, 975-988.

Scott-Shaw, C.R. (1999) Rare and threatened plants of KwaZulu-Natal and neighbouring regions. KwaZulu-Natal Nature Conservation Services, Pietermaritzburg.

Snyman, H.A. (2004) Short-term influence of fire on seedling establishment in a semi-arid grassland of South Africa. South African Journal of Botany, 70(2), 215-226.

Stolton, S., Hockings, M., Dudley, N., MacKinnon, K., Whitten, T. and Leverington, F. (2007) Management Effectiveness Tracking Tool: reporting progress at protected area sites (2nd edition). World Bank and WWF Forest Alliance.

Trollope, W.S.W. (1999) Veld Burning. In Tainton, N.M. (ed) Veld Management in South Africa. University of Natal Press, Pietermaritzburg.

DEFINITIONS OF TERMS

Alien species	Species or genotypes, which are not indigenous to Ntsikeni Nature Reserve and the surrounding area including hybrids and genetically altered organisms.
Biodiversity	The variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems (as per the National Environmental Management: Biodiversity Act, 2004 [Act No. 10 of 2004]).
Bioprospecting	In relation to indigenous biological resources, means any research on, or development or application of, indigenous biological resources for commercial or industrial exploitation, and includes – the systematic search, collection or gathering of such resources or making extractions from such resources for purposes of such research, development or application (as per the National Environmental Management: Biodiversity Act, 2004 [Act No. 10 of 2004])
Board	The KwaZulu-Natal Nature Conservation Board as defined by the KwaZulu-Natal Nature Conservation Management Act, 1997 (Act No.9 of 1997).
Buffer zone	An area surrounding aprotected area that has restrictions placed on its use or where collaborative projects and programmes are undertaken to afford additional protection to the nature reserve.
Co-management	The term 'Co-management' must be understood within the context of Section 42 of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003).
Cultural heritage	As defined in Article 1 of the World Heritage Convention (UNESCO) 1972 , 'cultural heritage' is considered as "monuments, architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of (…) value from the point of view of history, art or science, groups of buildings, groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of significance from the point of view of history, art or science, sites, works of man or the combined works of nature and man, and areas including archaeological sites which are of (…) value from the historical, aesthetic, ethnological or anthropological point of view." For the purpose of this IMP, living heritage features such as mountains, pools, rivers, boulders, etc. as well as palaeontological features are included under this definition.
Ecotourism	The travel to natural areas to learn about the way of life and cultural history of people, the natural history of the environment, while taking care not to change the environment and contributing to the economic welfare of the local people (adapted from a definition of ecotourism by Hecto Ceballos Lascurain).
Ecological integrity	The sum of the biological, physical and chemical components of an ecosystem and its products, functions and attributes (as per the National Environmental Management: Protected Areas Act, 2003 [Act No. 57 of 2003]).
Ecosystem	A dynamic complex of animal, plant and micro-organism communities and their non-living environment interacting as a functional unit (as per the National Environmental Management: Protected Areas Act, 2003 [Act No. 57 of 2003]).

Ecosystem services	As defined in Section 1 of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) as "environmental goods and services" meaning: a. Benefits obtained from ecosystems such as food, fuel and fibre and genetic resources. b. Benefits from the regulation of ecosystem processes such as climate regulation, disease and flood control and detoxification. c. Cultural non-material benefits obtained from ecosystems such as benefits of a spiritual, recreational, aesthetic, inspirational, educational, community and symbolic nature;" For the purposes of this IMP, sustainable water production is also specifically included under this definition.
Environmental degradation	The deterioration of the environment through depletion of resources such as air, water and soil; the destruction of ecosystems and the loss of species or undesirable reduction of species population numbers from a specific area from an environmental health perspective
Ezemvelo KZN Wildlife	Nature Conservation Service as established in terms of the KwaZulu-Natal Nature Conservation Management Act No. 9 of 1997.
Indigenous species	In relation to a specific protected area, means a species that occurs, or has historically occurred, naturally in a free state of nature within that specific protected area, but excludes a species introduced in that protected area as a result of human activity (as per the National Environmental Management: Protected Areas Act, 2003 [Act No. 57 of 2003]).
Invasive species	Means any species whose establishment and spread outside of its natural distribution range – a. Threaten ecosystems, habitats or other species or have a demonstrable potential to threaten ecosystems, habitats or other species. b. May result in economic and environmental harm or harm to human health. (As per the National Environmental Management: Protected Areas Act, 2003 [Act No. 57 of 2003]).
Joint management	The agreed co-ordination of management and/or management actions by landowners and/or mandated managers on their individual or combined properties in order to achieve common management objectives.
Local community	Any community of people living or having rights or interests in a distinct geographical area (as per the National Environmental Management: Protected Areas Act, 2003 [Act No. 57 of 2003]).
Management	In relation to a protected area, includes control, protection, conservation, maintenance and rehabilitation of the protected area with due regard to the use and extraction of biological resources, community-based practices and benefit sharing activities in the area in a manner consistent with the Biodiversity Act (as per the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003).

Management authority	In relation to a protected area, means the organ of state or other institution or person in which the authority to manage the protected area is vested (as per the National Environmental Management: Protected Areas Act, 2003 [Act No. 57 of 2003]).
Monitoring	The collection and analysis of repeated observations or measurements to evaluate change in status, distribution or integrity in order to track the impacts of directed management implemented to achieve a stated management objective.
Nature conservation	The conservation of naturally occurring ecological systems, the sustainable utilisation of indigenous plants and animals therein, and the promotion and maintenance of biological diversity (as per the KwaZulu-Natal Nature Conservation Management Act, 1997 [Act No.9 of 1997]).
Neighbouring community	the communities and people permanently living in the local municipal area/s bordering onto the Nature Reserve.
Natural heritage	As defined in Article 2 of the World Heritage Convention (UNESCO) 1972 'natural heritage' is as: "natural features consisting of physical and biological formations or groups of such formations, which are of (…) value from the aesthetic or scientific point of view, geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of (…) value from the point of view of science or conservation, natural sites or precisely delineated natural areas of (…) value from the point of view of science, conservation or natural beauty." For the purposes of this IMP, this would include the required ecological integrity of the protected area for the production of ecosystem services.
Partnerships	A co-operative and / or collaborative arrangement between the Game Reserve management / EKZNW and a third party that supports the achievement of the Game Reserve management objectives.
Protected areas	• Means any area declared or proclaimed as such in terms of section 3 or listed in the Second Schedule to the KwaZulu-Natal Nature Conservation Management Act, 1997 (Act No. 9 of 1997); or • Means any of the protected areas referred to in section 9 of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003).
Protected area management committee	Is the management body that deals with the day-to-day management of the protected area and is chaired by the OIC.
Ramsar Convention	Means: "The Convention on Wetlands of International Importance, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty, which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources." (There are presently 158 Contracting Parties to the Convention, the Convention has broadened its scope to cover all aspects of wetland conservation and wise use, recognising wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities.)

Stakeholders/ interested parties	These are interested individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public. According to the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), "stakeholder" means a person, an organ of state or a community contemplated in section 82 (1) (a), or an indigenous community contemplated in section 82(1) (b).
Surveillance	The collection and analysis of single or repeated measurements to establish status or distribution or integrity at a point in time in the absence of a specific management context or objective.
Sustainable	In relation to the use of a biological resource, means the use of such resource in a way and at a rate that would not lead to its long-term decline; would not disrupt the ecological integrity of the ecosystem in which it occurs; and would ensure its continued use to meet the needs and aspirations of present and future generations of people (as per National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).
Wilderness area	Means an area designated in terms of section 22 or 26 for the purpose of retaining an intrinsically wild appearance and character, or capable of being restored to such and which is undeveloped and roadless, without permanent improvements or human habitation (as defined by the National Environmental Management: Protected Areas Act, 2003 [Act No. 57 of 2003]).
World heritage site	Means a World Heritage Site as defined in the World Heritage Convention Act, No. 49 of 1999 under Chapter 1, section 1 subsection (xxiv).

LIST OF STATUTES TO WHICH THE RED DESERT 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]
- KwaZulu Nature Conservation Act [No. 8 of 1975]
- KwaZulu-Natal Heritage Management Act [No. 10 of 1997]
- KwaZulu-Natal Nature Conservation Management Act [No. 9 of 1997]
- National Environmental Management Act [No. 107 of 1998]
- National Environmental Management: Biodiversity Act [No. 10 of 2004]
- National Environmental Management: Protected Areas Act [No. 57 of 2003]
- National Forests Act [No. 84 of 1998]
- National Heritage Resources Act [No. 25 of 1999]
- National Water Act [No. 36 of 1998]
- National Water Amendment Act [No. 45 of 1999]
- National Veld and Forest Fire Act [No 101 of 1998]
- Nature Conservation Ordinance [No. 15 of 1974]

General Management:

- Development Facilitation Act [No. 67 of 1995]
- Disaster Management Act [No. 57 of 2002]
- Fire Brigade Services Act [No. 99 of 1987]
- Local Government: Municipal Systems Act [No. 32 of 2000]
- National Road Traffic Act [No. 93 of 1996]
- National Building Standards Act [No. 103 of 1977]
- Natal Town Planning Ordinance [No. 27 of 1949]
- Occupational Health and Safety Act [No. 85 of 1993]
- KwaZulu-Natal Planning and Development Act [No. 5 of 1998]
- Water Services Act [No. 108 of 1997]

Financial Management:

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

Human Resource Management:

- Basic Conditions of Employment Act [No. 75 of 1997]
- Broad-Based Black Economic Empowerment Act [No. 53 of 2003]
- Compensation for Occupational Injuries and Diseases Act [No. 130 of 1993]
- Employment Equity Act [No. 55 of 1998]
- Labour Relations Act [No. 66 of 1995]
- Occupational Health and Safety Act [No. 85 of 1993]
- Pension Funds Act [No. 24 of 1956]
- Skills Development Act [No. 97 of 1998]
- Skills Development Levies Act [No. 9 of 1999]
- Unemployment Insurance Act [No. 63 of 2001]

COPY OF RED DESERT NATURE RESERVE PROCLAMATION

SPECIES LISTS

GRASSLAND AND FOREST HERBACEOUS ENDEMIC/NEAR ENDEMIC PLANT SPECIES

Anthospermum streyi Puff
Aristea platycaulis Bak.
Bulbine sp. nov.
Calopsis paniculata (Rottb.) Desv.
Cassytha pondoensis Engl.
Carissa sp. nov.
Crassula streyi Tölken
Craterostigma sp nov
Delosperma edwardsiae L. Bol.
Delosperma grantiae L. Bol.
Delosperma pallidum L. Bol.
Delosperma stenandrum L. Bol.
Delosperma sp. nov.
Erica abbottii Oliver
Erica sp. nov.
Eriosema umtamvunensis Stirton
Eriosemopsis subanisophylla Robyns
Euryops leiocarpus (DC.) B. Nord.
Helichrysum pannosum DC.
Helichrysum populifolium DC.
*Indigofera gogosa*ined. Schrire
I. herrstreyi in ed. Schrire
I. pondoense in ed. Schrire
I. rubroglandulosa Germish.
Ipomoea sp. nov.
Kniphofia drepanophylla Bak.
Lampranthus sp. nov.
Leucadendron spissifolium(Salisb. Ex Knight) Williams subsp. *natalense* (Thode&Gilg) Williams
Leucadendron spissifolium(Salisb. ex Knight) Williams subsp.*oribinum* Williams
Leucospermum innovans Rourke
Lopholaena dregeana DC.
Phylica natalensis Pillans
Plectranthus ernstii Codd
Plectranthus hilliardiae Codd
Plectranthus oertendahlii Th. Fr. Jr.
Plectranthus oribiensis Codd
Polygala esterae Chod.
*Psoralea abbotti i*Stirton
Sencio glanduloso-lanosus Thell.
Senecio medley-woodii Hutch.
Streptocarpus porphyrostachys Hilliard
Streptocarpus primulifolius Gand.subsp *formosus* Hilliard & Burtt
Streptocarpus trabeculatus Hilliard
Streptocarpus sp. nov.Bellsteadt
Syncolostemon ramulosus E. Mey. Ex Benth.
Tephrosia bachmannii Harms
Turraea streyi F. White & Styles
*Watsonia bachmanni i*L. Bol.
Watsonia mtamvunae Goldb.
Watsonia pondoensis Goldb.

PLANT SPECIES WHICH APPEAR TO BE LARGELY CONFINED OR POSSIBLY ENDEMIC TO THE PONDOLAND CENTRE

Alepidea stellata Weim.
Aspalathus gerradii H. Bol.

Aspidoglossum uncinatum (N.E. Br.) Kupicha
Atalaya natalensis R.A. Dyer
Berkheya sp. nov.
Brachystelma australe R.A. Dyer
Brachystelma kerzneri
Brachystelma tenellum R.A. Dyer
Centella graminifolia Adamson
Chironia albiflora Hilliard
Cineraria sp. nov.
Clutia sp. nov
Crassula obovata Haw. var.*dregeana* (Harv.) Tölken
Eriosema latifolium (Benth. Ex Harv.) Stirton
Euphorbia ericoides Lam.
Ficus bizanae Hutch.& Burtt Davy
Gnidia triplinervis Meisn.
Heliophila subulata Burch. ex DC. [form]
Hernia hystrix (Hook. f.) N.E. Br. subsp. *parvula* Leach
Hypoxis beyrichii
Impatiens flanaganii Hemsl.
Kniphofia coddiana Cufod.
Lotonis bachmannii Dümmer
Lotononis holosericea. (E. Mey.) B-E van Wyk
Lotononis viminea(E. Mey.) B-E van Wyk
Memecylon bachmannii Engl.
Monsonia natalensis Knuth
Orbea speciosa Leach
Peperomia rotundifolia (L.) H.B.K.
Peucedanum natalense (Sond.) Engl.
Phyllanthus sp. nov.
Plectranthus praetermissus Codd
Plectranthus reflexus van Jaarsveld & Edwards
Podranea ricassoliana (Tanf.) Sprague
Relhania pungens L'Hérit. subsp. *angustifolia* (DC.) Bremer
Schizoglossum atropurpureum E. Mey. subsp.*virens* (E. Mey.) Kupicha
Selago lepidioides Rolphe
Senecio erubescens Ait. var. *incisus* DC.
Siphonoglossa sp. nov.
Streptocarpus johannis Britten
Streptocarpus modestum Britten
Struthiola pondoensis Gilg. ex C.H. Wright
Tetraria sp. nov.
Utricularia sandersonii Oliv. [rare habitat]
Wahlenbergia sp. nov.
Watsonia inclinata Goldbl. [centred in Pondoland Centre]
Zaluzianskya angustifolia. Hilliard &Burtt

Bird list for Red Desert Nature Reserve

1. Natal Spurfowl *Pternistes natalensis*
2. Common Quail *Coturnix coturnix*
3. White-faced Duck *Dendrocygna viduata*
4. Egyptian Goose *Alopochena egyptiacus*
5. Spur-winged Goose *Plectropterus gambensis*
6. African Black Duck *Anas sparsa*
7. Yellow-billed Duck *Anas undulate*
8. Red-throated Wryneck *Jynx ruficollis*
9. Cardinal Woodpecker *Dendropicos fuscescens*
10. Yellow-rumped Tinkerbird *Pogoniulus bilineatus*
11. Red-fronted Tinkerbird *Pogoniulus pusillus*
12. Black-collared Barbet *Lybius torquatus*
13. Crowned Hornbill *Tockus alboterminatus*
14. Trumpeter Hornbill *Bycaniste sbucinator*
15. Southern Ground-Hornbill *Bucorvus leadbeateri*
16. African Hoopoe *Upupa africana*
17. Green Wood-Hoopoe *Phoeniculus purpureus*
18. Malachite Kingfisher *Alcedo cristata*
19. Brown-hooded Kingfisher *Halcyon albiventris*
20. Giant Kingfisher *Megaceryle maximus*
21. Pied Kingfisher *Ceryle rudis*
22. Little Bee-eater *Merops pusillus*
23. Speckled Mousebird *Colius striatus*
24. Klaas's Cuckoo *Chrysococcyx klaas*
25. Diderick Cuckoo *Chrysococcyx caprius*
26. Burchell's Coucal *Centropus burchelli*
27. KnysnaTuraco *Tauraco corythaix*
28. Purple-crested Turaco *Gallirex porphyreolopha*
29. Spotted Eagle-Owl *Bubo africanus*
30. Fiery-necked Nightjar *Caprimulgus pectoralis*
31. Rock Dove *Columba livia*
32. Speckled Pigeon *Columba guinea*
33. Laughing Dove *Streptopelia senegalensis*
34. Cape Turtle-Dove *Streptopelia capicola*
35. Tambourine Dove *Turtur tympanistria*
36. African Green-Pigeon *Treroncalvus*
37. Black-bellied Bustard *Eupodotis melanogaster*
38. Grey Crowned Crane *Balearica regulorum*
39. Common Sandpiper *Actitis hypoleucos*
40. Sanderling *Calidris alba*
41. Ruddy Turnstone *Arenaria interpres*
42. White-rumped Sandpiper *Calidris fuscicollis*
43. Water Thick-knee *Burhinus vermiculatus*
44. African Black Oystercatcher *Haematopus moquini*
45. Three-banded Plover *Charadrius tricollaris*
46. Blacksmith Lapwing *Vanellus armatus*
47. Kelp Gull (and Cape Gull) *Larus dominicanus*
48. Swift Tern *Sterna bergii*
49. Sandwich Tern *Sterna sandvicensis*
50. Common Tern *Sterna hirundo*
51. White-winged Tern *Chlidonias leucopterus*
52. Osprey *Pandion haliaetus*
53. Yellow-billed Kite *Milvus aegyptius*
54. African Fish-Eagle *Haliaetus vocifer*
55. Cape Vulture *Gyps coprotheres*
56. Rufous-chested Sparrowhawk *Accipiter rufiventris*
57. Black Sparrowhawk *Accipiter melanoleucus*
58. Jackal Buzzard *Buteo rufofuscus*
59. Long-crested Eagle *Lophaetus occipitalis*

60. African Crowned Eagle *Stephanoaetus coronatus*
61. Amur Falcon *Falco amurensis*
62. Lanner Falcon *Falco biarmicus*
63. Cape Gannet *Morus capensis*
64. Reed Cormorant *Phalacrocorax africanus*
65. Crowned Cormorant *Phalacrocorax coronatus*
66. White-breasted Cormorant *Phalacrocorax lucidus*
67. Little Egret *Egretta garzetta*
68. Yellow-billed Egret *Egretta intermedia*
69. Grey Heron *Ardea cinerea*
70. Black-headed Heron *Ardea melanocephala*
71. Cattle Egret *Bubulcus ibis*
72. Hadeda Ibis *Bostrychia hagedash*
73. Woolly-necked Stork *Ciconia episcopus*
74. African Penguin *Spheniscus demersus*
75. Black-headed Oriole *Oriolus larvatus*
76. Square-tailed Drongo *Dicrurus ludwigii*
77. Fork-tailed Drongo *Dicrurus adsimilis*
78. African Paradise-Flycatcher *Terpsiphone viridis*
79. Black-backed Puffback *Dryos copuscubla*
80. Southern Boubou *Laniarius ferrugineus*
81. Orange-breasted Bush-Shrike *Telophorussulfureopectus*
82. Gorgeous Bush-Shrike *Telophorusviridis*
83. Grey-headed Bush-Shrike *Malaconotus blanchoti*
84. Chinspot Batis *Batis molitor*
85. Pied Crow *Corvus albus*
86. White-necked Raven *Corvus albicollis*
87. Black Cuckoo shrike *Campephaga flava*
88. Greater Striped Swallow *Hirundo cucullata*
89. Lesser Striped Swallow *Hirundo abyssinica*
90. Black Saw-wing *Psalido procneholomelaena*
91. Dark-capped Bulbul *Pycnonotus tricolor*
92. Sombre Greenbul *Andropadus importunes*
93. Cape White-eye *Zosterops virens*
94. Olive Thrush *Turdus olivaceus*
95. Southern Black Flycatcher *Melaenornis pammelaina*
96. African Dusky Flycatcher *Muscicapa adusta*
97. Red-capped Robin-Chat *Cossypha natalensis*
98. Brown Scrub-Robin *Cercotrichas signata*
99. Red-winged Starling *Onychognathus morio*
100. Black-bellied Starling *Lamprotornis corruscus*
101. Olive Sunbird *Cyanomitrao livacea*
102. Grey Sunbird *Cyanomitra veroxii*

Invertebrates, amphibians, reptiles and fish (recorded from a 5 km radius)

Annelids:

Pondoland earthworm *Microchaetus pondoanus* (Endemic to SA, Near-Endemic to KZN)

Millipedes:

Ulodesmus margatensis (Endemic to KZN)
Ulodesmus pluridens (Endemic to KZN)
Montane black millipede *Doratogonus montanus* (Endemic to KZN)
Spinotarsus unicus (Endemic to KZN)
Spinotarsus costatus (Endemic to KZN)
Attemsodesmus minutes (Endemic to KZN)
Inscribed millipede *Centrobolus inscriptus* (Endemic to SA, Near-Endemic to KZN)

Molluscs:

Snake-skin hunter slug *Chlamydenphorus dimidius* (Endemic to KZN)

Onychophores:

Opisthopatus cinctipes (Endemic to SA)

Insects:

Silver-barred charaxes *Charaxes druceanuscinadon* (Endemic to KZN)
Pennington's forest-king charaxes *Charaxes xiphares penningtoni* (Endemic to KZN)
Natal flat bug *Dundocoris natalensis* (Endemic to SA, Near-Endemic to KZN)
Spotted buff *Pentila tropicalis tropicalis* (Endemic to SA, Near-Endemic to KZN)
Whitish amakosa rocksitter *Durbania amakosa albescens* (Rare, Endemic to SA)
Rainforest brown *Cassio nymphacassius* (Endemic to SA)
Chief friar *Amauris echeria echeria* (Endemic to SA)
Wichgraf's brown *Stygionympha wichgrafiwilliami* (Endemic to SA)
False silver-bottom brown *Pseudonymph amagoides* (Endemic to SA)
Yellow-spotted bush beauty *Paralethe indosaalbina* (Endemic to SA)
Large vagrant *Nepheronia argiavaria* (Endemic to SA)
Trimen's battling glider *Cymothoe alcimedatrimeni* (Endemic to SA)
False chief *Pseudacraea lucretia turquinia* (Endemic to SA)
False wanderer *Pseudacraeaeurytus imitator* (Endemic to SA)
Common black-eye *Leptomyrina gorgias gorgias* (Endemic to SA)
Zulu blue *Lepidochrysop signota* (Endemic to SA)
Small marbled elf *Eretis umbra umbra* (Endemic to SA)
Red-tab policeman *Coelia deskeithloa* (Endemic to SA)
Coastal hairstreak *Hypolycaena lochmophila* (Indeterminate)

Reptiles:

Weza dwarf chameleon *Bradypodion wezae* Endemic to KZN)
Transkei dwarf chameleon *Bradypodion caffrum* (Endemic to SA)
Common slug-eater *Duberria lutrix lutrix* (Endemic to SA) Amphibians:
Natal leaf-folding frog *Afrixalus spinifrons spinifrons* (V, Endemic to SA)
Natal tree frog *Leptopelis natalensis* (Endemic to SA, Near-Endemic to KZN)
Painted reed frog *Hyperolius marmoratus verrucosus* (Endemic to SA)

Fish:

Burrowing goby *Croilia mossambica* (Rare)
Freshwater mullet *Myxus capensis* (Rare)
Redtail barb *Barbus gurneyi* (Endemic to KZN)

Mammals:

Blue duiker *Philantomba monticola bicolour* (V)
African striped weasel *Poecilogale albinucha* (Data Deficient, Endemic to SA)
Forest shrew *Myosorex varius* (Data Deficient, Endemic to SA)
Dark-footed forest shrew *Myosorex cafer* (Data Deficient)
Greater red musk shrew *Crocidura flavescens* (Data Deficient)

PRO FORMA ANNUAL PLAN OF OPERATION

Notes of a management meeting for Red Desert Nature Reserve held at … on …

Present:

Apologies:

CC:

Appendix E

Table 1 Progress and goals set for Red Desert Nature Reserve

Management target	2012 / 14 Progress	2014 / 15 goals	Completion date	Responsibility	Action
LEGAL COMPLIANCE AND ENFORCEMENT					
Expedite the declaration of the Reserve	Management authority document signed by HCM	Proclamation of Reserve		GM/IJ	
Creation of cooperative structures with law enforcement officials.			Year 1	Landowner	
Institute a system of regular patrols along the fence to ensure no illegal access, and repair any damage to the fence.			Ongoing	Landowner	
Prosecution of any offender caught committing an offence.			Ongoing		
REGIONAL MANAGEMENT					
Ensure alignment with local government IDP as it is developed and reviewed.			On proclamation		
COMMUNITY PARTICIPATION					
Ensure ongoing participation with the broader local community surrounding the reserve.					
TOURISM PRODUCT DEVELOPMENT					
Develop a concept plan for the development of a single entry point, including appropriate facilities and staffing.				Landowner	
Develop a network of well-maintained paths and tracks for public access.				Landowner	
Investigate the need and desirability for the establishment of visitor facilities in the old sheds located on Mr Dave Watson's property.					

CONSERVATION MANAGEMENT					
Compliance with the National Veld and Forest Fires Act.			Ongoing	Landowner	
Prepare a fire management plan			Year 1	Landowner	
Become an active member of the local Fire Protection Association.			Year 1	Landowner	
Assess the status of any declared weeds and invasive plants and develop an alien invasive species control plan.			Year 1	Requires support from the Ecological Advice and Alien Plant Control Units	
Develop a wetland and river management programme in conjunction with relevant expertise.			Year 2		
Develop a forest management system.			Ongoing	Landowner	Requires support from the ecological advice unit
Implementation of soil erosion control measures in areas in which plant cover is low, which are susceptible to erosion				Landowner	Requires support from the ecological advice unit

	2011/12 Progress	2012/13 goals	Completion date	Responsibility	Action
OPERATIONAL MANAGEMENT					
Develop a human resource plan, based on the future plans for the RDNR.			Ongoing	Landowner	
Develop and implement an appropriate monitoring and evaluation programme.			Year 3	Landowner	
Regular scheduled maintenance of all facilities, assets and infrastructure.			Ongoing	Landowner	

Appendix F:

BUSINESS PLAN

RED DESERT NATURE RESERVE

1. Introduction

The Red Desert Nature Reserve consists of three individual properties, namely REM of Lot 1015 (owned by the Hibiscus Coast Municipality) and REM of Lot 1016 (owned by the Williams family). These two parties have agreed to the joint management of the Red Desert Nature Reserve (RDNR) through the establishment of an Agreement. This Agreement has resulted in the establishment of a legal entity which has been assigned as the Management Authority for the Red Desert Nature Reserve. This entity is responsible for the overall management of the Nature Reserve, particularly in making decisions regarding management activities and financial expenditure on the reserve. This entity will also be assist by an Advisory Forum, consisting of several additional stakeholders, who help guide these decisions, and even assist with management activities (e.g. alien clearing work).

Due to its small size and its location to urban environments, the RDNR has been subjected to extensive and frequent illegal entry and exploitation for inappropriate recreational activities. Therefore, attention needs to be given to adequate fencing and security of the RDNR to ensure security from possible trespassing and poaching. Entry to the RDNR should be through a single main entrance, with appropriate facilities established (office, toilets, etc.), with a staff member to take gate entry fees and patrol fence lines. An important aspect to incorporate into security matters is the existing pedestrian thoroughfare from the N2 to the Eagle Heights flats (turnstile gate access). Legal access should also be granted to Eskom for continued maintenance of the overhead power lines bisecting the RDNR. The Management Authority should focus on establishing good relationships with the SAPS, HCM Protection Services and Port Edward / Umtamvuna Community Policing Forum (CPF).

A Business Plan for a protected area focuses on the last and most important aspect of the protected area management planning process, namely determining and meeting the resource needs required to manage a protected area effectively and efficiently. The Business Plan is intended to give a clear picture of:

- The financial needs that must be met in order to conduct proposed management plan activities.
- Potential revenue sources to help meet those needs.

Thus far in a South African context, this type of (financial) Business Plan for protected areas has seldom been used and it is probably one of the most significant reasons that protected areas are considerably under-funded as very little information has been available to decision-makers on the total cost of effective management for individual protected areas.

2. Purpose of the Business Plan

The Red Desert Nature Reserve Management Authority has identified the need to generate a sustainable financial position for the Nature Reserve for the following purposes:

i. To effectively conserve the important biodiversity on the property, both species and ecosystems.
ii. To enable the effective implementation of management activities to reduce the current threats to the biodiversity (i.e. fire management, poaching).
iii. To allow for the access of the Nature Reserve by the general public, providing facilities for their enjoyment.
iv. Identify potential funding avenues, initiate investigation of the requirements of these funders as well as the necessary funding applications, as appropriate
v. To manage the financial situation of the Management Authority to ensure these activities can be carried out and funded in a sustainable manner.

3. Objectives of the Business Plan

The Objectives of the Business Plan are to:

i. Identify the financial needs of the Red Desert Nature Reserve.
ii. Administer the finances of the Nature Reserve to allow management activities to be carried out.
iii. Create a professionally managed Nature Reserve which can attract external funding.
iv. Be in a position to generate a proportion of the funding required through public use of the Nature Reserve.

4. Economic Importance of the Protected Area

Contributions to social development –
Much of the RDNR is owned by the Hibiscus Coast Municipality, which is zoned as "Conservation" and has the ability to be used by the general public of the area for their enjoyment. Public open space is an important aspect of urban environments, providing the recreational opportunities, but ensuring the conservation of the value of the area. In addition, the site has significant ancient stone artefacts contained in the dune sands, which are tools appearing to represent a ca 300,000-year-old archaeological culture known as the Sangoan Industry. These deposits near Port Edward were until recently the only reported occurrence of artefacts of this period, making this an area of significant cultural value.

Job creation –
The development of the Red Desert property as a nature reserve will allow the limited ability to create jobs. The improved status comes with a legal requirement to manage the area specific for its conservation objectives, indicating that management staff will be required to carry out the daily management activities. In addition, opportunities exist for environmental education, where trained educators could be used to programmes with school children and adult visitors.

Local economy –
The establishment of a nature reserve will be a good marketing tool for the Ugu District and Hibiscus Coast Municipality, which will significantly boost the eco-tourism value of the Port Edward Area, thereby allowed an improved local economy.

Ecosystem services -
Our natural environment is vital to our health and prosperity. Over recent years, much progress has been made towards getting a better understanding of the role of the natural environment in contributing to our economic performance as a country and as individuals. Environmental assets, like other assets, provide benefits that enhance economic performance, offer new opportunities for investment and employment, and improve living standards and quality of life. And, like other assets, enhancing or diminishing the condition of environmental assets increases or reduces the stream of benefits we can derive from them in the future.

Ecosystem services are defined as services provided by the natural environment that benefit people. Some of these ecosystem services are well known including food, fibre and fuel provision and the cultural services that provide benefits to people through recreation and cultural appreciation of nature. Other services provided by ecosystems are not so well known. These include the regulation of the climate, purification of air and water, flood protection, soil formation and nutrient cycling.

The following table highlights those specific ecosystem services that are likely to exist at the Red Desert Nature Reserve:

Table 1: Ecosystem Services expected to be prevalent on RDNR.

ECOSYSTEM SERVICES OF THE RED DESERT NATURE RESERVE -	
Provisioning services i.e. products obtained from ecosystems	• Genetic resources: genes and genetic information used for animal/plant breeding and biotechnology • Ornamental resources e.g. shells, flowers
Regulating services i.e. benefits obtained from the regulation of ecosystem processes	• Water regulation: ecosystems affect e.g. the timing and magnitude of runoff, flooding etc. • Erosion control: vegetative cover plays an important role in soil retention/prevention of land/asset erosion • Water purification/detoxification: ecosystems can be a source of water impurities but can also help to filter out/decompose organic waste
Cultural services i.e. nonmaterial benefits that people obtain through spiritual enrichment, cognitive development, recreation etc	• Aesthetic values: many people find beauty in various aspects of ecosystems • Cultural heritage values: many societies place high value on the maintenance of important landscapes or species • Recreation and ecotourism
Supporting services, necessary for the production of all other ecosystem services	• Nutrient cycling • Primary production • Provision of habitat

Although a relatively new science, the economic valuation of these services need to be understood and appreciated. eThekwini Municipality have determined an economic value of several services or habitats (e.g. indigenous forests or wetlands). Although actual figures are not available for the RDNR, the implication of the presence of these services implies significant financial benefit to the Hibiscus Coast Municipality and its people.

5. Financial Requirements

a) Past income and expenditure (trends)

The only past funding obtained for management of the Red Desert properties has been alien plant eradication funding from the Hibiscus Coast Municipality. A proposal was submitted to HCM in 2006 outlining the funding requirements for clearing an estimated 60ha of alien plant infestation. This proposed budget was R49,692.00 (excluding the cost of herbicide), with an amount of R47,618.00 being allocated by the municipality.

b) What are the current needs?

The following outlines the current needs of the Red Desert Nature Reserve:

- Entrance gate and fencing
- Visitor office / facility / ablutions
- Parking area
- Marketing and signage
- Management
    - Fire breaks
    - Alien clearing
- Patrolling (security, poaching)
- Trails and paths

c) Income generation – funding opportunities

The financial value of protected areas in terms of environmental services and its potential contribution to local and regional economic development is rapidly becoming better understood and quantified. In support of the improved management activities on the RDNR, Ezemvelo KZN Wildlife has secured an amount of R42,500.00 from Conservation International and R50,000.00 from CAP (Climate Action Partnership). This funding could be utilised for activities as outlined in the budget (Table 2).

In addition, Ezemvelo KZN Wildlife and the Management Authority will engage with DAEA's Invasive Alien Species Programme in order to obtain herbicide assistance, and possibly even alien plant clearing teams. This will be done as part of the overall assessment of the alien plant infestations, and the plan devised for eradication (see Action Project 1.9.4.2 (i)).

6. Annual Budget (5 year projection)

The proposed budget for the first year of management activities for the RDNR is shown below in Table 2, while Table 3 indicates the funding allocations from the external funders.

Table 2: The proposed 2009 / 10 budget for the Red Desert Nature Reserve.

Description	Budget
Entrance gate	R10,000.00
Entrance fencing	R10,000.00
Parking area	R2,500.00
Signage	R20,000.00
Fire breaks / burns	R5,000.00

Alien plant clearing	R50,000.00
Footpaths / trails	R5,000.00
Sundries	R5,000.00
Marketing (brochures)	R5,000.00
TOTAL	R112,500.00

Income allocation -

Description	Budget	HCM	External funding[1]
Entrance gate	R10,000.00		R10,000.00
Entrance fencing	R10,000.00		R10,000.00
Parking area	R2,500.00	R2,500.00	
Signage	R20,000.00	R10,000.00	R10,000.00
Fire breaks / burns	R5,000.00		R15,000.00
Alien plant clearing	R50,000.00	R40,000.00	R50,000.00
Footpaths / trails	R5,000.00		R2,500.00
Sundries	R5,000.00	R5,000.00	
Marketing (brochures)	R5,000.00	R5,000.00	
TOTAL	R112,500.00	R62,500.00	R92,500.00

1 – This refers to the funding support already secured by Ezemvelo KZN Wildlife from Conservation International.

5 Year projection -

FINANCIAL YEAR	09/10	10/11	11/12	12/13	13/14

INCOME					
HCM	R 47,618.00	R 50,000.00	R 55,000.00	R 60,000.00	R 65,000.00
External funders	R 42,500.00	R 30,000.00	R 0.00	R 0.00	R 0.00
	R 50,000.00	R 0.00	R 0.00	R 0.00	R 0.00
SUB-TOTAL	R 140,118.00	R 80,000.00	R 55,000.00	R 60,000.00	R 65,000.00
CONSERVATION					
Expenditure					
Salaries	R 0.00	R 100,000.00	R 110,000.00	R 120,000.00	R 130,000.00
Operating exp.	R 5,000.00	R 5,400.00	R 5,832.00	R 6,298.56	R 6,802.44
Management	R 57,500.00	R 62,100.00	R 67,068.00	R 72,433.44	R 78,228.12
SUB-TOTAL	R 62,500.00	R 167,500.00	R 182,900.00	R 198,732.00	R 215,030.56
INFRASTRUCTURE					
Entrance facilities	R 22,500.00	R 50,000.00	R 5,000.00	R 0.00	R 0.00
Operating exp.	R 5,000.00	R 5,400.00	R 5,832.00	R 6,298.56	R 6,802.44
Signage	R 20,000.00	R 0.00	R 0.00	R 0.00	R 5,000.00
SUB-TOTAL	R 47,500.00	R 55,400.00	R 10,832.00	R 6,298.56	R 11,802.44
TOTAL	R 30,118.00	-R 142,900.00	-R 138,732.00	-R 145,030.56	-R 161,833.00

7. RDNR Business Plan Action Projects

Fund raising – to develop a fund raising strategy, allowing a sustainable funding stream to support conservation management.

Alien clearing – develop an alien plant clearing strategy, allowing the submission of proposals to DAEA for herbicide and clearing assistance. These proposals should also be submitted to HCM for budget allocation to the RDNR.

Appendix 4:

Zonation System

(Source: ROS User Guide, United States Forest Service, as in the Advanced Wilderness Course Manual)

CATEGORY	**Description of Criteria to be used for Zonation**	**Setting descriptions (as from ROS Handbook)**
Pristine Wilderness	Unmodified, no development, not impacted by any sights or sounds of people (e.g. formalized trails) No closer than 100m to either side of existing trails No formalized paths, no signage.	Area is characterized by essentially unmodified natural environment of fairly large size. Interaction between users is very low, and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-introduced restrictions and controls. Motorised use not permitted.
Primitive Wilderness	Unmodified environment, except for formalized trails being used at a low intensity (no signage) Visual and audio impact from outside, but at a distance (> 10km) 100m buffer of formalized trails passing through the Pristine Wilderness Zones will be Primitive Wilderness.	Extremely high probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquility and self-reliance through the application of woodsman and outdoor skills in an environment that offers a high degree of challenge and risk.
Semi-Primitive Wilderness	Unmodified environment, near-Wilderness experience, formalized trails used at a medium intensity Concreting or rock-packing of trails allowed where necessary (i.e. areas of medium intensity of use) Signage occur Visual and audio impact from outside, but at medium distance (5 – 10km) Natural environment impact.	High, but not extremely high, probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance through the application of woodsman and outdoor skills in an environment that offers challenge and risk.
Semi-Primitive Non-motorised	Closely related to the above zone, but usage of formalized trails at a high intensity – concreting/rock-packing of trails Natural environment experience, non-motorised use, usually a buffer between Wilderness and semi-primitive wilderness / roaded natural areas Visual and audio impact from outside, at a short distance (< 5km) May be hiking huts or other types of low-scale accommodation, possible field ranger outposts.	Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size, interaction between users is low, but there is often evidence of other users. The area is managed such that minimum on-site controls and restrictions may be present, but are subtle. Motorised use is not permitted.
Semi-Primitive Motorised	4x4 trails and their area of impact (audio and visual) Visitor and management tracks and their zone of visual and audio impact (GIS to be used to determine exact range of impact, hence an initial distance of 100m other side has been set) Rustic accommodation, or low-level, low intensity tourism nodes (no bigger than 10 – 20 beds).	Area is characterized by predominantly natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are suitable. Motorised use is allowed.

CATEGORY	**Description of Criteria to be used for Zonation**	**Setting descriptions (as from ROS Handbook)**
Roaded Natural	Small to medium sized camp nodes (20 – 100 beds), access control points, 2x4 roads (tar & gravel), small to medium management nodes.	Area is characterized by predominantly natural-appearing environments with moderate evidences of the sights and sounds of humans. Such evidences usually harmonize with the natural environment. Interaction between users may be low to moderate, but with evidence of other users prevalent. Resource modifications and utilization practices are evident, but harmonise with the natural environment. Conventional motorized use is provided for in construction standards and design of facilities.
Rural	A rural recreational node/area, rather than as a nature-based experience. Resort type development rather than a nature-based tourism facility.	Area is characterized by a substantially modified natural environment. Resource modifications and utilization practices are to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident and the interaction between users is often moderate-high. A number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Moderate densities are provided far away from developed sites. Facilities for intensified motorized use and parking are available.