MOUNTAIN ZEBRA

NATIONAL PARK

MARCH 2008

PARK MANAGEMENT PLAN

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This management plan is hereby internally accepted and authorized as the legal requirement for managing Mountain Zebra National Park as stated in the Protected Areas Act.

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LIST OF ACRONYMS ANDABBREVIATIONS

DEAT	Department of Environmental Affairs & Tourism
EPWP	Expanded Public Works Programme
SANParks	South African National Parks
Mountain Zebra NP	Mountain Zebra National Park
TPC	Threshold of Potential Concern
V-STEEP	The values (social, technological, economic, ecological and political), used to understand, with stakeholders, the social, economic and ecological context of the system to be managed, and the principles/values that guide management. These are used to develop a broadly acceptable vision of the future.

GLOSSARY OF SELECTED WORDS

Balanced Scorecard – the performance management tool used by SANParks to ensure feedback and effective implementation of various management objectives

Objectives hierarchy – the objectives for a park, with the most important, high level objectives at the top, cascading down to objectives at finer levels of detail, and eventually to operational actions at the lowest level

Desired state- the overall conditions of the park (across the full V-STEEP range) that stakeholders desire

Vision – a word "picture" of the future, or what the stakeholders see as the future for the park

Mission – an articulation of the Vision that describes why the park exists, and its overall philosophy on how to achieve its desired state.

Vital attributes – unique or special characteristics of the park, the determinants of which management should strive to protect, and the threats towards which management should strive to minimise.

EXECUTIVE SUMMARY

The Mountain Zebra National Park (Mountain Zebra NP) is situated in the Eastern Cape, on the Northern slopes of the Bankberg mountain range in the Cape Midlands. It was proclaimed in 1937 for the purpose of protecting a remnant population of the Cape Mountain zebra *Equus zebra zebra*. As such it has played a principle role in conserving this endangered species, but has now grown beyond a "species park" to focus on conserving the biodiversity of the region.

The park is located in a transitional area between four biomes: Grassland, Nama Karoo, Thicket and Savanna. All of the major vegetation types are currently very poorly conserved elsewhere in South Africa. Being a transition area between biomes allows for an interesting mix of flora and fauna, as well as important ecological and landscape processes. Climate change, development of conflicting land uses, and inappropriate management of large herbivores and fire present the biggest threats to Mountain Zebra NP's vital attributes.

The Vision and Mission of Mountain Zebra NP recognise the importance of conserving the characteristic elements that make up the interface between the biomes of the region, including both the patterns and processes associated with this landscape. The vision and mission also reflect Mountain Zebra NP's commitment to conserve these elements for the appreciation of all its stakeholders. Mountain Zebra NP's desired state is a fully functioning ecosystem that maintains ecological patterns and processes.

Programmes to achieve Mountain Zebra NP's desired state fall within four categories, i.e. Biodiversity and Heritage Conservation, Sustainable tourism and Socio Economic Benefits and Stakeholder Relationships and Effective Best Practice Park Management:

Biodiversity and Heritage Conservation

Over the short term (up to 2010) the expansion programme of the park focuses on securing an attractive main entrance route to the park and on consolidation of boundaries for to provide a manageable unit.

Given that the park has a past history of use for livestock production, habitat restoration and rehabilitation are important, the three main areas of concern being vegetation transformation, alien plant infestation and soil erosion. Removal of alien vegetation is funded by the Working for Water Programme and is being conducted in compliance with the requirements of the National Environmental Management: Biodiversity Act. There is also a focus on certain species of special concern such as Cape mountain zebra, black rhino and the recently reintroduced cheetah. In relatively small parks such as Mountain Zebra NP, biodiversity is likely to be lost unless large herbivore populations are managed. Evidence shows that mismanagement of fire is also a risk. On the basis of current evidence, it appears desirable for management to promote as far as possible the natural occurrence of fire. To achieve this it is desirable to allow lightning fires to burn to their natural extent rather than to put them out as quickly as possible. Monitoring of risks to biodiversity is seriously constrained by limited funds and human resources, and hence initiatives are needed to acquire the necessary resources. Performance in biodiversity management is assessed annually by means of systematic survey, the State of Biodiversity Management Report.

The purpose of Mountain Zebra NP's cultural heritage programme is to manage and sustain the significance, authenticity and integrity of the tangible and intangible cultural heritage resources for which the SANParks is responsible, for the enjoyment and benefit of all South Africans and of the world.

Sustainable tourism

Mountain Zebra NP has a park zoning plan that divides the park into areas of different use, to guide and co-ordinate conservation, tourism and visitor experience initiatives. The tourism programme, in alignment with South African tourism goals as well as SANParks corporate values and operating principles, aims to provide a true Karoo ecotourism experience by developing the infrastructure, and offering a variety of activities and quality service. Objectives to address this aim include providing adequate training for personnel, upgrading and developing the tourist infrastructure in order to increase revenue significantly, expanding tourist activities in order to enhance the ecotourism experience, and marketing the park effectively in order to increase the number of visitors. It will therefore be crucial to develop the marketing and commercial development programmes for Mountain Zebra NP during the next 5-year cycle.

Mountain Zebra NP's infrastructure development programme includes the maintenance of existing infrastructure and details plans for developing new infrastructure. Such developments include upgrading of existing internal roads, tarring of the remainder of the entrance road, construction of a new entrance gate, replacement of the existing Eskom powerline to the restcamp, construction of 30-km of new tourist roads and a tented camp at Doornhoek, as well as construction of two new junior staff houses. The infrastructure development programme also details rehabilitation and decommissioning requirements such as the removal of redundant structures in particular areas of the park.

Local Socio-Economic Development

Existing Expanded Public Works projects under Mountain Zebra NP's Stakeholder Relationship Programme include Working for Water, Working for Wetlands and Poverty Relief Programme. The purpose of Mountain Zebra NP's local socio-economic development programme is to play a significant, targeted and effective role in contributing to local economic development, economic empowerment and social development in communities and neighbouring areas adjacent to Mountain Zebra NP. The Expanded Public Works Programme will remain a significant focus area to effectively contribute to the creation of temporary jobs in the short term, and to sustainability by investigating exit opportunities and entrepreneurial opportunities for local communities. These programmes are aimed at local poverty alleviation and therefore total funding is meant for labour costs and the contracting of local entrepreneurs or SMME's. Preference is given to contractors from historically disadvantaged communities.

Stakeholder Relationships

A Park Forum has been established to provide for stakeholder consultation on an on-going basis. The local municipalities are represented on the Park Forum, and areas of mutual interest and concern have been identified between the municipal Integrated Development Plans on the one hand and the Park Management Plan on the other. The process of alignment of plans between the park and the municipalities will continue as part of the ongoing activities of the Park Forum. The current Park Forum does not currently include the full range of stakeholders and steps have been taken to invite further participants. Mountain Zebra NP cooperates with relevant provincial conservation agencies (Eastern, Northern and Western Cape) to achieve mutually agreed objectives for the conservation of Cape mountain zebra.

Effective Best Practice Park Management

The operating budget for the park is presented with an indication of expected income. Budget shortfalls include funding for infrastructure development and park expansion, and that significant sources of current funding, for example Working for Water, Working for Wetlands and other Expanded Public Works Programmes, are not guaranteed for the future. Corporate support for Mountain Zebra NP includes an increase in staff capacity (e.g. a dedicated research technician) to carry out the monitoring that is essential for the successful implementation of the biophysical programmes to achieve the desired state, and particularly to ensure the learning required by SANParks' new adaptive management approach.

The essential feature of the adaptive management system employed by SANParks for its biodiversity custodianship is the iterative way in which it will enable continual improvement in the management of each park through annual and five-year review cycles. The SANParks review process employs the Balanced Scorecard system to manage the performance of its management actions. The Balanced Scorecard integrates SANParks' and park-specific objectives across all levels of its staff through explicit linkages with individual performance areas.

OVERVIEW OF THE SANPARKS MANAGEMENT PLANNING PROCESS

Process Overview

South African National Parks (SANParks) has adopted an overarching park management strategy that focuses on developing, together with stakeholders, and then managing towards a 'desired state' for a National Park. The setting of a park desired state is done through the adaptive planning process (Rogers 2003). The term 'desired state' is now entrenched in the literature, but it is important to note that this rather refers to a 'desired set of varying conditions' rather than a static state. This is reinforced in the SANParks biodiversity values (SANParks 2006) which accept that change in a system is ongoing and desirable. Importantly, a desired state for a park is also not based on a static vision, but rather seeks refinement though ongoing learning and continuous reflection and appropriate adaptation through explicit adoption of the Strategic Adaptive Management approach.

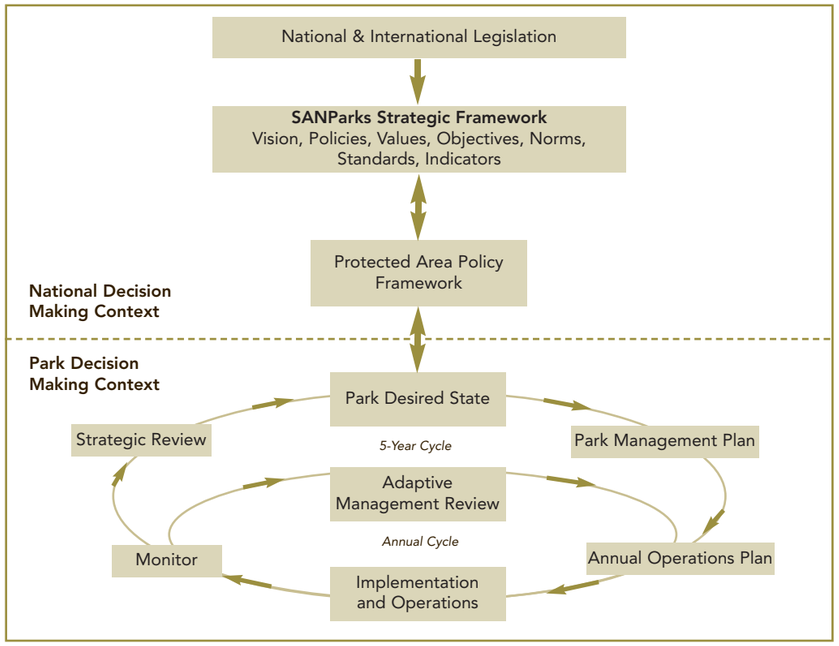

Figure 1: Protected Areas planning framework

The 'desired state' of a park is the parks' longer-term vision (30-50 years) translated into sensible and appropriate objectives though broad statements of desired outcomes. These objectives are derived from a park's key attributes, opportunities and threats and are informed by the context (international, national and local) which jointly determine and inform management strategies, programmes and projects. Objectives for national parks were further developed by aligning with SANParks corporate strategic objectives, but defining them in a local context in conjunction with key stakeholders. These objectives are clustered or grouped into an objectives hierarchy that provides the framework for the Park Management Plan. Within this document only the higher level objectives are presented. However, more detailed objectives, down to the level of operational goals, have been (or where necessary are currently being) further developed in conjunction with key stakeholders and specialists.

This approach to the management of a National Park is in line with the requirements of the National Environment Management: Protected Areas Act No. 57 of 2003 (NEM: PAA). Overall the Park Management Plan forms part of a National Planning framework for protected areas as outlined in Figure 1.

Park Management Plans were not formulated in isolation of National legislation and policies. Management plans comply with related national legislation such as the National Environmental Management : Biodiversity Act (NEM: BA), national SANParks policy and international conventions that have been signed and ratified by the South African Government.

Coordinated Policy Framework Governing Park Management Plans

The SANParks Coordinated Policy Framework provides the overall framework to which all Park Management Plans align. This policy sets out the ecological, economic, technological, social and political environments of national parks at the highest level. In accordance with the NEM: Protected Areas Act, the Coordinated Policy Framework is open to regular review by the public to ensure that it continues to reflect the organisation's mandate, current societal values and new scientific knowledge with respect to protected area management. This document is available on the SANParks website (www.sanparks.org).

Key functions of Park Management Plans

Key functions of park management plans are:

- A means of ensuring the Park is managed according to the reason it was declared
- A tool to guide management of a protected area at all levels, from the basic operational level to the Minister of Environmental Affairs and Tourism;
- A tool which enables the evaluation of progress against set objectives;
- A document which can be used to set up key performance indicators for Park staff, set the intent of the Park, and provide explicit evidence for the financial support required for the Park.

The Management Plan for Mountain Zebra NP comprises five sections:

1. Background information.
2. An outline of the desired state of the Park.
3. A summary of the management strategies, programmes and projects that are required to move towards achieving the desired state.
4. An outline of the Strategic Adaptive Management methodology and strategies that will ensure that the Park undertakes an adaptive approach to management and.
5. Presentation of the park budget, with projected income.

INTRODUCTION

1. BACKGROUND INFORMATION

1.1 Purpose

1.1.1 Declaration of the Mountain Zebra National Park

The Mountain Zebra NP was proclaimed in 1937 for the purpose of protecting a remnant population of the Cape Mountain zebra *Equus zebra zebra*. The species was almost driven to extinction; there were as few as 100 animals in existence in 1940 (Novellie, Lloyd & Joubert 1992). By 1981 the mountain zebra population in the Mountain Zebra NP had grown to 200, after which the population has been maintained at this level through removals until recent expansion allowed the population to increase to 280 animals. The relocated animals have been used to start other successful populations in protected areas such as in the Karoo National Park, Karoo Nature Reserve (now Camdeboo National Park), De Hoop Nature Reserve and also on a number of private ranches. By 1998 the world population had grown to 1200.

The Mountain Zebra NP has played a principle role in conserving the Cape Mountain Zebra. However, it has now grown beyond a "species park" and the focus of the current plan is on conserving the biodiversity of the region and on other generic objectives of protected areas as identified in Sections 17 and 20 of the National Environmental Management: Protected Areas Act of 2003.

1.1.2 Context

1.1.2.1 Location and Boundaries

Mountain Zebra NP is situated in the Eastern Cape, on the Northern slopes of the Bankberg mountain range in the Cape Midlands (Appendix 2). It is situated on the R61 road, 12km from Cradock on the road to Graaff-Reinet, and is 262km from Port Elizabeth. It is also 800km from both Johannesburg and Cape Town. Until the late 1990's, the Mountain Zebra NP remained at 6 536 ha in area. However, to make it both ecologically and financially more viable, the park has been expanded to 28 412 ha. A long term plan for the further expansion of the park seeks to unify the current Mountain Zebra and Camdeboo National Parks into a national park of 330 000 ha, an ideal that could be achieved through a combination of land acquisition and contractual land inclusions.

1.1.2.2 Cultural Heritage

Thirty archaeological sites were located in the Mountain Zebra NP during a survey by Brooker (1977), including three small rock shelters and 27 open sites. Analysis of the artefacts from these sites suggests that there was only ephemeral occupation of the area before the Holocene, and that during the Holocene there was a relatively larger population resided there. Rock paintings - depicting antelope, a large cat (possibly a leopard or a cheetah), baboons and human figures - are present at one of the shelters. Since the survey of Brooker the Mountain Zebra NP has expanded its borders considerably. A number of early farmer graves have recently been identified including some historical farmsteads. One of the farmsteads (Doornhoek) was declared a national monument under the old National Monuments Act of South Africa and is currently used as a tourist guesthouse.

1.1.2.3 Physical environment and land use

i) Climate

The climate of the Mountain Zebra NP is best described as cool and arid. Mean monthly minimum and maximum temperatures vary from 6-28°C in summer (September to March) and from 0-20°C in winter (April to August) (Brown & Bezuidenhout, 2000). Rainfall averages about 400 mm, with most (70%) falling in the summer months. Average annual rainfall for the period 1963 - 1996 was 382.6 mm with a distinct summer season peak between October to March (74 %). February had the highest rainfall with 56.7 mm while June had the lowest with 11.5 mm. Periodic light snow occurs during the winter months. Frost is common between May and October.

ii) Geology and Soils

The geology of the region is dominated by sedimentary rock types such as sandstones, siltstones and mudstones of the Beaufort Series of the Karoo System with post-Karoo doleritic intrusions being prevalent in some areas. The Beaufort Series contains a range of yellow-grey to dark-grey and greenish fine to medium grained sandstones which interchange with thick black to black-green and purple bands of mudstone and unstable shales (Van der Walt, 1980). The areas to the south and west of the existing Mountain Zebra NP are covered by extensive dolerite sheets and a number of dykes. Soils are generally shallow except along sloping pediments and large parts of the park are rocky with little or no soil. A soil map of the Mountain Zebra NP is in preparation (Bezuidenhout unpublished).

iii) Topography and Hydrology

The mountainous terrain of the Mountain Zebra NP is part of the south quarter of the Karoo Mountain Veld Complex which forms part of the Great Escarpment separating the Great Karoo and Upper Karoo (van der Walt, 1980). The southern boundary of the park follows the summit of the Bankberg, the highest point of which is 1957 m above sea level. To the north the Mountain Zebra NP extends across open flats to include the distinctive inselberg known as Salpeterkop. At 1000 to 1200 m the flats to the north-east form the lowest part of the park. The Wilgerboom River, running in a north-north-easterly direction through the park, only flows strongly after good rain but generally contains pools throughout the year.

1.1.2.4 Biological environment

i) Vegetation

In terms of the classification of South African vegetation by Mucina *et al.* (2005) the Mountain Zebra NP has three vegetation types, the Eastern Upper Karoo, Karoo Escarpment Grassland and Eastern Cape Escarpment Thicket making up 37%, 53% and 10%, respectively of the park (Appendix 2). The park thus incorporates elements of three biomes, the Nama-Karoo, Grassland and Thicket. The Karoo Escarpment Grassland is dominated by the grass species *Merxmuellera disticha,* with shrubs such as *Euryops annuus,* and *Elytropappus rhinocerotis.* The Eastern Upper Karoo is a mix of grass and shrub dominated vegetation types that are subject to dynamic changes in species composition depending upon rainfall. Shrubs such as *Pentzia incana, Eriocephalus ericoides* dominate, while grasses such as *Aristida* spp. *Eragrostis* spp. and *Themeda triandra* are common. Fires are fairly common in the Karoo Escarpment Grassland and may also occur occasionally in the Eastern Upper Karoo. The vegetation types in the Mountain Zebra NP are poorly or hardly protected elsewhere in South Africa (Driver et al. 2005).

The combination of different vegetation types is important from the point of view of preserving biodiversity, as well as from an aesthetic viewpoint. The area is one of transition between biomes allowing for an interesting mix of flora and fauna, as well as preserving important ecological and landscape processes. The warm north-facing slopes (which characterise the park) with a wide diversity of habitats ranging from mountaintops to valley bottoms will provide suitable habitat ideal to cater for the seasonal requirements of the large herbivores (Novellie *et al.* 1988). In addition the north aspect provides for productive land capable of supporting relatively high densities of game, with greater proportions of the more productive Karoo veld types allowing the carrying of large herbivores. Herbivore densities within the rocky grassland areas are likely to be low. Importantly, all of the major vegetation types in the park are currently very poorly conserved elsewhere in South Africa: South Eastern Mountain Grassland (0.3% conserved), Eastern Mixed Nama Karoo (1.08%), Valley Thicket (2.2%) and Central Lower Karoo (0.05%). Hence, the reserve will play a critical role in the long-term preservation of biodiversity.

The interface between biomes promotes a rich flora, as well as preserving important ecological and landscape processes. An analysis of the flora (Pond *et al.* 2002)

revealed 680 plant species in the park, thirteen of which are Red Data species. At 5.05 plant species per 100 ha the density of plant species in the Mountain Zebra NP is very high compared to other protected areas in the arid and semi-arid areas of South Africa, a feature which can be ascribed to the wide habitat and substrate diversity of the Mountain Zebra NP (Pond *et al.* 2002).

ii) Fauna

As noted, Mountain Zebra NP has played an important role in the conservation of the Cape mountain zebra, and today constitutes one of the major sources of genetically uncontaminated zebra from which to stock other conservation areas. Besides mountain zebra, the habitats within the park support a variety of other large mammalian species. Some of these species were present when the park was proclaimed, others were reintroduced in accordance with the objective of restoring the diversity of large herbivores that occurred in historical times (Novellie & Knight, 1994). Species that were reintroduced recently are Cape buffalo and black rhinoceros, as well as a number of plains zebras that have been selected for morphological traits that resemble the quagga (as part of a programme to 'recreate' this extinct subspecies of the plains zebra). The Mountain Zebra NP currently supports 16 species of large mammals.

The Mountain Zebra NP also supports diverse small mammal and reptile communities (Grobler & Bronkhorst,1981a,b; De Graaff & Nel, 1970; De Graaff, 1974). Although a distinct Karoo fauna is not recognised by zoogeographers (Werger, 1978) there are endemic species in a number of vertebrate taxa, particularly reptiles, which are confined to the region. There are some 216 species of birds in the Mountain Zebra NP with a good representation of raptors. Black eagles nest within the park and Cape vultures have been recorded more frequently in the past few years (Grobler & Bronkhorst, 1981b, Penzhorn & Bronkhorst 1976).

As a result of the ephemeral nature of the rivers there are no indigenous fish species. However, there is a rich, largely undescribed, invertebrate fauna to be found in the region and some species may have a significant impact on the vegetation, notably the Karoo caterpillar *Loxostega frustralis*, the brown locust *Locustana pardalina* and the harvester termite *Hodotermes mossambicus*.

1.1.2.5 Tourism

The tourism vision for Mountain Zebra NP is to provide a true Karoo ecotourism experience by developing infrastructure, and offering a variety of activities and quality service. This includes providing adequate training for personnel, upgrading and developing tourist infrastructure, to expand the available tourist activities, to expand the park, and to market Mountain Zebra NP more effectively. Tourism developments planned for Mountain Zebra NP over the next five years include the establishment of a tented bush camp and 4x4 trail, additional accommodation units, a new main gate and information office, upgrading of the roads, and the establishment of an interpretation facility or trail.

Mountain Zebra NP's tourist accommodation facilities currently comprise a main camp and a guest house. The main camp is attractively situated with a view of the Bankberg Mountains and its dolerite outcrops, offering 19 chalets a camping facility, a restaurant, swimming pool, curio shop, a conference room and picnic sites. The guest house, a restored Victorian homestead dating back to the 1800s, can accommodate six persons and is situated further into the park, overlooking the Doornhoek dam in the Wilgerboom River. None of the accommodation facilities is fenced, which does enhances the wilderness experience. Within Mountain Zebra NP, places of interset include the Grootkloof geological rock fall, bushman cave paintings, the Doornhoek guesthouse which is a national monument, an Anglo Boer War site, and settler graveyards dating back to the 1800s. There are a number of sites of interest in the immediate surroundings of Mountain Zebra NP which further enhance Mountain Zebra NP as a tourist destination – the popular natural hot water spring (Cradock spa), gravesites of the political activists Goniwe, Calata, and Mkhonto who were brutally killed in the mid-eighties during the period of the State of Emergency, and the house and grave of popular author Olive Schreiner's are on the farm Buffelsfontein outside Cradock. Several Bed and Breakfast establishments are also present in Cradock. Excluding the camping facility, Mountain Zebra NP's average occupancy rate over the past 3 years was 64.6%. Camping occupancy in Mountain Zebra NP has generally been very low, with an average of 8.7% over the past three years. The Mountain Zebra NP has a conference venue that can accommodate 30 people.

FORMULATION OF PARK DESIRED STATE

1.2 FORMULATION OF PARK DESIRED STATE

The development of the Vision, Mission and Desired State for Mountain Zebra NP was guided by stakeholder inputs during consultative workshops which were held during 2006 as part of the process of developing this park management plan.

The desired state for Mountain Zebra NP comprises a Vision and Mission reflecting the high-level essence of what Mountain Zebra NP is aspiring towards, and a hierarchy of objectives translating these broad values into strategic, auditable management outcomes. This section of the plan details the setting of Mountain Zebra NP's desired state, focusing on the determinants and threats to its vital attributes, and translating the maintenance of these determinants and overcoming of these threats from broad objectives into specific management actions.

Thereafter, specific programmes to achieve the desired state for Mountain Zebra NP are detailed. These programmes are the core components of protected area management, categorized by SANParks under four broad headings: biodiversity conservation, sustainable tourism, building co-operation and effective park management. Finally, the plan outlines how the various Mountain Zebra NP park objectives will be prioritized, integrated and operationalised, and which feedback mechanisms will be used to ensure compliance, auditability and maximum learning, as part of the adaptive management cycle.

1.2.1 Vision and Mission for Mountain Zebra NP

The Vision of Mountain Zebra NP is:

A park with biodiversity and cultural assets characteristic of the north-eastern Karoo-Grassland-Thicket interface, that are enjoyed by all users.

In order to achieve this Vision, Mountain Zebra NP's Mission is:

"To conserve the plants, animals, ecological processes, landscapes and cultural assets unique to the north-eastern Karoo-Grassland-Thicket interface for the appreciation of all users"

The Vision and Mission for Mountain Zebra NP ensure that while the park's management objectives and strategies (detailed below) conform to SANParks broad-level objectives, the specific high level objectives of the Mountain Zebra NP can ultimately be traced back to its stakeholders' values.

1.2.2 Values and Operating Principles

Mountain Zebra NP takes its biodiversity values from the SANParks biodiversity values:

- We adopt a **complex systems view** of the world while striving to ensure the **natural functioning** and **long term persistence** of the **ecosystems** under our care.
- We aim at persistent achievement of **biodiversity representivity** and **complementarity** to promote **resilience** and ensure **ecosystem integrity**.
- We can **intervene in ecosystems responsibly and sustainably**, but we focus management on **complementing natural processes** under a **"minimum interference"** philosophy.
- We accept with humility the **mandate of custodianship** of biodiversity **for future generations** while recognising that both natural and social systems change over time.

Although SANParks biodiversity values have been set, they need to be supplemented in Mountain Zebra NP by operating principles that meet the specific needs of Mountain Zebra NP's maintenance phase and focus on upliftment of the surrounding communities. The operating principles below reflect the values of individuals in the Mountain Zebra NP stakeholder group, including SANParks and Mountain Zebra NP management:

- Minimum human impact;
- Minimise external factors from influencing system;
- Building co-operation with other conservation agencies, particularly with regards to endangered species;
- Strive for high work ethic;
- Compliant with all applicable legislation;
- Striving towards financial sustainability;
- Establish an ecologically sustainable and visitor friendly park that all want to visit;
- Maintain current good relationships between park and local communities and government.

1.2.3 Vital attributes underpinning the value proposition of Mountain Zebra NP

Listing the vital attributes of a park is an important step in the objective-setting process as it identifies the fundamental purpose(s) of conservation management for a particular park. For each attribute, the factors which determine it are identified, together with the factors which threaten or constrain it. The management objectives of the park are then set with the intention of maintaining the determinants of, and on overcoming the constraints and threats to, these vital attributes. In this way the management plan is customized to reflect local values and attributes, without compromising the generic objectives that have been established for all parks in terms of the SANParks Policy Framework and the National Environmental Management: Protected Areas Act. The following vital attributes have been identified by stakeholders as making Mountain Zebra NP unique, or at least very special in its class:

- Mountain Zebra NP's biodiversity assets, primarily the ecological gradients, geology, soil and climate that produce the particular drainage lines, catchments and vegetation structure typical of the north-eastern Karoo-Grassland-Thicket interface, as well as the faunal and floral assemblages typical of the region, e.g. Cape mountain zebra.
- The open landscapes of the region produced by the geology and vegetation, with uninterrupted views and wilderness qualities.
- The under-conserved vegetation types protected in Mountain Zebra NP.
- The catchment of the Wilgerboom river (entirely within Mountain Zebra NP).
- Good tourism infrastructure and technology.
- Night skies.
- Good relationship with neighbours.
- Accessibility (close to Cradock on established roads).
- Accommodation, conference facility,

tranquillity/quietness, hospitality of staff.
- Venue for school outings – good interactions between schools and the park.
- Bushman paintings.
- Existing environmental awareness initiatives.

The biophysical vital attributes are largely determined by the steep gradients associated with the surrounding mountains, the geology and soil, climate and rainfall typical of the region. Climate change and development of conflicting land uses or infrastructure present the biggest threats to these vital attributes. Lack of interest from surrounding communities, lack of publicity and transport to the park, and lack of benefits to the landless through park expansion are socio-economic threats to Mountain Zebra NP's desired state identified by its stakeholders.

1.3 Setting the details of the desired state for Mountain Zebra NP

The desired state for the Mountain Zebra NP's is a fully functioning ecosystem that maintains the patterns and processes characteristic of the Karoo-Grassland-Thicket interface. While the focus is on maintaining the integrity of the biophysical component of Mountain Zebra NP, this is for the appreciation of all stakeholders.

1.3.1 An objectives hierarchy for Mountain Zebra NP

The desired state is achieved by means of a hierarchy of objectives, starting with broad, high level objectives, and proceeding to finer and finer levels of detail, ending with specific operational or management strategies. Figure 2 represents the highest level objectives, which form the basis for prioritisation of management issues. These objectives derive from the park's Mission and Vision. Three of the high level objectives focus on conserving the full range of biodiversity and cultural assets, and presenting these for the appreciation of all users through tourism opportunities and the provision of other benefits, particularly to local communities. The fourth objective is an enabling one that makes the attainment of the other objectives possible through best practise management of Mountain Zebra NP's human resources. The breakdown these high level objectives into more detailed sub-objectives and implementation programmes is described in the next section.

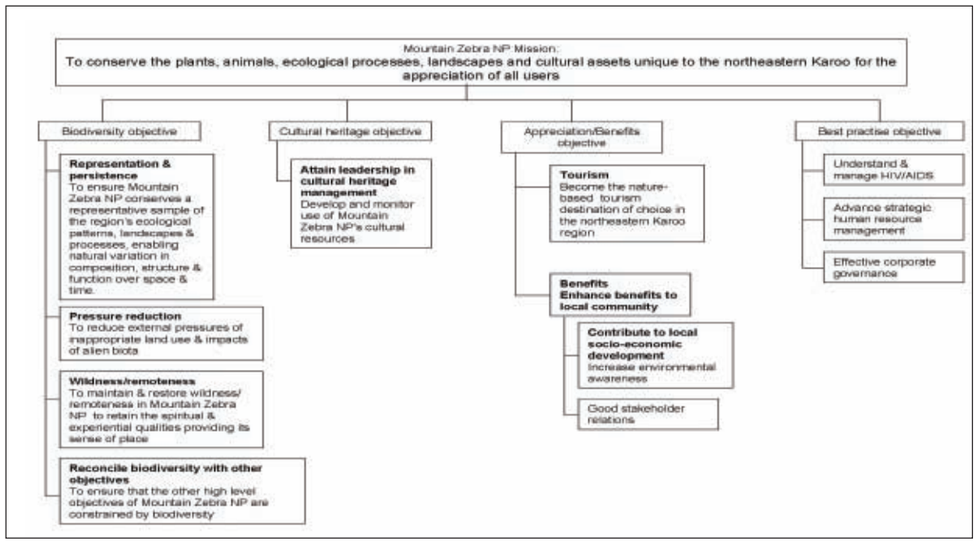

Figure 2 – High level objectives in an objectives hierarchy for Mountain Zebra NP.

PROGRAMMES TO ACHIEVE THE DESIRED STATE

2. PROGRAMMES TO ACHIEVE THE DESIRED STATE

This section deals with objectives lower in the hierarchy, following from the high level objectives of Figure 2, as well as the specific programmes that address these objectives. It is the programmes that lead to management actions on the ground. Together they represent the master plan by which the park attempts to achieve the desired state.

The various programmes are detailed under the headings: Biodiversity and Heritage Conservation, Sustainable Tourism, Building Co-operation and Effective Park Management.

2.1 Biodiversity and Heritage Conservation

The high level objective of **Representation and Persistence** (see Figure 2) has three lower level objectives as shown in below:

Representation: To incorporate the spectrum of biodiversity patterns (including landscapes) into the Mountain Zebra NP, as well as the ecological processes that support its long term persistence.

- **Persistence:** To manage the park to ensure the long term persistence of biodiversity, enabling natural variation in structure, function and composition over space and time.
- **Rehabilitation:** To re-establish structure and function of degraded land in the Mountain Zebra NP, including the restoration of key processes that support the long term persistence

These three are divided into various sub-objectives, each with actions or programmes for implementation.

Representation

The objective **Representation** comprises two sub-objectives:

- **Expansion and consolidation**: To incorporate the spectrum of biodiversity patterns (including landscapes) representative of the Nama Karoo plains, the Karoo arid mountain grasslands and thicket into Mountain Zebra NP, as well as the processes that support its long term persistence.
- **Reintroduction:** To investigate possibilities for the reintroduction of locally extinct species and to implement these in accordance with IUCN principles and guidelines.

The programmes designed to implement these two objectives – the Parks Expansion Programme and the Reintroduction Programme - are outlined below.

2.1.1 Park Expansion Programme

As noted above the Mountain Zebra Parks has expanded in recent years from 6 536ha to 28 412ha. This is significantly increased the conservation value of the park and has provided enough space to commence with the establishment of a natural large predator-prey system with the recent reintroduction of cheetah. The long term ideal of the expansion programme is to link Mountain Zebra NP with Camdeboo National Park, through a process of land acquisition and contractual arrangements with private landowners. The existence of extensive areas of private land in this region that is being used for wildlife conservation offers the potential to consolidate the area with relatively limited land purchases. This could potentially create a park of some 330 000 ha under different forms of conservation management, which would protect a highly diverse assemblage of plants and animals (the potential extent of this mega-park is shown in Appendix 2).

A preliminary assessment of the envisaged link between the two parks by SANParks (Castley and Knight 2000; Holness et al. 2003) showed that it has significant conservation and tourism value. The mega-park would include seven major vegetation types, including the three included in this mega-park would increase from three currently represented in the Mountain Zebra NP to seven, including the Tarkastad Montane Grasslands which is not currently present in either the Mountain Zebra or Camdeboo National Parks. The mega-park would play an important conservation role in increasing the Grassland protection, currently a national priority, and provide one of the best examples of the large herbivore-carnivore assemblages characteristic of this biome.

This broad vision was communicated to stakeholders during the process of consultation on the development of the park management plan. A number of stakeholders were against the proposal and urged that a socio-economic impact analysis be conducted of the Camdeboo-Mountain Zebra link before it is implemented.

There are currently no funds committed to the Camdeboo-Mountain Zebra link, and hence its implementation is subject to SANParks obtaining grants or donations. It is therefore not possible to set milestones for the achievement of this vision, nor is there immediate justification for conducting a socio-economic analysis as recommended by stakeholders. In the event of sufficient funds becoming available in the future to implement the link between the two parks, this would take place in consultation with stakeholders in accordance with the requirements of the National Environmental Management: Protected Areas Act.

Over the shorter term - up to 2010 - the expansion aims for the Mountain Zebra NP are limited to:

The re-alignment of the boundary to form a more manageable ecological unit, and consolidation of certain river catchment areas immediately to the west of the park.
An agreement with Transnet and Marlow Agricultural School for the acquisition of land between the park entrance gate and the Cradock-Graaff-Reinet road.

Regarding point 1 above, there are no committed funds for this land acquisition, so achievement of this short term aim will be on an opportunistic basis, depending on the availability of SANParks self-generated income and the availability of targeted neighbouring properties for sale. Regarding point 2, this acquisition not only increases the size of the park, but is important to secure the important main access route. Given a favourable outcome of negotiations with the land holders, donor funding is available to cover the costs.

2.1.2 Reintroduction Programme

Over the years the large mammal fauna of the Mountain Zebra NP has been restored and there are few species that remain to be introduced. The majority of any future reintroductions will be restricted to larger carnivores as the herbivore guild has effectively restored historical species occurrence. The most recent introductions include the gemsbok which have been successfully introduced to the northern sections of the expanded park (it should be noted that previous introductions to the original park failed – Novellie & Knight 1994) and the introduction of plains zebra (*Equus burchelli*) exhibiting quagga-like morphological features.

The herbivore populations in the park continue to show positive growth as demonstrated by the regular (often

annually) offtake of substantial numbers of larger herbivores. It is likely that the park prey populations would be able to sustain the introduction of a small number of larger carnivores. To this end the decision has been taken to reintroduce cheetah. Although Mountain Zebra NP is currently 28 412 ha in size, the cheetah have been introduced into a 21 000 ha portion of the park. It is estimated that this area will be able to support a population of 10 -15 cheetah. Surplus cheetah will be handled in line with meta-population management principles, and surplus animals may later be introduced to Addo Elephant National Park and Karoo National Park. The success of this introduction is being monitored, to assess the response by both predator and prey, to inform the future introduction of species such as lion and wild dog.

Contingency plans in the event of an escaped cheetah will follow the principles outlined in the guidelines for damage causing animals given below.

Besides cheetah, the reintroduction of brown hyena is under consideration. According to anecdotal evidence leopards are present but rare in the mountains between Cradock and Graaff-Reinet. They may possibly pass through the park sporadically, but are not present on a permanent basis. In time they may establish themselves in the expanded park.

Persistence

The following sub-objectives fall under the objective of managing for long term persistence of biodiversity:

- **Herbivory:** Develop and implement an herbivore management plan to understand and manage the role of herbivory as a modifier of biodiversity at different spatial and temporal scales.

- **Predation:** To establish and maintain large mammal predator-prey relationships and related processes.

- **Species of Special Concern, including Rare and Threatened Biota:** To understand and maintain viable populations of rare and threatened species, according to a realistic framework of threats.
- **Fire:** Where necessary, restore the role of fire as a natural process.

The implementation programmes to attain these objectives are described below.

2.1.3 Herbivory Programme (including Water Provision and Disease Monitoring)

In a relatively small park like Mountain Zebra, inappropriate management of large herbivore impacts can potentially cause loss of biodiversity. Past programmes for monitoring of the vegetation and herbivore populations are described in Novellie (1989), Novellie and Strydom 1987; Novellie 1990a and Novellie (1994). These monitoring programmes focused on patches that were known to be favoured by the different species of large herbivores in the Mountain Zebra NP, including grazing lawns maintained by springbok, blesbok and black wildebeest, as well as longer grass habitat favoured by zebras and red hartebeest. The monitoring programmes tracked both the way in which these key habitat patches were used by herbivores and the way in which the vegetation in the patches changed in response to the combined influence of between-year rainfall changes and herbivory. The ultimate objective was to understand the long term dynamics of patch use by the large herbivores, and the way this should be managed to maintain the diversity of the system.

The Mountain Zebra NP has expanded considerably in size since these monitoring programmes were designed and therefore they need to be revised and updated. Owing to a shortage of field staff, herbivory monitoring is currently limited to an annual wildlife census. Continuation and expansion of the herbivory monitoring programme depends on the success of SANParks' initiatives to raise the necessary resources.

There are no permanent natural water sources in the Mountain Zebra NP so water is provided for wildlife at a number of sites. The impact that this artificial provision of water has on the distribution of wildlife needs to be considered. A number of impoundments along the primary river drainage line exist in Mountain Zebra NP while there are also a number of depressions that hold water periodically after rains. These water sources should be mapped and the nature of their permanence determined to provide an indication for management as to the need to supply further sources, particularly for species such as buffalo and black rhino. In accordance with corporate policy, provision of water will be kept to a minimum and explicitly related to vegetation impacts and minimum viable population sizes of species of special concern such as mountain zebra and black rhino.

If it is suspected that any animal in Mountain Zebra NP had contracted any disease, the SANParks's Wildlife Veterinary Officer and provincial authority (state veterinarian) will be informed as soon as possible. If the animal has sustained a life-threatening injury the Wildlife Veterinary Officer will advise on the treatment or euthanasia of such animal. The Guidelines of the Animal care Committee will apply in case of euthanasia. A key management objective for the buffalo centres on the threat posed by disease. The park objective is likely to require that the population remains disease free and any signs of diseases should be dealt with rapidly. Random blood tests of the population would also provide a mechanism to detect disease early, allowing for planned interventions to limit the potential impacts, should these occur.

2.1.4 Predation Programme

As noted under the Reintroduction programme, the newly reintroduced cheetah population, as well as its impact on the prey species, are being monitored.

2.1.5 Species of Special Concern Programme

SANParks' biodiversity values stipulate that, except in crucial instances for the survival of globally critically endangered species, management for system integrity and biodiversity must take precedence over species management. However, SANParks will strive to prevent extinction, within National Parks, of species on the IUCN's global critically endangered or endangered lists, and will work with other conservation initiatives to secure and strengthen the future of such species over their historic distribution ranges. Within this context, a realistic prioritization framework has been developed to aid in decision-making on resource allocation. Species in Mountain Zebra NP will be put through this prioritisation process, and according to the SANParks framework, those that emerge as priorities should have their own monitoring programme.

There are currently four mammal species that may require additional management considerations. One of these the Cape mountain zebra is the reason for the establishment of the park and the management objectives for this species have been highlighted previously (Novellie 1989). Conservation measures for Cape mountain zebra are formulated in collaboration with relevant provincial conservation authorities (Novellie *et al*. 2002). The other three are the south-western ecotype of the black rhinoceros, the Cape buffalo and the morphological strain of the plains zebra that resembles the "quagga".

The Cape Mountain zebra is the primary species of special concern in Mountain Zebra NP, since a primary aim of the park has been "To preserve a viable, genetically uncontaminated population of the Cape mountain zebras from which individuals can be drawn for reestablishment in other parts of the historical range of the subspecies, or in zoological gardens." Mountain zebras are dependent on habitat with good cover of moderately tall, tufted grasses (Grobler 1983; Novellie and Winkler 1993). Grazing by antelope species that favour short grass (for example, springbok, blesbok, black wildebeest) may transform the habitat into a condition that is

not optimal for zebras. As noted elsewhere in this management plan, it is necessary from the point of view of maintaining biodiversity to allow the natural development of a mosaic of grazing lawns together with patches of taller grasses. The diversity of patch types is the key to maintaining the full spectrum of indigenous herbivores. However, excessive impact by short grass grazers may lead to proliferation of grazing lawns which, if allowed to proceed to extremes, would be both undesirable from the point of view of patch diversity and also deleterious for the zebra. It is therefore necessary to monitor Thresholds of Potential Concern relevant to the condition of mountain zebra habitat (Novellie 1994).

The "quagga" population at Mountain Zebra NP forms one of the primary repositories for individuals displaying a high prevalence of the desired traits and an active management program is required to effectively maximise the retention of these traits within the population. Regular monitoring of the population is required and foals should be scrutinised each year to determine their contribution to the program. Repositories of unsuitable stock are maintained in the Addo Elephant NP in various areas.

2.1.6 Fire Programme

Almost all vegetation types within Mountain Zebra NP are potentially fire prone. As is characteristic of vegetation of the Grassland Biome, lightning fires tend to occur particularly in the Karoo Escarpment Grassland[1]. On private farms in the Karoo and Cape Midlands this vegetation type is regularly burnt to stimulate grazing (Roux and Smart 1979). In the other vegetation units of the Mountain Zebra NP fires are much less frequent, but nevertheless can occur in years when the grass biomass is high. It is noteworthy that Low and Rebelo (1996) regarded the Eastern Mixed Nama Karoo (redefined as Eastern Upper Karoo by Driver et al. 2005) as being the only vegetation type of the Nama Karoo Biome in which fire can be important in shaping communities. Fire is thus clearly a natural feature of the Karoo Escarpment Grassland (which includes vegetation units 5 and 6 of Brown and Bezuidenhout *in prep*. b) and it probably occurred fairly regularly in historical times. For other vegetation types of the Mountain Zebra NP fire is likely to have been rare rather than regular, but could nevertheless have had a major impact on plant communities.

During much of the history of the Mountain Zebra NP the practice was to put out lighting fires as soon as they were observed. Long absence of fire from the Karoo Escarpment Grassland led firstly to abnormal accumulation of dry material that made accidental fires difficult to control and secondly to a low level of utilization of the grazing by large herbivores (Novellie 1990b). Lack of knowledge makes it difficult to put forward appropriate conservation objectives for fire management, and a priority should be to encourage further research on the role of fire in the vegetation types of the Mountain Zebra NP. However, on the basis of current evidence, it appears desirable for management to promote as far as possible the natural occurrence of fire. To achieve this it is desirable to allow lightning fires to burn to their natural extent rather than to put them out as quickly as possible. This needs to be reconciled with the issue of fire security.

Rehabilitation

Historical land use in Mountain Zebra NP has led to extensive transformation of both vegetation and soil such that some areas require attention in order to prevent loss of ecosystem functioning. Most transformations in Mountain Zebra NP are human-induced, mainly due to previous agricultural practices. The dominant soil transformation is soil erosion and change in the chemical composition of the soil (e.g. through accumulation of inappropriate nutrients due to fertilizers) in areas historically used for crop production. Rehabilitation of the degraded farmland areas is therefore one of the priorities for Mountain Zebra NP. Invasive alien species are widespread.

The objective of **Rehabilitation** includes three sub-objectives:

- **Hydrological regimes:** To improve and restore hydrological regimes and natural functioning of hydrological systems through the management of rivers and aquifers.
- **Degraded land:** Re-establish structure and function of degraded land.
- **Alien biota:** Re-establish structure and function of areas degraded by the impacts of alien biota, by controlling and where possible eliminating these species.

These objectives are addressed through the Rehabilitation Programme and the Invasive Alien Species Programme.

2.1.7 Rehabilitation Programme

Attention is currently focused on soil erosion along drainage lines as the main aspect that needs attention. Active re-vegetation of degraded areas will be considered in future if it becomes apparent that natural vegetation cover will not re-establish by itself.

Particular attention is given to:
Old broken dam walls that channel water thus increasing the potential for soil erosion downstream
Construction of gabions along vulnerable drainage lines
Removal of redundant structures (mostly remains of farming activities)
Monitoring to determine the effectiveness of remedial measures.

Invasive Alien Species Control

Alien animals are rare in Mountain Zebra NP; if any are encountered they are eliminated in accordance with the SANParks Standard Operating Procedures for Lethal Population Management or the SANParks Standard Operating Procedures for Capture, Transportation and Maintenance in Holding Facilities of Wildlife. The presence of Red river hogs on a neighbouring farm is a source of concern, as this species can inter-breed with bushpig.

Control of all alien flora is conducted in accordance with the National Environmental Management: Biodiversity Act and with Working for Water standards and Dept Agriculture guidelines on herbicide use and application. For the purpose of the Working for Water programme the park is divided into 105 work areas. An annual plan of operations is compiled each year, which identifies areas of priority, person days and costs. On completion of each area the information is sent to a central GIS database, which captures the information to be used in follow up plans. The database records area and density of infestations so that progress can be gauged. Woody plants (e.g. Poplar) are felled with chainsaws and treated with herbicide to prevent regrowth. Other plants (e.g. Opuntia spp.) are treated by foliar application of herbicide.

The most important invasive species and the areas of infestation are shown in Table 1 below.

At least for the aggressively invading *Opuntia* species,

Table 1: The most important invasive alien plant species in Mountain Zebra NP, with estimate of area of infestation.

Species	Current area of infestation
Eucalyptus globulus (bluegum)	2.05ha
Opuntia ficus-indica (prickly pear)	3741,23ha
Opuntia imbricata (jointed cactus)	12764,77ha
Opuntia species	1914,22ha
Populus canescens (poplar)	3,94ha
Populus species	41,0ha
Schinus species (pepper tree)	19,26ha

the rate of re-infestation from external sources is such that permanent eradication will never be possible. On the basis of progress so far it is estimated that an initial eradication of these infestations, plus four follow-ups will be sufficient to reduce them to levels where they they can be kept under control by routine inspections and controls by park staff.

2.1.8 Pressure Reduction Programme

The high level objective of Pressure Reduction (Figure 2) focuses on controlling negative impacts from outside the park's boundaries. It is sub-divided into three objectives:

- **Management of external development pressures:** Minimization of impacts associated with inappropriate activities outside the park through effective engagement with regional planning structures.
- **Control of illegal resource use:** Minimization of illegal resource use through effective law enforcement and engagement with regional authorities.
- **Alien biota:** Minimize the threat of alien biota invasion from outside the park.

Important for the attainment of these objectives are engagement and communication with regional land management authorities, and programmes to address this are dealt with below under stakeholder relationships (section). Control of illegal resource use is dealt with under the safety and security plan below.

Unlike other parks in urban and developing areas, Mountain Zebra NP is not greatly affected by industrial or others developments on its periphery. Illegal resource harvesting has been insignificant in the past, although extra vigilance will be required now that high value species, such as black rhino, have been reintroduced.

As noted above, the current priority is to eradicate aliens within the park. Once this has been achieved attention will shift to minimizing re-infestation from outside.

i) Wildness / Remoteness

This high level objective (Figure 2) aims at providing a range of wildness experiences and at maintaining the sense of place that characterizes the Mountain Zebra NP. This is maintained through the Conservation Development Framework and the zonation plan programme (section below) and the restoration of wildness through the removal of unwanted farm structures (section below).

ii) Reconciling Biodiversity with Other Interests

The high level objective of Reconciling Biodiversity with Other Interests comprises two sub-objectives:

- **Reconciling biodiversity with the interests of neighbours**: To ensure that SANParks interactions with neighbours are informed and constrained by biodiversity, and where impacts on biodiversity are inevitable, that these impacts are managed and minimized.
- **Reconciling biodiversity with other park objectives**: To ensure that the other (non-biodiversity management) aspects of SANParks operations (revenue generation including tourism, resource use, management activities) are informed and constrained by biodiversity, and particularly that the impacts of these activities are minimized.

The former objective is addressed by the Damage-Causing Animal Programme, while the latter is addressed by the State of Biodiversity Report and the Environmental Management Programme. The Conservation Development Framework and Zonation Plan, as described below, are also relevant to the latter objective. The regulation of resource use falls under the latter objective, but there are currently no resource use programmes in the Mountain Zebra NP. Collection of firewood from indigenous species is currently unnecessary because of the availability of sufficient firewood from exotic tree species such as bluegums, pepper tree, and pines. Any resource use programmes that are initiated in future will be in accord with the requirements of the National Environmental Management Protected Areas Act and SANParks policies.

iii) Damage-Causing Animals Programme

One source of conflict with neighbours in the Mountain Zebra NP is damage causing animals. A number of wildlife species are currently listed as 'problem animals' or 'vermin' within the provincial ordinances although the tag is broadly applied as a result of the actions of possibly only a minor number of individuals. There is often little empirical evidence to support the perceptions that many carnivores are responsible for the threats posed to livestock (Marker *et al*. 2003) although the beliefs of landowners are likely to affect their attitudes and behaviour to wildlife regardless of the actual threats posed. Much of the future improvement in dealing with these conflicts will rely on the transparent relationships between SANParks and neighbouring landowners and an integrated approach to mitigating such situations. SANParks will strive to provide as much information about the ecological requirements of the species to landowners while simultaneously making recommendations for alternative management strategies to deal with reported incidents. In order to effectively monitor the impacts of these conflict situations SANParks will establish a reporting system that can be used by tourists, park neighbours as well a park staff. The reporting system will capture essential information about the date and time of the incident the species involved and what action was taken by the individuals responding to the incident.

iv) Contingency plan in the event of escape of a damage causing animal

Reports of escaped damage causing animals will be investigated immediately and relevant role-players informed eg. Park Manager, Provincial Authority, Regional Manager. The Section Ranger will take charge of the recovery/relocation of the animal/s. The SANParks' Wildlife Veterinary Officer will be called upon to dart the animal where after the animal will be relocated to the temporary holding camp and kept for at least two weeks before being released back into the park. All darting, transporting and handling of the animal will be conducted according to the guidelines of the Animal Care Committee of SANParks. According to the Draft Norms, Standards and Regulations Relating to the Management of Permits for the capture or destruction of any large predator will only be issued after the provincial authority has been satisfied that the capture or killing of such animal is warranted.

It should be noted that there are special conditions relating to damage causing large predators and the transportation of large predators according to the Draft Norms, Standards and Regulations Relating to the Management of Large Predators (2006):

- Damage caused by large predators is an inherent agricultural risk and therefore the onus is on the landowner to use non-lethal preventative measures to protect his property from large predators that might cause damage.
- Exemption from permit requirements for the transport requirements of large predators will only be allowed in case of sick or injured animals in need of urgent medical care at an animal medical facility, provided that a veterinary surgeon at such medical facility has certified that the animal is in need of urgent medical attention.

2.2 State of Biodiversity Reporting

This is a standardized evaluation of the state of biodiversity management in each national park. It is conducted annually, and at each annual survey targets are set to be achieved over the following year. It covers all aspects of biodiversity management, including the reconciliation of biodiversity objectives with other management objectives.

Table 2. Summary of Biodiversity Management Actions/Initiatives with Cost Availability (Planning Horizon Next Five Years)

Programme	Action/Initiative	Costing
Park Expansion	Short term land acquisition programme: securing the park access route, consolidation of boundaries and river catchments.	Donor funding is potentially available for land to secure the entrance route. If available, SANParks self-generated income will be used to take advantage of appropriate opportunities for land purchase.
Reintroduction programme	Monitoring of the reintroduction of cheetah	Covered by SANParks Corporate operational budget
Herbivory	Annual large mammal census	Costs variable from year to year. Covered by SANParks Corporate operational budget
Herbivory	Disease monitoring and disease contingency plan	Covered by SANParks Corporate operational budget
Herbivory	Monitoring of water availability, assessment of needs for artificial water points	Covered by park operational budget Table 8)
Herbivory	Monitoring of TPCs for large herbivore impacts	Not secured. Initiatives to raise funds under development.
Species of Special Concern	Application of prioritization framework for species of special concern	Covered by SANParks Corporate operational budget
Species of Special Concern	Monitoring of TPCs for species of special concern	Not secured. Initiatives to raise funds under development
Species of Special Concern	Management of the quagga project	Covered by SANParks Corporate operational budge
Fire	Promote the natural occurrence of fire by allowing lightning fires to burn, subject to safety considerations	Covered by park operational budget (Table 8)
Fire	Research into fire impacts on biodiversity	Not secured
Rehabilitation	Erosion control	Covered by Working for Wetlands budget (Table 8)
Rehabilitation	Removal of redundant infrastructure	Covered by park operational budget (Table 8)
Alien species	Invasive alien species control: phase 1: reduction of infestation to controllable level, phase 2: routine control and minimization of re-infestation	Phase 1 covered by the Working for Water budget (Table 8); phase 2 by park operational budget.
Damage causing animals	Monitoring, reporting system and escape contingency plan	Covered by park operational budget (Table 8) and the SANParks Corporate operational budget
State of Biodiversity Report	Systematic annual survey of the state of biodiversity management	Covered by SANParks Corporate operational budget
Environmental Management	Including waste management, pollution control, management of visitor impacts	Covered by park operational budget (Table 8)
Sustainable Resource Use	There are currently no resource use programmes	None

2.2.1 Environmental Management Programme

Having an environmental management system (EMS) will assist park management with the achievement of their environmental management responsibility regarding ongoing operational environmental impacts. The EMS provides a mechanism for environmental management throughout all areas and departments at park level and focuses on covering environmental aspects at an operational level which a park can control and manage directly. The outcome of this standard must be integrated with the national park management framework to ensure an integrated approach.

The following interim environmental management standards will be adhered to at all times:

Waste Management: No tips or rubbish dumps are to be developed anywhere within the Park – all waste material, of whatever nature, whether of tourist or management origin must be separated for recyclable materials and the residue must be removed to the local town dump.

Pollution Control: All toxic waste such as chemicals and batteries must be removed from the Park and disposed of in a sensitive and responsible manner. Herbicide containers will not be cleaned and used for other purposes but returned to the suppliers. Old oil drained from machines will be stored in a drum for later recycling.

Visitor Impacts: Impacts of this nature that require particular attention include littering at picnic sites. All tourist sites should be provided with baboon-proof bins while hikers are not allowed to bury any rubbish and must remove what they carry into the Park.

Building Sites: The practise of using rubble from demolished structures for erosion control or roadworks will be disallowed. An Environmental Management Plan will be put in place before work on any building site is initiated and this will include a final cleanup clause.

Other Aspects: Driving off the roads in the veld by visitors, contractors or staff is disallowed, other than under the supervision or instruction of the Park Manager and only where this is unavoidable or warranted by circumstances such as culling or capture.

The Environmental Management Programme is funded from the park's operational budget (Table 8).

2.2.2 Future Requirements for the Biodiversity Management Programme

In the adaptive management of ongoing change in ecological systems, Thresholds of Potential Concern (TPCs) are the upper and/or lower limits of flux allowed, explicitly specifying the boundaries of the desired state of the park. If monitoring or predictive modelling indicate exceedances beyond these limits, then mandatory management options of the adaptive cycle are prompted.

Following from the Biodiversity Programmes outlined above, it is anticipated that TPCs will be needed with regard to the following:

- Extent of change of vegetation structure typical of the northeastern Karoo (this could potentially be brought about by climate change or overutilization of vegetation by herbivores).
- Extent of change of under-conserved vegetation types.
- Extent of change of habitat required by Cape mountain zebra.
- Homogenization of the habitat, such as may occur through the widespread encroachment of grazing lawns into taller grass habitat.
- Signs that grazing lawns are 'unsustainable' over the long term.
- Change in population growth rate trends, particularly for species of special concern, e.g. mountain zebra, black rhino, and in relation to introduction of predators.
- Change in proportional representation of herbivore foraging guilds (bulk grazer, concentrate grazer, mixed feeder and browser).
- Change in the ratio of productivity to biomass.
- Shifts in the long-term distribution patterns of herbivores across the landscape.
- Shifts in prey composition of predator diets.

The development of TPCs relating to these issues need to form part of particular programmes to achieve the desired state, and will require explicit monitoring to assess the potential exceedance of each TPC. It is therefore crucial to note at this point that the adaptive management cycled cannot be successfully implemented without the necessary capacity for monitoring. In addition, research should be solicited in conjunction with the monitoring to increase our understanding of the ecological processes in Mountain Zebra NP. As noted, the capacity to maintain the intensive monitoring programmes of the past, and to extend them to cover the new areas of the park, is currently seriously lacking.

The lack of resources for biodiversity monitoring is common to the majority of national parks, and SANParks is in the process of formulating specific initiatives to acquire the necessary resources.

2.2.3 Management of Cultural Heritage Resources In the Mountain Zebra National Park

In order to fully comply with all management requirements for cultural heritage resources in the park a number of initiatives have been planned and will be implemented within the next five years. SANParks legal obligations and management principles regarding cultural heritage resources are included in the Cultural Heritage Corporate Policy Statement. Table 3 presents an outline of planned management objectives and activities. Regarding the objectives in Table 3, funds have been

obtained from the National Lottery for the development of the cultural resources inventory and the cultural heritage resources management plan. Initiatives are required to secure funds for remaining initiatives in Table 3.

2.3 Sustainable Tourism

The overall objective of becoming the nature based tourism destination of choice in the Cape Midlands is dependent on:

- The maintenance of existing tourism services and infrastructure, and
- The development of new infrastructure to take advantage of business opportunities resulting from increasing demand.

Maintenance and development for tourism takes place within the framework of the Zoning Plan, as set out below.

2.3.1 Mountain Zebra National Park Zoning Plan

The primary objective of a park zoning plan is to establish a coherent spatial framework in and around a park to guide and co-ordinate conservation, tourism and visitor experience initiatives. A zoning plan plays an important role in minimizing conflicts between different users of a park by separating potentially conflicting activities such as game viewing and day-visitor picnic areas whilst ensuring that activities which do not conflict with the park's values and objectives (especially the conservation of the protected area's natural systems and its biodiversity) can continue in appropriate areas. The zoning of Mountain Zebra National Park was based on an analysis and mapping of the sensitivity and value of a park's biophysical, heritage and scenic resources; an assessment of the regional context; and an assessment of the park's current and planned infrastructure and tourist routes/products; all interpreted in the context of park objectives.

Overview of the use zones of Mountain Zebra National Park

The summary of the use zoning plan for Mountain Zebra National Park is shown in Appendix 2. Full details of the use zones (including high resolution maps), the activities and facilities allowed in each zone, the conservation objectives of each zone, the zoning process, the Park Interface Zones (detailing park interaction with adjacent areas) and the underlying landscape analyses are included in Appendix 1: Mountain Zebra National Park Zoning Plan.

Table 3: Cultural resource conservation objectives and initiatives

Management Objectives	Measures	Initiatives
To further develop and continuously update an inventory of cultural resources in the Mountain Zebra National Park	Cultural heritage resources data for the National Park	• Documentation of newly discovered cultural heritage sites and associated oral histories and indigenous knowledge (tangible & intangible heritage) • Maps • GPS coordinates; • include information in the Cultural heritage data base • Pictures and tracings of rock art
To formulate and implement a Cultural Heritage Resources Management Plan (CHRMP) for the Mountain Zebra National Park as soon as inventorisation is fully done.	Cultural Heritage Resources Management Plan	• Asses significance of individual sites; • Assess conservation/protection status for all cultural resources in the park; • Site conservation measures • Assess the potential utilisation of sites (current & future); • involve stakeholder participation in the development process • Maintain an appropriate balance between natural and cultural heritage in all aspects of park management. • Allocate resources to implement the CHRMP • Identify cultural heritage research priorities
To formulate and implement Cultural Heritage Site Management Plan for the San rock art sites that have been identified for educational, research and tourism purposes	Cultural heritage site management plans	• Site Development (education/tourism) • Visitor control measures • Information boards & signage • Conservation measures for rock art sites • Restore and maintain heritage buildings • Interpretation plan • Maintain the sense of place at archaeological sites
To regularly monitor cultural resources in the Mountain Zebra National park, in order to determine state or condition of resources, and to enable decision-making in terms of conservation measures or improved management.	Cultural heritage monitoring system	• Design and implement a Monitoring System for cultural resources as required by the management plan • Compile status files for all sites with condition reporting forms and photos. • Assess sites as highly sensitive, sensitive or stable and monitor accordingly • Annotate files after each visit

Remote Zone: This is an area retaining an intrinsically wild appearance and character, or capable of being restored to such and which is undeveloped and roadless. There are no permanent improvements or any form of human habitation. It provides outstanding opportunities for solitude, with awe inspiring natural characteristics with sight and sound of human habitation and activities barely discernable and at far distance. The conservation objectives for this zone require that deviation from a natural/pristine state should be minimized, and existing impacts should be reduced. The aesthetic/recreational objectives for the zone specify that activities which impact on the intrinsically wild appearance and character of the area, or which impact on the wilderness characteristics of the area (solitude, remoteness, wildness, serenity, peace etc) will not be tolerated. In Mountain Zebra NP, Remote areas were designated in the high altitude mountain areas of the park. The zones were designated include most landscapes with high environmental sensitivity and value.

Primitive Zone: The prime characteristic of the zone is the experience of wilderness qualities with the accent on controlled access. Access is controlled in terms of numbers, frequency and size of groups. The zone shares the wilderness qualities of the Remote zone, but with limited access roads and the potential for basic small-scale self-catering accommodation facilities. Views of human activities and development outside of the park may be visible from this zone. The conservation objectives for this zone require that deviation from a natural/pristine state should be small and limited to restricted impact footprints, and that existing impacts should be reduced. The aesthetic/recreational objectives for the zone specify that activities which impact on the intrinsically wild appearance and character of the area, or which impact on the wilderness characteristics of the area (solitude, remoteness, wildness, serenity, peace etc) should be restricted and impacts limited to the site of the facility. Ideally visitors should only be aware of the facility or infrastructure that they are using, and this infrastructure/facility should be designed to fit in with the environment within which it is located in order to avoid aesthetic impacts. In Mountain Zebra NP, Primitive areas were designated to buffer Remote areas from higher use areas, as well as to protect most of the remaining sensitive areas (such as the Wilgeboom Valley and most escarpment slopes) from high levels of tourist activity. Primitive areas were also designated in valleys with low environmental sensitivity to allow access to Remote areas as well as to contain the infrastructure required for management and tourist activity in these areas (e.g. trail huts and access roads). The two satellite sections of Mountain Zebra National Park were designated primitive pending their full consolidation into the park. In areas where Remote zones border on the park boundary, a 100m wide Primitive zone was designated to allow park management access to fences.

Quiet Zone: This zone is characterized by unaccompanied non-motorized access. Visitors are allowed unaccompanied (or accompanied) access, mainly on foot, for a wide range of experiences. Larger numbers of visitors are allowed than in the primitive zone and contact between visitors is frequent. The conservation objectives for this zone specify some deviation from a natural/pristine state is allowed, but care should be taken to restrict the development footprint. The aesthetic/recreational objectives for the zone specify that activities which impact on the relatively natural appearance and character of the area should be restricted, though the presence of larger numbers of visitors and the facilities they require, may impact on the feeling of "wildness" found in this zone. In Mountain Zebra NP, Quiet areas were designated immediately adjacent to the main rest camp to allow visitors access on foot.

Low Intensity Leisure Zone: The underlying characteristic of this zone is motorized self-drive access with the possibility of small basic camps without facilities such as shops and restaurants. Facilities along roads are limited to basic self catering picnic sites with toilet facilities. The conservation objectives for this zone specify that although deviation from a natural/pristine state should be minimized and limited to restricted impact footprints as far as possible, it is accepted that some damage to the biophysical environment associated with tourist activities and facilities will be inevitable. The aesthetic/recreational objectives for the zone specify that although activities and facilities will impact on the wild appearance and reduction of the wilderness characteristics of the area (solitude, remoteness, wildness etc) is inevitable, these should be managed and limited to ensure that the area still provides a relatively natural outdoor experience. In Mountain Zebra NP, Low intensity leisure areas were designated in the current game viewing areas (Rooiplaat, the northern plains areas and the Wilgeboom loop), as well as additional potential plateau and plains areas where these did not conflict with the underlying landscape sensitivity and value analysis.

High Intensity Leisure Zone: The main characteristic is that of a high density tourist development node with amenities such as shops, restaurants and interpretive centres. This is the zone where more concentrated human activities are allowed, and is accessible by motorized transport on high volume transport routes. The conservation objectives for this zone specify that the greatest level of deviation from deviation from a natural/pristine state is allowed in this zone, and, it is accepted that damage to the biophysical environment associated with tourist activities and facilities will be inevitable. However, care must be taken to ensure that the zone still retains a level of ecological integrity consistent with a protected area. The aesthetic/recreational objectives for the zone specify although the high visitor numbers, activities and facilities will impact on the wild appearance and reduction of the wilderness characteristics of the area (solitude, remoteness, wildness etc) is inevitable, these should be managed and limited to ensure that the area generally still provides a relatively natural outdoor experience. In Mountain Zebra NP, High intensity leisure areas were restricted to the current rest camp and management areas.

Overview of the Special Management Overlays of Mountain Zebra National Park

Special management overlays which designate specific areas of the park that require special management interventions have not yet been identified in Mountain Zebra National Park.

Overview of the Park Interface Zone of Mountain Zebra National Park

The Park Interface Zones shows the areas within which land use changes could affect a national Park. The zones, in combination with guidelines, serve as a basis for a.) identifying the focus areas in which park management and scientists should respond to EIA's, b.) helping to identify the sort of impacts that would be important at a particular site, and most importantly c.) serving as the basis for integrating long term protection of a national park into the spatial development plans of municipalities (SDF/IDP) and other local authorities. In terms of EIA response, the zones serve largely to raise red-flags and do not remove the need for carefully considering the exact impact of a proposed development. In particular, they do not address activities with broad regional aesthetic or biodiversity impacts.

The Park Interface Zone for Mountain Zebra NP has two overlaying categories, namely priority natural areas, and a visual/aesthetic zone (Appendix 2).

Priority Natural Areas: These are key areas for both pattern and process that are required for the long term persistence of biodiversity in and around the park. The zone also includes areas identified for future park expansion. Inappropriate development and negative land-use changes should be opposed in this area. Developments and activities should be restricted to sites that are already transformed. Only developments that contribute to ensuring conservation friendly land-use should be viewed favourably.

Viewshed Protection Areas: These are areas where development is likely to impact on the aesthetic quality of the visitor's experience in a park. Within these areas any development proposals should be carefully screened to ensure that they do not impact excessively on the aesthetics of the park. The areas identified are only broadly indicative of sensitive areas, as at a fine scale many areas within this zone would be perfectly suited for development. In addition, major projects with large scale regional impacts may have to be considered even if they are outside the Viewshed Protection Zone.

Current status and future improvements

The current park use zonation is based on the same biodiversity and landscape analyses undertaken for a Conservation Development Framework (CDF); however certain elements underlying the CDF such as a tourism market analysis are not fully incorporated into the park use zonation. A full CDF will be developed for Mountain Zebra National Park within the current update cycle. Remote areas will be investigated for possible formal declaration designated as Wilderness Area in terms of section 22 of the PAA. Special management overlays which designate specific areas of a park that require special management interventions (e.g. areas requiring rehabilitation) will also be identified. Marketing and commercial development programmes will be a priority for Mountain Zebra NP during the next 5-year management cycle, and both must comply with its Conservation Development Framework (CDF). The development of the Conservation Development Framework and the marketing and commercial development programmes are to be covered by the operational budget of the park, supported by SANParks corporate resources.

2.4 Effective Park Management

2.4.1 Infrastructure: Development and Maintenance

This section of the management plan details the development and maintenance of facilities for the use of both tourists and members of the local community, who visit the Mountain Zebra NP, as well as the facilities required by SANParks staff, for the purpose of effective management of the Park. Current tourism infrastructure (roads, picnic sites etc.) as well as management, bulk and conservation infrastructure including offices, fences and stores are described in the plan and its condition or status are included. A maintenance plan for the next five year period is put forward.

2.4.2 Tourism infrastructure in the Park consists of

- 19 Family cottages with 76 beds (each unit sleeps 4 persons).
- One swimming pool (for overnight guests only).
- One camping site with 20 sites, each sleeping a maximum of 6 persons.
- Ablution and kitchen facilities in camp site
- One guest house sleeping 6 persons.
- One guest house sleeping 2 persons.
- Two overnight huts sleeping 12 persons each (for hiking trail) with approximately 39 km of hiking trails.
- Two picnic sites with ablution facilities, one with rock simming pool.
- Conference room/information centre.
- Ablution facilities – rest camp.
- One licensed restaurant; one curio shop; one office; two store rooms; cold storage; one kitchen (running of these facilities outsourced to Tige's Eye).

2.4.3 Management infrastructure in the Park consists of

- 1 Administration block (7 offices, meeting room, 2 store rooms, cold room, kitchen and ablution facilities).
- 1 Duty Managers' office
- 1 Laundry
- 3 Storerooms (linen; dry storage; chemical store) and ablution facilities
- 2 Storage sheds (Doornhoek; Babylon)
- 1 Workshop
- 22 Staff accommodation units (including community hall)
- 1 Ranger outpost
- 1 Helipad
- Rockdale farm: house x1, outbuildings x1 and shed x1
- Evendale farm: house x1, outbuilding x1 and shed x1
- Groenfontein farm: house x1, outbuildings x1 and shed x1
- Stapelbergskraal farm: house x 1, shearing shed x 1, kraal x 1, dipping tank x1
- Blinkberg farm: house x 2 ; shed x 1, outbuilding x1

Bulk infrastructure consists of:

- Approximately 44km of tourist roads
- Approximately 170km of management roads
- 72km electric fence
- Eskom Bulk supply line

Other infrastructure consists of:

- One weather station at Admin block
- 2 rhino bomas; 2 cheetah bomas
- 18 boreholes (operational)
- 8 quarries
- 12 reservoirs

2.4.4 Infrastructure Maintenance

Table 4 details the infrastructure maintenance requirements.

Table 4: Infrastructure maintenance requirements up to 2010

Project	Time Frame	Budget	Funded by	Motivation
Maintenance staff accommodation (Welgedacht & Ebenhaezer)	S2007/2008	R80 000	MZNP Operational Budget (Table 8)	General maintenance to prevent further deterioration of existing infrastructure
Maintenance Admin offices & staff accommodation (Babylons Toren)	2008/2009	R120 000	MZNP Operational Budget (Table 8)	General maintenance to prevent further deterioration of existing infrastructure
Community hall in staff village (upgrade building, construct ablutions)	2009/2010	R50 000	MZNP Operational Budget (Table 8)	
TOTAL		**R250 000**		

2.4.5 Requirements for Development of New Infrastructure

A number of future developments are proposed in order to provide a balanced range of facilities and opportunities for both local community and foreign tourists while promoting visitor experiences which take into account established business interests in the town and district.

The following principles or constraints on all developments within the Park must be taken into account:

- Any development must strike a sound balance between conservation requirements, economic development and community upliftment and participation. Park Management objectives require that we provide develop and promote visitor experiences which take into account established business interests in the town and district.
- Any specific proposal must be subject to the application of Integrated Environmental Management procedures, in accordance with EIA Regulations, by applying checklists to determine the ecological, economic and social or cultural impact of all proposed Park developments.
- Proposed developments should be considered in terms of compatibility with the vision and desired state and zonation for the Park. Provisional project planning should address location and surrounds, nature of the facility, rationale (including visitor numbers, type, management importance, etc), infrastructure requirements, cost and benefits and environmental impact.
- The expertise of consultants and professionals should be used wherever justified.
- The principle of peripheral development will be applied as far as is practicable.

2.4.6 Visitor Infrastructure

All developments must be 'environment-friendly' with unobtrusive sighting, judicious energy consumption and sensitive waste disposal. In addition to this –

- Consultation with local and visitor communities in order to understand their needs, form an integral part of the process of developing tourist facilities.
- The development of tourist facilities which compete with established business interests will be avoided or pursued only in exceptional circumstances after full consultation with the affected parties.
- The use of local entrepreneurs to construct, maintain and manage facilities will be encouraged with special preference for PDI's, women and disabled persons.
- All projects will be subject to the principles of resource economics.

Table 5. Development plan for new and upgraded tourism facilities (next 5 years)

Project	Time Frame	Approx. Cost	Funded by	Motivation
New entrance gate complex. Includes small information centre and ablution facilities	2007/2008 – 2008/2009 Construction starts Feb 2008. Expected completion July 2008	R1 198 439m	Funded by DEAT-IDP	To comply with SANParks corporate image and by providing an added service to staff and tourists. Improve controlled access. Improved security
Upgrade existing (35km) and construct new (9km) internal tourist roads (excluding proposed 4x4 route)	2007/2008 – 2008/2009 Construction starts early Feb 2008. Expected completion Dec 2008	R11 736 299	Funded by DEAT- IDP Tendering in process	Tourists complain about the condition of the road, wear-and-tear on Park's vehicles; increase number of and improve drainage to reduce erosion and loss of topsoil; make areas of the Park accessible for more tourists
Swimming pool at picnic site (Fonteinkloof). Extend ablution facilities	2008/2009	R150, 000	SANParks Capital Budget	Increase activities and enjoyment for day visitors (particularly due to extreme heat in summer)
Upgrade of Camping sites & ablutions	2008/2009	R120 000	SANParks Operational & Capital budget	Improve on existing infrastructure, improve customer satisfaction, providing accessibility for the disabled
Upgrade conference room	2008/2009	R60,000 (incl. furniture, aircon. Unit, carpet, projector, screen, etc)	SANParks operational budget	Improve facilities for visitors and overall image of MZNP
Ablution facilities at existing swimming pool. (Dressing room, one toilet and basin on each side)	2009/2010	R80,000	SANParks Capital budget	Improve on existing infrastructure; improve customer satisfaction
Shaded covers for cottages at braai area (droppers)	2009/2010	120 000	DEAT - EPWP	Improve on existing infrastructure; Provide more shade for guests especially with the extreme temperatures. Improve customer satisfaction
Tented bushcamp 6 units plus communal ablutions, kitchen and braai area	2010/2011	R3,650,400	DEAT - EPWP	Extend variety of tourism products in order to offer greater services for a unique bush experience
TOTAL		**R17, 115,138**		

2.4.7 Management Infrastructure

The maintenance of facilities including buildings (e.g. stores, animal holding pens) fences, roads and pumps, etc is required for the effective management of Mountain Zebra NP . The roads are challenging to maintain due to the terrain on which they occur and material used to construct these whereas most of the other management roads are old farm tracks and is not maintained much due to cost and labour constraints. This plan seeks to provide and maintain the minimum of facilities required for effective management in a manner compatible with the MZNP conservation development framework and desired state of the Park. Aesthetic considerations are to be of particular concern in the sighting and design of any structures. This plan provides further for the annual preparation of maintenance schedules and preference to local contractors in respect of maintenance contracts will be pursued. All infrastructure of this nature, including specifications and maintenance records, will be included in the Park's geographic information system. Infrastructure facilities of this nature will be placed on an inventory with an appropriate estimate of value.

Table 6: Development plan for management infrastructure

Project	Time Frame	Approx. Cost	Funded by	Motivation
Staff accommodation. (2 units at staff village)	2007/2008	R400,000	Funds from SANParks Capital budget	Retain key people in the Park; save HR costs; shortage of staff accommodation in the Park.
Tar remainder of access road. (MZNP responsible for inside gate, Municipality responsible from R61 to gate).	2008/2009	R 6,435,000	DEAT - EPWP	Tourists complain about the condition of the road, wear-and-tear on Park's vehicles; maintenance problems and operational budget restrictions; environmental factors (noise, dust).
Eskom power line	2009/2010	R5,217,960	DEAT - EPWP	Visual impact; protect low flying birds.
Staff Accomodation	2011/2012	R1,332,630	DEAT - EPWP	Retain key people in the Park; save HR costs; shortage of staff accommodation in the Park.
TOTAL		**R13,385,590**		

The rationale behind this plan is that while management infrastructures, equipment, plant and pumps generally make a significant contribution to Park expenditure they nevertheless contribute to cost effective management. Basic research to determine development or maintenance costs in relation to service by outside agencies will be carried out on a project basis. Monitoring will focus on maintenance costs and condition of infrastructure and equipment.

Concession for Commercial Activity

In line with SANParks Commercialization Strategy, the restaurant and retail facilities in the Mountain Zebra National Park are outsourced to a Private Party. Operations at these facilities are linked to an approved Environmental Management Plan. As the basis of the agreement is a Public Private Partnership, cooperation between Park Management and the Management of the Private Party is imperative. In light of this the parties meet on regular intervals and communication with the Park's clients, i.e. feedback on compliments and complaints are consolidated to not reflect disparity. The Legal and Financial aspect of the agreement is centralized and managed from Head Office level.

2.4.8 Proposed new future development

New Infrastructure

For the following projects funding has not been secured, and will need to be sourced. Possible sources are indicated in Table 7 below.

Table 7: Development plan for new infrastructure (funding not yet secured).

Project	Time Frame	Approx. Cost	Funded by	Motivation
Fencing of Marlow's property (between main access gate and R61	2008/2009	Finalize contractual agreement with Marlow	Application to DEAT	Resource protection; increase area of Park; comply with MZNP long-term conservation plan to link with CNP; increase security
Disabled/Interpretive trail.	2009/2010	R100,000	Honorary ranger project	Increase facilities for physically challenged visitors; educational tool
Interpretive centre including accommodation for large school groups. Interpretive centre: upgrade Doornhoek farm house, upgrade ablutions and kitchen/dining area, displays/exhibitions. (including building materials, bulk infrastructure, ablutions and furniture) Accommodation: upgrade Doornhoek stables into 2 dormitories and supervisors' Accommodation, ablutions, comms room.	2009/2010	R2.5 million	Approach organizations for donations/business proposals Honorary rangers to assist in the process.	Environmental education; cultural/heritage preservation, Youth development programme, Kids in Parks, increase activities for tourists
Bird hide. Area not yet identified	2010/2011	R50,000	Honorary Ranger project (sourcing of funds, etc)	Increase activities for bird enthusiasts; increase habitat for breeding water birds
TOTAL		**R2, 650,000**		

2.4.9 Rehabilitation & Decommissioning Requirements

The plan also entails the rehabilitation and decommissioning requirements of Mountain Zebra NP with respect to unwanted infrastructures in the Park that are related to past agricultural use of the area, including infrastructure on Blinkberg, Evendale and Stapelbergskraal farms.

Infrastructure (eg, reservoirs, sheds,etc) that cannot be upgraded due to deteriorating stage will be demolished. Rubble will be buried and area rehabilitated to allow vegetation to re establish. Infrastructure on Blinkberg, Evendale and Stapelbergskraal farms will be demolished due to their condition.

Funds for rehabilitation and decommission are provided by the operational budget of the Mountain Zebra NP (Table 8).

2.4.10 Enhance Benefits to Local Community

2.5 Local Socio-economic Development Programme

The purpose of Mountain Zebra NP's local socio-economic development programme is to play a significant, targeted and effective role in contributing to local economic development, economic empowerment and social development in communities and neighbouring areas adjacent to Mountain Zebra NP by partnering with Local Government to form part of the Integrated Development Plans (IDP's), participating in Government Programmes (Working for Water, Working for Wetlands and Expanded Public Works Programme) to contribute to local skills development by supporting learnerships, implementing needs related training programmes and by creating business opportunities.

The Expanded Public Works Programme remains a significant focus area of the Park to effectively contribute to local socio economic development. These programmes are all focus on poverty alleviation and are therefore labour intensive projects that create temporary jobs in the short term. Expanded Public Works Programmes include Working for Water (Clearing alien invasive species in the park), Working for Wetlands (Restoring wetlands to prevent soil erosion), and a Poverty Relief Programme (Upgrading nineteen chalets and erecting 68 kilometre predator proof fence). Great importance is also afforded to the skills development component of these programmes, with specific targets set for both hard and soft skills development. Sustainability is further supported by investigating and implementing exit strategies through the development of entrepreneurial opportunities for local communities.

Nine SMME's have been created, and their employees are attending life skills and development courses such as HIV and AIDS awareness, and diversity management. Mountain Zebra NP facilitates Skills and / or Learnership programmes. Both processes involve park staff and unemployed members from the neighbouring local communities. All participants in the Working for Water and Working for Wetlands programmes are trained in Life skills (E.g. HIV / AIDS, personal finance and basic first aid, occupational health and safety). Mountain Zebra NP procures contracted services ranging from maintenance to tourism related services. Where possible, local SMME's (especially PDI's) are favoured when sourcing contractors, provided that all procurement conditions as stated in the SANParks procurement policy can be adhered to.

2.6 Building Co-operation: Stakeholder Relationship Management Programme

The purpose of Mountain Zebra NP's stakeholder relationship management programme is to establish and maintain meaningful and beneficial relationships with a wide range of stakeholders supporting Mountain Zebra NP. Included in this section are the Park Forum, which provides for stakeholder consultation, alignment with Municipal Integrated Development Plans, the Environmental Education and Interpretation Programme, the Local Socio-Economic Development Programme and sustainable resource use.

2.6.1 Procedures for Public Participation

2.6.1.1 The Park Forum

The Mountain Zebra NP has a Park Forum which serves as an ongoing means of maintaining a consultation with stakeholders. Meetings of the Forum are held on a quarterly basis or as and when necessary. The meetings are chaired by the Park Manager in consensus with the Park Forum members.

The following stakeholders are currently represented in the Park Forum:

- Inxuba Yethemba Municipality
- Chris Hani District Municipality
- Dept. of Labour
- Dept. of Agriculture
- Dept. of Education
- SAPS
- SANParks

This list is not yet representative of all stakeholders, in fact membership and representation is the biggest challenge the forum faces. To address this, stakeholders currently not on the Forum have been approached and have been invited to attend meetings. The aim is to finalise membership of the Forum by June 2008. All members have been supplied with documentation (Terms of Reference and Guiding Principles) and a Charter has been drafted for members to comment on.

Additional consultative bodies include an Advisory Committee dealing with Working for Water, Working for Wetlands and Poverty Relief projects. This Committee currently has joint meetings with the Park Forum and follows the same procedures, but the intention is to separate the functions of the two in future.

2.6.1.2 Aligning the Management Plan with Municipal Integrated Development Plans

Mountain Zebra NP is a District Management Area which falls under Chris Hani District Municipality. The local municipality is Inxuba Yethemba Municipality. As indicated above, both municipalities are represented on the Park Forum, and both have Integrated Development Plans (IDPs). Alignment of these IDPs with the Park Management Plan has not yet been achieved but this will be an ongoing process as part of the activities of the Park Forum. However, the Integrated Development Plans recognize the Mountain Zebra National Park as one of the key tourist attractions, and suggest that all future developments should take cognisance of the important role that tourism plays in the economy of the region. The following issues listed in the IDP of the Inxuba Yethemba Municipality have been identified as overlapping with the interests and responsibilities of the Mountain Zebra NP:

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- Infrastructural services
- Development Needs
- Basic infrastructure and services development strategies
- Special programmes
- HIV/AIDS
- Disaster Management
- Waste Management
- Building local economy
- Poverty alleviation and job creation
- Tourism
- Youth development programme
- Integrated Environmental Programme

2.7 Environmental Education and Interpretation Programme

The purpose of the education development programme in Mountain Zebra NP is to build constituencies amongst people in support of SANPark's conservation endeavours by playing a significant, targeted and effective role in promoting a variety of educational opportunities and initiatives. The People and Conservation department of Mountain Zebra NP enhances biodiversity conservation through the promotion of a conservation ethic and

developing park-community relations. The primary component of the work conducted by this department is related to Environmental Interpretation & Education and focuses on the various park user groups (tourists, learners and staff) and local communities. The park's service area can roughly be estimated as reaching 45 000 people and a total of 40 schools (primary as well as secondary, including farm schools). These educational programs are facilitated by the People and Conservation Officer in the park. The areas of learning covered are extensive, but tend to concentrate on the protection and management of nature, the environment (in all its forms) and environmental learning. These programmes are normally offered free of charge (to improve accessibility), principally to the A total of 2500 learners and 99 adults visited the park during the financial year 2005/6. The park also hosts numerous environmental campaigns to celebrate environmental calendar days for example. World Environment Day, World Wetland Day, Arbor Day; World Aids Day and environmental competitions for example, Morula kids competition; which is an annual competition hosted by SANParks.

Mountain Zebra NP also provides an educational and information outreach service in the form of presentation of awareness programmes, focusing on targeted local schools, youth groups, religious groups, inmates and communities staying inside and outside the park. Mountain Zebra NP also supports the Decade for Education for sustainable Development - which commenced in 2005 – whereby we use Environmental Education as a tool for achieving affective resource management and sustainable development. The People and Conservation Officer is committed to invest in the development of an environmentally friendly ethic in the youth. Projects include the establishment of a Junior Honorary Rangers Corps during this financial year. To complement and support these education and awareness programs; the park develops and maintains resource materials, tools and kits; supports teacher programs; develops information resources such as booklets, books, videos, maps and pamphlets and develops and maintains interpretive displays and signage.

Mountain Zebra NP offers a variety of short trails to allow exploration of the ecosystem, each of which has an associated theme to ensure a variety of experiences that cater for wide participant interest. The trails can be done with or without a guide. Interpretive trails enhance environmental awareness by informing participants about various aspects of the environment - drawing on both scientific and traditional knowledge - and engaging participants in the environment through hands-on experiences. The guide also provides reference to further information with the aim of initiating further research or encouraging participants to get engaged in activities in and for the environment.
The funding available for all of the socio-economic development and stakeholder relationship programmes is shown in Table 7.

2.8 Best Practice Objective

The core of this objective is effective park management through high quality governance and human resource management. A central focus is improvement of income to cost ratio in the management of the Mountain Zebra NP.

2.8.1 Safety and Security Programme

Mountain Zebra NP is not currently faced with any serious safety or security threats. Potential threats vary from poaching to robbery and natural disasters such as fires or floods. The introduction of high value animals into Mountain Zebra NP has also increased the security risk. Since Mountain Zebra NP an income-generating business unit, with international and national visitors, the possibility of criminal activities relating to theft exists, including armed robberies, theft and house breakings. The purpose of the Safety and Security Plan is to put pro-active measures in place to ensure the safety and security of all people, assets, and resources in the park. The plan focuses on identifying weaknesses, strengths, threats and opportunities, identifying all role-players. In addition, the programme maintains an up-to-date operational plan with regard to contingencies to deal reactively with any related security and safety matters. All safety and security related costs are covered under the park operational budget (Table 7).

2.8.2 Access Controls

The Mountain Zebra NP has only one public access gate on the north-eastern boundary off the R61, linking Cradock and Graaff-Reinet. This gate is manned from 07h00-19h00 in summer; and from 07h00-18h00 in winter. The gate is locked at night with controlled access by certain staff members. No cash is handled at main gate. There are no restrictions regarding motor vehicles entering the park, but no motorbikes or bicycles are allowed because of the presence of potentially dangerous animals. Motor vehicles driven by members of the public may use tourist roads only, neither off-road driving nor use of management roads are allowed.

2.8.3 Access by aircraft

Highest point of the Mountain Zebra NP is Bakenkop (SE boundary) which is 1957m above sea level. In accordance with section 47 of the National Environmental Management: Protected Areas Act no aircraft may fly over the park at an altitude lower than 2500 feet above the highest point.

There is one helipad (size: 66.72m x 23.50m) near the administrative offices which is maintained and used in accordance with SANParks' and Civil Aviation Authority's requirements. In general this is used only by SANParks helicopters for the purpose of census, or wildlife capture or reintroduction. There are no designated fly over corridors.

2.8.4 Other Programmes

Other programmes include:

1. the Staff Capacity Building Programme
2. HIV/AIDS Programme, the purpose of which is to enable SANParks maintain a healthy and productive workforce within a viable and sustainable organization.

2.9 Financial Sustainability Programme

Table 8 shows the budget summary for the Mountain Zebra NP for the next five years.

Staffing

The Park currently has 26 staff on its permanent establishment. This is expected to grow to 30 positions as a result of the Parks expanding business operations. The Park currently employs three temporary staff (hospitality) and one contractor's team. Two key areas of staff expansion include the development of a dedicated tourism function to service the suite of tourism products and expanding the Technical department. The number of contract staff of 13 staff members, is expected to remain the same until 2010.

Table 8 – Costing

Cat 1	Cat 2	Description	2007-2008 (R'000)	2008-2009 (R'000)	2009-2010 (R'000)	2010-2011 (R'000)	2011-2012 (R'000)
MZNP: Current Operational Budget							
A. Income	Conservation Fees		-384,841	-438,045	-470,898	-506,216	-544,182
A. Income	Tourism Income		-2,262,640	-2,417,337	-2,598,637	-2,93,535	-3,003,050
A. Income	Other Income		-330,742	-323,101	-347,334	-373,384	-401,387
B. Expenditure	Human Resource		1,930,920	2,252,611	2,387,767	2,531,033	-2,682,895
B. Expenditure	Depreciation		222,348	274,123	290,570	308,005	326,485
B. Expenditure	Maintenance	All	506,392	529,730	561,514	595,205	630,917
B. Expenditure	Operating Costs	All	1,045,746	1,041,188	1,103,659	1,169,879	1,240,072
B. Expenditure	Finance Costs	All	27,249	7,000	7,420	7,865	8,337
Total Operations			**754,431**	**926,16**	**934,061**	**938,852**	**940,086**
MZNP Infrastructure Development Program (Provisional DEAT Funding)							
C. IDP	MZNP Roads	Upgrade existing internal roads	2,000,000	9,736,299	0	0	0
	MZNP Entrance Gate	New Entrance gate	398,439	800,000	0	0	0
	MZNP Perimeter Fence	Upgrade 18 km of fence	664,463	0	0	0	0
Total: IDP			**3,062,902**	**10,536,299**	**0**	**0**	**0**
Extended Public Works Program Application							
D. EPWP	Tar Entrance road	10km of 6-7m wide, drainage & rehabilitation of verges	0	6,435,000	0	0	0
	Shade cover for cottages	Droppers to be packed at braai area	0	0	120,000	0	0
	Power line	11 km underground cable & removal of 15 km of old power lines	0	0	5,217,960	0	0
	Staff accommodation	2 x 85m² two bedroom houses	0	0	0	0	1,332,630
D. EPWP	Tented Camp	6 units of 5mx5m canvass tents on decks, PPE, services, 4x4 access road	0	0	0	3,650,400	0
Total: EPWP			**0**	**6,435,000**	**5,337,960**	**3,650,400**	**1,332,630**
Working for Water							
E. WfW	Operational	All Projects	373,763	396,189	419,960	445,158	471,867
E. WfW	Management	All Areas	110,000	116,600	123,596	131,012	138,872
Total: WFW			**483,763**	512,789	543,556	576,169	610,740
Working for Wetlands							
F. WfW	Operational & management	All Projects & all areas	854,028	905,270	959,586	1,017,161	1,078,191
Total: WfW-Wetlands			**854,028**	905,270	959,586	1,017,161	1,078,191
Unfunded Projects							
G. UFP	Biodiversity Management	Fence Spoornet property	0	600,000	0	0	16,193
G. UFP	Tourism Management	Bird hide	0	0	0	50,000	3,500
	Tourism Management	Interpretive walkway (disabled persons)	0	0	100,000	0	0
G. UFP	Heritage Management	Interpretive centre	0	0	2,500,000	19,350	77,400
G. UFP	Other	All Projects	0	0	0	250,000	27,000
Total: UFP			**0**	**600,000**	**2,600,000**	**319,350**	**124,093**
Summary							
Total Income (A)		-2,978,223	-3,178,483	-3,416,869	-3,673,134	-3,948,619	
Total Committed Budgets (B, C)			6,795,556	14,640,951	4,350,931	4,611,986	4,888,706
Total Budgets Applied For (D, E, F)			1,337,791	7,853,058	6,841,102	5,243,730	3,021,560
Total Uncommitted Budgets (G)			0	600,000	2,600,000	319,350	124,093
Total: MZNP Short Fall*			**5,155,124**	**19,915,526**	**10,375,163**	**6,501,932**	**4,085,739**

ADAPTIVE AND INTEGRATIVE STRATEGIES TO SUSTAIN THE DESIRED STATE

3. ADAPTIVE AND INTEGRATIVE STRATEGIES TO SUSTAIN THE DESIRED STATE

The sections above set out the desired state for Mountain Zebra NP, and all the specific programmes necessary to achieve that state. However, the desired state cannot be effectively maintained without explicit attention being given to prioritization, integration, operationalisation, and above all, reflection and adaptation according to the principles in the biodiversity custodianship framework.

3.1 Steps to Operationalisation

The formulation an objectives hierarchy for Mountain Zebra NP assisted in prioritising management actions and goals for the park. The next step is for park management to use this guidance to draw up a detailed plan of action down to annual operational level, and wherever necessary, down to the level of tasks and duties of individual staff members. The park manager must be satisfied that the desired state for Mountain Zebra NP is adequately and appropriately served by all of this. A further cross-check is contained in the Balanced Scorecard system used by SANParks to measure its performance. Mountain Zebra NP's own Balanced Scorecard, as well as those of individual staff members, is in alignment with SANParks corporate-level Balanced Scorecard objectives, thereby supporting effective implementation of objectives across all levels of the organisation.

In addition, Mountain Zebra NP's broad costing for the next 5-year cycle outlines existing, as well as projected budgets and costs to achieve the desired state. It is important not to underestimate the required costs of implementing this management plan because of historical financial limitations, but to be realistic about the funds required to carry out the operations necessary to achieve the jointly agreed upon desired state under new paradigms, and using adaptive management that requires feedbacks not previously budgeted for.

3.2 Key ongoing adaptive management and evaluation interventions

- ***Feedback that the management action as decided upon and specified, is carried out as such:***- This responsibility lies with line-function management, and will be reported on via SANParks regional reporting structures to the Executive Director: Parks. Park-specific and individual Balanced Scorecards provide an explicit mechanism to ensure that this feedback takes place. In addition, the Protected Area Management Assessment (PARMA) evaluates the effectiveness of protected area management in ranger sections.

- ***Feedback whenever a TPC specifying the end-points of any of our biodiversity objectives is violated, or is credibly predicted to be violated in the future:-*** This requires that a disciplined monitoring programme be in place, that the custodian of the particular programme (post/person specified in low-level TPC plans for each theme in Mountain Zebra NP) duly report the exceedance to a competent (preferably formally constituted) joint science-management forum, which includes the Park Manager or his duly appointed delegate. This must lead to a management response. There is currently no such science-management forum in Mountain Zebra NP, and establishing one is therefore a crucial step in the park's adaptive management cycle over the next 5 years. Moreover, the suite of biophysical TPCs suggested for Mountain Zebra NP require explicit formulation and quantification. Wide experience shows it is far better to have roughly defined preliminary TPCs for these themes (and improve these later, something which then tends to happen automatically) than to wait years for perfect ones to be developed.

- ***Feedback that the predicted outcome (of management resulting from the above exceedance) of an intervention is achieved, or what materialized instead in its place:-*** This is usually directly measurable by checking whether the same TPC returned to within its acceptable limits after management action was taken. In Mountain Zebra NP this should be done by at least quarterly meetings of the science-management forum to be formed. The best possible adaptive decision must then be taken in light of this evaluation. Examples of outcomes that are likely to be of particular learning value in Mountain Zebra NP are the outcomes of predator-prey relationships, including the effect of cheetah on the growth rate of the mountain zebra population, the effects of minimum intervention on herbivore populations, and the effectiveness of jointed cactus control mechanisms. Additional feedbacks that are required, but for which no formal TPCs exist, relate to the effect of fire on vegetation diversity (composition, structure) in arid grasslands, and the effects of minimising/closing down further waterholes. The results of black rhino monitoring will contribute towards assessing whether habitat in Mountain Zebra NP really is suitable for the metapopulation management of this species.

- ***Feedback to SANParks Head Office of the overall performance of Mountain Zebra NP relative to its stated objectives:-*** This will be done via an annual State of Biodiversity report and other incidental reporting for Mountain Zebra NP. It is likely that Mountain Zebra NP may, for several key themes, take many years to progress towards the desired state (e.g. park expansion, development of the road network, invasive alien plant control), and that several issues may remain outside thresholds for many years, or may even require fine-tuning as our knowledge of the system increases or societal values change. It is important in these cases to track progress by achievement of intermediate steps towards the desired state, or to document the reasons for any changes in the mechanisms of achieving the desired state.

- ***Feedback as to whether organizational or societal acceptance of the consequence of an intervention is still, as agreed on previously, acceptable:-*** This is a longer-term adaptive evaluation, and if expectations are roughly met, can be dealt with at the time of the 5-yearly public meeting held to review the management plan. If, however, significant unintended consequences materialized that have shorter-term impacts, it will be the responsibility of the science-management forum above, to sense this, reflect on it, and make an appropriate recommenda-

tion to the Park Manager. The areas in which this is likely to occur are conflicting interests regarding park expansion, the issue of damage-causing animals and whether they originate within the park, financial accessibility of the park to locals, resource use in the park, and potential large-scale mortality of animals during drought periods related to the minimum interference management policy.

- ***Feedback as to whether the monitoring programme and list of TPCs is manageable/achievable and effective:-*** This is the responsibility of the scientific custodians involved, but overall (the programme taken as a whole) the responsibility of the science-management forum above. It is broadly challenged each 5 yearly cycle. The explicit use of adaptive management, using TPCs to make management decisions, and evaluating the state of Mountain Zebra NP along a trajectory of change away from its desired state by means of a monitoring programme, will be a new endeavour for Mountain Zebra NP. There may thus initially be feelings that the task is overwhelming, and these should be countered by referring to the objectives hierarchy for prioritisation of the various initiatives and strategies required. Manageable, achievable and effective monitoring and feedback will require complete buy-in and co-operation of the joint science-management forum, and careful consideration of the choice of a small and realistic list of TPCs that indicate the condition of essential ecosystem processes as far as possible.

- ***Feedback as to whether objectives need adjustment in the longer-term:-*** This is dealt with effectively at the 5-yearly review step. However, in the case of perceived "emergencies" the Park Manager is constrained within the limits of agreement. In Mountain Zebra NP, the most likely issues that may stir debate over the longer term are the park expansion programme, and the ecological spinoffs of the minimum interference policy with regards to game populations. However, these issues should make use of the objectives hierarchy, which flows directly from the jointly agreed upon Vision and Mission for Mountain Zebra NP, as guidance during conflict resolution.

- ***Feedback as to, or at least latent preparation for, surprises:-*** By definition these cannot be predicted. It will however, be an explicit obligation of the Park Manager to take responsibility to stimulate contingency and risk management assessments. From an ecosystem perspective, such surprises are best dealt with by generating scenarios. Mountain Zebra's joint science-management should aim to conduct at least one structured scenario planning session per 5-year cycle. In Mountain Zebra NP, appropriate scenarios are likely to include uncontrolled extensive lightning fires, outbreaks of disease in ecologically important or valuable animal species, or a significant reduction in the numbers of high value game species through droughts or predation.

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APPENDIX 1

MOUNTAIN ZEBRA NATIONAL PARK ZONING PLAN

INTRODUCTION

The primary objective of a park zoning plan is to establish a coherent spatial framework in and around a park to guide and co-ordinate conservation, tourism and visitor experience initiatives. A zoning plan plays an important role in minimizing conflicts between different users of a park by separating potentially conflicting activities such as game viewing and day-visitor picnic areas whilst ensuring that activities which do not conflict with the park's values and objectives (especially the conservation of the protected area's natural systems and its biodiversity) can continue in appropriate areas. A zoning plan is also a legislated requirement of the Protected Areas Act, which stipulates that the management plan, which is to be approved by the Minister, must contain "a zoning of the area indicating what activities may take place in different sections of the area and the conservation objectives of those sections".

The zoning of Mountain Zebra National Park was based on an analysis and mapping of the sensitivity and value of a park's biophysical, heritage and scenic resources; an assessment of the regional context; an assessment of the park's current and planned infrastructure and tourist products; and an assessment of the expansion plan for the park and its implication for use zoning. This was undertaken in an iterative and consultative process. This document sets out the rationale for use zones, describes the zones, and provides management guidelines for each of the zones.

RATIONALE FOR USE ZONES

The prime function of a protected area is to conserve biodiversity. Other functions such as the need to ensure that visitors have access to the park, and that adjoining communities and local economies derive benefits from the area, potentially conflict with and compromise this primary function. Use zoning is the primary tool to ensure that visitors can have a wide range of quality experiences without comprising the integrity of the environment.

Further, people visit a park with differing expectations and recreational objectives. Some people are visiting a park purely to see wildlife as well as natural landscapes. Others wish to experience intangible attributes such as solitude, remoteness, wildness, and serenity (which can be grouped as wilderness qualities), while some visit to engage in a range of nature-based recreational activities, or to socialize in the rest camp. Different people have different accommodation requirements ranging from extreme roughing it up to luxury catered accommodation. There is often conflict between the requirements different users and different activities. Appropriate use zoning serves to minimizing conflicts between different users of a park by separating potentially conflicting activities such as game viewing and day-visitor picnic areas whilst ensuring that activities which do not conflict with the park's values and objectives (especially the conservation of the protected area's natural systems and its biodiversity) can continue in appropriate areas. Use zones serve to ensure that high intensity facilities and activities are placed in areas that are robust enough to tolerate intensive use, as well as to protect more sensitive areas of the park from over-utilization.

3. PARK USE ZONATION SYSTEM

The process followed to compile the zoning system

The zoning of Mountain Zebra National Park was based on an analysis and mapping of the sensitivity and value of a park's biophysical, heritage and scenic resources; an assessment of the regional context; an assessment of the park's current and planned infrastructure and tourist products; and an assessment of the expansion plan for the park and its implication for use zoning. This was undertaken in an iterative and consultative process. The park use zonation plan is a lean version of the Conservation Development Framework (CDF). The park use zonation is based on the same biodiversity and landscape analyses undertaken for a CDF. However, certain elements underlying the CDF may not be fully incorporated into the park use zonation. In particular, the park use zonation plan will usually not incorporate elements such as a full tourism market analysis. Typically the park use zonation approach is applied in smaller and developing parks such as Mountain Zebra National Park, though the long term objective is to have a full CDF for all parks.

The zoning system

SANParks has adopted a dual zoning system for its parks. The system comprises:
a) Visitor use zones covering the entire park, and
b) Special management overlays which designate specific areas of a park that require special management interventions.

Table 2: Summary of the percentage area of the park covered by each zone, as well as the percentage of the highly environmentally sensitive and valuable areas (defined as areas with values in the top quartile of the sensitivity value analysis) that are in each zone.

		Zone as a percentage of park area	Percentage of highly sensitive areas that are in the zone
Mountain Zebra National Park			
Conservation orientated zone	Remote	20.1	65.4
	Primitive	41.3	28.2
Tourism orientated zone	Quiet	0.3	0.7
	Low Intensity Leisure	37.5	5.4
	High Intensity Leisure	0.8	0.3

Table 1: Summary of Use Zone Characteristics

Zone	General Characteristics	Experential Qualities	Interaction between uses	Type of Access	Type of activities	Limits of acceptable change: Biophysical	Limits of acceptable change: Aesthetics and facilities
REMOTE*	Retain an intrinsically wild appearance and character, incapable of being altered to such.	Solitude and awe inspiring natural characteristics	None to very low	Controlled access, only on foot	Hiking in small groups	Deviation from a natural/pristine state should be minimized, and existing impacts should be reduced	Activities which impact on the intrinsically wild appearance and character of the area will not be tolerated.
PRIMITIVE	Generally retain wilderness qualities, but with basic self-catering facilities. Access is controlled. Provides access to the Remote Zone, and can serve as a buffer.	Experience wilderness qualities	Low	Controlled access. Accompanied or unaccompanied. Foot 4x4 vehicles	Hiking; 4x4 drives; game viewing; possibly horse riding	Deviation from a natural/pristine state should be small and limited to isolated impact footprints. Existing impacts should be reduced.	Activities which impact on the intrinsically wild appearance and character of the area should be isolated, and impacts limited to the site of the facility.
QUIET	This zone allows non-motorised access to areas which generally retain a natural appearance and character. Access is not specifically controlled.	Wide range of activities, relaxation in a natural environment	Moderate to high	Unaccompanied non-motorised access. Mainly on foot, non-motorised access to specific facilities.	Hiking; walking; rock climbing; bird watching	Some deviation from a natural/pristine state is allowed, but care should be taken to restrict the development footprint. Infrastructure, especially paths and viewpoints should be designed to limit the impacts of large numbers of visitors on the biophysical environment.	Activities which impact on the visitor's natural appearance and character of the area should be isolated, though the presence of larger numbers of visitors and the facilities they require, may impact on the feeling of wilderness found in this zone.
LOW INTENSITY LEISURE	The underlying characteristics of this zone is motorised self-drive access with basic self-catering facilities. The number of visitors are higher than in the Remote and Pristine Zones. Campsites without modern facilities such as shops and restaurants.	Comfortable facilities in a relatively natural environment.	Moderate to high	Motorised self-drive access. When busses are permitted, some roads should be designated as accessible to self-drive only.	Motorised self-drive game viewing, picnicking, walking, cycling, rock climbing; hiking; adventure activities	Deviation from a natural/pristine state should be minimized and limited to isolated impact footprints as far as possible. However, it is accepted that some damage to the biophysical environment associated with tourist activities and facilities will be inevitable.	Although it is inevitable that activities and facilities will impact on the wild appearance and reduce the wilderness characteristics of the area, these should be managed and limited to ensure that the area still provides relatively natural outdoor experience.
HIGH INTENSITY LEISURE	The main characteristic is that of a high density tourist development node, with modern amenities, where more concentrated human activities are allowed.	Comfortable and sophisticated facilities while retaining a natural ambiance	High	Accessible by motorised transport (distribution high volume transport routes, including delivery vehicles.	As above. Additional sophisticated infrastructure. Larger, organised adventure activities (orienteering, fun runs). Dining at restaurants.	The greatest level of deviation from a natural/pristine state is allowed in this zone, and it is accepted that damage to the biophysical environment associated with tourist activities and facilities will be inevitable.	Although it is inevitable that the high visitor numbers, activities and facilities will impact on the wild appearance and reduce the wilderness characteristics of the area, these should be managed and limited to ensure that the area generally still provides a relatively natural outdoor experience appropriate for a national park.

*Wilderness areas need to be investigated and officially designated.

The zoning of Mountain Zebra National Park is shown in Appendix 2, and summarised in Table One. Appendix 2 also shows the relationship between the use zoning and the summary products of the biodiversity and landscape sensitivity-value analysis.

Remote Zone

Characteristics

This is an area retaining an intrinsically wild appearance and character, or capable of being restored to such, and which is undeveloped and roadless. There are no permanent improvements or any form of human habitation. It provides outstanding opportunities for solitude with awe inspiring natural characteristics. If present at all, sight and sound of human habitation and activities are barely discernable and at far distance. The zone also serves to protect sensitive environments from development impacts and tourism pressure.

Visitor activities and experience

Activities: Access is strictly controlled and on foot. Groups must be small, and can either be accompanied by a guide or unaccompanied. Several groups may be in area at the same time, but if necessary densities and routes should be defined so that no signs can be seen or heard between the groups. The principles of "Pack it in Pack it out" must be applied.

Interaction with other users: There is no interaction between groups. The numbers of groups within the area will be determined by the ability to ensure that there is no interaction between groups.

Objectives of the zone (Limits of acceptable change)

Biophysical environment: Deviation from a natural/pristine state should be minimized, and existing impacts should be reduced.

Aesthetics and recreational environment: Activities which impact on the intrinsically wild appearance and character of the area, or which impact on the wilderness characteristics of the area (solitude, remoteness, wildness, serenity, peace etc) will not be tolerated.

Facilities

Type and size: No facilities are provided. Should overnight facilities be required to serve this zone, these should be placed in the adjoining zones.

Sophistication of facilities: No facilities except self carried portable tents. Guidelines for washing, ablution and cooking must be defined according to the "Pack it in Pack" it out principles. Camping only at designated sites.

Audible equipment and communication structures: None.

Access and roads: Public access is non-motorized. Vehicular access and parking is provided in the adjoining Primitive zone. Established footpaths may be provided where erosion risks occur.

Location in Park

In Mountain Zebra NP, Remote areas were designated in the high altitude mountain areas of the park. The zones were designated include most landscapes with high environmental sensitivity and value.

Primitive Zone

Characteristics

The prime characteristic of the zone is the experience of wilderness qualities with the accent on controlled access. Access is controlled in terms of numbers, frequency and size of groups. The zone shares the wilderness qualities of Wilderness Areas and Remote zones, but with the provision of basic self-catering facilities and access. It also provides access to the Remote zone and Wilderness Area. Human activities and development outside of the park may be visible from this zone.

This zone has the following functions:

- It provides the basic facilities and access to serve Wilderness Areas and Remote zones.
- It contains concession sites and other facilities where impacts are managed through strict control of the movement and numbers of tourists, for example if all tourists are in concession safari vehicles.
- It serves as a buffer to the fringe of the park and other zones, in particular Wilderness and Remote.
- It serves to protect sensitive environments from high levels of development.

Visitor activities and experience

Activities: Access is controlled in terms of numbers, frequency and size of groups. Activities include hiking, 4x4 drives and game viewing. Access is controlled either through only allowing access to those with bookings for specific facilities, or alternatively through a specific booking or permit for a particular hiking trail or 4x4 route. Several groups may be in area at the same time, but access should be managed to minimize interaction between groups if necessary.

Interaction with other users: Interaction between groups of users is low, and care must be taken in determining the number and nature of facilities located in the area in order to minimize these interactions.

Objectives of the zone (Limits of acceptable change)

Biophysical environment: Deviation from a natural/pristine state should be small and limited to restricted impact footprints. Existing impacts should be reduced. Any facilities constructed in these areas, and activities undertaken here should be done in a way that limits environmental impacts. Road and infrastructure specifications should be designed to limit impacts.

Aesthetics and recreational environment: Activities which impact on the intrinsically wild appearance and character of the area, or which impact on the wilderness characteristics of the area (solitude, remoteness, wildness, serenity, peace etc) should be restricted and impacts limited to the site of the facility. Ideally visitors should only be aware of the facility or infrastructure that they are using, and this infrastructure/facility should be designed to fit in with the environment within which it is located in order to avoid aesthetic impacts.

Facilities

Type and size: Facilities are small, often very basic, and are distributed to avoid contact between users. Alternatively facilities designed for high levels of luxury, but limited visitor numbers can be accommodated here (e.g. controlled access private camps or concession sites).

Sophistication of facilities: Generally facilities are small, basic and self-catering, though concession facilities may be significantly more sophisticated.

Audible equipment and communication structures: None.

Access and roads: Vehicular access to facilities is limited to low-spec roads, often 4x4 only. Tourist and game viewing roads are 4x4 only. Established footpaths are provided to avoid erosion and braiding.

Location in Park

In Mountain Zebra NP, Primitive areas were designated to buffer Remote areas from higher use areas, as well as to protect most of the remaining sensitive areas (such as the Wilgeboom Valley and most escarpment slopes)

from high levels of tourist activity. Primitive areas were also designated in valleys with low environmental sensitivity to allow access to Remote areas as well as to contain the infrastructure required for management and tourist activity in these areas (e.g. trail huts and access roads). The two satellite sections of Mountain Zebra National Park were designated primitive pending their full consolidation into the park. In areas where Remote zones border on the park boundary, a 100m wide Primitive zone was designated to allow park management access to fences.

Quiet Zone

Characteristics

This zone is characterized by unaccompanied non-motorized access without specific access control and permits. Visitors are allowed unaccompanied (or accompanied) access, mainly on foot, for a wide range of experiences. Larger numbers of visitors are allowed than in the Primitive zone and contact between visitors is frequent. The main accent is on unaccompanied non motorized access. Larger numbers of visitors are allowed and contact between visitors is frequent. It is important to note that this zone may have different interpretations in different parks and the CDF documentation for each park should set the objectives specific to that park. Thus, in some instances horses and mountain bikes could be accommodated. This zone can also provide non motorized access within Low and High Intensity Leisure zones away from vehicular access roads.

Visitor activities and experience

Activities: Hiking, rock climbing, bird watching, self guided constructed trails and walks.

Interaction with other users: Interaction between groups of users is frequent.

Objectives of the zone (Limits of acceptable change)

Biophysical environment: Some deviation from a natural/pristine state is allowed, but care should be taken to restrict the development footprint. Infrastructure, especially paths and viewpoints should be designed to limit the impacts of large numbers of visitors on the biophysical environment.

Aesthetics and recreational environment: Activities which impact on the relatively natural appearance and character of the area should be restricted, though the presence of larger numbers of visitors and the facilities they require, may impact on the feeling of "wildness" found in this zone.

Facilities

Type and size: Hiking trails, footpaths, bird hides. No accommodation. Ablution facilities may be provided in high use areas. Heritage structures may be used for recreation purposes.

Sophistication of facilities: Where provided these should be basic.

Audible equipment and communication structures: Allowed, but should be managed to retain a relative level of solitude.

Access and roads: Essentially pedestrian access, but in certain parks horse and Mountain bikes can be accommodated. Pedestrian only or in some cases cycles. No access for tourists by vehicle. The only roads are essential two wheeled management tracks.

Location in Park

In Mountain Zebra NP, Quiet areas were designated immediately adjacent to the main rest camp to allow visitors access on foot.

Low Intensity Leisure Zone

Characteristics

The underlying characteristic of this zone is motorized self-drive access with basic self-catering facilities. The numbers of visitors are higher than in the Remote and Primitive zones. These camps are without modern facilities such as shops and restaurants. Relatively comfortable facilities are positioned in the landscape retaining the inherent natural and visual quality which enhances the visitor experience of a more natural and self providing experience. Access roads are low key, preferably gravel roads and/or tracks to provide a more wild experience. Facilities along roads are limited to basic self-catering picnic sites with toilet facilities. In some parks, large busses and open safari vehicles are not permitted.

Visitor activities and experience

Activities: Self drive motorized game viewing, picnicking, walking, cycling, game viewing, rock climbing, hiking, adventure activities.

Interaction with other users: Moderate to high

Objectives of the zone (Limits of acceptable change)
Biophysical environment: Deviation from a natural/pristine state should be minimized and limited to restricted impact footprints as far as possible. However, it is accepted that some damage to the biophysical environment associated with tourist activities and facilities will be inevitable.

Aesthetics and recreational environment: Although activities and facilities will impact on the wild appearance and reduction of the wilderness characteristics of the area (solitude, remoteness, wildness etc) is inevitable, these should be managed and limited to ensure that the area still provides a relatively natural outdoor experience.

Facilities
Type and size: Picnic sites, view sites, information centres, ablution facilities, parking areas, education centres etc. Small self-catering (including camping) camps of low to medium density 25-35 beds. Additional facilities can include swimming pools. Trails for 4x4 trails can also be provided. Day visitor site are not placed within the camps. Day visitor sites must relate to the general self-catering characteristic of the zone.

Sophistication of facilities: Self contained self-catering units with bathroom facilities. Camp sites will include ablution facilities. These camps are without modern facilities such as shops and restaurants.

Audible equipment and communication structures: Cell phone coverage in vicinity of camps. Code of use for cell phones and radios required to retain relative level of solitude.

Access and roads: Motorized self drive sedan car access (traditional game viewing) on designated routes which are preferably gravel roads. In some parks, large busses and open safari vehicles are not permitted. When busses are permitted some roads should be designated as accessible to self drive only. Roads are secondary gravel tourist roads or minor game viewing roads.

Location in Park

In Mountain Zebra NP, Low intensity leisure areas were designated in the current game viewing areas (Rooiplaat, the northern plains areas and the Wilgeboom loop), as well as additional potential plateau and plains areas where these did not conflict with the underlying landscape sensitivity and value analysis.

High Intensity Leisure Zone

Characteristics

The main characteristic is that of a high density tourist development node with modern amenities such as restaurants and shops. This is the zone where more concentrated human activities are allowed. As impacts and particularly cumulative impacts are higher, such facilities

should be placed on the periphery of the park. Staff not directly associated with tourism facilities should be accommodated outside of the park if possible. All industrial type facilities such as laundries, abattoirs, maintenance depots and workshops should ideally be located outside of the park within suitably zoned adjoining urban or rural areas. Accessible by motorized transport (Car/bus) on high volume transport routes. More concentrated activities occur than in than Low Intensity leisure.

Visitor activities and experience

Activities: Traditional game viewing routes with associated more sophisticated infrastructure, sight seeing at tourist destinations, picnicking, walking, cycling, rock climbing, hiking, adventure activities (orienteering, scuba diving, fun runs), activities associated with amenities such as dining in restaurants.

Interaction with other users: High

Objectives of the zone (Limits of acceptable change)

Biophysical environment: The greatest level of deviation from deviation from a natural/pristine state is allowed in this zone, and, it is accepted that damage to the biophysical environment associated with tourist activities and facilities will be inevitable. However, care must be taken to ensure that the zone still retains a level of ecological integrity consistent with a protected area.

Aesthetics and recreational environment: Although the high visitor numbers, activities and facilities will impact on the wild appearance and reduction of the wilderness characteristics of the area (solitude, remoteness, wildness etc) is inevitable, these should be managed and limited to ensure that the area generally still provides a relatively natural outdoor experience.

Facilities

Type and size: High density camps providing tourist accommodation with modern amenities. Restaurants, shops, education centres, botanical gardens. Day visitor sites are provide outside of main camps. Day visitor sites or picnic sites may provide catered facilities and kiosks. In some parks it may be necessary to provide high density recreational sites with a wide range of intensive activities (edutainment centres) close to the periphery of the park. Picnic sites, view sites, information centres, ablution facilities, parking areas, education centres etc. Staff villages and administrative centres restricted to core staff. Non essential staff housing, administration and industrial activities positioned outside of or peripheral to the park.

Sophistication of facilities: Moderate to high density facilities. Self catering and catered. These camps have modern facilities such as shops and restaurants.

Audible equipment and communication structures: Cell phone coverage in vicinity of camps. Code of use for cell phones and radios required to retain relative level of solitude.

Access and roads: The zone is highly motorized including busses and delivery vehicles on designated routes which are often tarred. Care must be taken to distinguish between roads that serve as high access delivery routes to camps, link roads between camps, and game viewing roads to minimize conflict between users.

Location in Park

In Mountain Zebra NP, High intensity leisure areas were restricted to the current rest camp and management areas.

THE PARK INTERFACE ZONE

The Park Interface Zones shows the areas within which landuse changes could affect a national Park. The zones, in combination with guidelines, will serve as a basis for a.) identifying the focus areas in which park management and scientists should respond to EIA's, b.) helping to identify the sort of impacts that would be important at a particular site, and most importantly c.) serving as the basis for integrating long term protection of a national park into the spatial development plans of municipalities (SDF/IDP) and other local authorities. In terms of EIA response, the zones serve largely to raise red-flags and do not remove the need for carefully considering the exact impact of a proposed development. In particular, they do not address activities with broad regional aesthetic or biodiversity impacts.

The Park Interface Zone for Mountain Zebra NP has two overlaying categories, namely priority natural areas, and a visual/aesthetic zone (Appendix 2).

Priority Natural Areas

This zone aims to ensure the long term persistence of biodiversity, within and around the park, by identifying the key areas on which the long term survival of the park depends. This includes areas important to both biodiversity pattern (especially reasonably intact high priority natural habitats) and processes (ecological linkages, catchments, intact hydrological systems, etc.). This does not imply any loss of existing rights (e.g. current agricultural activities or legal extractive biodiversity use such as fishing), but rather aims to ensure the parks survival in a living landscape.

Priority natural areas include areas identified for future park expansion as well as reasonably natural areas of high biodiversity value which are critical for the long-term persistence of biodiversity within the park. These include adjacent natural areas (especially high priority habitats) which function as an ecologically integrated unit with the park, as well as areas critical for maintaining ecological links and connectivity with the broader landscape.

Development guidelines

Inappropriate developments and negative land use changes (such as additional ploughing of natural veld, development beyond existing transformation footprints, urban expansion, intensification of landuse through golf estates etc) should be opposed within this area. Developments with site specific impacts (e.g. a lodge on a game farm) should be favourably viewed if they contribute to ensuring conservation friendly land use within a broader area. Further inappropriate developments, such as dam construction, excessive aquifer exploitation, and development resulting in the loss of riparian vegetation, should be opposed. In addition, the control of alien vegetation, the control of soil erosion, and appropriate land care (e.g. appropriate stocking rates) should be promoted.

REFERENCES

Viewshed protection

These are areas where developments could impact on the aesthetic quality of a visitors experience in a park. This zone is particularly concerned with visual impacts (both day and night), but could also include sound pollution.

Development guidelines

Within these areas any development proposals should be carefully screened to ensure that they do not impact excessively on the aesthetics of the park. The areas identified are only broadly indicative of sensitive areas, as at a fine scale many areas within this zone would be perfectly suited for development. In addition, major projects with large scale regional impacts may have to be considered even if they are outside the Viewshed Protection Zone.

CURRENT STATUS AND FUTURE IMPROVEMENTS

The current park use zonation is based on the same biodiversity and landscape analyses undertaken for a Conservation Development Framework (CDF); however certain elements underlying the CDF such as a tourism market analysis are not be fully incorporated into the park use zonation. A full CDF will be developed for Mountain Zebra National Park within the current update cycle. Remote areas will be investigated for possible formal declaration designated as Wilderness Area in terms of section 22 of the PAA. Special management overlays which designate specific areas of a park that require special management interventions (e.g. areas requiring rehabilitation) will also be identified.

REFERENCES

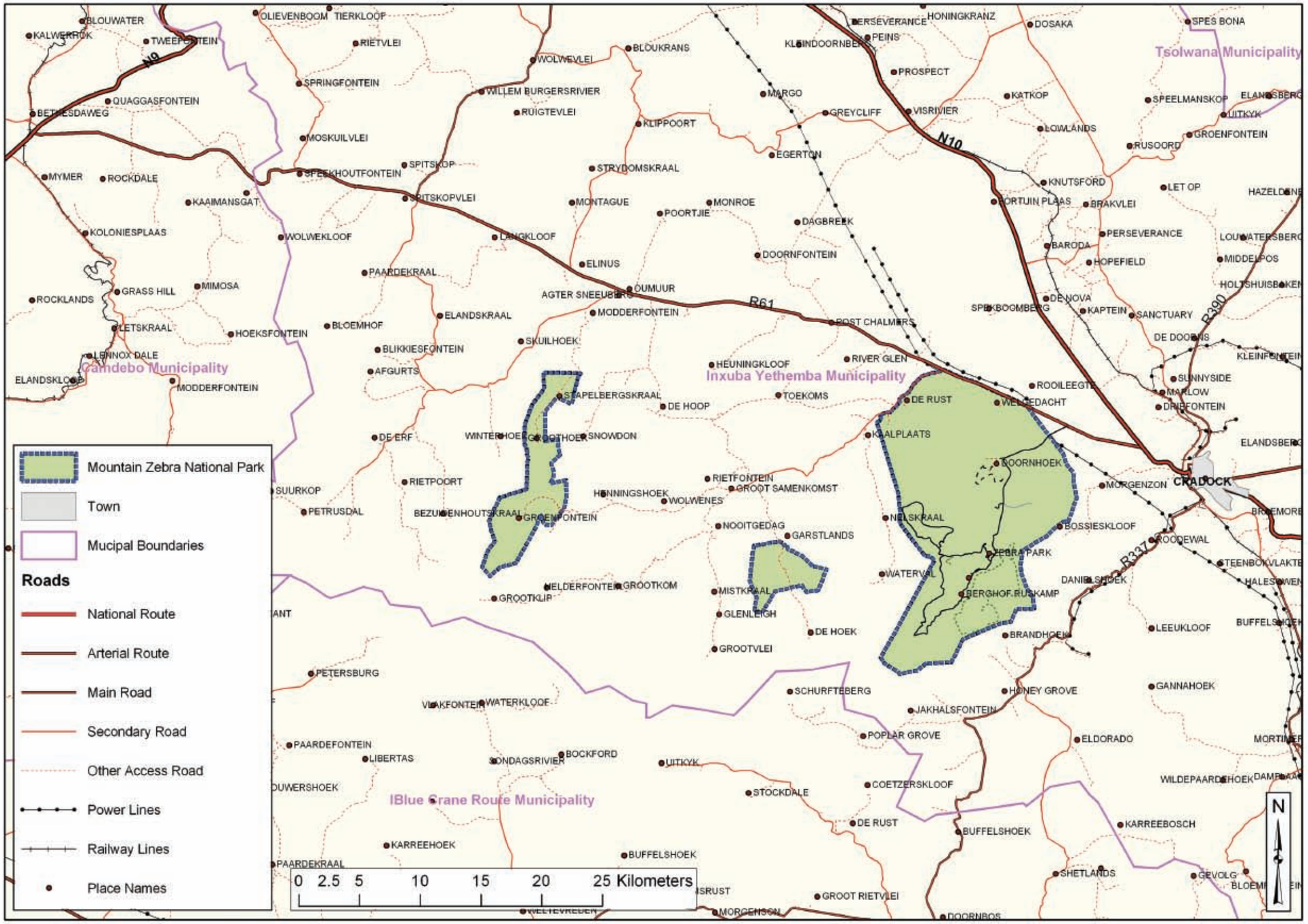
Department of Environmental Affairs and Tourism. 2003. National Environmental Management: Protected Areas Act (Act 57 of 2003). Department of Environmental Affairs and Tourism, Pretoria.

SANParks. September 2005. Sensitivity-Value analysis Manual. Unpublished. SANParks , Pretoria.

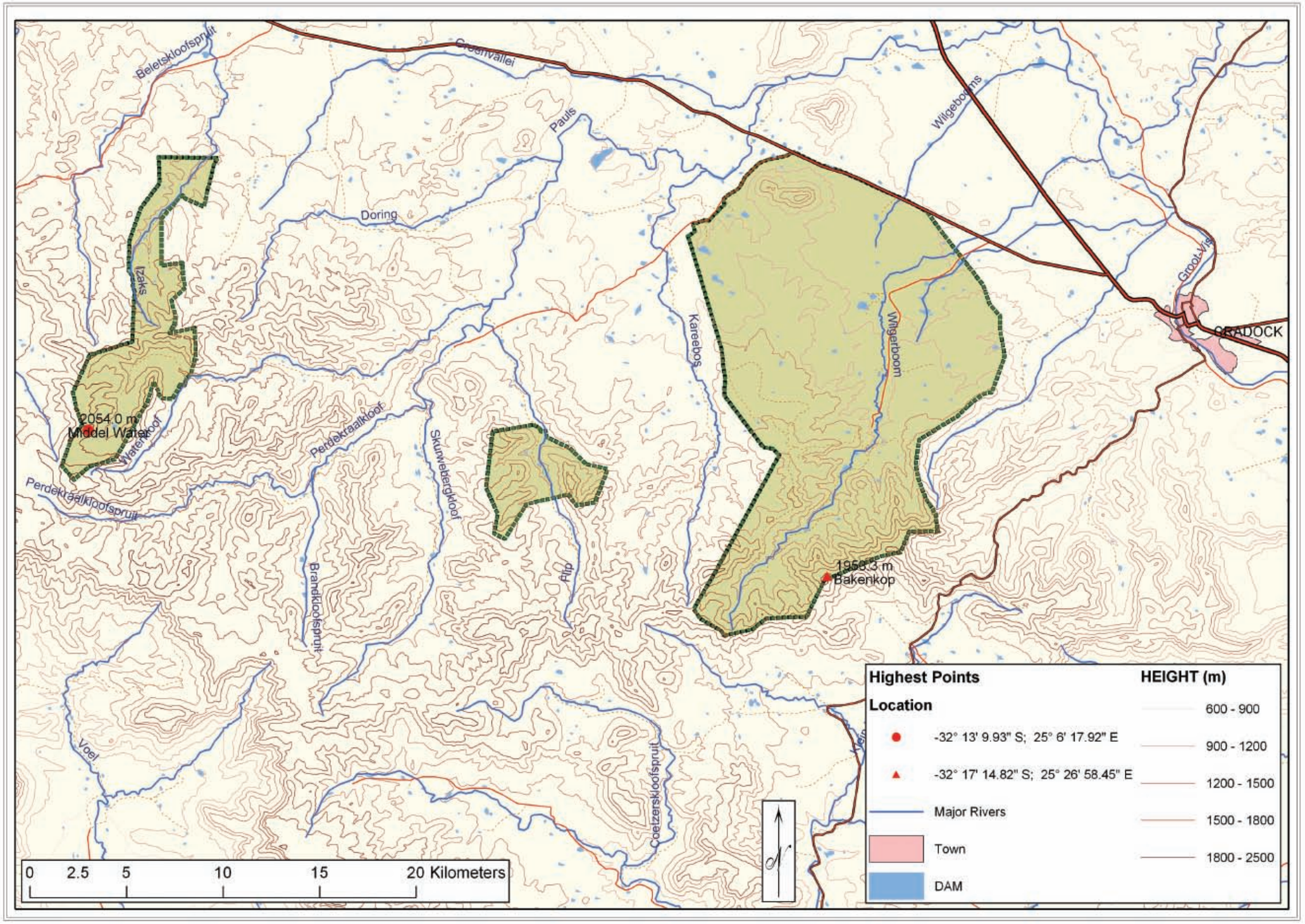
SANParks. November 2005. CDF Planning Manual. Unpublished. SANParks , Pretoria.

APPENDIX 2

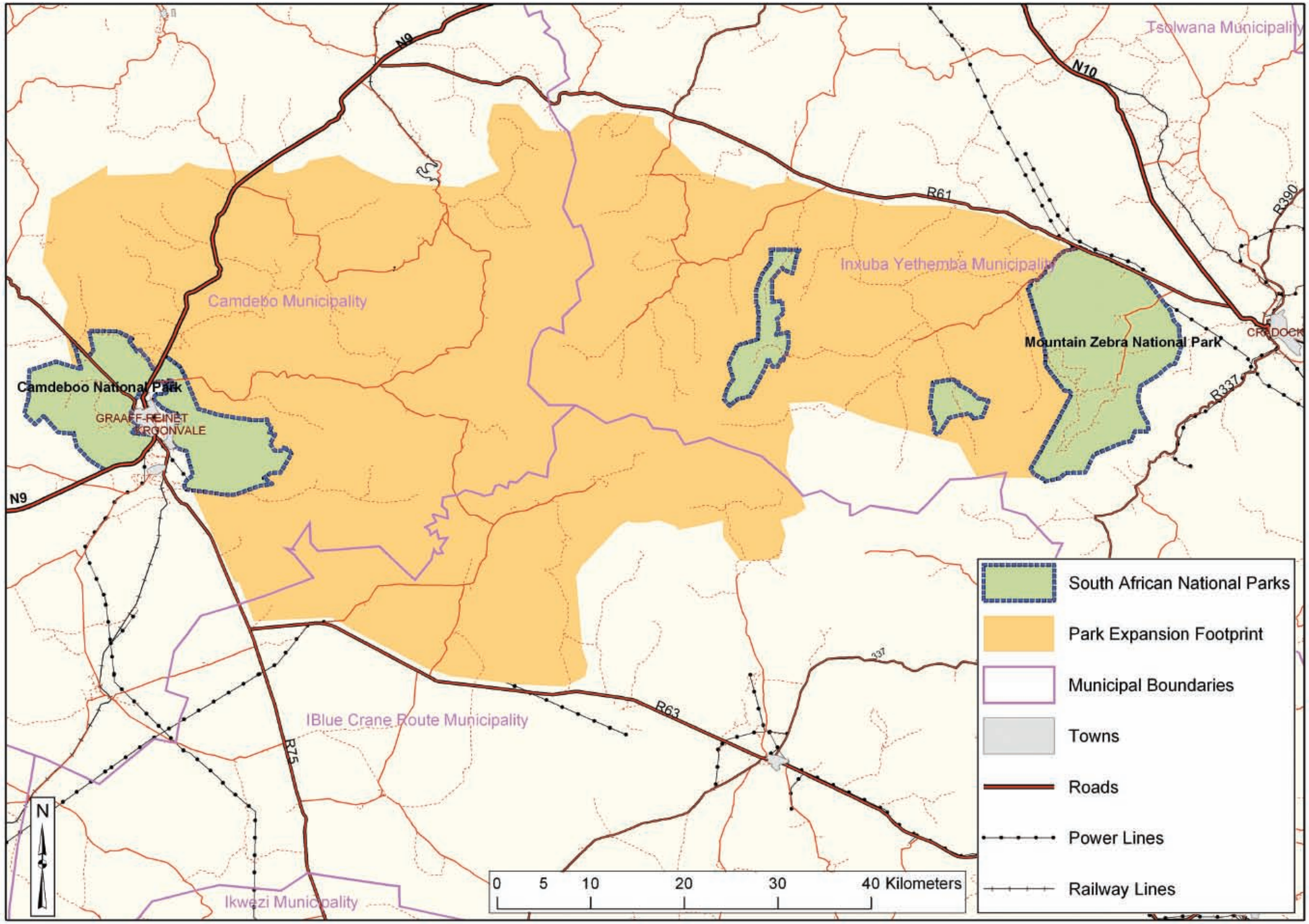
Map 1 – Regional Map



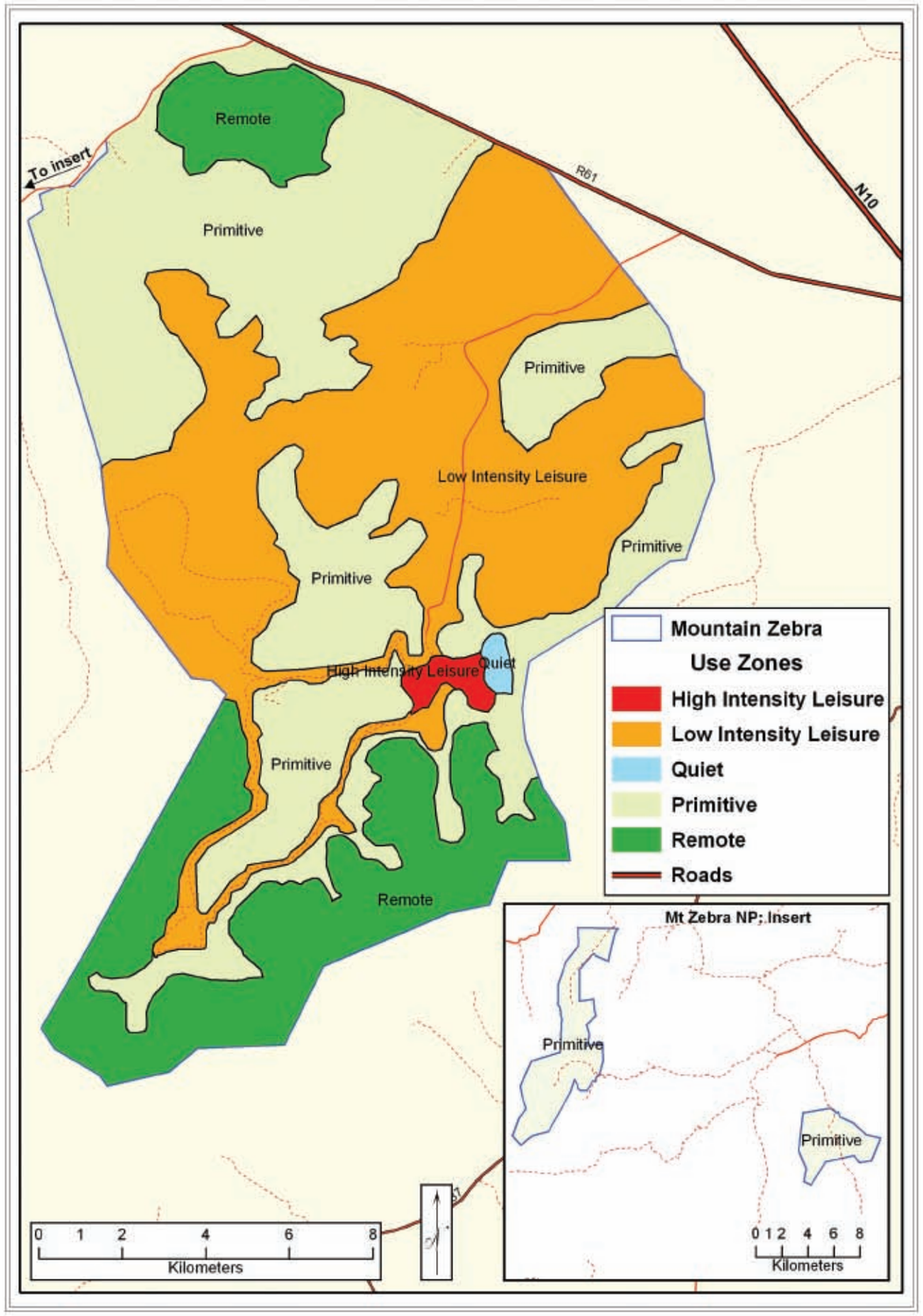
Map 2 – Physical features of the park



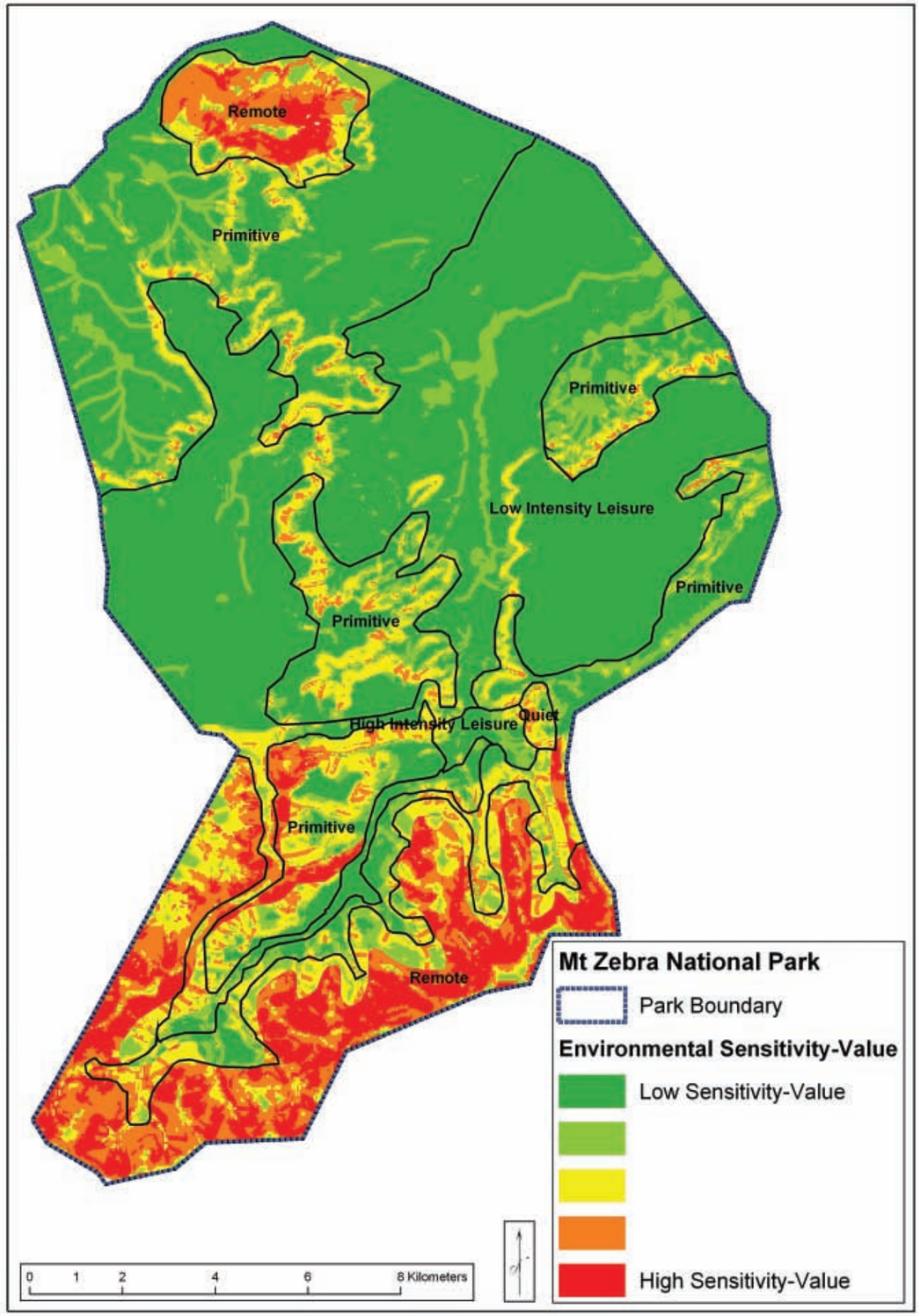
Map 3 – Land tenure and park expansion



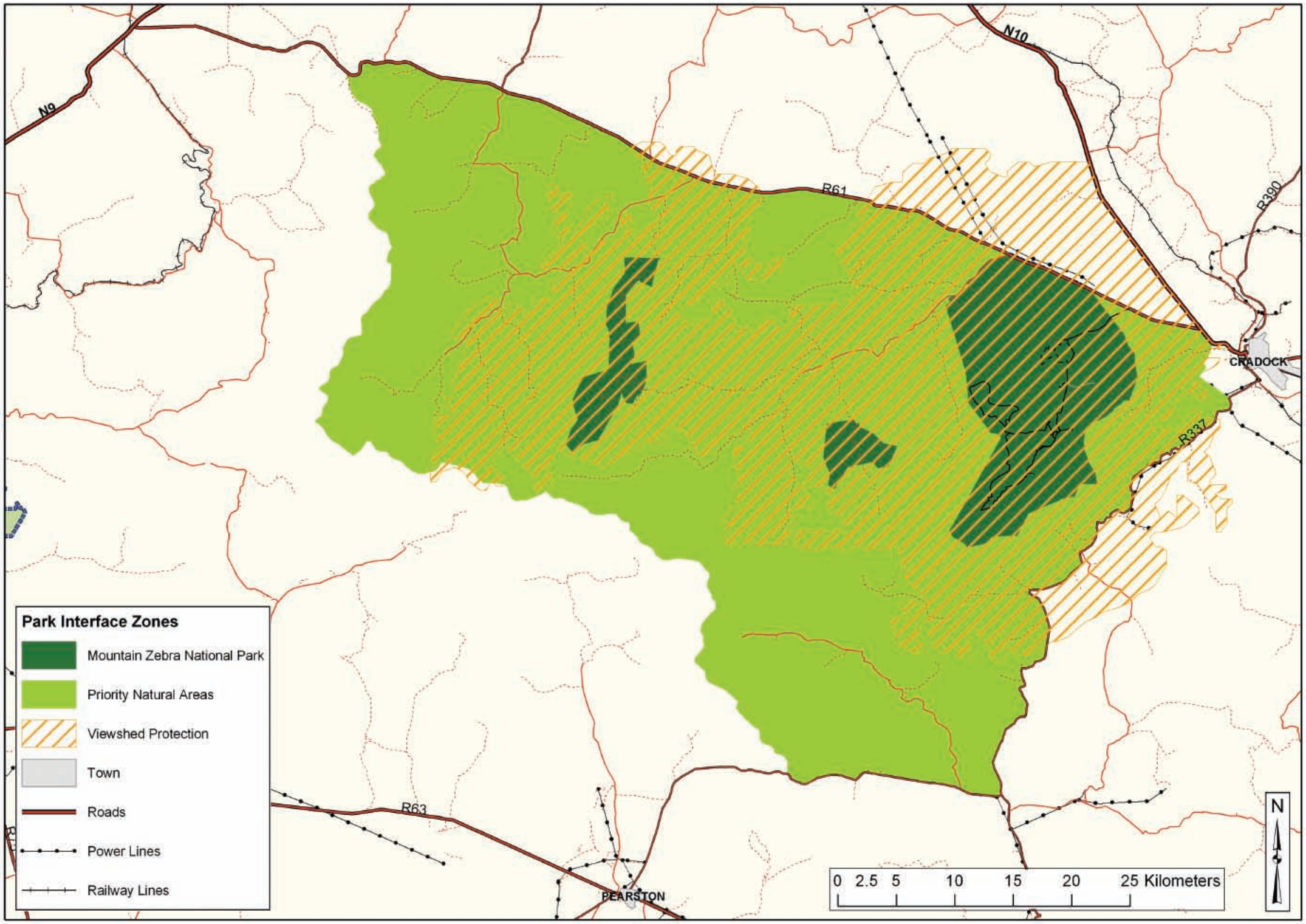
Map 4 – Zoning Maps



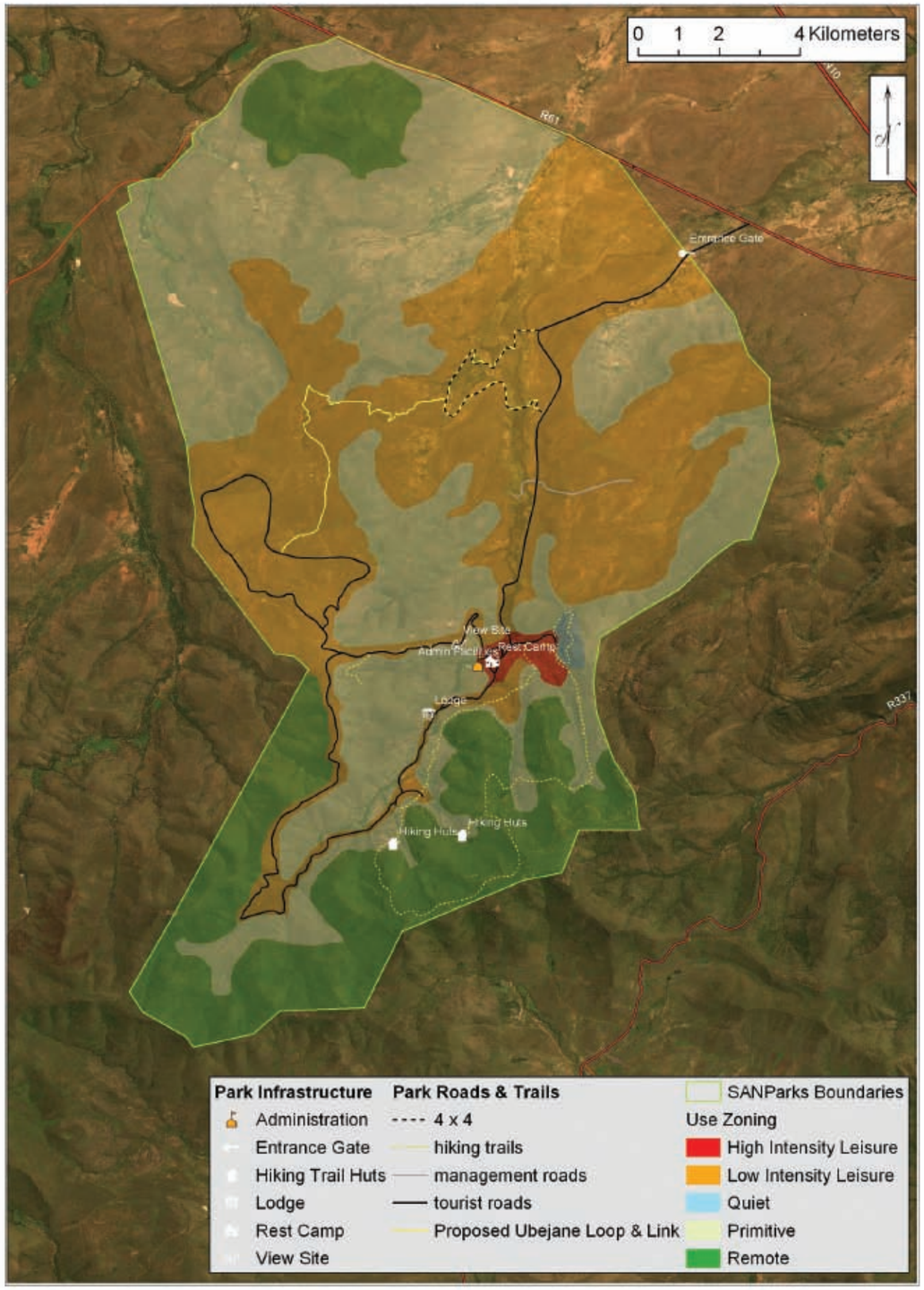
Map 5 – Zoning with sensitivity value



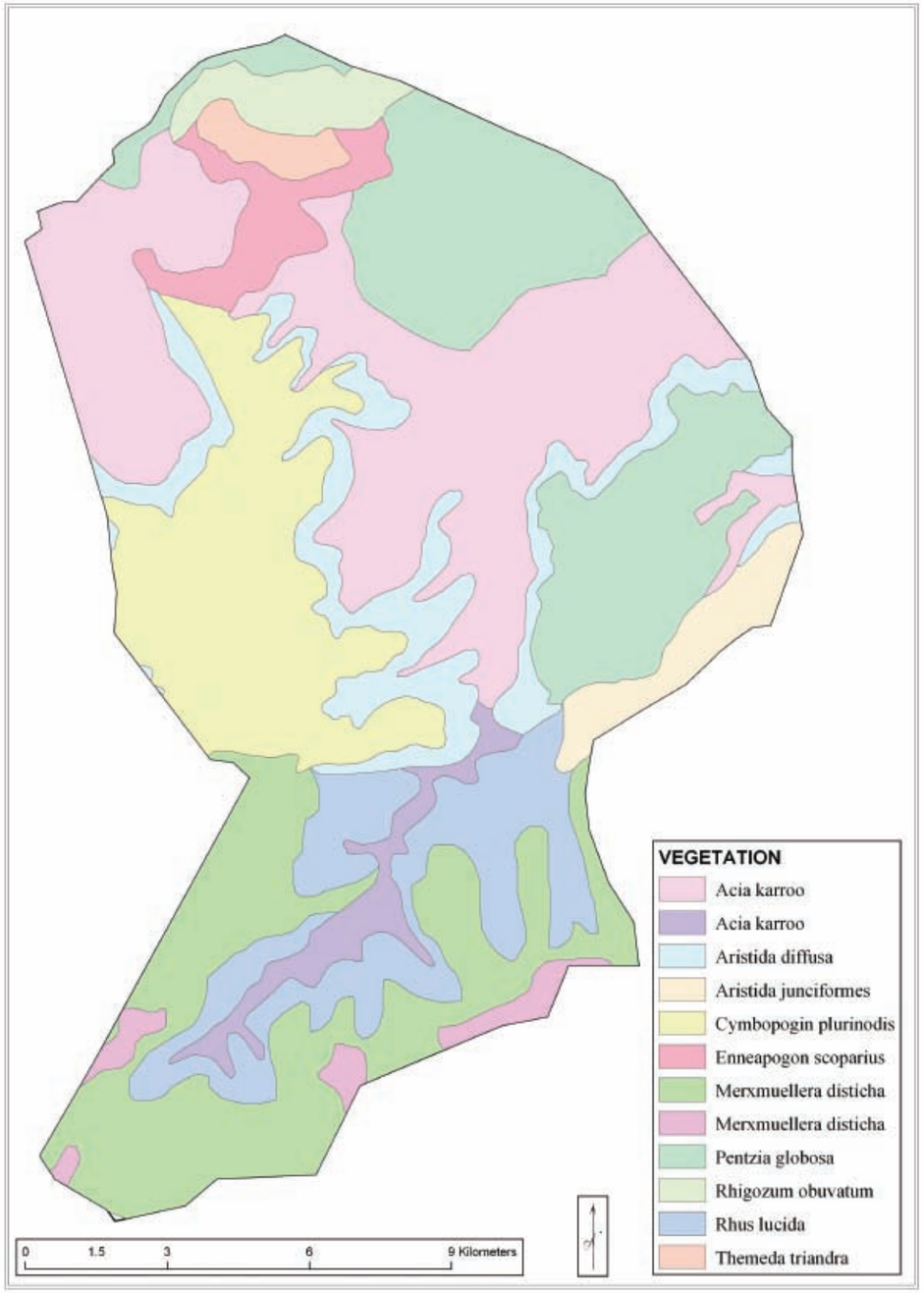
Map 6 – Buffer areas or interface zones



Map 7 – Infrastructure and development



Map 8 – Vegetation



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