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MPENJATI NATURE RESERVE
Protected Area
MANAGEMENT PLAN



Photo: Richard Boone

Mpenjati Nature Reserve

KwaZulu-Natal
South Africa

Protected Area Management Plan

Prepared by

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Citation

Mpenjati Nature Reserve: Management Plan. Version 1.0 (June 2013), Ezemvelo KZN Wildlife, Pietermaritzburg.

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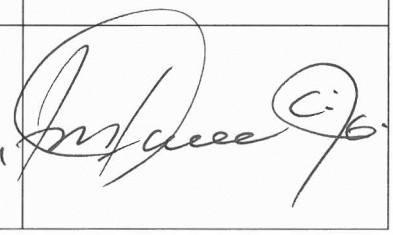
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PREFACE

This Protected Area Management Plan for Mpenjati Nature Reserve is the primary and overarching management document for the protected area and has been developed during 2013. It forms the framework within which the nature reserve will be managed and developed towards the achievement of its management objectives, derived in collaboration with the protected area's stakeholders during January 2013.

The protected area management planning process, and the resultant planning document (elaborated on in the next few pages), has been designed to meet the statutory requirements of the National Environmental Management: Protected Areas Act and other relevant legislation.

The protected area management planning process requires participation from the protected area's stakeholders, the general public and specialists during the various stages of plan development and implementation. Although the management plan and its sub-components are five-year planning documents, an annual review process will ensure an active adaptive management planning approach.

A long-term business approach has also been introduced that ensures that the protected area's management objectives are operationalised and reflected through an Annual Plan of Operation. This costs and prioritises the management actions required to achieve the vision and objectives of the management plan and allows Ezemvelo KZN Wildlife to actively pursue additional and improved funding and income towards the achievement of the natural and cultural heritage conservation objectives of the nature reserve over the next five years.

Ezemvelo KwaZulu-Natal Wildlife, as the appointed Management Authority for Mpenjati Nature Reserve, hereby commits itself to the implementation of this plan.

Dr. Bandile Mkhize
Chief Executive Officer

Date:

EXECUTIVE SUMMARY

Introduction

The Mpenjati Nature Reserve is an 86 ha protected area, located in the Hibiscus Coast Local Municipality of the Ugu District Municipality, on the south coast of the province of KwaZulu-Natal. It is situated 165 km south-west of Durban, between the small holiday towns of Trafalgar and Palm Beach. The Mpenjati Estuary (30° 58' 15" S; 30° 17' E) covers approximately 11.6 ha and is located 10 km north of Port Edward.

Strategic management framework

The following vision has been adopted for Mpenjati Nature Reserve:

"The ecological integrity, function and character of Mpenjati Nature Reserve is conserved in perpetuity through effective management and community support to maintain a representative sample of this ecosystem that will promote opportunities for environmental awareness and nature-based recreation."

This incorporates the key aspects of the vision that was developed in a separate management plan for the Mpenjati Estuary (Breetzke & Meyer, 2012), i.e.:

"The Mpenjati Estuary is a well-managed and fully functional ecological system with exceptional natural attributes that provides sustainable resource use, recreational and educational opportunities, and with enhanced and extended protection."

An objective has been identified for each of Mpenjati Nature Reserve's key performance areas, which relate to the important functions and activities necessary to achieve the vision and protect, develop and manage the nature reserve 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.

The following specific issues have been identified by the Nature Reserve Planning Committee:

- Crime and intimidation of visitors by people entering from the beach as it is difficult to fence off access from the sea and river/estuary. Negative publicity is resulting in low visitor numbers – no more than three per day.
- The nature reserve is included in a broader land claim by the local Inzamakwe Community. However, even should ownership of the nature reserve change, it will still be zoned as, and remain and be managed as a protected area.
- Picnic facilities, on both north and south banks of the estuary, are eroding.
- Sewage spills into the river from upstream.
- Disturbance and impact by a large sand and rock dredging operation, immediately up-stream of the protected area, within the estuary.

The coastal dunes immediately south of the Mpenjati Lagoon have been recently categorised as being at a "moderate risk" of erosion due to sea level rise and coastal storm surges. However, since the coastal dunes and portion of Yengele Forest immediately north of the Mpenjati Lagoon have recently been eroded due to sea level rise and coastal storm surges, the Trafalgar Conservancy argue that this should be categorised as "major risk".

The following specific strategic outcomes have been identified by the Nature Reserve Planning Committee to address the abovementioned issues:

- Adequate law enforcement within Mpenjati Nature Reserve in order to achieve the protected area vision.
- Constructive community involvement in Mpenjati Nature Reserve's management through an effectively functioning Stakeholder Consultation Forum/ Advisory forum.
- Determination of the park buffer zone requirements around Mpenjati Nature Reserve.
- Prioritisation of key buffer zone areas within the provincial Protected Area Expansion Plan.
- Capture of buffer zone considerations in IDP's and SDF's and municipal schemes.
- Implement a maintenance schedule to better manage day visitor facilities and maximise security for visitors.
- Support efforts to identify and produce educational material and signage for the Community Centre (administrative centre) and existing hiking trails.
- Develop and implement a comprehensive fire management plan for Mpenjati Nature Reserve.
- Develop and implement an alien species control plan for Mpenjati Nature Reserve (fauna and flora).
- Develop and implement an indigenous invasive species control plan for Mpenjati Nature Reserve.
- Identify, rehabilitate and manage areas that have been significantly impacted by accelerated soil erosion.
- Ensure extractive resource use is legally undertaken and conforms to Ezemvelo KZN Wildlife policy. This includes the phasing out of mining within the functional estuarine area.
- Develop and implement strategies for each of the herbivore species in Mpenjati Nature Reserve, in accordance with Ezemvelo KZN Wildlife policies.
- Key species management, including rare and endangered species, is undertaken using the best available scientific knowledge.
- Critical ecological processes and functions are maintained within Mpenjati Nature Reserve.
- Biological monitoring programmes are developed and implemented to determine the success of management interventions in protecting the ecosystems, communities and species of Mpenjati Nature Reserve.
- Development of a five-year financial plan that identifies the resource needs to achieve the objectives for Mpenjati Nature Reserve.
- Ensure that Mpenjati Nature Reserve is adequately staffed and conforms to legal staffing practices.
- All facilities and infrastructure in Mpenjati Nature Reserve are adequately maintained.
- Service infrastructure and practices in Mpenjati Nature Reserve do not cause environmental harm.

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. An annual monitoring schedule for Mpenjati Nature Reserve, which conforms to the norms

and standards for surveillance and monitoring (Goodman, 2011), has been developed, based on the management targets contained in the operational management framework.

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. The annual plan of operation should be prepared, based on the findings of the previous year's management plan implementation review. The annual plan of operation will be tied to staff performance contracts, and goals set in them will be categorised in the same key performance areas as the management plan.

Table 1: Abbreviations

Amafa	Amafa aKwaZulu-Natali (KwaZulu-Natal Provincial Heritage Agency)
CCA	Community Conservation Area
CDP	Concept Development Plan (Component of Ezemvelo KZN Wildlife protected area management planning process)
CEO	Chief Executive Officer
CRMP	Cultural Resource Management Plan
CMS	Co-management Structure
DAEARD	KwaZulu-Natal Provincial Department of Agriculture and Environmental Affairs
DEAET	Eastern Cape Department of Economic Affairs, Environment and Tourism
DEA	National Department of Environmental Affairs
DWA	National Department of Water Affairs
EIA	Environmental Impact Assessment
Ezemvelo	Ezemvelo KwaZulu-Natal Wildlife
EMF	Environmental Management Framework
EMP	Environmental Management Plan
FPA	Fire Protection Association in terms of the National Veld and Forest Fire Act (No.1 of 1998)
GDP	Gross Domestic Product
GIS	Geographical Information System
IDP	Municipal Integrated Development Plan
IUCN	International Union for the Conservation of Nature
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
NRPC	Nature Reserve Planning Committee
NSBA	National Spatial Biodiversity Assessment
OIC	Officer in Charge
OPSCOM	Ezemvelo KZN Wildlife Operations Committee
PA	Protected Area
ROC	Ezemvelo KZN Wildlife Regional Operations Committee
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SAPPI	South African Pulp and Paper Industry
SDF	Municipal Spatial Development Framework
SMME	Small, Micro and Medium Enterprises
SWOT	Strengths, weaknesses, opportunities and threats analysis
UNESCO	United Nations Educational, Scientific and Cultural Organisation

1 BACKGROUND

1.1 Introduction

The Mpenjati Nature Reserve is an 86 ha protected area, located in the Hibiscus Coast Local Municipality, within the Ugu District Municipality, on the south coast of the province of KwaZulu-Natal. It is situated 165 km south-west of Durban, between the small holiday towns of Trafalgar and Palm Beach. The Mpenjati Estuary (30° 58' 15" S; 30° 17' E) covers approximately 11.6 ha and is located 10 km north of Port Edward.

A regional review of the current status of marine and estuarine protected areas in KwaZulu-Natal (Mann *et al.*, 1998) was commissioned by the Marine Reserves Task Group, which was established by the Sea Fisheries Research Institute (SFRI) and the South African Network for Coastal and Oceanographic Research (SANCOR), in 1996, to examine the use of Marine Protected Areas (MPA's) in Marine Resource Management in South Africa. The purpose of that review was to investigate the current status of marine and estuarine protected areas in KwaZulu-Natal.

The review reported that there are 74 estuaries in KwaZulu-Natal, of which only 10 fall within official protected areas. Of the 50 estuaries south of Durban, only one, the Mpenjati Estuary, is formally protected. This is totally inadequate in terms of the importance of estuaries as "life support systems" and more estuaries on the KwaZulu-Natal south coast (south of Durban) need to be given full conservation protection. The Mpenjati Estuary is a temporarily open/closed estuarine system.

The system is further unique in that it flows into the Trafalgar Marine Protected Area (MPA) and, together, these two reserves preserve some of the largest diversity of coastal habitats in the province; encompassing marine, estuarine and terrestrial environments, effectively serving as a critical link between the ecological processes of these environments and as a sanctuary for fauna and flora. Consequently, the Mpenjati Estuary is listed as one of South Africa's 120 "priority estuaries", which need to remain formally protected, and whose functioning must be protected to satisfy the targets of the national conservation plan in terms of protecting estuarine biodiversity.

The estuary is managed by Ezemvelo KZN Wildlife (Ezemvelo) and picnic sites for visitors are provided. No capture of bait organisms is allowed, but recreational fishing is permitted. Both windsurfing and canoeing are allowed, but powerboating is not. Controlled harvesting of the sedge, *Juncus kraussii*, is permitted in the nature reserve (Mann *et al.*, 1998).

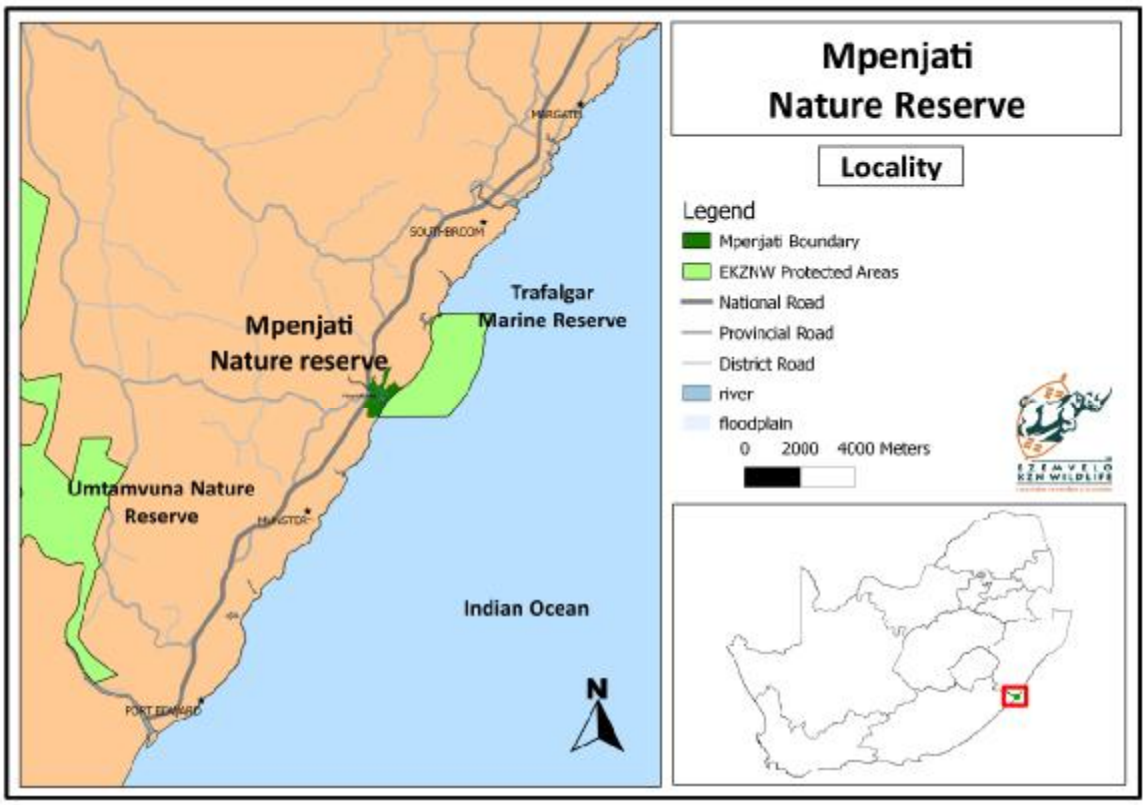
One of main problems associated with the Mpenjati Estuary is disturbance by a large sand dredging operation, in the upper part of the estuary, just outside the protected area boundary.

According to the Mpenjati Estuary Management Plan, prepared in 2012 by SSI Engineers and Environmental Consultants, the Mpenjati Estuary is naturally functional and in good condition, with few deviations from its natural state. However, it is not without anthropogenic impacts that have altered its ecological state, which has been identified as being on a deteriorating trajectory.

Monthly freshwater input is, on average, more than 90 % of the natural state, indicating that the current level of water abstraction for agricultural and light industrial use is

sustainable, with minimal effect on estuarine health and functioning. The recorded degradation of the Mpenjati Estuary relates to three specific aspects, which are notably threats emanating from outside the current boundary of the protected area:

- Past and present sand mining activities.
- Current flow restriction as a result of the rubble causeway (farm servitude) and mining platforms.
- Sustained nutrient enrichment from the Palm Beach Waste Water Treatment Works.



Map 1: Regional location of Mpenjati Nature Reserve

1.2 The values of Mpenjati Nature Reserve

The values of a place are those remarkable attributes that exemplify it and are largely the reason that it has been proclaimed as a protected area. The values are important in planning and management, as they are the aspects of the place that must be protected.

Table 1.1: The values of Mpenjati Nature Reserve

Natural values	§ Only one of 50 estuaries south of Durban that is formally protected. § Provides habitat for a number of important animal species, including Red Data fish, reptile, bird and invertebrate species. § Mpenjati River and Estuary support a high biodiversity of freshwater and estuarine fish species; including a high concentration of Mottled Eels and low altitude occurrence of endemic KwaZulu-Natal Yellowfish. § Terrestrial grassland/palmveld mosaic is one of last remaining remnants on the South Coast. § Intact coastal forest and dunes. § Link to the Trafalgar marine protected area.
Ecosystem service values	§ Mpenjati provides a number of ecosystem services, including silt trapping, acting as a carbon sink, a nursery for offshore fisheries, processing of sewage/nutrients and a source of sustainable resources.
Eco-cultural tourism values	§ Located within the scenic KwaZulu-Natal South Coast, which is regarded as one of the most popular tourist destinations in KwaZulu-Natal and South Africa, and which already has many supporting tourist amenities. § Unique in that there are few other protected areas in KwaZulu-Natal with a combination of nature reserve, estuary and beach, offering a diversity of natural habitats in a small area.
Cultural and historic values	§ The Mpenjai Nature Reserve is one of the last few remnants of the original greater South Coast landscape.
Social values	§ Potential to be a valuable and accessible education facility, which can be used by many educational groups, from schools to universities.

1.3 Purpose of the plan

Protected area management plans are intended to be high-level, strategic five-year documents that provide the direction for the development and operation of protected areas. The purpose of the management plan is to:

- facilitate compliance with the National Environmental Management: Protected Areas Act, 2003 (No. 57 of 2003) and other relevant legislation;
- inform management at all levels, from the staff on site, through to the CEO, the Board and the MEC;
- provide the primary strategic tool for management of Mpenjati Nature Reserve, informing the need for specific programmes and operational procedures;
- provide motivations for budgets and providing indicators that the budget is spent correctly;
- build accountability into the management of Mpenjati Nature Reserve;
- provide for capacity building, future thinking and continuity of management; and
- enable Ezemvelo KZN Wildlife to develop and manage Mpenjati Nature Reserve in such as way that its values and the purpose for which it was created are protected.

Consistent with Section 17 of the National Environmental Management: Protected Areas Act, 2003 (No. 57 of 2003), the purpose of Mpenjati Nature Reserve is to:

- Contribute to the achievement of provincial and national protected area targets through protecting a representative portion of the KZN Coastal Belt Grassland (CB3), Northern Coastal Forest (Foz7), Sub-tropical Seashore Vegetation (AZd4), Subtropical Coastal Lagoon (W2), Sub-tropical Freshwater Wetlands (AZf6) and their associated biodiversity.
- Protect key species, including endangered, rare and endemic species indigenous to the area.
- Maintain the ecological processes, services and integrity of the area.
- Protect an area which is vulnerable or ecologically sensitive; to assist in ensuring the sustained supply of environmental goods and services, particularly those associated with estuaries.

1.4 Planning approach

The preparation of this management plan has been undertaken based on the following guiding principles.

1.4.1 Adaptive management

Adaptive management is a structured, iterative process in which decisions are made using the best available information, with the aim of obtaining better information through monitoring of performance (Figure 1). In this way, decision making is aimed at achieving the

best outcome, whilst accruing the information needed to improve future management. Adaptive management can lead to the revision of a part or, if necessary, the whole management plan.

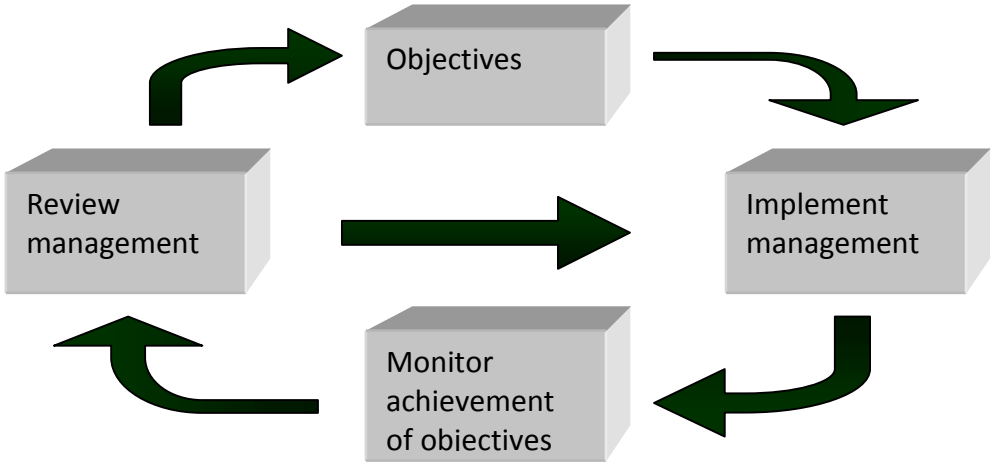


Figure 1: The adaptive management cycle

Adaptive management enables protected area managers to:

i) Learn through experience.

ii) Take account of, and respond to, changing factors that affect the protected area.

iii) Continually develop or refine management processes.

iv) Demonstrate that management is appropriate and effective.

1.4.2 Collaboration and transparency

Stakeholder involvement and support is an important aspect of effective protected area management. It is also a requirement in terms of Sections 39(3) and 41(2) (e) of the National Environmental Management: Protected Areas Act, 2003 (No. 57 of 2003). Accordingly, the development of this protected area management plan has been undertaken through a collaborative process, involving local communities and other key stakeholders.

Furthermore, the draft protected area management plan was made available for public review and comment, prior to its finalisation. It is intended that this process will ensure a great deal of valuable input into the development of the protected area management plan, the outcomes of which are incorporated into the plan. A detailed public participation report will be available upon request from the nature reserve manager or Ezemvelo's Planning Unit.

1.4.3 Structure of the plan

The structure of the management plan is as follows:

Section1:	Provides an introduction and background to Mpenjati Nature Reserve and the integrated management plan.
Section 2:	Establishes the context of the Mpenjati Nature Reserve, providing the basis for the strategic and operational management frameworks that follow.
Section 3:	Sets out the vision and objectives that must be achieved in an effort to effectively conserve the nature reserve.
Section 4:	Provides a plan for zonation of the nature reserve, outlining the land uses that are permissible in particular zones and those that are not.
Section 5:	Describes the administrative structure required to effectively manage Mpenjati Nature Reserve.
Section 6:	Sets out the detailed 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 and the requirements for reporting on performance in implementing the plan.
Section 8:	Describes some of the components that must be included in the annual plan of operation.

The structure is presented graphically in Figure 2 below, with arrows indicating information and process flows.

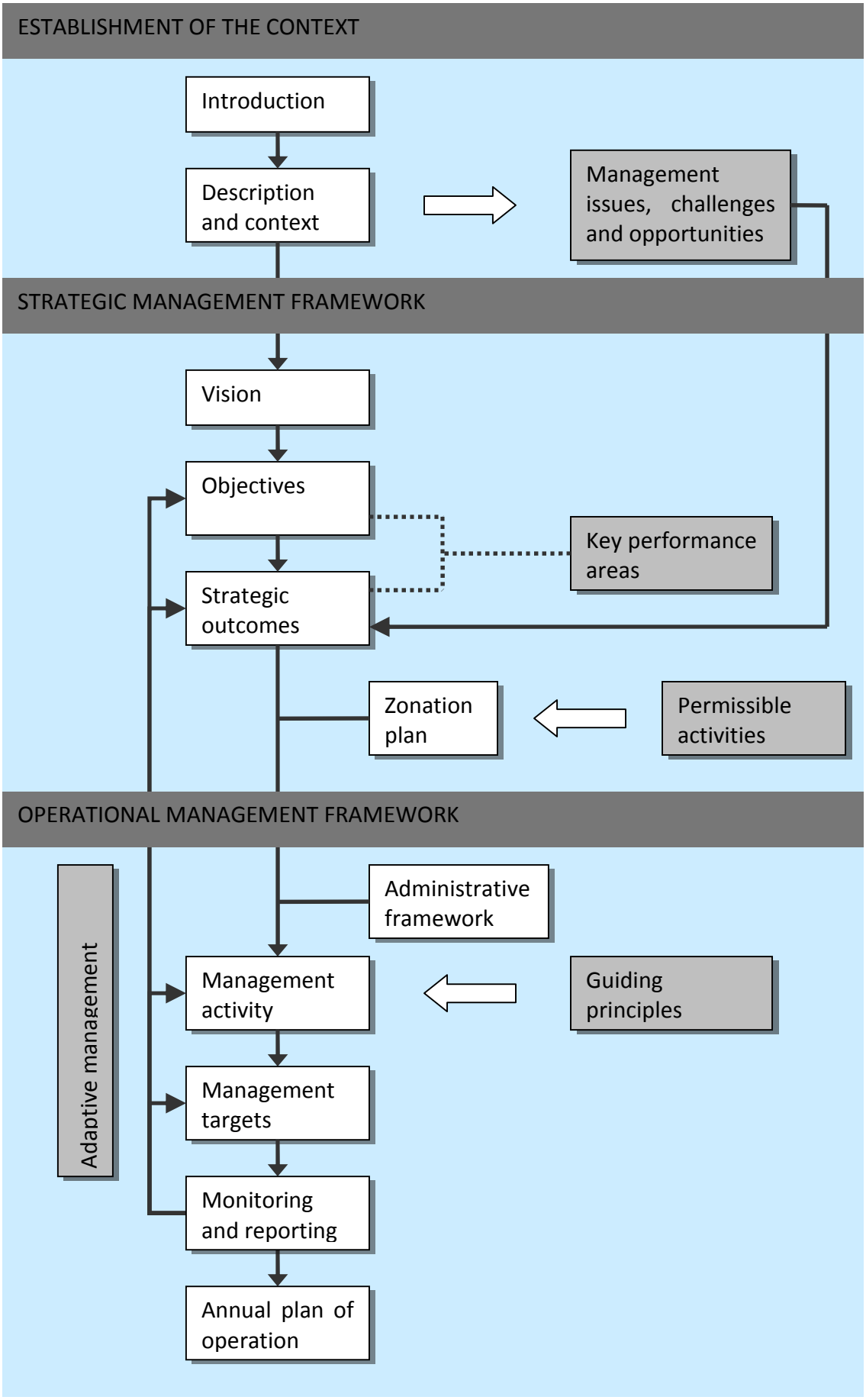


Figure 2: Structure of the Protected Area Management Plan

2 DESCRIPTION OF MPENJATI NATURE RESERVE AND ITS CONTEXT

2.1 Institutional and administrative framework for the management of Mpenjati Nature Reserve

The KwaZulu-Natal Nature Conservation Board, established in terms of the KwaZulu-Natal Nature Conservation Management Act No. 9 of 1997, was appointed by the KwaZulu-Natal MEC: Agriculture and Environmental Affairs as the management authority for all provincial protected areas in KwaZulu-Natal. The Board's implementing agency is Ezemvelo KZN Wildlife.

Management of Mpenjati Nature Reserve must be undertaken in accordance with relevant legislation and the management policies of Ezemvelo KZN Wildlife. This includes a commitment to maintain the ecological integrity of the site.

The KwaZulu-Natal Nature Conservation Board will be responsible for reporting on the management of Mpenjati Nature Reserve to the designated KwaZulu-Natal Provincial Member of the Executive Committee (MEC) and the Premier, thus ensuring coordination of those matters that may affect the nature reserve through the relevant provincial departments, district and local municipality.

2.2 The legislative basis for the management of Mpenjati Nature Reserve

There is a large body of legislation that is relevant to the management of Mpenjati 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. Managers are required to familiarise themselves with the purpose and contents of the statutes and their subsequent amendments and regulations.

2.2.1 Proclamation status of Mpenjati Nature Reserve

An area of 23 ha at Palm Beach, on the lower Natal South Coast, was initially identified, in September 1982, by the special committee appointed by the Natal Executive Committee for the development of open-air recreational facilities for other race groups along the Natal Coast. This followed a request from the Department of Constitutional Development and Planning to the Administrator of Natal to formulate a detailed policy for the provision and use of recreational facilities for other race groups along the Natal South Coast. By Executive Committee resolution No.1425, dated 27/8/85, this area at Palm Beach was officially named Mpenjati Public Resort Nature Reserve.

To the 23 ha acquired in 1985, more land was added; namely, Yengele forest and Mackenzie farm, and these increased the overall size to 86.3433 ha.

The KwaZulu-Natal Province Extraordinary Government Gazette (Vol. 6 No. 799), dated 30 August 2012, declared a number of nature reserves under the National Environmental Management: Protected Areas Act (57/2003) and assigned Ezemvelo KZN Wildlife as the Management Authority in terms of the Act. This included Mpenjati Nature Reserve, which consists of the following properties:

Properties Comprising the Mpenjati Nature Reserve	**Surveyor General Diagram No.**	**Extent (ha)**
Erf 877 Palm Beach	S.G. No. 18/1988	33.6263
The Remainder of Lot 2 Umtamvuna No. 10630	S.G. No. G.V. 373 F.5	2.1662
Portion 5 of Lot 2 Umtamvuna No. 10630	S.G. No. 6787/1958	0.4047
The Remainder of Lot 3 Umtamvuna No. 12689	S.G. No. 1735/1936	4.2516
Portion 2 of Lot 2 Umtamvuna No. 10630	S.G. No. 2870/1947	11.4961
Portion of land between Admiralty Reserve and Ptn. 2 of Lot 2 Umtamvuna No. 10630		*Actual sizes not indicated on Proclamation*
Lagoon		
Government Reserve		
Total Extent		**86.3433 ha**

Appendix C2 contains the recent 2012 re-proclamation of Mpenjati Nature Reserve.

2.2.2 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 management plan. This is addressed in Section 5.6.2.

2.3 The policy framework guiding the management of Mpenjati Nature Reserve

In conserving and managing the biodiversity of KwaZulu-Natal, Ezemvelo KZN Wildlife operations are undertaken within a broad framework of policies. At a national level, overarching policy is set out in:

i) The White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity of 1997.

ii) The Bioregional Approach to South Africa's Protected Areas, 2001/2002.

iii) Community Based Natural Resource Management Guidelines, 2003.

iv) National environmental management principles, set out in Section 2 of the National Environmental Management Act.

v) Relevant norms and standards set by the Minister and MEC in terms of the Protected Areas and Biodiversity Acts.

Within the province, Ezemvelo KZN Wildlife has adopted a Five Year Strategic Plan and Performance Plan for 2009-2014, with the following corporate strategic profile:

VISION

"To be a world renowned leader in the field of biodiversity conservation"

MISSION STATEMENT

"To ensure effective conservation and sustainable use of KwaZulu-Natal's biodiversity, in collaboration with stakeholders, for the benefit of present and future generations."

STRATEGIC GOALS

i)To conserve indigenous biodiversity in KwaZulu-Natal, both within and outside of protected areas.

ii) To be a sustainable, well resourced and capacitated biodiversity conservation and ecotourism organisation.

iii) To foster the value of biodiversity conservation with stakeholders.

iv) To be an efficient, effective and compliant organisation with good governance.

v) To effectively promote the mandate of the organisation to stakeholders.

CORE VALUES

Integrity	At all times we act morally, ethically and with honesty.
Respect	We treat stakeholders with patience, politeness and acknowledge and value their right and those of the environment.
Accountability	We involve stakeholders in the organisation's activities, with a culture of openness, and are answerable for the outcome of our actions and activities.
Team work	Working together to achieve our vision through goals.
Innovation	An adaptable organisation that embraces the culture of creativity and learning.
Excellence	We are a progressive organisation, applying best practices to achieve the highest quality and standards.
Commitment	At all times, we undertake our activities with passion, loyalty and dedication.
Productivity	We undertake to produce results timeously, efficiently and effectively.

A number of policies, specific to particular areas of operation, have also been developed by Ezemvelo KZN Wildlife (Appendix C1). These policies have been considered and applied within the plan, where relevant. The nature reserve's manager is required to be familiar with them and to apply them in managing Mpenjati Nature Reserve.

The management plan has utilised this body of policies to develop a strategic and operational management framework for Mpenjati Nature Reserve that is consistent with the broad goals and specific policy requirements of Ezemvelo KZN Wildlife.

2.4 The regional and local planning context of Mpenjati Nature Reserve

The Hibiscus Coast Municipality Integrated Development Plan (IDP) makes reference to the need "to promote a healthy and hygienically safe environment, which supports sustainable utilisation of natural resources and creates an environmentally educated society". However, due to financial constraints, the municipality's Environmental Management Plan is still outstanding at this time.

The Ugu IDP has a chapter devoted to environmental management, in which they identify issues such as wetland degradation/destruction and alien plant infestation as being threats to biodiversity conservation. It records that there are 36 estuaries in the District Municipality's area, and notes that the Land Use Management Framework and Coastal Zone Management Plans are out of date. It also mentions that there is a Strategic Environmental Assessment in place, which is under review in a phased manner, per local municipality.

Some of the environmental issues highlighted in the Ugu IDP include:

- Alien plant infestation is a threat both to food security and the environment at large.
- Lack of public knowledge and awareness, as well as lack of funding for invasive alien species eradication.
- Sea level rise, accompanying climate change, may result in coastal disasters.
- Lack of funding for development of coastal management plans and estuarine development plans.
- No research being done on coastal processes and ability of the Municipality to adapt in the face of climate change and its effects on the coast.
- A growing problem of bushpigs destroying agricultural produce.

In terms of mitigating effects of climate change, the IDP suggests small-scale interventions, such as:

- Planting of indigenous trees.
- Enhancement of green spaces and establishment of green corridors to act as carbon sinks.
- It also mentions the need to allocate funds to long-term initiatives like renewable energies and cleaner production technologies.
- Improving environmental education in local high schools.

With regard to current interventions, the IDP refers to the Mpenjati Estuarine Management Plan, which is also referred to extensively in this Protected Area Management Plan, and which is attached as Appendix G to this document.

Two documents exist regarding the development and conservation of the Mpenjati Nature Reserve. The first is the Mpenjati Estuary Management Plan, which was developed in order to structure the conservation of the estuary. The second is still a draft document, in the form of a pre-feasibility study for the Mpenjati Nature Reserve, to consider options for the future development of the protected area. During the process of developing the Mpenjati Tourism Pre-feasibility Study, a high-level SWOT Analysis was performed, based on site visits

and discussions with key stakeholders. The salient points of this assessment are summarised below (comments on some of the conclusions of that study are made in square brackets):

Strengths

- Unique in that there are few other protected areas in KwaZulu-Natal with a combination of nature reserve, estuary and beach, offering a diversity of natural habitats in a small area.
- Well connected to the Eastern Cape and the rest of KwaZulu-Natal, especially Durban, via major national and regional roads.
- Located within the scenic KwaZulu-Natal South Coast, which is regarded as one of the most popular tourist destinations in KwaZulu-Natal and South Africa, and which already has many supporting tourist amenities.
- The nature reserve is well managed and preserved by Ezemvelo [Note: at present, Mpenjati does not have a manager, and the word "conserved" should be used rather than "preserved"].
- Availability of bulk infrastructure (roads, electricity, sewage, water).
- Availability of some buildings that may be suitable for tourist services.

Weaknesses

- Previous negative publicity around incidents of crime, health risks and smells.[1]
- Adjacent activities incompatible with conservation/ecotourism, e.g. water treatment plant and mining.
- Security issues, especially on the beachfront.
- No shark nets and strong tidal currents make swimming unsafe [the Blue Flag Trafalgar Beach has shark nets, but it is 2.5 km north of the northernmost point of Mpenjati].
- Large areas of the nature reserve are deemed as environmentally sensitive and no-development areas [this should not be viewed as a weakness, but rather a strength in terms of biodiversity conservation].
- Occasional flooding of some of the facilities due to rising water levels in the estuary.
- Financial and human resource capacity of Ezemvelo to manage a commercial venture.

[1] A survey amongst local tourism enterprises indicated a perception that the Mpenjati was unsafe and not adequately marketed, despite its immense potential.

Opportunities

- Implementing a greater marketing effort to channel more tourists arriving in KwaZulu-Natal and the South Coast, as well as locals, to the nature reserve.
- Offering value-added services, such as light meals and beverages, equipment hire (for water sports), guided nature tours, picnic spots, children's play area, fossil tour, etc.
- Developing a market segmentation strategy to target market segments, such as education (schools, tertiary institutions, etc.), conferencing (corporate and government sector), family (outings and social events), backpackers/campers, angling clubs, canoeists, bird and butterfly enthusiasts, etc.
- Offering low-impact and secure overnight B&B accommodation facilities, such as wooden cabins and camping sites.

Threats

- Criminal elements, especially from the beachfront, where security may pose a challenge.
- Anthropogenic threats to the estuarine function from treatment plant and mining.
- Occasional sewage overloading of the estuary.
- Pending land claim.

The tourism pre-feasibility study did mention that chalet development within the nature reserve, on the river banks or the foredune, is a current option, but this location has been rejected by Ezemvelo planning staff on the basis that, firstly, that location would be inappropriate in terms of the environmental impacts and, secondly, that accommodation facilities in the area are undersubscribed and adding more accommodation needs to be investigated for viability. In addition, most up-country visitors come to this area for the beach and not for a wildlife/nature-based experience, so there is not likely to be a high demand for that type of accommodation, unless all other accommodation facilities were fully subscribed.

2.4.1 The National Protected Area Expansion Strategy

In an effort to address a lack of effective protection and representation of all vegetation types within the protected areas system, a National Protected Area Expansion Strategy (NPAES, DEAT, 2008) has been developed and approved at a national ministerial level. The purpose of the NPAES is to provide a national framework for the expansion and consolidation of the protected area system, focussing on priority areas for representation and persistence of biodiversity.

The closest priority area in terms of the NPAES is the Pondoland Region.

2.4.2 The Provincial Protected Area Expansion Plan

The KwaZulu-Natal Protected Area Expansion Strategy identifies the Indian Ocean Coastal Belt as a high priority biodiversity area. The opportunities for expansion of Mpenjati Nature Reserve include proclaiming more land further upstream, i.e. the entire estuary and including the Trafalgar Marine Reserve into Mpenjati. Black Lake, which is a horseshoe

shaped “lake” near to Yengele forest, has been identified as an ecologically important site, to be acquired in the future.

2.4.3 EIA Regulations in terms of NEMA

In terms of the National Environmental Management Act (No. 107 of 1998) Environmental Impact Assessment (EIA) Regulations, various activities require environmental authorisation before they may commence. In addition, in terms of Regulation RN.546, Listing Notice No.3, there are a number of activities that require environmental approval *specifically* as a result of their proximity to a protected area. The implication of this is that if any of the activities listed in Appendix D are proposed in the nature reserve, or within five kilometres of it, they will be subject to either a basic assessment or a full scoping and EIA process. A number of general activities, and those proposed for either tourism development or operational management within the nature reserve, or the buffer areas, will thus require environmental authorisation.

2.4.4 Local government planning mechanisms

In terms of the principles of cooperative governance set out in the Constitution of South Africa, the different spheres of government are required to coordinate their actions with one another. In terms of the conservation objectives of a protected area, this is an important aspect in ensuring that appropriate land uses are applied in the areas around a protected area, as they may influence the operation of the protected area and the ecological functioning within it. On this basis, it is important to ensure that local government planning mechanisms, such as Integrated development plans (IDP’s), Spatial development frameworks (SDF’s) and municipal schemes are aligned with the conservation objectives and principles of protected areas within their jurisdiction.

It is important that Ezemvelo KZN Wildlife, in particular the managers of Mpenjati Nature Reserve, work closely with the Hibiscus Coast Municipality in further developing these spatial plans. The focus of these efforts should be to ensure that inappropriate land uses, which may lead to impacts in the nature reserve, are discouraged in the buffer areas and in areas identified as national or provincial priorities for protected area expansion near the nature reserve.

The Hibiscus Coast Municipality developed an Integrated Development Plan that was drafted in 2012 and will be reviewed on an annual basis. This is discussed in Section 2.7.

2.5 The history of the Mpenjati Nature Reserve

Mpenjati means “the place of the warring buffalos” and Yengele, which is part of Mpenjati Nature Reserve, means “Spotted Genet”, in Zulu.

Part of the area of the Trafalgar Marine Reserve, which starts at the high water mark and extends into the sea, has been the home of Mr R De Maine since 1957. Much of the area has been cleared for bananas and sugar cane.

An area of 23 ha at Palm Beach on the lower Natal South Coast was identified, in September 1982, by the special committee appointed by the Natal Executive Committee for the development of open-air recreational facilities for other race groups along the Natal Coast. This followed a request from the Department of Constitutional Development and Planning

to the Administrator of Natal to formulate a detailed policy for the provision and use of recreational facilities for other race groups along the Natal South Coast. Notice of expropriation with offers were served on 97 property owners in Palm Beach by Exco Resolution 72\d\D09\01\85, totalling an area of 23 ha. Exco (Natal Executive Commitee) Resolution 1425d\d\27\08\85 officially named this area Mpenjati Public Resort Nature Reserve.

In September 1985, the Yengele Forest, which totalled 12 ha in extent, was expropriated. On the 15 September 1988, Rem Lot Umtamvuna, known as Joymac Farm, was expropriated. The extent of expropriation was 47 ha.

In 1990, a portion of land on the northern boundary, commonly known as MacKenzie's, was excised from the nature reserve because it was overgrown with Napier fodder and there was no money for rehabilitation. In light of the pressures for township development on the northern bank, it was felt by management that the land should be reclaimed. However, after a long, complex and hard-fought battle in the supreme court, the previous owners of the Joymac Land were awarded compensation amounting to R3,752,000.00, plus legal costs. The land has since been handed over to the Trafalgar Town Board by the KwaZulu-Natal Province. Today the overall size to just over 86 ha.

An adjacent area, Black Lake has been identified as an ecologically important site, to be formally protected in the future.

The KwaZulu-Natal Province Extraordinary Government Gazette (Vol. 6 No.799), dated 30 August 2012, declared a number of nature reserves under the National Environmental Management: Protected Areas Act (57/2003) and assigned Ezemvelo KZN Wildlife as the Management Authority in terms of the act. This included Mpenjati Nature Reserve, which consists of the following properties:

Table 2.1: Properties comprising Mpenjati Nature Reserve

Properties Comprising the Mpenjati Nature Reserve	**Surveyor General Diagram No.**	**Extent (ha)**
Erf 877 Palm Beach	S.G. No. 18/1988	33.6263
The Remainder of Lot 2 Umtamvuna No. 10630	S.G. No. G.V. 373 F.5	2.1662
Portion 5 of Lot 2 Umtamvuna No. 10630	S.G. No. 6787/1958	0.4047
The Remainder of Lot 3 Umtamvuna No. 12689	S.G. No. 1735/1936	4.2516
Portion 2 of Lot 2 Umtamvuna No. 10630	S.G. No. 2870/1947	11.4961
Portion of land between Admiralty Reserve and Ptn. 2 of Lot 2 Umtamvuna No. 10630		*Actual sizes not indicated on Proclamation*
Lagoon		
Government Reserve		
Total Extent		**86.3433 ha**

2.6 Ecological context of the nature reserve

2.6.1 Climate and weather

Mpenjati's climate is subtropical, with warm sunny winters and summer rainfall. The summer temperatures remain comfortable and this climate is considered highly desirable for holidays and retirement.

The South Coast is made up of a collection of golden beaches, lagoons, rocky coves, grassy slopes, warm Indian Ocean waters, frequent sunny weather, sub-tropical forests and vegetation – an environment that draw the crowds, particularly during the festive season. A number of activities keep tourists busy, from adrenaline sports to shopping and "eating out".

The warm Indian Ocean and sunny weather make KwaZulu-Natal's South Coast a popular year-round holiday resort for both local and international visitors.

The following climate data was derived from http://www.myweather2.com/City-Town/South-Africa/Margate/climate-profile.aspx

2.6.1.1 Temperature

The chart below plots the average high and low temperature for each month of the year in Margate. It also shows the maximum and minimum recorded temperatures.

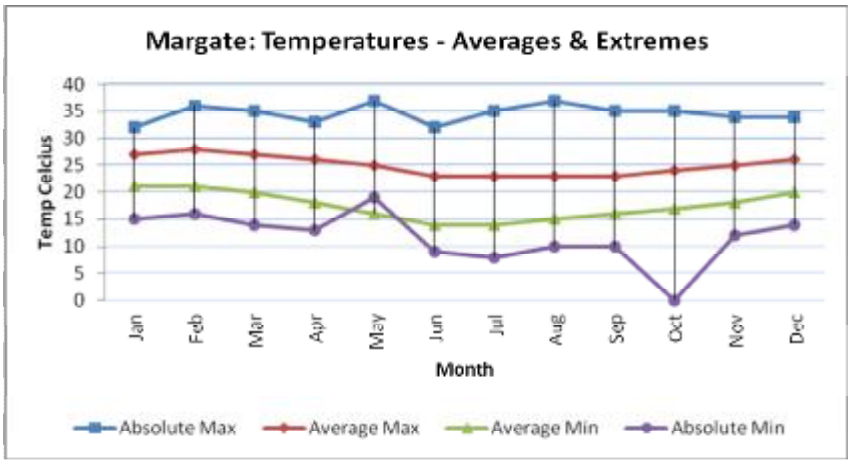


Figure 3: Margate temperatures - Averages and extremes

2.6.1.2 Precipitation amount

The chart below plots the average monthly precipitation for Margate.

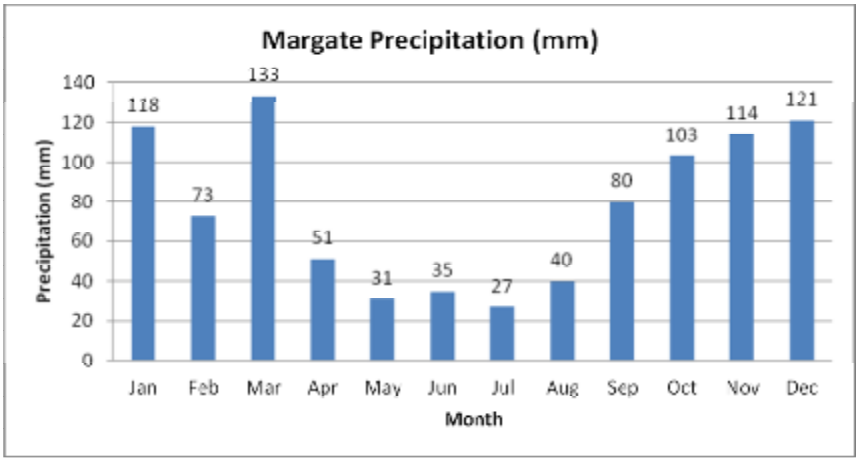


Figure 4: Average monthly precipitation for Margate

2.6.1.3 Wind speed

The chart below plots the average daily wind speed for each month of the year. It also shows the maximum recorded sustained wind speed for each month.

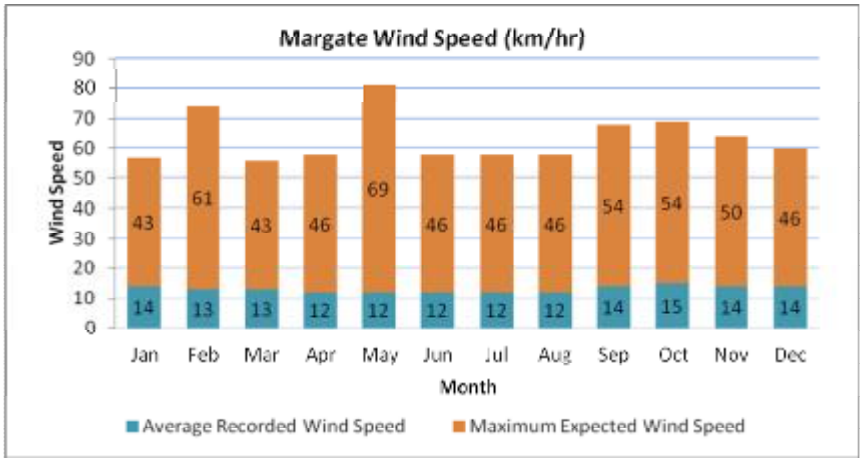
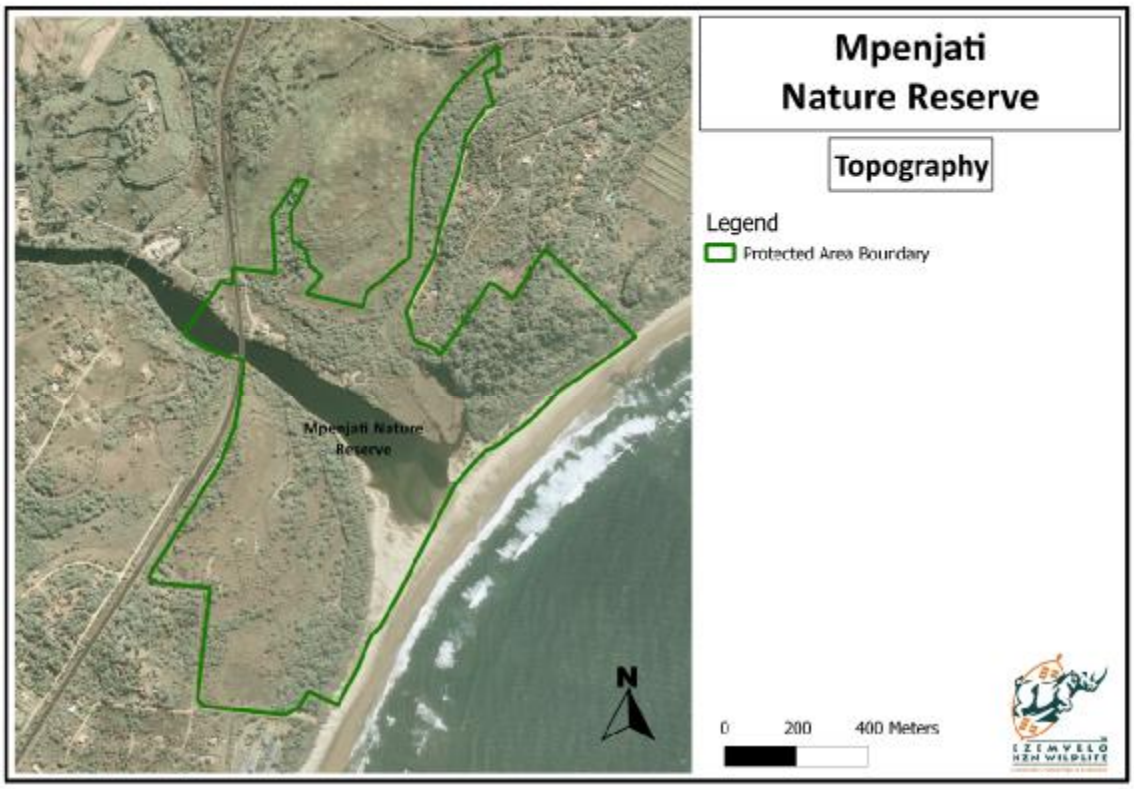


Figure 5: Average wind speed for Margate

2.6.2 Topography

The topography of Mpenjati consists predominantly of gentle slopes with some flat zones, wetlands, coastal dunes and forests. The gently sloping hills in the west become flatter towards the dunes along the beach, whilst Yengele Forest is on a high domed dune. Altitude ranges from sea level to about 27 m. (Also see Geology).



Map 2: Mpenjati Nature Reserve topography

2.6.3 Geology and soils

This description of the rocks underlying the Mpenjati Nature Reserve and surrounds was derived by GA Botha (Council for Geoscience) from the 3030CD Margate map explanation (unpublished).

2.6.3.1 Natal Metamorphic Province

The Natal Metamorphic Province rocks exposed in the Mpenjati valley are allocated with the Margate Terrane, which comprises a volcanic arc that accreted onto the Kaapvaal Craton about 1,100,000 years ago (1.1 Ga) (Thomas, 1989; Wareham *et al*., 1998; McCourt *et al*., 2006; Cornell *et al*., 2006).

2.6.3.2 Glenmore granite

Glenmore Granite is exposed within the bed of the Mpenjati River. These intrusive rocks are notable for their large grain size. The granite outcrops are of pale yellow-grey to greenish weathering, massive to foliated, mostly coarse-grained granite with tabular feldspar crystals, typically ~1-3 cm long and biotite, garnet and amphibole laths.

2.6.3.3 Munster monzonite

This rock type is exposed in the Little Mpenjati tributary upstream and in the Palm Beach area. The Munster Suite diorite is medium-grained, granular-textured and consists mostly of biotite, pyroxene and plagioclase.

2.6.3.4 Margate Granite Suite

The area north of the Mpenjati River valley is underlain by the diverse granite-charnockite rocks comprising the Margate Granite Suite, which includes medium-grained, granular-textured granite that passes gradationally into charnockite. The granitic lithologies weather anywhere from light reddish-pink to dark grayish-green, whereas the charnockitic rocks are mostly dark grayish-green. The rocks are dominated by feldspar and quartz, with subdominant garnet, biotite, amphibole and pyroxene. The rocks have been dated to 1093±7 Ma (Mendonides *et al*., 2009).

2.6.3.5 Mzamba Formation

The Upper Cretaceous Mzamba Formation crops out as wave-cut intertidal platforms and small sea cliff exposures for ~2 km along strike, from Trafalgar Beach in the north to the mouth of the Mpenjati River in the south. The outcrops of Mzamba Formation near Trafalgar were the subject of studies by Anderson (1907), Crick (1907), and Klinger and Kennedy (1975). The units comprise fossiliferous conglomerate, limestone and siltstone that nonconformably overlie the Margate Granite Suite and dip at ~2° to the southeast. Outcrops occur only along the beach section, as further inland they are covered by beach sands and Neogene dune formations. The basal part of the Mzamba Formation comprises a ~40 cm fossiliferous, glauconitic, clast-supported conglomerate. The pebble- to cobble-sized clasts are closely packed, well-rounded and consist predominantly of Jurassic dolerite with minor granite, gneiss and quartzite clasts. In the south, this unit is overlain by fine-grained, sandy limestone and glauconitic siltstone, which host abundant ammonite assemblages. Within the Trafalgar exposures, Kennedy and Klinger (1975) identified Inoceramus species and ammonites (*Natalites* species, *Baculites sulcatus*, *Pseudoschloenbachia umbulazi*) of middle Santonian to lower Campanian age (~85 million years). Anderson (1907) identified 11 species of Mollusca, as well as shark teeth, turtle shell plates and reptile bones from the limestone and conglomerate beds. Cooper and Greyling (1996) proposed that the Mzamba Formation was deposited as longitudinal bars in a shallow marine, subtidal, middle shoreface environment. The coarse clastic horizons formed as distal sea-level lowstand deposits that were buried by the overlying upward fining succession deposited during marine transgression (Cooper & Greyling, 1996). The abundance of marine fossils, combined with the reworked nature of the limestone and siltstone beds, is indicative of a shallow marine depositional environment for all occurrences of these units along the KwaZulu-Natal South Coast.

2.6.3.6 Maputaland Group

This lithostratigraphic grouping includes marine and coastal deposits related to major climatic and sea-level changes during the Cenozoic era (Roberts *et al*., 2006). The rocks include calcareous late Neogene beach conglomerate (Uloa Formation) overlain by Umkwelane Formation aeolianite. Unconsolidated Pleistocene and Holocene dune deposits are also present in this area.

2.6.3.7 Umkwelane Formation

The hill north of the Mpenjati River is formed by weathered Pliocene aeolian sediments correlated with the Umkwelane Formation. No calcareous aeolianite protolith remains and

the hillslopes are formed in the thick Hutton Form soils that characterise the rubified weathering profile that is informally referred to as “Berea red sand”. South of the river, the red sand cover is thinner and has been incised by tributary streams that form wetlands at the contact with the underlying granites.

2.6.3.8 Sibayi Formation

The low coastal foredunes have been stabilised by coastal forest and thicket. These hummocky and parabolic dunes were probably mobilised during the mid-Holocene marine transgression (~6,000 - 2,000 years BP).

2.6.3.9 Peat deposits

The shallow valley that has incised the left bank valley slopes preserves peat deposits that were formally excavated for use as agricultural growing medium. The deposits represent accumulation of organic matter in the wetland during the Holocene climatic optimum.

2.6.3.10 Estuarine deposits

The presence of granite outcrops in the river bed upstream of the freeway bridge and the Mzamba Formation ledges, north and south of the river mouth, suggest that a narrow, sediment infilled bedrock channel underlies the estuary mouth. This valley was incised during the many sea-level drawdowns associated with Pleistocene climatic cycles. The sediment infill probably comprises estuarine deposits and alluvial sands that accumulated during the sea-level rise prior to the mid-Holocene.

2.6.4 Hydrology

The Mpenjati Lagoon is one of the few remaining estuaries that can be salvaged from the effects of man’s development. The estuary is tidal, being open to the sea approximately once a quarter. The river has a reasonable catchment, as is shown by its present high level, even during a period of severe drought. Associated with the estuary is an area of marshland and reed beds on the northern bank.

On the southern bank, the dune vegetation runs for 1.5 km to Palm Beach. Another stream inlet runs parallel to the dunes and feeds into the lagoon on the southern bank. The inlet feeding into the Mpenjati Lagoon is characterised by the reed beds and a patch of swamp forest. Along the Mpenjati River, between the northern inlet and the old main road, was a strip of transitional forest, which has subsequently been destroyed by sand mining. This transitional forest was previously island vegetation when the river course forked in the vicinity of the old main road bridge. When the bridge was constructed, the river became blocked by sand deposition and the only remaining evidence of the island is in the form of pools found on the northern bank.

Mpenjati estuarine system was classified by Heydorn (1986) as “Fair” and as an estuary that needed to be conserved, but could have some controlled development. Sand-winning was cited as a major problem there.

Characteristics of the Mpenjati catchment are:

- Area: 78 km^2 (213); 83 km^2 (206, 245, 257); 101 km^2
- River length: 18 km (206, 245, 257)
- There are two streams from the wetland on the western part of Yengele Forest.
- Co-ordinates of the mouth are 30°◦55’59” S; 30°◦16’00” E
- The main tributary of the Mpenjati River is the Little Mpenjati that enters from the south at the head of the estuary.

The following text is a direct extract of the recently compiled Mpenjati Estuary Management Plan.

“While the rubble causeway does not fully exclude freshwater input, it does restrict this input, disrupts the estuarine functional zone (it excludes freshwater habitats) and tidal fluxes. Its design should be reviewed and a less invasive, but equally serviceable, solution should be implemented. The bed of the Mpenjati Estuary has been mined extensively for sand and stone, altering the depth of the system, benthic organisms and physical-chemical conditions of the water and sediment. Sand mining should thus be excluded from the estuarine functional zone and a policy developed to reduce the potential negative impacts of any prospective upstream mining on the estuary.

Despite the protected area status of almost half of the estuarine area, the Mpenjati Estuary is still subject to human interference, from a variety of sources, that has resulted in some habitat loss and changes in water quality and in the biota of the system. Protecting and preserving the biodiversity of the estuary is a critical responsibility/mandate of Ezemvelo, given the conservation importance status of the Mpenjati as a core estuarine system at the both provincial and national level.

Conserving the natural heritage and biodiversity of the estuary, as a whole, was a key concern identified during stakeholder engagement. Since destructive and invasive activities within the estuary, upstream of the current boundaries of the nature reserve, negate downstream conservation efforts of the nature reserve, it is imperative that the current protected area be extended to cover the entire estuarine functional zone. This would guard it against development encroachment, while regulating specific activities, thereby preserving the ecological integrity of the entire system and securing the valuable ecosystems services in the protected area network. Subsequently, all estuarine habitats, biota and processes within this area will be consolidated in terms of conservation priorities. Further recommendations to conserving natural habitats are the determination of Thresholds of Potential Concern (TPCs) and controlling land use adjacent to the expanded nature reserve. There are, however, conflicting issues relating to neighbouring land use, the causeway, water extraction and mining that need to be sensitively resolved. Various options for extending the protected area, including custodianship/stewardship and buy-in from surrounding land-owners, need to be investigated. Ultimately, an agreement would thus need to be reached between the land owners and the custodian of the whole estuary/those responsible for the implementation of the Mpenjati Estuarine management Plan.”

2.6.5 Vegetation

Mpenjati's proclamation conserves and maintains the diverse ecosystems that were under threat of development pressures, *viz*: wetlands, dune forest, swamp forest, riverine forest as a natural feature of the landscape. This includes open grasslands, dense forest patches, a relatively clear running river, healthy estuary and the diverse wildlife species associated with all of these. In the context of altered landscape and ecosystems initiated by development and sand winning activities surrounding Mpenjati, the nature reserve has become of great value over time.

The Mpenjati Nature Reserve is located within the Indian Ocean Coastal Belt, as defined by Mucina and Rutherford (2006). This is an almost 800 km long coastal strip, between the South African border with Mozambique, extending as far south as the mouth of the Great Kei River, near East London. It is a climatically, ecologically and biogeographically peculiar region that, they have argued, deserves to stand on its own, at the level of a Biome, within the scope of the South African vegetation. It is characterised by a regional concentration of endemic species. Whilst the northern landscapes are flat, the southernmost landscapes are characterised by elevated plateaus, separated by deep gorges associated with major river valleys.

Mpenjati Nature Reserve is dominated by coastal grassland and forest. The coastal grasslands are intersected by numerous wetlands. The forest is a combination of Coastal Forest and Dune Forest, which are both grouped under Northern Coastal Forest as they essentially grade into one another.

The Dune Forest occurs exclusively on the coastal dune cordon between the ocean and coastal grasslands, whilst the Coastal Forest occurs on higher-lying landward dune ridges.

Some of the wetlands support the uncommon and unusual looking plant "Palmiet" (*Prionium serratum*).

In terms of Mucina and Rutherford (2006), the nature reserve can be divided into four vegetation types:

1. Large areas throughout the nature reserve are KZN Coastal Belt Grassland (CB3).
2. A strip adjacent to the foredunes, and south of the estuary, as well as large patches in the north of the estuary, are Northern Coastal Forest (Foz7).
3. The south-eastern edge, bordering on the beach, is Sub-tropical Seashore Vegetation (AZd4).
4. The lower part of the estuary itself is Subtropical Coastal Lagoon (W2).
5. Patches of Sub-tropical Freshwater Wetlands are found throughout the nature reserve (AZf6).

These will be discussed in turn (the bulk of the discussion being taken directly from Mucina and Rutherford, 2006, unless specifically indicated otherwise):

2.6.5.1 KZN Coastal Belt Grassland (CB3)

The KZN Coastal Belt Grassland consists of a long and, in places, broad coastal strip along the KwaZulu-Natal Coast. Grasslands are becoming increasingly rare throughout the province, due to development and agricultural pressures, and this vegetation type is highly transformed (about 50 %) and is affected by a mosaic of very extensive sugar cane fields, timber plantations, urban sprawl, roads and coastal holiday resorts, with interspersed secondary *Aristida* grasslands, thickets and patches of coastal thornveld. The KZN Vegetation Type Code is 29 and in the province its conservation status is Critically Endangered (Scott-Shaw & Escott, 2011) and, apart from the tiny areas in Beachwood and Umhlanga Lagoon, only a very small part is statutorily conserved in Ngoye, Mbumbazi and Vernon Crookes.

A prominent tree species found in the coastal grassland is *Hyphaene coriacea* (Lala Palm).

2.6.5.2 Northern Coastal Forest (FOz7)

Northern Coastal Forest includes KwaZulu-Natal Dune Forest: East Coast Dune Forest (KZN Vegetation Type Code 63.1). This vegetation type is found in KwaZulu-Natal at low altitudes between 0 and 150 m asl. It is particularly well-developed in Maputaland. It also extends into the Mozambique seaboard, to Southern Tanzania. In KwaZulu-Natal its conservation status is Critically Endangered (Scott-Shaw & Escott, 2011).

Species-rich, tall/medium height subtropical coastal forests occur on coastal (rolling) planes and stabilised coastal dunes. The conservation status is "Least Threatened", but, in general, it is still under threat in KwaZulu-Natal due to mining for heavy metals on the North Coast. The original extent was diminished by agriculture (sugar cane and fruit gardens), timber plantations, urban sprawl and tourism-orientated development on the KwaZulu-Natal coast. The forest is sensitive to alien plant invasion and invaders, such as *Chromolaena odorata* and species of *Pereskia* and *Acacia*, are posing threats.

Coastal Dune Forest is typically species rich, with dominant species being *Mimusops caffra* (Coastal Red Milkwood) and *Sideroxylon inerme* (White Milkwood). Other characteristic species are *Acokanthera oppositifolia* (Dune Poison Bush), *Allophylus natalensis* (Dune False Current), *Aloe thraskii* (Dune Aloe), *Brachylaena discolour* (Coast Silver Oak), *Chaetachme aristata* (Thorny Elm), *Chrysanthemoides monilifera* (Tick Berry), *Cola natalensis* (Coshwood), *Cordia caffra* (Septee), *Deinbollia oblongifolia* (Dune Soap Berry), *Dracaena aletriformis* (Large-leaved Dragon Tree), *Euclea natalensis* (Natal Guarri), *Eugenia capensis* (Dune Myrtle), *Ficus burtt-davyi* (Veld Fig), *Pavetta revoluta* (Dune Bride's Bush), *Strelitzia nicolai* (Natal Wild Banana) and *Strychnos decussata* (Cape Teak).

The importance of the vegetated sand dunes on the coast cannot be over-emphasised as they perform the following functions (Branch & Branch, 1981; Garland, 2003).

- Prevent excessive erosion of dune sands by wind and water. They also act as reservoirs of sand, which replenish beaches when they are eroded by high seas.
- Are a biodiversity reservoir, having plant and animals species often found nowhere else.
- Provide a screen against the potential impact of corrosive onshore winds on landward vegetation and coastal properties.

- Are an aesthetically-pleasing backdrop to the beach. The presence of an intact dune plant community gives one the feeling of entering a "wild" environment, which is severely contrasted with that created by the presence of coastal dwellings and other developments right on the beach.

2.6.5.3 Subtropical Seashore Vegetation

A strip of dune vegetation is found on the seaward (eastern) edge of the nature reserve. This consists of pioneer dune species, such as *Scaevola plumieri*, an evergreen, succulent shrublet, which is one of the most important pioneers of a dune plant community. Wind-blown sand builds up against young *Scaevola* plants and a line of baby dunes is started just above the high spring tide mark. The plants continue to grow, branching and sending out roots in all directions and more and more wind-blown sand piles up around them, sometimes burying them temporarily – temporarily because burial stimulates *Scaevola* to grow more vigorously and its shoots soon emerge above the sand again, while its roots and buried stems help to stabilise the dunes, which therefore steadily increase in height (Hennessey, 1974).

In addition to mechanical building of the dunes, these plants contribute to the process of soil formation by adding organic matter (leaves, etc.) to the sand. The physical presence of the dunes creates shelter from salt-spray laden winds in their lee and the combination of more shelter and more stable and better soil allows other plant species to become established. The first line of dunes near the coast is populated by the pioneer species and successive rows of dunes carry more and different species. Initially, the first row of trees are dwarfed and have a shrubby growth form, usually not exceeding 2 m in height, and are referred to as dune scrub. The scrub zone is succeeded by forest. The forest usually contains the same tree species that are present in the scrub, but they are accompanied by many other tree species, as well as climbers or lianas (Hennessey, 1974).

The dune community, all the way from the pioneers to the climax forest species, play an enormously important role in creating and maintaining a stable environment along the shore line. Without this community, there would be no protection from damaging on-shore, salt-laden winds, which only dune plants can tolerate, and nothing to prevent wind-blown sea sand from being blown inland and from blocking the mouths of rivers.

Stormier periods can result in beach erosion, or even total removal of the beach, in which case, the base of the mobile dune system may also be attacked and eroded by waves. There is a constant cycle of destruction and accretion, which can be influenced by sea level drops or rises, storm events, rip currents and sand deposits from rivers and estuaries (Branch & Branch, 1981; Garland, 2003).

The frontal dune, or foredune, acts as a barrier protecting inland areas and retaining sand on the beach by both trapping sand blown up from the beach, and returning sand to the beach in times of erosion (Branch & Branch, 1981; Garland, 2003).

The conservation status of Subtropical Seashore Vegetation (KZN Vegetation Type Code 55) is Least Threatened (Scott-Shaw & Escott, 2011).

2.6.5.4 Subtropical Coastal Lagoon (W2)

This is not described in Mucina and Rutherford (2006), but they do describe the ecology of estuaries in some detail, which is summarised briefly here.

An estuary is a place where freshwater from a river meets salt water from the sea or coastal lagoon and where gradual transitions in physical, chemical and biological characteristics between freshwater and seawater ecosystems can be found. The dynamics of water flows, mixing of fresh and salt water, erosion and sedimentation processes mould an intricate system of microhabitats, which make up the estuary. Essentially, there are two types of estuaries; open and closed (permanently and temporarily). This simple classification reflects the role and strength of tidal influences in controlling the patterning and dynamics of estuarine habitats.

The Mpenjati Estuary is a typical temporarily open/closed estuary. The conservation status of these estuaries in KwaZulu-Natal is Least Threatened (Scott-Shaw & Escott, 2011).

2.6.5.5 Subtropical Freshwater Wetlands (AZf6)

Wetlands are a dynamic part of the Mpenjati ecosystem and support the uncommon and unusual looking palmiet plant, *Prionium serratum*, as well as *Otholobium stachyerum.*

Subtropical Freshwater Wetlands (Mucina & Rutherford, 2006) are found in the coastal belt from the Transkei, as far as Maputaland, as well as in the Lowveld and Central Bushveld. They are found at altitudes of approximately 0-1400 m asl. Their conservation status is Least Threatened (Scott-Shaw & Escott, 2011). They are 4 % transformed and 40-50 % conserved in the iSimangaliso Wetland Park and other parks in South Africa and about 10 % protected in private game ranches.

These wetlands are found within flat topography supporting low beds dominated by reeds, sedges and rushes or waterlogged meadows dominated by grasses. They are usually on waterlogged, clayey soils of the Champagne and Arcadia series, containing certain levels of decaying organic matter, especially in very productive reedbeds.

These wetlands are considered to be Azonal vegetation types, in the sense that they are found within a particular vegetation type or biome, but special substrates, such as soil types, bedrock and/or hydrogeological conditions (waterlogging, flooding, tidal influence) exert an overriding influence on floristic composition, structure and dynamics over macroclimate. Freshwater Wetlands thus form a system of archipelagos of small and highly fragmented patches imbedded within all the main biomes of South Africa. They are common in regions with mean annual rainfall of greater that 500-600 mm.

Wetlands are valuable for the following reasons:

- In terms of hydrology (water production/retention).
- Home to many plant species.
- Habitat for resident and migratory waterfowl.
- Nutrient cycling.
- Grazing.
- Protein for humans – wild fowl and fish.

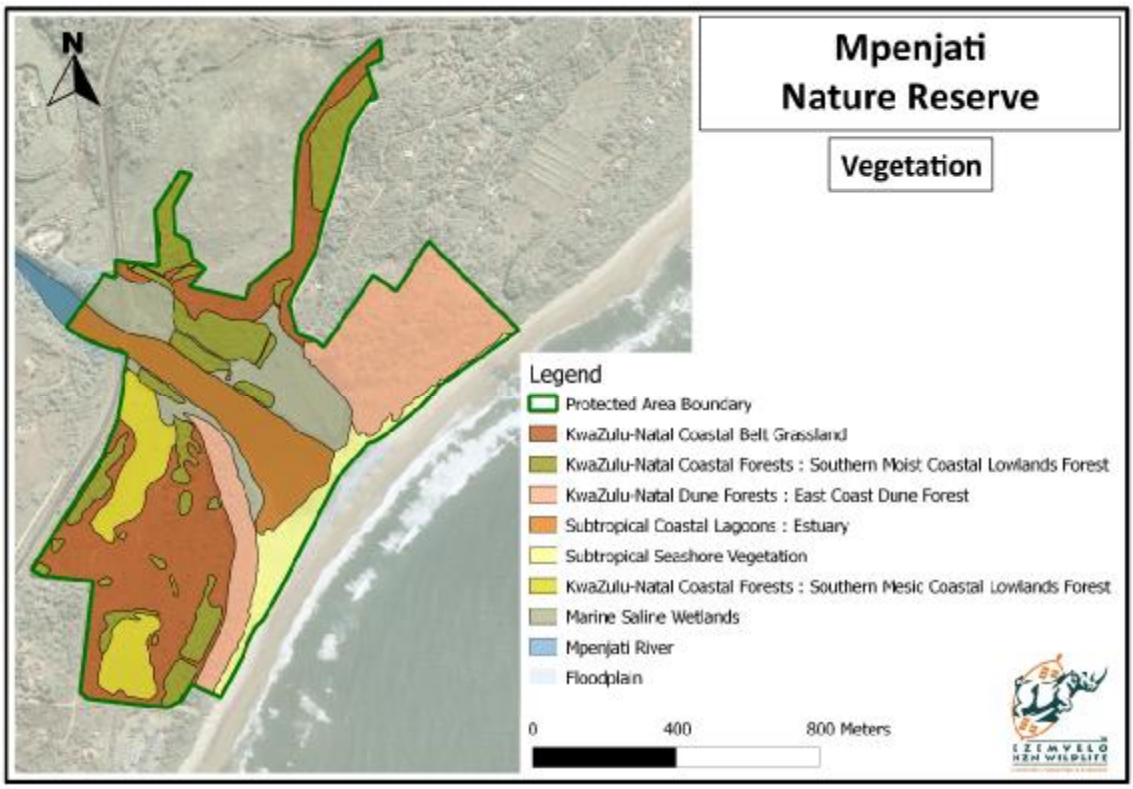
- Material for building.
- Carbon sequestration.

The principle threats to wetlands include conversion of a wetland from one form to another, reduction in size, or total destruction/drainage and pollution, urban sprawl and invasion by alien plants. Many invasive alien plants are also wetland species, thus making wetlands particularly vulnerable to infestation. Disturbance of wetlands also increases the likelihood of alien plant invasion by species such as *Chromolaena odorata* and others on the edges, and aquatic weeds, such as *Salvinia molesta* (Kariba Weed) and others, within water bodies.

A more recent and serious threat to wetlands is *Sagittaria latifolia* (Broad-leaf Arrowhead). This plant is found naturally across North America, and in Hawaii, the Caribbean and the northern part of South America. It has been introduced to Europe, Australia and South Africa. In Australia and South Africa, it is a serious weed and forms dense colonies on very wet soils that become more open as the species mixes with other species of deeper water levels. These colonies form long bands, following the curves of rivers, ponds and lakes, well marked by the dark green colour of the leaves. The plant has strong roots and can survive through wide variations of the water level, slow currents and waves. It displays an affinity for high levels of phosphates and hard waters. This species is present at Beachwood Mangroves in Durban and management needs to guard against this species establishing at Mpenjati.

2.6.5.6 Priority plant species

Otholobium stachyberum is found on the northern bank. The plant is fire sensitive and found in close proximity to the wetland. The only other known record of this plant is in Port Elizabeth. It is therefore important that it is managed correctly within the nature reserve. The plant is fire sensitive.



Map 3: Vegetation of Mpenjati Nature Reserve

2.6.6 Fire regime

Fire is a key driver of ecological dynamics in southern African systems, which are largely driven by patterns of disturbance. Fire contributes to patterns of disturbance by removing the vegetative growth of plants and, in contrast to grazing, it does this non-selectively, which reduces the competitive advantages of species adapted to grazing.

The majority of plant species in the mesic rangelands east of the escarpment in southern Africa display functional traits and life-history strategies adapting them to tolerate repeated frequent burns. The same is true of the savanna and woodland trees living in this grassland matrix, but not of the forest trees. These are particularly fire sensitive and owe their existence, in this fire landscape, to the fire-tolerant species that characterise the forest ecotone (Hilliard & Burtt, 1987; Trollope, 1999, Uys *et al.*, 2004; O'Connor, 2005; Uys, 2006).

The following ecosystem processes operate in the nature reserve:

- Biennial burning of the grasslands to limit woody plant encroachment.
- Total control of all alien plant species.
- Grazing and browsing by faunal species.
- Collection of *ncema* grass, thatching grass and *ilala* palm leaves by the rural community.

There is some evidence of increase in the woody component of the nature reserve and, at the public meeting in January 2013, participants commented that the view of the sea had

diminished within the nature reserve due to the increase in woody vegetation. To maintain the grassland, therefore, periodic hot burns will be required.

2.6.7 Invasive vegetation

Terrestrial and aquatic alien species in Mpenjati Nature Reserve include:

Species	**Common Name**
Acacia mearnsii	Black Wattle
Ageratum conyzoides	Invading Ageratum
Ageratum houstonianum	Mexican Ageratum
Albizia lebbeck	Lebbeck
Anredera cordifolia	Madeira Vine
Campuloclinium macrocephalum	Pom Pom Weed
Cardiospermum grandiflorum	Balloon Vine
Cestrum laevigatum	Inkberry
Chromolaena odorata	Triffid Weed
Cinnamomum camphora	Camphor
Ipomoea indica	Morning Glory
Lantana camara	Tickberry
Montanoa hibiscifolia	Tree Daisy
Ricinus communis	Castor-oil
Salvinia molesta	Kariba Weed
Schinus terebinthifolius	Brazilian Pepper
Senna didymobotrya	Peanut-butter Cassia
Solanum mauritianum	Bugweed

2.6.8 Alien Animals

Alien birds, such as the Common Mynah, are now so much part of the KwaZulu-Natal Coast that they are impossible to eradicate. Indications are that they do not yet occur within the nature reserve.

Stray domestic animals, such as cats and dogs, occasionally enter the nature reserve and present a threat to indigenous habitats and species.

See Section 5.6.2 which deals with alien invasive species.

2.6.9 Mammalian fauna

Mpenjati is not well-stocked with game species, but the Ipithi Trail, which is just over a kilometre in length, travels along the south bank of the river, and allows visitors the occasional opportunity to sight blue, red and grey duiker, as well as bushbuck.

Mammalian fauna species of conservation importance in Mpenjati Nature Reserve include: (For complete lists see Appendix E)

Scientific Name	**Common Name**	**Status**
Philantomba monticola bicolor	Blue Duiker	RDB - Rare
Aonyx capensis capensis	Cape Clawless Otter	Cites Appendix II

2.6.10 Avifauna

The Mpenjati Nature Reserve is a prime birding destination. Along the beach and river estuary, a number of less common bird species may be spotted, including Water Thick-knee, Osprey, Swift Tern, Half-collared Kingfisher, Kittlitz's Plover, African Black Oystercatcher, and Giant Kingfisher. Birds inhabiting the coastal dune forest include, Black-bellied Starling, Red-capped Robin-chat, White-browed Scrub-robin, Brown Scrub-robin, Black-backed Puffback, Forest Canary, Green Twinspot, Orange-breasted Bush-shrike and Grey-headed Bush-shrike.

Avifauna species of conservation importance in Mpenjati Nature Reserve: (For complete lists and sources of records see Appendix E)

Scientific Name	**Common Name**	**RDB Status**
Bucorvus leadbeateri	Southern Ground-Hornbill, Ground Hornbill	Vulnerable
Sterna caspia	Caspian Tern	Near Threatened
Ciconia episcopus	Woolly-necked stork	Near Threatened
Thalassarche chlororhynchos	Atlantic Yellow-nosed Albatross	Near Threatened
Pelecanus onocrotalus	Great White Pelican	Near Threatened
Phalacrocorax capensis	Cape Cormorant	Near Threatened
Phoenicopterus ruber	Greater Flamingo	Near Threatened
Procellaria aequinoctialis	White-chinned Petrel	Near Threatened
Spheniscus demersus	African Penguin, Jackass Penguin	Vulnerable
Morus capensis	Cape Gannet	Vulnerable
Accipiter minullus	Little Sparrowhawk	
Accipiter tachiro	African Goshawk	
Circus ranivorus	African Marsh-Harrier	Vulnerable
Elanus caeruleus	Black-shouldered Kite	
Gyps coprotheres	Cape vulture	Vulnerable
Haliaeetus vocifer	African Fish-Eagle	
Lophaetus occipitalis	Long-crested Eagle	
Milvus parasitus	Yellow-billed Kite	
Pandion haliaetus	Osprey	
Polyboroides typus	African Harrier-Hawk, Gymnogene	
Falco biarmicus	Lanner falcon	Near Threatened
Sagittarius serpentarius	Secretarybird	Near Threatened
Balearica regulorum	Grey Crowned Crane, Crowned Crane	Vulnerable
Tauraco corythaix	Knysna Turaco, Knysa Lourie	
Tchagra tchagra	Southern Tchagra	
Zoothera guttata	Spotted Ground-Thrush, Spotted Thrush	Endangered
Passer domesticus	House Sparrow	
Ploceus capensis	Cape Weaver	
Acridotheres tristis	Common Myna, Indian Myna	
Asio capensis	Marsh Owl	
Bubo africanus	Spotted Eagle-Owl	
Tyto alba	Barn Owl	

2.6.11 Herpetofauna (reptiles and amphibians)

Reptiles and amphibians form an important part of the ecosystem and certain species serve as bio-indicators due to their sensitivity to environmental factors. Much remains to be discovered about the reptile and amphibian species complement of Mpenjati Nature Reserve, their life histories, inter-relationships and contributions to the functioning of its ecosystems. The variety and importance of these fauna are poorly studied and little understood, although the nature reserve is considered important for the conservation of this group, as it is for other faunal groups.

Frogs found in Mpenjati have been well recorded, with a current list of 18 species.

Species of conservation importance include the following: (For complete lists and sources of records see Appendix E)

Scientific Name	**Common Name**	**Endemism**	**RDB Status**
Arthroleptis wahlbergii	Bush squeaker	NE (75-99%) - KZN; E - SA	
Bufo rangeri	Raucous toad	E – SA	
Afrixalus spinifrons spinifrons	Natal leaf-folding frog	NE (50-75%) to KZN; E - SA	Vulnerable
Hyperolius semidiscus	Yellow-striped reed frog	E – SA	
Leptopelis natalensis	Natal tree frog	NE (75-99%) - KZN; E - SA	
Anhydrophryne hewitti	Natal moss frog	E - KZN	
Cacosternum nanum nanum	Bronze caco	E – SA	

NE = Near endemic; E = Endemic; KZN = KwaZulu-Natal; SA = South Africa, Lesotho and Swaziland

2.6.12 Invertebrates

Invertebrate fauna constitutes the greatest component of species diversity in natural systems, but it is usually poorly understood. In terms of biodiversity and the provision of ecosystem services, however, it is important to acknowledge that invertebrates are fundamentally important.

Invertebrates within Mpenjati have been extensively surveyed, with the following numbers of species being recorded:

- 32 Gastropod.
- 3 Crustacean – 1 shrimp & 2 crab.
- 95 Butterfly.
- 3 Millipedes.
- 4 Earthworms.
- 1 Horsefly.
- 1 Antlion.
- 14 Dragonfly.
- 6 Damselfly.
- 1 Shrimp.

Invertebrate species of conservation importance include the following: (For complete lists and sources of records see Appendix E)

Earthworms			
TaxonName	**English Name**	**Endemism**	**RDB**
Pontoscolex corethrurus		Alien to KZN	
Amynthas minimus		Alien to KZN	
Amynthas rodericensis		Alien to KZN	
Geogenia pondoana	Pondoland earthworm	R - KZN; NE (50-75%); E - SA	
Millipedes			
TaxonName	**English Name**	**Endemism**	**RDB**
Centrobolus inscriptus	Inscribed millipede	NE (50-75%) - KZN; E - SA	
Spinotarsus costatus		R - KZN; E - KZN; E - SA	
Doratogonus montanus	Montane black millipede	E - KZN; E - SA	
Flies			
TaxonName	**English Name**	**Endemism**	**RDB**
Haematopota obscura	Obscure tabanid fly	E – SA	
Butterflies			
TaxonName	**English Name**	**Endemism**	**RDB**
Gegenes hottentota	Marsh Hottentot Skipper		Indeterminate
Moltena fiara	Banana-Tree Nightfighter	NE (50-75%) - KZN	
Alaena amazoula amazoula	Yellow Zulu	NE (50-75%) - KZN; E - SA	
Iolaus silas	Southern Sapphire	E – SA	
Myrina dermaptera dermaptera	Lesser Fig-tree Blue	E – SA	
Pentila tropicalis tropicalis	Spotted Buff	NE (75-99%) KZN; E - SA	
Pseudacraea eurytus imitator	False Wanderer	E – SA	
Pseudacraea lucretia tarquinia	False Chief	NE (50-75%) - KZN; E - SA	
Graphium colonna	Mamba Swordtail	R - KZN	
Colotis erone	Coast Purple Tip	R - KZN; NE (75-99%) KZN	Restricted
Colotis regina	Queen Purple Tip	R - KZN	
Nepheronia argia varia	Large Vagrant	R - KZN; E - SA	
Snails			
TaxonName	**English Name**	**Endemism**	**RDB**
Cochlitoma semigranosa	Half-grained agate snail	R - KZN; NE (75-99%); E - SA	
Trachycystis aenea	Bronze pinwheel	NE (75-99%) KZN	
Gulella columnella	Pinched-lip hunter snail	R - KZN; E - KZN; E - SA	

2.6.13 Fish

In terms of aquatic fauna, there is a large sand prawn (*Callianassa kraussii*) population in the Mpenjati Estuary, and a small, but thriving salt marsh. A 2009 survey, by R. Karssing, determined that the Mpenjati River and Estuary support a high diversity of freshwater and estuarine fish species (50 in total). The high concentration of Mottled Eels is significantly important, as is the occurrence of endemic KwaZulu-Natal Yellowfish, at such low altitude.

Fish species of conservation importance include the following: (For complete lists see Appendix E)

Scientific Name	**Common Name**	**RDB**
Croilia mossambica	Burrowing goby	Rare
Myxus capensis	Freshwater mullet	Rare

2.7 Socio-economic context

The bulk of this discussion is derived from both the Ugu District Municipality IDP (2012) and the Hibiscus Coast Local Municipality IDP, unless otherwise indicated.

The KwaZulu-Natal South Coast, or "Hibiscus Coast"**,** is a popular holiday destination. It stretches from Scottburgh, all the way down to Port Edward. "Margate, Port Shepstone, Scottburgh, Port Edward, sardines, golf, whales, dolphins, the Oribi Gorge, hibiscus flowers and golden beaches" are some of the terms which people associate with this magnificent South Coast region of South Africa and the Zulu Kingdom (Book Travel, 2012).

The South Coast is made up of a collection of golden beaches, lagoons, rocky coves, grassy slopes, warm Indian Ocean waters, perpetually sunny weather, sub-tropical forests and vegetation; an environment that draw the crowds, particularly during the festive season. A number of activities keep tourists busy, from adrenaline sports to shopping and "eating out".

The warm Indian Ocean and sunny weather make KwaZulu-Natal's South Coast a popular year-round holiday resort for both local and international visitors. Accommodation varies from up-market hotels to camping facilities, and everything in between (KwaZulu-Natal Tourism Authority, 2011).

This region has excellent golf courses, including two of the country's top ten. Often compared to the state of Florida in the United States, the South Coast has a number of river inlets that cut inland from the coast, and provide wonderful birdlife, as well as opportunities to paddle upstream along estuaries and lagoons. Aliwal Shoal is an international diving destination, while Protea Banks, a little further south, is deemed one of the world's top shark dives.

The South Coast also has a few blue-flag status beaches – Trafalgar, Hibberdene, Marina/ San Lameer and Ramsgate, that meet pre-requisites for water quality, environmental education and information, safety and services. Margate is one of the South Coast's most popular holiday destinations. Every year, thousands of holiday makers descend on Margate's famous mile long beach (African Reservations, 2012).

Mpenjati Nature Reserve falls within the Hibiscus Coast Local Municipality (KZN216), which is one of six local municipalities within the Ugu District Municipality (DC21). The Ugu District Municipality essentially covers and area of 5,866 km^2 and extends along the entire south coast of KwaZulu-Natal, from eThekwini Municipality in the north, to the Eastern Cape border in the south. The Hibiscus Coast Municipality covers 837 km^2 and extends from Hibberdene to Port Edward. The Hibiscus Coast Municipality consists of five previous traditional local authorities and six traditional authority areas. Towns are located along the urban strip and the traditional areas are located in the hinterland or the south western side of the municipality.

The Hibiscus Coast IDP identified a number of key challenges, some of which have direct relevance to the management of Mpenjati Nature Reserve and constrain development there.

Those key challenges that are relevant to Mpenjati Nature reserve are:

- Aging and neglected infrastructure (roads, electricity network, etc.).
- Low economic growth and high unemployment, particularly among the youth. Sickly and dying work force – HIV/AIDS related.
- Skills shortage due to the difficulty of attracting skilled people to the area.
- Growing levels of crime, e.g. house breakings, which can be directly linked to unemployment and poverty.
- Capacity to deal with seasonal influx of up-country visitors.
- Coordination and support from other organs of state.
- Backlogs in terms of access to basic services, such as water and sanitation, particularly inland.

The Hibiscus Coast Municipality is a key tourist area in the Ugu district and tourism is the key income generator for the area, with much of the economic activity geared towards providing products and services to the mostly up-country domestic tourists. A key role of the municipality is therefore the management of infrastructure for the tourism trade. Unfortunately, the focus of tourists visiting the area during the holiday seasons is on the beach, and wildlife experiences are secondary to the beach experience. Therefore, most tourists would not specifically go to the area to visit the nature reserve, but rather see Mpenjati as a single day activity during their visit.

The area has a number of attractive features that, on the whole, would attract tourists, including:

- Blue flag beaches.
- Major events, such as the Loerie Awards, Margate Airshow, Africa Bike Week, South Coast Queen, various beach events.
- Fishing and the annual sardine run.
- Golf courses and other sporting and adventure sport opportunities.
- Nature reserves, such as Mpenjati, Trafalgar Marine Reserve, Umtamvuna, and Oribi Gorge.

There are a number of anchor projects that the Hibiscus Coast Municipality believe will bring economic growth to the area, namely:

- The proposed upgrading of the Margate airport will make it easier for tourists to access the district.
- Port Shepstone beachfront development, which will include an inner harbour, canal, pier and coastal boardwalk.
- Hibberdene harbour – which is planned to have about 350 berths and is intended to provide the sports fishermen and ski-boat clubs with a safe launch site for their

boats. The project has stalled for more than 10 years, so it is not clear whether or not it will ever be realised.

- Port Shepstone prison – this is anticipated to result in positive economic spin-offs in the area.

In terms of employment figures, only 33 % of the 15-65 year age group are employed, 24 % are unemployed and 43 % are not economically active and this situation is deteriorating. Forty-four percent of the population is under the age of 20 and this puts strain on educational and healthcare facilities, recreational facilities and future employment opportunities. The economic growth rate for the period 2000 to 2003 for the Ugu Region was 2 % per annum, while for Hibiscus Coast it was 2.4 %. Ugu contributed about 3.3 % to the KwaZulu-Natal economy and 0.5 % to the South African economy in 2005. More than 60 % of all economic activity in Ugu in 2005 took place in the Hibuscus Coast Municipality, with most of the economic activity and the economically active population being found along the coastal strip. In the rural areas, there is a high proportion of single parent and female-headed households, with high male absenteeism.

The Hibiscus Coast Municipality has a campaign dubbed “one house one garden” where they are encouraging people to grow their own vegetables and thus improve food security, which will have positive spin-offs for other aspects of community health and well-being.

Mpenjati Nature Reserve is surrounded by urban township development and the main freeway on the western boundary.

2.8 Operational management within Mpenjati Nature Reserve

Effective operational management within the nature reserve is dependent on its staff, the equipment and infrastructure.

2.8.1 Management infrastructure

Management infrastructure in the Mpenjati Nature Reserve consists of:

- Entrance gates:
  - Two public entrance gates, one on the north side and one on the south side of the river.
- Administration building.
- Storerooms/workshops.
- Staff accommodation.

2.8.2 Conservation infrastructure

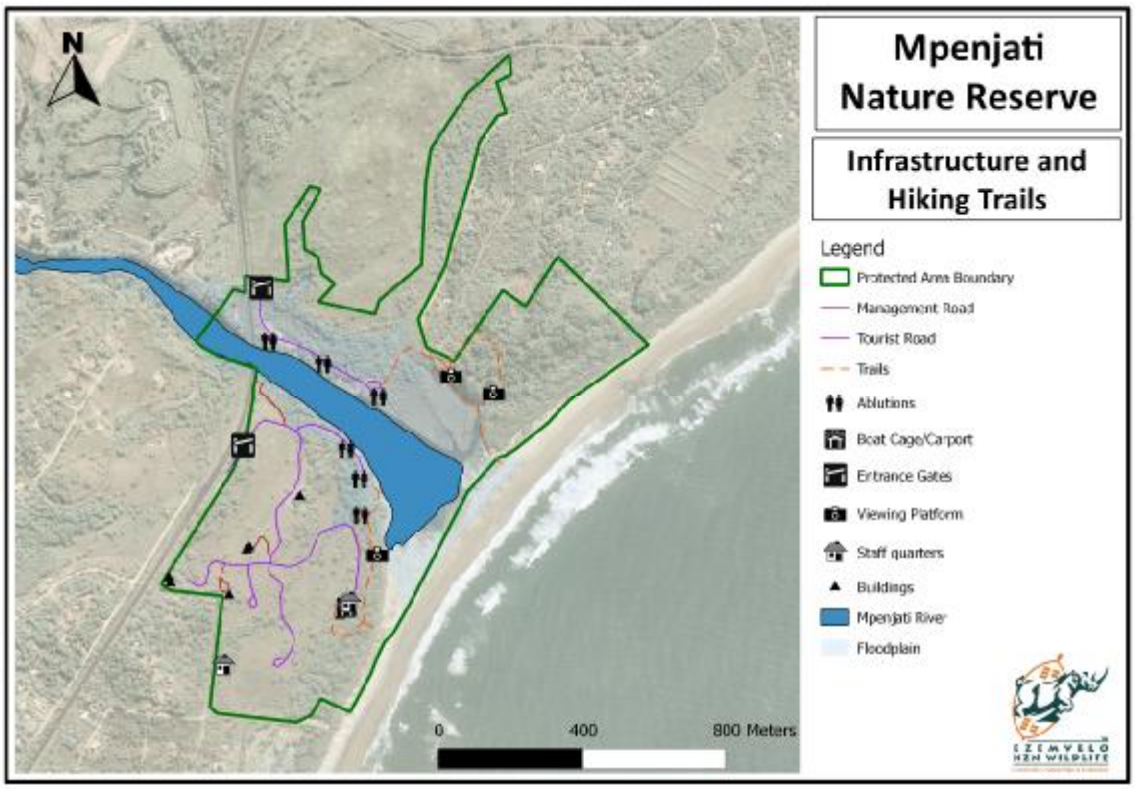
Conservation infrastructure consists of:

- Fencing.
- Roads.

2.8.3 Eco-tourism (environmental education) infrastructure

Eco-cultural tourism infrastructure consists of:

- Picnic sites with ablution facilities on the north and south banks.
- Marked trails through the wetland and dune forest.
- Administrative and conference/education centre.



Map 4: Infrastructure and hiking trails within Mpenjati Nature Reserve

2.8.4 Staff establishment

There are 10 permanent staff members at Mpenjati Nature Reserve, in the following positions:

- 1 Conservation Manager – Position vacant
- 1 Principal Field Ranger
- 3 Field Rangers
- 2 General Assistants

Mpenjati Nature Reserve has 0.1818 staff per hectare, should all vacant positions be filled (Carbutt & Goodman, 2010). Other protected areas on the coast of similar size include Harold Johnson (104 ha) – 0.058 staff/ha, North Park (53 ha) – 0.0943 staff/ha, Bluff (45 ha) – 0.0889 staff/ha and Umhlanga Lagoon (32 ha) – 0.0938 staff/ha.

2.8.5 Funding levels at Mpenjati Nature Reserve

According to the management effectiveness assessment, Mpenjati Nature Reserve receives an annual operational budget of R690,082.00 (2010). This budget works out to R11,908.48 per hectare (Carbutt & Goodman, 2010), which is the highest operational budget on the South Coast and the third highest on the entire coast.

2.8.6 Management effectiveness in Mpenjati Nature Reserve

In 2010, Ezemvelo KZN Wildlife conducted management effectiveness assessments for all of its protected areas (Carbutt & Goodman, 2010). Management effectiveness assessments consider protected area design, the appropriateness of management systems and processes, and delivery of protected area objectives. Such assessments are intended to enable conservation organisations to refine their conservation strategies, re-allocate budget expenditures, and develop strategic, system-wide responses to the most pervasive threats and management weaknesses (Carbutt & Goodman, 2010). They are not performance assessments of individuals, but serve to reflect an organisation's proficiency for protected area management as a whole. The Ezemvelo KZN Wildlife minimum standard for protected areas is 67 %, which is the national minimum standard set by National Department of Environmental Affairs. Mpenjati Nature Reserve achieved a management effectiveness score of 64 % in the 2010 assessment, and 71 % in the 2013 assessment.

The following issues for management attention were highlighted in the assessment:

- Law enforcement.
- Fire management.
- Control of alien organisms.
- Fencing.
- Staffing.
- Trails management.
- Managing herbivore populations.

2.8.7 Key operational issues at Mpenjati Nature Reserve

The following specific issues have been identified, associated with the facilities, infrastructure and operations within the nature reserve:

Pressures and threats identified through the management effectiveness assessments (Carbutt & Goodman, 2010) are as follows. Note that these are time-bound.

Threats:	**Pressures:**
Alien animals	Alien animals
Alien plants	Alien plants
Arson/uncontrolled fires	Arson/uncontrolled fires
Bush encroachment	Bush encroachment
Climate change	Climate change
Dam building	Dam building
Erosion (man-induced)	Erosion (man-induced)
Land invasion and disturbance	Land invasion and disturbance
Land-use change within the protected area	Land-use change within the protected area
Mining	Mining

Threats:	Pressures:
PA isolation	PA Isolation Unsustainable natural resource use

Issues identified by the Nature Reserve Planning Committee and nature reserve stakeholders:

- Crime and intimidation of visitors by people entering from the beach as it is difficult to fence off access from the sea and river/estuary. Negative publicity is resulting in low visitor numbers – no more than three per day.
- The nature reserve is included in a broader land claim by the local Inzamakwe Community. However, should ownership of the nature reserve change, it will still be zoned as, and remain and be managed as a protected area.
- Picnic facilities on both north and south banks of the estuary are eroding.
- Sewage spills into the river from upstream.
- Disturbance and impact by a large sand and rock dredging operation, immediately up-stream of the protected area, but within the estuary.
- The coastal dunes immediately south of the Mpenjati Lagoon have been recently categorised as being at a "moderate risk" of erosion due to sea level rise and coastal storm surges. However, since the coastal dunes and portion of Yengele Forest immediately north of the Mpenjati Lagoon have recently been eroded due to sea level rise and coastal storm surges, the Trafalgar Conservancy argue that this should be categorised as "major risk".

2.8.8 Summary of management issues and challenges

The following section summarises the key management issues and challenges outlined in the descriptive sections above, which must be addressed through the management plan. The issues and challenges have been grouped under key performance areas, which flow through the strategic and operational management frameworks that follow.

Table 2.2: Management challenges and issues

Key performance area	Issue that must be addressed
Legal compliance and law enforcement	§ General public safety (high crime rate).
	§ Illegal entry.
Stakeholder engagement	§ Good support from community, but requires manager at Mpenjati to co-ordinate the input and efforts.
	§ Capacity issues with local municipality.
Buffer zone protection and regional management	§ The nature reserve is not buffered and some of the land uses adjacent to the nature reserve and upstream on the estuary are currently incompatible with biodiversity conservation.
Eco-tourism development	§ A study is currently being conducted to evaluate potential recreational and eco-tourism development opportunities.
	§ Inappropriate infrastructure (roads network) has been developed; however, this has remained abandoned for years and is having very little impact at present.
Conservation management	§ Alien plants – terrestrial and aquatic.
	§ Impacts from mining activities in the upper estuary.
	§ Pollution from farming and from the waste water treatment works.
Operational management	§ Staffing establishment.
	§ Lack of training and capacity building in staff in terms of Occupational Health and Safety compliance and requirements.
	§ Consistent and sufficient funding levels.
	§ No nature reserve manager.

3 STRATEGIC MANAGEMENT FRAMEWORK

In an effort to ensure that Mpenjati Nature Reserve is effectively managed, the following strategic framework has been developed. It is aimed at providing the strategic basis for the protection, development and operation of the nature reserve over the next five years and has been prepared collaboratively through a process involving stakeholders within Ezemvelo KZN Wildlife, the communities around the nature reserve, local and provincial government departments and other stakeholders.

The vision describes the overall long-term goal for the operation, protection and development of the 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 and issues described in Section 2 above.

3.1 Mpenjati Nature Reserve vision

"To effectively manage the Mpenjati Nature Reserve, such that it maintains the representivity of its natural habitats, species and ecological processes to ensure that they contribute to national and provincial targets, maintain ecosystem services and create an environment for nature-based recreation and awareness opportunities for the local communities and general public."

The Mpenjati Estuary Management Plan's vision is in keeping with this and is as follows:

"The Mpenjati Estuary is a well-managed and fully functional ecological system with exceptional natural attributes that provides sustainable resource use, recreational and educational opportunities, and with enhanced and extended protection."

3.2 Objectives and strategic outcomes

An objective has been identified for each of Mpenjati Nature Reserve's key performance areas, which follow from the management challenges and issues and relate to the important functions and activities necessary to protect, develop and manage the protected area 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.

Table 3.1: Objectives and strategic outcomes for Mpenjati Nature Reserve

Key performance area	Objective	Strategic outcome
Legal compliance and law enforcement	Comply with and enforce legislation pertaining to the protection, development and management of Umhlanga Lagoon Nature Reserve.	There is adequate law enforcement within Mpenjati Nature Reserve in order to achieve the protected area vision.
Community participation	Establish and maintain the Mpenjati stakeholder consultation forum in order to ensure open lines of communication between members of the local communities, stakeholders and the Mpenjati Nature Reserve manager. Provide background to the management decisions to the Mpenjati liaison forum / Advisory committee.	Constructive community involvement in Mpenjati Nature Reserve's management through an effectively functioning Stakeholder Consultation Forum / Advisory forum.
Buffer zone protection and regional management	To interface with landowners / managers within a defined zone around the protected area, mitigating threats (including alien plants and incompatible developments and land uses) to the values of Mpenjati Nature Reserve.	§ Determination of the buffer zone requirements around Mpenjati Nature Reserve. § Prioritisation of key buffer zone areas within the provincial Protected Area Expansion Plan. § Capture of buffer zone considerations in IDP's and SDF's and municipal schemes.
Eco-cultural tourism development	Improve day visitor facilities and experience.	Implement a maintenance schedule to better manage day visitor facilities and maximise security for visitors.
Environmental interpretation and awareness	Support organisations conducting environmental interpretation and education programmes.	Support efforts to identify and produce educational material and signage for the existing Community Centre and hiking trails.
Conservation management	Manage the nature reserve to maintain its ecological integrity.	§ Develop and implement a comprehensive fire management plan for Mpenjati Nature Reserve. § Develop and implement an alien species control plan for Mpenjati Nature Reserve (fauna and flora). § Develop and implement an indigenous invasive species control plan for Mpenjati Nature Reserve.

Key performance area	Objective	Strategic outcome
		§ Identify, rehabilitate and manage areas that have been significantly impacted by accelerated soil erosion. § Ensure extractive resource use is legally undertaken and conforms to Ezemvelo KZN Wildlife policy. § Develop and implement strategies for each of the herbivore species in Mpenjati Nature Reserve, in accordance with Ezemvelo KZN Wildlife policies. § Key species management, including rare and endangered species, is undertaken using the best available scientific knowledge. § Critical ecological processes and functions are maintained within Mpenjati Nature Reserve. § Biological monitoring programmes are developed and implemented to determine the success of management interventions in protecting the ecosystems, communities and species of Mpenjati Nature Reserve.
Operational management	Provide adequate human resources, capacity, equipment and funding to enable the effective protection, development and management of Mpenjati Nature Reserve.	§ Development of a five-year financial plan that identifies the resource needs to achieve the objectives for Mpenjati Nature Reserve. § Ensure that Mpenjati Nature Reserve is adequately staffed and conforms to legal staffing practices. § All facilities and infrastructure in Mpenjati Nature Reserve are adequately maintained. § Service infrastructure and practices in Mpenjati Nature Reserve do not cause environmental harm.

4 ZONATION PLAN

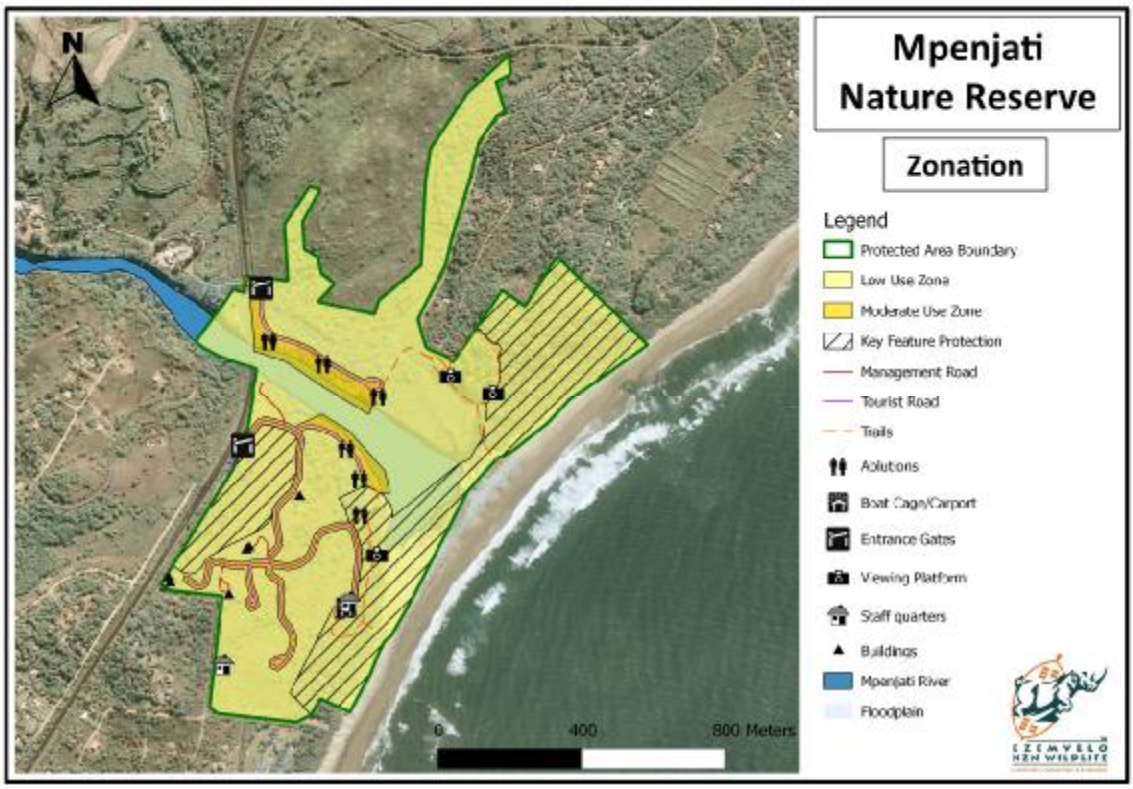
The purpose of zonation within a protected area is to identify types and levels of usage that are acceptable based on an area's sensitivity and resilience. Zonation may be used to identify areas in which appropriate uses and infrastructure may be located and developed.

The zonation categories used for the Mpenjati Nature Reserve are the standardised zonation categories developed for all of Ezemvelo KwaZulu-Natal Wildlife's protected areas (Goosen, 2011). The zonation system recognises and reflects the:

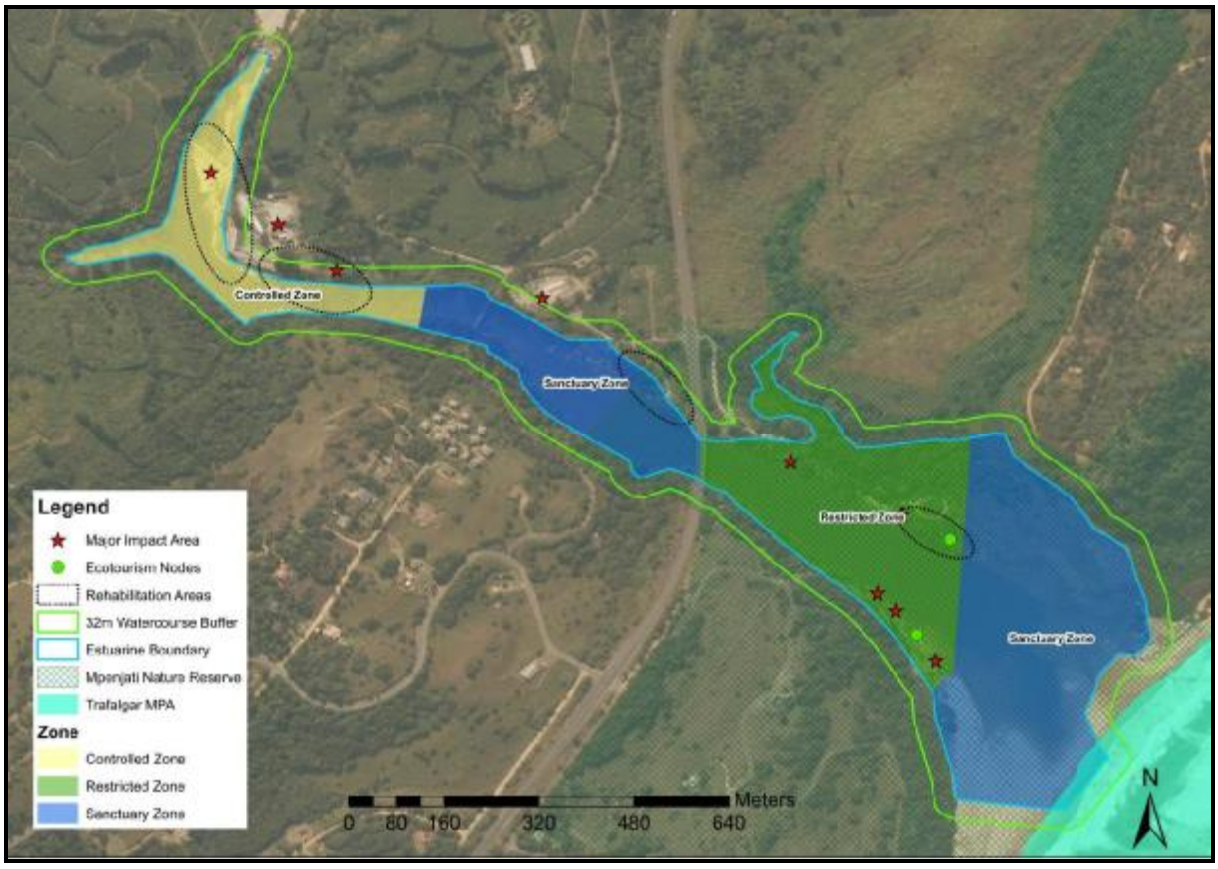
- Sensitive features associated with a protected area (i.e. biophysical, cultural and sense of place).
- Influence of existing development and use on these features and experiences.
- Opportunities and constraints (biophysical, social or managerial constraints) for use.
- Potential threats to wilderness, either within or adjacent to it.

General principles of zonation include the following:

- There is a general gradation in the zonation categories, ranging from high to low protection.
- An overlay zone provides additional protection and may be overlaid onto another zone in order to strengthen the protection, e.g. Key Feature Protection Zone.
- A node is an area where tourism, management and service infrastructure can be developed and that has a specified footprint.
- A Wilderness Zone will be buffered by the Low Use Zone.
- Where possible, both management and tourism infrastructure should be developed outside the protected area.
- Development of infrastructure should preferably be on the periphery of the zone, towards a higher impact/less sensitive adjacent zone.
- Deviations or exceptions in all zones require approval from the management authority.
- Any activities permitted in a category of higher protection are also permitted in a category of lower protection, e.g. activities permitted in the Low Use Zone can also be permitted in the Moderate Use Zone.
- All activities will take place in accordance with the local protected area rules and regulations.



Map 5: Zonation of Mpenjati



Map 6: Mpenjati Estuarine zonation map (extract from attached 2012 Estuary Plan, Appendix G)

4.1 Conceptual development guidelines

The purpose of the zonation of Mpenjati Nature Reserve is to control the intensity and type of use within it, in an effort to ensure the overriding goals of biodiversity conservation are met, whilst enabling acceptable levels of eco-cultural tourism. On this basis, the permissible intensity of use will be relatively higher within some zones than in others.

Zones

Low Use Zone (Terrestrial):

Description: An area where there is little evidence of modification of natural processes and landscapes, that is more sensitive than the moderate use zone and where the ecotourism principles of low human impact will prevail.

Objective: To designate an area for tourism experiences and management activities that are focused primarily on low impact activities and where general sensitivity requires that management and tourism impacts on the natural landscape should be mitigated.

Permissible activities and infrastructure: (Activities that could be allowed subject to the reserve management standard rules and regulation in terms of authorisation)

- Facilities of a rustic nature such as small bush camps, rustic overnight hiking huts, hides and trails.
- Motorized access is low key and 4 x 2 access is provided to points where trails start or to tourist facilities.
- 4 x 4 tracks are allowed in this zone (limit to number of tracks and frequency of use) as per site specific rules and regulations.
- Hiking and formalised trails. Management activities must focus on protecting park resources and core values.
- Limited management roads and tracks.
- Controlled extractive resource use in line with Ezemvelo KwaZulu-Natal Wildlife policies and norms and standards.

Constraints and implementation:

- Activities are mostly low impact and low density.
- No modern facilities such as restaurants and shops are permissible in this zone.
- Where possible, facilities should be developed on the periphery of the zone towards the less sensitive adjacent zone.

Moderate Use Zone (Terrestrial):

Description: An area where natural processes and the landscape may be altered to support protected area operations. This zone is less sensitive than the low use zone and this is where experiences, facilities, infrastructure and services are provided to visitors and where general park management activities can take place.

Objective: To designate a tourism area that is primarily focused on visitor experience while still securing the values of the protected area and an area that serves the operational and support functions of the protected area.

Permissible activities and infrastructure: (Activities that could be allowed subject to the reserve management standard rules and regulation in terms of authorisation)

- Hiking on formalised trails.
- The tourism road network including access roads and game viewing roads.
- Traditional game viewing routes with associated more formalised infrastructure.
- Infrastructure is accessible by motorised access.
- Management roads and tracks.
- Management activities are directed to maintaining park infrastructure for biodiversity conservation, park operations, equipment and material storage.
- Controlled extractive resource use.

Constraints and implementation:

- Within the Moderate Use Zone, a specific *Tourism Development Node* will be defined, which could include areas of commercial use.
- Where possible this node should be outside the protected area.
- The node should preferably be on the periphery of the Moderate and Low Use Zones, to ensure a quality visitor experience in the lower use zone but with the bulk of the impact *e.g.* access roads and services in the higher use zone.
- This node should be developed in the less sensitive part of the Moderate Use Zone.
- The Tourism Development Node can only be developed in areas where it does not compromise the values of the protected area.
- The node must have a specified footprint.

o *Nature Reserve Administrative Node* (within the Moderate Use Zone)

- Cater for facilities such as staff accommodation, administrative offices, other operational required infrastructure, waste handling sites *etc.*
- Wherever possible, facilities and infrastructure related to park operations should be located outside of the protected area. If not possible, they will form part of this node.
- The node must have a specified area as a footprint.

Key Feature Protection Overlay (Terrestrial)

Description: An area that is vulnerable and or scientifically important where specific additional controls are imposed in order to prevent undesirable impacts on identified sensitive or threatened species, habitats, ecosystems, bio-control release sites, research sites, archaeological, living heritage and palaeontological sites.

Objective: This zone is for permanent, temporary or seasonal protection of important core protected area values*. It aims to provide additional protection for the integrity of key areas.*

Permissible activities and infrastructure:

- The zone may overlay other zones where a range of infrastructure may already exist.
- In addition to restrictions of the underlying zone site specific rules and regulations will apply.

Constraints and implementation:

- This is a protection zone and would only allow for access and development under site specific constraints. (Does not cater for further developments or resource utilization)
- This zone provides a higher level of protection than the underlying zone.
- Could be permanent, temporary or seasonal overlay.
- Changes to this overlay can be implemented through the Reserve planning committee and the annual management meeting and recorded as such.

Protected Area Buffer Zone (Terrestrial):

Description: An area outside of the protected area where actions and agreements are taken to protect the integrity of the protected area and to enhance the livelihoods of protected area neighbours.

Objective: To influence land use adjacent to the protected area in order to manage external pressures and threats that may threaten its values and objectives.

Permissible activities and infrastructure: Each protected area must define these desirable or non-desirable activities in terms of its specific values, objectives and risks and considering factors such as :

- Alien and invasive species
- Pollution
- Impact on sense of place or wilderness
- Habitat fragmentation and isolation
- Water resource protection
- Damage causing animal management
- Climate change adaptation
- Compatible land use
- Priority species management

Estuarine Zonation:

The details of the Estuarine zonation below are contained in the Estuary Management Plan, attached as Appendix G, pages 13 to 18. It must be noted that estuary zonation is in keeping with marine zonation and that, while the terrestrial Moderate Use almost equates to the Controlled Zone, and the terrestrial Low Use almost equates to the Restricted Zone, the estuarine Sanctuary Zone does not have a terrestrial equivalent.

Estuary Buffer Zone:

NON PERMISSIBLE ACTIVITIES	PERMISSIBLE ACTIVITIES
No development within the estuarine functional zone (below the 5 m contour)	Strict adherence to EIA Regulations, water licenses and mining permits for existing infrastructure, agriculture, and development
No removal of development restrictions[2]	Environmentally-sensitive development, which is compatible with the surrounding natural landscape
No relaxation of side and rear spaces	Farming according to best practice and consideration of downstream environmental impacts
No further access routes to the estuary	Permitted water abstractions only
No installation of additional septic tanks	Licensed discharges only
No further servitudes, road or causeway construction	Bird watching
No dumping of any forms of waste (solid, chemical, litter, garden refuse, etc.)	Hiking
No edge hardening	Angling with fishing permit
No further discharges	Picnicking
No further water abstractions	Research with special permission/scientific permit only
No further water use license applications (WULAs)	Canoes and other low impact non-motorised watercraft
No sand mining and mining permit applications	Swimming
No removal of indigenous riparian vegetation without written permission	

Operational objectives for the Estuary Buffer Zone are directed at adhering to legal requirements, as well as protecting the integrity of this zone, controlling future development and mitigating the negative impacts of current development. Decisions in respect to future water abstractions in the greater catchment are beyond the mandate of this management plan. The completion of an Ecological Reserve Determination for the Mpenjati Estuary will, however, dictate the level of off-take permitted for the catchment area. In the interim, it is recommended for this and all the zones described below, that all future abstraction applications be very carefully considered and that, preferably, no further water abstractions are permitted (number of users and volume) to avoid potential cumulative impacts associated with additional abstractions below the applicable licence limits.

Estuary Sanctuary Zone:

The Sanctuary Zone represents an area where the exploitation of all living resources is prohibited (fishing, bait collecting,), excluding controlled fibre/reed harvesting. This zone is spread over two areas spatially, one from the main road bridge to 100 m upstream of the old steel bridge, and the other located seaward of the recreational areas towards the Trafalgar Marine Protected Area (MPA). These areas encompass critical habitat types within

[2] This recommendation relates to influencing implementation partners – in this instance, both the Hibiscus Coast Municipality and COGTA – who would consider applications made to remove development restrictions and land use controls, for example potential removal of rear space development restrictions.

the functional estuarine zone, including the rocky crevices, saltmarsh, reedbeds, wetland, sandbanks, main channel, shallow water fish nursery areas, minor drainage lines and the estuary mouth, as well as the primary dune environment and fragments of coastal dune forest. Providing sanctuary status will enable the control of direct human interference on these habitats, and food resources for various fauna. Controlled harvesting of *ncema* reeds and thatch grass has been permitted in the past and this activity, should it be reinstated, would require a portion of the wetland to be designated for such use. Only research granted by means of a special permit will be allowed in these areas.

NON PERMISSIBLE ACTIVITIES	**PERMISSIBLE ACTIVITIES**
No future development (including additional boardwalks)	Strict adherence to the EIA regulations
No extension of existing development, including backfilling	Research with special permission/scientific permit only
No edge hardening	Canoes and other low impact non-motorised watercraft
No jetties or slipways	Bird watching
No discharges	Hiking
No water abstractions	Swimming
No motorised boats (except management and permitted research with <7HP)	Removal of alien vegetation without jeopardising bank stability
No board sailing/kite boarding	
No dumping any forms of waste (solid, chemical litter, garden refuse, etc.)	
No fishing (except shore angling into MPA)	
No bait harvesting	
No stormwater or sewer outlet pipes	
No removal of natural vegetation	
No septic tanks	
No water abstraction or WULAs	

Estuary Restricted Zone:

The Restricted Zone is located in the vicinity of the park land areas on both the north and south banks of the estuary within the estuarine functional zone. This area is characterised by high recreational use, both consumptive (fishing) and non-consumptive uses (swimming, canoeing, bird watching and hiking). This zone includes:

- The main road network and direct access to the water's edge;
- Eco-tourism developments/facilities, such as picnic areas, children's play area and ablution facilities; and
- Boardwalk/hiking trails providing direct access to the wetland.

As this zone is located in the already transformed floodplain, expansion of this area is not recommended and removal of natural vegetation is not permissible. The maintenance of the existing recreational facilities is essential to prevent unnecessary and additional environmental degradation (for example undermined or unstable infrastructure). For this reason, controlled edge hardening is permitted in this area only, and should only be implemented once a formal assessment has been undertaken, and environmental approval or permission is granted. Fishing is only permitted in line with the conditions of the MLRA, while noticeboards should be erected in the event of poor water quality to preventing swimming.

NON PERMISSIBLE ACTIVITIES	PERMISSIBLE ACTIVITIES
No future development within 32 m of the water body (building, infrastructure, etc.)	Only low impact construction, including boardwalks and bird hides, allowed within 32 m of the water body
No dumping of any forms of waste (solid, chemical, litter, garden refuse, etc.)	Strict adherence to the EIA regulations
No extraction of water for any purpose	Research and monitoring with special permission/ scientific permit only
No additional stormwater or sewer outlet pipes	Canoes and other low impact non-motorised watercraft
No additional septic tanks	Controlled edge hardening with special permission
No bridges, causeways and slipways	Jetties for management use only
No motorised boats (except for research and management <7HP)	Controlled harvesting of indigenous vegetation only with written permission from the estuary management authority
No board sailing/kite surfing	Angling with fishing permit (and limited by number of daily fishing permits within nature reserve)
No bait collection	Hiking
No fishing using nets/traps	Swimming
	Bird watching
	Picnicking and braaing
	Removal of alien vegetation without jeopardising bank stability

Estuary Controlled Zone:

The Controlled Zone encompasses the remaining portion of the Mpenjati Estuary, from the Sanctuary Zone of the middle reaches to the confluence with the Little Mpenjati River and upstream to the inland estuary margin. Land use on either side of the estuary consists of light industry (brick factory, saw mill), agriculture and other privately owned land. The southern bank, closest to the reserve, is particularly steep and unlikely to be considered favourable for development. This zone represents the area of greatest resource use (water abstraction and potential mining[3]) and most significant estuarine impacts (historical mining, WWTW discharge and flow restriction), which cannot be completely excluded or prevented. Thus, the primary function of this area is to enable the delegated authority to control industrial and commercial related activities (in addition to low impact recreational activities) that potentially threaten the estuarine environment, specifically in relation to downstream effects. Apart from the need to reduce nutrient inputs into the system, discharges from the WWTW must be consistently within the acceptable limits for human contact, according to the DWAF (1996) guidelines, as recreational activities are permissible in this portion of the estuary.

[3] See Section 10.1

NON PERMISSIBLE ACTIVITIES	PERMISSIBLE ACTIVITIES
No future development within 32 m of the water body (building, infrastructure, etc.)	Only low impact construction, including boardwalks and bird hides, allowed within 32 m of the water body
No dumping of any forms of waste (solid, chemical litter, garden refuse, et.c)	Restricted development within the 100 m buffer
No further WULAs without written comment from the estuary management authority	Controlled change in land-use/development
No further mining operations, and mining permit applications in the estuarine functional zone (below 5 m contour)	Strict adherence to the EIA regulations
No further discharge pipes (only WWTW)	Strict adherence to permit restrictions (WULAs)
No agriculture within 50 m of the estuarine functional zone (5 m contour)	Removal of alien vegetation without jeopardising bank stability
No additional servitudes, bridges and causeways which restrict flow	Canoes and other low impact non-motorised watercraft
No research without a permit	Hiking
No motorised boats (except for research/ management <7hp)	Swimming
No removal of indigenous vegetation	Bird watching
No septic tanks	Research and monitoring with special permission/ scientific permit only
No bait collecting	
No fishing	Controlled WWTW discharge according to acceptable standards

5 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.

5.1 Determination of priorities for strategic outcomes

In the tables that follow in this section, a column has been included entitled "Priority", which is intended to convey the level of priority attached to its strategic outcome. The purpose of prioritising activities is to direct funds and resources to the most important activities, in the event that there are insufficient funds or resources to undertake all of the activities outlined in a particular year. Priorities are ordered in three categories, which have been determined on the following basis:

Priority 1:	A management target that is central to the responsibilities and mandate of Ezemvelo KZN Wildlife or that addresses an aspect of management that is fundamental to the protection of the values and purpose of Mpenjati Nature Reserve.
Priority 2:	A management target that addresses an aspect of management that contributes towards community involvement and support for the conservation of Mpenjati Nature Reserve, which is a key principle of effective protected area management.
Priority 3:	A management target that indirectly contributes towards the protection of biodiversity or the development of social and/or economic benefits and opportunities for Mpenjati Nature Reserve and/or its surrounding local communities.

The priorities are presented in the tables below, using the colour system above, which depicts the level of priority shown for the particular strategic outcome. In addition, a date is indicated in the priorities column for each strategic outcome, which is intended to convey the end date by which the management target should be achieved.

5.1 Linking to the Mpenjati Estuary Management Plan (2012) – Appendix G

The Estuary Management Plan has been attached in its entirety as Appendix G. References have been provided under each Key Performance Area to the relevant Strategic Outcome in the Estuarine Management Plan's tables. For ease of interpretation, the equivalent table headings in this management plan and in the attached Estuarine Plan (2012) are as follows:

This Document	**Estuarine Plan (Appendix G)**
Objective	Table Heading
Strategic Outcome	1st Column
Management Activities	Operational Objectives
Management Targets	Operational Indicators
Indicators of Concern	NA
Priority	Work Plan; and Timing
Responsibility	Responsibility
NA	Legislation

Extracts from the 2012 Estuarine Management Plan (Appendix G) must be read in conjunction with the text and abbreviations in that plan. They are included in the text of this management plan simply for ease of reference.

5.2 Legal compliance and law enforcement

Through its mandate to undertake the conservation and management of protected areas in KwaZulu-Natal, Ezemvelo KZN Wildlife must ensure that the province's protected areas are appropriately legally protected and that the laws governing the use of protected areas and the prohibition of particular activities are enforced. In fulfilling this role, the managers of Mpenjati Nature Reserve will adhere to the following guiding principles:

- All reasonable efforts must be made to ensure the effective conservation of biodiversity within and on the boundaries of the nature reserve. It should be noted that Ezemvelo KZN Wildlife's mandate to protect biodiversity extends beyond the protected areas; however, this responsibility is taken up by other components of the organisation.
- Cooperative structures should be established to enable participation by key stakeholders, such as local communities and the South African Police Service, in addressing offences and breaches of the law.
- Law enforcement within the nature reserve will be undertaken through surveillance, monitoring and appropriate reaction in the event of an offence.

5.3 Stakeholder engagement

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

- Efforts should be made to ensure that the communities living around the nature reserve are aware of the role that it fulfils in biodiversity protection and the provision of ecological services to the region.
- Community participation should be undertaken to engender a sense of ownership of the nature reserve, within the communities, and support for its biodiversity conservation goals and objectives.
- A common understanding of the issues that affect both the nature reserve and the surrounding communities should be developed and efforts to resolve them should be undertaken cooperatively.

The operational requirements for legal compliance and enforcement, and community participation, are set out in Tables 5.1 and 5.2 below.

Table 5.1: Framework for legal compliance and law enforcement

Strategic outcome	Management activities	Management targets	Indicators of Concern	Priority	Responsibility
LAW ENFORCEMENT					
There is adequate law enforcement within Mpenjati Nature Reserve in order to achieve the protected area vision.	Set annual security targets at the annual management meeting to address security issues.	Minutes of the annual management meeting indicating security targets.	§ Trespassing. § Illegal bait collection. § Vandalism and theft.	**Year1**	OIC and regional management
	Implement the annual plan of operation and a programme of patrols of the protected area and its boundaries, as contained in the abovementioned plan, to address security issues.	§ Regular patrols covering the full extent of the nature reserve. § Prosecution of offenders caught committing an offence.	Specific security targets, as set out in the annual security plan of operations, not achieved.	**Annually**	OIC

Extract from Estuarine Plan (2012) - Appendix G (Table 5, page 19)

SUSTAIN ESTUARINE HEALTH & FUNCTIONING (WATER QUALITY & QUANTITY)						
Legislation	**Operational Objectives / Indicators**	**Work Plan**	**Legislation**	**Operational Objectives / Indicators**	**Work Plan**	
					Timing	**Responsibility**
Secure adequate water quantity	**Police illegal abstractions & breaching**	**1**	**NWA (1998)** **Ezemvelo Best Practice**	• **Improvement in water quality and ecological status**	**Ongoing**	**DWA / Environmental Inspectorate**

Extract from Estuarine Plan (2012) - Appendix G (Table 6, page 21)

CONSERVE BIODIVERSITY						
Management Strategy	**Management Actions**	**Priority**	**Legislation**	**Operational Objectives/Indicators**	**Work Plan**	
					Timing	**Responsibility**
Ensure Sustainable resource use	Police resource use	1	NEMA: PA Act, NEMA: BA; ICM Act; MLRA	• Enforced regulations (MLRA) • Licensed use only • Reduced poaching/illegal fishing/harvesting	ongoing	Ezemvelo / Environmental Inspectorate
	Investigate and implement additional measures to control the use of living resources	1			By mid 2013	Ezemvelo / DEA

Extract from Estuarine Plan (2012) - Appendix G (Table 8, page 24)

CONTROL DEVELOPMENT						
Management Strategy	**Management Actions**	**Priority**	**Legislation**	**Operational Objective/ Indicators**	**Work Plan**	
					Timing	**Responsibility**
Implement zonation plan	Control land use and development	1	ICM Act 2008, LUMs	• Restrict type of development • Controlled access • Low impact recreational use of river banks	Once EMP approved	EMA / DAERD / HCM / UDM
	Formally demarcate estuary zones	1			Once zonation plan approved	

Table 5.2: Framework for community participation

Strategic outcome	Management activities	Management targets	Indicators of Concern	Priority	Responsibility
Stakeholder Engagement					
Constructive community involvement in Mpenjati Nature Reserve's management through an effectively functioning Stakeholder Consultation Forum / Advisory forum.	Establish and maintain the Mpenjati stakeholder consultation forum in order to ensure open lines of communication between members of the local communities, stakeholders and the Mpenjati Nature Reserve Manager.	§ Establishment of Mpenjati Nature Reserve Liaison forum / Advisory committee. § Annual meetings of the Mpenjati Liaison forum / Advisory committee.	§ Scheduled meetings with forum do not take place. § The forum is not properly constituted. § Community dissatisfaction with Mpenjati Nature Reserve.	**Year 1 Ongoing**	OIC
	Provide background to the management decisions to the Mpenjati Liaison forum / Advisory committee.	Nature reserve plans and management information presented to the forum as they are developed.	Lack of understanding of management practices at Mpenjati Nature Reserve.	**Year 1 Ongoing**	OIC

Extract from Estuarine Plan (2012) - Appendix G (Table 6, page 21)

CONSERVE BIODIVERSITY						
Management Strategy	**Management Actions**	**Priority**	**Legislation**	**Operational Objectives/Indicators**	**Work Plan**	
					Timing	**Responsibility**
Ensure Sustainable resource use	Investigate natural fibres harvesting programme potential	2	NEMA: PA Act, NEMA: BA; ICM Act; MLRA	• Reduced poaching/illegal fishing/harvesting	End 2012	Ezemvelo / DAEARD / DEA
Rehabilitate degraded areas	Lobby for landowners and respective companies to rectify damages/degraded areas on their property	3	NEMA	• Improvement of degraded areas	Early 2013	Ezemvelo / EMA / EAF / neighbouring land owners

Extract from Estuarine Plan (2012) - Appendix G (Table 7, page 23)

IMPROVE INSTITUTIONAL AND MANAGING STRUCTURES						
Management Strategy	**Management Actions**	**Priority**	**Legislation**	**Indicators**	**Work Plan**	
					Timing	**Responsibility**
Improve co-operative governance	Confirm EMA	1	ICM Act 2008	• EMA responsibility assigned • Constituted EAF • Bi-annual EAF meetings • Effective management • Effective communication • Conflict resolution • EMA and EAF part of catchment management processes/discussion • Minutes of meetings/discussions • Agreed ToR	ASAP	All roleplayers
	Prepare Terms of References for EMA and EAF	1			Within 3 months	EMA
	Appoint members and establish Mpenjati EAF	1			Within 6 months	EMA / DEA
	Establish/secure office space for the EMA at the estuary (preferably at Ezemvelo complex)	1	NEMA: Protected Areas Act,		Within 6 months	EMA / EAF / Ezemvelo
	Participate and influence catchment management planning	3	NWA 1998		2012 - ongoing	EMA / EAF / DWA

Extract from Estuarine Plan (2012) - Appendix G (Table 8, page 24)

CONTROL DEVELOPMENT						
Management Strategy	**Management Actions**	**Priority**	**Legislation**	**Operational Objective/ Indicators**	**Work Plan**	
					Timing	**Responsibility**
Ensure incorporation of EMP into HCM IDP/SDF and CMP	Ensure management strategies and action plans are incorporated in IDP	1	IDP, SDFs, Municipal LUMS	• Adoption of EMP including its zonation plan • Inclusion of EMP in IDP	By end 2012	EMA, HCM, UDM
	Ensure Estuary zonation and land-use controls are reflected in SDF and LUMS (when opportunity arises)	1			By end 2012	

Extract from Estuarine Plan (2012) - Appendix G (Table 10, page 26)

ENHANCE AWARENESS AND EDUCATION						
Management Strategy	**Management Actions**	**Priority**	**Legislation**	**Indicators**	**Work Plan**	
					Timing	**Responsibility**
Increase awareness	Develop and implement public awareness programme	1	ICM Act (2008), MLRA (1998)	• Effective distribution of informative material (pamphlets, newsletters etc); • Knowledgeable stakeholders; • Awareness programme established; • Records of engagement; • Educational signage installed	2012-ongoing	EMA / EAF
	Provide input into the Municipal / Provincial awareness programme (when developed)	1			2012-ongoing	EMA / EAF
Maximise education	Promote and maintain educational facility at the Mpenjati NR	2	ICM Act (2008), Protected Areas Act, MLRA 1998)	• A functional educational centre; • Increased footfall through the centre.	Mid 2013	EMA / EAF
	Develop environmental education programmes for school goers, university students, adult interest groups	2			Mid 2013	EMA / EAF
Undertake research & monitoring	Engage research institutions (including international) to increase scientific knowledge	2	MLRA (1998), NWA (1998), ICM Act (2008), NEMBA (2004)	• Research projects and publications; • Active research network.	2012-2015	EMA / EAF / Ezemvelo / UKZN

5.4 Buffer zone protection and regional management

5.4.1 Protected area expansion and buffering the protected area

Ezemvelo KZN Wildlife's Protected Area Expansion Plan has not identified any areas for protected area expansion around Mpenjati Nature Reserve. However, in order to safeguard the biodiversity within the nature reserve and to counter any threatening processes or edge effects, suitable buffer zones and appropriate land uses in these zones should be identified. Appropriate actions may then be taken to secure these buffer zones, through protected area expansion mechanisms and local planning tools, as described in Section 5.4.2 below. In ensuring the protection of its biodiversity, the following guiding principles will be adopted in terms of nature reserve expansion and buffer zone management:

- If under threat, efforts must be made to formally protect areas, located outside of the nature reserve.
- Threatening processes and edge effects on the nature reserve's boundary, and beyond it, must be identified.
- Appropriate actions must be taken to manage threatening processes and edge effects on the nature reserve's boundary, and beyond it.

While it is acknowledged that some of the land use around Mpenjati has a negative impact on the nature reserve, it is still important that management should influence and comment on land use change in order to ensure that the land use does not change to something that could potentially be more detrimental to the nature reserve.

5.4.2 Local and regional planning

It is important, in managing the buffer areas around the nature reserve, that Ezemvelo KZN Wildlife works with local government authorities to ensure that their land use planning considers the biodiversity conservation imperatives of Mpenjati Nature Reserve. In this regard, it is necessary to ensure that buffer zone considerations are captured in planning tools, such as IDP's and SDF's. In developing relationships with the local and district municipality, Ezemvelo KZN Wildlife will adhere to the following guiding principles:

- Relationships with local government and other provincial and national departments will be developed in the spirit of cooperative governance.
- Ezemvelo KZN Wildlife will endeavour to assist the local and district municipality in determining appropriate land uses and development strategies in the areas surrounding the nature reserve.
- Ezemvelo KZN Wildlife will endeavour to align its plans and strategies with the programmes and strategies of the local and district municipality, where appropriate.

The detailed operational requirements for buffer zone protection and regional management are set out in Table 5.3 below.

Table 5.3: Framework for buffer zone protection and regional management

Strategic outcome	Management activities	Management targets	Indicators of Concern	Priority	Responsibility
PROTECTED AREA EXPANSION					
Determination of the reserve buffer zone requirements around Mpenjati Nature Reserve.	Determine the zone to be demarcated as the buffer zone and appropriate land use for the purpose of protecting the biodiversity of Mpenjati Nature Reserve, with cognisance to ecological impacts and edge effects influencing the ecology of the nature reserve. *This process must include the identification of threatening processes on the nature reserve boundary.*	Mapped buffer zone with accompanying rational.	§ Lack of a documented understanding of the external threats to the nature reserve. § Edge effects, such as invasive plant encroachment along the nature reserve's boundary.	**Year 1**	OIC and Regional Ecologist
Prioritisation of key buffer zone areas within the provincial Protected Area Expansion Plan.	Keep Stewardship and Protected Area Expansion informed of opportunities for expansion. *This will assist to focus efforts of the Biodiversity Stewardship Programme on priority areas in the buffer zone around the nature reserve's boundaries.*	Record of report to Protected Area Expansion and Stewardship.	The priority areas have not been captured.	**Year 2**	Conservation Manager
LOCAL AND REGIONAL PLANNING					
Capture of buffer zone considerations in IDP's and SDF's and municipal schemes.	Negotiate the buffer zone requirements for inclusion into the local and district municipality IDP's and SDF's and municipal schemes in order to avoid inappropriate land uses in Mpenjati Nature Reserve's buffer zones.	Report presented and negotiated with the municipalities for inclusion in their IDP's and SDF's and schemes.	Approval of inappropriate land uses on the boundaries of the nature reserve.	**Year 3**	Conservation Manager

Extract from Estuarine Plan (2012) - Appendix G (Table 5, page 19)

SUSTAIN ESTUARINE HEALTH & FUNCTIONING (WATER QUALITY & QUANTITY)						
Legislation	**Operational Objectives / Indicators**	**Work Plan**	**Legislation**	**Operational Objectives / Indicators**	**Work Plan**	
					Timing	**Responsibility**
Secure adequate water quantity	Motivate for formal reserve determination study to confirm provisional ecological status	1	NWA (1998) (RDM Methods)	• Completion of reserve determination study • Improvement in water quality and ecological status	2013	DWA / EMA / EAF/ Ezemvelo
	EAF to participate and influence catchment management planning	2	NWA (1998)		Once agreed & established	EMA / EAF
Reduce disturbance to estuarine functional zone	Restrict mining to areas outside the 5m contour (EFZ)	1	NWA (1998), MPRDA (2004)	• Improved estuarine functioning • Improved estuarine habitat • No mining within estuarine functional zone • Approved position statement irt mining activities • Restricted mining outside of estuarine functional areas	ASAP	DME / Environmental Inspectorate
	Develop position statement to evaluate and reduce impacts of mining	1	ICM Act (2008) / NWA (1998)		By end 2012	EMA / Ezemvelo / DAEARD
	Review causeway design and potential alternatives (including undertaking a potential cost benefit analysis)	2	NWA (1998), NEMA EIA Regs (2010)		2013	EMA in consultation with DWA and DAEARD
Minimise pollution	Investigate opportunities to restrict discharges (or at least limit)	2	NWA (1998)	• Reduced litter and dumping • Alternate discharge of water containing waste from WWTW implemented	By end 2013	DWA
	Implement solid waste pollution strategies	2	NEMA: National Waste Management Act		By end 2012	EMA / Ezemvelo

Extract from Estuarine Plan (2012) - Appendix G (Table 6, page 21)

CONSERVE BIODIVERSITY						
Management Strategy	Management Actions	Priority	Legislation	Operational Objectives/Indicators	Work Plan	
					Timing	Responsibility
Extend protected area	Investigate options for extending PA	1	NEMA: PA Act; NEMA: B Act	• Fully protected estuary as agreed by land owners and authorities	End 2012	Ezemvelo / DEA / neighbouring land owners
	Engage with land owners and stakeholders	2			Early 2013	
	Implement solution (eg. Gazetting)	2	NEMA: PA Act		End 2013	Ezemvelo / DEA

Extract from Estuarine Plan (2012) - Appendix G (Table 8, page 24)

CONTROL DEVELOPMENT						
Management Strategy	Management Actions	Priority	Legislation	Operational Objective/ Indicators	Work Plan	
					Timing	Responsibility
Implement zonation plan	Extend environmentally sustainable farming practices to all neighbouring farms	2	ICM Act 2008, LUMs	• Environmentally sustainable farming practices applied on all farms (and applicable certification obtained)	Once zonation plan approved	EMA / DAERD / HCM / UDM

5.5 Eco-tourism development

5.5.1 Tourism product development

Ezemvelo KZN Wildlife has the mandate to sustainably develop Mpenjati Nature Reserve to fully realise its eco-cultural tourism and associated income-generating potential, within the context of protecting its biodiversity and cultural values. Several nature-based tourism products have been developed within the nature reserve and there is limited potential to further develop nature-based tourism products. In further developing tourism within the nature reserve, the following guiding principles should be adhered to:

- Tourism products developed within the nature reserve must be appropriate to the purpose for which the nature reserve has been proclaimed and must not threaten its biodiversity or ecological function.
- In developing tourism products, requirements for environmental authorisation must be considered and adhered to.
- Tourism products should be designed to capitalise on the unique beauty and biodiversity features of the nature reserve.
- Tourism products should be developed in response to tourism market demands and opportunities within the nature reserve and should be carefully assessed to determine their viability.
- The development of tourism products within the nature reserve must be integrated with tourism strategies and plans in the region.
- Tourism should be used as a tool for the generation of economic activity and employment in the communities surrounding the nature reserve.

5.5.2 Environmental interpretation and education

Environmental interpretation and education of Mpenjati Nature Reserve's natural and cultural resources will be aimed at creating awareness, understanding and appreciation of its biodiversity and ecological function, and their significance. In developing an environmental interpretation and education programme, the following guiding principles should be adhered to:

- There should be a strong focus on neighbouring communities, in efforts to engage, inform and benefit them.
- Wherever possible, local community members should be trained to assist and operate environmental interpretation and education tours.

The detailed operational requirements for eco-cultural tourism development and environmental interpretation and education are set out in Table 5.4 below.

Table 5.4: Framework for eco-cultural tourism

Strategic outcome	Management activities	Management targets	Indicators of Concern	Priority	Responsibility
VISITOR MANAGEMENT					
Improve day visitor facilities and experience.	Implement a maintenance schedule to better manage day visitor facilities and maximise security for visitors.	Annual report of visitor information. This will create understanding of annual tourist numbers and a tourism market profile for the nature reserve.	§ Changing trends. § Declining tourist numbers.	**Annually**	OIC
ENVIRONMENTAL INTERPRETATION AND AWARENESS					
Support organisations conducting environmental interpretation and education programmes.	Support efforts to identify and produce educational material and signage for the Community Centre and existing hiking trails.	§ Education material in Community Centre. § Adequate signage on trails.	§ Outdated or material not available in Community Centre. § Negative publicity.	**Year 1**	OIC

Extract from Estuarine Plan (2012) - Appendix G (Table 9, page 25)

PROMOTE ECO-TOURISM						
Management Strategy	**Management Actions**	**Priority**	**Legislation**	**Operational Objectives/ Indicators**	**Work Plan**	
					Timing	**Responsibility**
Manage visitor facilities (if Ezemvelo designated as EAF)	Control access	1	NEMA: Protected Areas Act	• Maintenance included in annual plan of operation for the Mpenjati NR • Increased visitor numbers • Recorded return visits • No recorded incidents • Number of complaints irt visitor facilities	asap	EMA / Ezemvelo
	Increase safety and security through policing	1			ongoing	EMA / Ezemvelo / HCM / SAPS
	Ensure ongoing maintenance of visitor facilities by Ezemvelo	1			ongoing	EMA / Ezemvelo
Market the Mpenjati Estuary as an eco-tourism destination	Develop and distribute marketing material	2	NEMA: Protected Areas Act	• Production of pamphlets, brochures, magazine articles; • Publicity on websites; • Increased visitor numbers;	By mid 2013	EMA / Ezemvelo / HC Tourism
	Motivate for national road agencies to erect appropriate road signage	2	NEMA: Protected Areas Act		By mid 2013	EMA / EAF/ Ezemvelo / HC Tourism
Improve eco-tourism related opportunities for HD communities	Identify opportunities whereby HD communities can benefit	1	NEMA: Protected Areas Act / ICM Act	• Increased job creation; • Increased HDI engagement; • Local community employment opportunities	By end 2013	EMA / Ezemvelo / DEA / EPWP / HCM
	Source funding and implement these opportunities	1			By mid 2014	EMA / Ezemvelo / DEA / CoastCare / EPWP / HCM

5.6 Conservation management

5.6.1 Fire management

Fire plays an important role in the ecological dynamics and has important effects on vegetation composition, primary productivity and nutrient cycling. In developing burning and fire management strategies for the nature reserve, the following guiding principles should be adhered to:

- Burning should be undertaken in such a way that it maintains spatial and temporal heterogeneity within the landscape, wherever possible.
- A patch mosaic of burnt and un-burnt areas should be maintained on an annual basis.
- 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 due consideration to the biodiversity conservation requirements of the nature reserve 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).

In terms of Section 17 of the National Veld and Forest Fires Act, a landowner (in this case the nature reserve) must have such equipment, protective clothing and trained personnel for extinguishing fires as may be prescribed or, if not prescribed, reasonably required in the circumstances. If a fire spreads from the nature reserve to a neighbour's property, Ezemvelo KZN Wildlife may be liable for damages that arise, in the event that such measures are not in place. It is therefore necessary to consider the following in relation to fire fighting:

- The size of the nature reserve and the requirements necessary to access different areas in the event of a wildfire. This relates to both roads and vehicles.
- The number of personnel necessary to effectively fight wildfires.
- The equipment necessary to effectively fight wildfires. This would include:
    - Water tankers and pressure pumps pulled behind tractors.
    - Fire fighting equipment mounted on the backs of vehicles.
    - Backpack sprayers.
    - Beaters.
    - Safety equipment for personnel involved in fire fighting.

The detailed operational requirements for fire management are set out in Table 5.5 below.

Table 5.5: Framework for conservation management – fire management

Strategic outcome	Management activities	Management targets	Indicators of Concern	Priority	Responsibility
FIRE MANAGEMENT					
Develop and implement a comprehensive fire management plan for Mpenjati Nature Reserve.	Develop a long term fire management plan that addresses the biological, legal and operational requirements.	Adoption and implementation of the fire management plan.	Unplanned and unmanaged fires.	**Year 1**	Ezemvelo's Ecological Advice Unit
	Develop an annual plan of operation for fire management at the annual management meeting. *This will be the annual planning through which the burning regime for the next year will be developed after assessing the previous season's fires and will be a joint process involving management and Eco Advice.*	Annual plan of operation for fire management available.		**Annually**	Regional Ecologist and OIC
	Implement fire plan and annual plan of operation for fire management.	§ Meet the targets as set out in the annual plan of operation. § Compliance with the National Veld and Forest Fires Act.	§ Targets in annual plan of operation not achieved. § Non-compliance with relevant legislation. § Wildfires spreading from the nature reserve to neighbouring properties.	**Ongoing**	OIC

5.6.2 Invasive species 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. Such plants are considered to be a serious threat to the ecological functioning of natural systems and to water production, and must be strictly controlled. 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 in controlling invasive plants.

There are a number of alien plant species, as listed in Section 2.6.7 and Appendix E, that need ongoing control.

Alien animal species can threaten the ecological, genetic or natural aesthetic integrity of Mpenjati Nature Reserve and can be vectors for the spread of diseases. In dealing with the control of alien animals, procedures to deal with animals that stray into the nature reserve should be developed. In addressing alien animal control, the following guiding principles should be adhered to:

- Domestic animals, such as horses and donkeys, will only be allowed if kept at the nature reserve for official purposes, such as patrolling.
- Feral animal species that pose a threat to indigenous species will be destroyed (as humanely as possible, with due regard to the tourist experience).

Alien animals occurring in Mpenjati include the following:

- Indian Myna's (Common Myna) are now so much part of the KwaZulu-Natal Coast that they are impossible to eradicate.
- Stray domestic animals, such as cats and dogs, occasionally enter the nature reserve and present a threat to indigenous habitats and species.

5.6.3 Soil erosion control and sedimentation management

The infilled portions of the banks on both sides of the estuary are being eroded, but it is not considered appropriate to try to arrest this. Apart from this, minor soil erosion problems in Mpenjati Nature Reserve are currently under control. Most roads on the southern side of the estuary are tarred. There is a potential for soil erosion problems if current trails are not properly maintained. 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.

Soil erosion control and rehabilitation measures may include the need to re-vegetate disturbed areas. A detailed assessment of the nature and extent of soil erosion within the nature reserve will determine the appropriate responses required and the costs associated with them.

Sedimentation is a risk within the nature reserve because of poor catchment management upstream and because of the high levels of fine sediment in the water due to upstream sand-winning operations.

The detailed operational requirements for invasive species and soil erosion control are set out in the Table 5.6 below.

Table 5.6: Framework for conservation management – invasive species control and soil erosion control

Strategic outcome	Management activities	Management targets	Indicators of Concern	Priority	Responsibility
INVASIVE SPECIES CONTROL					
Develop and implement alien species control plan for Mpenjati Nature Reserve (fauna and flora).	Implement the long term alien species control plan that addresses the biological, legal and operational requirements for terrestrial and aquatic fauna and flora.	§ Ongoing implementation of the alien species control plan. § Compliance with the Biodiversity Act.	§ Non-compliance with NEMBA and CARA. § Further spread of existing levels of infestation of listed invasive species. § New infestations of listed invasive species. § Input and output of control operations not at optimal level due to lack of planning. § Uncontrolled access of domestic animals within the nature reserve.	**Year 1**	OIC
	Develop an annual plan of operation for alien species control in the nature reserve, setting specific targets.	Minutes of annual management meeting containing the annual plan of operation and targets for alien species control.	§ Non-compliance with NEMBA and CARA. § Further spread of existing levels of infestation of listed invasive species. § New infestations of listed invasive species. § Input and output of control operations not at optimal level due to lack of planning.	**Annually**	OIC
	Implement the alien species control plan and the annual plan of operation.	§ Meet the targets as set out in the annual plan of operation.	§ Targets in the annual plan of operation not being achieved. § Non-compliance with NEMBA and CARA.		

SOIL EROSION CONTROL					
Identify and, where appropriate, rehabilitate and manage areas that have been significantly impacted by accelerated soil erosion.	Once an area of accelerated erosion is identified, an approach will be developed and implemented to rehabilitate the area.	§ Erosion problems identified. § Implementation of accelerated soil erosion control measures in areas identified.	§ Erosion areas not being identified. § Further erosion of impacted areas.	**Ongoing**	OIC

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CONSERVE BIODIVERSITY						
Management Strategy	**Management Actions**	**Priority**	**Legislation**	**Operational Objectives/Indicators**	**Work Plan**	
					Timing	**Responsibility**
Eradicate alien invasive species (aquatic & terrestrial)	Identify and prioritise infested riparian areas	1	NEMA: PA Act, NEMA: BA; NWA	• Reduction in coverage of alien invasive species; • Improvement in ecological health and aesthetic indices • Improved birding habitats	Mid 2013	Ezemvelo / EMA / DEA: Working for Water
	Estimate budget and source funding (ongoing)	1			End 2013	
	Develop and implement alien invasive species eradication programmes	1			End 2014	
	Identify drivers of alien invasive species	2			2012	
	Identify and prioritise Birding habitat	2			Mid 2013	

5.6.4 Resource utilisation

It is an accepted tenet of biodiversity conservation that the sustainable use of natural and biological resources may be undertaken within a protected area, provided that it does not compromise its ecological functioning or biodiversity conservation imperatives. Accordingly, applications for the extractive use of resources within the nature reserve will be considered, based on the following guiding principles:

- The context of the nature reserve's zonation plan, in particular the ecological sensitivity and the wilderness values of particular areas.
- The benefits that such resource use will provide to the neighbouring communities around the nature reserve.
- The equitable access of members of the neighbouring communities to such resource use opportunities.
- Whether activities such as the collection of biological materials/samples are for legitimate scientific purposes, are from *bone fide* South African research institutions and are undertaken in accordance with relevant Ezemvelo KZN Wildlife policies.
- The ability of the nature reserve's managers to effectively control and monitor such resource use.

The detailed operational requirements for resource utilisation are set out in the Table 5.7 below.

Table 5.7: Framework for conservation management –Resource Utilisation

Strategic outcome	Management activities	Management targets	Indicators of Concern	Priority	Responsibility
COLLECTION OF BIOLOGICAL MATERIAL					
Extractive resource use is undertaken legally and conforms to National Legislation (NEMBA, Act No.10 of 2004, Chapter 6).	§ To consider, with relevant scientific and management staff, requests for extractive use, in accordance with accepted norms and standards and resource use guidelines. § Ensure that any approved extractive resource use is managed, monitored and reported on.	§ Records of approved extractive use. § Ensure that collecting of biological material is done under the appropriate permit.	§ Uncontrolled or unsustainable resource extraction. § No monitoring of resource use. § Illegal collection of biological material or samples.	**Year 3**	Ezemvelo's Ecological Advice Unit and implementation by the OIC

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CONSERVE BIODIVERSITY						
Management Strategy	**Management Actions**	**Priority**	**Legislation**	**Operational Objectives/Indicators**	**Work Plan**	
					Timing	**Responsibility**
Conserve natural habitats	Workshop with key role-players to determine 'Thresholds of Potential Concern' (TPCs)	1	ICM Act (2008)	• Demarcation of all areas targeted for conservation; • TPCs set for water quality, habitat surface area and estuarine biota; • Land use controls identified for zones. • Increased viable nursery habitat	By end 2012	Estuarine Experts / Ezemvelo / DEA
	Implement zonation and associated controls	1			Once determined	Ezemvelo / EMA

5.6.5 Wildlife management

Management interventions related to indigenous wildlife will be limited to those that are for the purposes of safeguarding populations of key species, including rare and endangered species, or enhancing ecological functioning to meet set conservation targets. In addition, interventions may be required for human/wildlife conflict management. In addressing wildlife management, the following guiding principles should be adhered to:

- Wildlife management must be focussed primarily on protecting the ecological functioning of the nature reserve and meeting set provincial conservation targets for species and vegetation types.

- The introduction of indigenous species into the nature reserve must be undertaken in accordance with relevant Ezemvelo KZN Wildlife policies.

- Animals that become a danger or excessive nuisance to persons and property, due to either habituation or aberrant behaviour, must be managed in accordance with relevant Ezemvelo KZN Wildlife policies.

5.6.6 Conservation targets

The 2011 version of the KwaZulu-Natal systematic biodiversity plan identifies the provincial conservation targets, and those to which Mpenjati Nature Reserve contributes are depicted in Table 5.8. The conservation of Mpenjati Nature Reserve contributes towards the achievement of a portion of some of these targets. Targets will continue to be updated as knowledge develops about the ecology of areas, connectivity between them, and other process requirements for ecosystems, communities and species. On this basis, the conservation targets should be viewed as a set of working hypotheses around which conservation planning and evaluation can take place. An advantage of developing strategies around targets is that this process highlights critical knowledge deficits, thus guiding future research.

Table 5.8: Systematic biodiversity planning conservation targets to which Mpenjati Nature Reserve contributes

Feature	Description	Percentage of target located within Mpenjati	Notes
Centrobolus anulatus	Millipede	0.44	% of historic distribution
Doratogonus infragilis	Millipede	0.38	% of historic distribution
Doratogonus montanus	Millipede	0.00	% of historic distribution
Cochlitoma semigranosa	Molusc	0.57	% of historic distribution
Gulella columnella	Molusc	12.50	% of historic distribution
Eriosema umtamvunense	Plant	14.29	% of historic distribution
KwaZulu-Natal Coastal Forests	Vegetation Type	0.03	% of historic distribution
KwaZulu-Natal Dune Forests	Vegetation Type	0.06	% of historic distribution

Where possible, specific conservation and monitoring strategies should be established for ecological features and species for which conservation targets have been set.

The detailed operational requirements for wildlife management and the achievement of conservation targets are set out in Tables 5.9 and 5.10 below.

Table 5.9: Framework for conservation management – wildlife management

Strategic outcome	Management activities	Management targets	Indicators of Concern	Priority	Responsibility
WILDLIFE MANAGEMENT					
Key species management, including rare and endangered species, is undertaken using the best available scientific knowledge.	Develop a key species management plan.	Key species management plan developed.	Declining numbers of key species, including rare and endangered species that occur within the nature reserve.	**Year 2**	Ezemvelo KZN Wildlife Ecological Advice Unit
	Develop and implement a strategy for damage causing animal control, including preventative measures, such as boundary fence maintenance, to minimise the need for problem animal control.	Documented strategy for damage causing animals.	Frequent complaints from neighbours, with no clear response.	**Year 1**	OIC
	Develop an annual plan of operation for key species in the nature reserve.	Annual plan of operation for key species.	Declining numbers of rare and endangered species that occur within the nature reserve.	**Annually**	Regional Management and OIC
	Implement the key species management.	Meet targets set in annual plan of operation.	Targets set in annual plan to achieve.	**Ongoing**	OIC

Extract from Estuarine Plan (2012) - Appendix G (Table 10, page 26)

ENHANCE AWARENESS AND EDUCATION						
Management Strategy	**Management Actions**	**Priority**	**Legislation**	**Indicators**	**Work Plan**	
					Timing	**Responsibility**
Undertake research & monitoring	Establish comprehensive monitoring programme (fauna, flora, bacterial, physico-chemical)	1		• Specific biophysical indicators identified; • Monitoring data produced; • Monitoring reports; • Production of an annual report cards	2012 – ongoing	EMA / EAF / Ezemvelo / DEA

Table 5.10: Framework for conservation management – conservation targets

Strategic outcome	Management activities	Management targets	Indicators of Concern	Priority	Responsibility
CONSERVATION TARGETS					
Critical ecological processes and functions are maintained within Mpenjati Nature Reserve.	The maintenance of critical ecological processes must be included in all subsidiary plans.	All subsidiary plans must reflect critical ecological processes.	§ Ecological degradation § Change in composition. § Don't know what these critical processes are.	**Ongoing**	Ezemvelo KZN Wildlife Ecological Advice Unit
Biological monitoring programmes are developed and implemented to determine the success of management interventions in protecting the ecosystems, communities and species of Mpenjati Nature Reserve.	The biological monitoring and surveillance programme must be included in all subsidiary plans.	§ All subsidiary plans must include a biological monitoring programme. § Surveillance and monitoring plans for key threatened processes. § Monitoring plans for key rare and endangered species.	Lack of awareness of the status of key threatening processes, including infestations of invasive plant species and severity and extent of soil erosion.	**Ongoing**	Ezemvelo KZN Wildlife Ecological Advice Unit

Extract from Estuarine Plan (2012) - Appendix G (Table 5, page 19)

SUSTAIN ESTUARINE HEALTH & FUNCTIONING (WATER QUALITY & QUANTITY)						
Legislation	**Operational Objectives / Indicators**	**Work Plan**	**Legislation**	**Operational Objectives / Indicators**	**Work Plan**	
					Timing	**Responsibility**
Minimise pollution	Review and extend current water quality monitoring programme	1	NWA (1998)	• Ongoing water quality monitoring programme • Reduced litter and dumping • Integrity of habitat maintained • Increased nursery functioning • Improved water quality • Emergency response plan developed	ASAP	EMA / Ezemvelo / Ugu DM
	Identify sources and types of pollution in order to prioritise mitigation measures	1	National Waste Management Act, Municipal By-laws		Early 2012	EMA / DWA / Ugu DM
	Implement solid waste pollution strategies	2	NEMA: National Waste Management Act		By end 2012	EMA / Ezemvelo
	Develop an emergency response plan specific to the Mpenjati Estuary for failure of the WWTW, spillages and contamination of the estuarine environment	1	Best practice		2013	EMA / DWA / Ugu DM

Extract from Estuarine Plan (2012) - Appendix G (Table 6, page 21)

CONSERVE BIODIVERSITY						
Management Strategy	**Management Actions**	**Priority**	**Legislation**	**Operational Objectives/Indicators**	**Work Plan**	
					Timing	**Responsibility**
Rehabilitate degraded areas	Identify & prioritise degraded areas	2	NEMA: PA Act; NEMA: B Act; ICM Act	• Improvement of degraded areas • Increased coverage of estuarine habitats • Improvement in estuarine health scores • Improved water quality	ASAP	Ezemvelo / HCM
	Implement rehabilitation programme (*with ongoing care of rehabilitated areas*)	3			Early 2013	Ezemvelo / HCM
	Extend estuarine vegetation through replanting programme	3			Mid 2013	Ezemvelo

Extract from Estuarine Plan (2012) - Appendix G (Table 8, page 24)

CONTROL DEVELOPMENT						
Management Strategy	**Management Actions**	**Priority**	**Legislation**	**Operational Objective/ Indicators**	**Work Plan**	
					Timing	**Responsibility**
Minimise potential impacts of climate change	Incorporation of coastal setback line into estuary zonation plan (when gazetted)	1	ICM Act (2008), White Paper on Climate Change Response Strategy	• Limited new development in close proximity to the estuary • Relocation of inappropriately located high risk infrastructure • Comprehensive contingency plan developed	Once gazetted	EMA / DAEARD
	Develop contingency plan (extreme events, floods, droughts, failing infrastructure etc.)	1			By end 2013	EMA / DAEARD / UDM (disaster management centre)

5.7 Operational management

5.7.1 Financial and human resources

Mpenjati Nature Reserve cannot be effectively managed without adequate sustained funding and sufficient human resources. In addressing the financial and human resource needs of the nature reserve, the following guiding principles should be adhered to:

- Adequate funding must be provided for the management of the nature reserve to ensure the protection of its biodiversity and cultural values and the continued provision of its ecosystem services.
- A capable, experienced administrator and leader is required to fulfil the position of nature reserve manager.
- Adequate, properly trained and experienced staff must be employed at the nature reserve to undertake the operations required for its effective management.

5.7.2 Facilities and infrastructure

In order for Mpenjati Nature Reserve to operate appropriately, adequate facilities and infrastructure need to be developed and maintained, both for management and education purposes. In addressing facilities and infrastructure needs in the nature reserve, the following guiding principles will be adhered to:

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

The detailed operational requirements for financial and human resource, and facilities and infrastructure development and management, are set out in Tables 5.11 and 5.12 below.

Table 5.11: Framework for operational management – financial and human resources

Strategic outcome	Management activities	Management targets	Indicators of Concern	Priority	Responsibility
FINANCIAL RESOURCES					
Development of a five-year financial plan that identifies the resource needs to achieve the objectives for the nature reserve.	§ Undertake an assessment of past income and expenditure trends in the nature reserve. § Develop a five-year projection of income and expenditure targets that will allow for the effective achievement of the nature reserves objectives.	Adequate funding to achieve the objectives of the nature reserve.	Inadequate funding to effectively protect and operate the nature reserve.	**Year 1**	Ezemvelo KZN Wildlife Regional Management Unit
HUMAN RESOURCES					
Ensure that Mpenjati Nature Reserve is adequately staffed and conforms to legal staffing practices.	§ Motivate for all vacant staff positions to be filled. § Comply with OH&S legislation, labour legislation and internal Ezemvelo policies.	§ Sufficient staff to achieve nature reserve objectives. § Clean bill of health.	§ Non-compliance with legislation and policies. § Outstanding grievances. § Vacant posts.	**Ongoing**	OIC

Table 5.12: Framework for operational management – facilities and infrastructure

Strategic outcome	Management activities	Management targets	Indicators of Concern	Priority	Responsibility
FACILITIES AND INFRASTRUCTURE					
All facilities and infrastructure in Mpenjati Nature Reserve are adequately maintained.	Develop and implement an infrastructure maintenance schedule for the nature reserve that will address: § Environmental, health and safety requirements. § Road maintenance - including rehabilitation plans where necessary. § Fence maintenance - maintenance and monitoring. § Building maintenance and compliance with relevant building regulations and legislation.	§ Infrastructure maintenance plan developed. § Regular scheduled maintenance of all facilities and infrastructure.	Environmental, health or safety incidents associated with inadequately maintained facilities and infrastructure.	**Year 1**	OIC
	Develop an annual plan of operation for infrastructure of the nature reserve through the annual management meeting.	Regular scheduled maintenance of all facilities and infrastructure.	Environmental, health or safety incidents associated with inadequately maintained facilities and infrastructure. Environmental damage resulting from poorly maintained, roads, tracks and trails.	**Annually**	Regional Management
	Implement the annual plan of operation and infrastructure maintenance schedule.	Targets set in annual plan of operation through the management meeting.	Not achieving the targets as set in the annual plan of operation.	**Ongoing**	OIC

Strategic outcome	Management activities	Management targets	Indicators of Concern	Priority	Responsibility
Service infrastructure and practices in Mpenjati Nature Reserve do not cause environmental harm.	§ Where service infrastructure, including that for water supply, electricity and sewerage, is causing environmental harm, ensure proper maintenance is being undertaken and, if necessary, upgrade infrastructure or modify practices to address this. § Determine and implement appropriate strategies for the management and recycling of waste in the nature reserve.	Appropriately functioning service infrastructure and systems that do not cause harm to the environment.	Pollution events or incidents associated with service infrastructure and systems.	**Ongoing**	OIC

6 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.

6.1 Annual monitoring

The annual monitoring schedule should be designed to monitor the implementation of aspects or components of the plan. It should be designed to be straightforward and relatively easy to implement by on-site staff. In accordance with the Ezemvelo KZN Wildlife norms and standards for surveillance and monitoring (Goodman, 2011), monitoring is characterised by:

- An objective, target or desired state of the attribute or resource (as described in the management targets in Section 5 above).
- Being part of a formalised adaptive management cycle.
- Establishing and repeatedly evaluating the measures of success of conservation project or management intervention.

Records should be maintained of all key management interventions and of problem events or incidents, such as uncontrolled access, poaching, illegal plant collection or uncontrolled/arson fires. In terms of the norms and standards set for surveillance and monitoring (Goodman, 2011), these incidents would be deemed to be surveillance.

Scientific monitoring programmes may be established to monitor specific management interventions, such as measures for the protection of flagship species. Not all of the management interventions will be monitored through the monitoring schedule. Most of the outcomes of the monitoring process will be captured in an annual plan, which will be used to inform the following year's annual plan of operation.

On this basis, a monitoring schedule for Mpenjati Nature Reserve is set out in Table 6.1.

6.2 Linking to the Mpenjati Estuary Management Plan (2012) – Appendix G

The Estuary Management Plan has been attached in its entirety as Appendix G. The monitoring objectives, as they relate to the estuarine monitoring, follow after Table 6.1 below, and must be read in conjunction with the Estuarine Management Plan. They are included in the text of this plan simply for ease of reference.

Table 6.1: Annual monitoring schedule for Mpenjati Nature Reserve

Management issue	Parameters to be monitored	Monitoring measures	Monitoring frequency	Responsibility	Reporting requirements
Law enforcement	Schedule of patrols	Written record	Weekly	Nature Reserve Manager	Annual report
	Illegal incidents	Photographs/written record	Per event		Record of event
	Access control measures	Written record	Annually		Annual report
Protected area expansion	Influx of listed invasive vegetation on the nature reserve's boundaries.	Surveillance plan	To be determined	Nature Reserve Manager	Annual report
Local and regional planning	Land uses that are approved in the areas around the nature reserve in local and regional IDP's and SDF's	Written record	Annually	District – District Manager	Annual report
Visitor management	Visitor statistics	Visitor entries, bookings and accommodation data	Ongoing	Nature Reserve Manager	Annual report
	Attendance of environmental interpretation and education programmes	Written records	Annually	Ezemvelo KZN Wildlife Community Conservation Unit	Annual report
Invasive plant control	Areas subject to invasive plant control	Monitoring plan	To be determined	Nature Reserve Manager	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
Alien animal control	Control measures for alien animals found within the nature reserve	Written record	Per event	Nature Reserve Manager	Record of event

Management issue	Parameters to be monitored	Monitoring measures	Monitoring frequency	Responsibility	Reporting requirements
Soil erosion control	Areas subject to erosion control	Monitoring plan	To be determined	Nature Reserve Manager	Annual report
	State of rehabilitated areas of erosion				Annual report
Conservation targets	Incidents related to flagship species	Photographs/written record	Per event	Nature Reserve Manager	Record of event
	Status of key rare and endangered species, particularly those for which conservation targets have been set	Monitoring plan	To be determined	Nature Reserve Manager	Annual report
Biological collection	Species and amount of material collected	Photographs/written records	Per event	Nature Reserve Manager	Annual report
Human resources	Staffing levels	Number of full-time staff	Annually	Nature Reserve Manager	Annual report
Facilities and infrastructure	State of roads, tracks and trails	Photographs/written records	Quarterly	Nature Reserve Manager	Annual report
	State of the boundary fence	Photographs/written records	Monthly		Annual report
	Rainfall	Written record	Monthly		Annual report
	State of facilities and service infrastructure	Maintenance schedule/written records	Monthly		Annual report
	Pollution events	Photographs/written records	Per event		Record of event

Extract from Estuarine Plan (2012) - Appendix G, Proposed monitoring programme for the Mpenjati Estuary (Table 11, page 31)

Focal Areas and Indicators	Monitoring Objective	Frequency	Location	Staff	Collection/Analytical Method
Biological : Diversity and Abundance, Areal coverage • Macrophytes (reedswamp, other peripheral vegetation types, alien invasives) • Macrocrustaceans (sandprawns and crabs) • Fish (Ichthyofauna) • Birds (Avifauna)	To determine changes in biota in response to management actions	Once per annum (same season comparison)	A minimum of one fixed sample site within each zone and mixed zones[4], where applicable	2	As stipulated in the *Methods for the Determination of the Ecological Water Reserve for Estuaries* (DWA, 2010) Fixed photo monitoring/ aerial photography of macrophyte coverage
Exploitation of living resources : Macro crustaceans, Fish, Ncema Reed and Thatch Grass • People inspected / Daily fishing permits issued • Levels of non-compliance	To assess the level of exploitation of living resources to inform management actions	Daily	• Through-out system for fish • Sand banks for sandprawns • Reedswamp for Ncema Reed and Thatch grass harvesting	2	Patrol survey of the number of permits issued and non-compliance
Water Quality : • Essential physical parameters (salinity, temperature, dissolved oxygen, conductivity, depth, pH and turbidity/suspended solids) • Inorganic nutrients (phosphates, nitrates, ammonium etc) • Coliform bacteria (*E.coli* and total coliforms)	To determine changes in water quality in response to management actions;	Monthly	A minimum of one fixed sample site within each zone and mixed zones, where applicable	2	According to laboratory specifications and/or as stipulated in the *Methods for the Determination of the Ecological Water Reserve for Estuaries* (DWA, 2010)

[4] As per the proposed Mpenjati Estuary Zonation Plan

Focal Areas and Indicators	Monitoring Objective	Frequency	Location	Staff	Collection/Analytical Method
Water Quantity : • Water flow into the estuary • Depth of the estuary	• To detect decreases in volume of water reaching the estuary to inform management actions • To assess the sediment entering the system	Continuous	• Strategic location to be determined, most likely on an upright of the national road bridge • A minimum of two fixed points along the river channel	1	• Installation of a continuous flow gauging station; and • Review of new WULA and mining permit applications.
Social/Cultural : • Perception of the estuary and the role it plays; and • Use of the estuary.	• To assess the visual impact of management actions • To assess the types of user groups and level of consumptive and non-consumptive use • To determine the carrying capacity for various activities	Twice; at the commencement of the EMP and toward the end of the 5 yr review period	Through-out system	2	• A verbal survey (documented) of the views of the users; and • Documentation of permits issued (fishing permits), non-compliance and popularity of various activities

As set out in Table 6.1, the following issues require a surveillance plan:

- The influx of listed invasive vegetation on the nature reserve's boundaries.

In addition, the following issues require a monitoring plan:

- Measures taken to control invasive plant species (indigenous and alien).
- Measures taken to control soil erosion.
- Measures taken to manage rare and endangered species, particularly those for which conservation targets have been set.
- The ecological status of the hydrological system within the nature reserve.

These surveillance and monitoring plans must be developed and implemented in accordance with the Ezemvelo KZN Wildlife Norms and Standards: Surveillance and Monitoring Plans for Biodiversity (Goodman, 2011).

The preparation of these plans must be undertaken by the Ezemvelo KZN Wildlife regional Ecological Advice Unit, with the support of the Surveillance and Monitoring Working Group of Ezemvelo KZN Wildlife.

6.3 Annual management plan implementation review

The purpose of undertaking an annual performance review of implementation of the 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 report produced from the annual management plan implementation review should be submitted to the Regional Operations Committee, prior to the annual management meeting for Umhlanga Lagoon Nature Reserve, for its review and comment. Records of recommendations for update/changes to the management plan should be kept so that when the plan is revised, these recommendations can be assessed and included, where necessary. This should be undertaken in the form of a running list, which is updated in each annual report so that the final annual report before the review of the management plan contains the complete list of recommendations. The review process should include:

- Any recommended minor amendments to the management plan that do not affect the substance of the vision, objectives or zonation.
- The results of an evaluation of the management effectiveness achieved for the nature reserve, calculated using Ezemvelo KZN Wildlife Protected Area Management Effectiveness evaluation tool, which meets the criteria of the national Department of Environmental Affairs' effectiveness evaluation guidelines and was developed using

the WWF and World Bank Protected Area Management Effectiveness Tools (Stolton *et al.*, 2007).

Any proposed significant changes to the management plan that are likely to result in amendment to the vision, objectives and zonation must be supported by the Regional Operations Committee and the Operations Committee (OPSCOM, or its operational successor), before being subjected to the appropriate stakeholder participation process, and before OPSCOM recommends that the proposed amended management plan be submitted for authorisation to the Ezemvelo KZN Wildlife Executive Committee, Board, and onward to the MEC.

7 MPENJATI 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 protected area management plan.

7.1 Implementation of the protected area management plan

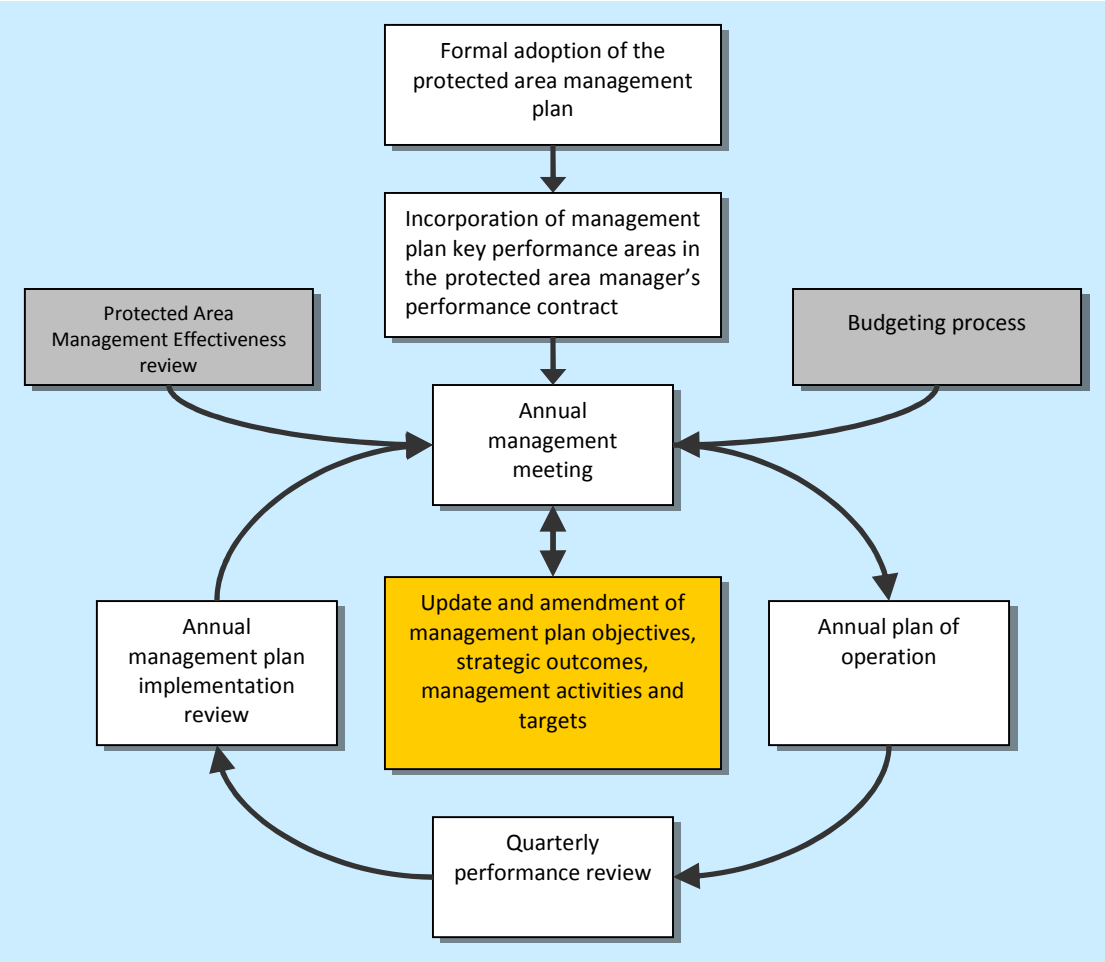


Figure 6: Process for the implementation of Protected Area Management Plans

Each year, an annual management meeting is held for each protected area managed by Ezemvelo KZN Wildlife. In terms of the implementation of the management plan, the purpose of the annual management meeting for Mpenjati Nature Reserve will be to:

- Finalise the annual report, as part of the annual management plan implementation review, described in Section 6.2 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 each quarter, based on the key performance areas set out in the management plan, in accordance with the nature reserve manager's performance contract.

- 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. The annual plan of operation will be tied to staff performance contracts, and goals set in them will be categorised within the same key performance areas as the management plan. A pro forma annual plan of operation is set out in Appendix F.

7.2 Responsibilities in implementing the 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 the Regional Operations Committee and the Biodiversity Conservation Operations Management Meeting (BCOMM) in order to assign responsibility for the completion of the management activity.

7.3 Mpenjati Nature Reserve resource requirements

In developing annual plans of operation for Mpenjati 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 nature reserve.

7.3.1 Staff and equipment

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

- Administration and management of the nature reserve.
- Patrolling of the nature reserve 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 nature reserve.
- Maintenance of facilities and infrastructure within the nature reserve.
- Capture of visitor information and statistics.
- Admitting visitors to the nature reserve and charging entrance fees.
- Community liaison and cooperation.
- Environmental interpretation and education.

7.3.2 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 capital projects, as and when these are identified.

7.4 Annual financial plan

The annual plan of operation must contain a financial plan, which must be approved by the Regional Operations Committee. The annual goals, contained in the annual plan of operation, will be prioritised with the approved budget and guided by the strategic direction of the integrated management plan.

7.5 Financial accounting system

It is accepted that all fiscal management will be guided by the Public Finance Management Act (No.1 of 1999) and the Ezemvelo KZN Wildlife Financial Policy and Procedures directive. Funding sources not generated internally will be accounted for in the prescribed process as determined by the donor source.

7.6 Financial reporting

Annual and quarterly fiscal reports will be submitted as directed by the Regional Operations Committee.

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9 APPENDICES

Appendix A – Definition of terms

Appendix B – List of statutes to which the Mpenjati Nature Reserve is subject

Appendix C – List of unpublished and supporting documentation

Appendix C1 – Ezemvelo KZN Wildlife corporate policies

Appendix C2 – Copy of Mpenjati Nature Reserve proclamation

Appendix C3 – Mpenjati Nature Reserve Public Participation Report, June 2013

Appendix D – Listed activities requiring environmental authorisation in terms of Regulation R.546, Listing Notice No.3

Appendix E – Species lists

Appendix F – Pro forma annual plan of operation

Appendix G – Mpenjati Estuary Management Plan

Appendix A – Definitions of terms

Alien species	Species or genotypes, which are not indigenous to Mpenjati 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 Mpenjati Nature Reserve 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.
Eco-cultural Tourism (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 – Threaten ecosystems, habitats or other species or have a demonstrable potential to threaten ecosystems, habitats or other species. 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 / Ezemvelo 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).

Appendix B – List of statutes to which the Mpenjati 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]
- Integrated Coastal Management Act [No. 24 of 2008]
- 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]
- Marine Living Resources Act [No. 18 of 1998]
- 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]

Appendix C – List of unpublished and supporting documentation

Copies of documents not included in this PAMP available from:

(a) Reserve Management and / or,

(b) Regional Ecologist

Item:

1. Ezemvelo KZN Wildlife Corporate Strategic Plan and Performance Plan for 2009 – 2014.
2. Ezemvelo Corporate Policies and Procedures (Norms & Standards), listed in the table in Appendix C1.
3. Proclamations of Mpenjati Nature Reserve – Appendix C2.
4. Mpenjati Nature Reserve Public Participation Report, June 2013 – Appendix C3

Appendix C1 – Ezemvelo KZN Wildlife corporate policies

The table below lists the Ezemvelo KZN Wildlife corporate policies (norms and standards) referenced from the intranet that are most relevant to Ezemvelo KZN Wildlife protected area management. It is the responsibility of all management and other personnel associated with management of protected areas to ensure that they familiarise themselves and comply with the most recent versions of all Ezemvelo KZN Wildlife Board Approved Policies.

Ezemvelo KZN Wildlife CORPORATE POLICIES (NORMS & STANDARDS)	
Policy File No.	**CORPORATE AFFAIRS**
B 2	Access to Ezemvelo KZN Wildlife Areas and Employment.
B 5	Outsourcing of Functions and Services
B 7	Monuments, Memorials and Names of Protected Areas under the control of Ezemvelo.
B 8	Restricted use of Board Theatres, Halls and Conference Facilities etc.
B 9	Code of Ethics / Conduct.
B 10	Photography in Board Protected Areas.
B 13	Mission Statement
B 14	Access to Information.
Policy File No.	**INTERNAL AUDIT**
C 5	Management Control
	BIODIVERSITY CONSERVATION OPERATIONS
	1. NATURAL RESOURCE SUSTAINABILITY
Policy File No.	**Threatened Species and Ecosystems**
D 1.1	Disposal of Black Rhino.
D 1.2	Disposal of Surplus White Rhino.
D 1.3	Strategy for the Management of Southern White Rhino in KwaZulu-Natal.
D 1.4	Strategy for the Biological Management of Black Rhino in KwaZulu-Natal.
D 1.5	Rhinoceros Products.
D 1.6	Crocodilians
D 1.7	Cycads.
D 1.8	Disposal of Threatened Species.

EZEMVELO CORPORATE POLICIES (NORMS & STANDARDS)	
	BIODIVERSITY CONSERVATION OPERATIONS
	1. NATURAL RESOURCE SUSTAINABILITY
Policy File No.	**Exotic and Invasive Species**
D 1.9	Release of Alien Species.
D 1.10	Control Measures for Red-billed Quelea.
D 1.12	Grass Carp.
D 1.13	Establishment of Alien Plantations.
Policy File No.	**Migratory Species**
D 1.14	Black Wildebeest and Blue Wildebeest Hybridization and Conservation.
D 1.15	Permit authorising the collection of Biological Material within Board Areas.

	2. CONSERVATION EFFECTIVENESS
Policy File No.	**Strategic Applications**
D 2.1	Involvement of the KwaZulu-Natal Nature Conservation Board in Project 8 of the MAB (Man an Biosphere) Programme.
Policy File No.	**Conservation Management: Protected Area Management**
D 2.2	Management of Wilderness Areas.
D 2.3	Protected Area Development.
D 2.4	Prohibition of Works and Servitudes in Board Areas.
D 2.5	Zonation and Regulations for the control of off-road vehicles on beaches controlled by the Boa
D 2.6	Quarries in KZN Protected Areas.
D 2.7	Re-establishment and Management of Vegetation on Development Sites in the Ezemvelo KZN Wildlife Protected Areas.
D 2.8	Ecotourism and Protected Areas.
D 2.9	Solid Waste Management within Protected Areas.
D 2.10	State Security Service Activities within Board Areas.
D 2.11	Shark Nets in or bordering KwaZulu-Natal Nature Conservation Board Controlled Areas.
Policy File No.	**Integrated Environmental Management**
D 2.12	Integrated Environmental Management - incorporating the procedure for the assessment of th impact of proposed development projects on nature conservation concerns.
D 2.13	Precautionary Principle.
D 2.14	Shark Net Installations.
D 2.15	Bioprospecting in KwaZulu-Natal.
D 2.17	Use of Pesticides by the Ezemvelo KZN Wildlife: Safety to Humans and the Environment.
D 2.18	Interference with the Mouth of a Lagoon or River (Breaching).
Policy File No.	*Ex Situ* **Wild Animal Management**
D 2.21	Re-establishment of Terrestrial Mammals in Board Areas.
D 2.22	Translocation of Animals.
D 2.25	Elephant Introductions and Elephant in Enclosures.
D 2.27	Introduction and Keeping of Large Predators in Enclosures in KZN.
D 2.28	Use of Narcotic Drugs.
D 2.29	Falconry.

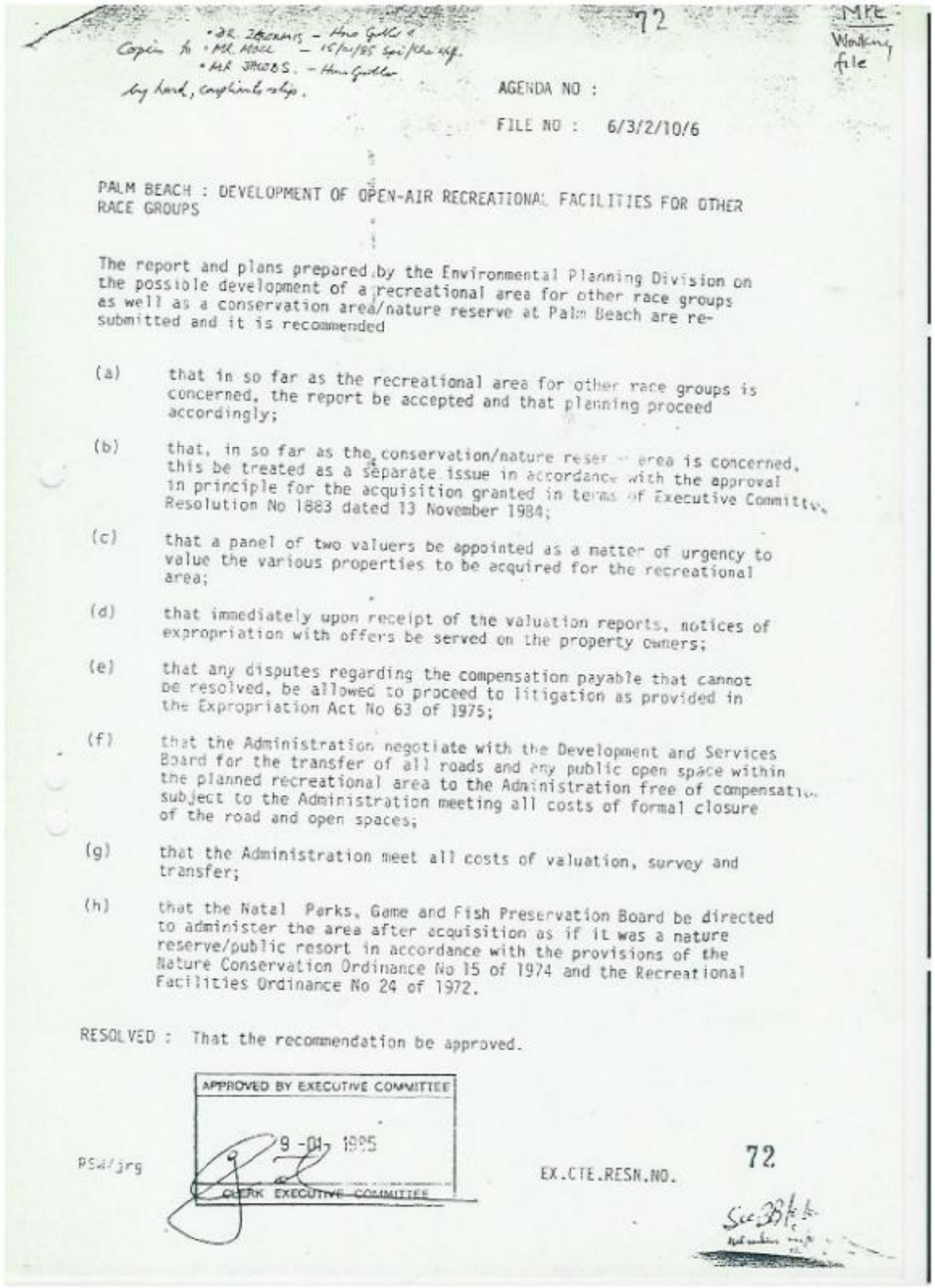
EZEMVELO KZN WILDLIFE CORPORATE POLICIES (NORMS & STANDARDS)	
	BIODIVERSITY CONSERVATION OPERATIONS
	2. CONSERVATION EFFECTIVENESS
Policy File No.	**Human Animal Conflict - Inside and Outside Protected Areas**
D 2.30	Disposal of Leopard from Ezemvelo KZN Wildlife Protected Areas.
D 2.31	Problem Animal Control.
D 2.32	Compensation claims in respect of damage caused by Lion, Cheetah, Wild Dog and Elephant to Stock and Crops.
D 2.33	Instances of Death as a result of an Unprovoked Attack by a Wild Animal Normally contained and originating from within a Fenced Protected Area under the Control of the KwaZulu-Natal Nature Conservation Board.
Policy File No.	**Environmental Awareness**
D 2.34	Environmental Education Policy.

	3. BIODIVERSITY PROTECTION
Policy File No.	**Co-management**
D 3.1	Supply of Game to Conservancies, Community Conservation Areas and Biosphere Reserves in KwaZulu-Natal
D 3.2	Establishment and Management of Community Conservation Reserves (CCR)
D 3.4	Community Conservation Programmes
D 3.5	Neighbours' Access to Board Protected Areas
D 3.6	Relationship with Local Boards
D 3.7	Conservation Partnerships Between KwaZulu-Natal Nature Conservation Board and Adjacent Landowners
D 3.8	Community Trust
D 3.9	Community Levy Policy and Guidelines
D 3.10	Land Claims on Proclaimed and Unproclaimed Provincial and Assigned National Protected areas in KwaZulu-Natal
D 3.11	Amafa Policy Guidelines for the access of rock art sites in KwaZulu Natal
Policy File No.	**Resource-use benefits**
D 3.12	Disposal of Venison from Ezemvelo KZN Wildlife Management Operations.
D 3.13	Sustainable use of wildlife resources.
D 3.14	Freshwater Angling.
D 3.15	Freshwater species utilisation.
D 3.16	Use of plant resources from protected areas.
D 3.17	Use of doomed biological material.
D 3.19	Provision of hunting by Ezemvelo KZN Wildlife.
Policy File No.	**4. RELATIONSHIPS**
D 4.1	Neighbour Relations.
D 4.2	Participation - Non Government Organisations.
D 4.3	Data Access.
D 4.4	Consultation and Communication with Stakeholders: Policy and Guidelines.

EZEMVELO CORPORATE POLICIES (NORMS & STANDARDS)	
Policy File No.	**COMMERCIAL OPERATIONS**
E 1	Concessions for Welfare Groups.
E 2	Hiking and Mountaineering.
E 3	Educational Concessions.
E 4	Club Facilities within Board Areas.
E 5	Hutted Camps.
E 6	Joint Venture Scheme.
E 7	Allocation of Sites in terms of the Joint Venture Scheme.
E 8	Access to Protected Areas through Unofficial Entry Points.
E 9	Visitor Facilities Management by Ezemvelo KZN Wildlife.
E 10	Lease of Lakeshore at State Dam Protected Areas.
E 11	Execution, Control and Management of Leases and Concession Contracts (excluding Biodiversity Conservation Partnerships and Leases of Wildlife).
E 12	Private Sector Reservations Policy.
E 13	Partnerships for Eco-Tourism Development within or Adjacent to Protected Areas.
E 14	Discounting of Tariffs for Walk-in Guests.
E 15	Ecotourism Discounting Strategy.
E 16	Travel Trade Commissions: Tour Operator/ Travel Agency.
E 17	Policy and Procedure for the establishment and monitoring of Commercial Operations Public Private Partnership (PPP) Agreements.
E 18	Administrative and operational policy on Professional hunting in South Africa.
E 19	Commercialisation.

Appendix C2 – Copy of Mpenjati Nature Reserve proclamation

Original Mpenjati Nature Reserve proclamation



72

MPE Working file

Copies to • DR. ZACHARIAS – Hans Gubler 8
• MR. MOLL – 15/1/85 Spoke rep.
• MR. JACOBS. – Hans Gubler
by hand, compliments slip.

AGENDA NO :

FILE NO : 6/3/2/10/6

PALM BEACH : DEVELOPMENT OF OPEN-AIR RECREATIONAL FACILITIES FOR OTHER RACE GROUPS

The report and plans prepared by the Environmental Planning Division on the possible development of a recreational area for other race groups as well as a conservation area/nature reserve at Palm Beach are re-submitted and it is recommended

(a) that in so far as the recreational area for other race groups is concerned, the report be accepted and that planning proceed accordingly;

(b) that, in so far as the conservation/nature reser - area is concerned, this be treated as a separate issue in accordance with the approval in principle for the acquisition granted in terms of Executive Committee Resolution No 1883 dated 13 November 1984;

(c) that a panel of two valuers be appointed as a matter of urgency to value the various properties to be acquired for the recreational area;

(d) that immediately upon receipt of the valuation reports, notices of expropriation with offers be served on the property owners;

(e) that any disputes regarding the compensation payable that cannot be resolved, be allowed to proceed to litigation as provided in the Expropriation Act No 63 of 1975;

(f) that the Administration negotiate with the Development and Services Board for the transfer of all roads and any public open space within the planned recreational area to the Administration free of compensation subject to the Administration meeting all costs of formal closure of the road and open spaces;

(g) that the Administration meet all costs of valuation, survey and transfer;

(h) that the Natal Parks, Game and Fish Preservation Board be directed to administer the area after acquisition as if it was a nature reserve/public resort in accordance with the provisions of the Nature Conservation Ordinance No 15 of 1974 and the Recreational Facilities Ordinance No 24 of 1972.

RESOLVED : That the recommendation be approved.

APPROVED BY EXECUTIVE COMMITTEE
9 -01- 1985
CLERK EXECUTIVE COMMITTEE

RSW/jrg

EX.CTE.RESN.NO. 72

See 38 b

Current Mpenjati Nature Reserve Proclamation

C E-D BRISCOE Professional Land Surveyors SHEET 2 OF 3 SHEETS PROCLAMATION DIAGRAM

SIDES Metres		ANGLES OF DIRECTION		CO-ORDINATES Y System WG31° X		
		Constants		+ 0.00	+3400 000.00	
ZA1	27.35	132 02 10	Z	+ 69 046.20	+ 28 743.07	
A1B1	310.90	186 23 50	A1	+ 69 066.51	+ 28 724.76	
B1C1	144.63	96 23 30	B1	+ 69 031.88	+ 28 415.80	
C1D1	27.72	122 10 20	C1	+ 69 175.60	+ 28 399.70	
D1E1	6.46	167 10 30	D1	+ 69 199.07	+ 28 384.94	
E1F1	373.12	212 10 20	E1	+ 69 200.50	+ 28 378.64	
F1G1	106.22	201 32 50	F1	+ 69 001.83	+ 28 062.81	
G1H1	106.22	189 16 10	G1	+ 68 962.82	+ 27 964.01	
H1J1	24.39	178 39 50	H1	+ 68 945.71	+ 27 859.18	
J1K1	266.14	165 24 40	J1	+ 68 946.28	+ 27 834.80	
K1L1	52.10	239 59 30	K1	+ 69 013.31	+ 27 577.24	
L1M1	39.62	178 39 20	L1	+ 68 968.19	+ 27 551.18	
M1N1	28.70	294 58 30	M1	+ 68 969.12	+ 27 511.57	
N1P1	95.74	276 04 50	N1	+ 68 943.11	+ 27 523.69	
P1Q1	157.17	176 25 30	P1	+ 68 847.91	+ 27 533.83	
Q1R1	126.66	213 35 00	Q1	+ 68 857.71	+ 27 376.97	
R1S1	30.66	285 19 10	R1	+ 68 787.65	+ 27 271.45	
S1T1	102.39	28 33 40	S1	+ 68 758.08	+ 27 279.55	
T1U1	75.86	356 20 00	T1	+ 68 807.03	+ 27 369.48	
U1V1	41.66	300 30 40	U1	+ 68 802.18	+ 27 445.18	
V1W1	48.83	346 18 20	V1	+ 68 766.29	+ 27 466.33	
W1X1	46.17	307 50 20	W1	+ 68 754.73	+ 27 513.77	
X1Y1	67.65	42 28 20	X1	+ 68 718.27	+ 27 542.09	
Y1Z1	161.54	282 29 30	Y1	+ 68 763.95	+ 27 591.99	
Z1A2	40.78	197 24 30	Z1	+ 68 606.23	+ 27 626.93	
A2B2	153.35	230 12 30	A2	+ 68 594.03	+ 27 588.02	
B2C2	233.88	182 57 30	B2	+ 68 476.20	+ 27 489.88	
C2D2	91.62	189 02 10	C2	+ 68 464.13	+ 27 256.31	
D2E2	184.09	213 35 10	D2	+ 68 449.74	+ 27 165.83	
E2A	158.28	227 08 50	E2	+ 68 347.90	+ 27 012.47	
SSa		314 17 00				
K1h		36 33 00				
L1a2		358 39 20				
La		343 59 40				
Mb		34 56 30				
K1a1		216 33 00				
Ug		294 44 40				

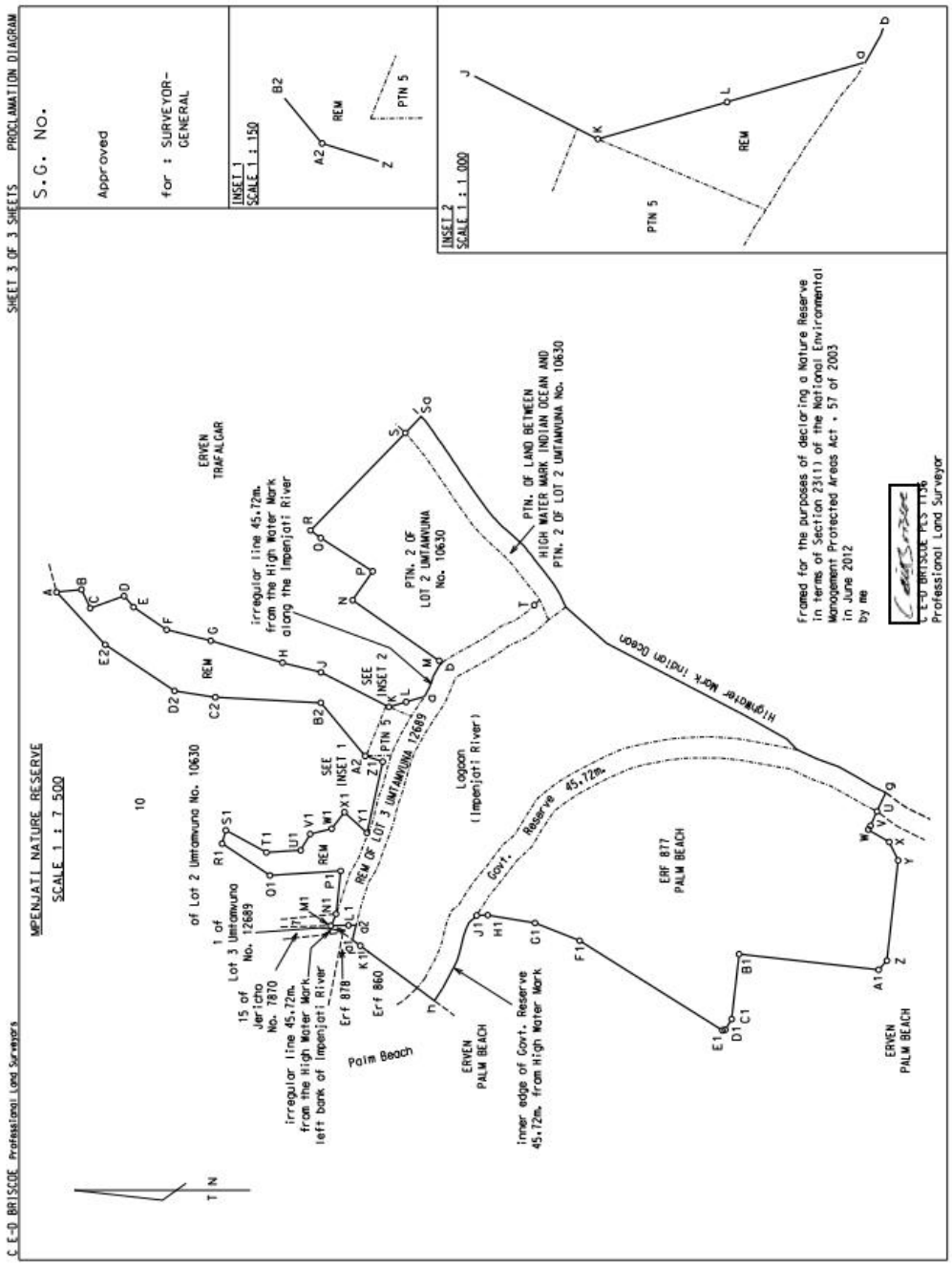
S.G. No.

Approved

for Surveyor-General

Framed for the purposes of declaring a Nature Reserve
in terms of Section 23(1) of the National Environmental
Management Protected Areas Act , 57 of 2003
in June 2012
by me

C E-D BRISCOE PLS 1136
Professional Land Surveyor


SHEET 3 OF 3 SHEETS PROCLAMATION DIAGRAM
S.G. No.
Approved
for : SURVEYOR-GENERAL
INSET 1
SCALE 1 : 150
INSET 2
SCALE 1 : 1 000
MPENJATI NATURE RESERVE
SCALE 1 : 7 500
framed for the purposes of declaring a Nature Reserve in terms of Section 23(1) of the National Environmental Management Protected Areas Act , 57 of 2003 in June 2012 by me
C E-D BRISCOE Professional Land Surveyor
ERVEN TRAFALGAR
irregular line 45.72m. from the High Water Mark along the Impenjati River
PTN. 2 OF LOT 2 UMTAMVUNA No. 10630
PTN. OF LAND BETWEEN HIGH WATER MARK INDIAN OCEAN AND PTN. 2 OF LOT 2 UMTAMVUNA No. 10630
HIGH WATER MARK Indian Ocean
Lagoon (Impenjati River)
Govt. Reserve 45.72m.
ERF 877 PALM BEACH
ERVEN PALM BEACH
Palm Beach
Erf 860
Erf 878
15 of Jericho No. 7870
1 of Lot 3 Umtamvuna No. 12689
of Lot 2 Umtamvuna No. 10630
REM OF LOT 3 UMTAMVUNA 12689
irregular line 45.72m. from the High Water Mark left bank of Impenjati River
inner edge of Govt. Reserve 45.72m. from High Water Mark
REM
PTN 5
SEE INSET 1
SEE INSET 2
10
T N

Appendix C 3 – Mpenjati Nature Reserve Public Participation Report, June 2013

This document is available as a separate report.

Appendix D – Listed activities requiring environmental authorisation in terms of Regulation R.546, Listing Notice No.3

If any of the following activities are proposed in a protected area, proclaimed in terms of the Protected Areas Act, or within five kilometres of one, they will be subject to either a basic assessment or full scoping and environmental impact assessment process:

- The construction of billboards exceeding 18 square metres in size.
- The construction of reservoirs for bulk water supply with a capacity of more than 250m^3.
- The construction of masts or towers of any material or type used for telecommunication broadcasting or radio transmission purposes where the mast:
    - Is to be placed on a site not previously used for this purpose.
    - Will exceed 15 metres in height but excluding attachments to existing buildings and masts on rooftops.
- The construction of a road wider than four metres with a reserve less than 13.5 metres.
- The construction of resorts, lodges or other tourism accommodation facilities.
- The conversion of existing structures to resorts, lodges or tourism accommodation facilities that sleep 15 people or more.
- The construction of aircraft landing strips and runways.
- The construction of above ground cableways and funiculars.
- The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good.
- The construction of tracks or routes for the testing, recreational use or outdoor racing of motor powered vehicles excluding conversion of existing tracks or routes for the testing, recreational use or outdoor racing of motor powered vehicles.
- The clearance of an area of 1ha or more of vegetation where 75% of the vegetative cover constitutes indigenous vegetation, except where such removal is required for:
    - The undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), in which case the activity is regarded to be excluded from this list.
    - The undertaking of a linear activity falling below the thresholds mentioned in Listing Notice 1 in terms of GN No.544 of 2010

The construction of facilities and infrastructure or structures of any size for any form of aquaculture *(this applies only inside a protected area, not within five kilometres of it)*.

- The construction of:
    - Jetties exceeding 10m^2 in size.
    - Slipways exceeding 10m^2 in size.
    - Buildings with a footprint exceeding 10m^2 in size.
    - Infrastructure covering 10m^2 or more.

    Where such construction occurs within a watercourse or within 32 metres of watercourse, measured from the edge of the watercourse, excluding where such construction will occur behind the development setback line.
- The expansion of reservoirs for bulk water supply where the capacity will be increased by more than 250m^3.
- The expansion of a resort, lodge, hotel and tourism or hospitality facilities where the development footprint will be expanded.
- The widening of a road by more than four metres or the lengthening of a road by more than one kilometre.
- The expansion of runways or aircraft landing strips where the expanded runways or aircraft landing strips will be longer than 1.4 kilometres in length.
- The expansion of above ground cableways and funiculars where the development footprint will be increased.
- The expansions of tracks or routes for the testing, recreational use or outdoor racing of motor powered vehicles excluding conversion of existing tracks or routes for the testing, recreational use or outdoor racing of motor powered vehicles, where the development footprint will be expanded.
- The expansions of facilities or infrastructure for the storage, or storage and handling of a dangerous good.
- The expansion of:
    - Jetties where the jetty will be expanded by 10m^2 in size or more.
    - Slipways where the slipway will be expanded by 10m^2 or more.
    - Buildings where the buildings will be expanded by 10m^2 or more in size.
    - Infrastructure where the infrastructure will be expanded by 10m^2 or more.

    Where such construction occurs within a watercourse or within 32 metres of watercourse, measured from the edge of the watercourse, excluding where such construction will occur behind the development setback line.
- The expansion of facilities, infrastructure or structures of any size for any form of aquaculture *(this applies only inside a protected area, not within five kilometres of it)*.
- Phased activities for all activities listed in the Schedule and as it applies to a specific geographical area, which commenced on or after the effectivee date of the Scheduulle, where any phase off the activity may be below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold.

Appendix E – Species lists

Plant species list for Mpenjati Nature Reserve

Plant list from KZN Wildlife Database

Phylum MAGNOLIOPHYTA (ANGIOSPERMIAE)
Class DICOTYLEDONAE(MAGNOLIIOPSIDA)
Family ANACARDIACEAE
*Harpephyllum caffrum**
*Protorhus longifolia**
*Searsia natalensis**
*Searsia nebulosa**

Family ANNONACEAE
*Annona senegalensis**
*Monanthotaxis caffra**
*Uvaria caffra**

Family ANTHERICACEAE
Anthericum cooperi

Family APIACEAE
Hydrocotyle bonariensis
Peucedanum capense var. *Capense*

Family APOCYNACEAE
Acokanthera oblongifolia
*Carissa bispinosa**
*Rauvolfia caffra**
*Voacanga thouarsii**

Family ARACEAE
Stylochiton natalensis

Family ARALIACEAE
*Cussonia spicata**

Family ASCLEPIADACEAE
Cynanchum natalitium

Family ASPARAGACEAE
*Asparagus setaceus**
*Protasparagus falcatus**

Family ASPHODELACEAE
*Smilax anceps**

Family ASTERACEAE
Achyrocline stenoptera
Berkheya speciosa lanceolata
*Brachylaena discolor**
*Chrysanthemoides monilifera**
Conyza scabrida
Helichrysum teretifolium

Senecio serratuloides var. dieterlenii
Tarchonanthus camphoratus
Vernonia oligocephala

Family BORAGINAEAE
*Cordia caffra**

Family BURSERACEAE
*Commiphora harveyi**

Family CAPPARACEAE
*Capparis sp.**

Family CELASTRACEAE
*Lauridia tetragona**
Maytenus procumbens
*Maytenus nemorosa (complex)**
*Maytenus procumbens**
*Putterlickia pyracantha**
*Putterlickia verrucosa**

Family CELTIDACEAE
*Celtis africana**
*Chaetachme aristata**
*Trema orientalis**

Family COMRETACEAE
*Combretum kraussii**

Family CONVOLVULACEAE
Ipomoea cairica
*Ipomoea pes-caprae**

Family DRACAENACEAE
*Dracaena aletriformis**

Family EBENACEAE
*Diospyros natalensis subsp. natalensis**
Euclea natalensis angustifolia

Family ERYTHROXYLACEAE
*Erythroxylum emarginatum**

Family EUPHORBIACEAE
*Antidesma venosum**
*Bridelia micrantha**
*Macaranga capensis**
*Sclerocroton integerrimum**

Family FABACEAE
*Dalbergia obovata**
Eriosema umtamvunense
*Erythrina caffra**
Indigofera rostrata
*Millettia grandis**
Mucuna gigantea Subsp. *gigantea*
Rhynchosia hirsuta

Family FLACOURTIACEAE
*Dovyalis rhamnoides**
*Scolopia zeyheri**

Family GOODENIACEAE
*Scaevola palmeri (thunbergii)**

Family ICACINACEAE
*Apodytes dimidiata**

Family LAMIACEAE
*Clerodendrum glabrum**

Family LAURACEAE
Cryptocarya latifolia

Family LECYTHIDACEAE
*Barringtonia racemosa**

Family LENTIBULARIACEAE
*Asystasia gangetica**

Family LOBELIACEAE
Lobelia caerulea var. Caerulea

Family MALVACEAE
*Abutilon sonneratianum**
Hibiscus diversifolius diversifolius
*Hibiscus tiliaceus**
Hibiscus trionum

Family MELIACEAE
*Ekebergia capensis**
Trichilia dregeana
*Trichilia emetica**
*Turraea floribunda**

Family MESEMBRYANTHEMACEAE
*Carpobrotus dimidiatus**

Family MIMOSACEAE
*Acacia ataxacantha**
*Acacia karroo**
*Adenopodia spicata**
*Albizia adianthifolia**
*Dichrostachys cinerea**

Family MORACEAE
*Ficus burtt-davyi**
*Ficus natalensis**
*Ficus sur**
*Ficus thonningii**

Family MYRICACEAE
Myrica serrata

Family MYRSINACEAE
*Embelia ruminata**

Family MYRTACEAE
*Eugenia capensis**
*Syzygium cordatum**

Family OCHANEAE
*Ochna sp.**

Family OLEACEAE
*Chionanthus peglerae**

Family ONAGRACEAE
Ludwigia octovalvis brevisepala

Family PASSIFLORACEAE
*Adenia gummifera**

Family PITTOSPORACEAE
*Pittosporum viridiflorum**

Family POLYGALACEAE
*Polygala myrtifolia**

Family POLYGONACEAE
Oxygonum dregeanum var. *Dregeanum*

Family RHAMNACEAE
Scutia myrtina

Family RHIZOPHORACEA
*Cassipourea gummiflua**

Family RUBIACEAE
*Burchellia bubalina**
*Canthium ciliatum**
*Canthium inerme**
Canthium spinosum
*Catunaregam obovata (spinosum)**
*Coddia rudis**
Gardenia thunbergia
*Kraussia floribunda**
*Pavetta revoluta**
*Psychotria capensis**
*Psydrax obovata**

Family RUTACEAE
*Clausena anisata**
*Teclea natalensis**
*Zanthoxylum capense**

Family SAPINDACEAE
*Allophylus natalensis**
*Deinbollia oblongifolia**
*Dodonaea angustifolia**
*Dodonaea viscosa**
*Hippobromus pauciflorus**

Family SAPOTACEAE
*Englerophytum natalense**
*Mimusops caffra**
Sideroxylon inerme

Family SCROPHULARIACEAE
Graderia scabra
Halleria lucida

Family TILIACEAE
*Grewia caffra**
*Grewia occidentalis**

Family THYMELEACEAE
*Peddiea africana**

Family VITACEAE
Rhoicissus digitata
*Rhoicissus revoilii**
*Rhoicissus rhomboidea**
*Rhoicissus sessilifolia**
*Rhoicissus tomentosa**

Class MONOCOTYLEDONAE(Liliopsida)
Family ARECACEAE
*Hyphaene coriacea**
*Phoenix reclinata**

Family ASPHODELACEAE
*Aloe thraskii**Bulbine asphodeloides*
Kniphofia littoralis
Kniphofia rooperi

Family COMMELINACEAE
*Aneilema aequinoctiale**

Family CYPERACEAE (Sedges)
Cyperus platycaulis
Mariscus capensis
Pycreus atribulbus
Pycreus polystachyos var. laxiflorus
*Typha capensis**

Family FLAGELLARIACEAE
*Flagellaria guineensis**

Family GERANIACEAE
*Pelargonium spp.**

Family HYACINTHACEAE
Ornithogalum tenuifolium tenuifolium

Family HYPOXIDACEAE
Hypoxis costata

Family IRIDACEAE
*Gladiolus longicollis**
*Tritonia sp.**

Family JUNCACEAE
Juncus kraussii effusus
Juncus kraussii
Juncus lomatophyllus
Prionium serratum

Family ORCHIDACEAE (Orchids)
*Brachycorythis ovata**
Eulophia foliosa

Family Poaceae (Grasses & Reeds)
Imperata cylindrica
Phragmites australis

Phylum PTEROPHYTA (Ferns)
Class FILICOPSIDA (FILICOPSIDA)
Family PTERIDACEAE
Cheilanthes viridis var. *glauca*

Family STRELITZIACEA
*Strelitzia nicolai**

Source: Ezemvelo KZN Wildlife Database; *Old management plan

Terrestrial alien plant species in Mpenjati Nature Reserve

Acacia mearnsii	Black Wattle
Ageratum conyzoides	Invading Ageratum
Ageratum houstonianum	Mexican Ageratum
Albizia lebbeck	Lebbeck
Anredera cordifolia	Madeira Vine
Campuloclinium macrocephalum	Pom Pom Weed
Cardiospermum grandiflorum	Balloon Vine
Cestrum laevigatum	Inkberry
Chromolaena odorata	Triffid Weed
Cinnamomum camphora	Camphor
Ipomoea indica	Morning Glories
Lantana camara	Tickberry
Montanoa hibiscifolia	Tree Daisy
Ricinus communis	Castor-oil
Salvinia molesta	Kariba Weed
Schinus terebinthifolius	Brazilian Pepper
Senna didymobotrya	Peanut-butter Cassia
Solanum mauritianum	Bugweed

Source: Trafalgar Conservation Group

Mammal species found in Mpenjati Nature Reserve

Family HERPESTIDAE (Mongoose)	
Herpestes ichneumon cafer	Large grey mongoose
Family MUSTELIDAE (Otters, Weasels, Polecat, Honey badgers)	
Aonyx capensis capensis	Cape clawless otter, African clawless otter
Family BOVIDAE (Antelopes)	
Philantomba monticola bicolor	Blue duiker
Sylvicapra grimmia	Common duiker, Grey duiker
Tragelaphus scriptus	Bushbuck
Cephalophus natalensis	Red duiker
Genetta tigrina *	Large-spotted genet

Source Ezemvelo KZN Wildlife database and Rowe-Rowe*, 1992

Birds of Mpenjati Nature Reserve

	Common Name	*Scientific Name*
3	African Penguin (Jackass Penguin)[13]	*Spheniscus demersus*
8	Little Grebe (Dabchick)[2]	*Tachybaptus ruficollis*
14	Atlantic Yellow-nosed Albatross (Yellow-nosed Albatross)[13]	*Diomedea chlororhynchos*
30	Slender-billed Prion[13]	*Pachyptila belcheri*
32	White-chinned Petrel[13]	*Procellaria aequinoctialis*
49	Great White Pelican (Eastern White Pelican)[13]	*Pelecanus onocrotalus*
50	Pink-backed Pelican[2]	*Pelecanus rufescens*
53	Cape Gannet[123]	*Morus capensis*
55	White-breasted Cormorant[123]	*Phalacrocorax lucidus*
56	Cape Cormorant[13]	*Phalacrocorax capensis*
58	Reed Cormorant[123]	*Phalacrocorax africanus*
60	African Darter (Darter)[123]	*Anhinga rufa*
62	Grey Heron[123]	*Ardea cinerea*
63	Black-headed Heron[123]	*Ardea melanocephala*
64	Goliath Heron[123]	*Ardea goliath*
65	Purple Heron[2]	*Ardea purpurea*
66	Great Egret (Great White Egret)[13]	*Egretta alba*
67	Little Egret[123]	*Egretta garzetta*
68	Yellow-billed Egret[2]	*Egretta intermedia*
69	Black Heron (Black Egret)[2]	*Egretta ardesiaca*
71	Cattle Egret[123]	*Bubulcus ibis*
72	Squacco Heron[13]	*Ardeola ralloides*
74	Green-backed Heron[123]	*Butorides striatus*
76	Black-crowned Night Heron[2]	*Nycticorax nycticorax*
81	Hamerkop[123]	*Scopus umbretta*
83	White Stork[13]	*Ciconia ciconia*
86	Woolly-necked Stork[123]	*Ciconia episcopus*
91	African Sacred Ibis (Sacred Ibis)[123]	*Threskiornis aethiopicus*
94	Hadeda Ibis[123]	*Bostrychia hagedash*
95	African Spoonbill[2]	*Platalea alba*
96	Greater Flamingo[1]	*Phoenicopterus ruber*
99	White-faced Duck[123]	*Dendrocygna viduata*
101	White-backed Duck[2]	*Thalassornis leuconotus*
102	Egyptian Goose[123]	*Alopochen aegyptiacus*
104	Yellow-billed Duck[123]	*Anas undulata*
105	African Black Duck[123]	*Anas sparsa*
112	Cape Shoveler[2]	*Anas smithii*

	Common Name	*Scientific Name*
116	Spur-winged Goose[123]	*Plectropterus gambensis*
118	Secretarybird[13]	*Sagittarius serpentarius*
122	Cape Vulture[13]	*Gyps coprotheres*
126	Yellow-billed Kite[123]	*Milvus parasitus*
127	Black-shouldered Kite[123]	*Elanus caeruleus*
139	Long-crested Eagle[123]	*Lophaetus occipitalis*
141	African Crowned Eagle[2]	*Stephanoaetus coronatus*
148	African Fish Eagle[23]	*Haliaeetus vocifer*
149	Steppe Buzzard[2]	*Butea vulpinus*
157	Little Sparrowhawk[123]	*Accipiter minullus*
158	Black Sparrowhawk[2]	*Accipiter melanoleucas*
160	African Goshawk[123]	*Accipiter tachiro*
165	African Marsh Harrier[13]	*Circus ranivorus*
169	African Harrier-Hawk (Gymnogene)[123]	*Polyboroides typus*
170	Osprey[123]	*Pandion haliaetus*
171	Peregrine Falcon[2]	*Falco peregrinus*
172	Lanner Falcon[123]	*Falco biarmicus*
180	Amur Falcon (Eastern Red-footed Falcon)[2]	*Falco amurensis*
196	Natal Spurfowl (Natal Francolin)[123]	*Pternistis natalensis*
200	Common Quail[13]	*Coturnix coturnix*
203	Helmeted Guineafowl[13]	*Numida meleagris*
204	Crested Guineafowl[13]	*Guttera pucherani*
205	Small Buttonquail (Kurrichane Buttonquail)[1]	*Turnix sylvaticus*
207	Wattled Crane[3]	*Bugeranus carunculata*
209	Crowned Crane[3]	*Balearica regulorum*
209	Grey Crowned Crane (Southern Crowned Crane)[1]	*Balearica regulorum*
213	Black Crake[2]	*Amaurornis flavirostris*
217	Red-chested Flufftail[12]	*Sarothrura rufa*
218	Buff-spotted Flufftail[2]	*Sarothrura elegens*
229	African Finfoot[2]	*Podica senegalensis*
240	African Jacana[13]	*Actophilornis africanus*
243	Eurasian Oystercatcher (European Oystercatcher)[12]	*Haematopus ostralegus*
244	African Black Oystercatcher[2]	*Haematopus moquini*
245	Common Ringed Plover[2]	*Charadrius hiaticula*
246	White-fronted Plover[123]	*Charadrius marginatus*
248	Kittlitz's Plover [2]	*Charadrius pecuarius*
249	Three-banded Plover[123]	*Charadrius tricollaris*
251	Greater Sand Plover[2]	*Charadrius leschenaultii*

	Common Name	*Scientific Name*
254	Grey Plover[123]	*Pluvialis squatarola*
255	Crowned Lapwing (Crowned Plover)[123]	*Vanellus coronatus*
258	Blacksmith Lapwing (Blacksmith Plover)[123]	*Vanellus armatus*
260	African Wattled Lapwing (Wattled Plover)[13]	*Vanellus senegallus*
262	Ruddy Turnstone[2]	*Arenaria interpres*
263	Terek Sandpiper[2]	*Xenus cinereus*
264	Common Sandpiper[123]	*Actitis hypoleucos*
266	Wood Sandpiper[2]	*Tringa glareola*
269	Marsh Sandpiper[2]	*Tringa stagnatilis*
270	Common Greenshank (Greenshank)[123]	*Tringa nebularia*
272	Curlew Sandpiper[2]	*Calidris ferruginea*
274	Little Stint[2]	*Calidris minuta*
281	Sanderling[123]	*Calidris alba*
284	Ruff[2]	*Philomachus pugnax*
288	Bar-tailed Godwit[2]	*Limosa japonica*
290	Common Whimbrel[2]	*Numenius phaeopus*
295	Black-winged Stilt[2]	*Himantopus himantopus*
297	Spotted Thick-knee (Spotted Dikkop)[12]	*Burhinus capensis*
298	Water Thick-knee (Water Dikkop)[123]	*Burhinus vermiculatus*
307	Parasitic Jaeger (Arctic Skua)[2]	*Stercorarius parasiticus*
312	Kelp Gull[123]	*Larus dominicanus*
315	Grey-headed Gull[123]	*Larus cirrocephalus*
322	Caspian Tern[123]	*Sterna caspia*
324	Swift Tern[123]	*Sterna bergii*
325	Lesser Crested Tern[2]	*Sterna bengalensis*
326	Sandwich Tern[123]	*Sterna sandvicensis*
327	Common Tern[123]	*Sterna hirundo*
328	Arctic Tern[123]	*Sterna paradisaea*
335	Little Tern[2]	*Sterna albifrons*
338	Whiskered Tern[13]	*Chlidonias hybridus*
348	Rock Dove (Feral Pigeon)[2]	*Columba livia*
349	Speckled Pigeon (Rock Pidgeon)[2]	*Coliumba guinea*
352	Red-eyed Dove[123]	*Streptopelia semitorquata*
354	Cape Turtle Dove[123]	*Streptopelia capicola*
355	Laughing Dove[123]	*Streptopelia senegalensis*
356	Namaqua Dove[13]	*Oena capensis*
358	Emerald-spotted Wood-Dove (Greenspotted Dove)[2]	*Turtur chalcospilos*
359	Tambourine Dove[123]	*Turtur tympanistria*

	Common Name	*Scientific Name*
360	Lemon Dove (Cinnamon Dove)[123]	*Aplopelia larvata*
361	African Green-Pigeon (Green Pigeon)[123]	*Treron calvus*
370	Knysna Turaco (Knysa Lourie)[123]	*Tauraco corythaix*
371	Purple-crested Turaco (Purple-crested Lourie)[123]	*Gallirex porphyreolophus*
375	African Cuckoo[13]	*Cuculus gularis*
377	Red-chested Cuckoo[13]	*Cuculus solitarius*
378	Black Cuckoo[2]	*Cuculus clamosus*
384	African Emerald Cuckoo (Emerald Cuckoo)[13]	*Chrysococcyx cupreus*
385	Klaas's Cuckoo[123]	*Chrysococcyx klaas*
386	Diderick Cuckoo (Diederik Cuckoo)[123]	*Chrysococcyx caprius*
391	Burchell's Coucal[123]	*Centropus burchellii*
392	Barn Owl[13]	*Tyto alba*
395	Marsh Owl[13]	*Asio capensis*
396	African Scops-Owl (Scops Owl)[13]	*Otus senegalensis*
401	Spotted Eagle Owl[13]	*Bubo africanus*
404	European Nightjar[13]	*Caprimulgus europaeus*
405	Fierynecked Nightjar[123]	*Caprimulgus pectoralis*
412	African Black Swift (Black Swift)[123]	*Apus barbatus*
415	White-rumped Swift[123]	*Apus caffer*
417	Little Swift[123]	*Apus affinis*
418	Alpine Swift[123]	*Tachymarptis melba*
421	African Palm-Swift (Palm Swift)[123]	*Cypsiurus parvus*
424	Speckled Mousebird[123]	*Colius striatus*
426	Red-faced Mousebird[2]	*Urocolius indicus*
427	Narina Trogon[123]	*Apaloderma narina*
428	Pied Kingfisher[123]	*Ceryle rudis*
429	Giant Kingfisher[123]	*Megaceryle maximus*
430	Half-collared Kingfisher[2]	*Alcedo semitorquata*
431	Malachite Kingfisher[123]	*Alcedo cristata*
432	African Pygmy-Kingfisher[2]	*Ispidina picta*
435	Brown-hooded Kingfisher[123]	*Halcyon albiventris*
438	European Bee-eater[2]	*Merops apiaster*
444	Little Bee-eater[123]	*Merops pusillus*
446	European Roller[2]	*Coracias garrulus*
451	African Hoopoe (Hoopoe)[123]	*Upupa africana*
452	Green Wood-Hoopoe (Red-billed Woodhoopoe)[123]	*Phoeniculus purpureus*
455	Trumpeter Hornbill[123]	*Bycanistes bucinator*
460	Crowned Hornbill[123]	*Tockus alboterminatus*

	Common Name	*Scientific Name*
463	Southern Ground-Hornbill (Ground Hornbill)[13]	*Bucorvus leadbeateri*
464	Black-collared Barbet[123]	*Lybius torquatus*
469	Red-fronted Tinkerbird (Red-fronted Tinker Barbet)[123]	*Pogoniulus pusillus*
471	Yellow-rumped Tinkerbird (Goldenrumped Tinker Barbet)[123]	*Pogoniulus bilineatus*
473	Crested Barbet[123]	*Trachyphonus vaillantii*
474	Greater Honeyguide[2]	*Indicator indicator*
475	Scaly-throated Honeyguide[2]	*Indicator variegatus*
476	Lesser Honeyguide[2]	*Indicator minor*
478	Brown-backed Honeybird (Sharpbilled Honeyguide)[123]	*Prodotiscus regulus*
483	Golden-tailed Woodpecker[123]	*Campethera abingoni*
486	Cardinal Woodpecker[123]	*Dendropicos fuscescens*
488	Olive Woodpecker[2]	*Dendropicos griseocephalus*
489	Red-throated Wryneck[123]	*Jynx ruficollis*
494	Rufous-naped Lark[123]	*Mirafra africana*
518	Barn Swallow (European Swallow)[123]	*Hirundo rustica*
520	White-throated Swallow[123]	*Hirundo albigularis*
526	Greater Striped Swallow[2]	*Hirunda cucullata*
527	Lesser Striped Swallow[123]	*Hirundo abyssinica*
529	Rock Martin[123]	*Hirundo fuligula*
533	Brown-throated Martin[2]	*Riparia paludicola*
536	Black Sawwing Swallow[123]	*Psalidoprocne holomelas*
538	Black Cuckooshrike[123]	*Campephaga flava*
540	Grey Cuckooshrike[2]	*Coracina caesia*
541	Fork-tailed Drongo[123]	*Dicrurus adsimilis*
542	Square-tailed Drongo[123]	*Dicrurus ludwigii*
543	Eurasian Golden Oriole (European Golden Oriole)[13]	*Oriolus oriolus*
545	Blackheaded Oriole[123]	*Oriolus larvatus*
547	Black Crow[3]	*Corvus capensis*
547	Cape Crow (Black Crow)	*Corvus capensis*
548	Pied Crow[123]	*Corvus albus*
550	White-necked Raven[123]	*Corvus albicollis*
554	Southern Black Tit[123]	*Parus niger*
568	Dark-capped Bulbul (Blackeyed Bulbul)[13]	*Pycnonotus tricolor*
569	Terrestrial Brownbul (Terrestrial Bulbul)[123]	*Phyllastrephus terrestris*
572	Sombre Greenbul (Sombre Bulbul)[123]	*Andropadus importunus*
574	Yellow-bellied Greenbul (Yellow-bellied Bulbul)[13]	*Chlorocichla flaviventris*
577	Olive Thrush[123]	*Turdus olivaceus*
578	Spotted Ground-Thrush (Spotted Thrush)[123]	*Zoothera guttata*

	Common Name	*Scientific Name*
596	African Stonechat (Common Stonechat)[123]	*Saxicola torquata*
600	Red-capped Robin-Chat (Natal Robin)[123]	*Cossypha natalensis*
601	Cape Robin-Chat (Cape Robin)[123]	*Cossypha caffra*
613	White-browed Scrub-Robin (White-browed Robin)[123]	*Cercotrichas leucophrys*
616	Brown Scrub-Robin (Brown Robin)[123]	*Cercotrichas signata*
631	African Marsh Warbler (African Reed-Warbler)[13]	*Acrocephalus baeticatus*
635	Lesser Swamp-Warbler (Cape Reed Warbler)[123]	*Acrocephalus gracilirostris*
638	Little Rush-Warbler (African Sedge Warbler)[2]	*Bradypterus baboecala*
639	Barratt's Warbler[123]	*Bradypterus barratti*
642	Broad-tailed Warbler[2]	*Schoenicola brevirostris*
644	Yellow-throated Woodland-Warbler[2]	*Phylloscopus ruficapilla*
645	Bar-throated Apalis[2]	*Apalis thoracica*
648	Yellow-breasted Apalis[123]	*Apalis flavida*
657	Green-backed Camaroptera (Bleating Warbler)[123]	*Camaroptera brachyura*
661	Cape Grassbird[2]	*Spheniscus afer*
664	Zitting Cisticola (Fantailed Cisticola)[2]	*Cisticola juncidis*
672	Rattling Cisticola[123]	*Cisticola chiniana*
674	Red-faced Cisticola[123]	*Cisticola erythrops*
675	Rufous-winged Cisticola (Blackbacked Cisticola)[123]	*Cisticola galactotes*
677	Levaillant's Cisticola[123]	*Cisticola tinniens*
678	Croaking Cisticola[123]	*Cisticola natalensis*
679	Lazy Cisticola[123]	*Cisticola aberrans*
681	Neddicky[123]	*Cisticola fulvicapilla*
683	Tawny-flanked Prinia[123]	*Prinia subflava*
689	Spotted Flycatcher[2]	*Muscicapa striata*
690	African Dusky Flycatcher (Dusky Flycatcher)[123]	*Muscicapa adusta*
691	Ashy Flycatcher (Blue-grey Flycatcher)[123]	*Muscicapa caerulescens*
694	Southern Black Flycatcher (Black Flycatcher)[123]	*Melaenornis pammelaina*
698	Fiscal Flycatcher[2]	*Sigelus silens*
700	Cape Batis[123]	*Batis capensis*
701	Chinspot Batis[123]	*Batis molitor*
710	African Paradise-Flycatcher (Paradise Flycatcher)[123]	*Terpsiphone viridis*
711	African Pied Wagtail[123]	*Motacilla aguimp*
713	Cape Wagtail[123]	*Motacilla capensis*
718	Plain-backed Pipit[2]	*Anthus leucophrys*
727	Cape Longclaw (Orangethroated Longclaw)[2]	*Macronyx capensis*
728	Yellow-throated Longclaw[123]	*Macronyx croceus*
732	Common Fiscal (Fiscal Shrike)[123]	*Lanius collaris*

	Common Name	*Scientific Name*
736	Southern Boubou[123]	*Laniarius ferrugineus*
740	Black-backed Puffback (Puffback)[123]	*Dryoscopus cubla*
742	Southern Tchagra[123]	*Tchagra tchagra*
744	Black-crowned Tchagra[123]	*Tchagra senegalus*
746	Bokmakierie[13]	*Telophorus zeylonus*
751	Grey-headed Bush-Shrike[123]	*Malaconotus blanchoti*
757	Common Starling (European Starling)[2]	*Sturnus vulgaris*
758	Common Myna (Indian Myna)[123]	*Acridotheres tristis*
761	Violet-backed Starling (Plumcoloured Starling)[123]	*Cinnyricinclus leucogaster*
764	Cape Glossy Starling (Glossy Starling)[123]	*Lamprotornis nitens*
768	Black-bellied Starling[123]	*Lamprotornis corruscus*
769	Red-winged Starling[123]	*Onychognathus morio*
775	Malachite Sunbird[13]	*Nectarinia famosa*
780	Purple-banded Sunbird[2]	*Cinnyris bifasciatus*
783	Southern (Lesser) Double-collared Sunbird[123]	*Cinnyris chalybeus*
785	Greater Double-collared Sunbird[2]	*Cinnyris afer*
789	Grey Sunbird[123]	*Cyanomitra veroxii*
790	Olive Sunbird[123]	*Cyanomitra olivacea*
791	Scarlet-chested Sunbird[123]	*Chalcomitra senegalensis*
792	Amethyst Sunbird (Black Sunbird)[123]	*Chalcomitra amethystina*
793	Collared Sunbird[123]	*Hedydipna collaris*
796	Cape White-eye[123]	*Zosterops pallidus*
801	House Sparrow[123]	*Passer domesticus*
803	Cape Sparrow[13]	*Passer melanurus*
804	Southern Grey-headed Sparrow[123]	*Passer diffusus*
807	Thick-billed Weaver[123]	*Amblyospiza albifrons*
808	Dark-backed Weaver (Forest Weaver)[123]	*Ploceus bicolor*
810	Spectacled Weaver[123]	*Ploceus ocularis*
811	Village Weaver (Spottedbacked Weaver)[123]	*Ploceus cucullatus*
813	Cape Weaver[123]	*Ploceus capensis*
816	Golden Weaver[123]	*Ploceus xanthops*
817	Yellow Weaver[123]	*Ploceus subaureus*
821	Red-billed Quelea[2]	*Quelea quelea*
822	Red-headed Quelea[2]	*Quelea erythrops*
824	Southern Red Bishop (Red Bishop)[123]	*Euplectes orix*
828	Fan-tailed Widowbird (Redshouldered Widow)[123]	*Euplectes axillaris*
831	Red-collared Widowbird (Red-Collared Widow)[123]	*Euplectes ardens*
832	Long-tailed Widowbird (Long-tailed Widow)[13]	*Euplectes progne*

	Common Name	*Scientific Name*
834	Green-winged Pytilia (Melba Finch)[13]	*Pytilia melba*
835	Green Twinspot[2]	*Mandingoa nitidula*
840	African Firefinch (Bluebilled Firefinch)[123]	*Lagonosticta rubricata*
842	Red-billed Firefinch[1]	*Lagonosticta senegala*
846	Common Waxbill[123]	*Estrilda astrild*
848	Grey Waxbill[2]	*Estrilda perreini*
850	Swee Waxbill[2]	*Coccopygia melanotis*
854	Orange-breasted Waxbill[2]	*Sporaeginthus subflavus*
857	Bronze Mannikin[123]	*Spermestes cucullatus*
858	Red-backed Mannikin[123]	*Lonchura nigriceps*
859	Magpie Mannikin (Pied Mannikin)[2]	*Lonchura fringilloides*
860	Pin-tailed Whydah[123]	*Vidua macroura*
864	Dusky Indigobird (Black Widowfinch)[2]	*Vidua funerea*
869	Yellow-fronted Canary (Yellow-eyed Canary)[123]	*Crithagra mozambicus*
872	Cape Canary[123]	*Serinus canicollis*
873	Forest Canary[2]	*Crithagra scotops*
877	Brimstone Canary (Bully Canary)[123]	*Crithagra sulpuratus*
881	Streaky-headed Seed-eater (Streaky-headed Canary)[2]	*Crithagra gularis*
884	Golden-breasted Bunting[13]	*Emberiza flaviventris*

Sources: [1] Ezemvelo KZN Wildlife Database; [2] Trogons Bird Club; [3] Natal Parks Board staff – 19/05/1992 (R. Boatwright, L. Holburn, R. Horner, A.H. Sinclair, D.N. Johnson, A.N. Marchant, R. Potter)

Reptiles of Mpenjati Nature Reserve

No verified records of reptiles occurring in Mpenjati are contained in the Ezemvelo KZN Wildlife Database. The following list was compiled by the Trafalgar Conservation Group and requires verification.

Species	Common name
Afroedura pondolia	Pondo flat gecko
Atractaspis bibronii	Stiletto snake
Bitis arietans	Puff adder
Causus rhombeatus	Common rhombic night adder
Chamaeleo dilepis	Flap-necked chameleon
Crotaphopeltis hotamboeia	Red-lipped snake (Herald)
Dendroaspis angusticeps	Green mamba
Dendroaspis polylepis	Black mamba
Dispholidus typus	Boomslang
Duberria lutrix	Common slug-eater
Hemachatus haemachatus	Rinkhals
Hemidactylus mabouia	Moreau's tropical house gecko
Lamprophis aurora	Aurora house snake
Lamprophis capensis	Brown house snake
Lamprophis inornatus	Olive house snake
Leptotypholops conjunctus	Cape thread snake
Lycodonomorphus rufulus	Common brown water snake
Mabuya homalocephala	Red-sided skink
Macrelaps microlepidotus	Natal black snake
Naja melanoleuca	Forest cobra
Philothamnus hoplogaster	Green water snake
Philothamnus natalensis	Eastern (Natal) green snake
Philothamnus semivariegatus	Spotted bush snake
Psammophis mossambicus	Olive grass snake
Psammophylax rhombeatus	Spotted skaapsteker
Pseudaspis cana	Mole snake
Tropidosaura montana	Common mountain lizard
Varanus niloticus	Nile monitor

Amphibians of Mpenjati Nature Reserve

Family ARTHROLEPTIDAE (Squeakers & Tree Frogs)

Arthroleptis wahlbergii	Bush squeaker

Family BUFONIDAE (Toads)

Bufo gutturalis	Guttural toad
Bufo rangeri	Raucous toad

Family HYPEROLIIDAE (Leaf-folding & reed frogs; kassinas)

Afrixalus fornasinii	Greater leaf-folding frog
Afrixalus spinifrons spinifrons	Natal leaf-folding frog
Hyperolius acuticeps	Sharp-nosed reed frog
Hyperolius marmoratus	Painted reed frog
Hyperolius pusillus	Water lily frog
Hyperolius semidiscus	Yellow-striped reed frog
Kassina senegalensis	Bubbling kassina
Leptopelis natalensis	Natal tree frog

Family PETROPEDETIDAE (Moss & Puddle Frogs, Cacos)

Anhydrophryne hewitti	Natal moss frog
Cacosternum boettgeri	Boettger's caco
Cacosternum nanum nanum	Bronze caco
Phrynobatrachus natalensis	Snoring puddle frog

Family RANIDAE (Bullfrogs; river, grass, stream & sand frogs)

Ptychadena oxyrhynchus	Sharp-nosed grass frog
Ptychadena porosissima	Striped grass frog
Tomopterna natalensis	Natal sand frog

Fish species found in Mpenjati Nature Reserve

Bony Fish

Family AMBASSIDAE (Asiatic glassfishes)	
Ambassis natalensis	Slender Glassy
Ambassis productus	Longspine Glassy
Family ANGUILLIDAE (Anguilla Eels – Freshwater Fish)	
*Anguilla marmorata**	Giant Mottled Eel
*Anguilla mossambica***	Longfin eel
Family CARANGIDAE (Kingfish, Leervis, Queenfish, etc)	
Caranx ignobilis	Giant kingfish, Giant trevally
*Caranx sexfaciatus**	Bigeye Kingfish
Caranx sexfasciatus	Bigeye kingfish
Family CICHILIDAE (Cichlids)	
Oreochromis mossambicus	Mozambique tilapia
*Pseudocrenilabrus philander***	Southern mouthbrooder
Family CIPRINIDAE (Carp/Minnows – Freshwater Fish)	
*Labeobarbus natalensis**	KZN Yellowfish
Family CLUPEIDAE (Herrings, Shads, Sardines, Menhadens)	
Gilchristella aestuaria	Estuarine round-herring
Family ELOPIDAE (Ladyfish)	
*Megalops cyprinoides***	Oxeye Tarpon
Family GOBIIDAE (Gobies)	
Caffrogobius gilchristi	Prison Goby
Caffrogobius natalensis	Baldy
*Chonophorus aeneofuscus***	Freshwater goby
Croilia mossambica	Burrowing goby
Glossogobius callidus	River goby
Glossogobius giuris	Tank goby
Oligolepis acutipennis	Sharptail goby
Family ELEOTRIDAE (Sleeper Gobies)	
*Eleotris fusca**	Dusky Sleeper
Family HAEMULIDAE (Rubberlips & Grunters)	
Pomadasys commersonnii	Smallspotted grunter
Family LUTJANIDAE (Jobfish & Snappers)	
Lutjanus fulviflamma	Dory snapper/Spotsnapper
Family MONODACTYLIDAE (Moonies)	
*Monodactylus argenteus**	Round Mooney
Monodactylus falciformis	Oval Moony
Family MUGILIDAE (Mullets)	
Liza dumerilii	Groovy mullet
Liza macrolepis	Large-scale mullet
Mugil cephalus	Flathead mullet
Myxus capensis	Freshwater mullet

Family OSTRACIIDAE (Boxfish)	
Lactoria cornuta	Longhorn cowfish
Family PLATYCEPHALIDAE (Flatheads)	
Platycephalus indicus	Bartail flathead
FAMILY SCIAENIDAE (Kob, Geelbek & Baardman)	
Argyrosomus japonicus	Dusky kob
Family SERRANIDAE (Rockcods, Goldies, Seabasses & Soapfish)	
Epinephelus andersoni	Catface rockcod, Catface grouper
Family SOLEIDAE (Soles)	
Solea bleekeri	Blackhand sole
Family SPARIDAE (Porgies & Seabream)	
*Acanthopagrus berda**	River Bream
Rhabdosargus holubi	Cape stumpnose
Rhabdosargus sarba	Natal stumpnose
Family SYGNATHIDAE (Pipefishes and seahorses)	
Hippichthys heptagonus	Belly pipefish
Family TERAPONTIDAE (Thornfish)	
Terapon jarbua	Thornfish
Family TETRAODONTIDAE (Puffers [Blaasops], Tobies & Blowfish)	
Amblyrhynchotes honckenii	Evileye blaasop

Sharks and Rays

Class ELASMOBRANCHII (Sharks and Rays)	
Order CARCHARHINIFORMES	
Family CARCHARHINIDAE	
*Carcharhinus Leucas***	Zambezi Shark
Order PRISTIFORMES	
Family PRISTIDAE	
*Pristis microdon***	Smalltooth sawfish

Source: Ezemvelo KZN Wildlife Database; R Karssing, 2009 (marked with *); Old Management Plan (marked with **)

Invertebrates of Mpenjati Nature Reserve

Millipedes

Class DIPLOPODA (Millipedes)
Order SPIROBOLIDA (Red Millipedes)
Family PACHYBOLIDAE
Centrobolus inscriptus

Family SPIROSTREPTIDA (Typical Millipedes)
Spinotarsus costatus
Doratogonus montanus — Montane black millipede

Earthworms

Class Clitellata
Order OLIGOCHAETA
Pontoscolex corethrurus
Amynthas minimus
Amynthas rodericensis
Geogenia pondoana — Pondoland Earthworm

Insects

Class INSECTA
Order DIPTERA (Flies)
Family TABANIDAE (horseflies)
Haematopota obscura — Obscure Tabanid Fly

Order LEPIDOPTERA (RHOPALOCERA) (Butterflies)
Family HESPERIDAE) (Skippers)

Artitropa erinnys erinnys	Bush Nightfighter
Coeliades forestan forestan	Striped Policeman
Gegenes hottentota	Marsh Hottentot Skipper
Metisella metis	Gold-spotted Sylph
Moltena fiara	Banana-Tree Nightfighter
Netrobalane canopus	Buff-Tipped Skipper
Spialia spio	Mountain Sandman
Tagiades flesus	Clouded Flat

Family LYCAENIDAE (Blues, Coppers & Hairtails)

Alaena amazoula amazoula	Yellow Zulu
Anthene butleri livida	Pale Hairtail
Anthene definita definita	Common Hairtail
Anthene lemnos lemnos	Large Hairtail
Baliochila aslanga	Common Buff
Cacyreus lingeus	Bush Bronze
Cacyreus marshalli	Common Geranium Bronze
Chilades trochylus	Grass Jewel Blue
Cigaritis natalensis	Natal Bar
Eicochrysops hippocrates	White-tipped Blue
Eicochrysops messapus	
Hypolycaena buxtoni buxtoni	Buxton's Hairstreak
Hypolycaena philippus philippus	Purple-brown Hairstreak
Iolaus pallene	Saffron Sapphire
Iolaus sidus	Red-line Sapphire
Iolaus silas	Southern Sapphire
Lachnocnema bibulus	Common Woolly Legs

Lampides boeticus	Lucerne Blue
Lepidochrysops patricia	Patricia Blue

Order LEPIDOPTERA (RHOPALOCERA) (Butterflies)

Family LYCAENIDAE (Blues, Coppers & Hairtails) Continued.....

Myrina dermaptera dermaptera	Lesser Fig-tree Blue
Myrina silenus ficedula	Common Fig-tree Blue
Pentila tropicalis tropicalis	Spotted Buff
Tuxentius melaena	Black Pie
Zizula hylax	Gaika Blue

Family NYMPHALIDAE (CHARAXINAE) (Charaxes)

Charaxes brutus natalensis	White-barred Charaxes
Charaxes candiope	Green-veined Charaxes
Charaxes cithaeron cithaeron	Blue-spotted Charaxes
Charaxes druceanus moerens	
Charaxes ethalion ethalion	Satyr Charaxes
Charaxes zoolina zoolina	Club-tailed Charaxes

Family NYMPHALIDAE (DANAINAE) (Monarchs)

Amauris albimaculata albimaculata	Layman Friar
Amauris ochlea ochlea	Novice Friar
Danaus chrysippus orientis	African Monarch

Family NYMPHALIDAE (HELICONIINAE) (Acreas)

Acraea horta	Garden Acraea
Acraea natalica natalica	Natal Acraea
Acraea petraea	Blood-red Acraea
Bematistes aganice aganice	Common Wanderer
Pardopsis punctatissima	Polka Dot

Family NYMPHALIDAE (LIBYTHEINAE) (Snout Butterflies)

Libythea labdaca laius	African Snout

Family NYMPHALIDAE (NYMPHALINAE) (Brush-footed Butterflies)

Antanartia hippomene hippomene	Short-tailed Admiral
Catacroptera cloanthe cloanthe	Pirate
Cymothoe alcimeda	Trimen's Battling Glider
Eurytela dryope angulata	Golden Piper
Eurytela hiarbas angustata	Pied Piper
Hypolimnas anthedon wahlbergi	Variable Diadem
Hypolimnas deceptor deceptor	Deceptive Diadem
Hypolimnas misippus	Common Diadem
Lachnoptera ayresii	Blotched Leopard
Neptis saclava marpessa	Spotted Sailer
Phalanta phalantha aethiopica	African Leopard
Pseudacraea boisduvalii trimenii	Boisduval's False Acrea
Pseudacraea eurytus imitator	False Wanderer
Pseudacraea lucretia tarquinia	False Chief
Vanessa cardui	Painted Lady

Family NYMPHALIDAE (SATYRINAE) (Browns)

Bicyclus safitza safitza	Common Bush Brown
Heteropsis perspicua perspicua	
Melanitis leda helena	Common Evening Brown

Order LEPIDOPTERA (RHOPALOCERA) (Butterflies) Continued…….

Family PAPILIONIDAE (Swallowtails & Swordtails)

Graphium colonna	Mamba Swordtail
Graphium leonidas leonidas	Veined Swordtail
Graphium policenes	Small Striped Swordtail
Papilio constantinus constantinus	Constantine's Swallowtail
Papilio dardanus cenea	Mocker Swallowtail
Papilio demodocus demodocus	Citrus Swallowtail
Papilio nireus lyaeus	Green-banded Swallowtail
Papilio ophidicephalus	

Family PIERIDAE (Whites, Yellows, etc)

Appias epaphia contracta	Diverse White
Belenois aurota aurota	Brown-veined White
Belenois creona severina	African Common White
Belenois gidica	African Veined White
Belenois thysa thysa	False Dotted Border
Belenois zochalia zochalia	Forest White
Catopsilia florella	African Migrant
Colias electo electo	African Clouded Yellow
Colotis antevippe gavisa	Red Tip
Colotis erone	Coast Purple Tip
Colotis ione	Bushveld Purple Tip
Colotis regina	Queen Purple Tip
Dixeia charina charina	African Small White
Dixeia pigea	Ant-Heap Small White
Eronia cleodora cleodora	Vine-leaf Vagrant
Eronia leda	Autumn-Leaf Vagrant
Eurema brigitta brigitta	Broad-bordered Grass Yellow
Eurema desjardinsii regularis	Angled Grass Yellow
Eurema hecabe solifera	Common Grass Yellow
Mylothris rueppellii haemus	Twin Dotted Border
Nepheronia argia varia	Large Vagrant
Pinacopteryx eriphia eriphia	Zebra White
Pontia helice helice	Meadow White

Order NEUROPTERA (Lacewings)

Family MYRMELEONTIDAE (Antlions)

Macroleon quinquemaculata

Order ODONATA (ANISOPTERA) (Dragonflies)

Family AESHNIDAE (Hawkers)

Aeshna minuscula	Friendly hawker
Anax imperator	Blue emperor

Family LIBELLULIDAE (Skimmers)

Hemistigma albipuncta	Pied spot
Nesciothemis farinosa	Ashen black-tailed skimmer
Notiothemis jonesi	White-spot primitive
Orthetrum brachiale	Brachiale orthetrum
Orthetrum guineense	Guinea orthetrum
Orthetrum hintzi	Hintzi's orthetrum
Orthetrum julia falsum	Julia's orthetrum
Palpopleura lucia	St Lucia widow
Pantala flavescens	Globe skimmer
Tetrathemis polleni	Black-splashed woodland flutterling
Trithemis arteriosa	Red-veined dropwing
Trithemis stictica	Jaunty dropwing

Order ODONATA (ZYGOPTERA) (Damselflies)
Family COENAGRIONIDAE (Pond Darters)

Ceriagrion glabrum	Orange pond damsel
Ischnura senegalensis	Marsh bluetail
Pseudagrion glabrum	Common Pond Damsel
Pseudagrion hageni tropicanum	Painted sprite
Pseudagrion kersteni	Kersten's sprite
Pseudagrion massaicum	Massai sprite

Crustaceans
Order DECAPODA (Crayfish, Crabs, Lobsters, Prawns)
Family PENAEIDAE (Penaeid Shrimps & Prawns)

Metapenaeus monoceros	Speckled shrimp

Family PORTUNIDAE (Swimming Crabs)

Scylla serrata	Mud crab/ mangrove crab
Hymenosoma orbiculare	Membrane Bodied Crab

Molluscs
Family ACHATINIDAE (Agate Snails)

Achatina immaculata	Pink-lipped Agate Snail
Cochlitoma granulata	
Cochlitoma semigranosa	

Family CERASTIDAE (Bark & Porcelain Snails)
Gittenedouardia spadicea

Family CHAROPIDAE (Pinwheels & Afrodonts)

Afrodonta bilamellaris	Two-toothed Afrodonta
Afrodonta farquhari	Farquar's Afrodonta
Afrodonta inhluzaniensis	Nhlosane Afrodonta
Trachycystis aenea	Bronze Pinwheel
Trachycystis glanvilliana	Miss Glanville's Pinwheel
Trachycystis inclara	Pearly Pinwheel
Trachycystis rudicostata	Windmill Pinwheel
Trachycystis subpinguis	Milky Pinwheel

Family CYCLOPHORIDAE (Cyclophores & Millipede Snails)

Chondrocyclus isipingoensis	Hairy Millipede Snail

Family EUCONULIDAE (Hive Snails)

Afroguppya rumrutiensis	Honey-coloured Hive Snail

Family FERUSSACIIDAE (Pin Snails or Blind Awl Snails)
Cecilioides sp. n. cf. Callipeplum

Family HELICARIONIDAE (Helicarionid Snails)

Kaliella barrakporensis	Keeled kaliella

Family POMATIIDAE ()

Tropidophora insularis	Few-ridged Shuffler
Tropidophora ligata	Smooth Shuffler

Family RHYTIDIDAE (Cannibal Snails)

Nata vernicosa	Dwarf Cannibal Snail

Family STREPTAXIDAE (Hunter Snails)

Gulella columnella	Pinched-lip Hunter Snail
Gulella delicatula	Delicate Hunter Snail
Gulella gouldi	Gould's Hunter Snail
Gulella himerothales	Delightful Hunter Snail
Gulella isipingoensis	Isipingo Hunter Snail
Gulella obovata	Obovate Hunter Snail
Gulella sp. cf. Sylvia	Sylvan Hunter Snail

Family SUBULINIDAE (Awl Snails)

Opeas florentiae	Slit-lipped awl snail

Family UROCYCLIDAE (Tailed Snails & Slugs)

Elisolimax flavescens	African Banana Slug
Sheldonia (Kerkophorus) poeppigii	Poeppig's tail Wagger

Family VERONICELLIDAE (Leather Back Slugs)

Laevicaulis natalensis	Brown Leather Back Slug

Family VERTIGINIDAE (Whorl Snails)

Nesopupa farquhari	Farquhar's Whorl Snail
Pupisoma orcula	Umbiculate Whorl Snail

Source:
D Herbert (Curator of Molluscs – KZN Museum Services) and Ezemvelo KZN Wildlife Database.

Appendix F - Pro forma annual plan of operation

Notes of a management meeting for Mpenjati Nature Reserve held at office on

…

Present:

Apologies:

CC:

Management Target	2011/12 Progress	2012/13 Goals	Completion Date	Responsibility	Action
LEGAL COMPLIANCE AND ENFORCEMENT					
Minutes of the annual management meeting indicating security targets.					
§ Regular patrols covering the full extent of the protected area. § Prosecution of offender caught committing an offence.					
STAKEHOLDER ENGAGEMENT					
§ Establishment of Mpenjati Nature Reserve Liaison forum / Advisory committee. § Annual meetings of the Mpenjati Liaison forum / Advisory committee. § Nature reserve plans and management information presented to the forum as they are developed.					
PROTECTED AREA EXPANSION					
§ Mapped buffer zone with accompanying rationale. § Record of report to Protected Area Expansion and Stewardship.					
LOCAL AND REGIONAL PLANNING					
Report presented and negotiated with the municipalities for inclusion in their IDP's, SDF's & schemes.					

Management Target	2011/12 Progress	2012/13 Goals	Completion Date	Responsibility	Action
VISITOR MANAGEMENT					
Annual report of visitor information.					
ENVIRONMENTAL INTERPRETATION AND AWARENESS					
§ Education material in Community Centre. § Adequate signage on trails.					
FIRE MANAGEMENT					
§ Adoption and implementation of the fire management plan. § Annual plan of operation for fire management available. § Meet the targets as set out in the annual plan of operation. § Compliance with the National Veld and Forest Fires Act.					
INVASIVE SPECIES CONTROL					
§ Continue alien species control efforts. § Compliance with the Biodiversity Act. § Minutes of the annual management meeting containing the annual plan of operation and targets for alien species control. § Meet the targets as set out in the annual plan of operation.					

Management Target	2011/12 Progress	2012/13 Goals	Completion Date	Responsibility	Action
SOIL EROSION CONTROL					
§ Erosion problems identified. § Implementation of accelerated soil erosion control measures in areas identified.					
COLLECTION OF BIOLOGICAL MATERIAL					
§ Records of approved extractive use. § Ensure that collecting of biological material is done under the appropriate permit.					
WILDLIFE MANAGEMENT					
§ Key species management plan developed. § Documented strategy for damage causing animals. § Annual plan of operation for key species. § Meet targets set in annual plan of operation.					
CONSERVATION TARGETS					
§ All subsidiary plans must reflect critical ecological processes. § All subsidiary plans must include a biological monitoring programme. § Surveillance and monitoring plans for key threatened processes are required					

Management Target	2011/12 Progress	2012/13 Goals	Completion Date	Responsibility	Action
§ Monitoring plans for key rare and endangered species to be developed.					
FINANCIAL RESOURCES					
Adequate funding to achieve the objectives of the nature reserve.					
HUMAN RESOURCES					
§ Sufficient staff to achieve nature reserve objectives § Clean bill of health.					
FACILITIES AND INFRASTRUCTURE					
§ Infrastructure maintenance plan developed. § Regular scheduled maintenance of all facilities and infrastructure. § Regular scheduled maintenance of all facilities and infrastructure. § Targets set in annual plan of operation through the management meeting § Appropriately functioning service infrastructure and systems that do not cause harm to the environment.					

Appendix G – Mpenjati Estuary Management Plan