EZEMVELO KZN WILDLIFE
Conservation, Partnerships & Ecotourism

NDUMO GAME RESERVE

NDUMO GAME RESERVE

Integrated MANAGEMENT PLAN 2009 - 2013

LUBOMBO
Transfrontier Conservation and Resource Area

BirdLife IBA IMPORTANT BIRD AREA

Ramsar

Ndumo Game Reserve

KwaZulu-Natal
South Africa

Integrated Management Plan: 2009-2013

Reviewed and edited by
EKZNW Management Planning Co-ordination Unit

Based on the original Integrated Management Plan (2007 - 2012)
Compiled by Terratest (Pty) Ltd and MCDS

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Authorisation

This **Integrated Management Plan (2009-2013)** for **Ndumo Game Reserve** (NGR) is recommended by the Game Reserve Planning Committee (GRPC), a multi-disciplinary team consisting of:

Ezemvelo KwaZulu Natal Wildlife, Zululand Region

Sifiso Keswa	General Manager (GRPC and Regional Operations Committee Chairperson)
Rob Blok	Biodiversity Conservation Co-ordinator, North Zululand
Caiphus Khumalo	Ecological Advice Co-ordinator
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Lubombo Transfrontier Conservation Area Project

Roelie Kloppers	Project Co-ordinator (Previous)
Andrew Whitley	GIS and Planning (Previous)

External Key-Stakeholder Representatives (See **Appendix 2**)

National Departments:	Land Claims Commission.
Provincial Institutions:	Amafa
Municipalities:	Umhlabuyalingana Local; Jozini Local; Umkhanyakude District.
Traditional Authorities:	Tembe and Mathenjwa.
NGOs:	Wildlands Trust
Private Sector:	Game Lodges as represented in Appendix 2 ; Ingwavuma Woman's Centre and Maputaland Development Information Centre and Elephant Coast Tourism Association

Recommended:

TITLE	NAME	SIGNATURE and DATE
Chairperson: Tembe - Ndumo Local Board	M.A. MALWANE	08/02/10
Chairperson: Regional Operations Committee	MR S. KESWA	02/02/2010
Chairperson: EKZNW, Biodiversity Conservation Operations Management Committee	MR. B. KHOZA	16/02/2010
Chief Executive Officer: EKZNW (CHAIRPERSON : EXCO)	DR. I. B. MKHIZE	12/03/2010
Chairperson: KZN Nature Conservation Board	MR ZC NGIDI	16/07/10
Head of Department: Department of Agriculture, Environmental Affairs and Rural Development	DR SS MKHIZE	23/11/2010
Chairperson: Portfolio Environment and Conservation Committee		

Approved:

KwaZulu-Natal MEC: Agriculture, Environmental Affairs and Rural Development	LYDIA JOHNSON	26.11.2010

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PREFACE

This Integrated Management Plan for Ndumo Game Reserve is the primary and overarching management document for the Game Reserve for the period 2009-2013. It forms the framework within which the Game Reserve will be managed and developed towards the achievement of its management objectives derived in collaboration with the Game Reserve's stakeholders during October 2006.

The protected area management planning process and the resultant planning documents (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 Game Reserve's stakeholders, the general public and specialists during the various stages of plan development and implementation. Although the Integrated 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 Game Reserve's management objectives are operationalised and reflected through a Strategic Management Plan in the Game Reserve's operational budget over the next five years. A Business Plan will at the same time actively pursue additional and improved funding and income towards the achievement of the natural and cultural heritage conservation objectives of the Game Reserve over the next five years.

Ezemvelo KwaZulu-Natal Wildlife as the designated Management Authority for Ndumo Game Reserve hereby commits itself to the implementation of this plan.

Dr. Bandile Mkhize
Chief Executive Officer

Date:

PROTECTED AREA MANAGEMENT PLANNING PROCESS FRAMEWORK FOR NDUMO GAME RESERVE

The Integrated Management Plan, its components and authorisation

The **Integrated Management Plan (IMP**) is the overarching protected area integrated planning document that describes the administrative and legal framework, contextual background, public participation processes followed, vision / mission statements, management objectives, zonation as well as a management policy framework and guidelines, for a protected area, for a specific 5 year period. The **IMP** forms the framework within which all the other planning components, such as the **Conceptual Development Plan (CDP), Strategic Management Plan (SMP)** and **Business Plan (BP)** are developed. The National Environmental Management: Protected Areas Act 57 of 2003 (NEMPA) considers these plans to be components of the **IMP**.

The **Conceptual Development Plan (CDP)** is an integrated planning document and provides a strategic guideline for the development and maintenance of conservation management infrastructure and visitor facilities / activities within the constraints of the protected area receiving environment. This component will be developed further during the IMP's five-year period. To ensure operational effectiveness, protected areas may require specific Operational plans, programmes and procedures such as Fire management Plans, Wilderness Areas Management Plans, Elephant Management Plans etc, that support the **IMP** and **CDP.** These will be compiled where they do not already exist.

The **Strategic Management Plan (SMP)** is an operational management component that identifies the order of priority of IMP action projects, activities and tasks that need to be undertaken in the achievement of the protected area objectives and attaches key performance areas, responsibilities, timeframes, budgets and resources to each activity. This plan usually takes the form of a Microsoft Access database that 'actions' the Reserve's management objectives and any projects identified by the **IMP, CDP** and **Business Plan (BP)**. The **SMP** is a key planning document that also informs the Annual Budgeting Estimates and provides information for Annual Reports.

The **Business Plan (BP)** is primarily aimed at describing the manner in which the **IMP** and **CDP** are to be both financially resourced as well as manpower and capacity needs. It may address issues of operational efficiency and the optimisation of income generated opportunities in order to bridge any possible shortfalls between required operational expenditure and committed provincial government budget allocations. Five year expenditure estimates will inform the development of the **Business Plan (BP**).

Once the **BP** has been approved, the **SMP** is finalised according to the committed five-year provincial budget allocations for the protected area and other expected financial income

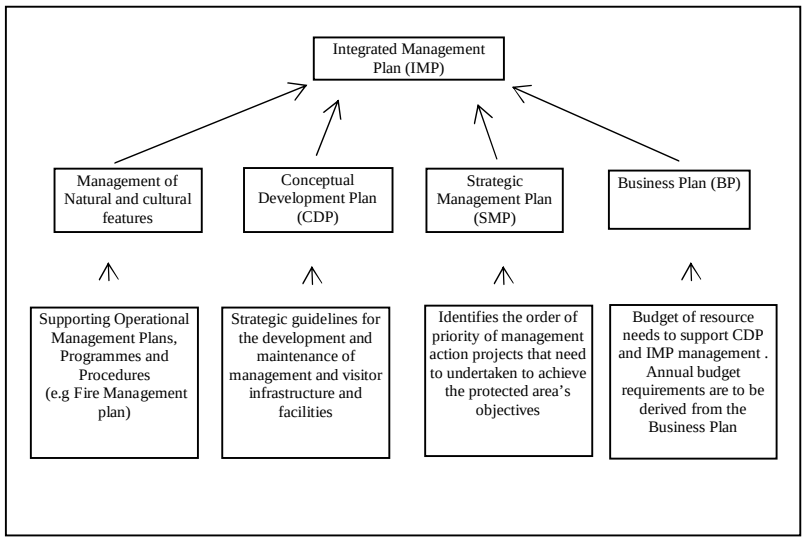

Figure 1: Core Components of the Management Plan Document

The process by which the **IMP** plans are developed is in accordance with the requirements of South Africa's environmental legislation, in particular the NEMPA, requiring public consultation and participation, as follows:

- The Protected Area Mission and Objectives contained in the **IMP** are derived in consultation at a Stakeholders' Workshop, the outcomes of which are advertised both regionally and provincially for comment in the next step.
- The **IMP** will be advertised provincially and regionally for public comment before being authorised.
- The **SMP** and **BP** will form the basis for regular progress reporting to the protected area Management Authority and its structures.

The **IMP** and its subsidiary plans are required to be authorised by the Provincial Minister for the Department of Agriculture, Environmental Affairs and Rural Development, in terms of the National Environmental Management: Protected Areas Act 57 of 2003. The IMP and any subsidiary plan is to be forwarded to the MEC on recommendation from the EKZNW Board.

IMP Planning & Review

The IMP requires both annual and five year revision cycles to ensure that the management objectives remain relevant and that management actions are continually improved. The figure below illustrates how the annual and five year planning and review cycles are to be integrated.

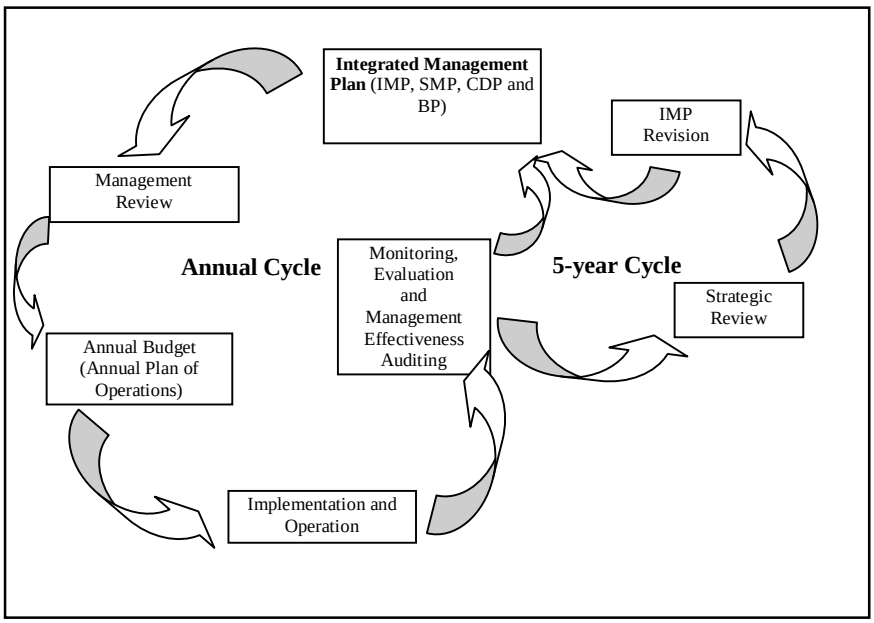

Figure 2: Integrated management Plans: Aligning Annual and Five year Cycles

DEFINITIONS

Alien Species:
Means species or genotypes, which are not indigenous to Ndumo Game Reserve and the surrounding area including hybrids and genetically altered organisms.

Biodiversity / Biological Diversity:
Means 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:
Means the KwaZulu-Natal Nature Conservation Board as defined by the KwaZulu-Natal Nature Conservation Management Act , 1997 (Act No.9 of 1997).

Buffer Zone:
Means an area surrounding Ndumo Game Reserve that has restrictions placed on its use or where collaborative projects and programmes are undertaken to afford additional protection to the Game Reserve (See LDP).

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[1], 'cultural heritage' is considered *(with wording excluded as indicated)* 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)**:**
Means 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, 1996[2])*.

Ecological Integrity
Means 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:
Means 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; and
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.

Ecotourism:
Means natural heritage-based tourism.

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[1] UNESCO 1972 *Convention concerning the Protection of the World Cultural and Natural Heritage.* Adopted by the General Conference at its seventeenth session, Paris, 16 November 1972. UNESCO, Paris, France

[2] Ceballos Lascurain, H., 1996. *Tourism, ecotourism and protected areas.* IUCN: Gland, Switzerland

Environmental Degradation: Means 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.

Indigenous Species:
In relation to a specific protected area, means a species that occurs, or has historically occurred, naturally in a free state of nature within that specific protected area, but excludes a species introduced in that protected area as a result of human activity (as per the National Environmental Management: Protected Areas Act, 2003 [Act No. 57 of 2003]).

Invasive Species:
Means any species whose establishment and spread outside of its natural distribution range –

a. threaten ecosystems, habitats or other species or have a demonstrable potential to threaten ecosystems, habitats or other species; and
b. may result in economic and environmental harm or harm to human health.

(as per the National Environmental Management: Protected Areas Act, 2003 [Act No. 57 of 2003]).

Joint Management:
Means 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:
Means 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]).

Nature Conservation:
Means 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]).

Game Reserve:
Means Ndumo Game Reserve.

Neighbouring Community:
Means the communities and people permanently living in the local municipal area / s bordering onto the Game Reserve.

Natural Heritage:
As defined in Article 2 of the World Heritage Convention (UNESCO) 1972[3] 'natural heritage' is considered *(with wording excluded as indicated)* 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.

Partnership/s:
Means a co-operative and / or collaborative arrangement between the Game Reserve management / EKZNW and a third party that supports the achievement of the Game Reserve's management objectives.

Protected Area:

- 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).

[3] UNESCO 1972 *Convention concerning the Protection of the World Cultural and Natural Heritage*. Adopted by the General Conference at its seventeenth session, Paris, 16 November 1972. UNESCO, Paris, France

Ramsar[4]:
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, with 1 832 wetland sites, totalling 170 million hectares, designated for inclusion in the Ramsar List of Wetlands of International Importance. Over the years, however, the Convention has broadened its scope to cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities.)

Stakeholders / Interested Parties[5]:
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).

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]).

Transfrontier Conservation Area:
Means an area straddling across two or more international borders where the natural and cultural resources are collaboratively managed by the governments/ authorities involved

Transfrontier Park:
Means an area where two or more protected areas are adjoined and collaboratively managed across international borders.

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).

[4] http://www.ramsar.org (Accessed 20 March 2009).
[5] Defined in Guideline Document EIA Regulations, National Department of Environmental Affairs and Tourism, April 1998

ABBREVIATIONS

Amafa	Amafa aKwaZulu-Natali (KwaZulu-Natal Provincial Heritage Agency)
BP	Business Plan (Component of EKZNW protected area management planning process)
CCA	Community Conservation Area
CDP	Concept Development Plan (Component of EKZNW protected area management planning process)
DAEA&RD	KwaZulu-Natal Provincial Department of Agriculture, Environmental Affairs and Rural Development
DWEA	National Department of Water and Environmental Affairs
EKZNW	Ezemvelo KwaZulu-Natal Wildlife
FPA	Fire Protection Association in terms of the National Veld and Forest Fire Act, 1998 (Act No.101 of 1998)
GIS	Geographical Information Systems
IDP	Municipal Integrated Development Plan
IMP	Integrated Management Plan (Component of EKZNW protected area management planning process)
LDP	Municipal Local Development Plan
IUCN	International Union for Conservation of Nature or The World Conservation Union (as commonly referenced)
KZN	KwaZulu-Natal Province of the Republic of South Africa
MEC	Member of the Executive Council for DAEA&RD, KwaZulu-Natal Provincial Government
MoA	Memorandum of Agreement
MoU	Memorandum of Understanding
GRPC	Planning Committee for the Ndumo Game Reserve
NGR	Ndumo Game Reserve
ROC	EKZNW Regional Operations Committee
ROS	Recreational Opportunity Spectrum
SA	Republic of South Africa
SAHRA	South African Heritage Resources Agency
SDF	Municipal Spatial Development Framework
SMME	Small, Micro and Medium Enterprises
SMP	Strategic Management Plan (Component of EKZNW protected area management planning process)
TFCA	Usuthu-Tembe-Futi Transfrontier Conservation Area
TFP	Transfrontier Park
UNESCO	United Nations Educational, Scientific and Cultural Organisation

COMMONLY USED ABBREVIATIONS FOR SPECIFIC STATUTES (LEGISLATION)

CARA:	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
KZNNCMA:	KwaZulu-Natal Nature Conservation Management Act, 1997 (Act No. 9 of 1997)
KZNHRA:	Kwa-Zulu heritage Resource Act, 1997 (Act No. 10 of 1997)
NEMBA:	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEMPAA:	National Environmental Management: Protected Areas Act 2003 (Act No. 57 of 2003
NHRA:	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
PFMA:	Public Finance Management Act, 1999 (Act No. 1 of 1999)

1 PURPOSE AND SIGNIFICANCE OF NDUMO GAME RESERVE[6].

1.1 *Purpose*

The purpose of Ndumo Game Reserve NGR is to:

- Ø Provide sanctuary for Hippopotamus and its associated habitat;
- Ø Preserve and protect intact representative areas of the Usuthu and Phongolo River Floodplains and their associated biodiversity;
- Ø Safeguard the cultural heritage including the archaeological, historical, palaeontological and living heritage of the area;
- Ø Contribute to the achievement of Provincial and National conservation targets through the protection of a representative portion of Maputaland Lowveld, and its associated biodiversity including the ecological and evolutionary processes that generate and maintain this diversity; and
- Ø Protect endangered, rare and endemic species of the area.

1.2 *Significance*

Significant and sensitive attributes of NGR include:

Biodiversity and Natural Heritage Values

- Ø In 1997 NGR was proclaimed as Wetland of International Importance in terms of RAMSAR Convention i.e. a Ramsar site (significant feeding ground for a large number of migratory and resident wader species associated with wetlands);
- Ø NGR is the only conserved representative example of the Phongolo River floodplain and associated biodiversity in South Africa;
- Ø More than 424 species of birds (almost 60% of South Africa's total) are found at NGR (including all 5 Maputaland endemic species);
- Ø NGR is listed as an internationally recognised IBA (Important Bird Area);
- Ø NGR has the highest recorded diversity of spiders for a single conservation area (431species) in South Africa;
- Ø A significant number of the IUCN recognized Maputaland Centre of Plant Endemism species are to be found in NGR;
- Ø A significant diversity of fish species and associated water fauna, including endemic species occurs here;
- Ø NGR is a protected area within the Maputaland Centre of Plant Endemism, the Usuthu-Tembe-Futi Transfrontier Conservation Area and the greater Maputaland-Pondoland-Albany system (internationally recognised – Conservation International "hotspot");[7] and
- Ø NGR is the only protected area that contains representative examples of the Maputaland coastal plain fossil beds.

Cultural Heritage Values

- Ø The Mahemane bush is recognised as having a "Unique Sense of Place";
- Ø Aesthetic value of the pan systems;
- Ø Relationship between people and the environment (*isifonyo* fishing, wild fruit utilisation [Marula festivals, monkey oranges etc.]) and the importance of fish;
- Ø Stories, myths and legends and associated with the area;
- Ø The history of the various Traditional Authorities in the area;

[6] Note that with the development of the NGR IMP, the Purpose and Significance statements were specifically workshopped with the key-stakeholders too and the statements recorded here are the results from the relevant workshops. Wording and spelling has been changed minimally for the sake of consistency throughout the IMP. The word *ecotourism* has been replaced with the words *eco-cultural tourism* as a more inclusive term – see Definition of *eco-cultural tourism*.

[7] To qualify as a Conservation International 'hotspot', a region must meet two strict criteria: it must contain at least 1,500 species of vascular plants (> 0.5 percent of the world's total) as endemics, and it has to have lost at least 70 percent of its original habitat.

- Ø The settlement history and trade routes of the past;
- Ø The history of conservation in the area;
- Ø The mixing of cultures, Thonga, Swazi, Zulu culture and customs;
- Ø Frontier life style of the local people – kin on both sides of the border, trade across borders, border markets etc.; and
- Ø Promote awareness of the natural beauty and aesthetic value of the area.

Business Significance

- Ø Noteworthy destination for eco-tourism in SA;;
- Ø Recognition of conservation as viable and sustainable land use option;
- Ø Part of a bigger TFCA Ecotourism development area;
- Ø Unique biodiversity assets as part of guest experience;
- Ø Investment opportunities for local entrepreneurs;
- Ø Anchor role in eco-cultural tourism development both within South Africa and Mozambique;
- Ø Contribute to local, regional, and national economies through eco-tourism, and the sustainable use of natural resources; and
- Ø Opportunity to provide employment.

Benefits (Partnerships)

- Ø Key stakeholder in planning initiatives with the TFCA, District and Local Municipalities, Amafa, private and communal initiatives;
- Ø Serve an anchor role for conservation and regional economic empowerment through co-operative joint management agreements;
- Ø Economic benefit flow to Mathenjwa / Tembe people from sustainable resource (consumptive and non-consumptive) use; and
- Ø Co-operative partnerships on development and conservation programmes.

2 ADMINISTRATIVE AND LEGAL FRAMEWORK

2.1 *Institutional Arrangements*

2.1.1 NGR Management Authority

Ezemvelo KwaZulu-Natal Wildlife (EKZNW) is the designated Management Authority responsible and accountable for the Ndumo Game Reserve (NGR).This must be confirmed in terms of Section 38(2) of the National Environment Management: Protected Areas, 2003 [Act No.57 of 2003] (NEMPAA) which requires that the provincial MEC assign the management authority for a Protected Area.

Project 2.1.1 (i): Obtain written assignment from the MEC appointing EKZNW as the management authority for NGR in terms of Section 38(2) of NEMPAA.

The NGR Management Authority is responsible for reporting on the management of the Game Reserve to the designated KwaZulu-Natal Provincial Member of the Executive Committee and the Premier thus ensuring co-ordination of those matters that may affect NGR through the relevant provincial departments, District and Local Municipalities.

2.1.2 Land Tenure and Land Claims

NGR was originally declared in 1924 on Mathenjwa and Tembe communal lands under the leadership of their respective traditional authorities. The traditional authorities did not, however have any legal status, hence the establishment of the Ingonyama Trust Board in 1994, as a land-holding legal entity on behalf of the traditional authorities. The Ingonyama Trust Board was constituted in accordance with the KwaZulu Ingonyama Trust Act, 1994 (Act No. 3 of 1994). In accordance with this Act, ownership of the land was vested in the Ingonyama Trust Board which is responsible for the administration of the communal land.

During March 1998, the Mathenjwa community (west of Phongolo River) and Tembe community (east of Phongolo River) lodged a land claim against the communal land that makes up the Game Reserve, in terms of the Restitution of Land Rights Act No. 22 of 1994. This claim was successful and a Settlement Agreement was signed on 2 February 2008

In accordance with the Restitution of Land Rights Act, the claimed land can only be transferred in title to a legal entity representing the originally dispossessed or their direct descendents. Presently, the claimants' legal entities are in the process of being formed. Once this has occurred, the Ingonyama Trust Board will transfer ownership to the claimants' legal entities. The transfer of ownership shall be subject to the conditions of:

- The **Memorandum of Agreement** (signed on 2 May 2007) between the then Ministers of the Department of Environmental Affairs and Tourism as well as Department of Land Affairs (**Appendix 1, Item 8**); and
- The **Settlement Agreement** signed by the relevant parties on 2 February 2008 (**Appendix 1, Item 9**).

A fundamental condition for the transfer of land is that claimant landowners will not physically occupy the land and the land-use shall not be altered and will remain a conservation area in perpetuity under the management of the existing management authority (EKZNW).

The Game Reserve is bounded on the east by the Tembe Traditional Authority and on the west and south by the Mathenjwa Traditional Authority, with its northern boundary being the international border with Mozambique along the Usuthu River.

2.1.3 Co-management Agreements

In terms of the Agreements mentioned under **Par. 2.1.2**, **Co-management Agreements** between EKZNW and these claimants' legal entities must be negotiated after transfer of ownership of the land to the claimants' respective legal entities.

Action Project 2.1.3 (i): Facilitate the development and implementation of Co-management Agreements between EKZNW and the claimant landowners.

Action Project 2.1.3 (ii): If required**, c**apacitate the claimant landowners i.t.o. the Co-management Agreement and related management protocols as well as NGR conservation and eco-cultural tourism management policy guidelines defined by this IMP and its subsidiary management documents.

2.1.4 Separation of Authority Functions

The following state or parastatal institutions need to enter and traverse the Game Reserve from time to time to fulfil their respective mandates:

- **Telkom**
  - To service and repair communication lines and infrastructure.
- **Eskom**
  - To service and repair power lines and infrastructure.
- **DWEA (Water Affairs)**
  - To take water level measurements at two monitoring sites in NGR. One, on the banks of the original course of the Phongolo River, close to the present pump house, and the other on the southern bank of Nyamithi Pan.
- **SA Police Services (SAPS)**
  - They regularly travel through NGR, entering at the Main Gate, and along the southern boundary fence to switch on their water pumps and also to execute their border policing and security mandates.
- **SA National Defence Force (SANDF)**
  - They will need to enter NGR at times to execute their mandate.

In order to avoid inappropriate actions by staff of the above or other such institutions on NGR, it is advisable to proactively develop documented MoAs on operational protocol between these institutions and the EKZNW in terms of fulfilling their mandate within the boundaries of NGR. This must be undertaken in the spirit of co-operative governance.

The NGR Conservation Manager must be familiar with the content of such MoAs and must ensure that there is compliance with the conditions contained therein. Copies of all documentation must also be filed manually and digitally at the NGR management and regional management offices for easy reference (See **Appendix 1, Item 7**). These copies must also be updated as necessary.

Action Project 2.1.4 (i): Develop and conclude documented inter-agency MoAs with Telkom, Eskom, DWEA, SAPS and SANDF regarding their operational protocol on NGR.

2.2 *Legislation Guiding the Administration of Ndumo Game Reserve.*

It is important to note that Ndumo Game Reserve is a protected area in terms of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003 [NEMPAA]). In terms of this Act, any conflicts with other legislation must be dealt with in accordance with Section 7 of NEMPAA. In essence it stipulates that - where a provision of NEMPAA specifically concerns the management or development of protected areas, and there is conflict with other national legislation, the relevant section of NEMPAA prevails.

The operational administration and management of Game Reserve is subject to the following key statutes – it is acknowledged that this list is not exhaustive. Managers must familiarize themselves with the purpose and contents of these statutes as well as their subsequent amendments and regulations. Many of these statutes can be downloaded from the following SA Government Documents internet website:

http://www.info.gov.za/view/DynamicAction?pageid=528. (Accessed 11 August 2009).

Natural and Cultural Heritage / Resource Management and Development:

- Animals Protection Act, 1962 (Act No. 71 of 1962).
- Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965).
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).

- Constitution of the Republic of South Africa, 1997 (Act No. 108 of 1997).
- Criminal Procedures Act, 1977 (Act No. 51 of 1977).
- Environment Conservation Act, 1989 (Act No. 73 of 1989).
- Forest Act, 1984 (Act No. 122 of 1984).
- Game Theft Act, 1991 (Act No 105 of 1991).
- KwaZulu Animal Protection Act, 1987 (Act No. 4 of 1987)
- KwaZulu Ingonyama Trust Act,1994 (Act No. 3 of 1994)
- KwaZulu-Natal Heritage Act, 2008 (Act No. 4 of 2008).
- KwaZulu-Natal Nature Conservation Management Act, 1997 (Act No. 9 of 1997).
- KwaZulu Nature Conservation Act, 1992 (Act No. 29 of 1992).
- National Environmental Management Act, 1998 (Act No. 107 of 1998).
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).
- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003).
- National Forests Act, 1998 (Act No. 84 of 1998).
- National Heritage Resources Act, 1999 (Act No. 25 of 1999).
- National Water Act, 1998 (Act No. 36 of 1998).
- National Water Amendment Act, 1999 (Act No. 45 of 1999)
- National Veld and Forest Fire Act, 1998 (Act No.101 of 1998).
- Nature Conservation Ordinance, 1974 (Act No. 15 of 1974)

General Management:

- Development Facilitation Act, 1995 (Act No. 67 of 1995).
- Disaster Management Act, 2002 (Act No. 57 of 2002).
- Fencing Act, 1963 (Act No. 13 of 1963)
- Firearms Control Act, 2000 (Act No. 60 of 2000)
- Fire Brigade Services Act, 1987 (Act No. 99 of 1987).
- KwaZulu-Natal Planning and Development Act, 1998 (Act No. 5 of 1998).
- Intergovernmental Relations Framework Act, 2005 (Act No.13 of 2005).
- Local Government: Municipal Systems Act, 2000 (Act No. 32 of 2000).
- Local Government: Municipal Structures Act, 1998 (Act No. 117 of 1998).
- Natal Town Planning Ordinance, 1949 (Act No. 27 of 1949).
- National Building Standards Act, 1977 (Act No. 103 of 1977).
- National Road Traffic Act, 1996 (Act No. 93 of 1996).
- Occupational Health and Safety Act No, 1993 (Act No. 85 of 1993).
- Restitution of Land Rights Act, 1994 (Act No. 22 of 1994).
- State Land Disposal Act, 1961(Act No. 48 of 1961).
- Water Services Act, 1997 (Act No. 108 of 1997).

Financial Management:

- Public Finance Management Act, 1999 (Act No. 1 of 1999).

Human Resource Management.

- Basic Conditions of Employment Act, 1997 (Act No. 75 of 1997).
- Compensation for Occupational Injuries and Diseases Act, 1993 (Act No. 130 of 1993).
- Employment Equity Act, 1998 (Act No. 55 of 1998).
- Labour Relations Act, 1995 (Act No. 66 of 1995).
- Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).
- Pension Funds Act, 1956 (Act No. 24 of 1956).
- Skills Development Act, 1998 (Act No. 97 of 1998).
- Skills Development Levies Act, 1999 (Act No. 9 of 1999).
- Unemployment Insurance Act, 2001 (Act No. 63 of 2001).

Game Reserve Regulations

EKZNW protected area regulations are enforced in accordance with Section 15 of the Nature Conservation Ordinance, 1974 (Act No. 15 of 1974) read together with the KwaZulu-Natal Nature Conservation Management Act, 1997 (Act No. 9 of 1997).

2.3 *Regional Planning Context and Principles*

The NGR is a core conservation area forming part of the EKZN protected area network and the Usuthu-Tembe-Futi TFCA. As with all EKZNW protected areas, the intention is to continually improve management effectiveness of NGR in line with the levels adopted for all protected areas within the EKZNW protected area network.

Within the KwaZulu-Natal Province, the Game Reserve is situated in the Umkhanyakude District Municipality (DC 27) area and within 2 local municipality areas, namely the Jozini Local Municipality (KZ 272) west of the Phongolo River; and Umhlabuyalingana Local Municipality (KZ 271) east of the Phongolo River.

In terms of the requirements of NEMPAA and the Local Government: Municipal Systems Act there must be appropriate planning alignment between the Game Reserve and the surrounding area which should be recognised through the Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the relevant municipalities. This will assist in developing an effective buffer zone around NGR. The NGR Conservation Manager in collaboration with the designated EKZNW officials must be tasked to make the relevant inputs whenever these municipalities' Integrated Development Plans and Spatial Development Frameworks are reviewed and updated.

The Game Reserve itself has been zoned (See **Par. 5**) according to protected area management norms to control various activities and for the achievement of various conservation objectives.

Action Project 2.3 (i): The NGR Manager in collaboration with other relevant EKZNW officials must be mandated with active participation in the review processes of the municipal Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs), in order to ensure the effective maintenance of a buffer zone surrounding NGR through an alignment of appropriate land use adjacent to the Game Reserve.

The forging of Transfrontier linkages between the NGR and the authorities and communities of the bordering Mozambique and Swaziland will be promoted and maintained by NGR management in line with the **Lubombo Transfrontier Conservation and Resource Area** biodiversity conservation and social development strategies for the TFCA. (See **Map 1** and Text Box on next page).

The Lubombo Transfrontier Conservation and Resource Area

The Lubombo Transfrontier Conservation and Resource Area is a tri-lateral regional development programme incorporated under the Lubombo Spatial Development Initiative. As a 2010 Legacy Project it has been identified as a key international project for regional development by the South African, Mozambican and Swaziland governments. Conservation of biodiversity across international borders is also a major component of the project.

On 22 June 2000, the governments of Mozambique, South Africa and Swaziland signed five protocols on the establishment of the Lubombo Transfrontier Conservation and Resource Area. It includes five distinct Transfrontier Conservation Area (TFCA) projects:

- Lubombo Conservancy-Goba TFCA (Mozambique/Swaziland)
- **Usuthu-Tembe-Futi TFCA (Mozambique/ South Africa /Swaziland)**
- Ponta do Ouro-Kosi Bay TFCA (Mozambique/South Africa)
- Nsubane-Pongola TFCA (South Africa/Swaziland)
- Songimvelo-Malolotja TFCA (South Africa/Swaziland)

EKZNW is one of the lead implementing agencies of the South African government in the Lubombo Transfrontier Conservation Area. As such, the organisation has been delegated the authority to implement the project on behalf of DWEA. EKZNW is also the lead agency in the implementation of the Usuthu-Tembe-Futi and Nsubane-Pongola TFCA Protocols and plays a direct role in the Kosi Bay – Punto do Ouro TFCA Protocol.

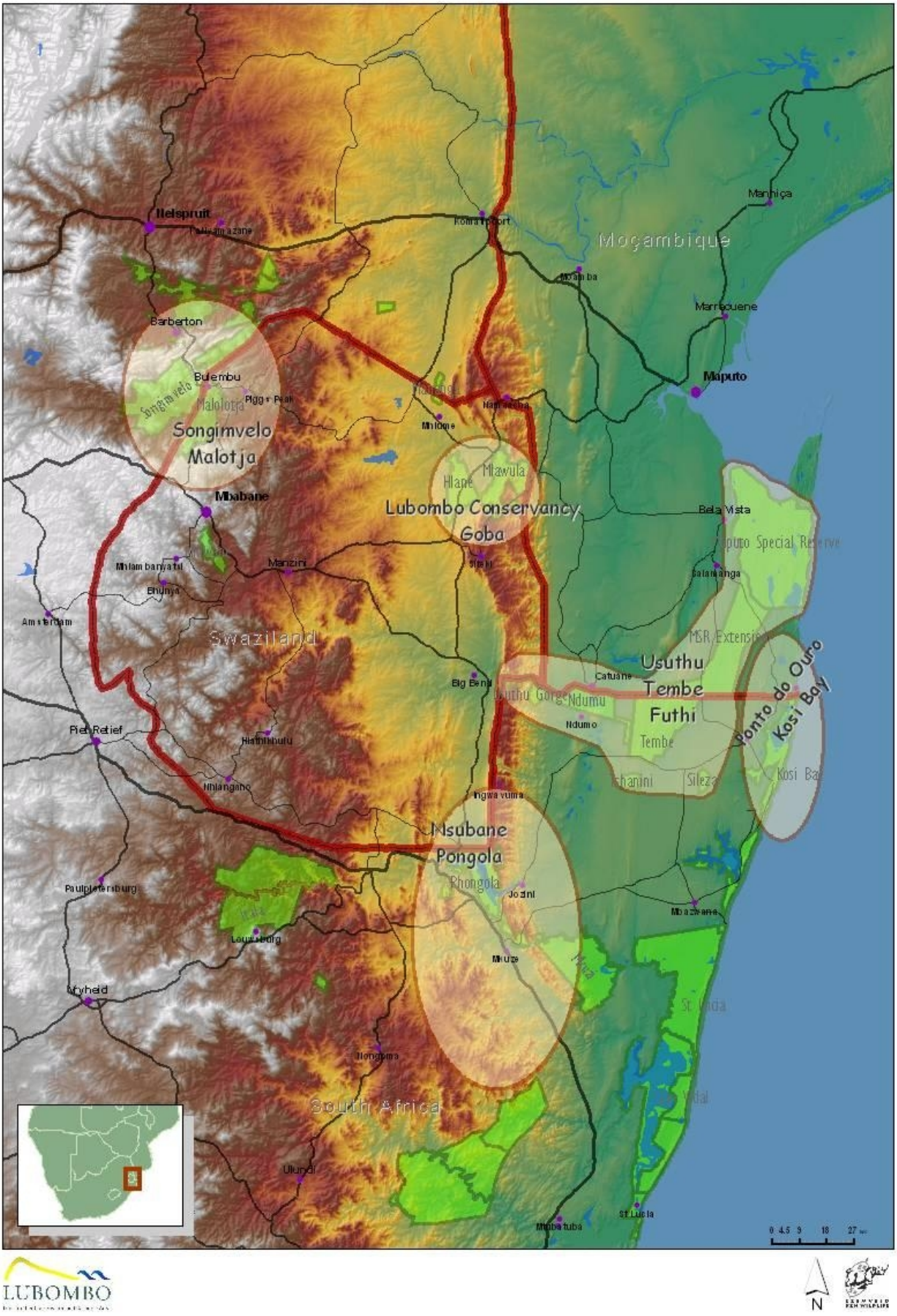
The Lubombo Transfrontier Conservation and Resource Area is a catalyst for development in the region and for the conservation of biodiversity across international boarders. As it is incorporated under the Lubombo SDI (Spatial Development Initiative), it has international relevance and places obligations on South Africa.

Regional socio-economic development, peace and stability can be achieved in the Lubombo region through this project. Socio-economic projects linked to tourism have the potential to enlarge the area.

Legal Protocols:

- The General Lubombo Spatial Development Initiative Protocol (1999)
- The General Lubombo Transfrontier Conservation and Resource Area Protocol (2000)
- **The Usuthu-Tembe-Futi Transfrontier Conservation and Resource Area Protocol (2000)**
- The Nsubane-Pongola Transfrontier Conservation and Resource Protocol (2000)
- MOA between KZN Province and Maputo Province regarding collaboration on environmental management.

(The above information was extracted from the publication: EKZNW – Managing Our Biodiversity, 2009. Published by Ezemvelo KwaZulu-Natal Wildlife, Pietermaritzburg.)



Map 1: Lubombo Transfrontier Conservation Area

2.4 *Proclamation Status of NGR*

Appendix 4, Map 2 shows the area declared as Ndumo Game Reserve.

Ndumo Game Reserve was first established as the Nduma (sic) Game Reserve (English text) in terms of Section 17(1) of the Game Ordinance No. 2 of 1912 by:

- Provincial Notice No. 96 of 1924 dated 16 April 1924.

Thereafter, *Game and Vermin Regulations* were amended in terms of Game Ordinance No. 2 of 1912 in the following Provincial Notices:

- Provincial Notice 140, 1939 dated 6 April 1939, and
- Provincial Notice 131, 1941 dated 17 March 1941.

Both notices included the full set of regulations resorting under the Game Ordinance which coincidently included the original 1924 NGR establishment property description. The intention of these Provincial Notices was; however not to amend the NGR property description. The KZN Nature Conservation Management Act in Part A of its Second Schedule erroneously refers to Provincial Notice 140, 1939 as the NGR establishing notice and to Provincial Notice 131, 1941 as an amending notice. What is, however important is that both notices referred to the name of the Game Reserve as the Ndumu Game Reserve.

Thereafter, Ndumu Game Reserve was declared a Game Reserve in terms of the Zululand Game Reserves and Parks Ordinance, 1939 (Ord. No. 6 of 1939) w.e.f. 25 March 1947 by:

- Proclamation 13 of 1947 dated 27 March 1947.

Thereafter, as part of the administration of the formation of the then 'apartheid era' homeland governments Ndumu Game Reserve area was:

- Released as state land in the SA Province of Natal for the purpose of acquisition to the South African Development Trust in terms of the Development Trust and Land Act No. 18 of 1936 w.e.f 12 December 1986 by:
  - Proclamation No.9 of 1987 dated 16 January 1987.
- Disestablished as Game Reserve by the Province of Natal in terms of Nature Conservation Ordinance No. 19 of 1974 w.e.f. 31 March 1988 by:
  - Proclamation No.19 of 1988 of 24 March 1988.
- Established in terms of the KwaZulu Nature Conservation Act No. 8 of 1975 as the Ndumu Game Reserve by the KwaZulu Government (Department of Economic Affairs) by:
  - Notice No. 132 of 1988 dated 25 March 1988.
- In terms of a by KwaZulu Government: Department of Economic Affairs Circular No. 13 of 1989 the KwaZulu Government Cabinet decided by Resolution No. 51 of 1989 that the name Ndumu Game Reserve change to Ndumo Game Reserve with effect from 1 April 1988.

Surveyor-General Diagram No. 3174/1997 refers to the area of Ndumo Game Reserve as being 11 898,3422 ha (See **Appendix 2**). The size of NGR has erroneously been indicated as 10 117 ha in previous documents.

In terms of the national system of classification of protected areas (which follows that of the IUCN), NGR is categorized as national park and equivalent reserve – Category II.

2.4.1 Uncertainty on International Boundary

Presently, a matter of significant concern is the fact that the Usuthu River which forms the northern boundary of the Game Reserve and also the SA international border line with Mozambique has over the last decade, for a number of reasons, demonstrated an ongoing tendency to divert from its original course and at a number of places move south. A clear opinion on the legal implications of a shifting international river boundary and specifically in terms of the Usuthu River is required but not available at present (August 2009).

Thus far, unconfirmed preliminary investigations by the Office of the Chief State Law Adviser points to the fact that an 11 June 1891 agreement between the then British and Portuguese colonial governments confirming the Usuthu River as the international border was followed by a border

commission that established beacons and co-ordinates mapping out the exact border line. This would therefore mean that the determination of the border is not limited to the middle line of the river (*thalweg*) but will also use the line indicated by the co-ordinates and beacons. It is, however important that a final authoritative legal opinion is urgently obtained through the Office of the Chief State Law Adviser.

Should it be confirmed that the international boundary here shifts as the river shifts, it would imply the potential loss of NGR (and SA) land as the river moves south. This may be negatively affect the viability and integrity of NGR as a protected area and would also have significant management implications for NGR. If this be the case, it is important that EKZNW, in collaboration with the relevant SA authorities, urgently and proactively initiate discussions with the Mozambique authorities in terms of the Lubombo Transfrontier Conservation and Resource Area protocols to avoid potential international border conflicts and negative impacts on NGR.

Action Project 2.4.1 (i): Obtain a firm legal opinion on the legal implications of the shifting international boundary formed by the Usuthu River through the Office of the Chief State Law Adviser. If this legal opinion highlights potential unfavourable implications for NGR, proactively initiate TFCA discussions on this matter.

2.5 *Local Agreements, Leases, Servitude Arrangements and MoUs*

The formal documentation and maintenance of all local agreements, leases, servitude arrangements and MoUs concerning the authorised use of the NGR area by beneficiaries other than EKZNW must be undertaken to promote transparency and good governance. All such agreements must be scrutinized by the Manager EKZNW Legal Services for direction, prior to any EKZNW member signing such documents.

The NGR Conservation Manager must be familiar with the content of such authorised documents and must ensure that there is compliance with the conditions contained therein. Copies of all documentation must also be filed manually and digitally at the NGR management and regional management offices for easy reference. These copies must be updated in accordance with any authorised amendments.

An updated list of local agreements, leases, servitude arrangements *etc.* pertaining to NGR is available (See **Appendix 1, Item 7**).

Action Project 2.5 (i): As a matter of priority, review all formal and informal local agreements, MoUs, leases, servitude arrangements *etc.* pertaining to NGR and document, update, maintain and monitor these appropriately authorised agreements. The Banzi Camp Concession in particular needs comprehensive revision while agreements with the Usuthu Gorge community must be developed.

The following are documented agreements:

2.5.1 Banzi Camp Concession

Wilderness Safaris developed and managed Banzi Camp within NGR for a fifteen years under a lease agreement with Isivuno and with a Code of Conduct between KwaZulu Department of Nature Conservation in place. Unfortunately, over time the Code of Conduct was reviewed but remained unsigned and ineffectual in providing an effective framework to guide the relationship between the concessionaire and EKZNW.

The Banzi Camp is presently not operational and Wilderness Safaris Company is seeking to dispose of their share in the operation (shares also held by Mathenjwa Traditional Authority) to a willing buyer. EKZNW must ensure that any potential new operator is aware that an effective operating protocol needs to be negotiated with EKZNW.

It is critical therefore that EKZNW proactively develops a comprehensive MoA on the Banzi Camp concession in order to adequately inform any new shareholder of the operational conditions that will apply.

The following documentation that could assist with the compilation of such a MoA is available and filed at NGR:

1. A lease agreement between Isivuno and Wilderness Safaris. This agreement was signed on the 27th of January 1994.

2. A code of conduct regarding the use of spotlights. This appears to be an addition to the existing document and was drawn up by the Officer-in-Charge of Ndumo Game Reserve. This document was not dated nor signed.

3. An interim site specific code of conduct in respect of Ndumo Game Reserve agreed to between KwaZulu-Natal Conservation Services and Zululand Wilderness Safaris. Dated 2001, but no specific date, or signatures appear on the document.

4. Ndumo Wilderness Lodge Code of Conduct signed on 4 August 1996.

5. Sub-Lease Agreement between Isivuno and KwaZulu Housing Company (Proprietary) Limited signed on 21 October 1994

6. A Round Robin Resolution of Directors of KwaZulu-Natal Housing Company (Proprietary) Limited signed on 31 October 1994.

2.5.2 Tshwane University of Technology (Technikon Pretoria)

The Tshwane University of Technology has a written co-operation agreement with EKZNW to operate an Environmental and Awareness programme using the Goldfields Environmental Education Centre at NGR. This arrangement is documented in a Memorandum of Co-operation Agreement made and entered into between Technikon Pretoria and KwaZulu-Natal Nature Conservation Board (Signed in Pretoria on 24 May 2002).

This Memorandum of Co-operation Agreement is presently being revised. A new MoA will be developed.

Action Project 2.5.2 (i): Finalise the new MoA with Tshwane University of Technology in terms of running programmes at the Goldfields Environmental Education Centre.

2.6 *Broadening Conservation Land Use Management in Areas Surrounding NGR*

Opportunities may arise that will enable the establishment of new formal protected areas or other conservation management areas on land bordering or in vicinity of NGR in collaboration and co-operation with the relevant communities and landowners. This is likely to contribute to the EKZNW conservation planning and Usuthu-Tembe-Futi TFCA targets through more effective natural and cultural heritage conservation. Indirectly, new tourism opportunities could also develop with the resulting socio-economic benefits.

All EKZNW officials associated with NGR should remain sensitive to these opportunities and ready to engage with the relevant role-players, assisting them with the most appropriate options for establishing conservation areas. This may be in the form of conservancies, private, community or local authority protected areas, contractual protected areas, public open space or even incorporation of land into NGR and in so doing increasing the extent and representivity of core protected areas within the TFCA and KZN. Alignment with the municipal IDPs must also be actively sought to ensure appropriate land use on the borders of NGR **[**See **Action Project 2.3(i)]**.

As an integral part of the approach described above, NGR staff, the Mathenjwa and Tembe Traditional Authorities; as well as the District and Local Municipalities; must be actively sensitised to the identified opportunities and the potential benefits for the various parties. Empowered with this knowledge engagement with the relevant stakeholders should lead to constructive deliberations. Where partnerships and agreements are successfully concluded, these must be articulated in formalised agreement documents in order to positively manage and sustain these relationships.

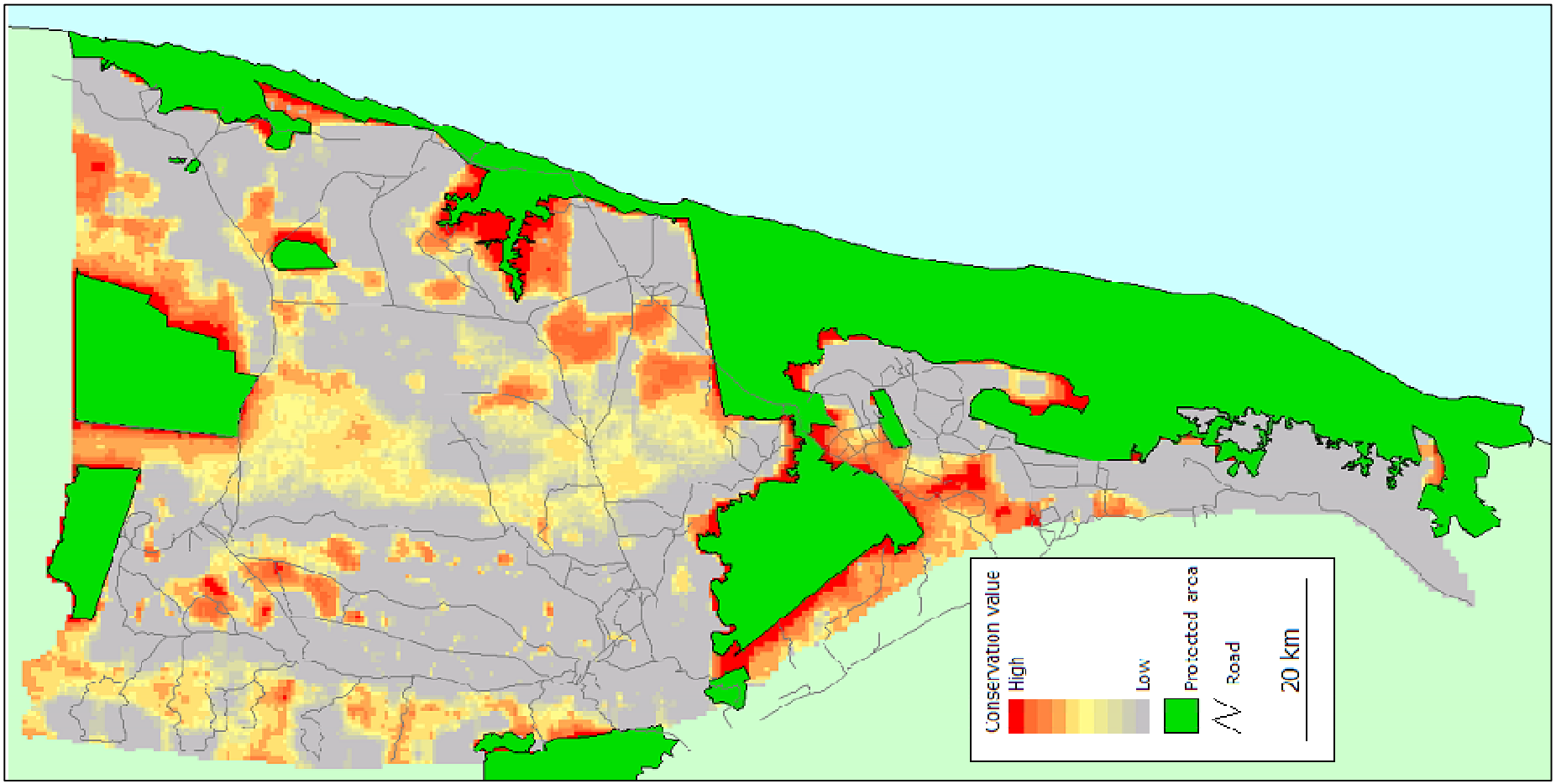
Priority areas regarding the broadening of the ecological footprint include:

- The establishment of a conservation area that would join Ndumo Game Reserve and Tembe Elephant Park effectively institutionalising synergy and collaborative conservation management between the two protected areas. This would consolidate the conservation of Maputaland and effectively create a critical link to the nutritional Phongolo River floodplain for elephant. This will effectively reduce the utilisation pressure on the Sand Forest in Tembe Elephant Park, while significantly contributing to the achievement of the objectives of the Usuthu-Tembe-Futi Transfrontier Conservation and Resource Area Protocol.
- An extension of a conservation area west of the Game Reserve into the Usuthu Gorge would

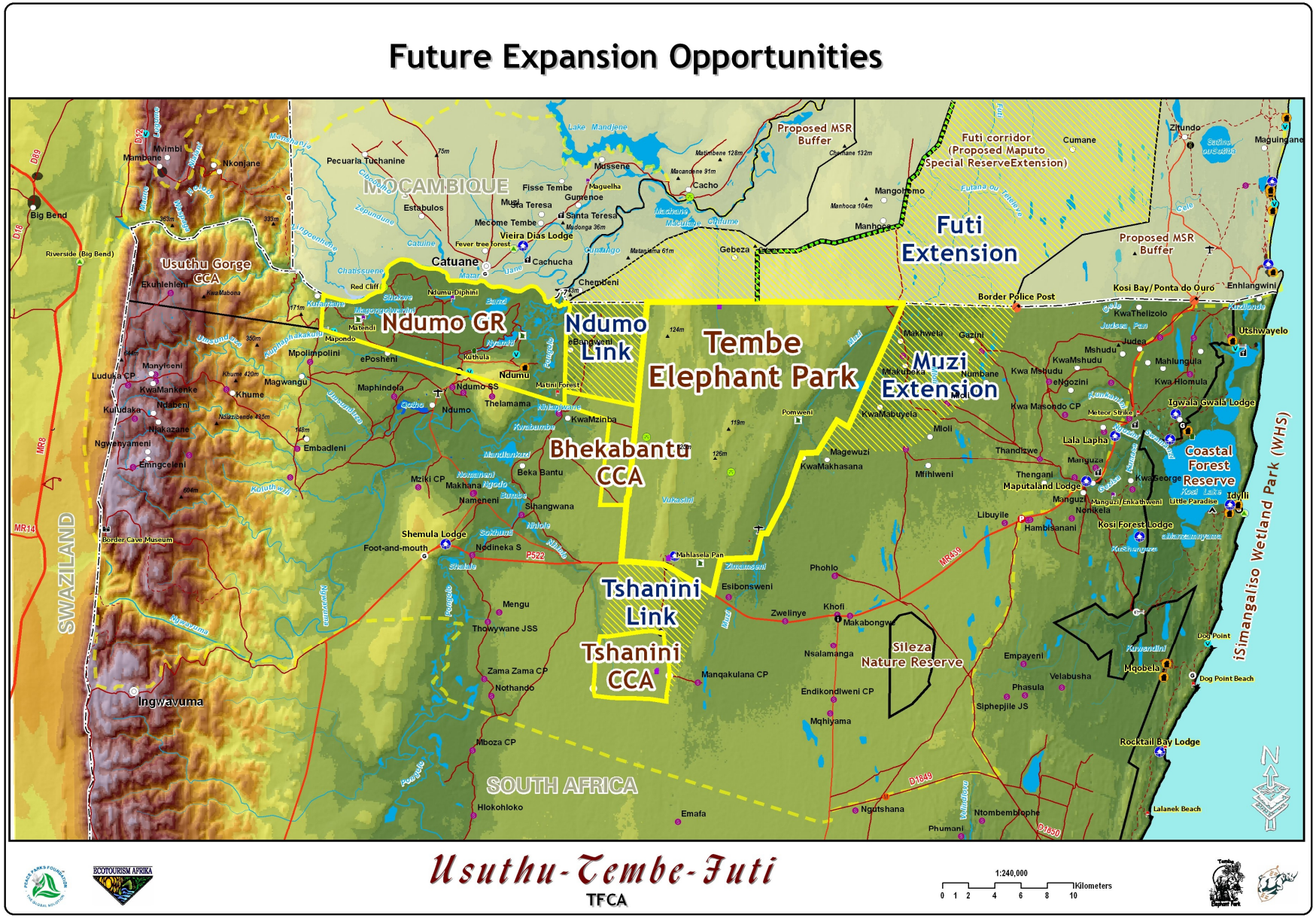
significantly contribute to biodiversity conservation management in northern KZN and southern Mozambique.

- The establishment of a Transfrontier Park incorporating: the Ndumo Game Reserve, Tembe Elephant Park (in collaboration with the Mbangweni and Bhekabantu Communities), the Usuthu Gorge Community Conservation Area, and bordering conservation areas in Mozambique.
- Any area adjoining NGR that would contribute to the attainment of the overall objectives of the Game Reserve will be supported.

Action Project 2.6 (i): Annually explore, investigate and negotiate opportunities to broaden conservation land use in and around NGR on an ongoing basis.



Map 3: Conservation value map for Maputaland, RSA - from a preliminary conservation plan for Maputaland, South Africa (Bob Smith, Wayne Matthews, Pete Goodman and Nigel Leader-Williams)



Map 4: Future Expansion Opportunities

2.7 *Establishment of a Transfrontier Park*

On 22 June 2000, the governments of Mozambique, South Africa and Swaziland signed five protocols on the establishment of the **Lubombo Transfrontier Conservation and Resource Area**. It consists of five distinct Transfrontier Conservation Area projects (See **Par.2.3**) which includes a protocol that establishes the **Usuthu-Tembe-Futi Transfrontier Conservation Area** (TFCA).

The proposed Usuthu-Tembe-Futi TFCA is situated in the southern part of Mozambique and includes the Maputo Special Reserve in Mozambique (formerly known as Maputo Elephant Reserve) and Tembe Elephant Park and Ndumo Game Reserve in South Africa. The proposal considers the linkage of Ndumo Game Reserve to Tembe Elephant Park via a narrow corridor of communally owned land known as the Mbangweni community area. It furthermore considers the linkage of the South African conservation areas to Maputo Special Reserve through a corridor of land along the Futi River. The proposed area will consolidate a conservation area of approximately 2 000 km^2. Additional Community Conservation Areas (CCAs) have recently been included in the project area. These include the Usuthu CCA situated on the western boundary of Ndumo Game Reserve. The result of this proposal, supported by the Trilateral Commission, facilitates the inclusion of Swaziland into the TFCA project scope. The scope of work currently focuses on linking Tembe to the Maputo Special Reserve through the Futi Corridor. This area forms the core of the TFCA. The linkage and partnership opportunities between Ndumo and the Usuthu CCA are being crafted as a parallel process to the Tembe linkage.

3 BACKGROUND

3.1 *Origin of the Name of the Game Reserve*

Ndumo Game Reserve takes it name from Induna Ndumo Tembe. He was one of two Indunas who originally controlled the land on which the Game Reserve was established. The other was Induna Mthombeni.

Ndumo Tembe lived near where the present day vulture feeding site ('restaurant') situated 2 km north of Ndumo camp. He was also a shop owner and this shop was next to his house. He was considered to be a very wealthy man and apparently had many cattle. His authority stretched all the way to Mkane's which is about 10km south of the reserve and to Manzibomvu in the southwest of the reserve. Induna Mthombeni was the Induna who controlled the area west of Ndumo Tembe's area.

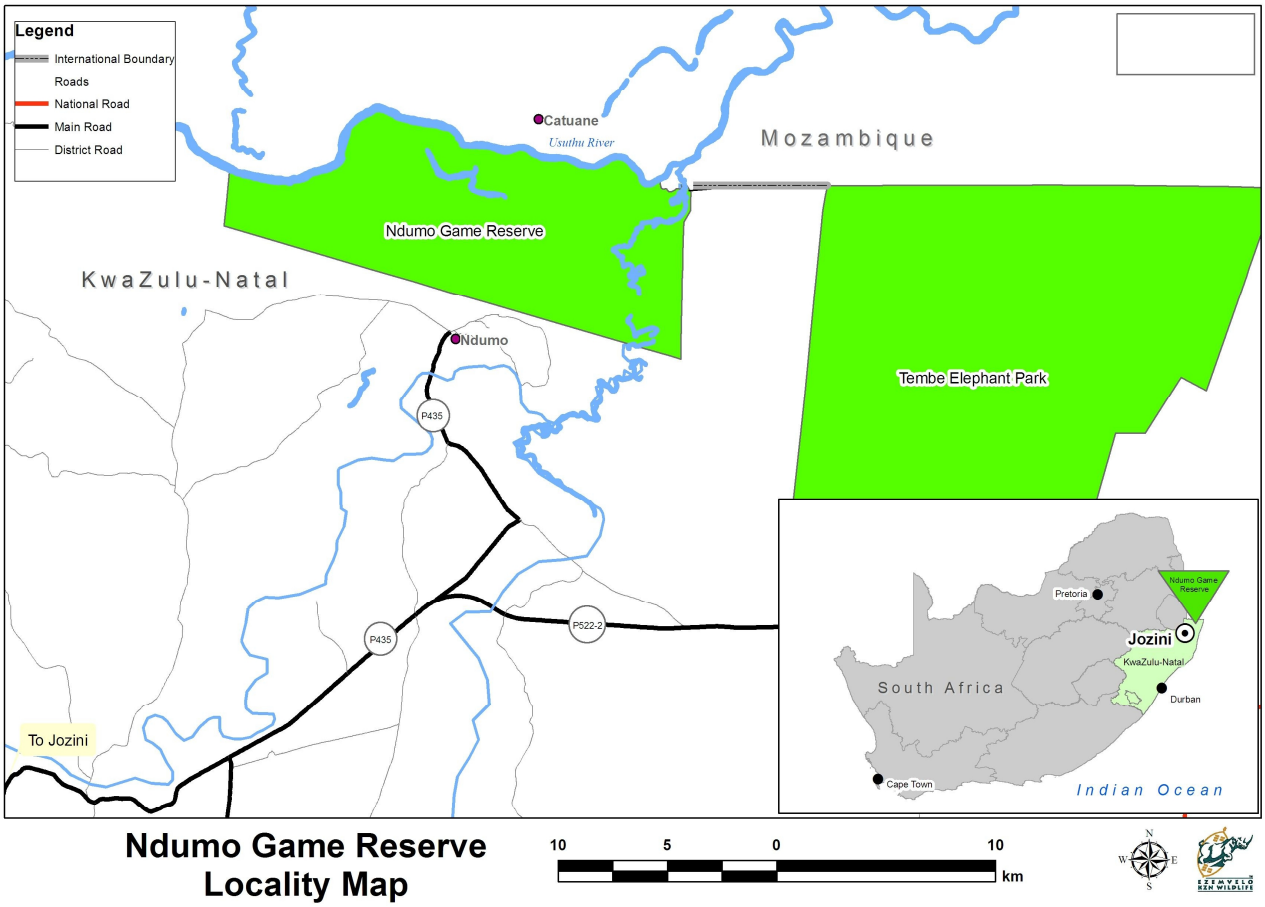
The Game Reserve was first proclaimed as Nduma Game Reserve in 1924 and later this changed to Ndumu which are both anglicized versions of Ndumo. The name was officially changed to the Ndumo Game Reserve in 1989 by the then KwaZulu Government (See **Par. 2.4**). The name for the area, the village just south of the Game Reserve and the Game Reserve itself is still indicated incorrectly as Ndumu on many maps and brochures.

3.2 *Location and Extent of the Game Reserve*

Ndumo Game Reserve at the northern end of the Phongolo floodplain, covers an area of 11 898 ha (See **Par. 2.4**) and is situated in the northern western corner of KwaZulu-Natal Province of the Republic of South Africa, on the border with Mozambique, approximately 500km north-northeast of Durban (See **Map 1**).

The Game Reserve stretches from latitude 26° 49' 55" S to 26° 56' 10" S and from longitude 32° 10' 50 " E to 32° 21' 05" E. The midpoint co-ordinates of NGR are 32° 14' 58.935" E and 26° 52' 42.481" S.

The altitudinal range within NGR is approximately 152 m, from the lowest point on the Usuthu River in the east of NGR at approximately 18 m.a.s.l., to 170 m.a.s.l. at the highest point on NGR's north eastern boundary. The Game Reserve's mean altitude is approximately 30 m.a.s.l.



Map 5: Location of NGR

3.3 *Previous Land Use*

Ndumo Game Reserve was extensively inhabited by the community prior to and even until quite sometime after proclamation. Subsistence agriculture was practiced throughout but predominantly on the Usuthu River floodplain, but to a lesser extent on the Phongolo River floodplain and pan systems where fishing also took place.

An old 'Native Recruiting Corporation' (NRC) house and outbuildings existed near the picnic site at Development Node 3 (**Appendix 4**, **Map 6 - Zonation**). These buildings were purchased by the then Natal Parks Board and demolished in 1959 / 60; a few remains of this building are still evident today.

Little has been documented on the extent of the previous agricultural, conservation or other use of the area.

3.4 *Conservation History of the Game Reserve*

Soon after Deneys Reitz was sworn in as Cabinet Minister in April 1921, he travelled to Zululand. He wrote in his book 'No Outspan' (Reitz 1943, page 44): "*I remained at Inyameti* (Nyamithi Pan at NGR) *for a few days and then began the homeward journey. The hippo I shot is the last that has been killed there, for I had the lake and the adjacent land proclaimed a sanctuary and since then they have lived in peace and they are increasing in number.*
From Inyameti we crossed the plains, following up along the banks of the Pongola by the way we had come, once again camping at night by lagoons where lion roared and fish splashed and hippo snorted; and so we came to Otobotini,…"

The above passage has been widely interpreted to mean that Deneys Reitz's express purpose with the proclamation of the Ndumo Game Reserve was to create a sanctuary for hippopotamus. This was supported in older reports and past plans (Tinley 1962, 1964, 1965; Scotcher 1974). This interpretation

is perpetuated in other NGR management plans *e.g.* the 1993 draft Ndumo-Tembe Management Plan (**Appendix 1, Item 6**). With reference to **Paragraph 1.1** it is clear that stakeholders have also upheld this opinion.

It is also quite possible to interpret Deneys Reitz's words as having a wider purpose than just the conservation of the Hippo as was the case with Alan Mountain's interpretation. In his book 'Paradise under Pressure' (Mountain 1990, page 39), he writes *"….Ndumo Game Reserve. It is bounded by the Usutu River in the north and extends to the confluence of the Usutu and Pongolo rivers in the east. From here straight boundaries were arbitrarily drawn by the cartographers who were instructed in 1924 by the Minister of Lands at the time, Deneys Reitz, to set land aside for a game sanctuary in the area. Although the ill-conceived Nagana Campaign was still in progress at the time, Reitz had the foresight to realise that unless an area was set aside as an animal sanctuary, little, if anything, would be left for future generations of the rich animal kingdom that once characterised Maputaland."*

Although various aspects of the conservation history of NGR are recorded in the Tembe-Ndumo Management and Development Plan – Draft, (1993), the long conservation history of the NGR is unfortunately fragmented, incomplete and not documented in a single cohesive publication. Not only would such a publication be valuable from a historical perspective, but it could provide valuable historical insights into observed ecological phenomena. The 1993 (draft) plan makes reference to the important fact that although the NGR was proclaimed in 1924, there were still about 300 local people staying on the Game Reserve with about 600 cattle in 1935. During this time, the Natal Provincial Administration planned to evict the Amatonga people living within the park. The eviction was considered necessary because of the impact the people were having on both the vegetation and the wild animal population. There was only a very small population of of game, mainly bushbuck, red duiker, hippo and crocodiles. It was obvious that there was heavy predation on the game by the residents and the vegetation was also suffering, (Player, *pers comm*).Later, between 1954 and 1957 this had increased to between 1 000 and 1 500 people with up to 740 cattle and other livestock using 249 kraals. The continued ecological impact of this habitation must have been significant. The 1993 draft plan does not record when or how these people eventually left the Game Reserve but unconfirmed oral history suggests that it was as late as 1969. The draft plan does record, however 'Since the fencing of the Reserve, there has been a marked improvement; vegetation has to some extent recuperated, beyond recognition compared to what it was like in 1954.' Dr. Ian Player, in 1954, took over the management of Ndumo Game Reserve from ranger Tom Elphic. On his arrival there were no fences on either the southern, western or eastern boundaries. He was instructed by Colonel J. Vincent via the chief conservator in Zululand, Mr. Peter Potter, to begin the fencing, which he did with the help of an excellent team of labourers and senior game guard staff, all of whom had been born in the game reserve and knew it intimately, (Payer, *pers comm*).

Ndumo Game Reserve was listed in the Directory of Wetlands of International Importance (Ramsar Site No. 887) on 21 January 1997. The site forms the largest floodplain system in South Africa, consisting of five wetland types, from fresh to brackish, permanent to ephemeral lakes, marshes and pools, as well as riparian and gallery forest. Well known for its abundant bird life and diversity of species, internationally important numbers of several species are supported, including many that are rare or vulnerable.

NGR has also been listed as an internationally recognised Important Bird Area (IBA) by Birdlife International. It is site ZA 038 as a number of bird that have been recorded in the Game Reserve are considered to be Globally Threatened (Criteria A1), Restricted-range (Criteria A2) and / or Biome-restricted (Criteria A3) by Birdlife International. NGR furthermore falls within the South-east African coast Important Bird Area (092).

Action Project 3.4 (i): Document a comprehensive conservation history of NGR which includes historical and ecological perspectives.

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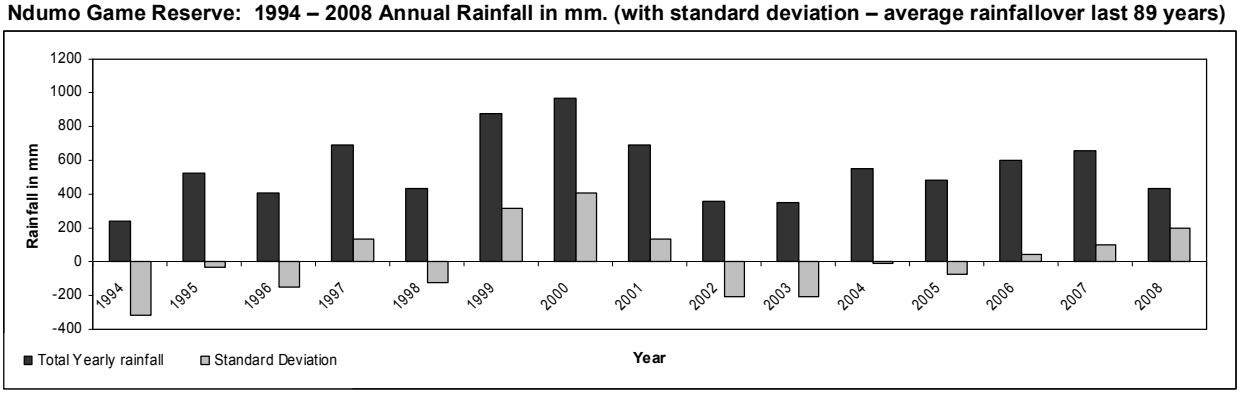
Tinley, K.L. 1962. *Food and Feeding*: Hippopotamus amphibius L. Lammergeyer, 2(1), 67.
Tinley, K.L. 1964. *Summary of ecology survey of Ndumu Game Reserve, Tongaland*, Natal Parks Board. Unpublished Report. (See **Appendix 1, Item 14**).
Tinley, K.L. 1965. *Note and comments on a recent visit to the Ndumu Game Reserve, North-western Tongaland*. Natal Parks Board. Unpublished Report. (See **Appendix 1, Item 15**).

3.5 *Climate and Weather*

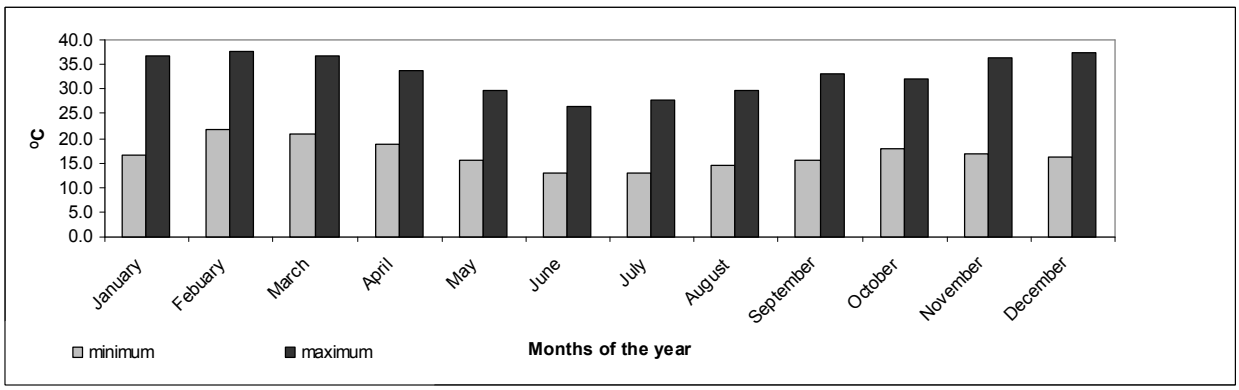
The region is characterised by summer rainfall dominated by the influence of subtropical anticyclones. The average annual rainfall has been given as 638mm. The heaviest rains usually fall in the middle to late summer with lighter falls in early summer (Kyle and Marneweck, 1996). The mean annual temperature is 21.9°C with summer temperatures often reaching well above 40°C. Summers are hot and winters are mild to warm. Variations between the seasonal and day and night temperatures are not considerable.

The following tables have been compiled from data recorded at the NGR weather stations.

Ndumo Game Reserve: 1994 – 2008 Annual Rainfall in mm. (with standard deviation – average rainfallover last 89 years)



Ndumo Game Reserve: 2008 Monthly Minimum and Maximum Temperatures in °C



Historical weather data for NGR is however incomplete. This needs to be improved and addressed under **Action Project 6.10.1 (i)**.

Reference:
Kyle, R. and Marneweck, G. 1996. Ndumo Game Reserve, South Africa: *Information Sheet for the site designated to the List of Wetlands of International Importance.* South African Wetlands Conservation Programme, Department of Environmental Affairs and Tourism, Pretoria.

3.6 *Topography, Geology and Soils*

As is evidenced from the NGR topographic map (**Appendix 4, Map 2**), most of the Game Reserve is relatively low lying, flat land. The Game Reserve is divided into 3 physiographic regions, the low lying Usuthu and Phongolo flood plains, the higher ground comprising of Ndumo Hill and the Mahemane and Bunguzana flats. Distinct features of the floodplains are the large, shallow seasonal pans (Tinley,

1965).The altitudinal range within NGR is approximately 152 m, from the lowest point on the Usuthu River in the north-east of NGR (18 m.a.s.l.) to the highest point on NGR's south eastern boundary (170 m.a.s.l.). The Game Reserve's mean altitude is approximately 30 m.a.s.l. Much of this area is regularly inundated with water when the Usuthu and Phongolo Rivers flood.

Geologically, the Ndumo area dates back to the cretaceous period (65 to 142 million years before present) with evidence of early terrestrial deposits. It is comprised of terrestrial bed deposits overlain with alluvium and tertiary sediments, all of which are exposed in several areas (McCarthy and Rubidge, 2005). Lebombo rhyolite outcrops (such as Ndumo Hill) occur principally, in the western areas. The origin of the area (during the Pleistocene) is characterised by deposits of sandy material, which forms the Port Durnford beds overlaying the flat surface from the Mesozoic era (Cairncross, 2004). This was followed by a drop in sea level causing the coastline to shift gradually to the east. A system of longshore dunes developed where there was little or no movement of the shoreline because of static sea levels. These dunes, with their north-south orientation, underwent periods of modification by wind action to give origin to the sands of recent ages which characterise the landscape of the Maputaland plain. The static sea level also affected flow velocities of the rivers of the area causing them to deposit alluvial material at successively different levels. The alluvium now forms river terraces whilst the infilling forms the present day Phongolo floodplain (Kyle and Marneweck, 1996).

The Ndumo Hill (where the main camp is situated) is composed of red sands while east of it; the sandveld (situated mostly 30 m.a.s.l.) is composed of undulating pallid sands. Lower down the slope, there is grey compacted coarse sandy clay with a hard mottled layer at a one metre depth. These two sandveld areas comprise about 1 151 ha. The flats, comprising 6 316 ha, consist of reddish sandy clay as does another 648 ha in the western area ((Kyle and Marneweck, 1996)).

References:

Cairncross, B., 2004. *Field Guide to Rocks and Minerals of South Africa*, Struik Publishers, Cape Town.

Kyle, R. and Marneweck, G. 1996. *Ndumo Game Reserve, South Africa: Information Sheet for the site designated to the List of Wetlands of International Importance*. South African Wetlands Conservation Programme, Department of Environmental Affairs and Tourism, Pretoria.

McCarthy, T., Rubidge, B., 2005. *The Story of Earth and Life: A Southern African Perspective on a 4.6 billion - year Journey*, Struik Publishers, Cape Town.

Tinley, K.L., 1965. *Fishing methods of the Thonga tribe in N.E. Zululand and Southern Mozambique*, Lammergeyer, 3;1, 9-39.

3.7 *Hydrology*

The Game Reserve is located at the confluence of the Usuthu and Phongolo River systems. The Phongolo River runs through its far eastern sector flowing from south to north. The Usuthu River (becoming the Maputo River in Mozambique) flows from west to east, forming the northern border of NGR and the international border with Mozambique (See **Appendix 4, Map 2**). The floodplains of both rivers have a significant effect on the ecology of NGR.

The site forms the lower reaches of the Phongolo floodplain, the second largest floodplain system in South Africa. There are three principal water sources flowing to and through the NGR, namely the Phongolo and Usuthu Rivers as well as the streams in the southwest. The Pongolapoort Dam, some 90 km south west of NGR regulates the flow in the Phongolo River, while the Usuthu River is modified by irrigation abstractions in Swaziland.

There are two major semi-permanent floodplain pans, namely the Banzi and Nyamithi Pans as well as many smaller ephemeral pans within the Game Reserve.

The largest pan in terms of surface area, the Banzi Pan, was in the past artificially kept at high levels by means of a barrage. The construction of this barrage was deemed necessary after severe scouring of the natural exit during Cyclone Domoina in 1983 eroded it and drained the pan. The barrage was, however subsequently damaged due to subsequent flooding events allowing the pan to drain to significantly low water levels. The barrage is still largely intact, but engineering attempts to repair the barrage are expected to be very costly. The biodiversity benefits of repairing the barrage or removing the remaining barrage are considered to be minimal. For this reason, management will continue to implement a minimum interference policy in terms of hydrology of the pan.

The Banzi Pan presently has a very different dynamic to the Nyamithi Pan, as it is currently forms part of one of the alternative channels of the Usuthu River. In the past two high rainfall years (2005-2006), the water flow of the river has changed from the northern channel to the current one which flows

through the pan itself. This has had a significant impact on the nature of the water body. The water in Banzi Pan now flows faster, is less saline and more turbid due to the higher silt levels of the river water. Fluctuations in the pan's water level are now directly related to the river level. Some exploratory work (Hattingh 2002) on groundwater salinities at Banzi Pan determined that it was not saline at all. Based on this limited data, the pan would therefore appear to be less prone to hypersalinity than Nyamithi under the present conditions.

The second largest pan, Nyamithi Pan (which was considerably silted up during the above cyclone), exhibits high salinities at times when the water level is low. It is also artificially barraged at its downstream end (Kyle and Marneweck, 1996).

Marine cretaceous deposits underlie the Phongolo floodplain and in places the groundwater is saline. Pans, such as Nyamithi which receive seepage water, can therefore become quite saline (<500 to 5000 μScm^{-1}) during the dry winter season but summer floods flush them out and replenish them with low conductivity, turbid water (Heeg *et al*., 1978).

The Usuthu River catchment in Swaziland is believed to have been altered significantly over the past few decades in terms of utilisation. It is significantly affected by water extraction for agriculture upstream, resulting in reduced flows for most of the year. There are still occasional floods and in these instances the silt load is high (Kyle and Marneweck, 1996).

It is understood that sugar cane and afforestation are the most important land-uses impacting on the catchment in addition to environmental degradation caused by of poor grazing practises. It is therefore not surprising that the response to rainfall in terms of river level rise noted at Ndumo is rapid and that active erosion is taking place. This is most noticeable at Red Cliffs, where the base of the cliff appears to be eroding at a rapid rate. Such changes may lead to the following:

(i) Alteration in the course of the Usuthu River along the Ndumo border. Immediately north of Red Cliffs the river naturally turns to the east towards the confluence with the Phongolo River. It is likely that an oxbow lake is at present forming in this area.
(ii) Alteration of flow patterns into the Shokwe Pan system (an oxbow lake).
(iii) Changes in the flow dynamics of Banzi Pan.
(iv) Changes in water quality in Shokwe and Banzi Pan.

It must be noted that some of these changes may have occurred naturally anyway, and that the process may just be accelerated by current catchment management practises.

The waters of the Phongolo system have in recent years had a reduced silt burden since the construction of the Pongolapoort Dam upstream. The dam completed in 1973, only filled for the first time in 1984 during the cyclone Domoina floods (Rossouw, 1985). The Ingwavuma River, however, enters the Phongolo River just outside the Game Reserve and if it is in flood then there can still be a considerable silt load for short periods in the Phongolo River.

Apart from the catchments of the two main rivers, the only other significant catchment of the reserve is to the southwest, in communally owned areas where increasing agriculture is a threat. Intensive agriculture in the catchment has in recent years resulted in heavy silt loads following good rains. Eutrophication may result from the increased use of fertilizers in the Balamhlanga catchment.

Water inundated areas in the "wet season" cover approximately 4 047 ha (40% of the reserve) while in the "dry season" this shrinks to about 1 518 ha (about 15%). The pans are all relatively shallow (< 2, 5 m) and siltation is a serious threat to them.

The downstream areas are in Mozambique and constitute a continuation of the Usuthu floodplain system into the Maputo River floodplain.

In conclusion, a number of changes are evident in the flow of the Usuthu and Phongolo Rivers through the floodplains in NGR. Some of these changes can be driven or are accelerated by catchment management practices outside of the Game Reserve. Our present knowledge of the hydrological dynamics needs to be improved in order to adopt conservation strategies and make informed conservation management decisions that are most likely to meet the management objectives for NGR (See also **Par. 6.5.2 Floodplain Management**).

Ramsar Site

Ndumo Game Reserve was listed in the Directory of Wetlands of International Importance (Ramsar Site No. 887) on 21 January 1997[8]. Five wetland types which are permanent, seasonal or intermittent occur in the area. These include:

- § Permanent and intermittent rivers/streams/creeks;
- § Permanent and intermittent freshwater lakes;
- § Permanent, seasonal and intermittent saline/brackish lakes or marshes;
- § Permanent, seasonal and intermittent freshwater marshes and/or pools; and
- § Tree-dominated wetlands – riparian/gallery forest.

The NGR Ramsar listing was motivated (Kyle and Marneweck, 1996) based on the following Wetlands Importance Criteria: (Note that the original 1996 criteria have been loosely interpreted below according to the updated criteria in the present Ramsar Strategic Framework (3rd edition, 2008).

Ramsar Group A - Criterion 1:
A wetland considered internationally important as it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.
Ramsar Group B - Criterion 2:
A wetland considered internationally important as it supports vulnerable and endangered species and threatened ecological communities.
Ramsar Group B - Criterion 3:
A wetland considered internationally important as it supports populations of plant and animal species important for maintaining the biological diversity of a particular biogeographic region.
Ramsar Group B - Criterion 4:
A wetland considered internationally important as it supports plant and animal species at a critical stage in their life cycles.
Ramsar Group B - Criterion 5 & 6:
A wetland considered internationally important as it regularly supports significant numbers of individuals from particular groups of waterfowl.

The text of the Ramsar Convention (Article 2.2) states that: Wetlands should be selected for the List [of Wetlands of International Importance] on account of their international significance in terms of ecology, botany, zoology, limnology or hydrology". The main onus that the Ramsar Convention places on its member states (and thereby EKZNW as the designated management authority) is that listed sites should not be allowed change negatively in their ecological character.

The existing Ramsar Information Sheet for Ndumo Game Reserve, last compiled in 1996 requires updating according to Ramsar prescripts in collaboration with DWEA.

Action Project 3.7 (i): In collaboration with DWEA, update the Ndumo Game Reserve Ramsar Information Sheet.

References:

Heeg, J., Breen, C. M., Colvin, P. M., Furness, H. D. and Musil, C. F. 1978. *On the dissolved solids of the Pongolo floodplain pans*. *Journal of the Limnological Society of South Africa* 4:59-64.

Hatting, R. 2002. *Notes from site visit to Ndumo, March 2002*. Unpublished Report (**Appendix 1, Item 11**)

Kyle, R. and Marneweck, G. 1996. Ndumo Game Reserve, South Africa: *Information Sheet for the site designated to the List of Wetlands of International Importance*. South African Wetlands Conservation Programme, Department of Environmental Affairs and Tourism, Pretoria.

Rossouw, J.N. 1985. *The effects of the Domoina floods and releases from the Pongolapoort Dam on the Pongolo floodplain*. Department of Water Affairs Branch: Scientific Services Hydrological Research Institute, File No. B-N3/0704/1. Pretoria.

3.8 *Vegetation*

Detailed descriptions of the vegetation and soils have been documented by De Moor *et al. (1977)*. Basically it is adequate to recognize the following broad vegetation units: (See **Appendix 4, Map 7**)

- § Floodplain communities on recent soils. These occupy approximately 29% of the reserve.
- § Woodland, forest and thicket on recently deposited sandy soils covering approximately 16% of the reserve.
- § Bushland and thicket on yellow to orange calcareous clay soils–locally called *Mahemane* thicket and covering approximately 35% of the reserve.
- § *Acacia tortilis* woodland on ancient red dune sands covering approximately 11% of the reserve.

[8] http://www.ramsar.org (Accessed 20 March 2009).

- Mixed *Acacia nigrescens* wooded grassland covering approximately 5% of the reserve.
- The remaining 4% is taken up by open water, pans and rivers.

The NGR vegetation falls within the Lowveld veld type as classified by Acocks (1988).

Seven major vegetation types occur in NGR according to Mucina & Rutherford (2006), each with their own conservation status and importance, they are:

- Western Maputaland Clay Bushveld,
- Makatini Clay Thicket,
- Lowveld Riverine Forest;
- Western Maputaland Sandy Bushveld,
- Sand Forest,
- Subtropical Alluvial Vegetation; and
- Subtropical salt pans.

Fairly large tracts riverine and floodplain vegetation occurs along the two principal rivers and at the main pans. The floodplain grass *Cynodon dactylon* dominates on the ephemeral mudflats while trees such as *Ficus sycomorus* and *Trichilia emetica* dominate in the riparian forest areas. Six plant communities have been recognised on the floodplain and are grouped according to their relative periods of exposure and inundation (Breen et al., 1993). These are:

- The *Acacia xanthophloea – Dyschoriste depressa* community which occurs near the outer edge of the floodplain under drier conditions;
- The *Ficus sycomorus – Rauvolfia caffra* forest community which grows along the levees of the Pongolo and Usuthu Rivers;
- The *Cynodon dactylon* community, which occurs in areas which are alternately regularly inundated and exposed, and is especially well developed around shallow pans subjected to periodic flooding;
- The *Cyperus fastigiatus – Echinochloa pyramidalis* community which occurs in marshy areas and tolerates longer periods of inundation;
- Two *Phragmites* communities, each of which comprise distinct species. Both these communities occur in the wettest areas with *Phragmites australis* having a preference for flat, swampy areas, and *P. mauritianus* favouring river banks, inlet/outlet channels and pan margins where there is a fluctuation in water level; and
- The euhydrophyte communities, which may either, be permanent or seasonal. These occur with the zone of colonization of open waters. Permanent communities consist mainly of *Trapa bispinosa* and various *Nymphaea* species. They are best developed in those pans where the water level is not subject to extensive seasonal fluctuations. The seasonal communities consist mainly of *Potamogeton crispus* and *Naja pectinata* and normally occur where a reasonable depth of water is still retained in the dry season. The turions of *P. crispus* are extremely sensitive to desiccation and large plant standing crops develop where the pans do not dry out. Large turions are selectively grazed by waterfowl, which stimulates production of small turions, which are less easily grazed. The result is a stable grazing system (Rogers 1984, and Rogers and Breen, 1990a, b).

Drainage line vegetation communities occur along the seasonal streams, particularly in the south and west. Principal tree species in these communities include *Acacia robusta*, *Schotia brachypetala* and *Spirostachys Africana* (Kyle and Marneweck, 1996).

The *Cynodon dactylon* community, which occurs in areas that are regularly inundated and exposed, is of major significance with regard to the productivity of the floodplain pans (Heeg and Breen, 1982). With abundant water, such as immediately following exposure, production is high (23 $kgha^{-1}d^{-1}$ dry mass) and lawns support many terrestrial grazers. When these lawns are inundated again, the remaining components that were not grazed by the terrestrial herbivores are either directly utilised by aquatic herbivores or enters the decomposer cycle as detritus. The major contribution by hydrophytes to the productivity of the floodplain pans comes from the seasonal winter growth of *Potamogeton crispus*, which provides an input at a time when that from all other sources is at a minimum. The turions of *P. crispus* are extremely sensitive to desiccation and large plant standing crops develop where the pans do not dry out. Large turions are selectively grazed by waterfowl, which flock in large numbers onto the pans during the winter months to feed.

The Game Reserve is a core protected area within the IUCN recognised Maputaland Centre of Plant Endemism (Van Wyk 1994; Van Wyk & Smith 2001). It is critical that the associated biodiversity and features are afforded the appropriate the levels of conservation on NGR due to its global relevance and contribution to national conservation targets. Presently, however little is known about the distribution and status as well as the integrity of the habitat associated with these elements / species on NGR. A survey to identify and clarify these aspects is required in order to develop the appropriate conservation management strategy.

Action Project 3.8 (i): Initiate a survey to identify and clarify the Maputaland Centre of Plant Endemism associated elements / species / habitat on NGR and develop an appropriate conservation management strategy for NGR.

An appropriate vegetation monitoring system is not in place and needs to be developed and implemented **[**See also **Action Project 6.10.1 (i)]**.

In total, 890 plant species have been recorded on NGR. This includes 12 Red Data Book species and 22 Maputaland endemic species. These records we extracted from the EKZNW Biodiversity Database, recent studies, Pooley (1978) and old NGR records. It is critical that the central EKZNW Biodiversity Database be updated with this information (See **Appendix 1, Item 3**).

Action Project 3.8 (ii): Update the EKZNW Biodiversity Database with the NGR plant species records.

References:

Acocks, J.P. 1988. *Veld types of South Africa*. Memoirs of the Botanical Survey of South Africa No. 57.

Breen, C.M., Heeg, J. and Seaman, M. 1993. South Africa. In: Whigham, D. F., Dykyjováand Hejný, S. (eds.) *Wetlands of the world I: inventory, ecology and managemen*t (Handbook of vegetation science). Kluwer Academic Publishers, Dordrecht, The Netherlands. 79-111.

de Moor PP, Pooley E, Neville G and Berichievy J. (1977). *The vegetation of Ndumu Game Reserve, Natal: a quantitative physiognomic survey.* Annals of the Natal Museum. Vol. 23 (1).

Heeg, J. and Breen, C.M. 1982. *Man and the Pongolo floodplain*. South African National Scientific Programmes Report No. 56. Council for Scientific and Industrial research, Pretoria, South Africa.

Kyle, R. and Marneweck, G. 1996. Ndumo Game Reserve, South Africa: *Information Sheet for the site designated to the List of Wetlands of International Importance*. South African Wetlands Conservation Programme, Department of Environmental Affairs and Tourism, Pretoria.

Mucina, L. & Rutherford, M.C. 2006. *The vegetation of South Africa, Lesotho and Swaziland*. SANBI, Pretoria.

Pooley E, (1978). *A checklist of the plants of Ndumu Game Reserve, North-Eastern Zululand*. Journal of S. Afr. Bot. 44(1): 1–54.

Rogers, K. H. 1984. *The role of Potamogeton crispus in the Pongolo river floodplain ecosystem.* Unpublished Ph.D. dissertation, University of Natal, Pietermaritzburg, South Africa.

Rogers, K. H. and Breen, C. M. 1980. *Growth and reproduction of Potamogeton crispus in a South African lake*. Journal of Ecology 68: 561-571.

Van Wyk, A.E. 1994. *Maputaland-Pondoland Region.* In: Davis, S.D., Heywood, V.H. & Hamilton, A.C. (eds), Centres of plant diversity, a guide and strategy for their conservation, IUCN Information Press, Oxford. Vol. 1. pp. 227–235.

Van Wyk, A.E. & Smith, G.F. 2001. *Regions of floristic endemism in Southern Africa: A review with emphasis on succulents*. Umdaus Press, Pretoria.

3.9 *Animals*

Species checklists will be compiled as data becomes available (**Appendix 1, Item 3**). A fixed protocol for compiling and maintaining these checklists needs to be developed to ensure that they provide accurate, comparable and contemporary baseline data for management and scientific purposes [This must be addressed under **Action Project 6.10 (i)**]. The information from NGR species checklists mentioned below were extracted from the EKZNW Biodiversity Database, recent studies and old Game Reserve records. It is critical that the central EKZNW Biodiversity Database be updated with this information.

Action Project 3.9 (i): Update the EKZNW Biodiversity Database with the NGR animal species checklist records.

3.9.1 Invertebrates

Invertebrates play critical roles in the functioning of all ecosystems as they are responsible for maintaining soil fertility, for waste disposal, water purification, pest control and pollination. Few studies quantifying the contribution of invertebrates to these processes have been carried out in South Africa, but internationally the complexity of the invertebrate interactions required to sustain ecosystems and even in influencing the structure of plant communities is becoming increasingly evident. Several invertebrates, such as termites, are considered to be keystone species. Termites recycle large quantities of plant biomass into the soil and keep the soil porous with their tunneling, allowing water to infiltrate the soil profile. Earthworms play a similar role and are more diverse and widespread in the

reserve grasslands than termites. The dung beetle fauna of the reserve is responsible for the removal of animal wastes and recycling of nutrients to the soil. Pollination of a large proportion of flowering plants, including endemics, is dependant on a range of insect groups, such as bees, wasps, flies, and beetles. In some cases the survival of locally endemic plant species is linked to pollination by a single insect species. (Extract, with amendments, from a report for the uKhahlamba Drakensberg Park World Heritage Site compiled by Dr. Michelle Hamer, University of KwaZulu-Natal dated 17 January 2005)

Thus far, 431 spider species, 33 beetles and only 8 other invertebrate species have been formally recorded for NGR. This includes 8 Red Data Book invertebrate species.

Despite the above records, the present knowledge of the invertebrate fauna for NGR is still relatively limited. It is therefore necessary that the database is continually updated and expanded. It is specifically important that ecological critical NGR invertebrate species be identified in order to develop an appropriate monitoring system **[**See also **Action Project 6.10.1 (i)]**.

Action Project 3.9.1 (i): Initiate surveys to further develop the NGR invertebrate database.

Action Project 3.9.1 (ii): Determine the ecologically critical NGR invertebrate species that need to be included in the Game Reserve's monitoring programme.

3.9.2 Fish

NGR provides a safe sanctuary and reservoir for floodplain fish as they are under heavy exploitation both upstream and downstream. According to various studies, annual yields of fish to fishermen upstream of the reserve have been estimated at up to 500 000 kg per year.

31 NGR fish species have been collected, identified and officially recorded on the EKZNW Biodiversity Database. Of these, three Red Data Book fish species, the Mozambique Killifish (*Nothobranchius orthonotus*), Southern Barred Minnow (*Opsaridium peringueyi*) and the Checked Goby (*Redibobius dewaali*) occur in the Game Reserve.

It is important that the ecological critical NGR fish species be identified in order to develop an appropriate monitoring system **[**See also **Action Project 6.10.1 (i)]**.

Action Project 3.9.2 (i): Determine the ecologically critical NGR fish species that need to be included in the Game Reserve's monitoring programme.

3.9.3 Herpetofauna (Reptiles and Amphibians)

The presence/absence of certain frog and reptiles species is often indicative of the state of health of an ecosystem.

115 NGR reptile and amphibian species have been collected, identified and officially recorded on the EKZNW Biodiversity Database (44 frog / toad, 31 lizard, 34 snake, 5 terrapin / tortoise and 1 crocodile species) . Of these, 35 are endemic and 3 Red Data Book species.

The Game Reserve has a high density of crocodiles, with Nyamithi Pan recording the highest number. Past counts have recorded between 500 – 700 crocodiles from aerial counts (this would be crocodiles greater than 1.5 m).

It is important that ecological critical herpetofauna species be identified in order to develop an appropriate monitoring system **[**See also **Action Project 6.10.1 (i)]**.

Action Project 3.9.3 (i): Determine the ecologically critical NGR herpetofauna species that need to be included in the Game Reserve's monitoring programme.

3.9.4 Avifauna (Birds)

Ndumo Game Reserve is well known for its abundant bird life and diversity of species; internationally important numbers of several species are supported, including many that are rare or vulnerable (Birdlife International[9]).

The wetlands of NGR support a variety of birdlife which utilise the Game Reserve either as a breeding or feeding habitat or both. Ducks and pelicans feed on the pans during winter and spring. A total of 424 bird species have been recorded on the Phongolo floodplain and in the surrounding area. Of all the species recorded, 35 are included in the South African Red Data Book (Brooke 1984), of which 19 are Red Data waterbirds.

Great White Pelicans (*Pelecanus onocrotalus*) from the breeding colony at Lake St. Lucia are known to feed on the floodplain from time to time, and in the breeding season carry food from the floodplain to their young over a distance of 100 km away (Heeg and Breen 1982). This suggests that the pans on the Phongolo floodplain are important for the maintenance of this, the only breeding colony of Great White Pelicans in South Africa (Heeg and Breen 1982). The Great White Pelican is a near threatened Red Data Book species.

The extensive Common Reed (*Phragmites australis*) stands in NGR are one of two or possibly three breeding localities of the Openbilled Stork (*Anastomus lamelligerus*) in South Africa (NGR records). This is a near threatened Red Data Book species that is dependent on the floodplain for both feeding and breeding; since its diet is restricted to large molluscs (mussels and large snails) which need to occur in sufficient abundance and in shallow water for the birds to be able to obtain sufficient food.

Waterfowl are well represented by a wide variety of species as well as abundance in numbers. White-faced Duck (*Dendrocygna viduata*) for example, occur in large flocks during the peak of the Curled Pondweed (*Potamogeton crispus*) growing season. As many as 8 000 of these duck may be present on an individual pan where they feed exclusively on the turions of *P. crispus* (Breen and Heeg1982). The large flocks which temporarily invade the floodplain are indicative of its importance as a winter feeding ground. The reserve also provides a relatively safe haven for migrating waterbirds as it sits astride an important north/south migration route.

NGR has been designated internationally as an Important bird Area (IBA ZA 038) by Birdlife International. Numbers of bird species recorded in the Game Reserve have met the following IBA criteria, resulting in the Game Reserve acquiring this status:

Criteria A1 - Globally Threatened;
Criteria A2 - Restricted-range; and / or
Criteria A3 - Biome-restricted.

NGR furthermore falls within the Birdlife International South-east African coast Important Bird Area (092).

It is important that ecological critical bird species be identified in order to develop an appropriate monitoring system **[**See also **Action Project 6.10.1 (i)]**.

Action Project 3.9.4 (i): Determine the ecologically critical NGR bird species that need to be included in the Game Reserve's monitoring programme.

References:

Brooke, R.K. 1984. *South African Red data book – birds*. South African National Scientific Programmes Report No. 97 FRD. CSIR, Pretoria.

Heeg, J. and Breen, C.M. 1982. *Man and the Pongola floodplain*. South African National Scientific Programmes Report No. 56. Council for Scientific and Industrial research, Pretoria, South Africa.

[9] www.birdlife.org (accessed 20/03/2009)

3.9.5 Mammals

Relatively large and safe breeding populations of amongst others, Hippopotamus (*Hippopotamus amphibious)*, Nyala (*Tragelaphus angasii*) and Impala (*Aepyceros melampus melampus)* are present at NGR.

Leopards (*Panthera pardus melanotica*) are present while NGR is also home to the following Red Data Book mammals:

Yellow Golden Mole (*Calcochloris obtusirostris chrysillis*) – Vunerable
Four-toed Elephant Shrew (*Petrodomus tetradactylus warreni*) – Endangered
Black Rhinoceros (*Diceros bicornis minor*) – Vunerable
Suni (*Neotragus moschatus zuluensis*) – Vulnerable

Altogether only 21 mammal species have been recorded against the EKZNW Biodiversity Database. This is incomplete. The small mammals especially are not well recorded. It is important that the necessary surveys be initiated to confirm the presence and status of the large and small mammals present in the Game Reserve

It is also important that the ecological critical mammal species be identified in order to develop an appropriate monitoring system **[**See also **Action Project 6.10.1 (i)]**.

Action Project 3.9.5 (i): Determine the ecologically critical NGR mammal species that need to be included in the Game Reserve's monitoring programme.

Table 1 below, reflects the game estimates for Ndumo Game Reserve between 1984 and 2008 (Note that studies are underway to determine the cause of the decline in the Black Rhinoceros over time). Three methods were used to estimate numbers of large herbivore populations namely: (i) aerial census (ii) line transect sampling and (iii) known populations. The aerial survey gives a total area count and the line transect sampling is based on distance sampling principles.

Table 1: Ndumo Game Reserve – Annual Game Estimates (1984 – 2008)
NC = No count of species done.
NR = Not recorded during the counts

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Buffalo	35	55	63	70	75	80	80	**NC**	60	67	100	100	130	130	**NC**	130	130	130	98	123	181	**NR**	**NR**	165	165
Bushbuck	75	150	100	100	50	95	120	**NC**	100	50	50	50	50	50	**NC**	50	75	75	75	NR	75	**NC**	**NC**	**NC**	**NC**
Bushpig	300	300	300	300	350	380	350	**NC**	350	300	200	150	150	150	**NC**	150	100	100	100	100	100	**NR**	**NR**	**NR**	**NR**
Duiker, grey	300	480	360	208	280	420	415	**NC**	477	269	221	256	132	133	**NC**	120	160	42	510	179	292	**NR**	**NR**	112	103
Duiker, red	810	730	950	493	620	800	850	**NC**	605	466	491	425	239	237	**NC**	350	357	201	196	179	470	**NR**	**NR**	310	333
Giraffe	18	20	24	27	32	33	28	**NC**	35	40	96	43	40	43	**NC**	40	97	30	28	54	92	**NR**	**NR**	119	88
Hippo	200	230	317	272	293	277	304	**NC**	374	285	279	336	200	200	**NC**	200	242	242	255	275	307	**NR**	**NR**	257	257
Impala	400	400	237	278	680	650	350	553	441	1180	1010	1135	515	2048	**NC**	1336	2992	1047	1467	244	673	1398	1366	1459	1117
Kudu	70	80	90	100	160	120	120	**NC**	100	100	80	100	100	100	**NC**	60	109	109	127	21	21	**NR**	**NR**	105	77
Nyala	3800	2940	3610	2550	5700	5300	3000	3386	6877	4009	3993	4024	3705	3268	**NC**	3885	5302	2623	4783	5692	5031	2460	2472	2207	1606
Reedbuck	140	200	200	200	160	305	320	**NC**	300	83	42	166	150	150	**NC**	100	130	58	76	24	227	**NR**	**NR**	**NR**	**NR**
Rhino, black	25	40	42	44	47	50	25	**NC**	35	24	25	30	30	26	**NC**	24	20	21	17	14	10	8	8	8	13
Rhino, white	40	55	57	53	57	60	40	**NC**	50	35	50	40	40	43	**NC**	50	45	45	40	45	48	**NR**	**NR**	47	45
Suni	300	200	200	200	195	280	300	**NC**	200	200	150	100	100	100	**NC**	100	83	83	83	33	63	**NR**	**NR**	101	73
Warthog	10	20	20	20	20	30	30	**NC**	40	50	100	134	134	99	**NC**	1016	865	309	1311	154	344	**NR**	**NR**	382	402
Waterbuck	**NC**	**NC**	13	13	15	15	15	**NC**	15	15	10	15	15	15	**NC**	10	29	29	29	29	29	**NC**	**NC**	**NC**	**NC**
Wildebeest	0	0	0	0	0	0	0	**NC**	0	0	0	37	48	48	**NC**	55	78	125	203	93	184	**NR**	**NR**	521	763
Zebra	70	80	100	100	115	135	120	**NC**	100	174	105	103	80	249	**NC**	249	306	210	80	29	54	**NR**	**NR**	441	559

3.10 *Cultural Heritage*

The cultural heritage of Ndumo Game Reserve, and the larger Maputaland, remains largely unexplored. Portions of the area have, however been surveyed by archaeologists, and amateur enthusiasts in the past.

In the 1950's, Natal Museum archaeologist Dr. Oliver Davies surveyed Ndumo Game Reserve for Stone Age sites. Although locating none on NGR, Davies did find a large number of Middle Stone Age and Later Stone Age sites on the lower slopes of the Lebombo Mountains in the Usuthu Gorge Community Conservation Area just west of the Game Reserve. These were mostly surface scatters without any significant archaeological deposit associated with it. Nevertheless, he found many stone tools and flakes mostly made from lydianite, quartzite, basalt, and agate. He commented that the coastal plain was unpromising for archaeological research as it was covered by superficial sands and bush coverage which affect preservation and visibility. More sites were located in the 1970's by his successor Dr. Tim Maggs. However, it was a previous warden of Ndumo Game Reserve, a Mr Paul Dutton, who located most of the known heritage sites in the reserve during the 1960's and 1970's. Apart from the previously located Stone Age sites he also found Later Iron Age sites including a site with a smelting furnace. A small excavation was conducted by Mr. Dutton and the remains of the furnace and tuyeres (furnace blowpipe), together with some Stone Age material, was displayed at the wardens office for many years. Most of these archaeological materials have subsequently been removed to the Natal Museum, Pietermaritzburg, where it is presently still curated on their non-electronic database.

Although not located within the borders of NGR, mention must be made of the archaeological site called Border Cave which is located to the west of the Game Reserve in the Lebombo Mountains. This cave site, located near the borders of South Africa with Mozambique and Swaziland, contains a deep and well preserved archaeological deposit. It was excavated in the 1970's by archaeologist Peter Beaumont, of the McGregor Museum. Apart from an exceptionally rich archaeological deposit spanning many millennia and cultural traditions, Peter Beaumont also found early *Homo sapiens* remains, most probably a burial, in layers predating 100 000 years ago. This may in fact be the oldest recorded burial in the world and supports evidence from Middle Stone Age sites elsewhere in southern Africa that human modernity evolved in Africa. Border Cave has been declared a national heritage site by the South African National Heritage Council, the predecessor of the South African Heritage Resources Agency (SAHRA), in the 1970's. This important archaeological site contains all the cultural traditions identified from surface sites in NGR; however, unlike most of the sites in Ndumo it was possible to date these layers in terms of radio-carbon dating technology.

The archaeological data base of the Natal Museum indicates the occurrence of two Early Stone Age sites, nine Middle Stone Age sites, three Later Stone Age sites, and two Later Iron Age site at Ndumo Game Reserve. The Early Stone Age sites would have been associated with early hominid types such as *Homo erectus* or *Homo ergaster* and dates back to between 200 000 years and 1.5 million years ago. The Middle Stone Age is associated with the first anatomically and behaviourally modern people *Homo sapiens sapiens*. These sites would date back to between 200 000 and about 40 000 years ago. The Later Stone Age arrived at about 30 000 years ago and is associated with the immediate ancestors of San hunter-gatherers. It most probably lasted until about 1000 years ago in Maputaland when the San where finally displaced by immigrant Bantu-speaking farmers – also called Iron Age in the archaeological literature. There is evidence that Early Iron Age farmers already settled in the coastal areas of Maputaland around 1700 years ago. All the Later Iron Age sites in NGR date back to the second millennium AD. According to Iron Age expert, Professor Thom Huffman, the Blackburn facies (a period pottery style and cultural tradition) of the Later Iron Age that dates back to approximately 800years ago, could be expected to occur in the area. These sites are associated with the first Nguni-speaking farmers who settled along the eastern seaboard of southern Africa. Charcoal from the iron-smelting furnace found in Ndumo Game Reserve by Paul Dutton has been dated at 630 AD.

Little has been documented regarding the historical features of NGR, including the more recent inhabitants of the area, pre- and post proclamation of the Game Reserve and their associated dwellings and other buildings. Oral history suggests that the area will be fruitful for further investigation of the historical features of the Game Reserve. Of note are the following features:

- Oral history has it that Induna Ndumo Tembe, after who the Game Reserve is named, lived near where the present day vulture feeding site ('restaurant') situated 2 km north of Ndumo camp. He was also a shop owner and this shop was next to his house.
- The Tembe-Ndumo Management and Development Plan – Draft, (1993), records the existence of an old 'Native Recruiting Corporation' (NRC) house and outbuildings that existed near the picnic

site at Development Node 3 (**Appendix 4, Map 6**). These buildings were purchased by the then Natal Parks Board and demolished in 1959 / 60.

Apart from archaeological sites Maputaland, including NGR, is well known for its 'living heritage' values amongst local communities. Most of these sites are linked to the rich and diverse natural features of the environment. Sites with living heritage values in NGR include the Mahemane Bush, the pan systems and areas associated with traditional fishing techniques. In addition, the area is exceptionally rich in oral histories and myth and legends relating to early African settlement and culture.

In summary, it can be said that our knowledge of the cultural heritage of NGR is incomplete and that there is an urgent need to compile a detailed inventory of these heritage sites (See **Par. 6.6**).

Compiled by:
Frans Prins, Cultural Heritage Specialist (2009)

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3.11 *Socio-Cultural History of the Area*

The area surrounding NGR is not solely inhabited by the Tembe-Thonga, but also by the Mathenjwa people. In fact, the larger part of the reserve's boundary is neighboured by the Mathenjwa. The Mathenjwa trace their origin to the present-day Northern Province. According to Bryant (1929), they belong to the same group as the BaPedi (northern-Sotho speakers) who inhabited the area prior to the annexation of Swaziland by the eMbo (Ngwane). The Mathenjwa are particularly related to the Bapedi who historically lived between the Crocodile and Olifants rivers under the authority of Modjadji (the Rain Queen) of the Lobedu. According to oral tradition, the Mathenjwa moved into their current area, in the north-western corner of 'Sambaneland', between the Usuthu and Pongola Rivers long before the Mngomezulu appeared on the scene.

The Mathenjwa did not really feel the affects of the conquest wars of the expanding Zulu Kingdom under Shaka in the early 1800s, but suffered from attacks by Lubelo who ruled the neighbouring Mngomezulu peoples. These attacks forced the Mathenjwa to leave their area and settle further south in the Hlabisa area, where they lived under the authority of Mbopa. After the death of Lubelo of the Mngomezulu, the Mathenjwa returned to their land with the permission of the then Zulu monarch, King Mpande. However, shortly after, they were once again forced to leave their area under the instruction of Mpande and they settled north of the Usuthu River in Portuguese East Africa (Mozambique). Only after the annexation of Zululand by Britain in 1887 were they allowed to return to the area that they currently inhabit in northern KwaZulu-Natal.
The resettlement of Mathenjwa territory occurred under Mtshelekwama who died in 1904. His son, Sibhama, succeeded him till his death in 1923 when Shikisi took over the leadership of the clan. He was in turn, succeeded by Mankonke who reigned till 1971/72, when Mbekwana followed him as nkosi (chief) of the Mathenjwa.
Tembe, the founding ancestor of the Tembe-Thonga, migrated from Karanga, in present-day Zimbabwe, to the area surrounding Delagoa Bay (present-day Maputo) in the middle of the seventeenth century. Due to the abilities of their strong and charismatic leaders, the Tembe-Thonga remained a unified chiefdom and gradually extended their influence in the Delagoa Bay hinterland.

By the middle of the eighteenth century the Tembe-Thonga were the strongest political and economic unit in south-east Africa. Their chiefdom stretched from the Maputo River in the west to the Indian Ocean in the east, and from Delagoa (Maputo) Bay in the north to as far south as Lake St. Lucia. The

Tembe-Thonga were never attacked by, nor directly involved in any war with the Zulu Kingdom. Maputaland remained politically and culturally distinct from areas to the north, south and west. However, European colonialism divided the Tembe-Thonga chiefdom in 1875 when Marshal MacMahon, the president of France (who was requested to arbitrate), drew a straight line along the 26º 30' S that divided the Portuguese and British spheres of influence in south-east Africa. Since he awarded the disputed area south of Delagoa Bay to Portugal, MacMahon's decision came to be known as the MacMahon Award. The Tembe-Thonga were neither consulted nor informed about the fact that the largest part of their country had been awarded to Portugal.

During the early years of the 20th century, the control the Portuguese exercised over southern Mozambique was ineffectual. Ngwanase, the Tembe-Thonga chief, and his successors still appointed headmen (izinduna) in southern Mozambique, collected taxes from the people and heard court cases arising out of disputes between people living in Mozambique. However, from the 1940s onwards the border has become a reality for the Thonga. The Tembe-Thonga have since been incorporated within the Zulu nation but still have strong ties with Mozambique and Swaziland.

The Mathenjwa also have a very close relationship with the Swazi, although the Swazi view them as subservient to the Mngomezulu. In the early 1980s, when Swaziland negotiated with the apartheid government of South Africa for the annexation of the Ingwavuma-corridor to Swaziland, they did not communicate directly with the Mathenjwa chiefs, but instead with Mbekisa of the Mngomezulu. The plan to annex the area to Swaziland did not realize as a result of successful court action by the Inkhatha Party in KwaZulu-Natal. After the failed 'Ingwavuma Land Deal', the Zulu royalists aimed to prove that the Mathenjwa and other inhabitants of the area are subservient to the Zulu monarch.

Today the area is administered as part of the KwaZulu-Natal Province of SA.

Checked by:
Dr R.J. Kloppers (2009).

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3.12 *Socio- Economic Context*

The majority of the population surrounding NGR are poor rural and previously disadvantaged South African communities. Agriculture (incl. subsistence) is the main land use in this area. Cattle farming and crop farming are the dominant form of agriculture practiced within these community tribal areas.

The wetland upstream of the Game Reserve on the Phongolo River floodplain is extensively utilised by people living in the vicinity. Large-scale subsistence and artisenal fishing are important activities supported by the Phongolo River and its wetlands which are replenished from the fish breeding grounds protected within NGR. This is of considerable value both socially and culturally while agriculture generally provides the basis for the local rural economy.

The local communities also rely on the government Expanded Public Works Programme such as the Elephant Coast TFCA Infrastructure Project (or Ndumo-Tembe-Futi TFCA Poverty Relief Project) which is funded by DWEA and implemented by EKZNW. The project implementation area forms part of the Umkhanyakude District Municipality, which is sometimes referred to as the Elephant Coast or Maputaland.

Ecotourism ventures and hospitality trade in the area also support the local economy significantly.

NGR is situated on the international border between South Africa and Mozambique. In the surrounding community area, illegal immigrants often cross the international border. Presently, there is a significant amount of legal as well as illegal cross-border trade and iillegal resource harvesting occurring in NGR and surrounds.

3.13 *Developed Infrastructure*

It is imperative that the necessary appropriate standard of infrastructure be developed and maintained as soon as possible to support the effective management of NGR and promote eco-cultural tourism to the Game Reserve. Concept future development will be detailed in the NGR Concept Development Plan. [See **Action Project 6.11 (iii)**]. The future positioning of the main office / workshop complex in relation to the hutted camp needs to be addressed in the CDP as these two activities are not compatible in such close proximity to each other.

Existing NGR infrastructure is categorised as follows:
The number in brackets indicates the Development Zone Nodes where the infrastructure is located (See **Par. 5** and **Appendix 4, Map 6**).

3.13.1 Eco-cultural Tourism Infrastructure

Eco-cultural tourism infrastructure consisting of:

- **Main Entrance Gate area [10]**
  - Stone and thatch entrance gate building.
  - Gate guard camp with two rondawels.
  - Single room prefabricated building.
  - Basic ablution facility with cold water shower, basin and flushing toilet.
  - Rustic reed and asbestos kitchen.

- **Viewing Tower [11]** (without public toilets)

- **Ndumo Main Camp – at Ndumo Hill [20]**
  - Visitor reception office and Hospitality Manager's office, walk-in strong room, staff toilet and camp laundry.
  - Hutted camp with 7 x 2 bed accommodation units = 14 beds.
  - Campground with 14 camp sites collectively taking up to 42 persons.
  - Communal ablution block with equipped laundry that serves the campground and hutted camp occupants as well as day visitors.
  - Communal kitchen and lounge with TV that serves both the campground and hutted camp occupants.
  - Old reception building (poor condition) used as a store and situated next to the communal kitchen and lounge.
  - Building complex containing the visitor's reception office, Hospitality Manager's office, walk-in strong room, staff toilets and a laundry
  - Day visitor picnic sites.
  - 2-Roomed camp store situated next to the NGR Administrative Office
  - Small pre-fabricated store (near Hut 7) used by camp gardeners.

- **Banzi Camp [9] – Operated by concessionaire – presently (2009) not operational**
  - Camp reception and kitchen area.
  - Communal dining and recreational area building.
  - 8 x 2 bed accommodation tented units = 16 beds.
  - 1 x storeroom
  - 7 x Concessionaire staff accommodation units

- **Picnic Site and Hides**
  - NRC picnic site **[3]** (With pubic toilet – poor condition).
  - Red Cliffs picnic site **[4]** (With pubic toilet – poor condition).
  - Diphini hide **[6]** (disused and dismantled now only stopping site).
  - Bird Hide, Nyamithi Barrage and Causeway **[15]** (Without public toilets).
  - Ezulwini Hide **[16]** (Without public toilets).

3.13.2 Management Infrastructure

- **Main Water Supply Pump – Phongolo River [28]**
  - Pump and pump house.

- **Main Office Complex [21], Workshop and Stores [22] – at Ndumo Hill**
  - Conservation Manager's office and Administration office with two staff toilets.
  - Section Ranger's office.
  - Two offices for the Law Enforcement Officer and Co-ordinator: Usuthu Gorge CCA are located in the management workshop / store building. The following are also located in this building:
    - stationary store / archives,
    - operational (Field Ranger) store,
    - chemical store,
    - walk-in safe / armoury,
    - small equipment store, and
    - store for consumables.
  - Oil store and staff ablutions building.
  - Store yard behind the stores that includes a roofed area.
  - Pump house for irrigation is situated near a raw water reservoir.
  - Water purification plant comprising:
    - Concrete raw water reservoir which is uncovered.
    - Concrete purified water reservoir which is covered.
    - Purification plant housed in a container covered by a roof.
    - Pump house in which the transfer pumps are located and store housing water purification chemicals.
    - Standby lightning plant.
    - Fuel is stored in an underground tank.
  - Petrol pump and underground tank (4 500 l) is situated next to the Section Ranger office.
  - 4 x Diesel tanks (2 200 l) on stands situated opposite the Workshop building.
  - 3 x Reed and asbestos garages / car ports.
  - 2 x Brick and asbestos garages / car ports.
  - A pump house is situated on the western bank of the Phongolo River below the rest camp.
  - A disused pump house is close to the NRC Picnic Site.

- **Abattoir and Skinning Shed [25] and Water Reservoir [26]**
  - Registered abattoir complex (Meat Safety Act – Category A, B and C animals).
  - Store
  - Generator Room
  - Water Reservoir

- **Airstrip [27]**

- **Staff Housing and Accommodation [23, 24 & 28]**
  - 36 x Staff accommodation units.
  - 2 x Communal ablution units for staff.
  - 4 x Management accommodation units.
  - 1 x Accommodation unit (being renovated) in rest camp for contract staff / researchers.
  - 1 x Accommodation unit (squaredawel) for Co-ordinator: Usuthu CCA.
  - 1 x Accommodation unit (Inspection quarters) at old Croc Farm.

- **Field Ranger Outposts**
  - Fontana **[1]**.
  - Balamhlanga **[5**].
  - Shabatana [14].
  - Pholwe **[18]**.
  - Mganweni **[29]**.

- **Goldfield Environmental Education Centre [19]**
  - Hall, store, and kitchen.
  - Library
  - Accommodation Unit.
  - Ablution block
  - Lapa.

3.13.3 Bulk Infrastructure:

Bulk infrastructure consists of:

- No formal hiking trails are maintained.
- Game Reserve roads (all gravel /sand roads):
  - Roads for public use (approx. 37 km 'hardened' and 6, 5 km 'non-hardened' [Mtikini 4x4 track]).
  - Management roads and tracks (approx. 8 km 'hardened' and 70 km 'non-hardened')
- No waste management sites exist. Solid waste is collected and removed to the municipal dump at Kwangwanase (Manguzi).
- 1 x water treatment plant (included main office complex infrastructure description above).
- Airstrip.

3.13.4 Conservation Infrastructure

No unguided hiking trails have been developed at NGR because of the presence on dangerous animals. Visitors can however book and undertake guided hikes parts of the Game Reserve.

Other conservation infrastructure outside the developed centres consists of:

- The perimeter boundary fences total length is approximately 30 km. The existing boundary fence is generally 2.4 m high, is generally in a good condition (except for the eastern boundary line) and follows the cadastral boundaries closely. No boundary fence has been erected along the Usuthu River.

  The entire eastern boundary fence was cut / broken down by members of the adjoining community allegedly due to dissatisfaction with land claim progress during 2008. Once tensions have settled, it is a priority to replace the fence along the eastern boundary (See also **Par. 6.11.2**).
- No internal fencing exists except for that around staff accommodation units, stores, abattoir, skin shed and the water purification plant.

3.13.5 Water Supply Infrastructure

All water supply infrastructure must as far as is possible be appropriately screened or camouflaged to reduce its detrimental aesthetic impact on the landscape. For management purposes it is essential that all water supply infrastructure (including the location of pipelines) must be indicated on a Game Reserve infrastructure database and map [See **Action Project 6.11 (i)**].

3.13.6 Infrastructure Owned / Maintained by outside Organisations

- Telephone lines are maintained by Telkom and the electricity lines maintained by Eskom.
- Banzi camp maintenance will be the responsibility of the allocated concessionaire.
- Maintenance of river diversion structures constructed by DWEA will be their responsibility unless otherwise agreed to with EKZNW.
- No other infrastructure within NGR is owned and / or maintained by outside organisations.

4 VISION, MISSION, MANAGEMENT OBJECTIVES and CONSERVATION TARGETS

4.1 *Introduction*

Ezemvelo KwaZulu-Natal Wildlife has a legislative mandate which rests the custodianship of biodiversity conservation within the organisation. In alignment with this mandate, EKZNW has adopted a Five Year Strategic Plan and Performance Plan for 2009-2014 (**Appendix 1 Item 1**) which has identified the following corporate Vision, Mission, Goals and Core Values (see Text Box below):

EKZN WILDLIFE
STRATEGIC VISION, MISSION, GOALS AND CORE VALUES

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

1. To conserve indigenous biodiversity in KwaZulu-Natal both within and outside of protected areas.
2. To be a sustainable, well resourced and capacitated biodiversity conservation and ecotourism organisation.
3. To foster the value of biodiversity conservation with stakeholders.
4. To be an efficient, effective and compliant organisation with good governance.
5. 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.

This Ndumo Game Reserve Integrated Mangement Plan (IMP) has been developed in consultation with stakeholders cognizant of EKZNW's legislative mandate as well its corporate Vision, Mission, Goals and Core Values. (See **Appendix 1, Item 18**).

4.2 *Stakeholder Participation*

A Vision, Mission and Management Objectives for NGR were derived at a Key-stakeholder Workshop held at Ndumu River Lodge between 5th and 6th October 2006 as the first in a series of workshops and meetings to develop an IMP for the Game Reserve. The workshop was facilitated by Terratest / MCDS Consultant Consortium on behalf of EKZNW. Provision was made for translation into *isiZulu* throughout the workshop.

The Key-stakeholder Workshop included the following sessions and activities:

- Pre-workshop meeting with community representatives
- Sharing of information
- Determination of individual visions and a consolidated vision statement for NGR

- Derivation of a mission statement, from individual sector mission objectives
- Articulation of preliminary management objectives
- Rationalisation of preliminary management objectives
- Prioritisation of management objectives
- Closure and a way forward

Representatives from the following Key-stakeholders representatives attended the Workshops (as per **Appendix 4**):

- Ezemvelo KZN Wildlife
- Lubombo Transfrontier Conservation Project
- Jozini Local Municipality
- Mathenjwa Traditional Authority
- Tembe Traditional Authority
- Usuthu Trust
- Mbangweni Corridor Representatives
- Land Claims Commission
- Thonga Village Representatives
- Space for Elephants Foundation

The following NGR vision, mission and management objectives derived with stakeholder involvement, together with the zonation plan and management policies all contained in this Integrated Management Plan (IMP) provide an integrated management planning framework for the Game Reserve that is supported by EKZNW. The Management Objectives will be operationalised within this framework through a Strategic Management and Business Plans. The latter will form the basis from which all management activities in and around NGR are initiated, financed, resourced and monitored.

4.3 *Vision*

The Vision for Ndumo Game Reserve is:

The ecological integrity and cultural values of NGR, in conserving the Phongolo and Usuthu floodplain systems and associated biodiversity, is maintained and enhanced in realising sustained benefits to the people of the Mathenjwa and Tembe communities, through:

- **land partnerships;**
- **sustainable eco-cultural tourism[10]; and**
- **environmental education appropriate to the character and inherent attractions of the reserve.**

4.4 *Mission*

The Mission of Ndumo Game Reserve is:

A commitment to sustainably utilise, manage and conserve the natural and cultural resources of the Ndumo Game Reserve, based on sound environmental principles that benefit both the visitor and local community in an equitable manner.

[10] The word *ecotourism* has been replaced with the words *eco-cultural tourism* as a more inclusive term – see Definition of *eco-cultural tourism*.

4.5 *Management Objectives*

To ensure that NGR's objectives as set by the Key-stakeholders, are achieved, it is imperative that the these objectives are grouped according to relevant Management Objectives (MOs).

To attain the NGR Vision and Mission and those of EKZNW, four overarching Management Objectives were acknowledged namely:

MO 1: Conservation of key biodiversity features, biophysical processes, landscapes, abiotic, cultural, historical, archaeological and palaeontological resources.

MO 2: The formation of functional **partnerships** to integrate the NGR with regional development plans and the Usuthu-Tembe-Futi Transfrontier Conservation Area initiatives, and other initiatives which underwrite the vision of NGR.

MO 3: The provision of socio-economic **benefits** (benefit flow) to the Game Reserve's neighbours and to contribute to the local economy and the efforts of conservation in a sustainable manner based on sound business principles (EKZNW Business Plan).

MO 4: The provision of eco-cultural tourism **business** opportunities in the natural and cultural environment based within the influence sphere of NGR.

NGR objectives were derived in collaboration with the Key-stakeholder group and prioritised. A ranking rationale was used for the prioritisation as trade-offs are required to achieve the objectives against a backdrop of resource limitations . The prioritisation method combined the Management Objectives as set out above with set and agreed criteria (Matthews *et al* 2008), namely proclamation agreements, international agreements, national and provincial legislation as well as institutional policies and protocols (See Prioritisation Schematic – **Appendix 3**).

The **eighteen** NGR objectives derived at the workshop are listed below. They are clustered according to the four distinct EKZNW management functions.

Biodiversity Objectives

1. **To comply with the terms of the Ramsar Convention, specifically with regard to the elements of the Maputaland Centre of Plant Endemism.**
2. **To protect intact representatives areas of the Usuthu and Pongola River floodplain systems and associated biodiversity in particular fish and bird species and associated water fauna and flora specifically the elements of the Maputaland Centre of Plant Endemism.**
3. **Protect representative examples of the Maputaland coastal plain fossil beds.**
4. **Protect and conserve the Hippopotamus as part of the Usuthu and Phongolo River floodplain system.**
5. **Conservation of elements of Maputaland Centre of Plant endemism (Global Relevance).**
6. **To protect endangered, rare and endemic species indigenous to the area (key biodiversity elements as identified by the EKZNW Conservation Plan).**
7. **Contribute to the achievement of Provincial and National conservation targets through the protection of a representative portion of Maputaland Lowveld and its associated biodiversity, specifically birds and spiders.**

Cultural Objectives

1. **Safeguard the cultural, historical, archaeological, palaeontological and living cultural heritage of the area.**
2. **Maintain the "unique sense of place" of the pan systems and Mahemane bush (a thicket on calcareous clay soils – locally referred to as Mahemane bush).**
3. **Promote awareness of the natural beauty and aesthetic value of the area.**
4. **Facilitate access to cultural heritage sites (graves, archaeological sites, sites of special activities).**

Benefit (Partnership) Objectives

1. **Ensure effective communication between the local communities and EKZNW through integrated, shared, co-operative working and relationships with Mathenjwa and Tembe Traditional Authority people.**
2. **Participate as a key stakeholder in planning initiatives that specifically refer to the promotion of overall Protected Area objectives; specifically the following:**
    - **Usuthu -Tembe - Futi TFCAs.**
    - **Local Government IDPs.**
    - **Amafa.**
    - **Private and Communal initiatives.**
3. **Play an anchor role for conservation and regional economic empowerment through joint agreements.**
4. **Economic benefit flow to Mathenjwa and Tembe Traditional Authority people from sustainable resource (consumptive and non-consumptive) use.**
5. **Co-operative partnerships on promoting environmental education and conservation programmes.**

Business Objectives

1. **Promote conservation as a viable and sustainable land use option.**
2. **Provide a better eco-tourism experience by capitalizing on the sense of place, unique biodiversity assets, such as pan systems, bird diversity, and aesthetic beauty.**

Reference

Matthews, W.S., Khumalo, C.E., Blok, E. & Kloppers, R. 2008. *The balance between biodiversity conservation, economic benefit flow to communities -Tembe Elephant Park, part of the Tembe – Futi Transfrontier area with Mozambique.* In: Proceedings of the Society for Conservation Biology. 22nd Meeting Chattanooga, USA.

4.6 *Conservation Targets*

In order to assist in developing a conservation management strategy more effectively linked to budget and resources, it is necessary to have specific conservation objectives (or 'targets' in conservation planning terms) in place. Monitoring of status relative to these targets will then allow for measurement of success of management interventions (and consequent budget and resource adjustments where required), and to trigger management interventions when certain thresholds are reached. This removes the 'monitoring to extinction' problem that has arisen in many organisations.

Apart from the need to monitor the success of implementation of the strategy in terms of achievement of conservation targets, a basic requirement for a systematic approach to conservation planning, impact assessment and protected area management effectiveness assessment is the identification of a clear set of provincial goals for the province, which for operational use needs to be translated into a more specific set of quantitative 'targets' (Margules & Pressey 2000). A key (but faulty) assumption often made with provincial Systematic Conservation Plans in terms of conservation priorities outside the protected area network is that protected areas continue to conserve key species and habitats at the same levels at which they occurred when the plan was developed. Where protected areas have failed to do so, it will result in an underestimate of conservation requirements outside protected areas and hence the real possibility of provincial conservation objectives and targets not being achieved. It is therefore essential to design and implement management and monitoring strategies to ensure that NGR continues to conserve those species and habitats which are important at a provincial level.

Conservation targets for biodiversity are not easily set, and indeed, conservation managers, scientists, decision makers and politicians have been reluctant to formalise and agree to targets. In reality our understanding of 'how much is enough', in what spatial configuration this should be, what the most critical processes are for the maintenance of biodiversity and how one can conserve these is poor, and the debate and research around this topic will continue for some time to come. This information will be continuously updated over time as our knowledge of area, connectivity and other process requirements improves for the conservation of ecosystems, communities and species. However, management has to take place despite these deficiencies so it is necessary to make best use of available information, stating the assumptions and limitations, and to see conservation targets as a set of working hypotheses around which conservation planning and evaluation can take place. Another advantage of developing

strategies around targets is that this process serves to highlight the critical knowledge deficits thus guiding future research and monitoring priorities.

Action Project 4.6 (i): Identify conservation targets for NGR.

Action Project 4.6 (ii): Develop conservation and monitoring strategies for all species for which NGR conservation targets have been set.

Reference:
Margules C, Pressey R. 2000. *Systematic conservation planning*. Nature 405:243-253.

5 ZONATION

Zonation within protected areas is an internationally accepted practice for the purpose of effecting management and recreation opportunities. Zonation that characterise various zones will ensure that protected area managers and users have a clear indication of the type of management that will be applied to each zone as well as the potential recreational opportunities that will be allowed within the various zones.

The Zonation of NGR is divided into four management zone categories that guide future use, management and development of the reserve to cater for the needs of different public user groups. They are:

Development Zone: Terrestrial zone where the majority of future developments will be spatially concentrated within the various identified Development Nodes (listed below) making up the Development Zone.

Natural Zone: Terrestrial zone where visitor use will be managed according to the guidelines described below for the Natural Zone: medium- and low-intensity utilisation sub-zones. Minimal development will take place in this zone.

Resource Protection or Use Zone: This zone can be of a permanent or temporary nature. It is used with a variety of sub-zoning applied as 'overlay' zones in order to achieve specific natural and cultural heritage conservation or resource use objectives that are aligned to the protected area's IMP management objectives.

NGR Zonation is described in more detail below and indicated spatially on **Appendix 4, Map 6.**

5.1 *Development Zone*

This zone consists of a number of 30 **Development Nodes** most of which have a relatively small impact area and are already developed or which contain infrastructure of some kind. One new development is proposed. In the Development Zone more intensive infrastructure development may be permitted. Development will not be demand-driven but will be designed to meet the basic management and eco-cultural tourism needs within the bounds of generally accepted ecological, aesthetic and architectural standards.

Paths or trails within the development zone should be surfaced (*e.g.* boardwalks, cement or paving) where environmental damage is evident as a result of high intensity use. These areas will also contain most of the Game Reserve administration / management stores / workshop facilities as well as the tourist accommodation and associated facilities.

The outer limits of the above development nodes must be physically demarcated by means of beacons and the GPS positions recorded to update mapping. Development will not be extended beyond these limits. Development at these nodes will be of a low-density nature at all times, and open space will make up no less than 60% of the areas demarcated.

The following infrastructure exists or is envisaged for each of the following Development Nodes:

Development Node 1 - Fontana field ranger outpost area:
Field ranger accommodation area.
Development Node 2 - Quarry:
This quarry hs been closed and must be re-habilitated.
Development Node 3 - N.R.C. water pump and picnic site:
The water pump is no longer in use and the picnic site is in poor condition. This site requires upgrading and re-habilitation.
Development Node 4 – Red Cliffs picnic site :
A number of picnic sites are available at this popular viewpoint.
Development Node 5 – Balamhlanga field Ranger outpost:
Field ranger accommodation area.
Development Node 6 – Diphini hide:
This hide is not at an ideal site and is disused. Site needs rehabilitation and converision to a possible picnic / stopping point for tourists viewing the Game Reserve by vehicle.
Development Node 7 – Usuthu River diversion:
DWEA has developed river diversion infrastructure at this point.
Development Node 8 – Gazini (old disused field camp):
This area is no longer used as such and needs to be investigated for re-habilitation purposes.
Development Node 9 – Banzi Camp:
This camp is operated by Concession Holder and needs to be monitored for contract compliance.
Development Node 10 – Main entrance gate office and staff housing:
The NGR main access control office and gate staff accommodation are situated here.
Development Node 11 – Observation Tower:
Tourist observation tower.
Development Node 12 – Banzi barrage and fish ladder:
The barrage has been partially destroyed by flooding. The future of the barrage and fish ladder will be determined by the future pan management policy that is developed.
Development Node 13 – Old bridge crossing:
This bridge has been damaged and no repair is envisaged, rehabilitation to be considered.
Development Node 14 – Shabatana field ranger outpost:
Field ranger accommodation area.
Development Node 15 – Bird hide / Nyamithi barrage and causeway:
The future of the bird hide, barrage and causeway to be considered in terms of the future pan management policy that is developed
Development Node 16 – Ezulwini hide:
The popular hide overlooking Nyamithi Pan where upgrading of the site is required.
Development Node 17 – Pump house:
Existing main water pump for pumping water from the Phongolo River. River course has changed – no longer ideal as a water pump site – new site is required.
Development Node 18 – Pholwe field ranger outpost:
Field ranger accommodation area.
Development Node 19 – Gold Fields Environmental Education Centre:
Environmental Education Centre site and camp.
Development Node 20 – Ndumo hutted camp:
Tourist hutted camp and camping site.
Development Node 21 – Main office complex:
Main Game Reserve management offices complex.
Development Node 22 – Workshop and stores:
Main Game Reserve management workshop and store complex.
Development Node 23 – Staff housing:
Main Game Reserve staff accommodation complex.
Development Node 24 – Staff housing (management):
Main Game Reserve managemenent accommodation area.
Development Node 25 – Abattoir and skinning shed:
Game meat processing plant.
Development Node 26 – Reservoir:
Main Game Reserve water stairage reservoir.
Development Node 27 – Airstrip:
Small airplane landing strip – continued use to be re-considered.
Development Node 28 – Croc farm and staff housing:
Old crocodile breeding area and staff inspection quarters.
Development Node 29 – Mganwini field ranger outpost:
Field ranger accommodation area.

Development Node 30 – Pump house (future):
Potential new site for the main water pump - where the Game Reserve boundary fence crosses the Phongolo River.

5.2 *Terrestrial Natural Zone*

5.2.1 Medium intensity utilisation

This sub-zone is largely determined by the impacts (audio, visual & other) of visitor motorised vehicular use of the area. Visitor motorised vehicular access along roads demarcated for public use will be permitted and pedestrian access can be mostly be unrestricted. Nature-orientated recreational activities such as day-walks, visits to bird-hides and picnic spots as well as the provision of view sites may be permitted in this area. Bicycles may be permitted on selected management tracks. Development in this zone will be kept to a basic minimum (*e.g.* parking areas, picnic sites, view sites and interpretation kiosks). Visitor use will be closely monitored, with the aim of determining an upper limit for visitor carrying capacity.

5.2.2 Low intensity utilisation

In this sub-zone, no public vehicular access will be permitted. Pedestrian access to this area will be limited to groups using formal or guided trails including bicycle use which may be permitted on selected management tracks. Numbers of users and routes will be restricted. Any further public access must be guided by reserve staff. Developments in this zone will be limited to the dispersed facilities utilized for management, management vehicle tracks or basic hiking trail overnighting areas for tents. The objective for in this zone will be to retain or restore its undisturbed natural character.

5.3 *Resource Protection or Use Zones*

5.3.1 Resource Use: Reed harvesting zones (Area 31 on Map 6)

A resource use sub-zone where limited, controlled and monitored reed harvesting by the local community is permitted during specific periods of the year and at which time normal visitor use of the area can be excluded (See **Par. 6.7.1**).

5.3.2 Resource Use: Mbangweni fishing zones (Area 32 on Map 6)

A resource use sub-zone where limited, controlled and monitored fishing by the local community is permitted. Public visitation to these areas will only be guided (See **Par. 6.7.1**).

5.4 *Adoption of Zonation Plan*

This Ndumo Game Reserve Zonation will be advertised for public comment as part of this IMP prior to being adopted and authorised.

6 OPERATIONAL MANAGEMENT POLICY FRAMEWORK AND GUIDING PRINCIPLES

NGR objectives were derived in collaboration with the key stakeholder group and prioritised. A ranking rationale was used for the prioritisation as trade-offs are required to achieve the objectives against a backdrop of resource limitations . The prioritisation method combined the Management Objectives as set out above with set and agreed criteria (Matthews *et al* 2008), namely proclamation agreements, international agreements, national and provincial legislation as well as institutional policies and protocols. In this section the objectives within the clusters were ranked against each other resulting in an integrated objectives hierachy. (See Prioritisation Schematic – **Appendix 3**).

Action projects have been identified throughout this IMP and are instrumental to achieving, and assuring, the long term sustainment, of the objectives. The policy and guiding frameworks discussed in this section, unless otherwise stated, are subservient to the action projects associated directly with the protected area objectives.

1. **Ensure effective communication between the local communities and EKZNW through integrated, shared, co-operative working and relationships with Mathenjwa and Tembe Traditional Authority people.**
2. **To comply with the terms of the Ramsar Convention, specifically with regard to the elements of the Maputaland Centre of Plant Endemism.**
3. **To protect intact representatives areas of the Usuthu and Pongola River floodplain systems and associated biodiversity in particular fish and bird species and associated water fauna and flora specifically the elements of the Maputaland Centre of Plant Endemism.**
4. **Protect representative examples of the Maputaland coastal plain fossil beds.**
5. **Protect and conserve the Hippopotamus as part of the Usuthu and Phongolo River floodplain system.**
6. **Conservation of elements of Maputaland Centre of Plant endemism (Global Relevance).**
7. **Safeguard the cultural, historical, archaeological, palaeontological and living cultural heritage of the area.**
8. **Participate as a key stakeholder in planning initiatives that specifically refer to the promotion of overall Protected Area objectives; specifically the following:**
    a. **Usuthu -Tembe - Futi TFCAs.**
    b. **Local Government IDPs.**
    c. **Amafa.**
    d. **Private and Communal initiatives**
9. **Play an anchor role for conservation and regional economic empowerment through joint agreements.**
10. **To protect endangered, rare and endemic species indigenous to the area (key biodiversity elements as identified by the EKZNW Conservation Plan).**
11. **Maintain the "unique sense of place" of the pan systems and Mahemane bush (a thicket on calcareous clay soils – locally referred to as Mahemane bush).**
12. **Promote conservation as a viable and sustainable land use option.**
13. **Provide a better eco-tourism experience by capitalizing on the sense of place, unique biodiversity assets, such as pan systems, bird diversity, and aesthetic beauty**
14. **Economic benefit flow to Mathenjwa and Tembe Traditional Authority people from sustainable resource (consumptive and non-consumptive) use.**
15. **Contribute to the achievement of Provincial and National conservation targets through the protection of a representative portion of Maputaland Lowveld and its associated biodiversity, specifically birds and spiders.**
16. **Co-operative partnerships on promoting environmental education and conservation programmes**
17. **Promote awareness of the natural beauty and aesthetic value of the area.**
18. **Facilitate access to cultural heritage sites (graves, archaeological sites, sites of special activities).**

The GRPC have identified the following predominant existing or potential threats to NGR:

- Unresolved land restitution issues.
- Inadequate financial and human resources.
- Illegal activities in and around the Game Reserve.
- Inappropriate floodplain management in and outside the Game Reserve
- Inappropriate or ineffective conservation management.
- Loss or degradation of cultural heritage sites.
- Alien species invasion.
- Soil erosion.

The NGR operational policy framework, guidelines and strategies have been developed to support the achievement of the stated Game Reserve management objectives and where possible to address the existing or potential threats as listed above.

6.1 *Financial and Human Resources*

6.1.1 Financial Resources

Capital and operational funding for NGR is sourced primarily from the KwaZulu-Natal Provincial Government. Funding is furthermore generated from commercial operations within NGR and various external sources.

Levels of funding have remained stable, however, over time the management of the NGR cannot be sustained at required levels and capital assets, including infrastructure, are not being effectively maintained.

It is necessary therefore to develop a realistic five-year Strategic Management and Business Plans in an attempt to secure funding to effectively support the achievement of the mission and management objectives for the Game Reserve.

The development of a NGR Business Plan is a priority and must indicate past income and expenditure trends, a five year projection of income and expenditure targets that will allow for effectively achieving the NGR management objectives. In addition, planning must be put in place to address any budget shortfalls after the annual grants from the KwaZulu-Natal Provincial Government have been accounted for.

The total self-sufficiency of commercial operations within the Game Reserve is a minimum requirement, while it will be expected that commercial operations must respect the natural and cultural heritage values of NGR and that any operational profit will be used to subsidise the NGR's conservation and community programmes.

The value of ecosystem services that NGR provides, as well as the direct and indirect economic value of NGR to the local and regional economy must be determined in order to market the Game Reserve, ensure continued government funding and where appropriate, leverage additional funding from other sources.

Action Project 6.1.1 (i): Develop a five-year Strategic Management Plan and Business Plan for NGR.

Action Project 6.1.1 (ii): Initiate a resource economics study of the Game Reserve to determine its economic value regarding the provision of ecosystem services and its contribution to the local and regional economy.

6.1.2 Human Resource Capacity

The existing human resource structure and capacity is insufficient to fully meet NGR Management Objectives. The following key areas of concern in particular are emphasised:

- Safe and secure environment for staff and visitors.
- Efficient and profitable tourism management.
- Effective conservation management and sustainable use of the biodiversity and landscape.
- Stakeholder liaison and advisory services, particularly within the TFCA.
- Environmental education and awareness programmes.
- Project management of externally funded projects.
- Ineffective research and monitoring

In order to effectively address the full spectrum of NGR management functions it is imperative that the human resource needs are fully investigated with a view developing a new and effective human resource structure for NGR.

Action Project 6.1.2 (i): Investigate and develop an appropriate human resource structure and capacity of NGR with a view to improving effectiveness and efficiency in achieving NGR objectives and informing the Business Plan.

6.1.2.1 NGR Employment Policy Guidelines

The Ndumo Izinduna's Forum and the Tembe Ndumo Local Board will always be informed in advance of impending recruitment of NGR staff.

- Appointments will be made in accordance with the:
  - relevant employment legislation;
  - employment policy framework of EKZNW; and
  - required experience, skills, proven ability and qualifications of applicants.

- Entry-level or temporary appointments requiring no specific skills will be employed any internal EKZNW applicants and thereafter from neighbouring communities after consultation with the Ndumo Izinduna's Forum.

6.2 *Local Community Involvement*

EKZNW will strive to work collaboratively with institutions and adjacent landowners / communities to improve communication as well as conservation management in and around the Game Reserve for the benefit of all. Neighbour relations and partnerships are guided by **Board Policies D 4.1** and **D 4.4** (See **Appendix I, Item 2**).

EKZNW encourages community involvement in the management of the Game Reserve through collaboration with adjoining communities in the following programmes and projects:

6.2.1 Tembe Ndumo Local Board and Ndumo Izinduna's Forum

Community involvement in the Game Reserve is realised, mainly, through the Tembe Ndumo Local Board established in terms of Chapter 5 of the KZNNCMA. The EKZNW Board Policy No.4.9 (**Appendix 1, Item 2**).**)** provides an operational relationship framework between the Game Reserve and its Local Board to ensure effective community participation in the management of the Game Reserve. Regular meetings are also held with the Ndumo Izinduna's Forum and representatives from the the Jozini and Umhlabuyalingana Local Municipalities.

6.2.2 Community Levy Trust Fund

Communities adjacent to the NGR can benefit from income generated by the Game Reserve through a community levy paid by visitors. These funds are administered through the Community Trust Fund and provided to communities for development needs as prescribed by EKZNW Board Policies No. 4.16 and No. 4.6 (**Appendix 1, Item 2**).

6.2.3 External Funding Projects

Where NGR procures external funding for specific Game Reserve related projects; priority is given, where appropriate, to training members of the community and the creation of community small, micro and medium enterprise (SMME) business and employment opportunities.

6.2.4 Land Claims

All of NGR was subject to successful land claims by originally dispossessed local community members or their direct descendents (See **Par. 2.1.2** and **Par. 2.1.3** for further details).

A fundamental condition of the Settlement Agreement is that the claimant landowners will not physically occupy the land and the land-use shall not be altered and will remain a conservation area in perpetuity under the management of the existing management authority (EKZNW).

A co-management agreement will now be developed between the claimant landowners and EKZNW. **Board Policy D 3.10** (See **Appendix I, Item 2**) outlines the organisation's approach in this regard.

6.2.5 Environmental Education

It is EKZNW policy to provide environmental education programmes for communities adjoining NGR (See also **Par. 6.9**). These programmes will be conducted in accordance with **Board Policy D 2.34** (**Appendix 1, Item 2**). Access to the material and spiritual benefits of the Game Reserve is facilitated in accordance with **Board Policy D4.1**. (**Appendix 1, Item 2**).

6.2.6 Adjoining Mozambique Communities

Transfrontier linkages between NGR management and Mozambique communities / authorities are necessary to build positive collaborative relationships that would be mutually beneficial and promote the Usuthu-Tembe-Futi TFCA concept. Wherever possible these linkages must be established and supported.

6.3 *Partnerships*

EKZNW will strive to work collaboratively with other state and private institutions as well as neighbouring and local communities through formal partnerships to improve natural and cultural heritage management as well as eco-cultural tourism development in and around NGR for the benefit of all. It must be borne in mind, however that all formal partnership agreements must be scrutinized by the Manager EKZNW Legal Services for direction, prior to any EKZNW member signing such documents.

NGR and EKZNW will also, wherever possible support and contribute to the achievement of the Usuthu-Tembe-Futi TFCA Protocol.

Action Project 6.3 (i): Formalise agreements with TFCA partners and co-ordinate drive towards seamless connection across the international borders.

Partnerships that comply with the management and legal framework as outlined in this IMP and are supportive of the achievement of the management objectives of NGR will be encouraged and facilitated. These partnerships must at all times be formalised in a written agreement that will be submitted to the appropriate level for authorisation accompanied with a recommendation from the GRPC. Copies of these agreements must be made available to the partnering institutions / person and copies must be filed at the EKZNW Head Office and at NGR.

In general terms, partnership agreements should be reviewed annually or at the most every three years. Business partnerships may however be considered for longer periods but must then be accompanied by stringent conditions. All partnership agreements must contain cancellation clauses in the event that NGR's natural or cultural heritage, its management objectives or the reputation of EKZNW are being negatively affected.

The NGR manager is responsible and accountable for ensuring any NGR partnership agreement (commercial or otherwise) is monitored and that the agreement conditions are strictly complied with. If it is evident that the agreement conditions are not complied with or any activity by an agreement partner is negatively affecting NGR's natural or cultural heritage, its management objectives or the reputation of

EKZNW are being negatively affected, the NGR manager must have the right to immediately stop the responsible activity until the situation is suitably rectified.

6.3.1 Usuthu-Tembe-Futi Transfrontier Conservation Area

Ndumo Game Reserve will support and participate in the Usuthu-Tembe-Futi TFCA initiatives.

Action Project 6.3.1 (i): Actively participate in Usuthu-Tembe-Futi TFCA initiatives.

6.3.2 Eco-cultural Tourism Development Partners

Wherever appropriate and financially viable, the existing or envisaged eco-cultural tourism facilities [See Concept Development Plan / **Action Project 6.11.(iii)**] within NGR can be outsourced in accordance with National Treasury's Public Private Partnership Toolkit for Tourism.

6.3.3 Informal Participation

Local community involvement will not only occur through formal structures like the NGR Local Board but also through an annual public meeting where informal community participation will be encouraged.

Action Project 6.3.3 (i): Annually in March of each year arrange a public meeting to give feedback on progress, planned projects and encourage informal local community participation.

Informal communication between the general public / stakeholders and reserve management will be encouraged at all times within practical limits (Open door policy).

6.4 *Security and Safety*

EKZNW recognises that illegal activities within and around NGR can be a severe threat to the integrity of its natural and cultural heritage, and the attainment of the Game Reserve's Vision, Mission and Management Objectives.

NGR management must therefore initiate and institutionalise security strategies that ensure co-ordinated participation at Game Reserve, regional and international levels. These strategies must ensure sufficient capacity to deal with conservation-related illegal activities in NGR (See also **Par. 6.5.7**) and contribute to a network of provincial, national and international law enforcement intelligence.

A Wildlife Protection Management Strategy must be developed and adopted for NGR which guides management on all aspects related to wildlife security and law enforcement.

NGR management must ensure participation and contribute to regional safety management through the fora that exist, including the local Rural Safety and Security Forum.

All Game Reserve as well as regional safety and security matters must be included in the broader TFCA security plan. An Integrated Security Strategy for the TFCA will be developed with the relevant international partners.

Action Project 6.4 (i): Develop and adopt a NGR Wildlife Protection Management Strategy that ensures collaboration with all relevant institutions.

Action Project 6.4 (ii): Participate in, and contribute to the Rural Safety and Security Forum.

Action Project 6.4 (iii): Contribute to the development of an Integrated Security Strategy for the TFCA.

6.5 *Natural Resource Management*

6.5.1 Introduction

The management philosophy is one of adaptive management. This includes implementing management actions according to the stated objectives, policies and operational plans, monitoring progress and adapting the management strategy accordingly. This is done using a participatory, team approach and making use of the best scientific understanding in collaboration with partners and stakeholders. The principle of sustainable use of natural resources is implicit in the philosophy.

Natural resource management aims to conserve biodiversity through addressing threats and ensuring the maintenance and/or re-instatement of the ecological processes that are considered the main determinants of ecosystem structure and function. Where these processes or regulatory mechanisms have been disrupted and cannot be re-instated, management should attempt to simulate their effects; otherwise management intervention in the system should be minimised.

In terms of the NGR management objectives, floodplain management, where required, is the primary intervention that must be considered based sound integrated hydrological and ecological information and with a monitoring programme in place. Where possible, floodplain management will be restricted to the key management interventions already in place.

Fire is a key ecological process influencing biodiversity in NGR. Although it is not possible to reconstruct the 'natural' fire regime, it is generally accepted that the natural frequency, intensity, seasonality and spread of fire through the landscape has been changed as has the ability of species to respond (especially game due to man made obstructions e. g. fences) to the disturbance caused by fire. Given the above, the objective is to actively manage for a shifting mosaic of vegetation patches with high basal cover but different ages and sizes - thereby creating a diversity of habitats that should ensure the conservation of the biodiversity representative of the area. This approach will also provide the best insurance policy for the majority of organisms for which habitat requirements and response to fire are unknown.

The other key interventions required to conserve biodiversity are the control of invasive species and man-induced soil erosion, as well as wildlife management and minimising illegal activities (*e.g.* illegal hunting and plant collecting).

6.5.2 Floodplain Management

Situated at the junction of the Usuthu and Phongolo floodplain systems, NGR is a listed Ramsar Site (No. 887) containing the largest floodplain system in South Africa, consisting of five wetland types, from fresh to brackish, permanent to ephemeral lakes, marshes and pools, as well as riparian and gallery forest. Well known for its abundant bird life and diversity of species, internationally important numbers of several species are supported, including many that are rare or vulnerable. Human activities include controlled harvesting of reeds and sedges, low-density tourism, and collection of water by neighbouring communities. (Summary information for Ndumo Game Reserve from the Ramsar website[11]) [See **Par. 3.7 Hydrology**].

Furthermore, NGR as a mostly floodplain area, is a core protected area within the Maputaland Centre of Endemism [See **Par. 3.8 Vegetation**] as well as an internationally recognised Important Bird Area (IBA ZA 038) [See **Par. 3.9.4 Avifauna**].

From the above and in terms of the Game Reserve's management objectives, it is clear that the primary NGR conservation function must be to ensure that the most appropriate integrated conservation management strategy is applied to conserve and protect this wetland / floodplain system and to maintain its international conservation status. The fact that the primary rivers in NGR have recently undergone relatively 'rapid' changes in terms of the long history of the Game Reserve further illustrates the urgent need for an integrated strategy.

Presently, such an integrated conservation management strategy for the NGR floodplains and wetlands does not exist and needs to be developed and implemented. Such a strategy should:

[11] http://www.ramsar.org (Accessed 20 March 2009).

- Ø Provide an updated assimilation of all the available knowledge on the hydrological and ecological dynamics of the system.
- Ø Provide direction on influencing human behaviour and activities in the upstream catchments outside NGR so as to reduce the negative impacts of poor land management on the wetland system (*e.g.* overgrazing and other practices leading to soil erosion, water extraction wastage as well as nutrient enrichment or pollution of river and groundwater).
- Ø Provide direction on the artificial maintenance of pan water levels and river courses (especially the Usuthu River) and the rehabilitation of damaged wetlands.
- Ø Provide direction to ensure that an optimal vegetative canopy and basal cover is maintained in NGR so as to maintain a sustained flow of water and reduce turbidity caused by accelerated soil loss (See **Par. 6.5.3 Fire Management**, **Par. 6.5.5 Soil Erosion Control and Par. 6.5.6.2 Game Population Management**).
- Ø Ensure the strict application of pollution control and waste management standards in the Game Reserve (See **Par. 6.11.10 Waste Management**).
- Ø Ensure the effective implementation of invasive alien control programs (See **Par. 6.4.3 Alien Species Control and Management**)
- Ø Ensure that an appropriate vegetation and wetland system monitoring programme is implemented. (See **Par. 6.10.1 Monitoring and Evaluation**)

It is possible that once an appropriate river and floodplain management strategy has been developed, that it may determine that other NGR management strategies will have to be adapted in support of this strategy.

Action Project 6.5.2 (i): Develop and implement an integrated conservation management strategy to conserve and protect the NGR's diversity of vegetation types and the associated wetland / floodplain system in the context of NGR's significance as a core protected area within the Maputaland Centre of Plant Endemism as well as an internationally recognised Ramsar Site and Important Bird Area.

6.5.2.1 Present (2009) Floodplain Management Strategy

The present NGR management strategy strives to conserve as much of the biodiversity and associated ecological processes of the Phongolo and Usuthu floodplains as possible within the Game Reserve. (Note: In terms of this strategy, should there be a potential clash between avifauna and fish conservation in the achievement of this objective, then the needs of the bird life would take precedence in the case of common species. When, however rare fish species are involved, the achievement of NGR objectives will be taken into consideration and such cases will be dealt with on a case by case basis.)

The following specific NGR pan management strategies and principles are in place:

Banzi Pan:
Banzi Pan has a damaged barrage at its outlet. The present strategy supports a minimum interference approach in the hydrology of the pan; therefore the barrage will not be repaired or removed. Indications are that engineering attempts to repair or remove the barrage would be very costly, and the ecological and biodiversity benefits, are thought to be minimal.

Nyamithi Pan:
a) The naturally fluctuating salinity levels in the pan water, will be maintained at sufficiently low levels to ensure that the diversity of local fauna and flora is not lost through a hyper-salinity-induced die-off.
b) The pan will be maintained at a water level equal to or above the 60% (final percentage to be determined by results of Digital Terrain Model analysis) of the "full" level.

6.5.3 Fire Management

A hybrid system of patch mosaic burning and lightning fires, with tolerance of wildfires under certain conditions has been adopted for NGR. The patch mosaic system philosophy applied emulates lightning and early man's fire management patterns to achieve an increase in landscape heterogeneity (Parr & Brockett 1999).

Fires are point-ignited under diverse weather and fuel conditions that are varied over time and are then allowed to follow their own course. This will depend on fuel load and condition, wind direction, existence of barriers such as bare or sparsely grassed patches and roads *etc.* rather than of

firebreaks typically used to control fires in block-burning operations. This system should mimic the historic fire patterns; reduce the fire hazard and the cost of prescribed burning, as well as the cost of managing wild fires. Point ignitions are used to start fires in areas where fire is deemed necessary. Grass-sward composition and grass fuel-loads are used to identify areas to be burned.

NGR management shall convene and chair a **Fire Workshop** in April / May each year. This workshop shall include the GRPC members and invited experts where appropriate.

At this Fire Workshop the burns of the previous fire season (planned and unplanned) will be reviewed and, based on the Game Reserve **Fire Management Plan,** management units will be scheduled for burns in the upcoming fire season and recorded as the **Annual Burning Plan** for implementation. In preparation for the Fire Workshop, all fire returns must be with Ecological Advice by 30 November each year to allow for digital capture and analysis of the data.

The **Fire Management Plan** is to be based on the NGR management objectives and guided by 'best practice' linked to scientific understanding, legal context and risk management.

Action Project 6.5.3 (i): Annually align NGR Fire Management Strategy to the outcome and recommendations of the vegetation survey.

Action Project 6.5.3 (ii): Arrange a NGR Management Fire Workshop in April / May of each year.

6.5.4 Alien Species Control and Management

Alien species are regarded as species or genotypes that are not indigenous to the NGR area including hybrids and genetically altered organisms.

The requirements of NEMBA (Sections 76 and 77) in terms of **invasive species** and the relevant legal obligations of protected area management authorities must be noted. The following is the NGR strategy to deal with alien and alien invasive species in the Game Reserve.

6.5.4.1 Alien Plants

Alien plant species have been planted or have established themselves within NGR over time. They can, to varying degrees impact negatively on groundwater levels, the natural environment and biodiversity as well as the natural landscape character of the Game Reserve. Their control and management is considered a management priority.

Wherever possible and appropriate these plants must be removed from NGR.

The following management guidelines apply:

Alien Plant Introductions

Introductions of alien plants to NGR will not be tolerated except for non-invasive vegetables, garden plants, fruit trees, or herbs (for domestic consumption) planted within staff accommodation plots or non-invasive pot plants used indoors for decorative purposes, provided these plants in no way impact negatively on the ecological processes or disrupt normal animal behaviour patterns (e.g. fruit trees and baboons / monkeys).

Only plants indigenous to the NGR and surrounds will be used outdoors in landscaping projects within the demarcated development zones.

Existing Non-invasive Alien Plants

A phased 3-year plan to address the existence and spread of **non-invasive alien plants** (including grasses) that already exist within NGR must be developed. Where required, this plan must also address the re-planting of relevant areas with indigenous plants for horticultural purposes. If considered appropriate by the GRPC, certain non-invasive alien plants may be demarcated and retained for horticultural or cultural-historical purposes. They must, however, not be replaced should

they die, unless recommended by the GRPC for cultural-historical reasons. All seedlings of demarcated alien plants must be removed annually.

Project 6.5.4.1 (i): Develop a phased 3-year plan to address the existing non-invasive alien plants in NGR.

Declared Alien Weeds and Invasive plants

Alien plants declared **weeds and invader plants** under section 29 of CARA (Act No. 43 1983) are a serious threat to the ecological functioning of natural systems as well as groundwater storage and water production from catchments. They must be controlled in terms of the relevant CARA regulations. An ongoing time-bound programme to effectively control these alien weeds and invader plants within the NGR and up to 1km beyond (buffer area) the Game Reserve boundary must be developed in collaboration with neighbours and relevant municipalities.

State poverty relief programs such as 'Landcare', 'Working for Water', ''Working on Fire' and 'Working for Wetlands" should be used to full effect to complement the Game Reserve budget for this management task.

NGR management will be accountable for all invasive alien plant clearing and therefore must strictly supervise control operations to ensure that the correct methodologies are used and to avoid environmental damage.

Project 6.5.4.1 (ii): Develop an ongoing time-bound programme to effectively control declared alien weeds and invader plants within NGR and 1 km beyond (buffer area) the Game Reserve boundary.

6.5.4.2 Alien Animals

Alien animal species can threaten the ecological, genetic or natural aesthetic integrity of the Game Reserve and can be vectors for the spread of diseases. Their control and management are considered a management priority. Wherever possible and appropriate these animals must be removed from the NGR.

The following management guidelines apply:

Alien Animal Introductions

Introductions of alien animals to NGR will not be tolerated except:

- as part of culture-based, community-based or management projects approved by the GRPC; or
- for domestic animals and livestock (incl. donkeys and horses) kept for official purposes or privately by staff according to specific rules for each management centre / protected area.

It is critically important that these exceptions do not negatively influence the integrity and sustainability of the Game Reserve's ecological processes.

A new, standardised and equitable NGR policy for keeping domestic animals and livestock is required and must also include procedures to deal in a consistent manner with alien animals that stray into NGR. This policy must, *inter alia* clearly address:

- Threats to biodiversity conservation as a priority.
- Reducing the numbers of such animals to an absolute minimum.
- Designating areas where these animals must be kept. They must not be allowed to roam or feed in the Game Reserve (except for official patrol horses when on patrol) or interfere in any way with tourists.
- The proper and hygienic care of these animals.
- Minimum standards (aesthetic acceptability, sizes, neatness and cleanliness) of facilities housing these animals *e.g.* stable, camps cages etc.

Alien Animals Present in the Game Reserve

Alien animals that are present and are a threat / potential threat to the ecological processes / tourism experience in the Game Reserve will be dealt with as necessary according to a control programme developed and approved by the GRPC.

Mallard ducks, alien wild ungulates, 'domesticated' guinea fowl and feral species are all potential threats and could be found in the Game Reserve sporadically. They must be destroyed as soon as possible after their presence is detected (humanely as practically possible and with due regard for the tourist experience).

Action Project 6.5.4.2 (ii): Develop a control programme for alien animals present in NGR.

6.5.5 Soil Erosion Control

Gradual natural soil erosion processes will be allowed to continue unless this is a threat to the achievement of the Game Reserve's management objectives. However, in the case of human-induced and / or aggravated erosion, appropriate remediation must be applied. Potential human impacts must be avoided through appropriate planning and maintenance of infrastructure.

Human-induced soil erosion in NGR is primarily the result of the presence of invasive alien vegetation, poor alignment and management of foot paths, vehicle tracks and roads prior to the establishment of the Game Reserve. Old quarry sites / borrow pits and areas that have been cleared of invasive alien vegetation need rehabilitation plans primarily to prevent soil erosion.

Extensive sites of potential or aggravated soil erosion must be mapped, and the rehabilitation prioritised annually.

Rehabilitation of soil erosion sites should follow the guidelines presented by Coetzee (2005) and the EKZNW Track and Trail Maintenance Manual (See **Appendix 2, Item 13).**

Action Project 6.5.5 (i): Map all extensive or potential human-induced / aggravated soil erosion sites and annually monitor the condition of these sites in order to prioritise rehabilitation work.

Reference:
Coetzee, K. 2005. *Caring for Natural Rangelands*. University of KwaZulu-Natal Press, Scottville, South Africa.

6.5.6 Wildlife Management

The primary objective of wildlife management at NGR will be to maintain, within the ecological carrying capacity of the Game Reserve, viable indigenous wildlife populations that historically occurred in the area and are suited to the particular habitats offered by NGR.

Where possible, a minimal intervention management strategy will be followed in terms of indigenous wildlife management. Exceptions are the specific strategies identified in terms of the National Norms and Standards and EKZNW priority species strategies for the management of specific species in accordance with NEMBA (e.g. Rhino, Vultures etc.) and / or this IMP and / or additional actions recommended by the GRPC. The latter interventions will only be considered for the following purposes:

- Safeguarding populations of Rare and Endangered species.
- Achieving NGR's Management Objectives and set Conservation Targets.
- Complying with NGR's IMP Management Guidelines.
- The management of wildlife species populations to avoid the over-utilisation of the available natural resources.
- Research and monitoring purposes.
- Translocation to other state or private protected areas.

Wildlife that have been injured and are highly unlikely to survive can be destroyed on the authority of the NGR Conservation Manager except for Rhinoceros, which may only be destroyed with the written recommendation of a practicing veterinarian. The Conservation Manager must, however ensure that all relevant information is recorded and the relevant data / specimens / material is provided to the

Ecological Advice component staff responsible for processing and recording such information. A copy of these records must be maintained in the reserve office record system. The by-products such as meat and horns must be disposed of according to tariffs and procedures determined by EKZNW and in accordance with the relevant legislation.

6.5.6.1 Introductions of Indigenous Wildlife Species into NGR

The introduction of indigenous species into the Game Reserve must be considered in terms of **Corporate Policy 3.18 (**See **Appendix 1, Table of Policies)** and taking into account their natural distribution range, genetic compatibility, social behaviour characteristics, impacts on existing populations, habitat requirements, practical management and possible interaction with human communities adjacent to NGR..

The introduction of **any** species (individual or group) must be done in collaboration with the responsible Ecological Advice staff, with the approval of the GRPC and must meet the requirements of any relevant EKZNW Transfrontier Park Wildlife Translocation policy and protocol adopted for a Transfrontier Conservation Area or bioregion. The introduction must be adequately documented.

6.5.6.2 Game Population Management

Ongoing game population management will not be aimed at maximising game production but rather at maintaining a diversity of species without negatively affecting vegetative diversity and cover. The objective of this management is therefore not production orientated but to control numbers as far as possible within the ecological carrying capacity of the Game Reserve.

Ungulate game species (plains game) populations that are not strongly territorial will be subject to a population management programme as their population numbers have the potential to increase to unsustainable numbers within the confines of NGR. This could result in overgrazing and trampling of the vegetation and eventually accelerated soil erosion and biodiversity losses.

Game management will be guided by the **EKZNW Protocol for the Management and Disposal of Surplus Animals from Protected Areas**. Removal quotas, which are dependent on management strategies (*e.g.* predator–prey simulation) and influenced by population trends for each species, will be determined at station level, with final approval from head office.

At NGR, presently two management options are applied:

- The following game are self-regulatory species and therefore, these species will not be controlled for ecological reasons: - this applies to Suni, Grey and Red Duiker, Bushbuck and Steenbok.
- Set stocking levels for species maintenance at fixed densities, possible below carrying capacity for management reasons. This applies to Nyala, Giraffe, Hippopotamus, Black and White Rhinoceros.

Specific management strategies that are implemented at NGR are the EKZNW Black and White Rhino Management Strategies.

The NGR Hippopotamus population is presently being kept at 200 based on a draft NGR Hippopotamus Management Plan that is being finalised.

The GRPC will annually determine and recommend game removal or augmentation in terms of the Game Management Policy Guideline.

Action Project 6.5.6.2 (i): Implement the EKZNW Protocol for the Management and Disposal of Surplus Animals from Protected Areas.

Action Project 6.5.6.2 (ii): Finalise the NGR Hippopotamus Management Plan and implement.

6.5.6.3 Fish Management

Will be informed by the floodplain management strategy and KZN Provincial Freshwater Fishing Strategy (**Appendix 1, Item 16**)

Action Project 6.5.6.3 (i): Develop a fishery management strategy for the conservation and utilisation of the fish species in the NGR wetlands in line with the NGR floodplain management strategy and the KZN Provincial Freshwater Fishing Strategy.

6.5.6.4 Bird Management

Apart from bird species protection and monitoring, no other specific bird management strategy is applied at NGR.

A vulture feeding site (restaurant) has been demarcated in the eastern sector of the Game Reserve, but the vultures are only provided with game carcasses when the game culling quota allows. A policy framework for the management of this vulture restaurant needs to be developed that is based on the KZN Vulture Conservation Strategy (2008-2012) [**Appendix 1, Item 17**].

Action Project 6.5.6.4 (i): Develop a policy framework for the management of the NGR vulture restaurant based on the KZN Vulture Conservation Strategy (2008-2012).

6.5.6.5 Problem Animal Management (Damage Causing Animals - DCA)

Animals that become a danger or excessive nuisance to persons and property due to either habituation or aberrant behaviour may be destroyed humanely or captured and removed from NGR. This also applies to animals that escape or leave and return periodically and cause damage outside NGR.

To minimize the need to control problem animals, pro-active and preventative measures (*e.g.* fencing) should be considered a priority, while affected public, visitors or neighbours need to be informed appropriately regarding the relevant animal behaviour and/or dangers. Where the only solution to the problem lies in destroying or capturing animals, the methods decided upon must be with due regard for possible public criticism.

All human / wildlife conflict matters relating to problem animal management (damage causing animals) must be dealt with in terms of the **NEMBA Norms and Standards for Management of Human and Wildlife Conflict in SA**. This is applicable to animals within and outside of the Game Reserve.

The NGR Conservation Manager must ensure that all complaints and incidents reported are investigated by the relevant NGR staff and or District Conservation Officer (DCO) as soon as possible. Complaint details, investigation findings and remedial action taken must be recorded in the prescribed Damage Causing Animals Complaints Register kept by the DCO. Investigations and incident reporting must be carried out in accordance with **EKZNW's DCA Control Protocol and Guidelines.**

NGR and Community Conservation staff must design and include into the Community Conservation Strategy any communication material which will inform and educate neighbours on crop and livestock protection. Similarly, the relevant legalisation, policies and procedures need to be included in the communication programme.

6.5.7 Control over Illegal Use of Natural Resources

Known illegal use of NGR's natural resources is recorded. NGR is however facing an unprecedented threat through *inter alia* an increasing incidence of poaching and illegal vegetation harvesting. This is a significant threat to the integrity of the Game Reserve and its potential to increase is great if not effectively controlled

It is policy to maintain an ongoing vigilance through cost-effective surveillance, monitoring programmes and reaction capabilities. Direct illegal use of natural resources will be dealt with by NGR management while high risk criminal activities will be monitored and communicated to the relevant security forces as part of a broader co-operative security strategy **[**See **Action Project 6.4(i)]**.

A staff component of 24 field rangers and an officer, primarily tasked with law enforcement, has been appointed and is operative. Given the increasing trend of illegal incidents, this would not appear to be adequate.

To assist in maintaining NGR's ecological integrity as well as safeguarding staff and visitors, it is essential that the effectiveness of the field ranger component and their deployment is regularly and critically assessed. A well maintained statistical incident register is an effective tool for such assessments **(**See also **Par. 6.10 Monitoring and Evaluation)**. In the light of this situation, the law enforcement strategy at NGR must be reviewed with a view to improving effectiveness.

The main effort towards resolving illegal utilisation of natural resources by neighbouring communities for purposes of subsistence will be to create understanding and awareness through pro-active education amongst these communities **(**See **Local Community Involvement: Environmental Education under Par. 6.2.5)**. Management will however be ruthless with those that illegally utilise natural resources for commercial or other purposes.

Action Project 6.5.7 (i): Redevelop the present NGR law enforcement strategy with a view to significantly improving effectivity.

6.6 *Cultural Resource Management*

Management of the cultural heritage is guided by the National Heritage Resources Act and as well as the Amafa / EKZNW Co-operative Conservation Management of Cultural Heritage Agreement (signed July 2005) (**Appendix 1, Item 4**) and must aim to promote the conservation and public appreciation of the cultural heritage found in NGR. **Corporate Policy B7 (**See **Appendix 1, Item 2)** also provides guidelines in terms of monuments and memorials.

There is a critical need to develop a comprehensive cultural heritage management plan for NGR that would meet national requirements. This plan must cover Rock Art, Iron Age, and Stone Age, historical sites as well as palaeontological features and living heritage sites.

The cultural heritage of the NGR is non-renewable and importantly may shed further light on the socio-cultural history of the area. These resources are fragile and therefore the Cultural Heritage Management Plan should, in addition, address institutional specialist capacity to guide cultural heritage management on NGR.

Action Project 6.6 (i): Develop a comprehensive Cultural Heritage Inventory and Management Plan for NGR in collaboration with SAHRA and Amafa. Institutional capacity must also be addressed by this plan.

6.7 *Resource Utilisation*

EKZNW will consider requests for extractive use of plant, animal and abiotic resources provided that such resource use is sustainable, controlled and the natural or cultural heritage conservation management objectives of NGR are not compromised. Furthermore, the resource use must not degrade the aesthetic landscape character of NGR and management must have adequate capacity to ensure effective control over the resource utilisation without compromising its essential functions.

6.7.1 Plants and Animals

Extractive resource use must be considered within the framework of, amongst others, **Board Policies Nos. D2.15** as well as **D3.12 to D3.19 (Appendix 1, Item 2**).

A Resource Utilisation Operational Management Plan for NGR was developed during 2008 (**Appendix 1, Item 10**). This document provides guidelines and identifies specific areas within the Game Reserve for controlled harvesting of various resources by the local communities (*e.g.* mangoes, marulas, sedges, fish [agreements with the Mbangweni community], reeds, animal by-products and alien vegetation). The Resource Utilisation Operational Management Plan will form part of a more comprehensive Resource Utilisation management Plan that is to be developed for Ndumo Game Reserve.

Only specific areas within the Game Reserve (see **Par. 5 and Appendix XX, Map 3 – Zonation**) have been identified for resource utilisation in order that other areas will serve as a control or 'bench mark' areas. These are clearly stipulated and have been agreed to in the Resource Use Operational Management Plan for Ndumo Game Reserve.

The GRPC (which includes the NGR Conservation Manager and the Zululand Region's Resource Use Ecologist) must evaluate any further applications in accordance with the abovementioned corporate policies, the NGR Resource Utilisation Operational Management Plan and with due consideration of:

- any applicable land restitution or other agreements,
- the precautionary principle
- ecological and social acceptability,
- impact on the aesthetic character of the landscape,
- impact on eco-cultural tourism,
- sustainable and wise use of the resource,
- benefit to neighbouring communities,
- equitable access to the resource,
- that any benefit transaction is acceptable within the PFMA framework,
- that the harvesting operations are effectively controlled and monitored,
- a written agreement stipulating resource price and /or conditions of harvest, and
- viable alternatives.

Action Project 6.7.1 (i): Develop and implement a Resource Utilisation Management Plan for NGR

Action Project 6.7.1 (ii): Develop a Resource Utilisation Management Plan for NGR.

6.7.2 Bioprospecting

Requests to collect biological material / samples from NGR will only be considered by the GRPC in accordance with, amongst others, **EKZNW Board Policy D2.15** (**Appendix 1, Item 2**) from *bone fide* South African research institutions until national (NEMBA) and provincial legislation governing bioprospecting is in place.

Bioprospecting activities within the Game Reserve must be closely monitored and regulated in terms of present environmental legislation.

6.7.3 Abiotic Resources

The extraction of abiotic resources will not be permitted unless it has direct bearing on achievement of the NGR management objectives and any application for extraction will be reviewed according to applicable legislation.

The only quarry that was utilised in the Game Reserve on the western boundary has been closed and will be rehabilitated. Road repair gravel is now sourced from quarries outside of NGR only.

6.8 *Eco-Cultural Tourism and Marketing*

Eco-cultural tourism and marketing must be considered within the framework of, amongst others, **Board Policy E1** to **E19** with regard to **Commercial Operations** (**Appendix 1, Item 2**).

EKZNW has the mandate to sustainably develop NGR within the framework of its approved IMP and Conceptual Development Plan (CDP). This will be undertaken to fully realise its eco-cultural tourism and associated income-generating potential, while respecting and giving access to the Game Reserve's natural and cultural heritage features.

To fulfil this mandate, and in accordance with NEMPAA, EKZNW will initiate the compilation of a CDP. It will address future new development as well as the upgrading and maintenance of all existing infrastructure including tourist facilities (See **Par. 6.11**).

The CDP will be guided by the framework of the NGR Vision, Mission, Management Objectives, Zonation and Operational Management Policy Framework and Guidelines as adopted and approved for this IMP. The approach adopted in the compilation of the CDP must involve an objective and integrated assessment of NGR in terms of its natural and cultural heritage sensitivities, management and bulk infrastructure, its particular sense of place and its visitor infrastructure and facilities

EKZNW will strive to provide a quality eco-cultural tourism experience for visitors to the NGR. A range of appropriate facilities and services will be provided for the use of visitors to NGR. While some of these will serve recreational and social needs, emphasis will be placed on facilities and services that enrich the visitor's understanding and appreciation of the Game Reserve.

In order for NGR to realise its full income-generating potential:

- The quality and standard of facilities will be maintained at a high level.
- Professional standard tourism service delivery will be provided.
- Its tourism opportunities will be competitively and effectively marketed.
- Cultural heritage tourism will require emphasis.
- A partnership strategy, that takes full advantage of appropriate opportunities for outsourcing (joint venture or otherwise) needs to be put in place while linkages must be sought with other regional tourism initiatives.
- A visitor orientation and interpretation strategy must be developed and implemented.

The above policies and values will be supported by NGR Eco-cultural Tourism Development and Marketing Strategy that must be compiled and approved.

Action Project 6.8 (i): Cognizant of the NGR IMP and CDP policy guidelines and TFCA initiatives, develop a NGR Eco-cultural Tourism Development and Marketing Strategy , that addresses:

- the attainment of professional tourism service delivery standards
- branding and marketing
- linkages with other regional tourist initiatives
- public / private partnerships
- cultural heritage tourism
- visitor awareness, orientation and interpretation

6.9 *Environmental Interpretation, Awareness and Education*

Environmental interpretation, awareness and education of NGR's natural and cultural resources will be aimed at creating an awareness, understanding and appreciation of the value of these resources as well as an understanding of the relevant legislation and associated policies and protocols among the general public and visitors to the Game Reserve.

An environmental awareness and education programme must be developed to pro-actively engage, inform and benefit the Game Reserve's range of neighbouring communities and visitors. **Board Policies D 2.34** (Environmental Education) and **D 4.1** (Neighbour Relations) apply (See **Appendix 1, Item 2**).

Ideally such programmes should not only be primarily aimed at children, but provision should be made for developing various programmes, applicable to a wide spectrum of ages and education levels.

Programmes for groups and communities from other areas will be accommodated on request whenever possible. The Kids and Parks Programme requires school groups visiting the Game Reserve, to submit a lesson plan before the visit to qualify for a concession. The visit must also take place during schooling days.

Where and whenever possible members of the local community (*e.g.* community tour guides) should empowered and used to run appropriate environmental education tours.

Action Project 6.9 (i): Develop a NGR environmental awareness education programme specifically for surrounding neighbouring communities and the public interest groups.

An interpretation programme using signage, displays and information media must be developed to effectively direct and inform visitors in respect of appropriate natural and cultural features of the area. The format of these signs must be standardised and trail marking must be a priority.

Action Project 6.9 (ii): Develop an interpretation programme in a standard format for the Game Reserve.

An investigation to identify synergies in the needs of various government or other institutions in the area to develop awareness programmes (*e.g.* social education of the youth) must be undertaken and if

feasible, to combine environmental awareness education with these other programmes. In this way, it will be possible to combine resources to reach a wider target audience.

Action Project 6.9 (iii): Investigate the possibility of combining environmental awareness programmes with social programmes offered by other institutions in the general area of the Game Reserve.

The Tshwane University of Technology has a written co-operation agreement with EKZNW to operate an Environmental and Awareness programme using the Ndumo Environmental Education Centre. A new MoA will be developed (See **Par. 2.5.2**).

6.10 *Research*

The natural heritage, the functioning of the ecosystems and the cultural heritage that NGR was declared to conserve are presently inadequately understood. Research is necessary to provide such information that will assist in ensuring that the natural and cultural heritage management objectives of NGR are realised.

Priority will be given to research that will provide information and understanding that is of direct benefit to NGR and will guide management interventions required to achieve the protected area's conservation targets as well as natural and cultural heritage management objectives in the most cost-effective manner. Opportunities will, however, be considered and provided for both applied *and* theoretical research of local, provincial or national importance.

Long term research and monitoring is desirable and necessary as a result of the dynamic and stochastic nature of the ecosystem and to ascertain whether management actions are having their desired affect in terms of achieving conservation targets as well as natural and cultural heritage management objectives. All baseline abiotic and biotic data collected will be collated and stored in databases as well as GIS data layers.

- Ø Partnerships and agreements with appropriate academic and research institutions will be promoted to stimulate and encourage the desired research in NGR.

- Ø Appropriate permanent research facilities must be developed within or bordering NGR to facilitate research work.

Action Project 6.10 (i): Develop procedures that will ensure that all abiotic and biotic data collected are captured in managed databases and GIS data layers for interrogation by researchers and managers.

Action Project 6.10 (ii): Determine the requirement for research facilities at NGR and implement.

All proposals to undertake research within the Game Reserve will be submitted and evaluated using the procedures outlined in the ***Guidelines for the Registration and Administration of Research Projects Undertaken by or through Ezemvelo KZN Wildlife (August 2002)*** [**Appendix I, Item 12**]. Where research requires the collection of biological material, a collection permit will also be required.

A copy of all publications must be lodged within the Game Reserve, the Regional Office as well as the Head Office library and details captured using appropriate keywords into the Region's bibliography.

A NGR bibliography and reference library facilities must be developed together with procedures to maintain a hard and digital copy of all NGR related research work, all documents listed as IMP supporting documentation in **Appendix 1** as well as any new supporting management documentation produced. Libraries must be maintained at the Game Reserve and at the Regional Office. Strict curation rules must apply and the ultimate responsibility for the curation of this library at NGR must be allocated to the most senior reserve management position and the Regional Ecologist: North Zululand at the Tembe Research Centre, Tembe Elephant Park.

Action Project 6.10 (iii): Identify and develop reference library facilities and procedures to maintain hard and digital copies of all NGR related research work, all documents listed as IMP supporting documentation in **Appendix 1** as well as any new supporting management documentation produced. Strict curation rules must apply and the ultimate responsibility for the curation of this library at NGR must be allocated to the most senior reserve management position and the Regional Ecologist: North Zululand.

6.10.1 Monitoring and Evaluation

Baseline data collection, monitoring and evaluation are essential in order to determine whether conservation targets, natural and cultural heritage management objectives as well as eco-cultural tourism objectives and targets are being achieved, and to ascertain the effectiveness of management interventions. Much of this information is required in order to meet the legal reporting requirements of the NEMBA and NEMPAA.

Due to (a) the stochastic (random behaviour) nature of the environment; (b) the effects of long-term climate cycles and change, and (c) the length of time for treatment effects to manifest themselves, it is desirable and necessary to implement long-term baseline collection and monitoring programmes. It is also important to monitor and record all management interventions and the biophysical environment in order to understand the causes for any biological and environmental changes.

Any existing monitoring programs must be maintained unless there is a specific decision recorded in writing by the GRPC to terminate a particular monitoring programme.

The **Ecological Advice component** is responsible for:

- Designing all biodiversity monitoring and baseline collection programmes (including the data capture and storage procedures) and ensuring that these will provide data of the right precision and accuracy, and at the right frequency, in order to guide management decision making and to allow for reporting at the required frequency.
- Biodiversity data collection, secure storage, analysis, reporting and regular feedback to management.
- Undertaking advanced scientific monitoring and data collection.

The **Biodiversity Conservation Management component** is responsible for:

- The accurate collection of biological baseline data, monitoring and data storage as agreed with the Ecological Advice component.
- Monitoring the use of natural areas by visitors through Limits of Acceptable Change criteria.
- Monitoring cultural sites as outlined in approved and implemented cultural heritage management plans in collaboration with Amafa / SAHRA as the case may be.
- Monitoring energy and water use by conservation management facilities.
- Monitoring development or land use change in the Game Reserve and in its buffer zone for compliance with set environmental conditions linked to authorisation.
- Monitoring compliance by outside parties with conditions as specified in agreements, contracts etc. in collaboration (where practical and as agreed) with the Ecotourism and Marketing component.

The **Ecotourism and Marketing (Commercial Operations) component** is responsible for:

- Monitoring eco-cultural tourism statistics and revenue generation and reporting against revenue targets.
- Monitoring energy and water use by eco-cultural tourism and associated management facilities.
- Monitoring compliance by outside parties with conditions as specified in agreements, contracts etc. in collaboration (where practical and as agreed) with the Biodiversity Conservation Management component.

Action Project 6.10.1 (i): Implement the recomendations made by the Protected Area management Effectiveness Programme.

6.11 *Infrastructure*

EKZNW has the mandate to maintain, remove, expand or develop infrastructure within NGR for natural and cultural heritage management, and tourism purposes. However, development projects will only be undertaken if they are:

- Ø aligned with the Game Reserve's Zonation and Management Guidelines.
- Ø listed as an approved Action Project either in this IMP or in the Game Reserve's Concept Development Plan (CDP).
- Ø recommended for implementation by the GRPC and approved by the EKZNW Board's Development Committee.
- Ø development is compliant with the relevant NEMA regulations and other applicable legal requirements, particularly regarding Environmental and Heritage Impact Assessments.

Infrastructure development outside NGR or on its periphery should always be considered as a preferred option, where practical, so as to reduce the amount of infrastructure and its resultant impacts on the environment within the Game Reserve.

NGR management is responsible for infrastructure within the Game Reserve and must at all times ensure that it is maintained in a safe, sound, clean, serviceable and aesthetically acceptable condition. Tourist accommodation, camp-grounds and other facilities must at all times be maintained to appropriate world class standards regarding appearance, cleanliness and serviceability.

Service providers (*e.g.* Telkom, Eskom, DWEA), concessionaires or other groupings that may through agreements develop, use and maintain infrastructure within NGR must be closely monitored by management to ensure that they abide by relevant agreements and that their activities do not negatively impact on the natural and cultural heritage as well as landscape character of NGR and that they maintain the same values as expressed above.

All structures must as far as possible be harmonised with the surrounding environment and landscape character through appropriate siting, use of colour, building materials, landscaping and screening.

To create a sound foundation for future planning, all infrastructure must be listed on a maintained database and their positions plotted with GPS points on an associated NGR Infrastructure Map. Furthermore, it would be useful to objectively assess the desirability and effectiveness of all infrastructure with a view to reducing the impact of these structures on the NGR environment and landscape.

Action Project 6.11 (i): Develop and maintain a NGR Infrastructure database and map.

Action Project 6.11 (ii): Review the desirability and effectiveness of all present infrastructures with regard to.

- Adequacy
- State of repair
- Demolition
- Existing maintenance plans and programs
- Visitor and staff use, requirements and values
- Financial
- Environmental impact (negative and positive)
- Income generation
- Possibilities of outsourcing

In compliance with NEMPAA and in order to initiate the development of new infrastructure as well as the strategic maintenance of existing infrastructure, EKZNW will initiate the compilation of a Conceptual Development Plan (CDP). The CDP will address the future development, improvement and maintenance of all infrastructure including eco-cultural tourism facilities.

The CDP will be guided by the framework of NGR's Vision, Mission, Management Objectives, Zonation and Management Policy Guidelines as adopted and approved for this IMP. The approach adopted in the compilation of the CDP must involve an objective and integrated assessment of the Game Reserve in

terms of its natural and cultural heritage sensitivities, management and bulk infrastructure, its particular sense of place and its visitor infrastructure and facilities.

Action Project 6.11 (iii): Develop a Concept Development Plan for NGR.

6.11.1 Entrance Points and Gates

All entrance points to the Game Reserve will be under the control of the NGR management, certain functions may, however be outsourced. It is important that the entrance gates be secure at all times to discourage illegal entry. It is important that management ensures that the latter points are as secure as possible so that game species do not leave the Game Reserve or that persons cannot enter illegally at these points.

6.11.2 Boundary Fence

The purpose of the boundary fence is to keep game in and farm stock out of the reserve while demarcating reserve boundaries to assist in preventing illegal entry.

The entire eastern boundary fence was cut / broken down by members of the adjoining community allegedly due to dissatisfaction with land claim progress during 2008. Once tensions have settled, it is a priority to replace the fence along the eastern boundary.

Action Project 6.11.2 (i): Replace the fence along the eastern boundary of Ndumo Game Reserve as soon as possible after the relations with the adjacent community have normalised sufficiently.

6.11.3 Internal Fences

No internal fencing exists except for that around staff accommodation units, the abattoir complex and the water purification plant.

6.11.4 Signage

All access routes to NGR must be appropriately signposted.

Four groups of signage are identified, namely:

Public Entrance Gate and Boundary Signage
A standard for this signage must be developed that clearly depicts the fact that one is entering the Ndumo Game Reserve with any camp /office names in a secondary position. The main entrance signboard must also reflect that NGR is a Ramsar Site and an Important Bird Area.

Tourist Camp or Management Infrastructure Area Signage
Interpretation, directional and information signage at camps in NGR must have a standardised format **[**See also **Action Project 6.8(i)]**. The fact that NGR is Ramsar Site and an Important Bird Area must be fully interpreted at the main visitor office and at important information kiosks.

Trail Signage
No formal hiking trails exist as all trails are guided and therefore trail signage is not required.

Personal Remembrance Plaques
No guideline on the use of personal remembrance plaques (*e.g.* on donated park benches, trees *etc.*), exists at present. *Ad hoc* or uncontrolled placing of such plaques in NGR can have considerable negative aesthetic, equity and maintenance implications and should only be permitted within an authorised guideline framework.

Action Project 6.11.4 (i): Develop the necessary policy and standards for each group of signage in NGR and implement a phased programme for replacing signage with the standardised formats – see also Action Project 6.8 (i).

6.11.5 Roads, Tracks and Paths

Maps 2 & 6 indicate the existing vehicle roads / tracks and footpaths used for public access, recreational use or management purposes.

Roads and tracks must be kept to a minimum to maintain the natural character of the landscape as far as possible and to avoid unnecessary negative impacts on the natural and cultural heritage of NGR. In terms of this management guideline, a critical evaluation of the existing road / track and footpath network needs to be undertaken to identify any that need to be closed or re-aligned. Any section that is approved for closure must be rehabilitated according to a documented rehabilitation programme.

Proposed development of new roads / tracks and footpaths or their closure must be aligned with the Zonation specified in this IMP and must follow the appropriate legal and other procedures after recommendation from the GRPC.

Management must ensure that the existing vehicle road / tracks and footpaths on NGR are effectively maintained to the appropriate standards in order to support the relevant use and avoid soil erosion as well as other negative impacts on the environment.

Roads and tracks that are heavily used by vehicles or sections prone to accelerated soil erosion must be tarred, paved, concreted or upgraded to 'all-weather' gravel roads that have been treated with a dust repellent (sealer).

Action Project 6.11.5 (i): All vehicle roads and tracks must be evaluated for the suitability of their alignment and recommendations made for new vehicle roads and tracks, repair or closure (with rehabilitation measures) of existing ones.

6.11.6 Staff Accommodation

Where essential, for the efficient functioning of NGR, management will consider the provision and maintenance of staff accommodation, according to Corporate Norms and Standards. Accommodation must meet standards as set by EKZNW's Technical Division and any development or maintenance in this regard must form part of the CDP.

Staff will be encouraged to acquire their own housing and live outside NGR, where practically possible and financially viable in the long-term. In such cases, official transport to and from NGR can be considered depending on site specific circumstances and applicable corporate policies.

6.11.7 Offices, Workshops, Stables and other Infrastructure

NGR management must ensure that all infrastructure within NGR, is always maintained in a clean, neat and functional state and that these work areas meet Occupational Health and Safety Act standards.

All service areas (e.g. workshops, waste management and storage areas) must be effectively screened from public view.

Management will also be responsible for ensuring that any facility for keeping animals encamped or in captivity on NGR are legally compliant or maintained at generally accepted standards for keeping and caring for such animals.

6.11.8 Services

Services such as electricity, telephone and water supply infratructure must where possible be located or screend so as to minimise their aesthetic and environmental impacts.

6.11.8.1 Water Supply

Water for the main tourist and office complex as well as the staff housing is pumped from the existing pump house on the Phongolo River (Development Node 17). The river course has changed at this point and is no longer ideal as a water pump site. A new site, where the southern boundary fence crosses the Phongolo River (Development Node 30), must be investigated for this purpose.

Action Project 6.11.8.1 (i): Investigate the feasibility of a new water pump installation at Development Node 30. If feasible, proceed with the development of a new water pump system in accordance with development procedures and rehabilitate the old site.

6.11.9 Radio Communication and other Communication Equipment

NGR management requires a two-way radio system for efficient management. Any radio repeater stations or similar communication towers must comply with EIA conditions.

6.11.10 Waste Management

6.11.10.1 Domestic Solid Waste

All domestic waste must be sorted for recycling and must be removed from NGR to authorised companies or municipal waste management sites. The use of organic waste for compost purposes may be permitted but will be subject to strict conditional approval on the recommendation of the GRPC. All historical waste sites in NGR must be rehabilitated.

Solid waste management procedures must be closely monitored by management to prevent pollution and other adverse impacts, especially of the water resources. All waste receptacles (for staff or the public) must be animal-proof (especially against baboons and monkeys) and maintained as such.

Action Project 6.11.10.1 (i): Develop an integrated waste management plan for NGR.

Action Project 6.11.10.1 (ii): Install and maintain effective standardised solid waste receptacles for NGR that are animal and baboon / monkey-proof.

6.11.10.2 Sewage

It is important that EKZNW sets an example and complies with new legal standards regarding the processing of sewage. All sewage systems must be investigated and their compliance verified. New systems must be installed where there is non-compliance.

Existing infrastructure at NGR has septic tank / French drain sewage systems that can possibly be contaminating ground and surface water. These systems must be replaced with more environmentally friendly systems available in the market as funding permits. Septic tank / French drain systems will not be installed at future small developments.

Action Project: 6.11.10.2 (i): All sewage systems in NGR must be investigated for legal compliance. A phased development plan to upgrade existing systems and septic tank / French drain systems must be put in place.

6.11.10.3 Water- and Energy-saving Measures

It is important too that EKZNW leads by way of example. Infrastructure in NGR has little or no modern water- and energy-saving (electricity) devices or measures in place. There is furthermore no structured plan in place to do so. Not only will such a plan and implementation demonstrate an environmentally friendly approach but it has the potential to bring about significant financial savings on energy over time.

Any future tourism accommodation in NGR will only have solar powered lighting, gas for cooking and heating of water as well as water saving devices on all provision points.

Action Project 6.11.11 (i): Develop a phased plan to install standardised (reliable and tested) water- and energy-saving devices throughout NGR as soon as practically possible.

6.11.11 Aircraft Landing Fields

An aircraft landing field (airstrip) presently exists in NGR which is also used by helicopters when required. As the airstrip near the town of Ndumo is more often used by those that wish to fly to the Game Reserve. An investigation therefore needs to undertaken to detemine whether aircraft landing facilities are still required on NGR. If it is deemed necessary, the aircraft landing facilities must be maintained to the minimum aviation standards at the selected sites within the Development Zone only.

Action Project 6.11.12 (i): Determine the requirement for the continued existence of an aircraft landing field on NGR. If required and approved, maintain the present site according to minimum aviation standards. If not required, plan and implement a rehabilitation plan for the present site.

6.11.12 Staff and Visitor Safety

All requirements of the Occupational Health and Safety Act and other applicable legal requirements must be met to provide for the safety of staff and visitors in and around infrastructure installations at NGR (*e.g.* fire and electricity).

NGR management will maintain a secure entry controls system and maintain a high level of internal security in order that visitors and their belongings can be safe and secure.

NGR staff must receive the appropriate training regarding all health and safety aspect and must receive refresher course training as required on a regular basis.

7 IMP REVIEW AND AMENDMENT PROCEDURES

7.1 *Five-Yearly Review and Amendment Procedures*

This NGR IMP will be reviewed every five years to revise and amend the IMP for the following five years, namely 2014 -2018. If deemed appropriate by the GRPC, the review can take place sooner.

The EKZNW Management Planning Steering Committee in collaboration with the Co-ordinator: Management Planning will give guidance on the extent of public / stakeholder participation required before submitting the amended / updated IMP for approval to the MEC. The extent of the public / stakeholder participation (apart from that undertaken with the Local Board) will depend on the nature and extent of amendments recommended by the relevant GRPC.

Action Project 7.1 (i): The GRPC must undertake a five-yearly review of this IMP to revise and amend the IMP for the following five years.

7.2 *Annual Review and Amendment Procedures*

The GRPC will convene annually in November to monitor and evaluate IMP progress, plan and, if necessary, recommend the re-prioritisation of management activities for the next year. The GRPC must, as record of these meetings, submit a report to the EKZNW Management Planning Co-ordination Unit which contains the following:

- Any recommended **minor amendments or corrections** to the IMP that do not affect the substance of the Vision, Mission, Management Objectives, Zonation, Operational Management Policy Framework and Guiding Principles;
- The result of an annual evaluation by the GRPC of the Management Effectiveness Level achieved for NGR. This must be calculated using the World Bank Protected Area Management Effectiveness Evaluation Tool (Stolton *et al*, 2007);
- The cumulative number of Action Projects per Management Objective that have been completed, activated or not activated; as well as
- An indication of progress towards achieving Conservation Targets set in the IMP.

The GRPC will also be responsible for the recommendation of any policies, projects and plans that are developed as a result of the implementation of this IMP or other *ad hoc* projects *etc*. not covered by the IMP that have operational, financial and human resource or ecological implications (*e.g.* research projects that have not been identified according to IMP guidelines, or *ad hoc* funding received for the development of unplanned recreational facilities).

Any proposed significant amendments that are deemed necessary / urgent and that are likely to result in the amendment of the Vision, Mission, Management Objectives, Operational Management Policy Framework and Guiding Principles contained in the NGR IMP must be supported by the GRPC, the Integrated Management Planning Steering Committee and BCOMM before being subjected to the appropriate public /stakeholder participation process and before BCOMM recommends that the proposed amended IMP is submitted for authorisation through the EKZNW Board to the MEC.

The EKZNW Management Planning Co-ordinator must ensure that any minor or significant IMP amendments that are appropriately approved, are duly noted / recorded and that a new digital 'master copy' (Word) version is generated and archived with the EKZNW Management Planning Co-ordination Unit as well as ensuring that updated 'read only' copies are distributed to the relevant Head Office sections and Regional General Manager who must ensure that the updated 'read only' digital and / or hard copies are distributed to all staff requiring these. The EKZNW Management Planning Co-ordinator will furthermore be responsible to ensure that website / intranet copies are updated at the same time.

Action Project 7.2 (i): Convene a GRPC meeting annually in November to monitor, evaluate and report on progress in terms of this IMP, plan and, if necessary, recommend the re-prioritisation of management activities or amendments to the IMP.

Reference:
Stolton, S., Hockings, M., Dudley, N., MacKinnon, K. Whitten, T. and Leverington, F. 2007. Management Effectiveness Tracking Tool, *Reporting Progress at Protected Area Sites:* Second Edition. Prepared for the World Bank / WWF Forest Alliance.

8 PROJECTS FOR ACTION CORRELATED WITH PRIORITISED MANAGEMENT OBJECTIVES

8.1 List of IMP Action Projects

Tables 2.1 to 2.18 below lists the Action Projects identified in the IMP. It is important to note that these IMP Action Projects must not be interpreted in isolation but must be interpreted and operationalised within the context of the associated narrative that precedes the articulation of the Action Project in the relevant paragraph.

8.2 Alignment of IMP Action Projects with Prioritised Management Objectives

The **eighteen** NGR objectives, derived at the Key-Stakeholders Workshop held at at Ndumu River Lodge between 5th and 6th October 2006, were ranked in priority, both within the management clusters and between the clusters. The ranked objectives will guide NGR management in the execution of this IMP but it must be borne in mind that the EKZNW legal mandate, national / provincial conservation policies and changing circumstances may require that priorities change.

The 87 IMP Action Projects identified throughout this IMP are instrumental to achieving, and assuring, the long term sustainment, of the objectives. Action Projects associated directly with the protected area objectives are included in the tables below. Additional Action Projects, not directly assosciated with the objectives, (but are important to guide management to effectively administer the protected area) are summarised at the end of the tables.

The tables below expand on the rational used to determine their ranking order, it links the objective to the management cluster category, articulates the rational used to determine its level of importance. The rationale section further refers to the objectives prioritisation process (**Appendix 3**, see basic for threat analysis hierachical list). It furthermore elloborates on the management support that is required to achieve the objective, and where this support is deficient, action projects are identified to achieve the respective objective. Performance indicators were developed as measures to determine the successful achievement of the objectives.

The IMP Action Projects in many cases are cross-cutting in achieving more than one objective. To aid prioritisation they have been placed (listed in number sequence) under the objective where they are likely to make the greatest contribution.

While the tables below indicate the list of identified Action projects that support the achievement of the specific objectives, it must be recognised that a number of other actions relating to ongoing protected area management, take place. Such actions would relate particularly to security, maintenance (buildings, roads, fences, veld management, etc) and relationships with stakeholders. It is important that they be detailed and included when developing budgets and business strategies.

Objective 1: Ensure effective communication between the local communities and EKZNW through integrated, shared, co-operative working and relationships with Mathenjwa and Tembe Traditional Authority people.

Table 2.1

ITEM	DESCRIPTION
Ranking	1
Management Objective	Benefits (Partnership) objective
Rationale	Ranked 1 as it is specific to vision and the EKZNW operating philosophies (failure to implement affective working relationships with neighbours and land owners will negatively impact on achieving other protected area objectives). The success of most initiatives around and including Ndumo will depend largely on sustained support for the protected area through partnerships and working relationships. **[Refers to 1 *is of significance*, 2 *is of major significance*, 3 *is of major significance*, 4(4th)]**
Management Support	• Clarity from land claims commission regarding land claims iro effective operational approach post settlement • Support and finalisation from EKZNW executive management regarding comanagement policies and agreements to be implemented. • Co-management structure (Institutionalisation)
Programmes	**Action project 1.1:** Facilitate the development and implementation of Co-management Agreements between EKZNW and the claimant landowners. **Action project 1.2:** If required, capacitate the claimant landowners i.t.o. the Co-management Agreement and related management protocols as well as NGR conservation and eco-cultural tourism management policy guidelines defined by this IMP and its subsidiary management documents. **Action project 1.3:** Develop and implement a neighbour relations communication strategy. **Action project 1.4:** Develop a Concept Development Plan for NGR
Performance Indicator	• Co-management agreement with claimants. • Successful co-management practices with claimants. • An implemented neighbour relations and communication strategy • CDP in place

Objective 2: To comply with the terms of the Ramsar Convention, specifically with regard to the elements of the Maputaland Centre of Plant Endemism.

Table 2.2

ITEM	DESCRIPTION
Ranking	2
Management Objective	Biodiversity objective
Rationale	Ranked 2 as it is of National relevance, as well as specific to the UNESCO's Ramsar Convention, IBA's and the Biodiversity Act, Contributing to national & international targets. **[Refers to 1 *is of major significance*, 3 *is of major significance*, 4(2nd *is of major significance*)]**
Management Support	• Bird monitoring programs (CWAC) • Key species monitoring program • Management protection measures
Programmes	**Action project 2.1:** In collaboration with DWEA, update the Ndumo Game Reserve Ramsar Information Sheet.
Performance Indicator	• Compliance with RAMSAR Convention conditions

Objective 3: To protect intact representatives areas of the Usuthu and Pongola River floodplain systems and associated biodiversity in particular fish and bird species and associated water fauna and flora specifically the elements of the Maputaland Centre of Plant Endemism.

Table 2.3

ITEM	DESCRIPTION
Ranking	3
Management Objective	Biodiversity objective
Rationale	Ranked 3 as it is of National relevance, as well as specific to the vision and the Biodiversity Act, Contributing to national & international targets. **[Refers to 1 *is of major significance*, 3 *is of significance*, 4(1st *is of significance*)]**
Management Support	• Habitat monitoring programs • Key species monitoring program • Management protection measures
Programmes	**Action project 3.1:** Develop and implement a conservation management plan to conserve and protect the NGR's diversity of vegetation types associated with the wetland / floodplain system. **Action project 3.2:** Develop a fishery management strategy for the conservation and utilisation of the fish species in the NGR wetlands in line with the NGR floodplain management strategy and the KZN Provincial Freshwater Fishing Strategy.
Performance Indicator	• Floodplain associated species diversity • Integrity of floodplain habitats • Status of Key indicator species

Objective 4: Protect representative examples of the Maputaland coastal plain fossil beds.

Table 2.4

ITEM	DESCRIPTION
Ranking	4
Management Objective	Biodiversity objective
Rationale	Ranked 4 as it is of National relevance, as well as specific to the vision and the Biodiversity Act, Contributing to national & international targets. The lack of information is affecting the performance regarding the achievement of this objective. **[Refers to 1 *is of major significance*, 3 *is of significance*, 4(1st *is of significance*)]**
Management Support	• Benchmarking exercise and site identification • Status assessment survey • Fossil bed mapping
Programmes	**Action project 4.1:** Compile a map and status assessment. **Action project 4.2:** Compile a fossil bed management protocol.
Performance Indicator	• Map and status assessment • Protection measures in place

Objective 5: Protect and conserve the Hippopotamus as part of the Usuthu and Phongolo River floodplain system

Table 2.5

ITEM	DESCRIPTION
Ranking	5
Management Objective	Biodiversity objective
Rationale	Ranked 4 as it is specific to the Ndumo PA proclamation conservation objectives, its vision and the Biodiversity Act —species of regional importance Contributing to national targets. **[Refers to 1 *is of significance*, 2, 3 *is of significance*, 4(3rd)]**
Management Support	• Hippo monitoring program • Habitat integrity (suitability) monitoring program • Management protection measures
Programmes	**Action project 5.1:** Finalise and implement the NGR Hippopotamus Management Plan.
Performance Indicator	• Integrity of habitat (Habitat shifts) • Population size • Genetic Integrity • Hippo management plan in place

Objective 6: Conservation of elements of Maputaland Centre of Plant endemism (Global Relevance).

Table 2.6

ITEM	DESCRIPTION
Ranking	6
Management Objective	Biodiversity objective
Rationale	Ranked 6 as it is of Global relevance and the Biodiversity Act, Contributing to national & international targets. **[Refers to 1 *is of significance*, 3 *is of significance*, 4(1st)]**
Management Support	• Key species monitoring program • Management protection measures
Programmes	**Action project 6.1:** Initiate a survey to identify and clarify the Maputoland Centre of Plant Endemism associated elements / species / habitate on NGR and develop an appropriate conservation management strategy for NGR
Performance Indicator	• Integrity of habitat patches • Status of Key indicator species

Objective 7: Safeguard the cultural, historical, archaeological, palaeontological and living cultural heritage of the area.

Table 2.6

ITEM	DESCRIPTION
Ranking	7
Management Objective	Cultural objective
Rationale	Strong contribution to Provincial conservation of cultural heritage. **[Refers to 1, 2, 3 *is of major significance*, 4(2nd), 6]**
Management Support	• Sufficient funding and resources in terms of site protection and interpretation. • Support from AMAFA in respect of completing a management plan for Tembe.
Programmes	**Action project 7.1:** Develop a comprehensive Cultural Heritage Inventory and Mangement Plan for NGR in collaboration with SAHRA and Amafa. Institutional capacity must also be addressed by this plan. **Action project 7.2:** Document a comprehensive conservation history of NGR which includes historical and ecological perspectives.
Performance Indicator	• Database of all cultural heritage sites • Implementation of Cultural Resource Management Plan • Training programme in place

Objective 8: Participate as a key stakeholder in planning initiatives that specifically refer to the promotion of overall Protected Area objectives; specifically the following:

a. Usuthu -Tembe - Futi TFCAs.
b. Local Government IDPs.
c. Amafa.
d. Private and Communal initiatives

Table 2.8

ITEM	DESCRIPTION
Ranking	8
Management Objective	Benefits (Partnership) objective
Rationale	The need to form effective partnerships with the above bodies will allow for increased understanding of the PA objectives and improved ability to meet a number of these objectives. . **[Refers to 1, 2 *is of significance*, 3 *is of significance*, 4(2nd), 5 *is of significance*]**
Management Support	• Clarity from executive regarding policy, programmes and procedures iro planning initiatives
Programmes	**Action project 8.1:** Play an active role in the relevant planning initiatives **Action project 8.2:** The NGR Manager in collaboration with other relevant EKZNW officials must be mandated with active participation in the review processes of the municipal Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs), in order to ensure the effective maintenance of a buffer zone surrounding NGR through an alignment of appropriate land use adjacent to the Game Reserve. **Action project 8.3:** Formalise agreements with TFCA partners and co-ordinate drive towards seamless connection across the international borders. **Action project 8.4:** Actively participate in Usuthu-Tembe-Futi TFCA initiatives. **Action project 8.5:** Annually explore, investigate and negotiate opportunities to broaden conservation land use in and around NGR on an ongoing basis. **Action project 8.6:** Contribute to the development of an Integrated Security Strategy for the TFCA.
Performance Indicator	• Number of planning initiatives involving Ndumo • Number of planning initiatives that move to implementation

Objective 9: Play an anchor role for conservation and regional economic empowerment through joint agreements

Table 2.9

ITEM	DESCRIPTION
Ranking	9
Management Objective	Benefits (Partnership) objective
Rationale	The need to form effective partnerships with the above bodies will allow for increased understanding of the PA objectives and improved ability to meet a number of these objectives **Refers to 1, 2 *is of significance*, 3 *is of significance*, 4(2nd), 5 *is of significance*]**.
Management Support	• NEMA: PAA • Lebombo TFCA Protocol
Programmes	**Action project 9.1:** As a matter of priority, review all formal and informal local agreements, MoUs, leases, servitude arrangements *etc.* pertaining to NGR and document, update, maintain and monitor these appropriately authorised agreements. The Banzi Camp Concession in particular needs comprehensive revision while agreements with the Usuthu Gorge community must be developed **Action project 9.2:** Establish a Joint Management Committee specifically recognising existing structures, institutions and organisations in line with the settlement agreement and the Local Board structures (refer to institutional arrangements in Section 2)
Performance Indicator	• Implementation of co-management agreement • Appropriate Joint Management Committee in place

Objective 10: To protect endangered, rare and endemic species indigenous to the area (key biodiversity elements as identified by the EKZNW Conservation Plan).

Table 2.10

ITEM	DESCRIPTION
Ranking	10
Management Objective	Biodiversity objective
Rationale	These species have specific conservation significance, prescribing to a Provincial or National strategy or they have a specific monitoring and/or recovery plan. **[Refers to 1, 2, 3 *is of major significance*, 4(2nd)]**
Management Support	• Obtaining information that is lacking and required prior to determining appropriate management actions which will require funding. • Information required determining viability of certain species to implement species specific management in line with Working Group recommendations, as relevant. • Support and understanding of the importance of conserving red data species from neighbours.
Programmes	**Action project 10.1:** A full justified rare species list for the reserve needs to be compiled and guide/inform Provincial and or National targets **Action project 10.2:** Compile status assessment and prioritised list of all red data species in Ndumo **Action project 10.3:** Implement the EKZNW strategies for the management of black and white rhino populations **Action project 10.4:** Implement the EKZNW strategies for the management of vultures in Ndumo
Performance Indicator	• Contribution to National or provincial targets • Performance in relation to targets of prioritised red data species

Objective 11: Maintain the "unique sense of place" of the pan systems and Mahemane bush (a thicket on calcareous clay soils – locally referred to as Mahemane bush).

Table 2.11

ITEM	DESCRIPTION
Ranking	11
Management Objective	Cultural objective
Rationale	Ranked number 11 as it is specific to the Tembe PA vision — and to sense of place. Supports objective 13 — Capitalize on the unique assets [wilderness] Need to ensure that no impact takes place. **[Refers to 1, 2, 3 *is of significance*, 4(4th)]**
Management Support	• Implementation of EKZNW IEM policy • Guidance from EKZNW Planning and IEM experts • Understanding on the part of stakeholders that integrated environmental management cannot be compromised in favour of inappropriate development
Programmes	**Action project 11.1:** Implement the prescripts and recommendations of the IMP and CDP, as well as the EKZNW EIM protocols.
Performance Indicator	• Negative change to current environmental character • ROD (Record of Decision) / Environmental Authorisation (EA) for every development

Objective 12: Promote conservation as a viable and sustainable land use option

Table 2.12

ITEM	DESCRIPTION
Ranking	12
Management Objective	Benefits (Partnership) objective
Rationale	Ranked number 12 because essentially the exploitation of these natural resources is outweighed by their sustainability & protection first (Triple bottom line), and is Driver for regional socioeconomic development. The success of most initiatives around and including Ndumo will depend largely on sustained economic benefits from the park based on sustainable wildlife economics. EKZNW operating philosophies. **[Refers to 1, 2 *is of major significance*, 3, 4(4th)]**
Management Support	• Case studies • Clarity on business models • Awareness programmes
Programmes	**Action project 12.1** Compile balance sheet that clearly articulates the fiscal investment in relation to the benefit outcomes(financial situation) **Action project 12.2:** Initiate a resource economics study of the Game Reserve to determine its economic value regarding the provision of ecosystem services and its contribution to the local and regional economy. **Action project 12.3:** Determine the value of ecosystem services
Performance Indicator	• Number of investments • Annual audit of the contribution of conservation to the local economy • Ecosystem service report

Objective 13: Provide a better eco-tourism experience by capitalizing on the sense of place, unique biodiversity assets, such as pan systems, bird diversity, and aesthetic beauty.

Table 2.13

ITEM	DESCRIPTION
Ranking	13
Management Objective	Benefits (Partnership) objective
Rationale	Ranked 13 as it is specific to the Ndumo proclamation vision and is dependent on the other objectives. Does contribute to 14, but is separated out as a separate and important management component. Ranked lowest as it is not specific to the Ndumo vision and specific PA objectives. Ranked 14 because capitalizing on the asset shouldn't necessarily negatively impact it. **[Refers to 1, 2, 4(4th), 6]**
Management Support	• DEVCO compliance • Funding
Programmes	**Action project 13.1:** Identify the appropriate activities and access in line with the CDP. **Action project 13.2:** Cognizant of the NGR IMP and CDP policy guidelines and TFCA initiatives, develop an NGR Eco-cultural Tourism Development and Marketing Strategy, that addresses : • the attainment of professional tourism service delivery standards • branding and marketing • linkages with other regional tourist initiatives • public / private partnerships • cultural heritage tourism • visitor awareness, orientation and interpretation
Performance Indicator	• ˜Increase in the number of satisfied tourists˜ • Number of complaints • ˜Encounter rates (of draw card features)˜ • Number of activities offered related to feature

Objective 14: Economic benefit flow to Mathenjwa and Tembe Traditional Authority people from sustainable resource (consumptive and non-consumptive) use.

Table 2.14

ITEM	DESCRIPTION
Ranking	14
Management Objective	Benefits (Partnership) objective
Rationale	Ranked number 16 because essentially the exploitation of these natural resources is outweighed by their sustainability & protection first (Triple bottom line), and is Driver for regional socioeconomic development. The success of most initiatives around and including Ndumo will depend largely on sustained economic benefits from the park based on sustainable wildlife economics. EKZNW operating philosophies. **[Refers to 1, 2 *is of major significance*, 3 *is of significance*, 4(4th)**
Management Support	• Approved Concept Development Plan • Monitoring programme
Programmes	**Action project 14.1:** Develop a five-year Strategic Management Plan and Business Plan for NGR. **Action project 14.2:** Develop an overall ecotourism master plan (TFCA) aligned to the Concept Development Plan **Action project 14.3:** Develop and implament a Resource Utilisation Management Plan for NGR **Action project 14.4:** Compile balance sheet that clearly articulates the fiscal investment in relation to the benefit outcomes(financial situation) – refer to objective 6.12
Performance Indicator	• Business plan • CDP in place • Annual audit of the contribution of conservation to the local economy • Ecotourism master plan • Sustainable resource use plan • Compliance with contractual obligations

Objective 15: Contribute to the achievement of Provincial and National conservation targets through the protection of a representative portion of Maputaland Lowveld and its associated biodiversity, specifically birds and spiders.

Table 2.15

ITEM	DESCRIPTION
Ranking	15
Management Objective	Biodiversity objective
Rationale	A need to focus on retaining a minimal viable unit for re-colonization and expansion following shifts in temporal and spatial dynamics. **[Refers to 1 *is of significance*, 2 *is of significance*, 3 *is of significance*, 4(4th)]**
Management Support	Need external expertise to identify and indicate what representation are needed Require funding Need guidelines regarding national and provincial targets
Programmes	**Action project 15.1:** Identify appropriate refugia & key species related to the Provincial and National conservation targets **Action project 15.2** Monitor the refugia **Action project 15.3** Implement appropriate management actions in respect of managing the refugia.
Performance Indicator	• Identified refugia • Size and status of refugia & key species

Objective 16: Co-operative partnerships on promoting environmental education and conservation programmes

Table 2.16

ITEM	DESCRIPTION
Ranking	16
Management Objective	Benefits (Partnership) objective
Rationale	Ranked 14 specific to the Ndumo Vision & EKZNW operating philosophies. **[Refers to 1, 2, 3 *is of significance*, 4(4th)]**
Management Support	• Educational environmental conservation programme • Align management support programme with kids and parks programme
Programmes	**Action project 16.1** Develop an NGR environmental awareness education programme specifically for surrounding neighbouring communities and the public interest groups. **Action project 16.2** Develop an interpretation programme in a standard format for the Game Reserve. **Action project 16.3** Investigate the possibility of combining environmental awareness programmes with social programmes offered by other institutions in the general area of the Game Reserve **Action project 16.4** Finalise the new MoA with Tshwane University of Technology in terms of running programmes at the Goldfields Environmental Education Centre.
Performance Indicator	• Increase in occupancy at environmental education centre Number of educational programmes

Objective 17: Promote awareness of the natural beauty and aesthetic value of the area.

Table 2.17

ITEM	DESCRIPTION
Ranking	17
Management Objective	Cultural objective
Rationale	Ranked 17 as this objective is merely to promote awareness, relates to Ndumo PA vision. It is important for people to value the park and as a draw card. **[Refers to 1, 4(3rd)]**
Management Support	• TFCA marketing strategy • EKZNW marketing strategy • Interpretation programme (brochures, information boards, internet, field guides)
Programmes	Refer to Action Project in objective 13
Performance Indicator	• Marketing strategy in place • Interpretation programme in place.

Objective 18: Facilitate access to cultural heritage sites (graves, archaeological sites, sites of special activities).

Table 2.18

ITEM	DESCRIPTION
Ranking	18
Management Objective	Cultural objective
Rationale	Ranked 18 as the cultural heritage sites are already protected and this objective is merely to allow for appropriate access to some of these site, relates to Ndumo PA vision and the access agreements with people. It is important for sustained support for the park. **[Refers to 1, 2 *is of significance*, 3 *is of significance*, 4(4th)]**
Management Support	• Policies on access to cultural sites.
Programmes	**Action project 18.1** Develop policies on the management and access to cultural sites **Action project 18.2** Refer to Action Project in objective 7.
Performance Indicator	• Access monitored • CRMP • Maintaining integrity of sites • Training

*8.*3 Supporting Projects for action correlated to the overarching Management Objectives (additional action projects indirectly related to the objectives / not ranked)

NGR Management Objective 1 **Conservation** of key biodiversity features, biophysical processes, landscapes, abiotic, cultural, historical, archaeological and palaeontological resources.	
Action project reference #	Action Projects
2.1.1 (i)	Obtain a firm legal opinion on the legal implications of the shifting international boundary formed by the Usuthu River through the Office of the Chief State Law Adviser. If this legal opinion highlights potential unfavourable implications for NGR, proactively initiate TFCA discussions on this matter.
3.8 (ii)	Update the EKZNW Biodiversity Database with the NGR plant species records.
3.9 (i)	Update the EKZNW Biodiversity Database with the NGR animal species checklist records.
3.9.1 (i)	Initiate surveys to further develop the NGR invertebrate database.
3.9.1 (ii)	Determine the ecologically critical NGR invertebrate species that need to be included in the Game Reserve's monitoring programme.
3.9.2 (i)	Determine the ecologically critical NGR fish species that need to be included in the Game Reserve's monitoring programme.
3.9.3 (i)	Determine the ecologically critical NGR herpetofauna species that need to be included in the Game Reserve's monitoring programme.
3.9.4 (i)	Determine the ecologically critical NGR bird species that need to be included in the Game Reserve's monitoring programme.
3.9.5 (i)	Determine the ecologically critical NGR mammal species that need to be included in the Game Reserve's monitoring programme.
6.1.2 (i)	Investigate and develop an appropriate human resource structure and capacity of NGR with a view to improving effectiveness and efficiency in achieving NGR objectives and informing the Business Plan.
6.4 (i)	Develop and adopt a NGR Wildlife Protection Management Strategy that ensures collaboration with all relevant institutions.
6.5.3 (i)	Annually align NGR Fire Management Strategy to the outcome and recommendations of the vegetation survey.
6.5.3 (ii)	Arrange a NGR Management Fire Workshop in April / May of each year.
6.5.4.1 (i)	Develop a phased 3-year plan to address the existing non-invasive alien plants in NGR.
6.5.4.1 (ii)	Develop an ongoing time-bound programme to effectively control declared alien weeds and invader plants within NGR and 1km beyond (buffer area) the Game Reserve boundary.
6.5.5 (i)	Map all extensive or potential human-induced / aggravated soil erosion sites and annually monitor the condition of these sites in order to prioritise rehabilitation work.
6.11.2 (i)	Replace the fence along the eastern boundary of Ndumo Game Reserve as soon as possible after the relations with the adjacent community have normalised sufficiently.
6.10 (i)	Develop procedures that will ensure that all abiotic and biotic data collected are captured in managed databases and GIS layers for interrogation by reseachers and managers.
6.5.7 (i)	Re-develop the present NGR law enforcement strategy with a view to significantly improving effectivity.
4.6 (i)	Identify conservation targets for NGR.
4.6 (ii)	Develop conservation and monitoring strategies for all species for which NGR conservation targets have been set.
6.10 (ii)	Determine the requirement for research facilities at NGR and implement.
6.10.1 (i)	Implement the recomendations made by the Protected Area management Effectiveness Programme

6.11.10.1 (i)	Develop an integrated waste management plan for NGR.
6.11.10.1 (ii)	Install and maintain effective standardised solid waste receptacles for NGR that are animal and baboon / monkey-proof.
6.11.5 (i)	All vehicle roads and tracks must be evaluated for the suitability of their alignment and recommendations made for new vehicle roads and tracks, repair or closure (with rehabilitation measures) of existing ones.
6.11.10.2 (i)	All sewage systems in NGR must be investigated for legal compliance. A phased development to upgrade existing systems and septic tank / French drain systems must be put in place.
6.11.12 (i)	Determine the requirement for the continued existence of an aircraft landing field on NGR. If required and approved, maintain the present site according to minimum aviation standards. If not required, plan and implement a rehabilitation plan for the present site.
2.1.1 (i)	Obtain written assignment from the MEC appointing EKZNW as the management authority for NGR in terms of Section 38(2) of NEMPAA.
6.10 (iii)	Identify and develop reference library facilities and procedures to maintain hard and digital copies of all NGR related research work, all documents listed as IMP supporting documentation in **Appendix 1** as well as any new supporting management documentation produced. Strict curation rules must apply and the ultimate responsibility for the curation of this library at NGR must be allocated to the most senior reserve management position and the Regional Ecologist: North Zululand.
6.11 (i)	Develop and maintain NGR Infrastructure database and map.
6.11 (ii)	Review the desirability and effectiveness of all present infrastructures with regard to : • Adequacy • State of repair • Demolition • Existing maintenance plans and programmes • Visitor and staff use, requirements and values • Financial • Environmental impact (negative and positive) • Income generation • Possibilities of outsourcing
6.11.11 (i)	Develop a phased plan to install standardised (reliable and tested) water- and energy-saving devices throughout NGR as soon as practically possible.
7.1 (i)	The GRPC must undertake a five-yearly review of this IMP to revise and amend the IMP for the following five years.
7.2 (i)	Convene a GRPC meeting annually in November to monitor, evaluate and report on progress in terms of this IMP, plan and, if necessary, recommend the re-prioritisation of management activities or amendments to the IMP.

NGR Management Objective 2

The formation of functional **partnerships** to integrate the NGR with regional development plans and Nsubane-Pongola Transfrontier Conservation Area initiatives, and other initiatives which underwrite the vision of NGR.

Action project reference #	Action Projects
6.4 (ii)	Participate in, and contribute to the rural Safety and Security Forum.
2.1.4 (i)	Develop and conclude documented inter-agency MoAs with Telkom, Eskom, DWEA, SAPS and SANDF regarding their operational protocol on NGR.

NGR Management Objective 3

The provision of socio-economic **benefits** (benefit flow) to NGR's neighbours and to contribute to the local economy and the efforts of conservation in a sustainable manner based on sound business principles (EKZN Business Plan).

Action project reference #	Action Projects
6.3.3 (i)	Annually in March of each year arrange a public meeting to give feedback on progress,

	planned projects and encourage informal local community participation.
6.5.6.2 (i)	Implement the EKZNW Protocol for the Management and Disposal of Surplus Animals from Protected Areas
6.11.4 (i)	Develop the necessary policy and standards for each group of signage in NGR and implement a phased programme for replacing signage with the standardised formats – see also Action Project 6.8 (i).
NGR Management Objective 4 The provision of Eco-cultural tourism **business** opportunities in the natural and cultural environment based within the influence sphere of NGR.	
Action project reference #	Action Projects
6.11.8.1 (i)	Investigate the feasibility of a new water pump installation at Development Node 30. If feasible, proceed with the development of a new water pump system in accordance with development procedures and rehabilitate the old site.

8.4 Summarised Action Projects

Consolidated List of IMP Action Projects

Table 3 below lists the all the Action Projects identified in the IMP. The Action Projects are separated into ranked projects (as they relate to the objectives) and unranked (as they related to the supporting projects).

Ranking	Project Description	IMP Action Project No (text ref)
1.	Facilitate the development and implementation of Co-management Agreements between EKZNW and the claimant landowners	**AP1.1** (2.1.3 (i))
2.	If required, capacitate the claimant landowners i.t.o. the Co-management Agreement and related management protocols as well as NGR conservation and eco-cultural tourism management policy guidelines defined by this IMP and its subsidiary management documents.	**AP 1.2** (2.1.3 (ii))
3.	Develop and implement a neighbour relations communication strategy.	**AP 1.3** (Table 2.1)
4.	Develop a Concept Development Plan for NGR	**AP 1.4** (6.11 (iii))
5.	In collaboration with DWEA, update the Ndumo Game Reserve Ramsar Information Sheet.	**AP 2.1** (3.7 (i))
6.	Develop and implement a conservation management plan to conserve and protect the NGR's diversity of vegetation types associated with the wetland / floodplain system.	**AP 3.1** (6.5.2 (i))
7.	Develop a fishery management strategy for the conservation and utilisation of the fish species in the NGR wetlands in line with the NGR floodplain management strategy and the KZN Provincial Freshwater Fishing Strategy.	**AP 3.2** (6.5.6.3 (i))
8.	Compile a map and status assessment.	**AP 4.1** (Table 2.4)
9.	Compile a fossil bed management protocol.	**AP 4.2** (Table 2.4)
10.	Finalise and implement the NGR Hippopotamus Management Plan.	**AP 5.1** (6.5.6.2 (ii))
11.	Initiate a survey to identify and clarify the Maputoland Centre of Plant Endemism associated elements / species / habitate on NGR and develop an appropriate conservation management strategy for NGR	**AP 6.1** (3.8 (i))
12.	Develop a comprehensive Cultural Heritage Inventory and Mangement Plan for NGR in collaboration with SAHRA and Amafa. Institutional capacity must also be addressed by this plan.	**AP 7.1** (6.6 (i))
13.	Document a comprehensive conservation history of NGR which includes historical and ecological perspectives	**AP 7.2** (3.4 (i))
14.	Play an active role in the relevant planning initiatives	**AP 8.1** (Table 2.8)
15.	The NGR Manager in collaboration with other relevant EKZNW officials must be mandated with active participation in the review processes of the municipal Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs), in order to ensure the effective maintenance of a buffer zone surrounding NGR through an alignment of appropriate land use adjacent to the Game Reserve.	**AP 8.2** (2.3 (i))
16.	Formalise agreements with TFCA partners and co-ordinate drive towards seamless connection across the international borders.	**AP 8.3** (6.3 (i))
17.	Actively participate in Usuthu-Tembe-Futi TFCA initiatives.	**AP 8.4** (6.3.1 (i))
18.	Annually explore, investigate and negotiate opportunities to broaden conservation land use in and around NGR on an ongoing basis.	**AP 8.5** (2.6 (i))
19.	Contribute to the development of an Integrated Security Strategy for the TFCA.	**AP 8.6** (6.4 (iii))

20.	As a matter of priority, review all formal and informal local agreements, MoUs, leases, servitude arrangements *etc.* pertaining to NGR and document, update, maintain and monitor these appropriately authorised agreements. The Banzi Camp Concession in particular needs comprehensive revision while agreements with the Usuthu Gorge community must be developed	**AP 9.1** (2.5 (i))
21.	Establish a Joint Management Committee specifically recognising existing structures, institutions and organisations in line with the settlement agreement and the Local Board structures (refer to institutional arrangements in Section 2)	**AP 9.2** (Table 2.9)
22.	A full justified rare species list for the reserve needs to be compiled and guide/inform Provincial and or National targets	**AP 10.1** (Table 2.10)
23.	Compile status assessment and prioritised list of all red data species in Ndumo	**AP 10.2** (Table 2.10)
24.	Implement the EKZNW strategies for the management of black and white rhino populations	**AP 10.3** (Table 2.10)
25.	Implement the EKZNW strategies for the management of vultures in Ndumo	**AP 10.4** (6.5.6.4 (i))
26.	Implement the prescripts and recommendations of the IMP and CDP, as well as the EKZNW EIM protocols.	**AP 11.1** Table 2.11
27.	Compile balance sheet that clearly articulates the fiscal investment in relation to the benefit outcomes(financial situation)	**AP 12.1** (Table 2.12)
28.	Initiate a resource economics study of the Game Reserve to determine its economic value regarding the provision of ecosystem services and its contribution to the local and regional economy.	**AP 12.2** (6.1.1 (ii))
29.	Determine the value of ecosystem services	**AP 12.3** (Table 2.12)
30.	Identify the appropriate activities and access in line with the CDP.	**AP 13.1** (Table 2.13)
31.	Cognizant of the NGR IMP and CDP policy guidelines and TFCA initiatives, develop an NGR Eco-cultural Tourism Development and Marketing Strategy, that addresses : • the attainment of professional tourism service delivery standards • branding and marketing • linkages with other regional tourist initiatives • public / private partnerships • cultural heritage tourism • visitor awareness, orientation and interpretation	**AP 13.2** (6.8 (i))
32.	Develop a five-year Strategic Management Plan and Business Plan for NGR.	**AP 14.1** 6.1.1 (i))
33.	Develop an overall ecotourism master plan (TFCA) aligned to the Concept Development Plan	**AP 14.2** (Table 2.14)
34.	Develop and implement a Resource Utilisation Management Plan for NGR.	**AP 14.3** (6.7.1 (i))
35.	Compile balance sheet that clearly articulates the fiscal investment in relation to the benefit outcomes(financial situation) – refer to objective 6.12	**AP 14.4** (Table 2.14)
36.	Identify appropriate refugia & key species related to the Provincial and National conservation targets	**AP 15.1** (Table 2.15)
37.	Monitor the refugia	**AP 15.2** (Table 2.15)
38.	Implement appropriate management actions in respect of managing the refugia	**AP 15.3** (Table 2.15)
39.	Develop an NGR environmental awareness education programme specifically for surrounding neighbouring communities and the public interest groups.	**AP 16.1** (6.9 (i))
40.	Develop an interpretation programme in a standard format for the Game Reserve.	**AP 16.2** (6.9 (ii))
41.	Investigate the possibility of combining environmental awareness programmes with social programmes offered by other institutions in the general area of the Game Reserve	**AP 16.3** (6.9 (iii))

42.	Finalise the new MoA with Tshwane University of Technology in terms of running programmes at the Goldfields Environmental Education Centre.	**AP 16.4** (2.5.2 (i))
43.	Develop policies on the management and access to cultural sites	**AP 16.4** (Table 2.18)
Non ranked	**Project Description**	**IMP Action Project #**
1.	Obtain written assignment from the MEC appointing EKZNW as the management authority for NGR in terms of Section 38(2) of NEMPAA.	2.1.1 (i)
2.	Develop and conclude documented inter-agency MoAs with Telkom, Eskom, DWEA, SAPS and SANDF regarding their operational protocol on NGR.	2.1.4 (i)
3.	Obtain a firm legal opinion on the legal implications of the shifting international boundary formed by the Usuthu River through the Office of the Chief State Law Adviser. If this legal opinion highlights potential unfavourable implications for NGR, proactively initiate TFCA discussions on this matter.	2.4.1 (i)
4.	Update the EKZNW Biodiversity Database with the NGR plant species records.	3.8 (ii)
5.	Update the EKZNW Biodiversity Database with the NGR animal species checklist records.	3.9 (i)
6.	Initiate surveys to further develop the NGR invertebrate database.	3.9.1 (i)
7.	Determine the ecologically critical NGR invertebrate species that need to be included in the Game Reserve's monitoring programme.	3.9.1 (ii)
8.	Determine the ecologically critical NGR fish species that need to be included in the Game Reserve's monitoring programme.	3.9.2 (i)
9.	Determine the ecologically critical NGR herpetofauna species that need to be included in the Game Reserve's monitoring programme.	3.9.3 (i)
10.	Determine the ecologically critical NGR bird species that need to be included in the Game Reserve's monitoring programme.	3.9.4 (i)
11.	Determine the ecologically critical NGR mammal species that need to be included in the Game Reserve's monitoring programme.	3.9.5 (i)
12.	Identify conservation targets for NGR.	4.6 (i)
13.	Develop conservation and monitoring strategies for all species for which NGR conservation targets have been set.	4.6 (ii)
14.	Investigate and develop an appropriate human resource structure and capacity of NGR with a view to improving effectiveness and efficiency in achieving NGR objectives and informing the Business Plan.	6.1.2 (i)
15.	Annually in March of each year arrange a public meeting to give feedback on progress, planned projects and encourage informal local community participation.	6.3.3 (i)
16.	Develop and adopt a NGR Wildlife Protection Management Strategy that ensures collaboration with all relevant institutions.	6.4 (i)
17.	Participate in, and contribute to the Rural Safety and Security Forum.	6.4 (ii)
18.	Contribute to the development of an Integrated Security Strategy for the TFCA.	6.4 (iii)
19.	Develop an NGR Fire Management Plan to outline : Fire management objectives, scientific understanding, management actions, legal compliance, personnel training requirements, monitoring and research required.	6.5.3 (i)
20.	Arrange a NGR Management Fire Workshop in April / May of each year.	6.5.3 (ii)
21.	Develop a phased 3-year plan to address the existing non-invasive alien plants in NGR.	6.5.4.1 (i)
22.	Develop an ongoing time-bound programme to effectively control declared alien weeds and invader plants within NGR and 1km beyond (buffer area) the Game Reserve boundary.	6.5.4.1 (ii)
23.	Develop a control programme for alien animals present in NGR.	6.5.4.2 (ii)
24.	Map all extensive or potential human-induced / aggravated soil erosion sites and annually monitor the condition of these sites in order to prioritise rehabilitation work.	6.5.5 (i)
25.	Implement the EKZNW Protocol for the Management and Disposal of Surplus Animals from Protected Areas.	6.5.6.2 (i)
26.	Re-develop the present NGR law enforcement strategy with a view to significantly improving effectivity.	6.5.7 (i)
27.	Develop procedures that will ensure that all abiotic and biotic data collected are captured in managed databases and GIS layers for	6.10 (i)

	interrogation by reseachers and managers.	
28.	Determine the requirement for research facilities at NGR and implement.	6.10 (ii)
29.	Identify and develop reference library facilities and procedures to maintain hard and digital copies of all NGR related research work, all documents listed as IMP supporting documentation in **Appendix 1** as well as any new supporting management documentation produced. Strict curation rules must apply and the ultimate responsibility for the curation of this library at NGR must be allocated to the most senior reserve management position and the Regional Ecologist: North Zululand at the Tembe Research Centre, Tembe Elephant Park.	6.10 (iii)
30.	Develop and maintain NGR Infrastructure database and map.	6.11 (i)
31.	Review the desirability and effectiveness of all present infrastructures with regard to : • Adequacy • State of repair • Demolition • Existing maintenance plans and programmes • Visitor and staff use, requirements and values • Financial • Environmental impact (negative and positive) • Income generation • Possibilities of outsourcing	6.11 (ii)
32.	Replace the fence along the eastern boundary of Ndumo Game Reserve as soon as possible after the relations with the adjacent community have normalised sufficiently.	6.11.2 (i)
33.	Develop the necessary policy and standards for each group of signage in NGR and implement a phased programme for replacing signage with the standardised formats – see also Action Project 6.8 (i).	6.11.4 (i)
34.	All vehicle roads and tracks must be evaluated for the suitability of their alignment and recommendations made for new vehicle roads and tracks, repair or closure (with rehabilitation measures) of existing ones.	6.11.5 (i)
35.	Investigate the feasibility of a new water pump installation at Development Node 30. If feasible, proceed with the development of a new water pump system in accordance with development procedures and rehabilitate the old site.	6.11.8.1 (i)
36.	Develop an integrated waste management plan for NGR.	6.11.10.1 (i)
37.	Install and maintain effective standardised solid waste receptacles for NGR that are animal and baboon / monkey-proof.	6.11.10.1 (ii)
38.	All sewage systems in NGR must be investigated for legal compliance. A phased developmetn plan to upgrade existing systems and septic tank / French drain systems must be put in place.	6.11.10.2 (i)
39.	Develop a phased plan to install standardised (reliable and tested) water- and energy-saving devices throughout NGR as soon as practically possible.	6.11.11 (i)
40.	Determine the requirement for the continued existence of an aircraft landing field on NGR. If required and approved, maintain the present site according to minimum aviation standards. If not required, plan and implement a rehabilitation plan for the present site.	6.11.12 (i)
41.	The GRPC must undertake a five-yearly review of this IMP to revise and amend the IMP for the following five years.	7.1 (i)
42.	Convene a GRPC meeting annually in November to monitor, evaluate and report on progress in terms of this IMP, plan and, if necessary, recommend the re-prioritisation of management activities or amendments to the IMP.	7.2 (i)

APPENDIX 1

List of References for Unpublished Supporting Documentation

Ndumo Game Reserve: Integrated Management Plan
2009 - 2013

Copies available from:

Ezemvelo KZN Wildlife, Tembe Research Centre, Tembe Elephant Park, Private Bag 356, Kwangwanase.

Telephone: +27 (0)35 592 0032, Fax: +27 (0)35 592 0240, e-mail: waynem@icon.co.za

Contact person: Regional Ecologist: North Zululand.

Item

1. EKZNW Corporate Strategic Plan and Performance Plan for 2009-2014.
2. EKZNW Corporate Policies (Norms & Standards) listed in **Table 2** below.
3. EKZNW Biodiversity Database Checklists for NGR.
4. Amafa / EKZNW Co-operative Conservation Management of Cultural Heritage Agreement (signed July 2005).
5. Terratest (Pty) Ltd & MCDS, 2007. *Ndumo Game Reserve Integrated Management Plan (2007-2012).* Unpublished Report, Ezemvelo KZN Wildlife, Pietermaritzburg.
6. Natal Parks Board, *Tembe-Ndumo Management and Development Plan – Draft*, 1993. Pietermaritzburg.
7. List of local agreements, leases and other servitude arrangements pertaining to NGR (2009)
8. Memorandum of Agreement between the Minister of Agriculture and Land Affairs and the Minister of Environmental Affairs and Tourism regarding the fundamental principles that will govern the resolution of land Claims in Protected Areas dated 2nd May 2007.
9. Agreement for the settlement of the Usuthu Community Claim in terms of Section 42 D of the Restitution of Land Rights Act, 1994 (Act No. 22 of 1994) signed by the parties on 2nd February 2008.
10. Resource Utilisation Operational Management Plan: Ndumo Game Reserve (June 2008).
11. Hatting, R. 2002. *Notes from site visit to Ndumo, March 2002.* Unpublished Report.
12. Guidelines for the Registration and Administration of Research Projects Undertaken by or through Ezemvelo KZN Wildlife (August 2002).
13. EKZNW Track and Trail Maintenance Manual.
14. Tinley, K.L. 1964. *Summary of ecology survey of Ndumu Game Reserve, Tongaland*, Natal Parks Board. Unpublished Report.
15. Tinley, K.L. 1965. *Note and comments on a recent visit to the Ndumu Game Reserve, North-western Tongaland*. Natal Parks Board. Unpublished Report.
16. KZN Provincial Freshawater Fishing Strategy (2008).
17. KZN Vulture Conservation Strategy (2008-2012).
18. Ndumo Game Reserve Public Participation report 2010.

Table2 below lists the EKZNW Corporate Policies (Norms & Standards) referenced from intranet[12] that are most relevant to EKZNW PA management. It is, however, the responsibility of all management and other personnel associated with the management of protected areas to ensure that they familiarise themselves and comply with the most recent versions of *all* EKZNW Board Approved Policies.

EKZNW CORPORATE POLICIES (NORMS & STANDARDS)	
Policy File No.	**CORPORATE AFFAIRS**
B 2	Ø Access to Ezemvelo KZN Wildlife Areas and Employment.
B 5	Ø Outsourcing of Functions and Services
B 7	Ø Monuments, Memorials and Names of Protected Areas under the control of EKZNW.
B 8	Ø Restricted use of Board Theatres, Halls and Conference Facilities etc.
B 9	Ø Code of Ethics / Conduct.
B 10	Ø Photography in Board Protected Areas.
B 13	Ø Mission Statement
B 14	Ø Access to Information.
Policy File No.	**INTERNAL AUDIT**
C 5	Ø Management Control
	BIODIVERSITY CONSERVATION OPERATIONS
	1. NATURAL RESOURCE SUSTAINABILITY
Policy File No.	**Threatened Species and Ecosystems**
D 1.1	Ø Disposal of Black Rhino.
D 1.2	Ø Disposal of Surplus White Rhino.
D 1.3	Ø Strategy for the Management of Southern White Rhino in KwaZulu-Natal.
D 1.4	Ø Strategy for the Biological Management of Black Rhino in KwaZulu-Natal.
D 1.5	Ø Rhinoceros Products.
D 1.6	Ø Crocodilians
D 1.7	Ø Cycads.
D 1.8	Ø Disposal of Threatened Species.
Policy File No.	**Exotic and Invasive Species**
D 1.9	Ø Release of Alien Species.
D 1.10	Ø Control Measures for Red-billed Quelea.
D 1.12	Ø Grass Carp.
D 1.13	Ø Establishment of Alien Plantations.
Policy File No.	**Migratory Species**
D 1.14	Ø Black Wildebeest and Blue Wildebeest Hybridization and Conservation.
D 1.15	Ø Permit authorising the collection of Biological Material within Board Areas.
	2. CONSERVATION EFFECTIVENESS
Policy File No.	**Strategic Applications**
D 2.1	Ø Involvement of the KwaZulu-Natal Nature Conservation Board in Project 8 of the MAB (Man and Biosphere) Programme.

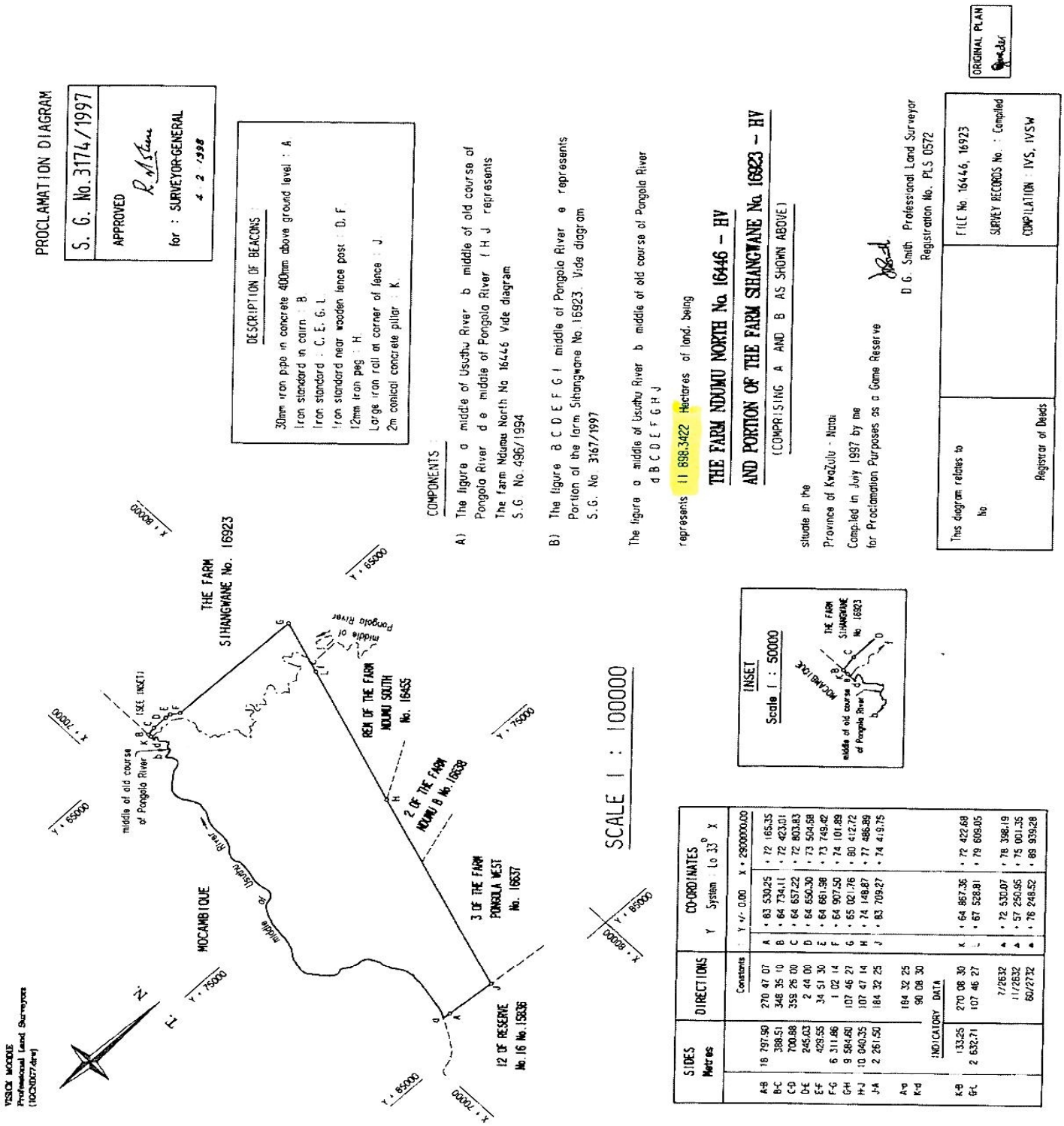
[12] www.kznwildlife.com/intranet (Accessed 31 March 2009)

Policy File No.	**Conservation Management: Protected Area Management**
D 2.2	Ø Management of Wilderness Areas.
D 2.3	Ø Protected Area Development.
D 2.4	Ø Prohibition of Works and Servitudes in Board Areas.
D 2.5	Ø Zonation and Regulations for the control of off-road vehicles on beaches controlled by the Board.
D 2.6	Ø Quarries in KZN Protected Areas.
D 2.7	Ø Re-establishment and Management of Vegetation on Development Sites in the Ezemvelo KZN Wildlife Protected Areas.
D 2.8	Ø Ecotourism and Protected Areas.
D 2.9	Ø Solid Waste Management within Protected Areas.
D 2.10	Ø State Security Service Activities within Board Areas.
D 2.11	Ø Shark Nets in or bordering KwaZulu-Natal Nature Conservation Board Controlled Areas.
Policy File No.	**Integrated Environmental Management**
D 2.12	Ø Integrated Environmental Management - incorporating the procedure for the assessment of the impact of proposed development projects on nature conservation concerns.
D 2.13	Ø Precautionary Principle.
D 2.14	Ø Shark Net Installations.
D 2.15	Ø Bioprospecting in KwaZulu-Natal.
D 2.17	Ø Use of Pesticides by the Ezemvelo KZN Wildlife: Safety to Humans and the Environment.
D 2.18	Ø Interference with the Mouth of a Lagoon or River (Breaching).
Policy File No.	***Ex Situ* Wild Animal Management**
D 2.21	Ø Re-establishment of Terrestrial Mammals in Board Areas.
D 2.22	Ø Translocation of Animals.
D 2.25	Ø Elephant Introductions and Elephant in Enclosures.
D 2.27	Ø Introduction and Keeping of Large Predators in Enclosures in KZN.
D 2.28	Ø Use of Narcotic Drugs.
D 2.29	Ø Falconry.
Policy File No.	**Human Animal Conflict - Inside and Outside Protected Areas**
D 2.30	Ø Disposal of Leopard from Ezemvelo KZN Wildlife Protected Areas.
D 2.31	Ø Problem Animal Control.
D 2.32	Ø Compensation claims in respect of damage caused by Lion, Cheetah, Wild Dog and Elephant to Stock and Crops.
D 2.33	Ø 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	Ø Environmental Education Policy.
	3. BIODIVERSITY PROTECTION
Policy File No.	**Co-management**
D 3.1	Ø Supply of Game to Conservancies, Community Conservation Areas and Biosphere Reserves in KwaZulu-Natal
D 3.2	Ø Establishment and Management of Community Conservation Reserves (CCR)

D 3.4	Ø Community Conservation Programmes
D 3.5	Ø Neighbours' Access to Board Protected Areas
D 3.6	Ø Relationship with Local Boards
D 3.7	Ø Conservation Partnerships Between KwaZulu-Natal Nature Conservation Board and Adjacent Landowners
D 3.8	Ø Community Trust
D 3.9	Ø Community Levy Policy and Guidelines
D 3.10	Ø Land Claims on Proclaimed and Unproclaimed Provincial and Assigned National Protected areas in KwaZulu-Natal
D 3.11	Ø Amafa Policy Guidelines for the access of rock art sites in KwaZulu Natal
Policy File No.	**Resource-use benefits**
D 3.12	Ø Disposal of Venison from Ezemvelo KZN Wildlife Management Operations.
D 3.13	Ø Sustainable use of wildlife resources.
D 3.14	Ø Freshwater Angling.
D 3.15	Ø Freshwater species utilisation.
D 3.16	Ø Use of plant resources from protected areas.
D 3.17	Ø Use of doomed biological material.
D 3.19	Ø Provision of hunting by Ezemvelo KZN Wildlife.
Policy File No.	**4. RELATIONSHIPS**
D 4.1	Ø Neighbour Relations.
D 4.2	Ø Participation - Non Government Organisations.
D 4.3	Ø Data Access.
D 4.4	Ø Consultation and Communication with Stakeholders: Policy and Guidelines.
Policy File No.	**COMMERCIAL OPERATIONS**
E 1	Ø Concessions for Welfare Groups.
E 2	Ø Hiking and Mountaineering.
E 3	Ø Educational Concessions.
E 4	Ø Club Facilities within Board Areas.
E 5	Ø Hutted Camps.
E 6	Ø Joint Venture Scheme.
E 7	Ø Allocation of Sites in terms of the Joint Venture Scheme.
E 8	Ø Access to Protected Areas through Unofficial Entry Points.
E 9	Ø Visitor Facilities Management by Ezemvelo KZN Wildlife.
E 10	Ø Lease of Lakeshore at State Dam Protected Areas.
E 11	Ø Execution, Control and Management of Leases and Concession Contracts (excluding Biodiversity Conservation Partnerships and Leases of Wildlife).
E 12	Ø Private Sector Reservations Policy.
E 13	Ø Partnerships for Eco-Tourism Development within or Adjacent to Protected Areas.
E 14	Ø Discounting of Tariffs for Walk-in Guests.
E 15	Ø Ecotourism Discounting Strategy.
E 16	Ø Travel Trade Commissions: Tour Operator/ Travel Agency.
E 17	Ø Policy and Procedure for the establishment and monitoring of Commercial Operations Public Private Partnership (PPP) Agreements.
E 18	Ø Administrative and operational policy on Professional hunting in South Africa.
E 19	Ø Commercialisation.

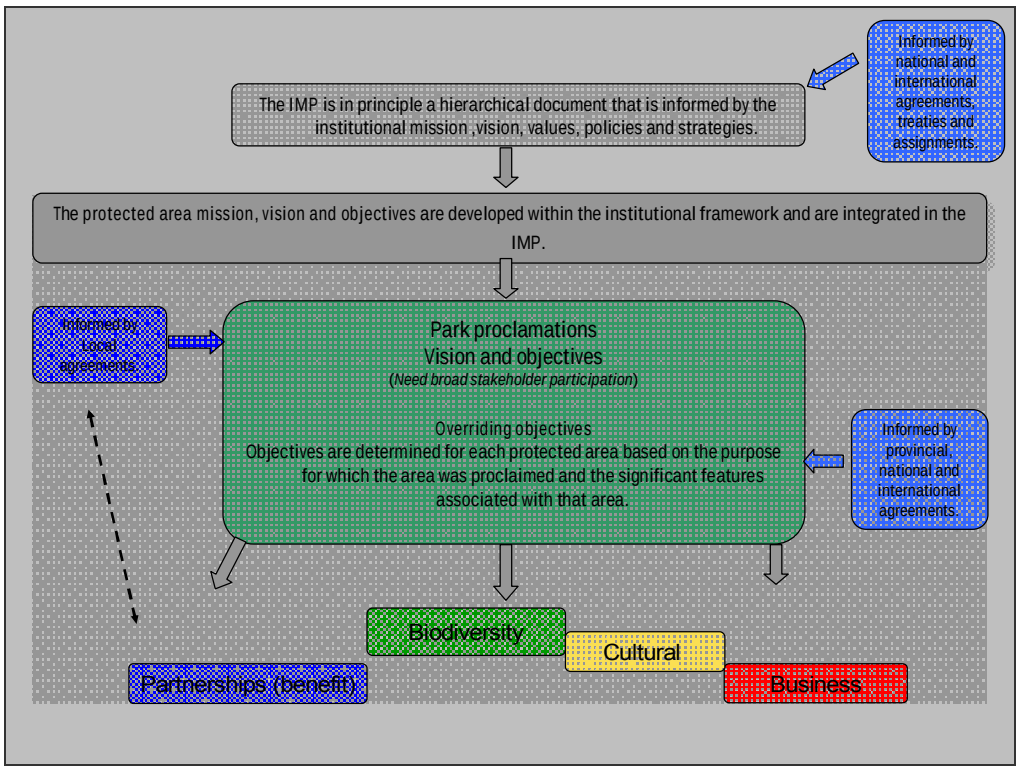
APPENDIX 2

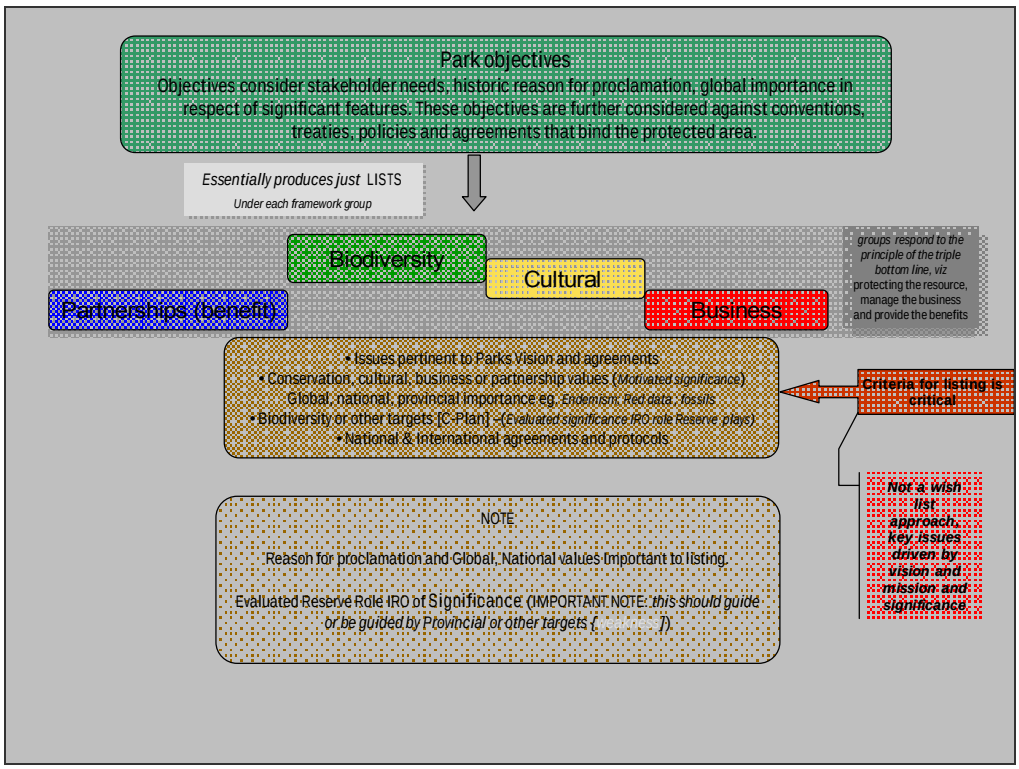
Ndumo Game Reserve: SG Diagram 3174/1997

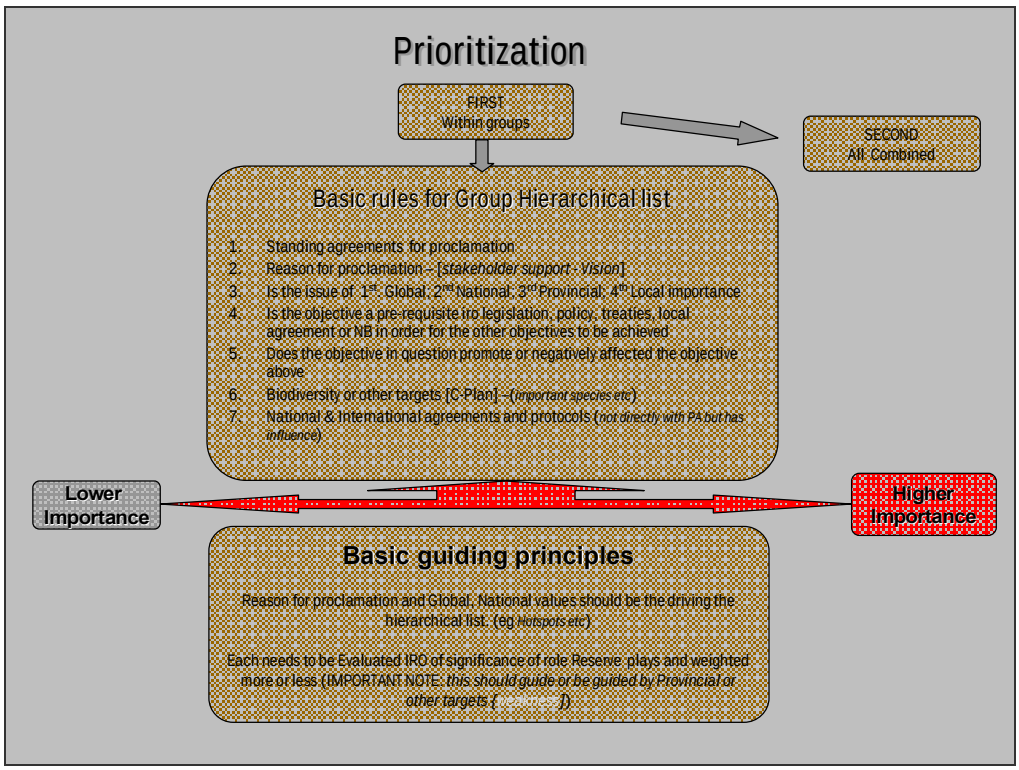


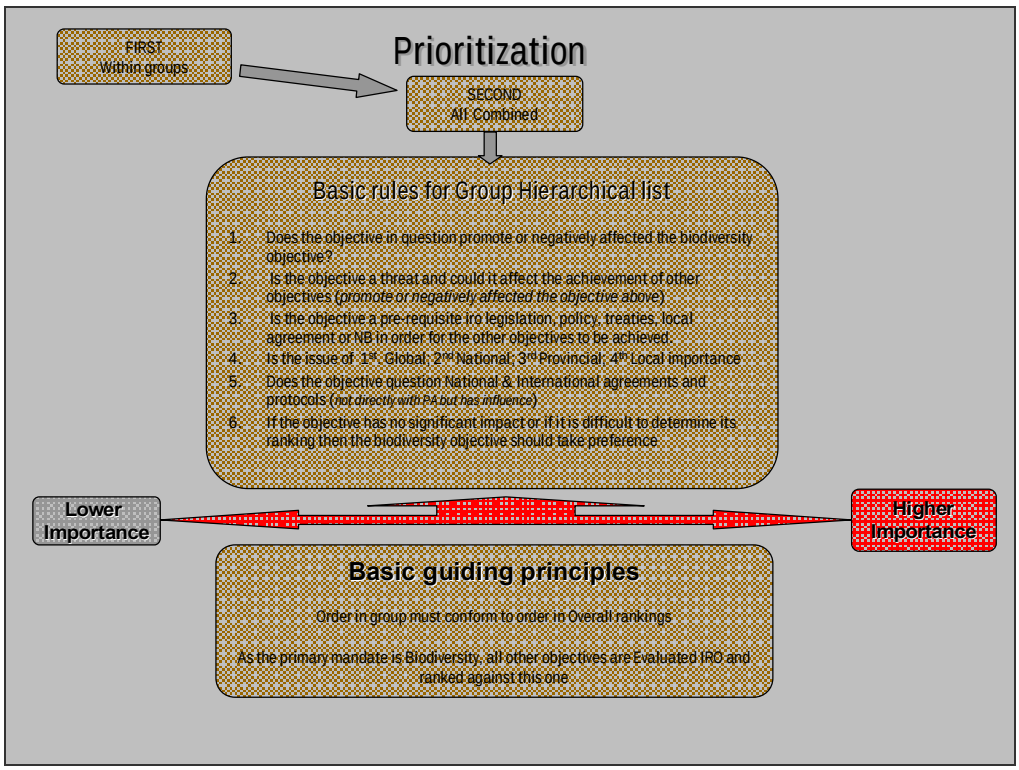
APPENDIX 3

Schematical Representation of the Objectives Prioritisation Process






Prioritization
FIRST
Within groups
SECOND
All Combined
Basic rules for Group Hierarchical list
1. Standing agreements for proclamation
2. Reason for proclamation – [stakeholder support - Vision]
3. Is the issue of 1st Global, 2nd National, 3rd Provincial, 4th Local importance
4. Is the objective a pre-requisite iro legislation, policy, treaties, local agreement or NB in order for the other objectives to be achieved
5. Does the objective in question promote or negatively affected the objective above
6. Biodiversity or other targets [C Plan] – (important species etc)
7. National & International agreements and protocols (not directly with PA but has influence)
Lower Importance
Higher Importance
Basic guiding principles
Reason for proclamation and Global, National values should be the driving the hierarchical list. (eg Hotspots etc)
Each needs to be Evaluated IRO of significance of role Reserve plays and weighted more or less (IMPORTANT NOTE: this should guide or be guided by Provincial or other targets [e.g. C-Plan])


FIRST
Within groups
Prioritization
SECOND
All Combined
Basic rules for Group Hierarchical list
1. Does the objective in question promote or negatively affected the biodiversity objective?
2. Is the objective a threat and could it affect the achievement of other objectives (promote or negatively affected the objective above)
3. Is the objective a pre-requisite iro legislation, policy, treaties, local agreement or NB in order for the other objectives to be achieved
4. Is the issue of 1st Global, 2nd National, 3rd Provincial, 4th Local importance
5. Does the objective question National & International agreements and protocols (not directly with PA but has influence)
6. If the objective has no significant impact or if it is difficult to determine its ranking then the biodiversity objective should take preference
Lower Importance
Higher Importance
Basic guiding principles
Order in group must conform to order in Overall rankings
As the primary mandate is Biodiversity, all other objectives are Evaluated IRO and ranked against this one

Basic rules for overall Hierarchical list

- Order in group must be same as order in Overall rankings
- As the primary mandate is Biodiversity, all other objectives are test and ranked against this one

1. Does the objective in question promote or negatively affected the biodiversity objective?
2. Is the objective a threat and could it affect the achievement of other objectives.
3. Is the objective a pre-requisite iro legislation, policy, treaties, local agreement or NB in order for the other objectives to be achieved.
4. If the objective has no significant impact or if it is difficult to determine its ranking then the biodiversity objective should take preference.

8.5

EKZNW IMP Objectives Prioritisation Process

APPENDIX 4

Topographical and Zonation A3 Maps

Topographic Map of Ndumo Game Reserve

Reserve Extents

Area:	11 898.3 ha
Boundary Length:	53 Km
Highest Point:	170 m.a.s.l
Lowest Point:	18 m.a.s.l
Geographical Extent	
Lat:	26°49'55"S to 26°56'10" S
Long:	26°10'50" E to 32°21'05"E
Midpoint:	32°14'58.935" E 26°52'42.481"S

Reserve Roads: Public

Reserve Roads: Management

Reserve Boundary

- **Gate**
- **Field Office**
- **Staff Housing**
- **Airstrip**
- **Field Ranger Outpost**
- **Observation Tower**
- **Picnic Area**
- **Hide**
- **Hutted Camp**
- **Camp Site**
- **Tented Camp**
- **Rustic Camp**

- Trig Beacons (Number & ground height)
- Magnetic Stations & Ground Signs
- Monuments
- Dipping Tanks
- Windmills
- Walls
- Excavations
- Anti-erosion Walls
- Perennial Water
- Non-perennial Water
- Dry Pans
- Springs, Waterholes & Wells
- Marshes, Swamps & Vleis
- Pipelines
- Prominent Rock Outcrops
- Terraces
- Cultivated Lands
- Orchards & Vineyards
- Trees & Bush
- International Boundaries
- Provincial Boundaries
- Multiple Track Railways
- Single Track Railways
- Electrified Railways
- Narrow Guage Railways
- Service Railways
- Freeways & Arterial Roads
- Main Roads
- Secondary Roads
- Other Roads
- Tracks & Hiking Trails
- Power Lines
- Telephone Lines
- Post Offices, Police Stations Stores, Hotels, Schools & Places of Worship
- Lighthouses & Marine Lights
- Marine Beacons

2632 CC | 2632 CD | 2732 AA | 2732 AB

Topographic Map Sheets (Updated in 2006)

N W E S

EZEMVELO KZN WILDLIFE™

1 0.5 0 1 2 3 4 Kilometers

WGS84 Datum

Compiled by: T. Bigwood, September 2009

Data Sources: Ezemvelo KZN Wildlife, Chief Directorate:Surveys & Mapping

Zonation of Ndumo Game Reserve

- Reserve Roads: Public
- Reserve Roads: Management
- Reserve Boundary
- Open Water Wetlands
- Development Zone Nodes
- Natural Zone: Medium Intensity Utilisation
- Natural Zone: Low Intensity Utilisation
- Resource Use Zone

Development Node Description

1. Fontana field ranger outpost
2. Quarry (disused)
3. N.R.C Water pump/picnic site
4. Red Cliffs picnic site
5. Balamhlanga field ranger outpost
6. Diphini (disused hide)
7. Usuthu River diversion
8. Gazini (disused camp)
9. Banzi camp
10. Main entrance gate and staff accomodation
11. Observation tower
12. Banzi barrage and fish ladder
13. Old bridge crossing (disused)
14. Shabatana field ranger outpost
15. Bird hide/ Nyamithi barrage and causeway
16. Ezulwini hide
17. Pump house (existing)
18. Pholwe field ranger outpost
19. Goldfields Environmental Education Centre
20. Ndumo hutted Camp
21. Main office complex
22. Workshop and stores
23. Staff housing
24. Staff housing (management)
25. Abattoir and skinning shed
26. Reservoir
27. Airstrip
28. Croc farm & staff housing
29. Mganwini field ranger outpost
30. Pump house (future)

Resource Use Zone Description

31. Reed harvesting areas
32. Mbangweni fishing zones

Topographic information was updated in 2006

2632DC | 2632DD
2732AA | 2732AB

N W E S

1 0.5 0 1 2 3 4 Kilometers

EZEMVELO KZN WILDLIFE
Conservation, Partnerships & Ecotourism

WGS84 Datum
Compiled by: T. Bigwood, June 2009
Data source: Ezemvelo KZN Wildlife, Chief Directorate: Surveys &Mapping

Vegetation

- Basalt Sweet Arid Lowveld
- Delagoa Lowveld
- Freshwater Lakes
- Lebombo Summit Sourveld
- Lowveld Riverine Forest
- Makatini Clay Thicket
- Mangrove Forest
- Maputaland Coastal Belt
- Maputaland Wooded Grassland
- Northern Coastal Forest
- Sand Forest
- Scarp Forest
- Southern Lebombo Bushveld
- Subtropical Alluvial Vegetation
- Subtropical Coastal Lagoons
- Subtropical Dune Thicket
- Subtropical Freshwater Wetlands
- Subtropical Salt Pans
- Subtropical Seashore Vegetation
- Swamp Forest
- Tembe Sandy Bushveld
- Western Maputaland Sandy Bushveld
- Western Maputuland Clay Bushveld
- Zululand Lowveld

SWAZILAND
MOÇAMBIQUE
SOUTH AFRICA
Mvimbi
Mambane
Nkonjane
Nkonjane
D12
Nhlatani
Mattie
Hlobe
Wespaga
363m
333m
RIverside (Big Bend)
MR8
Mboyi
614m
Usuthu Gorge CCA
Ekuhlehleni CP
KwaMabona
Nkonjane
171m
Red Cliff
Sociedade Pecuaria Tuchanine
75m
Cyibobolho
Zepundune
Estabulos
Zingoenhene
Mussene
Fisse Tembe
Maguelha
Macandene 91m
Cacho
Gumenoe
Sta Teresa
Santa Teresa
Mudonga 36m
Mecome Tembe
Vieira Dias Lodge
Catuane
Cachucha
Catuane
Closed
Uame
Proposed MSR Buffer
Mataniama 61m
Futi corridor (Proposed Maputo Special Reserve Extension)
Chembeni
43m
Ndumu-Diphini
Ndumo Game Reserve
Ndumo NRC
Matendi
Manzabomvu
Kuphaphakakulu
Mapondo
Umsunduze
350m
ePosheni
Mpolimpolini
Magwangu
644m
Manyiseni
Luduka CP
Mayaluka CP
KwaMankenke
Khume 420m
Khume CP
Khume
Ndabeni
Njakazane
Kuludaka
Ndlazibende 435m
148m
Embadleni
Embandleni CP
Ngwenyameni
Emngceleni
Emngqobetweni CP
Emnceleni CP
Mgedula
Kuluthwili
604m
Nyamiti Pan
Kuthula
Vulture restaurant
Ndumu
Ndumu
St Philips CP
Ndumo SS
Thelamama
Maphindela
Ndumo
Matini Forest
Ng wavuma
Pongolo
eBangweni
124m
Tembe Elephant Park
KwaMzinba
Bhekabantu
125m
Bhekabantu CCA
Beka Bantu
Mziki CP
Makhana
Nameneni
Sihangwana
N

Ndumo Game Reserve

1:120,000
0 1 2 4 6 8 10 Kilometers