



**South African**  
**NATIONAL PARKS**

# **Kruger National Park**

## **Park Management Plan**

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## EXECUTIVE SUMMARY

Kruger National Park is arguably one of South Africa's premier conservation holdings, its presence having arisen on what were originally large tracts of disease-infested land in the lowveld of north-eastern South Africa. Although it started out with a preservationist agenda, it went through many paradigm shifts over the century since its initial precursor, the Sabie Game Reserve, was first proclaimed. From the beginnings of ecotourism game-viewing in South Africa, through an era of assertive hands-on management and research, and growing tourism, to a situation today when management strives to be more hands-off but highly adaptive in the light of research and monitoring, Kruger has remained a national and international icon. In the mid-1990s, amidst tumultuous political and social change in South Africa, Kruger redefined its relationship with stakeholders from one of perceived "fortress conservation" to one of far more open involvement and more conscious regional interlinkages. Thus, for instance, Kruger sees itself as integrally embedded in the Greater Limpopo Transfrontier Conservation Area and forthcoming north-eastern escarpment bioregion, with research, monitoring and adaptive learning grow stronger.

In 1997 Kruger followed a public process of determining a desired state, the three focus areas then being *biodiversity, human benefits and wilderness*. At the first revision, of which this particular plan represents the output, the three important mainstays have remained but *cultural heritage* and later *constituency building* were added to the mission. Supporting this overarching mission comes a detailed objectives hierarchy (with more defined goals) and eventually, below these, a zoning plan and detailed endpoints of ecosystem change. These endpoints represent the now well-known thresholds of potential concern, and play a pivotal role in articulating the desired state to exact specifications, difficult though this is when a fundamental tenet is to allow as much change as possible in a natural system. This philosophy (desired state represented ultimately by thresholds) owes its origin to the Kruger National Park Rivers Research Programme which, during the nineties, had taken on the beleaguered cause of the perennial rivers flowing through Kruger and whose headwaters are all outside the park (this is an ongoing and major theme in park management still today). The philosophy has proven robust and useful for general implementation in ecosystem management, and currently is used in Kruger as an objective instrument to help determine when park authorities should be concerned about a wide range of issues, including impacts of herbivory (especially elephant).

Important breaches in co-operative governance arrangements led to recent river crises, and this feedback loop at provincial and national level is now receiving focused attention to prevent a recurrence. Other important themes in the biophysical desired state in Kruger include fire and nutrient cycling, pollination, disease and alien invasions. All this is put together under the general heading of heterogeneity, a desired level of landscape patchiness and function, and one which is undergoing healthy oscillations characteristic of a savanna. SANParks is of the view that such a configuration underlies all diversity. What were previously major thematic programmes (such as fire, elephant, surface water management, river management, neighbour relations, etc.) are becoming increasingly merged into more unitary overall programmes. While it is still a little early in our history to completely unify terrestrial and aquatic biodiversity programmes (though much common ground has been found) and to perhaps flange social and biodiversity programmes into one joint form, terrestrial biodiversity issues are presented here, and treated in practice, as one larger programme, albeit with interdigitated sub-programmes. This is testimony to clear understanding of our integrated mandate, and the complementary role of each issue. Apart from the two current major biodiversity thrusts (responses to poor river flow and a critical assessment of the role of elephant herbivory along with other ecosystem drivers) there is considerable interest in alien invasions which are generally currently under reasonable control (an exception being bovine tuberculosis) and an ongoing interest in species

conservation (key species in Kruger are black rhino, wild dog, pepperbark tree, wild ginger and Swazi impala lily). A justification framework helps prioritise these and other species which also require action, and trade this off against the modern need for overall ecosystem conservation.

Another crucial specification at the detailed planning end of the desired state is the zoning plan that is based on the conservation development framework guideline for SANParks, which though not complete, is based on the well-used precursor, the Recreational Opportunity Zonation Plan. Tourism objectives have always been strong, but are now developed as explicit statements during this revision, with care being taken to integrate tourism development needs with ecosystem and particularly wilderness and sense-of-place objectives. Kruger has identified candidate areas for formal designation as wilderness areas in line with the statutory provisions of the Protected Areas Act in support of another major theme, namely the maintenance of wilderness experiences in one of the few remaining parks in South Africa where this is possible over wide areas.

Tourism development in Kruger is currently undergoing strategic review in line with principles of responsible tourism and Kruger's forward-going paradigm shift towards providing high quality cultural and nature-based experiences. People and Conservation continue widening their empowerment opportunities for local people and enhancing the cultural heritage portfolio. A key project in this regard in the next 5 years is a systematic heritage resource inventory and the development of a heritage plan linked to tourism opportunities.

Outside the biophysical and tourism realm, major themes in the desired state include the mapping, auditing and development of preservation, conservation and management of cultural heritage landscapes and resources (notably Thulamela and Masorini sites, and a wide spread of San rock art) within the thematic domain of People and Conservation. Other major thrusts are initiatives for local economic empowerment, also through programmes such as 'Working for Water' while, environmental education and youth development are aimed at promoting a conservation ethic. Neighbour and regional benefits are seen as increasingly important, as is our core position vis-à-vis the Greater Limpopo Transfrontier Conservation Area, involving Zimbabwe and Mocambique. Finally, it is now explicitly recognised that we must mobilise a significant constituency behind our cause. All these core objectives are supported using well-developed integrating and adaptive techniques, and all are enabled in an aligned way by a range of services such as conservation management and advice, technical services that ensure infrastructure and road development, maintenance and rehabilitation, water and energy provision and waste management, administration, human resources, game capture and so forth.

Finally, Kruger has a developing integration ability, and an institutionalised adaptive management system. The theory and practice of this, including knowledge management and group learning dynamics, will receive attention in the next 5 year cycle, in order to keep Kruger fit for adaptation.

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## LIST OF ACRONYMS AND ABBREVIATIONS USED

CDF:	Conservation Development Framework
DEAT:	Department of Environmental Affairs and Tourism
DWAF:	Department of Water Affairs and Forestry
EPWP:	Expanded Public Works Programme
GLTP:	Great Limpopo Transfrontier Park
GLTCA:	Great Limpopo Transfrontier Conservation Area
IDP:	Integrated Development Plan
IUCN:	International Union for the Conservation of Nature
KNP:	Kruger National Park
NEEB:	North-Eastern Escarpment Bioregion
NEMA:	National Environmental Management Act
NEM: PAA:	National Environmental Management Protected Areas Act
SADC:	Southern African Development Community
SAHRA:	South African Heritage Resources Agency
SANBI:	South African National Biodiversity Institute
SANParks:	South African National Parks
SMMEs:	Small, Micro and Medium Enterprises
TPC:	Threshold of Potential Concern
WFW:	The Working for Water Programme

## GLOSSARY OF SELECTED WORDS

**Biological diversity** - the variability among living organisms from all sources, including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems [CBD] (also shortened to “biodiversity”). Biodiversity includes the number, abundance and composition of genotypes, populations, species, functional types and landscape units within a given system [Millennium Ecosystem Assessment]

**Biological resources** - includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity [CBD]; the term therefore refers mainly to use of species and genes

**Conservation Development Framework** - this is a guide for a national park to establish a coherent spatial framework to guide and coordinate conservation and development initiatives in and around the park

**Conservation** - management of human use of the biosphere to yield the greatest benefit to present generations while maintaining the potential to meet the needs and aspirations of future generations; this includes sustainable use, protection, maintenance, rehabilitation, restoration and the enhancement of the natural environment [Biodiversity White Paper]

**Desired State** - Is based on a collectively developed vision of a set of a desired future conditions that integrates ecological, socio economic and institutional perspective applied within a geographical

framework defined primarily by natural ecological boundaries [SANParks adaptive management frame work]

**Ecosystem** - a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit [CBD, NEMBA, NEMPAA]

**Heritage** - Is the sum total of the wild life and scenic parks, sites of cultural and historical importance, archaeological, palaeontological and cultural objects national monuments, historic buildings, works of art, literature and music, oral traditions and their collection and documentation which provides the basis for a shared culture and creativity of the arts

**IDP** - A plan compiled by a Municipality describing the zoning and services for the Integrated Development of an area

**Invasive species** - any species whose establishment and spread outside its natural distribution range threatens (or has the potential to threaten) ecosystems, habitats or other species, and which may result in economic or environmental harm or harm to human health [NEMBA]

**Park forum** - The recognized stakeholder forum through which park-based stakeholder participation in SANParks is to be achieved.

**Stakeholder participation** - The participation of an interested and affected party in the development of an aspect of the management plan, such that they are afforded the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation

**Sustainable use** - the use of components of biological diversity, or biological resources, in a way and at a rate that does not lead to long-term decline of the resource and does not disrupt the ecological integrity of the ecosystem in which it occurs, thereby maintaining its potential to meet the needs and aspirations of present and future generations [CBD/NEMBA]

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## **1. BACKGROUND TO AND FORMULATION OF THE PARK DESIRED STATE**

This section deals with the setting of a park desired state through the adaptive planning process (Rogers 2003; Cowan 2006), from the general to the specific, focusing on unique attributes of Kruger National Park. 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 values (SANParks 2006) which accept that change in a system is ongoing and desirable.

### **1.1 The fundamental decision-making environment**

The three pillars of the decision-making environment are seen as the mission statement, the context, and thirdly, the values and operating principles. Although derived through a process, the mission is stated upfront, but much of the supporting materials which helped form it are captured under other headings further down the document. As mentioned below, much of sections 1.1 and 1.2 were derived through stakeholder engagement using the adaptive planning approach, and thus reflect a shared desired state derived jointly by integrating stakeholders’ desires and SANParks’ mandate. This has resulted in a suite of jointly agreed-upon high level objectives for this park. The expansion of these high level ideas were presented as part of an integrated proposal of a management plan at three public meetings held in terms of the Protected Areas Act on 23, 25 and 30 August 2006.

#### **1.1.1 Mission**

An important landmark in the Kruger National Park was the first publicly-derived mission statement in the mid-nineties. At the time, the idea of having all stakeholders contributing directly to its formulation was a new concept for Kruger. Park leaders soon learnt that this was the way they now needed to operate in a post-apartheid South Africa, the immediate impetus for this initiative (setting clear objectives in the full public domain) having been the elephant debate at that time. The series of public meetings that took place set Kruger off in a new direction regarding the way it generates and continually checks its social contract (described in SANParks 2005). The resultant 1997 mission statement and ensuing objectives stood on three legs – biodiversity, human benefits and wilderness (see Braack 1997a). This 1997 plan was dominated by biodiversity issues, with some mention of social ecology. The KNP management plan based on this mission was only finally approved by the SANParks Board in 1999 although, effectively, the implementation of most major non-contentious issues had already begun in 1998. An interim internal audit was carried out late in 2000 (Biggs & Van Wyk 2000), and by 2004 preparations were being made for the first full revision, admittedly slightly beyond the five year mark.

Cognisant of likely developments under the impending Protected Areas Act, but driven by its internal commitment to a five-yearly revision, Kruger set about a full internal revision in 2005/6, this time engaging comprehensively across all departments, including all support functions. This initiative then needed to be fitted into the expectations under the Protected Areas Act, a merger which proved fairly straightforward. The resultant mission statement, which depicts Kruger’s purpose of existence, has now widened slightly, to incorporate constituency building as per the 2002 McKinsey Report (McKinsey and Company 2002) and explicit cultural heritage commitment at the highest level. It now reads:

*In keeping with the SANParks mission to maintain biodiversity\* in all its natural\*\* facets and fluxes, to provide human benefits\*\*\* and build a strong constituency and preserve as far as possible the wilderness qualities and cultural resources associated with the Park*

\* *sensu* Noss (1990), embracing the three facets of structure, function and composition; and incorporating heterogeneity and dynamism (the fluxes) at multiple scales.

\*\* 'natural' appears only in front of 'facets and fluxes', see Rogers (2005). Additionally, the notion of 'indigenous' although tricky when applied to near-local transfer of biota, is also now regarded as part of 'natural'.

\*\*\* sustainable use as a benefit is explicit in SANParks' overall mission and is cautiously interpreted in the previous KNP mission. This concept is under ongoing discussion and formulation in SANParks (see Rogers (2005) and relevant SANParks grey literature).

The footnotes and their implications are important, materially influencing the many downstream outcomes of objective-setting and ultimately practical results. A major lever on outcomes, via interpretation, will hinge on where the sustainable use debate in SANParks ultimately settles out.

This somewhat broad mission for Kruger, now expanded by inclusion of *constituency* and *cultural heritage* issues, acts as the benchmark against which all actions are measured. The 1997 tripartite mission served Kruger until this first revision, establishing that Kruger was in the broad conservation business, and had to do this in a way which generated appropriate human benefits and preserved wilderness over large tracts. This broad inclusive focus had many consequences, including the spreading of effort across this broad field rather than dealing with sectoral or species concerns in detail. It will be an important learning exercise over the next five years to see if this focus continues to serve societal needs well. The SANParks Board has given clear recent directives that in the event of contention, biodiversity issues predominate if there is unresolved contention. The objectives hierarchy and endpoints derived from this mission, and presented in this plan, constitute a structured attempt to integrate all these aspects and hence reach the publicly-mandated, agreed-upon desired state for Kruger.

The 2006 public participation process concerning the Kruger mission and management plan was in line with the expectations of the Protected Areas Act. Stakeholder engagement was undertaken in three steps focusing on general consultation, specific tourism engagement and a co-management process with existing contractual partners. The general workshops focused on introducing the management plan process and enabled participants to voice their opinions on several issues, including park management, tourism, border issues, local community outreach, interactions and knowledge information sharing. This built on the backdrop of the 1996-1999 public meetings during the first round described above.

Stakeholders, on the whole, were positive about the stakeholder engagement process being followed for the development of the management plan and actively participated through providing suggestions and comments. Their comments were largely incorporated into the management programmes with actions to be implemented in the next 5 years. Several outstanding concerns raised by stakeholders, including their ability to access knowledge, economic opportunities and natural resources require further investigation prior to implementation. An outstanding concern that remains pertinent is the impact of damage-causing animals on neighbouring land owners and users. The Kruger Park is of the opinion that such participation creates ongoing rewards through mutual sharing and understanding of value systems, so that such values can be used as a fundamental point of departure from which to build objectives in subsequent revisions, though we also accept that this needs to take place under the broad mantra of SANParks' overall mandate.

## 1.1.2 Context

The range of values as well as social, technological ecological, economic, legal and political facts, conditions, causes and surroundings that define the circumstances relevant to Kruger National Park provide the “context” for decisions and are therefore important elements of this decision-making environment. The material presented in this section is updated and expanded from that derived in the 1997 management plan process (Braack 1997a) and contains relevant material added since, and importantly also, issues raised at the 2006 public participation meetings that informed the writing of this updated version of the plan. Three chapters (1, 2 and 20) in a recent book (du Toit, Rogers & Biggs 2003) give more detail and also several useful further references. The purpose of this section will thus only be to provide a capsule summary of the internal context followed by some influential international, national and local contextual issues.

### 1.1.2.1 Location and Boundaries

The Kruger National Park covers a large and varied area, and lies embedded in an even more varied regional setting, for which multiple historical and geographical descriptions exist. It covers almost 2 million hectares or 20 000 km<sup>2</sup> of South Africa’s lowveld, bordering Mozambique in the east and Zimbabwe in the north (Figure 1). Its elongated shape is approximately 350 km from north to south and on average 60 km wide, with rivers providing natural boundaries in the south and north and the Lebombo hills bounding the east. To the west, the park is predominantly bordered by private and provincial nature reserves and many high-density communal areas.

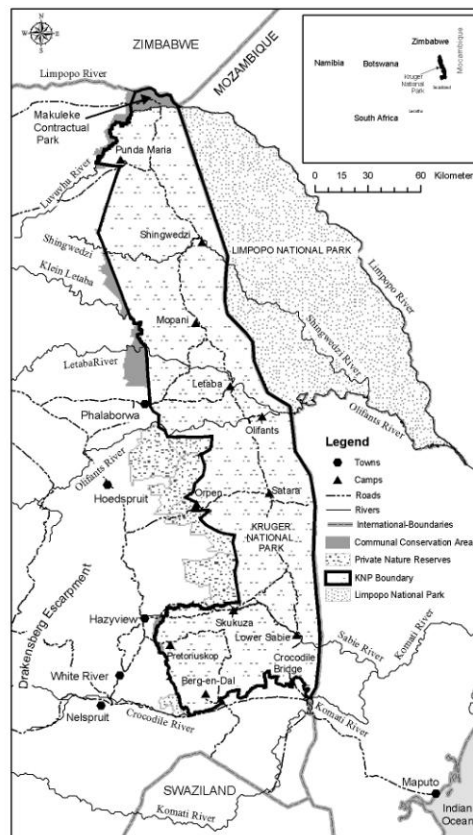


Figure 1: Location and boundaries of the Kruger National Park.

### 1.1.2.2 History

Kruger was established as a national park in 1926, although portions had already enjoyed conservation status for considerably longer. It was however preceded by hunter-gatherer communities of the Stone Age, including the San who left a rich heritage of rock paintings and other artifacts. The iron-age farmers, metalworkers and traders who followed were probably formidable hunters, also utilising fire. The era from the twelfth century till around 1650 was characterized by active trade first from Mapungubwe, along the Limpopo River to Mocambique and later from Thulamela.

Kruger's 1926 national park status played a crucial role in the unification of english- and afrikaans-speaking white South Africans despite their cultural differences and economically different orientations, consolidating their interest in conservation to the exclusion of black people (Carruthers 1995). While credit must be given to the early game rangers and their black labourers for the service rendered in laying a solid foundation for the successful management of this iconic park in South African's national parks system, one of the major challenges facing Kruger today is its lack of legitimacy amongst the three million black people living on its doorstep (Mabunda 2004). Communities were seldom involved in decision-making processes and for more than a century park authorities regarded adjacent communities as potential poachers and this relationship has bred animosity between the park and its neighbours (Makoe 2002 in Mabunda 2004). To this day there are issues concerning Kruger that remain a concern for adjoining communities, including issues around economic benefits, damage-causing animals and natural resource utilisation.

The colonial and game preservation eras (1836-1925), followed by the establishment and early management-by-intervention eras are documented by Carruthers (1995) and Pienaar (1990), while Joubert (1986) and Mabunda et al. (2003) cover some of the more recent eras. The Kruger Park also has a rich tourism history that spans more than a century and is well documented in the book, "*Neem uit die Verlede*" (Pienaar 1990).

### 1.1.2.3 Physical environment and land use

Kruger's approximate 2 million hectares lie in the low-lying savannas of north-eastern South Africa, with elevations from about 250 m to a small section over 800 m. Kruger's climate is tropical to subtropical with high mean summer temperatures and mild, generally frost-free winters. Rainfall, delivered mostly through convective thunderstorms, is concentrated between October and April. A rainfall gradient stretches from an annual mean of about 750 mm in the south-west, to 350 mm in the north, although strong inter-annual and roughly decadal cyclic variations exist, with drought considered endemic.

The basic geological template comprises a western granitic half, characterised by distinctive catenas, and an eastern clayey basaltic and rhyolitic half, with some important smaller intrusive, sedimentary or recent sandy zones. The extreme north of Kruger is unique due to its diverse assemblage of rock formations. Seven major perennial or seasonal rivers cross the park, and especially the western half of the park's terrestrial landscape is heavily dissected by drainage channels on undulating land. Kruger's patterns of geology, soil, fire and rainfall, and its convergence zones are regional to local factors which are emphasised in the *vital attributes* section below.

Current land use around Kruger is dominated by small-scale cropping, limited commercial farming and grazing in rural impoverished areas and communal conservation areas, while private conservation, game and cattle farming and high-value irrigated crop farming dominate other areas. The area north of the Olifants River in Mocambique comprises the relatively recently proclaimed Limpopo National Park while the area south of the Olifants is predominantly under hunting concessions.

#### 1.1.2.4 Biological environment

Numerous classification systems exist to divide the park into various vegetation, physiographic and natural history zones, and composites of these. There are close on 2000 plant species in the park (Braack 1997b), including about 400 trees and shrubs, and 220 grasses. At a very coarse level, the vegetation can be considered as falling into one of three zones. A lower nutrient, higher rainfall well-wooded area occurs in the southwest and important trees are bushwillows (*Combretum* species, especially *C. apiculatum*), knobthorn (*Acacia nigrescens*), tamboti (*Spirostachys africana*) and marula (*Sclerocarya birrea*). The southeast lies on basalts with palatable productive grasslands and some trees such as knobthorn, marula and leadwood (*Combretum imberbe*). The northern half of the park is, broadly speaking, dominated by mopane (*Colophospermum mopane*) with more fertile open grasslands on the eastern basaltic half, and more undulating landscapes with woodlands including bushwillow trees (*Combretum* spp) in the north-western quadrant. Fauna is very diverse, with about 150 species of mammals, including many large charismatic predator and grazing species, roughly 50 fish, just over 500 bird, 34 amphibian and 116 reptile species. In addition, there are about 375 alien species, mostly plants, although mostly with restricted distributions and densities.

#### 1.1.2.5 Social, economic and political context

Kruger acts as a *de facto* hub of economic, especially tourism, development in the lowveld region. The Kruger National Park offers a variety of tourist accommodation and currently has 12 main rest camps, five bushveld camps, two bush lodges and four satellite camps; a total of more than 4 500 beds. There are also seven luxury lodges that have been granted concessions. It is one of the world's most popular public entry game parks and receives in excess of 1 million visitors per year. Malaria has a potentially negative impact on tourism, but is currently under tight control. The KNP provides some employment opportunities, a market outlet, and source of business custom for local communities, and stakeholder meetings in these communities always voice the desire to share structures (such as marketing channels), decision-making, and benefits. Adjacent land uses impact in various ways on the KNP and have to be incorporated in management considerations. Even though relationships between the park and immediate neighbours have been improving since 1994 there is still need to continuously discuss contentious issues and work towards a common purpose. Land claims may threaten management block sizes and/or management options within the park. Provincial borders and the limited jurisdiction of SANParks outside Kruger affects the efficiency with which management options can be exercised. Damage causing animals, employment issues and insufficient interaction affect neighbour-relations and require special attention.

#### 1.1.2.6 International and national context

##### *International*

These obligations and expectations relate to the many agreements, conventions and affiliations South Africa or SANParks has internationally. Importantly, the IUCN (1994) categorisation of protected areas imposes certain obligations for the KNP in terms of its schedule 1 definition of most of the park; and the schedule 2b designation for the Makuleke region. Furthermore, the IUCN Species Survival Commission imposes very particular obligations in terms of the handful of globally endangered species for which Kruger is particularly responsible. In addition, there are a multiplicity of international conventions to which South Africa is signatory (see Van der Linde 2006). Those which in practice have particular bearing or influence on Kruger are the Convention on Biological Diversity (1992), the Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973), the Ramsar Convention on Wetlands of International Importance, especially as Waterfowl Habitat (1972). The Convention concerning the Protection of the World Cultural and Natural Heritage (1972)

will become influential if any of the sites within Kruger would be earmarked for nomination for inscription into the World Heritage Site register as stand-alone or transboundary serial nominations. Multilateral agreements in the SADC context, which affect Kruger more particularly, include the SADC Protocol on Shared Watercourse Systems (along with the older international Helsinki Rules in this regard), and the SADC Protocol on Wildlife Conservation and Law Enforcement (1999). Aside from the resource theme focus of these SADC agreements, the mere presence of international borders carries with it a host of security, trade and transit agreements which will not be expanded on here, although special mention does need to be made of sometimes controversial international and national animal disease regulations, which in some ways protect and in other ways act as a brake on both biodiversity and community livelihood concerns.

The recent formation of the Great Limpopo Transfrontier Park (GLTP), as well as the developing wider area around it (the GLT Conservation Area) has instituted new forms of international organisation, with a formal treaty and a joint management board, certain themes being multilateral (tri-national), and others deemed national.

Kruger's role in international tourism and wilderness custodianship, international conservation and ecological science, and the mere size and biodiversity content of Kruger, mean both influence and expectation, and so Kruger remains strongly in the permanent limelight, an important global contextual reality for this management plan.

### *National*

The NEM: PAA in particular provides the mandatory basis of this plan, so that, while Kruger had a very similar plan beforehand, it will now be fully in line with the Act, and carry the concomitant legal stature. Stakeholders frequently point to the very obvious fact that because National Parks are a *national* competency, they enjoy stronger protection than provincial parks, so we state this explicitly here. In the eyes of many stakeholders, Kruger is the premier or flagship park in South Africa, which places certain obligations on this park towards particularly management of biodiversity and ecotourism. It is in many senses the pride and joy of an increasing percentage of South Africans, and tends to attract ongoing, often intense, interest by holidaying or concerned citizens, and from civil society. It attracts direct and indirect foreign investment, at a scale seen to be of national significance. Kruger has a certain value as a source of organisms for restocking other protected areas. Apart from its biodiversity value, it has national cultural resource conservation obligations due to the presence of important anthropological and archaeological sites especially Thulamela and its collection.

Other important national legislation which has major direct bearing on the *core* functions of Kruger are the National Environmental Management Biodiversity Act (2004), the National Environmental Management Heritage Resources Act (1999) which together with the National Environmental Management Protected Areas Act (2003) and the National Environmental Management Air Quality Act (2004), fall under the overarching National Environmental Management Act (1998). Probably of equal importance, given Kruger's particular richness in riverine features and biodiversity and precarious position low down in six major catchments, is the National Water Act. Additional to these, a wide host of other acts are also partially to highly relevant (see Van der Linde 2006).

### 1.1.3 Values and Operating Principles

The SANParks' core conservation values underpin what we do, namely that

- We respect the complexity, as well as the richness and diversity of the socio-ecological system making up each national park and the wider landscape and context. We respect the interdependency of the formative elements, the associated biotic and landscape diversity, and the aesthetic, cultural, educational and spiritual attributes\* and leverage all these for creative and useful learning.

\* Biodiversity (sensu Noss) is explained as biotic and landscape diversity and includes structure, function and composition of biotic and all underlying abiotic elements; cultural

heritage (sensu Galla) includes moveable, immovable, tangible and intangible assets, even living arts. The word 'natural' is used in the sense expanded upon in the "Guide to the use of values" in SANParks' custodianship framework.

- We strive to maintain natural processes in ecosystems, along with the uniqueness, authenticity and worth of cultural heritage, so that these systems and their elements can be resilient and hence persist.
- We manage with humility the systems under our custodianship, recognising and influencing the wider socio-ecological context in which we are embedded.
- We strive to maintain a healthy flow of ecosystem and cultural goods and services (specifically preserving cultural artefacts), and to make these available, also through access to national parks, thereby promoting enjoyment, appreciation and other benefits for people.
- When necessary, we will intervene in a responsible and sustainable manner, complementing natural processes as far as possible, using only the level of interference needed to achieve our mandate.
- We will do all the above in such a way as to preserve all options for future generations, while also recognising that systems change over time.
- Finally, we acknowledge that conversion of some natural and cultural capital has to take place for the purpose of sustaining our mandate, but that this should never erode the core values above.

This is followed by a fairly exhaustive set of principles grouped into the following major headings:

- Overall principles as ways of thinking (such as the 'Web of Life'; the adaptive learning imperative as the way to survive and prosper in complex natural systems; multiple ways of knowing; cognisance of transaction costs of non-core operations, etc),
- Principles underlying social and regional linkages (such as socio-ecological systems; bioregionalism; co-operative governance in African democracies),
- Principles of biodiversity planning and implementation (including representivity, complementarity, least possible but even severe interference, *laissez-faire* as one conscious informed and explicit decision option),
- Principles of compliance and safety (such as due diligence, compliance, accountability),
- Principles of integration (between biodiversity, cultural and environmental; balance and mitigation; precautionary principle (sensu Cooney 2004); burden of proof lying with the developer; conversion of natural capital to avoid insidious impoverishment of integrity of genes or ecosystem; activities informed by landscape, context and environment; sustainable eco-friendly best practices),
- Principles relating to the role of tourism (including sustainable *high-quality* nature-based; market-relevant; broad-based constituency; SANParks' best financial opportunity; equitable access, albeit subsidised for poorer sectors; differentiated; recognition of wider societal context; strategic approach and sustainable product development; supportive of local culture, heritage and wealth creation).

In Kruger specifically, many of these values (especially regarding heterogeneity in ecosystem management and concessioning of tourism) are at the cutting edge of application, and a "guide to the use of values" has been prepared for parts of the value set, and will eventually be prepared for all values. Wilderness-related values are unique in South Africa to Kruger and only a few other national parks and areas, and these spiritual values are an ongoing challenging area of development, especially their contextualisation in Africa, where people have for millions of years lived in and interacted with ecosystems and wild places.

## 1.2 Vital attributes underpinning the value proposition of the Park

This section attempts to answer the question “what are the key features that together make up the specific value of this park?” While a long list can be presented, the following issues are believed to contribute over 80% of the overall value, as determined by repeated participatory initiatives. Each of these are in turn caused or strengthened by *determinants* and offset by *constraints* and/or *threats*. This information helps focus the exact formulation of park objectives, which must strengthen positive determinants and weaken or remove threats, so that objectives are appropriate to the uniqueness and special nature of this national park. In this way the management plan is customised in its fullest local extent, without detracting from some of its more generic functions.

### 1.2.1 Vital attributes as identified

- *Kruger is the size of a number of countries,(e.g. Swaziland, the Netherlands) and is big enough to maintain near-natural large mammalian predator-prey interactions.*
- *The KNP is one of the largest national parks in the world, and the protected areas and buffers around these have now further been enhanced in size and stature, especially into Mocambique and Zimbabwe with the GLTP and GLTCA.*
- *The geographically extensive matrix formed by variations in geology and climate promotes spatial heterogeneity and hence biodiversity.*
- *The KNP is a semi-arid savanna with inherently high spatial and temporal variability in biodiversity.*
- *Multiple, diverse rivers cross the KNP, promoting biodiversity. The KNP includes significant segments of the two most biodiverse rivers in South Africa, namely the Sabie and the Crocodile Rivers.*
- *The KNP is home to major cultural resources of societal interest.*
- *The biota and ecological processes, and cultural heritage sites, are largely intact.*
- *Kruger is neighboured by 5 different language communities.*
- *The predominant land-use form of the KNP (ecotourism) is compatible with biodiversity conservation.*
- *Many forms of adjacent land use promote biodiversity conservation and create corridors, preventing the KNP from being an island. Conversely, a wider mosaic of heterogeneous land uses also includes what are not necessarily biodiversity-friendly practices, low levels of which, in other ways, contribute to regional resilience.*
- *The KNP is the hub for tourism in the lowveld and a magnet for foreign exchange, thus affording some justification for and assurance that the KNP and its biodiversity will continue to be conserved. In other words, it has forged an ongoing practical social contract that currently contributes to its persistence in conserved form.*
- *The KNP has a well-developed infrastructure and human capacity for and history of research and management.*
- *Well-developed databases exist, affording insight and foundations which support management decisions.*
- *The KNP is one of the few protected areas in South Africa which contains significant wilderness areas.*
- *The KNP (including now its wilderness) is protected by national legislation, and national and international sentiment, affording a high level of assurance of long-term survival of the park. This includes the interest and momentum related to the transfrontier park/area.*

The next step towards developing objectives was to consider each of the attributes above, listing the various *determinants* (factors which contribute to, enable or allow the vital attribute to exist), *constraints* (limitations *within* the organisational structure of the KNP which detract from it maintaining or managing its biodiversity or other assets) and *threats* (factors *outside* the KNP which affect or impact directly or indirectly on the biodiversity, assets or qualities of the park). These are contained in detail in Braack (1997a). These detailed analyses gave the necessary guidance to sensibly compose objectives as outlined in the section below.

### 1.3 Setting the details of the desired state for Kruger National Park

Using the mission, context and values, and bearing in mind particularly the vital attributes above, the following set of park objectives has been determined. Objectives are aimed at overcoming threats to ensure the persistence of vital attributes and/or their determinants for this national park.

#### 1.3.1 An objectives hierarchy for Kruger National Park

The full objectives hierarchy in KNP (available in Supporting Document 1), in spite of its length and detail, has proved to be a living document. Both rounds of revision (1997 and 2006) have shown that almost as soon as the issues are discussed and debated in the structured process and written down in a clearly articulated way, many of the ideas go into immediate practical use. Furthermore, in the first round, ongoing additions or modifications were brought up and were formally or informally added to the hierarchy rather like patches to a blanket. Ultimately, this “patching” requires that a full revision be undertaken, and a neatly organised new objectives hierarchy constructed. Many of the 1997 objectives (Braack 1997a) were achieved faster than anticipated, and indeed there was pressure for fuller revision even before the mandated 5-year period. This same pattern is playing out with this recent revision, and we believe it is healthy and indicative of a self-sustaining system of joint direction-finding and implementation. Presented below are only *the top components of the objectives tree or hierarchy*, with lead-ons pointing to the detailed continuation of further “unpacked” components in the Supporting Document. Within reason, and as a very broad generalisation only, the amount of unpacking generally represents the extent to which the detail has been thought through thoroughly. For instance, the relatively shorter “middle” section on *integration* implies that this is new ground, and that the broad details have been arrived at, but not the finer details yet.

The high level objectives presented in this report comprise the following main pages:

- Biodiversity objectives
  - Integrated objectives
  - People objectives
  - and
  - Enabling objectives (those which best support our achievement of core functions)
- } together these are seen as “core functions”

#### *Overall preamble to KNP objectives*

The purpose of this section is to explain how the objectives-setting initiative got to where it is in this revision, in other words, why and in which ways the version in this plan differs from the previous 1997 objectives. As explained above, KNP had its first public goal-setting exercise in the mid-nineties, and this was dominated by biodiversity issues. The current iteration has built on the success of implementation of the previous one, but widened the coverage now well beyond biodiversity, although this remains central. All departments and functions are now included, and there are clear attempts to define the interrelationships between them, especially through the *integrating objectives*. The dotted line to the *enabling objectives* denotes the clear meaning that each objective in this category should

only be justified in terms of ways in which it supports the core (solid-line) objectives: biodiversity, people, and integration. So, for instance, the supporting objective *game capture* is not seen as an end in itself, but must always be justified by an explicit calling in one of the core objectives of KNP or SANParks.

It is important to discuss broadly the changes that have taken place internally in the biodiversity objectives layout in this version. Instead of separate management and research goals as in the 1997 version (which, at the time, seemed essential to get all stakeholders comfortable) this round merges objectives at a conceptual level, leaving the detail below (and indeed the programmes described later in this report) to carry the information around *how* it should be done. Furthermore, although it was within reach to actually unite the terrestrial and aquatic objectives now, it was decided, for reasons of current comprehensibility, to keep these separate but to align their schemas far more. A major expansion is in the objectives set by the People and Conservation Section, reflecting the growth of that section, and their depth in formulating explicit objectives for action. Also, Mabunda (2004) produced a backbone for the first time for an explicit set of tourism objectives.

All in all, this overall expanded objectives tree is felt to be far more comprehensive than the first round, and its components reasonably inter-related, though this is an ongoing task of improvement. There is a preamble written in the Supporting Document for every branch or subsection of the objectives hierarchy; these preambles add important understanding to the ongoing evolution of each particular bundle of objectives. There is also an equivalent *way forward* statement for each in the Supporting Document; these statements are very informative in the domains covered by every bundle, providing the reader with a clear idea of what the key leveraging issues are in getting the wider set of objectives for each reasonably met over the five year planning horizon. Thus, for example, the aquatic ecosystem objectives are galvanised by the central aim over the next five years of equitable water distribution subject to the sustainability demands of the Water Act's environmental reserve. By focusing on this, most of the aquatic ecosystem objectives will either have to be met, or be met as a consequence. For the *overall* way forward for the Kruger Park, see section 3.1 of this plan (key prioritisation, integration and sequencing issues) which is based partly on the various *ways forward* in the Supporting Document, but also on the inter-linkages between these and the overall 'big picture' generated for the desired state.

**Figure 2a**

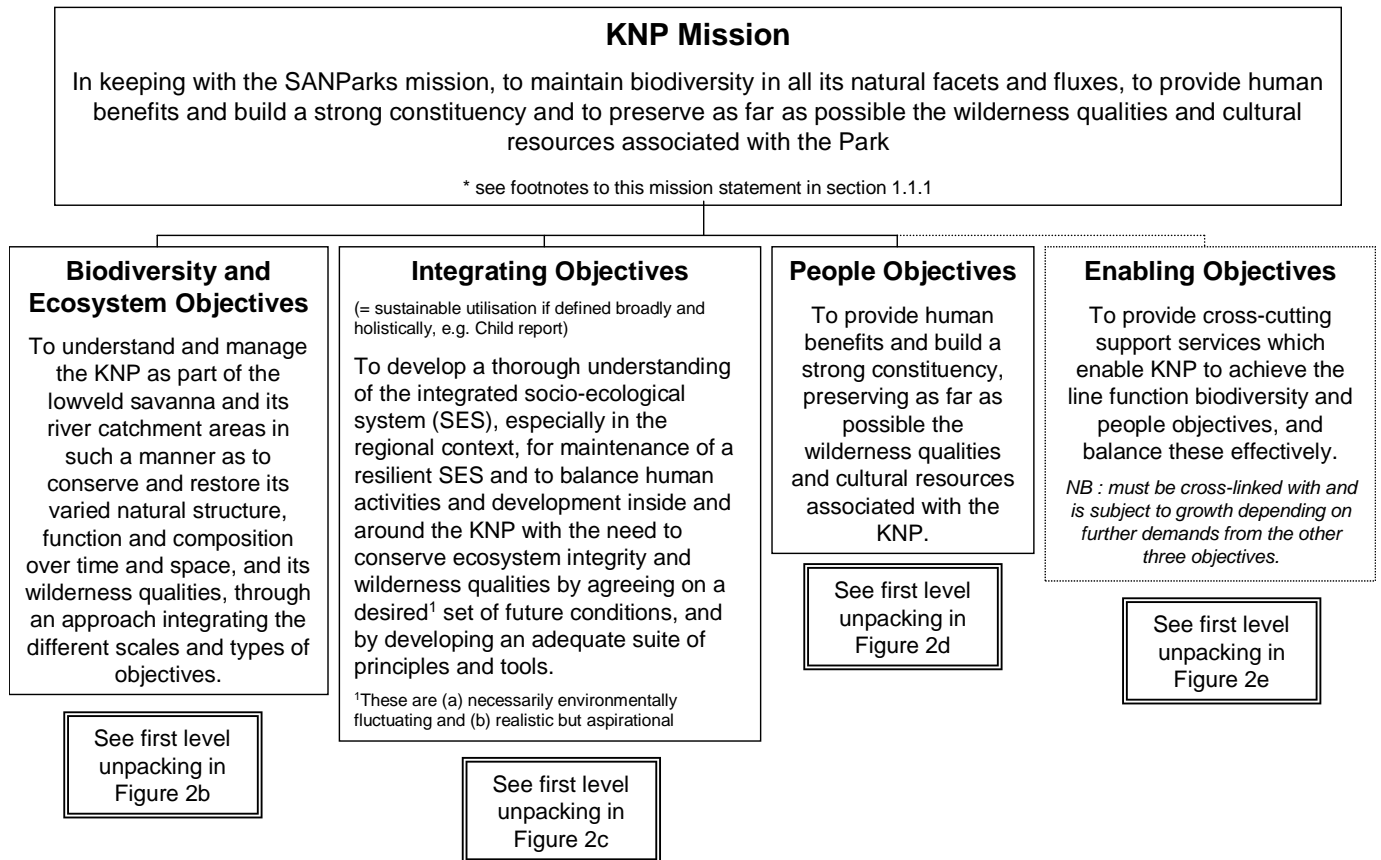


Figure 2a: Objectives Hierarchy for Kruger National Park – mission and highest level objectives

Figure 2b

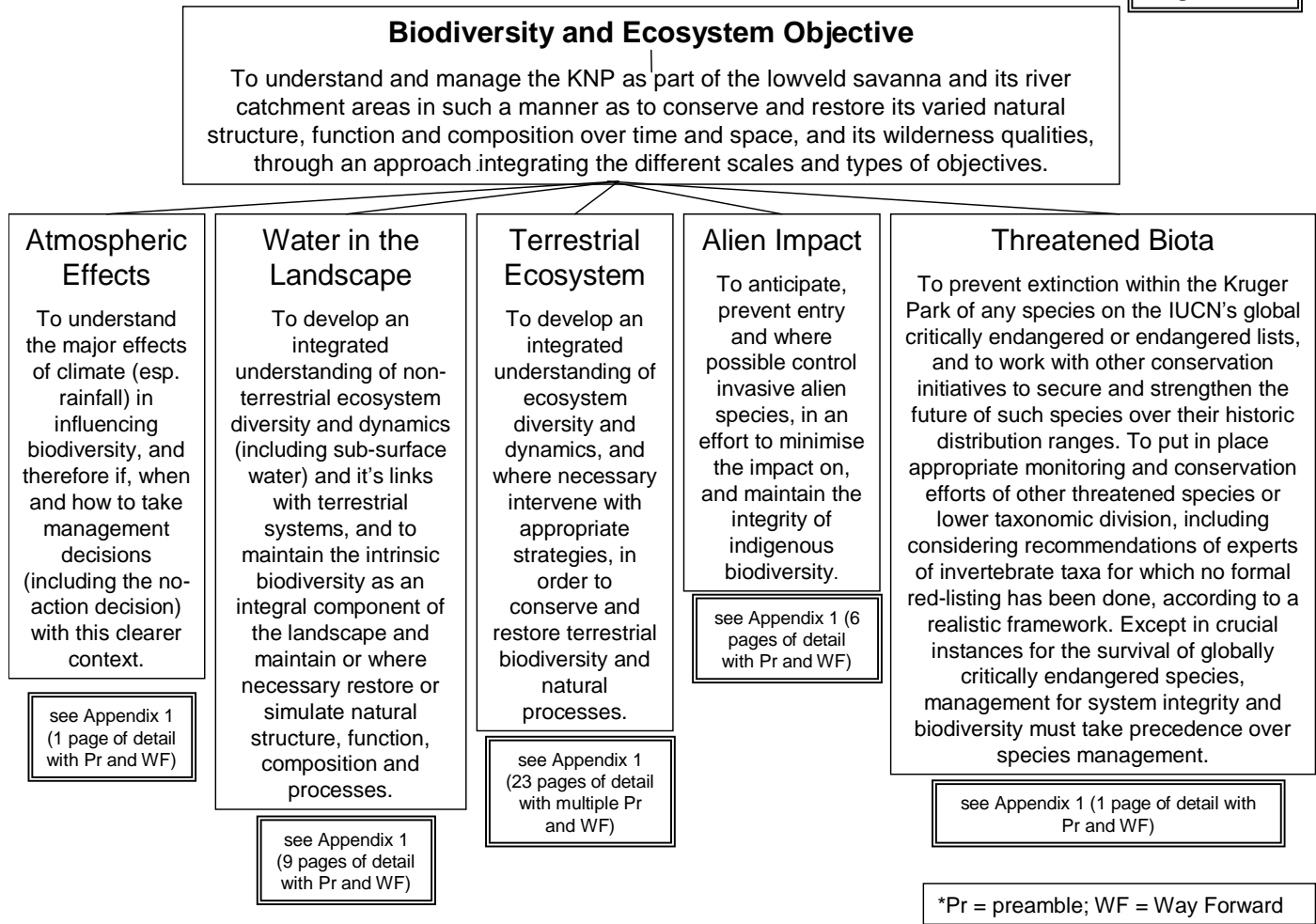


Figure 2b: Objectives Hierarchy for Kruger National Park – high level biodiversity and ecosystem objectives

**Figure 2c**

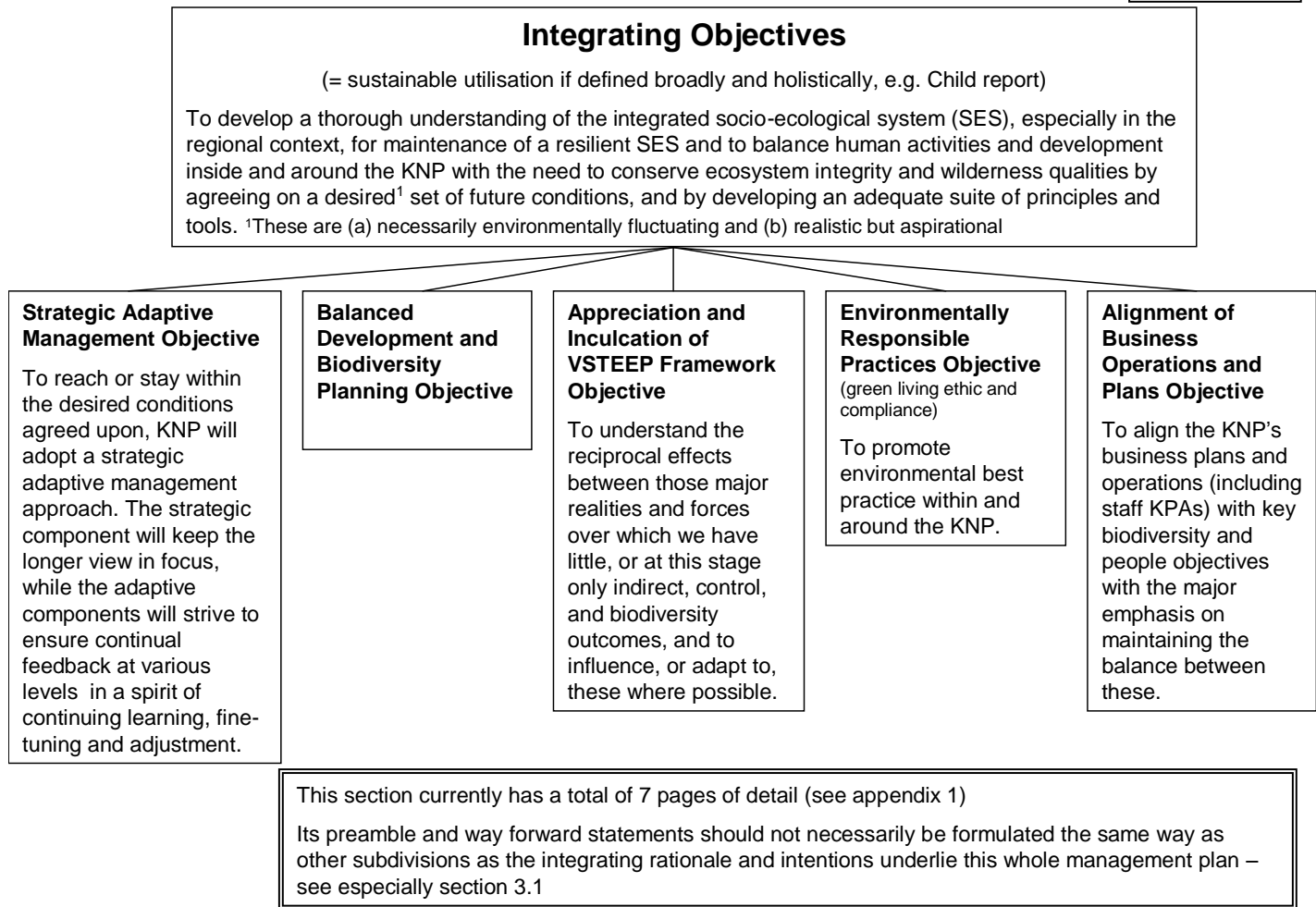


Figure 2c: Objectives Hierarchy for Kruger National Park – high level integrating objectives

Figure 2d

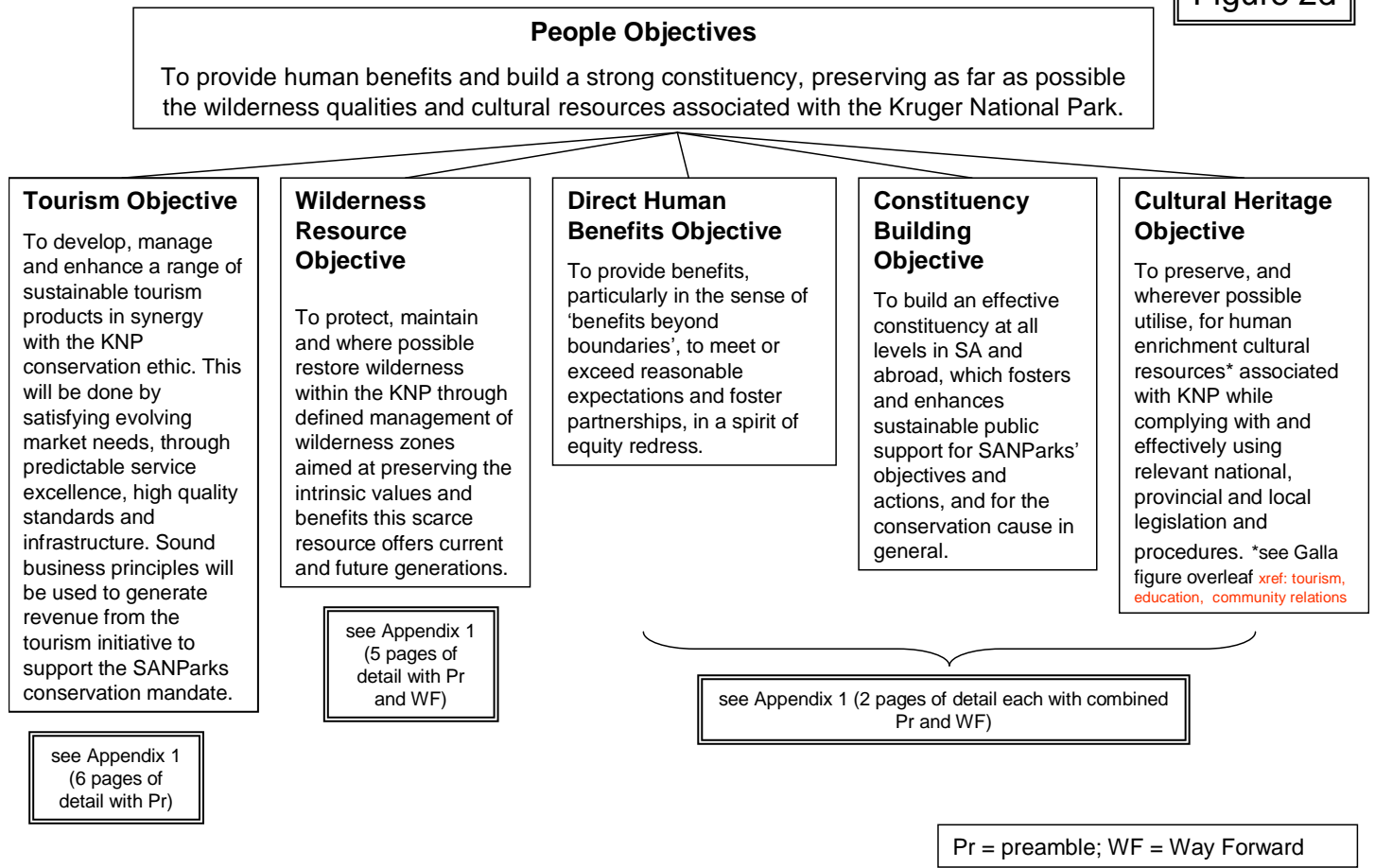


Figure 2d: Objectives Hierarchy for Kruger National Park – high level people objectives

**Figure 2e**

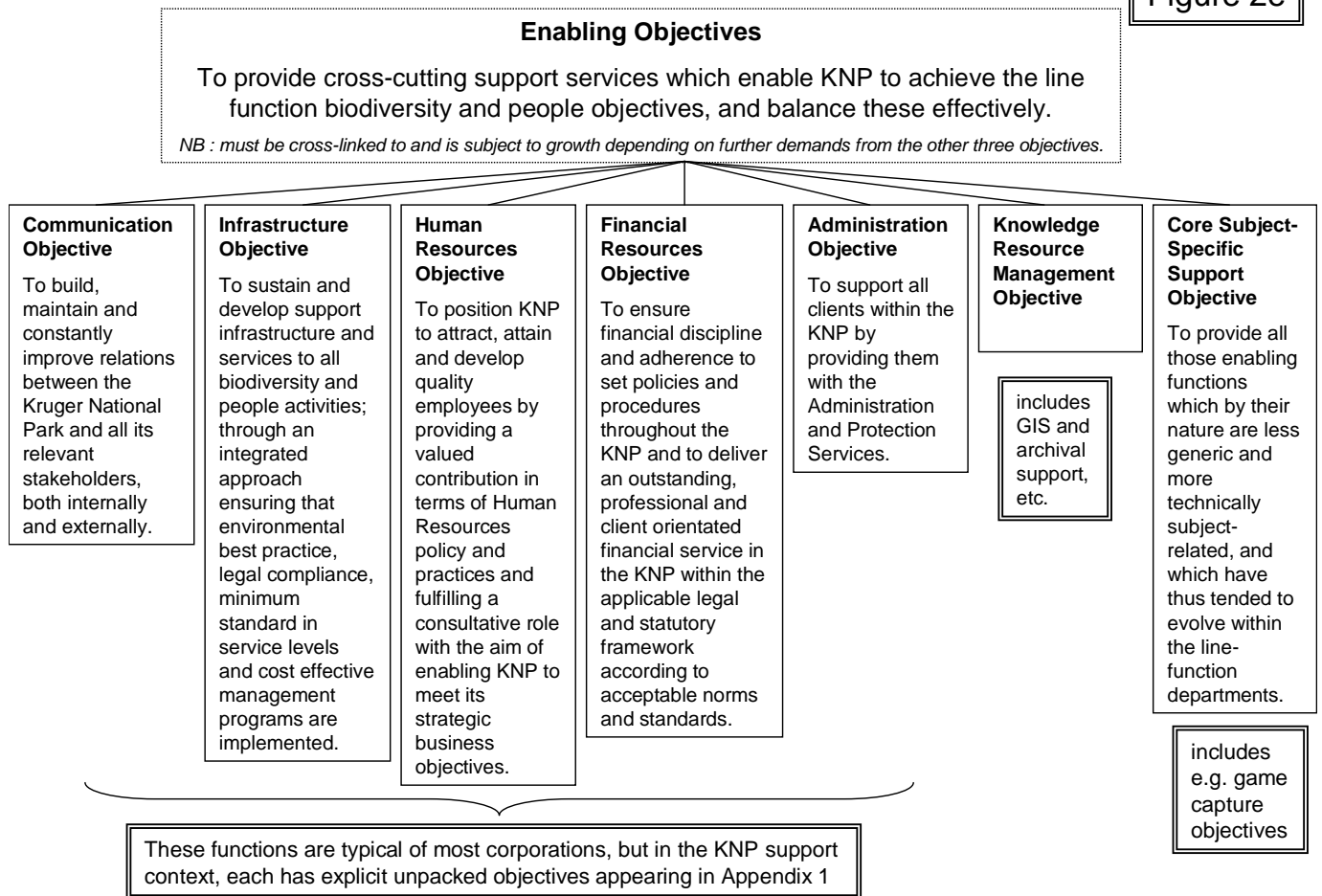


Figure 2e: Objectives Hierarchy for Kruger National Park – high level enabling objectives

### 1.3.2 Thresholds of concern and other conservation targets

In the adaptive management of ongoing change in socio-ecological systems, thresholds of concern are the upper and/or lower limits of flux allowed, literally specifying the boundaries of the desired state. If monitoring (or better still monitoring in combination with predictive modeling) indicates certain or very likely exceedances beyond these limits, then mandatory management options of the adaptive cycle are prompted for evaluation and consideration. Considering the biophysical objectives stated in Supporting Document 1, the following TPCs are tabled for Kruger National Park.

(a) **TPCs related to plant-animal dynamics** – this suite of TPCs are at both at a landscape and, where possible, catenal level scale, calibrated separately for different landscape sensitivities and relate to either compositional or structural and functional biodiversity elements for vegetation and herbivores separately.

(b) **Fire TPCs** – these TPCs are specified according to fire intensity and fire scar pattern index as it is suggested in KNP that fires should vary widely over space and time at as many scales as possible, the belief being that this will lead to a range of fire types, intensities and effects over space and time and that this will most likely best maintain biodiversity.

(c) **TPCs for species of conservation concern** – the SANParks approach for prioritising species for monitoring and setting of TPCs emphasises species which are native to South Africa and the national park in question and all species which are globally critically endangered or endangered automatically qualify for attention. In the Kruger context, TPCs have been set for wild dog (*Lycaon pictus*), black rhino (*Diceros bicornis*), Swazi impala lily (*Adenium swazicum*) and wild ginger (*Siphonichilus aethiopicus*). TPCs for the pepperbark tree (*Warburgia salutaris*) are currently under development.

(d) **TPCs for degradation** – degradation is reflected in a decrease in soil stability, infiltration and nutrient cycling indices and rough thresholds have been set for interim use and further evaluation. These TPCs are still in the development and refinement phase.

(e) **TPCs for heterogeneity** – this integrated TPC is designed to track a loss, or potential loss of biodiversity through homogenisation of the ecosystem. We have initialised the development of this complex process by evaluating the extent of homogenisation at three different scales where possible. Homogenisation is currently evaluated as a loss of dissimilarity in the most important structural, functional or compositional components of the ecosystem at the three scales. This TPC is still in the development and refinement phase.

(f) **TPCs for invasive alien biota** - these TPCs currently represent management or operational TPCs, which have loosely been termed “tracking” TPCs, focusing on alien species rather than their biodiversity effects. The three levels of TPC deal with (i) new invasions of a species into the KNP, (ii) an annual increase in geographic distribution of alien species within the KNP, (iii) an increase in alien species density across KNP (these latter TPCs are not yet operational due to the lack of data and efficient cost-effective monitoring options to date, but they may have the potential to be used as surrogates for biodiversity impacts in future).

*Specific TPCs for bovine tuberculosis (BTB)* – The “tracking” TPCs were specified as arrival of BTB within the boundaries of KNP, an increase in spatial distribution of BTB into the adjacent TFCA, and/or increased or sustained zonal prevalence of BTB in buffalo. “Biodiversity effects TPCs” are designed to detect significant measured or predicted (through modeling) negative effects on population growth and structure, and long-term viability of a species that can be attributed to BTB and are currently specified separately for buffalo, lion and alternate species. The “socio-political” TPCs deal with detection of KNP buffalo-strain BTB infection in neighbouring communities and livestock.

(g) **TPCs for river geomorphological diversity, terrestrialisation and sedimentation** - three different approaches to detecting unacceptable river changes are considered, with a long-term physical approach in terms of geomorphological diversity, and two faster-responding biological approaches, namely the *Breonadia* and terrestrialisation models.

(h) **TPCs for river flow and quality** - these TPCs are used to track and warn of long-term trends of in river flow and water quality. The DWAF-defined instream flow requirements (IFRs) are adopted as the river flow TPCs for the KNP based on the knowledge that the IFRs were well researched and calculated, and trying to develop other thresholds would be superfluous. However, IFRs were developed as a statement of river flow requirements, and as such they are a set of minimum flows which should avoid unacceptable biodiversity loss. Thus continuously having rivers flowing on or below IFR levels is only just acceptable and certainly not the point to which we should aspire. Similarly, the stringent river water quality requirements set by DWAF primarily for drinking water have

been adopted by the KNP as TPCs as these are stringent enough for satisfactory ecosystem requirements as well.

(i) **TPCs for river health, specified through fish assemblages** – The Fish Assemblage Integrity Index (FAII) forms the core of this TPC as it is based on the categorisation of the fish community according to an intolerance rating which takes into account trophic preference and specialisation, requirement for flowing water during different life-stages, and association with habitats with unmodified water quality. Results of the FAII are expressed as a ratio of observed conditions versus conditions that would have been expected in the absence of human impacts.

The above TPCs (outlined in detail in Supporting Document 2) constitute the range of biophysical TPCs believed to be necessary in Kruger. However, in time, other TPCs will need to be developed particularly for wilderness qualities and nature-based tourism.

### 1.3.3 Zonation Plan

A full CDF has not yet been set for Kruger National Park, although a practical and inclusive zonation (Figure 3) is available and in use to guide development and protection of wilderness areas. This was derived from the following informants: biodiversity sensitivity-value, tourism opportunities, current research areas, heritage and other unique features, the Ramsar site, regional linkages, the GLTP, finalized and potential land claims, wilderness areas, adjacent land use, concessions, and the historic legacy of existing infrastructure. The plan details the strategic land use intent for the Kruger Park for the next 20 years. While some aspects of the CDF are contained elsewhere in the management plan, there is still a need to pull together a comprehensive spatially-based regionally-embedded framework, which includes multiple scales of detail, and this full CDF will be available at the first iteration of this plan in 5 years time. Still to be considered in future are resource use potential, heritage sites for tourism, cultural tourism opportunities, municipal Integrated Development Plans and Environmental Management Frameworks still under development.

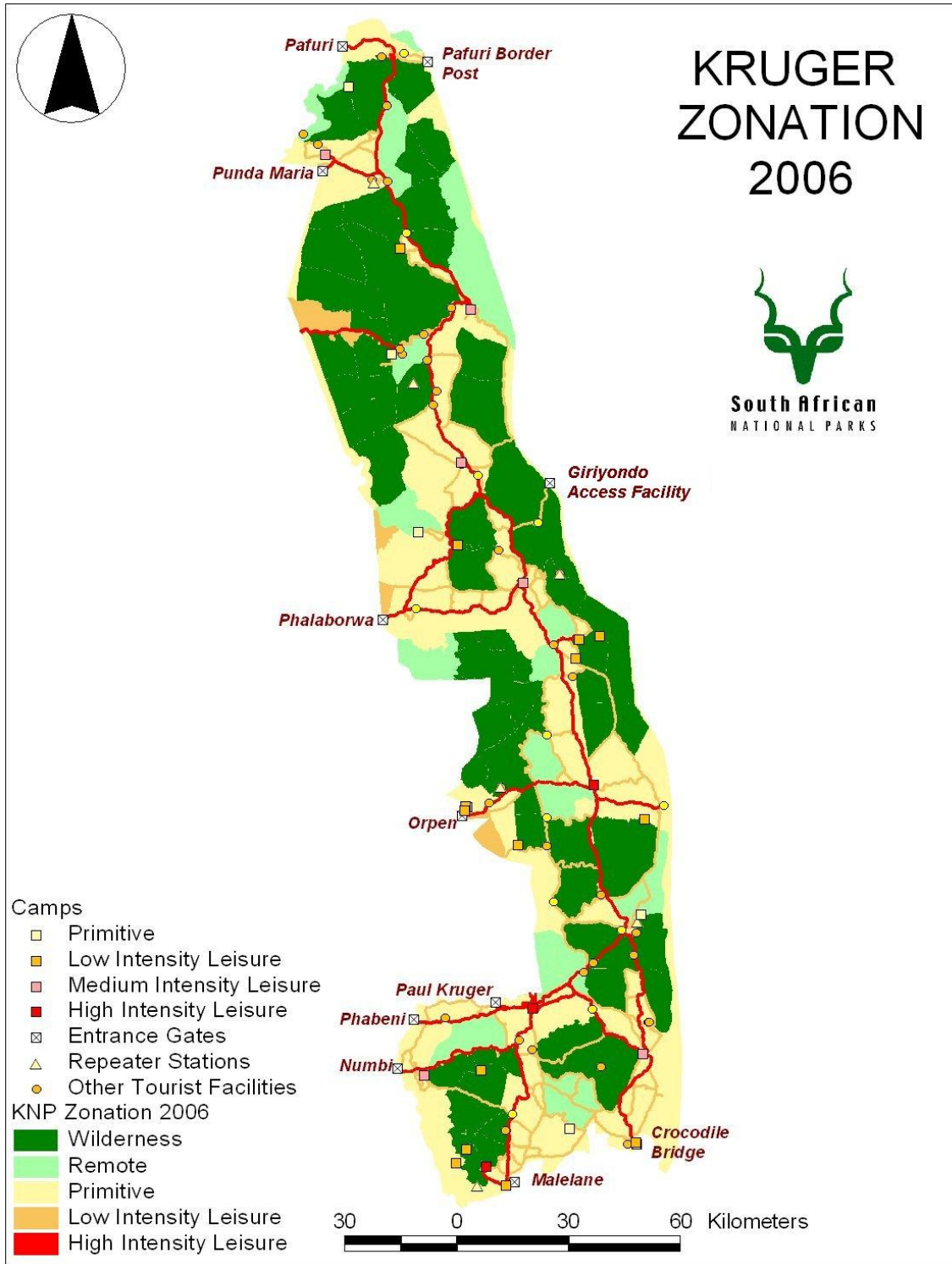


Figure 3: Zonation plan for Kruger National Park

The mission (within context and values), the vital attributes, the objectives, together with the Thresholds of Potential Concern and the zonation plan together make up the desired state of Kruger.

## 2. PROGRAMMES TO ACHIEVE THE DESIRED STATE

This section deals with all the discrete, but often interlinked, programmes which make up the approaches to issues, and lead to the actions on the ground. Together they are the park's best attempt to achieve the desired state specified in Part 1 above. Each subsection in this management plan is a summary of the particular programme, invariably supported by details in what are called *lower-level plans*, referred to in Supporting Documents but not included here.

The various programmes are classified into the five 'real-world' activity groupings as reflected in the SANParks biodiversity custodianship framework (Rogers 2003), namely Biodiversity and Heritage Conservation, Sustainable Tourism, Building Co-operation, Effective Park Management, and Corporate Support. Corporate SANParks policies provide the guiding principles for most of the subsections, and will not be repeated here, except as references and occasionally key extracts. Within each of these groups, the last section entitled 'Other Programmes' deals under one heading briefly with programmes which have some relevance to Kruger National Park, but which have been deemed sufficiently small as to not require their own subsection and reference to a fully-fledged lower-level plan.

### 2.1 Biodiversity and Heritage Conservation

#### 2.1.1 Zonation Programme

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. The rationale for and standard zonation criteria are contained in the SANParks zonation policy (SANParks 2006). A zoning plan plays an important role in minimising conflicts between different users of a park by separating potentially conflicting activities whilst ensuring that activities which do not conflict with the park's values and objectives can continue in appropriate areas. Ideally the zonation is based on a full Conservation Development Framework (CDF), which is not yet available for Kruger, and is couched in the context of corporate values and park objectives.

The use zoning plan for Kruger National Park is shown in Figure 2 above. Full details of the use zone definitions, the zoning process, the Park Interface Zones (detailing park interaction with adjacent areas) and the underlying landscape analyses are included in Supporting Document 3. In Kruger there is a spread of use zones from high intensity leisure to wilderness, with a large focus on remote, primitive and low intensity leisure zones in line with the vital attributes and objectives of this park.

As the park's primary focus areas, biodiversity conservation, Kruger's unique wilderness attributes and unique features, and its legacy of development that includes infrastructure considered as *heritage* in terms of the National Heritage Resources Act, all act as the primary informants to the land use planning. In the 20-year scenario a distinct increase in development alongside the western and southern boundary fence is expected with concomitant negative environmental impacts, whilst on the eastern and northern sides the further development of the GLTP means an increase in land under conservation.

### 2.1.2 Transfrontier Conservation Area Programme

The Department of Environment Affairs and Tourism sets out principles for transfrontier conservation area development. SANParks strives to embed Kruger National Park as an essential core element in the Great Limpopo TFCA whose conceptualised boundaries are shown in Figure 4. The International Treaty was signed on 9 December 2002 by the Heads of State of Mocambique, South Africa and Zimbabwe at Xai-Xai, Mocambique, to establish the Great Limpopo Transfrontier Park (GLTP). The objectives of the GLTP project are outlined in the Treaty, which has been jointly developed and agreed to by all three countries. Following the signing of the Treaty a Joint Management Board was established with various Management Committees advising it on issues relating to conservation, safety and security, finance, human resources, legislation and tourism, facilitated by an international coordinator. The Joint Management Board, in turn, reports back to a Ministerial Committee on progress made in the development of the GLTP on a regular basis.

The GLTP will link the Limpopo National Park in Mocambique; Kruger National Park in South Africa; Gonarezhou National Park, Manjinji Pan Sanctuary and Malipati Safari Area in Zimbabwe, as well as two areas between Kruger and Gonarezhou, namely the Sengwe communal land in Zimbabwe and the Makuleke region in South Africa into one huge conservation area of 35 000 km<sup>2</sup>, bringing together some of the best and most established wildlife areas in southern Africa. The park will be managed as an integrated unit across three international borders. The establishment of the GLTP is the first phase in the establishment of a bigger transfrontier conservation area (GLTCA) encompassing almost 100 000 km<sup>2</sup> and including Banhine and Zinave National Parks, the Massingir and Corumana areas and interlinking regions in Mocambique, as well as various privately and state-owned conservation and communal areas in South Africa and Zimbabwe bordering on the transfrontier park. The final delineation of the area will be determined by way of broadly consultative processes that are currently under way. The establishment of the GLTP is an exemplary process of partnerships between governments and the private sector.

The GLTP and wider GLTCA will demand much of our energy in getting started up, from a position where Kruger is a dominating feature in the landscape, to setting up a situation to allow a more equitable range of opportunities to become available to the surrounding conservation areas and adjacent communities. In doing so, initiatives such as the AHEAD (Animal Health for Environment and Development) programme have been initiated to examine the interfaces between human livelihoods and health, livestock health, and wildlife/ecosystem health, and looking particularly at who is 'winning' and 'losing' as fences drop and land-uses potentially change. The exact delineation of the South African side of the GLTCA must be carried out shortly, and may have a lasting imprint. It will have to be sensibly done in conjunction with other bioregional and municipal efforts, particularly the bioregional plans and Environmental Management Frameworks of all eight municipalities adjacent to Kruger. For more details go to the website <http://www.greatlimpopopark.com/>. It is our belief that an effectively designed and implemented TFCA will enhance the achievability of the desired state within and around Kruger.

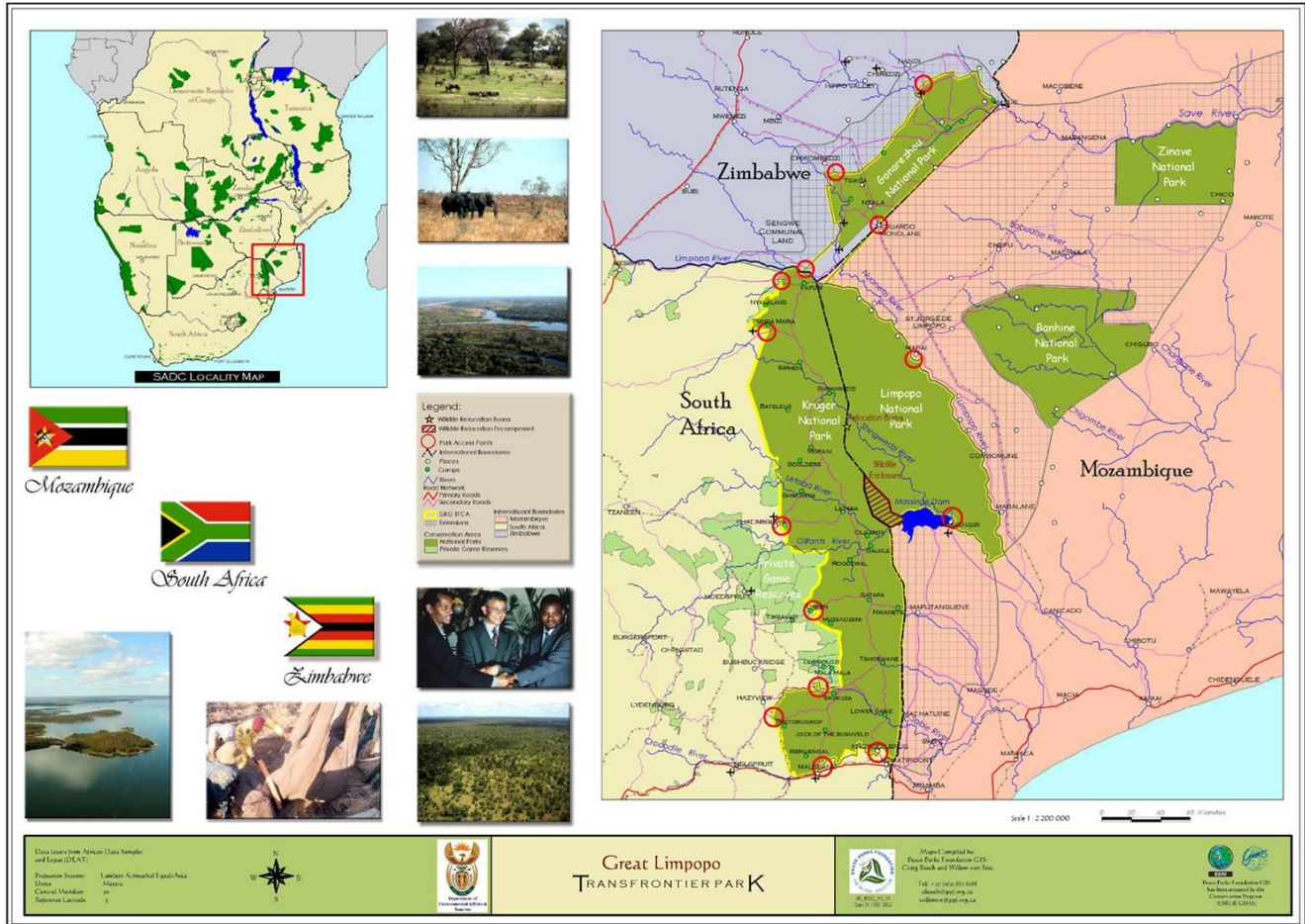


Figure 4: Great Limpopo Transfrontier Park

### 2.1.3 Biodiversity Management Programme

The overarching biodiversity goal of Kruger is to maintain biodiversity in all its facets and fluxes. Since the IUCN decisions of the 1980s that species conservation should be achieved through ecosystem conservation, SANParks developed this 'facets and fluxes' theme, especially appropriate in the KNP ecosystem which, although extremely rich in species, carries few regional and probably no entirely local endemics. The Noss (1990) formulation of biodiversity, because it covers all facets at all scales, including the habitat template, is very amenable to use for this purpose. Thus, more specifically, Kruger's ecosystem objective is "to understand and manage the KNP as part of the lowveld savanna and its river catchment areas in such a manner as to conserve and restore its varied natural structure, function and composition over time and space, and its wilderness qualities, through an approach integrating the different scales and types of objectives in the objectives tree" (Supporting Document 1).

A crucial aspect is how this is approached. It is currently believed that the above aspirations can be achieved through the KNP's integrated biodiversity plan (Supporting Document 2) which aims at ensuring that research and management are integrated in pragmatic learning-by-doing processes and generate understanding in a structured knowledge management system. This plan should be seen together with the KNP objectives hierarchy, from which the TPCs have been derived, as well as the adaptive management framework and broader SANParks values. Together these form the

desired state, with much of Kruger's biodiversity issues well within its bounds except, notably, not the riverine components.

Within Kruger, the biodiversity thresholds of potential concern, monitoring programme and associated management interventions are tightly interlinked and interwoven to reflect the emphasis on managing the heterogeneity of the KNP ecosystem (meaning a desired level of landscape patchiness and function, undergoing healthy oscillations characteristic of a savanna), accepting that ecological systems function in a dynamic space-time mosaic. This requires identification and understanding of the key agents of change across the nested patches and has resulted in Kruger adopting a unique version of the widely recognised model for managing this uncertainty and flux within ecological and social systems, namely strategic adaptive management (SAM, see du Toit et al. 2003). This emphasises forward-looking approaches to help convert decisions to a more proactive rather than reactive mode with a strong goal-setting component (the well developed biodiversity parts of the objectives hierarchy; Supporting Document 1) and strongly articulated spatial planning features (CDF or zonation) and end-points specified as TPCs. The objectives hierarchy, CDF and TPC endpoints connect science, monitoring and management, explicitly considering scale and covering changes in biodiversity at scales that vary from park-wide to the finest catenal (the divisions from hillcrest to valley bottom) scale. The scale that each TPC is set at is determined by the scale at which the specific element of function, structure or composition is believed to be relevant in the ecosystem, given the desired state and scales of management.

TPCs, as specified in section 1.3.2, are set to relate to either (a) the imminent danger of global loss of a species, or (b) to the 'flip' of the ecosystem or part of it to an undesirable ecological state. The basis for identifying "undesirable" ecological states is generally founded on a predictive understanding derived from past monitoring of fluctuations and their causes. Deviations from these patterns might suggest abnormal (possibly anthropogenic or management-induced) perturbations that would require investigation through adaptive management. We are interested especially in irreversibility of management actions arising from decisions taken now which have impacts beyond the 25-year time horizon, as these are effectively irreversible from the point of view of at least the next generation. In practice, the TPCs are specified as some mix of *habitat mosaics* allowed to vary over time and space across the park, an approach which tends to cut down our overall numbers of TPCs, or actual ultimate concerns or worries. Nevertheless, it is not considered desirable to actively create spatial or temporal heterogeneity by means of management measures, to the point of creating an 'artificially diverse' system, rather, the ideal is to maintain the extent of heterogeneity over space and time that may have prevailed in historical times (as far as this can be ascertained). We do also recognise the need to monitor other variables as key inputs to understanding TPC exceedances or as requiring management response options. The figures that we have attached to some of the TPCs were derived using specialist knowledge to interpret the current data. These will be refined as we gain knowledge from additional data collected by the monitoring programme (outlined in Supporting Document 2) and research projects. Kruger encourages outside researchers and scientists to constructively challenge the TPCs, especially the levels that have been set, and to help us better define these.

Thresholds, designed to detect unacceptable change in landscape structure, function and/or composition have been set and TPCs are being used as an objective instrument to help determine when Kruger authorities should be concerned about any of a wide range of issues impacting on the biophysical desired state, including herbivory (especially elephant) impacts, fire and nutrient cycling, disease and alien invasions. What were previously major thematic programmes (such as fire, elephant, surface water management, river management, etc.) are increasingly melded into more unitary overall programmes. Nevertheless, complete unification of terrestrial and aquatic biodiversity programmes is still outstanding, although much common ground has been found. Terrestrial biodiversity issues are treated, in practice, as one larger programme, albeit with interdigitated sub-programmes. This is testimony to clear understanding of our integrated mandate, and the complementary role of each issue.

Currently, the major biodiversity thrusts are responses to poor river flow, invasive aliens and a critical assessment of the role of elephant herbivory, along with other ecosystem drivers, on biodiversity and heterogeneity. These issues are considered in terms of SANParks' biodiversity values and the overarching missions of both the KNP and SANParks. TPCs, designed to detect unacceptable system changes or losses of biodiversity, should be able to detect changes due to system drivers including human interference, water provision, fire, global climate change as well as changes due to herbivory.

Elephants are one, albeit important, component of herbivory and the real challenge is to evaluate TPCs and interpret their main causes. Although current societal concerns often hinge around reduction of elephant impacts, it is important, as SANParks has stressed from the outset, that the philosophy also embraces the converse i.e. allows identification of concerns related to too low elephant impacts as well. In terms of elephant management specifically, four foundational areas may be used, separately or in combination, to consider action (integrity of ecosystems and biodiversity; security and safety considerations, opportunities for human benefit, including tourism and sustainable use; other value systems such as human aesthetic preferences and values) although the biodiversity programme focuses on the measurable aspects of biodiversity change that would trigger management concern. The underpinning principle for elephant management is the belief that varying densities over both space and time will be best for achieving biodiversity, a process that will have to be both tested and guided by adaptive management.

To add to this, an elephant impact tolerance classification is under development in conjunction with SANBI. This is being developed using primarily (i) the national obligations on Kruger to protect certain vegetation types (i.e. SANBI-specified conservation status of and targets for the vegetation types within Kruger) and (ii) the KNP landscape sensitivity to elephant impact/disturbance. Since landscapes differ in terms of importance of their conservation status for South Africa, the KNP landscape classification has therefore been combined with a national conservation importance rating (as defined by SANBI) and a KNP-based rating of the sensitivity of the various landscapes to elephant utilisation. Landscape-based TPCs will therefore be set at different levels to reflect the variable concerns. Although final maps are not yet available, preliminary outputs are presented in Supporting Document 2.

As heterogeneity is an essential aspect of biodiversity, an overall TPC (under active current development) assessing the status of heterogeneity makes a first attempt towards such an ideal and aims to look at a series of layers representing the different important ecosystem components. Evaluation at different scales attempts to determine whether overall spatial heterogeneity is acceptable, specifically by looking at change over time. Ultimately, such a TPC of 'general system variability' may make some or even most current TPCs redundant. Variability is considered the essence of biodiversity, and its study and practical management implementation is currently fairly novel. Nevertheless, in the interim, the existing approaches to evaluation are maintained, at least until we have satisfactorily prototyped these newer ones.

River research, understanding and management has come a long way since 1997 and there is clearer (but still incomplete) integration of aquatic and terrestrial ecosystem understanding which should grow in the next 5-year period. Although implementation of the new Water Act has been slow, it holds promise for Kruger's rivers. Nevertheless, Kruger cannot be complacent, with ecological reserve implementation and refinement remaining highest on the agenda over the next 5-year period. The provision of artificial water is one of the tools available to management, however, to use the tool efficiently we must understand the consequences of water provision for biodiversity and ecosystem function. For instance, the role of placing artificial surface water in the park has been through a full cycle, with recent trends leading to closing off of many waterholes to regain landscape patchiness. Newly instituted biodiversity surveys across Kruger represent a wide distribution of sites with varying distances from water and these surveys should render information on the influence of water provision on biodiversity and system function. Other factors to be addressed are the effect of water provision on nutrient redistribution and long-term effects on vegetation and mammalian (and also smaller faunal)

species composition. All the water in the landscape objectives recognise the cardinal roles of climatic, anthropogenic and global change impacts and it is hoped that this increased awareness will lead to better scenario-planning and predictive capabilities within the next 5-year cycle. This should aid our increased interaction with neighbouring and upstream land-use planning and catchment management activities as we appreciate more fully the interdependence of these systems.

Apart from the herbivory and water themes, there is also considerable interest in alien invasions. Although invasive species comprise almost all taxonomic groups, the most notable concerns in the KNP include alien plants and bovine tuberculosis which is currently the subject of an intensive research and monitoring programme. Alien plants pose a substantial threat to the riparian corridors through herbaceous shrubs and floating plants, and the rivers are currently the most impacted areas although even these are generally currently under reasonable control. *Opuntia stricta* (sour prickly pear) is widespread around the Skukuza region, but is managed through a well researched and integrated biological control programme. Most of the alien plant control work being conducted in, and especially surrounding, the KNP is carried out by the Working for Water Programme. Although an environmental programme, this programme also provides other socio-economic benefits to rural poor communities. Although alien fish (carp and Nile tilapia), freshwater snails, the varroa (bee) mite and the Indian myna (bird) have been recorded in the KNP, the abundance is localized or relatively low and impacts are unknown at this stage.

There is also ongoing interest in species conservation issues, with key species in Kruger being black rhino, wild dog, pepperbark tree, wild ginger and Swazi impala lily. A justification framework helps prioritise these and other species which also require action, and trade this off against the modern need for overall ecosystem conservation. Internationally significant disease control measures, particularly around foot-and-mouth disease, take place near around Kruger due to its three-country juncture position. This disease has much wider economic than biodiversity implications and some of the veterinary control measures themselves can be considered as important biodiversity conservation constraints, an issue under study in the AHEAD (Animal Health for Environment and Development) programme launched at the Durban World Parks Congress.

#### 2.1.4 Regional Land-use Planning and Cooperative Governance Programme

Kruger Park lies in the middle of a three-country mosaic of sharply juxtaposed land-uses, problems and challenges and to see itself in isolation is considered pertinently counterproductive and ecologically dangerous. The real linkages to this complexity are currently still being built, but considerable progress has been made by Kruger in regional river management and in somewhat softening the social boundary on the South African side through activities of the People and Conservation Division. We probably stand at the start of a five year period which could characterise the formation of more regional linkages than ever before and possibly more than for a long period hereafter – this could thus potentially be seen as the 5 year window, or perhaps decade, of building linkages. Kruger therefore needs to become adept at reaching out influentially, in an at least partly organised and practical way, to a host of outside partners in the landscape. There is no overarching regional plan at this time, but the important elements are listed below. It is probably highly desirable that these be consolidated into such a plan by the next writing of this management plan in 5 years time.

Catchment management agencies (CMAs), emerging though they still are, are where we may have had the most constructive influence. During the next 5 year period, we will need to ensure that *water allocation as a social process* takes hold and delivers sustainable outcomes also for biodiversity. These CMAs and all the structures beneath them will need to find harmony with the wide range of other geographical realities and pressures.

The existing IDPs for the municipalities are currently under revision as Environmental Management Frameworks (EMFs) and inform the spatial development frameworks. Existing regional

initiatives, such as the Maputo Development Corridor, which influence all our bioregional linkages must be taken into account. Very little attention has to date been given to the linkage between biodiversity and economic, especially tourism-related spatial planning (as has now started in several municipalities and district municipalities as well as local and regional tourism offices and chambers of commerce). This will need to happen very soon and be well-linked by the next iteration of this plan. The Road Infrastructure Strategic Framework for South Africa is another key lever for such interlinkage, currently in an amenable stage. Probably the central long-term opportunity, if it materialises, is the initiative to establish Mbombela region as an intellectual capital of environmental management and tourism. The World Soccer Cup in 2010 acts as an obvious additional reason to mobilise immediate synergies in regional, including international, planning possibilities.

Kruger splits similar rural populations on each side, and human migration routes across the park represent both undeniable cultural-historical patterns, and security challenges. Some of these will be addressed through the GLTP programme (see also 2.1.2).

On the biodiversity front, the north-eastern escarpment bioregion (NEEB) will probably become a reality, its core area including the northernmost tip of Kruger, but its dependent satellite areas including much of the lowveld. Kruger will need to assertively participate in NEEB (which strives to link ecosystem services and livelihoods) to meet its goals and SANParks wider off-reserve goals (SANParks 2006). One prototype area of NEEB in particular (the Blyde-Sand catchments) will help achieve several goals of the somewhat stalled Kruger-to-Canyons UNESCO biosphere initiative. Mpumalanga province in particular has well-developed systematic conservation plans, and Limpopo province promises to follow suit. Together with them, we need to integrate all of these, and see Kruger as a one complimentary but valuable land parcel in a bigger overall plan. At the terrestrial-aquatic conservation interface, SANBI and co-workers have gone to great lengths to harmonise planning units and present *one* conservation priority map to planners and developers. Action research on this union is being developed most strongly in just a few localities in South Africa, one of which is the Mpumalanga lowveld. The various clusters of private and provincial parks and protected areas which straddle Kruger (now in all three countries) present their own constructive governance challenges and a way must be found to organise our relationship with them effectively, without having to deal with scores of separate landowners or managers.

SANParks also needs to consider its own long- and wider-range priorities, such as its participation in meta-population strategies, which could become important in the lowveld region for certain endangered plants. Also, we have a keen interest in developments higher up in the Limpopo catchment, not only because of Mapunguwe National Park, but because the northernmost region of the province and Kruger share the same catchment.

Working for Water, Working for Wetlands, and Working on Fire, as well as many NGOs (such as Africa Resources Trust) have specific geo-planning delineations or requirements, each of which must also feed into a unified land-use pattern. A recent decision has aligned fire protection agencies with municipal boundaries.

Given the broad understanding in this section, Kruger specifically needs to quickly develop a statement of intent identifying key persons who will populate the interface between our planning and that of the wider mosaic around us on all sides. This should not simply be a continuation of the catchment work, transfrontier park work and initiatives of People and Conservation, but now needs to stretch to include other dimensions, notably bioregionalism (driven by SANBI) and spatial tourism and wider economic planning. Sustainably integrating all these in the richly varied lowveld-escarpment region is the long term goal.

#### 2.1.5 Sustainable Use – Statement of Intent

SANParks recognise that they have been established to protect and conserve areas of biological diversity. This is its primary mandate and all other activities must be regulated by this goal. However, it also recognises that as a national agency, SANParks must provide for the needs of all citizens, by

generating an array of tangible and intangible benefits and resources. Subject to guidance from SANParks corporate principles (SANParks 2006), KNP has developed the following statement of intent on sustainable natural resource utilisation.

The KNP regards any action that utilises or impacts on the scenery, sense of place, soil, water, air and nutrient cycles, habitats, heritage resources, flora and fauna, and the interrelatedness between these, as a resource use. Furthermore, KNP recognises that they have a responsibility to ensure that natural and cultural resources which are not harvested from within the park boundaries, but are used in the park, are collected and harvested in an ethical way that conforms to SANParks' policies. The KNP is aware of the demand for resources by its various stakeholders (including both neighbouring communities and SANParks) as well as the role it needs to play in developing opportunities in this regard. While natural resources have been used by humans for millennia the balance between available resources and demands has become distinctly disproportional. The exhaustion of resources outside of national parks is one of the reasons for the increasing need and demand for resources inside national parks.

This statement of intent is the first step in the development of a sustainable resource management plan. Therefore, the KNP commits to investigating natural resource use in terms of past and present practice as well as future opportunities, in order to provide resources that are truly sustainable in the long-term, without compromising any of the organisations biodiversity or other values. All resource use in KNP should be considered, implemented, managed and monitored in accordance with the corporate policy which includes a comprehensive synthesis of international and national legal issues pertaining to resource use. KNP-specific regulations for resource use should follow an adaptive approach, based on the following 14 feasibility and implementation principles:

#### *Feasibility principles*

1. *Precautionary approach* - The 'precautionary approach' must apply. This is interpreted as:
  - leaving an appropriate 'margin of error' where information is inadequate;
  - prohibiting or preventing use of resources in instances where the consequences of erring could be severely negative for species, heritage resources, cultural landscapes and/or ecosystems;
  - terminating resource use activities if doubt arises as to the sustainability or impacts on the KNP.
2. *Maintenance of system integrity* - The ecological, aesthetic, socio-cultural, archaeological and spiritual integrity of protected areas must not be jeopardised in the long-term in order to satisfy short-term needs/demands. System integrity, composition and function are defined as the desired state and are represented by the KNP objectives hierarchy.
3. *Cost-benefit analysis* - The benefit-cost ratio to SANParks must be positive.
4. *Determination and evaluation of potential influence of utilising resources* - The thresholds of concern for use on affected species, heritage resources, cultural landscapes and ecosystems must be determined and evaluated using methodology that is appropriate for this purpose. This must take into account the effects of resource use on population dynamics, ecosystem functioning and social and cultural values. This must be achieved in an integrated manner, incorporating all relevant scientific, formal and informal information and knowledge (including traditional knowledge).
5. *Cost recovery* - Costs must be recoverable from resource users who are able to pay, and it should be possible to leverage 'contributions in kind' from users who are unable to pay. Cost recovery also includes the costs of monitoring programmes that are required to manage resources in a sound manner.
6. *Adequate capacity* - Appropriate human and financial resources must be available to manage, monitor and regulate resource use.

### *Implementation principles*

7. *Adaptive management* - Resource use must be managed adaptively, accompanied by constant learning based on monitoring, information gathering and research.
8. *Incentives* - Incentives for sustainable resource use and disincentives for unsustainable or wasteful use must be put in place.
9. *Ethics* - Accepted ethical norms and standards must be adhered to.
10. *Redress* - Past inequalities must be addressed through benefiting the poor, but without undermining the diversity of people's livelihood strategies.
11. *Respect for rights* - Intellectual property rights and historical claims to resources must be respected.
12. *Co-management* – Decision-making must be consultative and transparent. All stakeholders involved in resource use should accept responsibility for sustainable use.
13. *Enforcement* - Illegal resource use must be prevented through law enforcement.
14. *Rights and responsibilities*: While SANParks acknowledges the responsibilities outlined above, it also has the right to choose which resources to make available and how much, as well as the right to withdraw use if necessary (i.e. the use of a resource does not automatically constitute the source as being permanent).

#### 2.1.6 Rehabilitation Programme

Rehabilitation forms an integral part of the park's conservation strategy to minimise man-induced impacts that detract from or threaten the biodiversity and cultural heritage resources of the park. Although localised to a certain extent, past management interventions and developments had negative impacts on ecological processes, "sense of place" and wilderness qualities within the park and these must be mitigated or rehabilitated to an acceptable level. These include the closure, removal and rehabilitation of certain artificial water sources such as dams, reservoirs and drinking troughs, the closure and rehabilitation of disused management roads, the removal and rehabilitation of redundant structures (if not protected under SAHRA) and the rehabilitation of all man-induced erosion and other disturbed sites such as disused gravel pits.

The rehabilitation plan (Supporting Document 4) aims to:

- identify redundant structures and impacted sites within the park which require removal and/or rehabilitation in order to restore wilderness qualities and 'sense of place' and also to improve ecosystem functioning;
- prioritise rehabilitation goals with highest priority given to wilderness zones and areas bordering on those zones;
- determine the rehabilitation needs for the next five years with associated timeframes and projected funding requirements;
- identify associated research and monitoring needs;
- highlight potential risks or threats.

The most immediate need is the removal and rehabilitation of redundant manmade structures. Priority attention must be given to the removal of these structures from the wilderness areas of the park if they are not protected by SAHRA. KNP management must therefore commit to a structured and integrated rehabilitation approach if the legal designation of these areas is to be achieved. A concerted effort must be made to secure the necessary funds from DEAT through the EPWP.

Firebreak and management roads to be closed and rehabilitated have been identified and those within wilderness areas prioritised. Current erosion problems in the KNP are mainly associated with incorrect alignment of firebreaks and management roads through sensitive soils and seep lines. Another source of man-induced erosion occurs around artificial water sources such as dams and

windmills where excessive trampling and the unnatural channeling of water results in ongoing erosion problems. Approval for the systematic closure and removal of certain dams and windmills were granted by the SANParks Board following proposals stemming from the 1997 KNP Management Plan revision. Numerous windmills were subsequently closed and a number of dams were breached and rehabilitated. Unfortunately most of the closed windmills and associated structures were never removed or the sites properly rehabilitated. A number of earthen and concrete dams remain operational and need to be removed and the sites rehabilitated as soon as possible. The Working for Wetlands programme achieved good results though in the removal of some dams and helped restore hydrological flows along the Levuvhu floodplain and is a good example of an approach to follow in future.

#### 2.1.7 Wilderness Management Programme

Perhaps one of the most significant provisions under the new PAA legislation is the formal statutory protection status that may be awarded to wilderness areas. The Wilderness Management Programme (Supporting Document 5) identifies areas in the KNP to be declared statutory wilderness and highlights the KNP's wilderness management principles. Furthermore, it outlines the objectives (also specified in Supporting Document 1) and how these will inform the decision-making environment affecting conservation management, visitor management, scientific research and monitoring within such areas. Wilderness protection is guided by the SANParks Corporate policy on wilderness, which recognises wilderness as an enduring natural resource deserving the highest protection possible within our national parks.

The programme focuses on retaining the intrinsic qualities and values of wilderness and maintaining or restoring specific attributes associated with such areas. It recognises the crucial role of proactive involvement in regional and local development planning, as well as the need to follow a transparent and integrated development approach within the park to guide management and restoration of wilderness areas. Important objectives to be addressed in the next 5 years include the identification and statutory designation and protection of candidate wilderness areas (planned to be done by 2007/2008), and the implementation of an appropriate rehabilitation strategy and plan to remove redundant structures and human-induced impacts and restore the 'sense of place' of these areas. This will need to go hand-in-hand with appropriate monitoring and auditing mechanisms, research, promoting understanding, acceptance and support of the wilderness philosophy amongst park visitors, staff and neighbouring communities and the provision of human benefits through appropriate access and recreational use.

Within wilderness areas, management decisions must now be effected with due consideration of the minimum tool concept and this includes management of fire, alien biota, damage-causing animals, animal population management, disease management, natural resource use, rehabilitation efforts, safety and security, maintenance of territorial integrity, waste disposal ("pack it in, pack it out" principle), management of cultural, historical and archaeological heritage sites, visitor and other access, roads, trails and aviation. The "leave no trace" ethic will be applied to all wilderness uses within the KNP.

New initiatives such as the recently launched Olifants Backpack Trail will greatly assist in making some of these areas more accessible to the general public in future. With an expected future increase in wilderness use, it has become important to establish TPCs for these areas to facilitate proactive management of visitor numbers and their associated impacts. The current lack of a wilderness monitoring programme and associated database hamper the setting of realistic TPCs and must be addressed as a matter of urgency. Supporting Document 5 lists preliminary TPCs as a starting point for further development.

### 2.1.8 Management of Damage-causing Animals Programme

'Damage-causing animals', specifically lion and elephant, have impacts on particularly the western, but also southern, boundary of the KNP where they impact on neighbouring communal or commercial farmlands and pose a direct threat to livestock and community livelihoods. Movement of certain animals, specifically buffalo in the Kruger context, across park boundaries also pose a serious risk of spreading disease to domestic livestock and/or humans. We acknowledge that these and other animals may from time to time leave the park and cause damage. Maintenance of fences within Kruger is the responsibility of park management. Nevertheless, legally, at this stage, KNP officials have no jurisdiction to act against animals outside the borders of the park and any actions must be undertaken in consultation and by request of the Mpumalanga or Limpopo provincial authorities.

'Problem animals' and 'pests' within the park itself, do from time to time affect visitor experience, staff safety and management infrastructure. It therefore, at times, becomes necessary to remove individual or groups of damage-causing or problem animals, those that are injured, diseased, burnt or deformed. Lethal removal of animals is occasionally required where these pose a direct threat to people, livestock or crops on neighbouring land. The most efficient and humane technique for the particular set of circumstances will be used, taking into account constraints imposed by practicality, considerations of safety to humans as well as the potential impact on other animals or the environment. SANParks highlight respect for life and welfare of animals in the implementation of such actions, recognising that the problem is usually man-induced, and our approaches are based on the principle that prevention is better than cure. In terms of pest control, Kruger has a well developed strategy in line with responsible and environmentally-friendly pest control options, with mechanical control options being the preferred method.

SANParks takes note of the fears and concerns of all affected parties surrounding the park and will address these to the best of our ability within the National Legislative Framework and SANParks' Policy Framework. In addition, effective communication and partnerships, particularly with provincial departments and neighbours through the Park Forum require ongoing attention. Details of this programme can be found in Supporting Document 6.

### 2.1.9 Other Programmes under *Biodiversity and Heritage Conservation*

At this stage Kruger does not have a fully developed Cultural Heritage Management Programme, although a first draft is available (Supporting Document 7) and the desired state for Kruger includes maintenance of cultural heritage assets, notably Thulamela and Masorini sites, and a wide spread of San rock art. All actions are advised by SANParks policy on cultural resource management (SANParks 2006). A heritage inventory initiative, embracing all aspects of cultural heritage, has been identified as an essential priority within the next five years in Kruger. In addition, Kruger has some significant heritage resources within its boundaries requiring further research. Other objectives for the park include development and implementation of a Heritage Management Plan with appropriate Site Management Plans for those sites that have been identified for educational, research and/or tourism purposes.

## 2.2 Sustainable Tourism

This section clearly also cross-links to the Zonation Programme provided in 2.1.1. The lower level plan is detailed in Supporting Document 8.

### 2.2.1 Sustainable Tourism Programme

The KNP's tourism programme is aimed at simultaneously addressing and supporting the six key goals and associated strategic objectives of the Department of Environmental Affairs and Tourism strategic plan and the SANParks strategic tourism principles and objectives. In order to achieve our desired nature-based tourism destination state in Kruger, our *tourism activities and experiences must optimise the parks' unique attributes and special features as the preferred focus to ensure sustainability and a unique product compatible with the overall desired state whilst applying the principles of Responsible Tourism*. In order to achieve this, the following 11 aspects will require focused attention in the next 5 years:

1. **Transformation and empowerment** – This will have to permeate a wider variety of aspects, including the target market (visitors), small businesses (e.g. open safari vehicles), involvement of local communities in tourism activities, etc.
2. **Visitor management** – Taking heed of a recent demand analysis, it is anticipated that should the demand continue to grow at its current rate, Kruger will not be able to manage its visitors, particularly in the southern region. Creative alternatives to the 'self-drive' tourism model will need to be investigated, possibly incorporating a type of 'park and drive' concept in the next 20 year horizon. Attention will need to be given to the current quota system, particularly since 70% of visitors currently comprise day visitors and Kruger will need to consider converting these to overnight visitors, limiting day visitors.
3. **Infrastructure upgrading** – This area has been severely neglected in the past, particularly in the light of government grant cuts to SANParks. However, Kruger will need to rectify this and bring its tourism infrastructure up to standard with industry norms (as described by the Grading Council of SA) and ensure that it has the right supply for the right types of grading in the various camps where market demands lie. For example, to realise transformation of our potential growing target market, we must take into account that the black higher middle class market demands 4-star accommodation, breakfast included. It is not anticipated that any major new infrastructure will be developed in the next 5 years, but Kruger will need to focus its energy and funding on right-sizing this. Projected camp and bed-night demand suggest that additional facilities will be required during peak seasons. An alternative may be the introduction of seasonal camps i.e. light structures with required interiors and temporary staff on contract for 3-4 months of the year only. This would allow Kruger to generate income without having to make huge infrastructure investments that will require ongoing management and maintenance.
4. **Pricing strategy** – To ensure that our pricing is competitive, affords access to all South Africans and that it correlates with our star grading, tourism in Kruger will need to focus on the flexibility of packages, in line with the rest of SANParks and the ecotourism industry.
5. **Access** – This issue was highlighted strongly in the park management plan stakeholder engagement sessions, with an appeal to consider more day visitor centres, a 'park and ride' type concept for backpackers and people that don't own cars, air access for inclusive packages, etc. In addition, there is a demand for interpretive centres at gates, which will become particularly valuable when gate quotas are reached. In addition, Kruger should differentially class the various camps to pre-segment the visitor markets coming into the park. It is predicted that visitor demand will exceed daily quotas in peak times before 2010 at the southern gates and will require a visitor management strategy which includes sufficient facilities to provide alternative forms of visitor engagement with the park other than just self-drive. Unless this is taken care of properly, Kruger will lose its market appeal due to poor visitor experiences. Similarly the forecast predicts that visitor entries can become a problem in Phalaborwa especially during peak season months from 2010 onwards.
6. **Sustainable revenue growth** – This must focus better on the three new and growing markets, namely SA Leisure (black middle class), business tourism (conferences), and maintenance of the current market. In addition, and to enhance this, Kruger must expend energy on sufficient and

effective marketing of Kruger as a destination; provision of interpretive/orientation centres to promote the cultural and natural aspects of Kruger; provision of international standard facilities and services; provision of sufficient and appropriate recreation facilities for the local day visitor market; proper management of the park and its facilities as a whole; destination forums to ensure coordination on routes and packages within the region; alignment of Kruger to industry standards and commonly accepted tourism business principles.

7. **Budget** – Budget constraints are a reality, however for the KNP nature-based tourism model to succeed funds need to be sourced and made available for various strategic studies to plan better for tourism (include a visitor management study, consumer behaviour research, route mapping), upgrading of facilities and marketing (where the industry norm is 3–5% of revenue).
8. **Capacity** – Not only has a need for additional and enhanced capacity been identified (e.g. guides make money with activities, but due to budget constraints we can't employ them), but there is also a need for employees, especially at middle management level, to be appropriately trained to give proper service. Indications are that the greatest improvement to tourism in the short term will be to address management and capacity-building issues first, particularly for essential services and operations. This will result in more certain and sustainable results than from any other structural or planning changes. A key factor in managing tourism is timely access to good quality information. It is also necessary to have the skills to analyse it, develop plans and options, and then implement the resulting decisions. This appears to be a current deficiency that urgently needs to be rectified in the light of the relentless increase in visitor pressure and likelihood of resultant overcrowding, particularly with 2010 looming.
9. **Implement operational management and auditing** – Currently Kruger employs one Hospitality Standards Manager and has a very newly developed Standards Manual. This capacity needs to be expanded and independent auditing procedures and site inspections instituted to maintain a high quality tourism product.
10. **Marketing the KNP as a destination with regional linkages** - Continued analysis of the market demands and provision of tourism routes is required. The KNP must conform to industry marketing norms to ensure that it becomes the destination of choice, not only for South Africans, but for all people of the world. Investigation of the young and upcoming black market, concentrated in Gauteng, should be further considered. This market falls within lower income brackets and we will need further research to determine the exact requirements of this market in terms of tourism experiences, packages, etc. The educational market will also be an important strategic market for Kruger to develop in the future. If it is assumed that a third of the school children partaking in overnight excursions are based in Limpopo and Mpumalanga, then the annual demand for educational trips to these provinces is roughly 450 000 students per annum (Kruger currently attracts about 22 500 students annually). There is significant room to grow this market. In addition, the business tourism market in South Africa is one of the fastest growing domestic markets and can be a good antidote for the seasonality experienced in Kruger.
11. **Nature-based and heritage-based tourism** – This will require a paradigm shift in the way we do tourism business in Kruger, but all indications are that we should move towards providing predominantly nature-based activities, with an increasing focus on including cultural heritage tourism opportunities. The relevant debate around the merits of 'more visitors, more revenue', against the opposing view that 'high wilderness values guarantee quality visitor experiences' is not finalised in Kruger. In order to support the desired state for this park, cognisance must be taken of the fact that the all-important 'visitor experience' is an independent attribute specifically of visitors and tourism limits should be set in large measure by the opinions and responses of visitors. Nevertheless, Kruger will also need to position itself to market the nature-based experience it strives for and believes in. Qualitative information must however be systematically and skillfully collected and analysed, both from visitors directly and from visitor managers who are in close touch with them as overcrowding at peak periods and at favoured localities devalues the visitor experience, irritates individuals and can damage the reputation of SANParks.

## 2.3 Building co-operation

Co-operative, collaborative and mutually beneficial relationships with the broader park community are essential to the sustainability of Kruger National Park. The park must thus maintain existing, and identify and implement new opportunities for sustaining relationships between itself and the surrounding communities and broader park users. Co-operative relationships need to be established and nurtured with all spheres of government and other stakeholders to ensure that regional initiatives and developments contribute to, not compromise, the attainment of the overall desired state and objectives for Kruger. To this end three key *People and Conservation* programmes will continue running from Kruger Park during the next 5 year period, detailed below.

### 2.3.1 Environmental Education and Interpretation Programme

The park provides a host of different educational and awareness-building opportunities in the environmental and resource use domain, thus also enhancing our cause in South African society as a whole. It focuses particularly on schoolchildren and youth groups (examples from a wide range of projects are Kids in Parks, Morula Kids, Imbewu), and on teachers and curricular linkages, and also to an extent on guided and unguided activities, and interpretive material for tourists (see Supporting Document 9). This programme contributes towards building constituencies at all levels in South Africa and abroad in order to foster sustainable public support for KNP's people-centred conservation and tourism mandate. Through initiatives such as eco schools, bush camps, guided tours for tourists, the development of six educational centres, outreach programmes to schools in the surrounding local communities, and an open and transparent public participation process regarding park developments, KNP has taken the first steps towards enhancing local constituencies' understanding and awareness of biodiversity conservation and environmental issues, and building strong community relations.

Over the next five years, steps will be taken to develop tangible outputs from these relationships through promoting the use of KNP as an 'outdoor laboratory' and centre for social science research and projects through the development of specialised educational programmes aimed at tertiary institutions and researchers at the local and national levels, and active participation in the bioregional plan for KNP. Kruger will also be expanding the scope of its outreach programmes such as the Kruger to Kasie programme to local communities outside of the immediate 20 km radius of KNP as part of ongoing constituency building.

Another important component of environmental education, which has been somewhat overlooked in the past, is the use of interpretive materials such as information boards, signs and plaques pertaining to special features of KNP. Much of this information needs to be sourced from existing project/research reports and archives – a process which will be championed by People and Conservation over the next five years.

It is foreseen that all these thrusts must be continued over the next five year period, and that effective monitoring should be developed around key aspects. Reliance on donor funding is seen as an important risk.

### 2.3.2 Stakeholder Relationship Management Programme

This programme (Supporting Document 10) strives to establish and maintain meaningful and beneficial relationships with a wide range of stakeholders, in a way as beneficial as possible to core park values and aims. The programme further contributes towards strengthening stakeholder-park relations by empowering stakeholders and local communities to participate in decision-making processes related to management and development issues in KNP. Thus, as the park aims to

redefine its role within the broader landscape mosaic with the drafting of a bioregional plan over the next five years, the stakeholder participation process will be critical to ensure that the park's management and development decisions are sensitive to local contexts. Hence, key stakeholder relations will have to be fostered.

Although it has grown organically in response to various needs, the co-operative governance thrust in the South African constitution is leading to its intensification. The overall stakeholder list of those involved is obviously very wide, and includes appropriate departments from all three levels of government; international and national agencies (especially conservation NGOs and research institutions); business partners of many kinds, local communities, employees, customers and the media. It also includes composite and bridging structures such as park forums, community property associations, water user associations, and joint management boards of parks including the trans-frontier park. Planning structures such as integrated development plans and strategic development frameworks provide a link with which we need more regular and deeper involvement. We plan in the next 5 years to build further co-operative institutional capacity with these, and to ensure establishment of viable fora, and regular positive interaction. Better ways need to be developed to make explicit and prioritise aims, and monitor the progress of, this important supportive programme which underlies almost all SANParks does.

### 2.3.3 Local Socio-Economic Development Programme

This programme aims at contributing effectively to local economic development, economic empowerment and social development in communities and neighbouring areas adjacent to the park (Supporting Document 11) with an emphasis on redressing past imbalances. To do this Kruger must participate more effectively in municipal integrated development plans (IDP's) and continue participating in appropriate government programmes (especially *Working for Water*, Expanded Public Works Programmes etc.) in a way which not only produces short-term job opportunities but also contributes to local skills development through supporting learnerships, implementing needs-related training programmes, and creating useful exit strategies (after short-term employment) and business opportunities for participants. Kruger must keep up and expand its reputation as a reliable and meaningful vehicle for such government expenditure – major opportunities presenting themselves in the next 5 years being related to ecological rehabilitation (e.g. alien clearing), infrastructure development (development and repair of tourist facilities, roads etc.), the concessioning programme and retail operations.

By partnering with neighbouring district municipalities, various external donors and neighbouring local communities, KNP has made some good strides towards enabling previously disadvantaged individuals and small micro-medium enterprises (SMMEs) better access to park related opportunities ranging from biodiversity conservation, alien eradication (e.g. *Working for Water*), and arts and crafts to the concessions programme (outsourcing catering and transport services to neighbouring communities of KNP). Over the next five years, Kruger will continue to support livelihood-based programmes spear-headed by KNP, as well as co-operate with other livelihood-based initiatives such the north-eastern escarpment bioregional plan (RESTORE), and those initiated by agencies such as Wits Rural Facility and NGOs (such as CESVI in the Giyani region). Ongoing research by social science programmes such as the Transboundary Protected Areas Research Initiative (TPARI), TreeHouse, and others will also be promoted in the next 5 year period, as evidenced by the recent creation of a post in KNP to facilitate social and economic research.

Current projects, some of which now also include monitoring aspects, need ongoing care and expansion, and need to be expressed via recognised criteria and indicators. Important risks to this programme relate to product quality and to uncertainty around donor funding.

#### 2.3.4 Communications Strategy

This strategy aims to craft the means by which the communications component of relationships can be built, maintained and constantly improved, between KNP and all relevant stakeholders. The programme aims to create an environment that facilitates targeted communication to ensure shared understanding, to serve achievement of the overall desired state of the park. It outlines target audiences (fifteen groups in all) and develops appropriate themes and messages for each. It develops a tool-specific programme of actions and plans, over the next 5 years, to implement this with clear milestones and budgets. It also outlines ongoing media screening collections and evaluations and can be seen in full in Supporting Document 12.

#### 2.3.5 Other Programmes under *Building Co-operation*

Through the forum relating to the strategic planning of parks, established in 2003, a positive relationship exists between government agencies, particularly the relevant divisions of DEAT. SANParks has been intimately involved in the drafting and implementation of legislation, norms and standards as a result of this participatory governance approach. As Kruger is a national asset, planning, management and development within Kruger is overseen by DEAT. Several co-operative governance agreements are in the final stages of development that focus on aligning legislation and ensuring co-operative governance is given effect between DEAT and SANParks.

### **2.4 Effective Park Management**

Effective park management is essentially a means to an end, namely the enablement of our objectives to achieve the desired state in the three core areas above. The technical support services are based on principles of sustainable planning and design (including “touch the Earth lightly”, green building, sustainability and natural and cultural resource optimization principles), maintenance and rehabilitation, and environmental management.

#### 2.4.1 Environmental Management Programme

Environmental management within Kruger is guided by corporate environmental principles and Kruger's environmental objectives. These objectives are integrated across all divisions and all aspects of the business functions. The overarching environmental programme must ensure responsible tourism, environmental best practice, legal compliance and due diligence, while environmental ethics are incorporated and practiced in all we do. The environmental focus is on legal compliance and due diligence, integrating environmental ethics and principles into planning, environmental due diligence in operations, responsible tourism, monitoring and auditing. Within the next 5 years we seek to develop an environmental research programme that takes integrated environmental practice further. Key sub-programmes in Kruger deal with solid waste and effluent management as well as water use management (see details below)

##### 2.4.1.1 Solid Waste and Effluent Management Programmes

The solid waste (Supporting Document 13) and effluent (Supporting Document 14) management programmes strive to ensure the effective management of such waste through compliance with relevant legislation. The solid waste management programme is founded on the basis that we, wherever possible, minimise the effect of solid waste on the ecosystem and visitor experiences by

minimising waste production at all sources, maximising recycling and removal of all waste from Kruger where feasible. Efficient management of solid waste is promoted through active intervention and appropriate monitoring, including all components of the waste source, stream and disposal into all planning, continuous assessment and interpretation of future trends. Procedures for effective solid waste management strive to minimise pollution (air, soil, water, noise) and all waste sites have the necessary DWAF permits and compliance inspections. Five year strategic objectives include reduction of the waste stream by 70%, recycling of all plastics and removal of incineration where feasible.

Current liquid waste infrastructure consists of septic tanks with french drain systems or reed beds, oxidation ponds with reed beds, septic tanks with oxidation ponds with reed beds and enviro loos and all are permitted by DWAF in terms of the Water Act section 21 (4), with concomitant monitoring and sampling. Research is however needed to determine the efficiency of our sewerage works. Standard pollution prevention procedures apply to limit or minimise air, ground, water and toxic waste pollution. Five year strategic objectives include improvement of the effluent quality (through installation of septic tanks before oxidation ponds at a number of large rest camps), and introduction of grey water systems for irrigation and ablution facilities.

#### 2.4.1.2 Water Use Management Programme

Potable water is primarily provided from surface water (rivers) and ground water (boreholes) and this programme (Supporting Document 15) strives to ensure the effective management of potable water use through compliance with relevant legislation taking into account the amount of available water, ecological reserves, water demand, use and quality, environmental and social issues for efficient use. Potable water is managed and monitored by sampling, analysis and monthly inspections of infrastructure, ensuring that the water quality complies with requirements for human consumption. Irrigation of gardens in Kruger is considered a privilege, not a right. Five year objectives include installation and replacement of water meters to develop a water balance, water audits, appointment of KNP by DWAF as a Water Service Provider and reduction of water consumption by 5% per annum through water saving device programmes.

#### 2.4.2 Infrastructure Development Programme

Kruger's infrastructure development programme (Supporting Document 16) outlines existing infrastructure (detailing both income-generating and support infrastructure and facilities), management policies and procedures, challenges and 5-year strategic objectives. Management policies and procedures ensure that Kruger's infrastructure is maintained, renovated, upgraded and replaced at the required intervals and specifies design norms and standards, including national construction regulations, green building and touch the earth lightly principles, water saving measures and zero waste principles. Challenges, additional demand and upgrading and renovation requirements have also been identified for the period 2006 – 2011 for new income generating infrastructure, upgrading existing income generating infrastructure, upgrading and new support infrastructure. The 5-year strategic objectives include those related to securing funding for upgrading, renovation and replacement programmes, introducing water saving devices to 5% of all facilities per annum, targets to upgrade tourism facilities to achieve grading standards, upgrade of all staff dormitories to single units, improvement of the skills level of infrastructure management staff and removal and demolition of all redundant structures and services as indicated by the tourism, wilderness and zoning programmes. Due to their substantive nature, specific electro-mechanical and roads management requirements are detailed in the sub-programmes outlined further below.

#### 2.4.2.1 Electro-mechanical Programme

This programme (Supporting Document 17) highlights existing electro-mechanical infrastructure, particularly in terms of Eskom electricity supply points and general power requirements, recognising that certain areas of Kruger function off power generators or solar batteries while others do not have electricity. Key challenges include replacement of redundant electrical equipment, replacement and/or refurbishment of old electrical equipment, including emergency power generators (primarily due to demand increase), investigation into alternative energy sources, investigating new energy-saving technology and equipment and limiting wildlife deaths through contact with powerlines.

Important 5-year strategic objectives focus on replacement or upgrading of redundant/old electrical equipment and emergency power generators, including the reduction of noise pollution, reducing electrical power consumption per capita by 10% in the next 5 years through installation of energy saving equipment and implementation of sustainable energy options wherever feasible (e.g. through energy effective light fittings and globes, solar panels, water heaters as an alternative to geysers, time-switches), possible purchasing of “green power“ pending the outcome of an audit, and implementing effective measures to prevent damage to animals.

#### 2.4.2.2 Roads Management Programme

The roads management programme (Supporting Document 18) provides the basis for the development and maintenance of an effective and environmentally sound road network, meeting the needs of all users in Kruger. Transportation is a critical issue in Kruger and the surrounding region, affecting quality of life and the environment. Aging roads and bridges, tight budgets, changing activities and increasing traffic require focus on the delivery of road facilities and services. Transportation management objectives focus on issues of access, recreation, park management requirements, management and protection of basic resources such as soils (including gravel and sand), water, wildlife and vegetation as the road system affects these resources and their enjoyment by the public, and signage (promoting accessibility, user friendliness and sense of place). Kruger has a road classification standard, specifying road categories and standards to provide different levels of service and enjoyment.

Key objectives for the next 5 years include implementation of a roads traffic modeling system, linking vehicle commuters and traffic models to entrance gate numbers and bed-occupancy and assisting with improved route alignment and roads design to support tourism objectives and environmental best practice; reduction of gravel loss and maintenance costs and rehabilitation of all closed gravel pits. Further, the need has been identified for a comprehensive assessment based on tourism and environmental drivers to evaluate the degree of positive or negative impacts the road network, and individual roads, have on tourists, vegetation, water, wildlife and heritage. The study should help establish TPCs to bound risks and ensure negative impacts are maintained within acceptable parameters.

#### 2.4.3 Safety and Security Programme

The Kruger Park straddles two provinces and shares international boundaries with Mocambique and Zimbabwe, receiving approximately a million visitors per annum. This poses a number of serious and significant safety and security threats and risks which need to be addressed and managed. A major strategic intent of the safety and security programme (Supporting Document 19) is thus to ensure effective visitor and staff safety measures and to ensure that tourist perceptions are managed in order to protect the brand and reputation of SANParks and SA Tourism Industry at large. Security also refers to area integrity management to ensure the desired ecological and security status of the Kruger National Park. Directly related to this, the plan aims to secure the SANParks tourism income stream

from Kruger as well as securing the KNP's wider economic role in the regional and national tourism economy. Most potential threats are linked to illegal activities in and around the park, including illegal entry and trespassing, theft and armed robberies, illegal resource use and poaching. Daily park activities, implemented to mitigate many of these illegal activities form an important part of this plan. Nevertheless, issues around visitor and staff safety and security, environmental crime, cash in storage and transit, access control and infrastructure (including document) security still pose challenges.

A comprehensive analysis of the actual and perceived threats to environmental, visitor, staff and infrastructure security has been conducted. This, together with available intelligence, identifies certain activities, areas and individuals as being at risk of criminal attacks and other dangers. Dangers are prioritised in terms of real threat to individual visitors and staff, as well as threat to the SANParks brand. Roll out of the Environmental Management Inspector programme will assist with implementation of enforcement and compliance in terms of environmental legislation while the Protected Area Management Audit (PAMA), assessed per ranger section, highlights progress in terms of the Safety and Security Plan roll out and areas requiring additional attention. The safety and security strategy and operational plan will be continuously developed and updated from monitoring and evaluation feedback. Indicators are not yet adequately developed but would include measures such as numbers of violent and non violent attacks per year, incident records, and tourism perception indicators such as positive and negative media measures.

#### 2.4.4 Costing Programme

In line with the requirements to cost the implementation of the management plan to move towards achieving the desired state, an overall costing programme has been developed (Supporting Document 20), a summary of which is outlined in Table 1 below. The summary of all the costings done that shows the net effect on Kruger's current operational budget, to within the 20% deviation as allowed for. The high increase in the demand for operational funds is directly linked to associated costs to enable the park to arrive at its desired state as specified in the different programmes drawn up to get to this point. Linked to this is the need for additional staff as indicated to fulfill certain roles to enable the park to roll out the management plans as well as staff needed in the operations departments to ensure effective service levels to the customers of the park. This budgeting process also makes provision for management aspects that have never been budgeted for but that are needed to support the desire state initiative. An increase in funding needed for our Technical Services department is based on the need to catch up on the backlog created over the past number of years in terms of infrastructure maintenance in the park and linked with that is the increase in the need for funding from the operational units (Region/Business Units) to address a backlog in the replacement of furniture, soft refurbishments in all accommodation units throughout the park.

Table 1: Summary of current (2006/2007) and projected (2007-2011) costs for ongoing park management in line with specifications of this management plan to work towards achieving the desired state for Kruger. This includes rehabilitation, development and operating costs.

		<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Current Budget</u>	<u>Shortfall in year 1</u>
Scientific Services	Opex	9,209,742	10,441,419	11,793,194	13,947,296	15,519,966	7,937,040	1,272,701.80
	Capex	130,000	136,500	143,325	150,491	158,016		130,000.00
Technical Services	Opex	76,614,237	82,381,404	88,426,719	95,128,758	102,520,856	52,385,264	24,228,972.81
	Capex	26,538,667	27,769,455	30,077,110	22,497,161	24,335,978		26,538,667.00
Infrastructure Development Plan	Opex	0	0	0	0	0	0	0.00
	Capex	27,150,000	112,605,000	157,155,000	83,393,000	49,930,000		27,150,000.00
Infrastructure Development Plan	Opex	0	0	0	0	0	0	0.00
Approved	Capex	-14,492,957	-78,950,000	-101,800,000	0	0		-14,492,957.00

IDP Plan	Opex	0	0	0	0	0	0	0.00
	Capex	76,600,000	98,055,000	58,400,000	24,000,000	50,315,000		76,600,000.00
Rehabilitation Plan	Opex	4,728,500	3,163,000	4,257,750	1,677,500	3,672,500	0	4,728,500.00
	Capex	130,000	136,500	143,325	150,491	158,016		130,000.00
Tourism Plan	Opex	4,593,720	4,003,963	3,698,021	3,665,822	3,447,292	-1,834,053	6,427,772.87
	Capex	2,300,000	2,300,000	0	170,000	0		2,300,000.00
Planning & Compliance	Opex	445,000	392,000	345,000	680,000	0	0	445,000.00
	Capex	0	0	0	0	0		0.00
Resource utilisation plan	Opex	115,000	135,000	220,000	200,000	210,000	0	115,000.00
	Capex	0	0	0	0	0		0.00
Safety & Security	Opex	780,000	826,200	875,142	926,989	979,001	0	780,000.00
	Capex	5,620,385	330,000	0	0	0		5,620,385.18
People & Conservation	Opex	5,501,330	5,831,410	6,181,295	6,552,172	6,945,303	2,077,113	3,424,217.51
	Capex	1,350,000	600,000	0	800,000	0		1,350,000.00
Communications	Opex	5,359,878	6,566,591	7,768,426	8,234,532	8,728,604	3,666,755	1,693,123.56
	Capex	0	0	0	0	0		0.00
Conservation Services	Opex	10,911,088	11,565,754	12,259,699	12,995,281	13,774,998	10,521,403	389,685.57
	Capex	2,272,000	-34,169,000	1,104,820	880,465	658,085		2,272,000.00
Risk and Liability	Opex	Corporate Account						
	Capex							
Director KNP	Opex	6,564,619	6,852,218	7,146,446	7,446,636	7,751,979	7,499,572	-934,952.75
	Capex	200,000	212,000	224,720	238,203	252,495		200,000.00
Human Resources	Opex	11,057,211	11,634,040	12,236,818	12,866,236	13,522,940	10,274,160	783,050.78
	Capex	200,000	212,000	224,720	238,203	252,495		200,000.00
Finance Department	Opex	5,501,610	5,718,498	5,937,079	6,156,321	6,375,020	5,430,755	70,854.34
	Capex	300,000	318,000	337,080	357,305	378,743		300,000.00
Maroela Region	Opex	-76,740,078	-89,564,503	-104,086,942	-120,516,083	-139,085,650	-94,497,960	17,757,881.70
	Capex	2,400,000	2,544,000	2,696,640	2,858,438	3,029,945		2,400,000.00
Nkayeni Region	Opex	-37,021,349	-42,874,514	-49,501,876	-57,000,391	-65,479,011	-30,957,276	-6,064,073.42
	Capex	1,500,000	1,590,000	1,685,400	1,786,524	1,893,715		1,500,000.00
Nxanatseni Region	Opex	-15,406,846	-19,863,366	-24,963,860	-30,787,651	-37,423,286	-30,922,187	15,515,341.04
	Capex	2,000,000	2,120,000	2,247,200	2,382,032	2,524,954		2,000,000.00
								0.00
<b>Sub-Total</b>	<b>Opex</b>	<b>12,213,662</b>	<b>-2,790,886</b>	<b>-17,407,089</b>	<b>-37,826,580</b>	<b>-58,539,488</b>	<b>-58,419,414</b>	<b>70,633,075.80</b>
	<b>Capex</b>	<b>134,198,095</b>	<b>135,809,455</b>	<b>152,639,340</b>	<b>139,902,314</b>	<b>133,887,442</b>		<b>134,198,095.18</b>

**Departments to be transferred to the Corporate account at Head Office**

Corporate Investigation Services	0	0	0	0	0	0	5,101,790	-5,101,790.04
Flight Section	0	0	0	0	0	0	1,798,509	-1,798,509.44
Veterinary & Wildlife Services	0	0	0	0	0	0	12,592,001	-12,592,001.00

#### 2.4.5 Other Programmes under *Effective Park Management*

An essential complimentary function of park effectiveness is maintaining adequate human resources to provide a conservation, supporting and visitor service. Staff capacity-building requirements and needs are aimed at the continuous development of all levels of skills through both formal and in-service training and education to improve understanding, encourage a sense of pride in the

organisation and increase levels of efficiency and self fulfillment. These needs are generally incorporated into divisional targets, individual performance evaluations and development plans.

## **2.5 Corporate Support**

Again, these are enabling initiatives to achieve the desired state for Kruger as particularly outlined in 2.1 – 2.3 above.

### **2.5.1 Research Programme**

Kruger Park has a long history of research endeavour, being touted as one internationally significant example of a biodiversity locality which has over half a century of functional research inputs, and where a working interface exists between researchers and park managers. Much of this science and park history, and a summary of the near-current state of knowledge in the different fields, can be found in a science book to address this need (du Toit et al 2003). Kruger currently employs directly and on contract, or hosts as visiting resident scientists or technicians, a skilled staff complement of about 20 persons, and has various facilities to help stimulate science, including short-term visiting researcher accommodation in Skukuza, Phalaborwa and Shingwedzi. The main task of these scientific staff is to attract and support external research projects of value to the park, and re-integrate the ensuing knowledge into park understanding and management. The park has in the last decade attracted significant direct support funding from donors, including a junior scientist programme. Kruger offers via its objectives, structured opportunities for participation and collaboration, as well as long-term datasets and facilities (such as experimental burn plots), a feature which recently helped attract the first node of the South African Earth Observatory Network to the region (SAEON; <http://www.saeon.ac.za>). At the time of writing of this plan, the Kruger Research Section (which since 2004 also handles research issues at Marakele and Mapungubwe National Parks) is merging with SANParks' Arid Ecosystems Research Unit, to form an integrated savanna and arid research group, in that way sharing resources across parks. The new main organogrammatic divisions are systems ecology; human impacts and tourism; species and communities; and science support and monitoring (which includes a strong GIS and statistics division). Key additional positions, which should come on line within the next two years, include a social scientist, conservation interface ecologist and a science awareness manager. At any one time there are over 100 registered research programmes active in the Kruger Park and environs.

Important five-year goals are reflected in the way-forward sections of the objectives, and incoming project registrations are prioritised and afforded logistical support according to this. It is however very important, even in the "useful but not urgent" category, to attract those science thrusts which are operative at any one time in the country or internationally, rather than turn them away only to find they can never be re-attracted because those initiatives have later waned in the science community at large. Targets are also set for the next 5 years for number of desirable donor funders, appropriate amounts of usefully-contextualised donor funding, numbers of essential projects solicited from, or offered by institutes; amount of leveraged expertise, equipment and effective expenditure on park goals by research partners; effective knowledge management and re-integration into park-goals in an ongoing explicit adaptive cycle. As a result of several high-level recommendations over many years, and a real need, a credible Science Advisory Council for SANParks as a whole (initially it was motivated for just Kruger) will be implemented. Important theme areas for current and/or future research, driven by objectives aiming at attaining the desired state, include river functioning and management, especially co-operative governance; alien invasions; trans-frontier park issues, including socio-ecological scenarios and governance; cultural heritage research; mental models in resource management; ongoing programmes on the drivers of tree-grass interactions; and thresholds of concern for elephant effects.

## 2.5.2 HIV/AIDS Programme

HIV/AIDS requires attention as it is spreading at an alarmingly fast rate in South Africa, as well as within SANParks. As an integral component of the Employee Assistance Programme, it is accorded priority within the SANParks programming. The Programme will form the basis on which all employees working within Kruger National Park, permanent and temporary, as well as their families, will be made aware of HIV/AIDS and assisted when infection has occurred. Temporary employees working within the governmental Expanded Public Works Programme, of which Working for Water and Poverty Relief: Infrastructure Development is currently functioning within Kruger, will also be made aware of HIV/AIDS through these projects' training programmes.

## 2.5.3 Other Programmes under *Corporate Support*

*Risk management:* SANParks is necessarily a risk adverse organisation mindful of the importance of the sustainability of our organisation to society as a whole. However, stakeholders and the Board recognise that engaging risk is also at the core of SANParks business, and that risk-taking is a choice. SANParks Board and management are thus fully committed to and accountable for effective Corporate Risk Management in ensuring that SANParks business objectives are met and that continued, sustained growth and biodiversity management are achieved. Risk management is based on the principle that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions. As part of ongoing business operations, Kruger has incorporated risk management into its daily functions. Strategic and operational risks have been identified within the Kruger context. There are six focus areas at present to ensure we remain the pride and joy of all South Africans. These include addressing the potential loss of staff, the safety and security threat to staff, tourists, infrastructure and wildlife, the current poor state of infrastructure as a result of poor maintenance practices, land claims potentially impacting on the execution of our mandate, the shortage of funds for complete implementation of this management plan, and the potential liability incurred as a result of damage-causing animals. These focus areas are addressed on an on-going basis within the relevant divisional structures.

*Due diligence and legal compliance:* As the management authority, SANParks is responsible for legal enforcement and compliance to legislation. In addition to legal requirements, SANParks has several policy standpoints that are based on SANParks' own values and policy as determined by its Executive Management and Board and national policy. In order to ensure compliance to the legislation and enforcement of the legislation, Kruger has committed itself to ensure the governance process is undertaken in the planning, implementation and reviewing of compliance. Legal compliance and due diligence management (including "duty of care") therefore require ongoing updating of legislative requirements, annual park-wide audits by suitably qualified environmental auditors, appropriate training and mentorship to support compliance and ensuring that actions taken on non-conformance findings are addressed within reasonable timeframes.

## **3. ADAPTIVE AND INTEGRATIVE STRATEGIES TO SUSTAIN THE DESIRED STATE**

Section 1 has dealt with the desired state for Kruger, and Section 2 with all the specific programmes which are believed necessary to achieve that jointly-agreed future state. However, the desired state cannot be effectively maintained without explicit attention being given to prioritisation, integration, operationalisation, and above all, reflection and adaptation according to the principles in the biodiversity custodianship framework (Rogers 2003).

### 3.1 Key Prioritisation, Integration and Sequencing Issues

Kruger Park has a very broad mission and a desired state stretched across a wide front. It is therefore necessary to provide some explicit guidance as to the strategy of tackling all the issues in some unified way. The global *way forward* page after the objectives helps considerably (Supporting Document 1). Several key guidelines will assist further, namely

- (1) Kruger is an important research venue and there are *way forward* discussions written for each research theme bundle in the objectives hierarchy;
- (2) Kruger is embedded in a host of regional programmes such as the Greater Limpopo Transfrontier Park and the imminent north-eastern escarpment bioregion; spatial integration into these and the municipal Integrated Development Plans must command some priority;
- (3) Kruger now has the benefit of having experimented with approaches to integration, as also outlined in the *integration objectives*, and will endeavour to consolidate much of this into unified action. Certainly the joint objective-setting approach, with core and enabling objectives, has enhanced clarity in teamwork.

In practice, certain practical issues touched on heavily in the objectives are very likely to command attention, but hopefully with Kruger in a pro-active position. Foremost amongst these is the land reform process, with as much as a quarter of the park under land claims which must follow the cabinet memo prescriptions of remaining under conservation land-use. Nevertheless, SANParks will need to aid and abet these restitution processes, and sensibly interface them with the zonation imperatives. Secondly, SANParks is likely to strengthen its position as a flagship agency in river conservation and sustainable use, and this should be further facilitated by the intellectual and possibly financial capital invested in river management in the lowveld region. A practical implementation- and governance-centred follow-up of the Kruger Park Rivers Research Programme of the 1990s will be one of the most cost-effective investments the park can make, as this one act will probably save a greater proportion of biodiversity than any other. Recurrent elephant culling controversy will demand that we continue applying our minds in a measured way to this challenge. We will need to keep a wary eye on invasions of alien biota, currently under reasonable to good control with ongoing help from *Working for Water*. All this has to take place at the same time as development of the Greater Limpopo Transfrontier Park, and surrounding Greater Limpopo Transfrontier Conservation Area (with, on the South African side, the imminent likelihood of a declared north-eastern escarpment bioregion) which require our energies. As this unfolds, there will be major challenges regarding the interaction between wildlife and ecosystems, livestock health and human livelihoods, embodied in the AHEAD-GLTCA programme. Nevertheless, Kruger will need to position itself to sustain, and where appropriate adjust, its desired state to meet shifting targets in the face of global change and accelerated nitrogen deposition. We trust that the preparation and learning contained in this plan will help us adopt a sensible overall socio-ecological approach to Kruger as part of the wider region, and that this region may even become an example of how sustainable use can be practiced amidst all the synergies and conflicts of the complex context, and lead to longer-term resilience and options rather than shorter-term high production.

### 3.2 Steps to Operationalisation

Given the desired state, and the above cross-links and sequential desirabilities and priorities, 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. This must satisfy and serve the desired state as contained here. A further cross-check is contained in the Balanced Scorecard system implemented by SANParks, which serves not to replace any objectives contained in this plan, but to support their effective implementation. To help meld this synergy, within the next 5 years a cross-tabulation of the important objectives of this plan and explicit ways in which these are

reinforced by key performance areas in the Balanced Scorecard needs to be undertaken, with the two systems adjusted for harmony where necessary. Nevertheless, an important and critical focus area that will require explicit and systematic attention is the knowledge harvesting and reintegration approach that is currently weak within Kruger.

Furthermore, the broad staff and finance costing for the five-year drive towards achieving the desired state, is contained in Supporting Document 20, which outlines both existing and projected budgets and costs as we should not under-estimate costs because of historical limitations. This costing includes all resources believed to be required to achieve realistic progress towards the desired state as outlined here. The fact that the resources required are even higher than historically allocated to Kruger is the result of this report having made explicit what is actually required to achieve and maintain our desired state through linking the end points of this broad desired state to park programmes.

### 3.3 Key Ongoing Adaptive Management and Evaluation Interventions

Lack of informative and effective feedback, which should stimulate proper reflection by managers, is the commonest underlying cause of failure of adaptive management, and hence of reaching the desired outcomes we set for parks. The hallmark of adaptive management is ongoing learning, and this only results if users apply their minds to the adaptive cycle (Biggs & Rogers 2003). This section aims to detail procedures in the way that are used specifically in Kruger, by which the integrity of these feedbacks, and hence learning, will be guaranteed.

- *Feedback on strategic planning actions* – This responsibility lies with the Strategic Planning Committee, and will be reported on via Kruger’s internal reporting structures to the Executive Director: KNP. This includes a decision-making forum to track and implement the objectives of the management plan, co-ordinate and implement the mater-planning of the park, devise and implement the required studies and research programmes, and devise and implement the TPCs for other operational divisions.
- *Feedback that the management action as decided upon and specified, is carried out:-* This responsibility lies with line-function management, and will be reported on via Kruger’s internal reporting structures to the Director: KNP. Feedback on biodiversity management interventions (or conscious decisions not to intervene) will be focused through the bi-monthly Conservation Services Management Committee meetings between senior research and management staff. Particular attention will need to focus on reporting feedback on decisions and management actions relating to tourism, cultural heritage and cooperation-building programmes as currently no specific forum exists to address these. It is proposed that a dedicated agenda point to address this need is scheduled at the EXCO meetings.
- *Feedback whenever a TPC specifying the endpoints of any biodiversity objective is violated, or is credibly predicted to be violated in the future:-* This requires implementation of our revised, updated and restructured monitoring programme and that the scientific custodian of each particular programme duly reports exceedances to the Conservation Services Management Committee joint science-management forum. This leads to documented management response options, recognising that the “do nothing response” may also be a specific justifiable response. While the current suite of biophysical TPCs in Kruger is still relatively large, we will pursue these to gauge where we find ourselves relative to the biodiversity desired state. Testing of our newly developed and formulated heterogeneity TPC will hopefully enable us to drop some of the animal-plant interaction TPCs over time as we grow confident in its performance and overall ability to track system change. The recognition

that additional TPCs must be developed for wilderness qualities and cultural heritage- and nature-based tourism operations will require attention and focus. Wide experience shows it is far better to have roughly defined preliminary TPCs and improve these later (which tends to happen automatically) than wait years for perfect ones to be developed.

- *Feedback that the predicted outcome of a management intervention, in response to the exceedance of a TPC, is achieved, or what materialised instead in its place:-* This is usually directly measurable by checking whether that same TPC returned to within its acceptable limits after management action was initiated, recognising that this might take some time. In Kruger this follow-up is done through the meetings of the Conservation Services Management Committee where the best adaptive decision must be taken in the light of this evaluation and based on best available knowledge. Kruger will likely initially focus its adaptive learning and reflection on likely predicted and/or real outcomes of elephant management scenarios (in the light of overall herbivory and other impacts) under a heterogeneity paradigm which allows maximum flux within an ecosystem and on the outcomes of ongoing dedicated catchment management engagements and their medium-term effects on river health as measured within the KNP.
- *Feedback to SANParks Head Office of the overall performance of Kruger relative to its stated objectives:-* This will be done via an annual State of Biodiversity Report for Kruger National Park as well as other incidental reporting. It is clear that for some themes, Kruger will take some time to progress towards the desired state (e.g. river management, rehabilitation and adaptation of its tourism product) and progress in these cases must be tracked by achievement of intermediate steps towards the desired state. Kruger will also have to ready itself for a changing approach to management in the face of overarching global change scenarios. Structured feedback will also happen through the performance reporting requirements of the Balanced Scorecard, which partitions responsibilities down to individual key performance areas.
- *Feedback as to whether organisational 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 materialise that have shorter-term impacts, it will be the responsibility of the science-management forum to sense this, reflect on it, and make appropriate recommendations to park management. Very challenging areas where shorter-term re-evaluations may be required are the long-term organisational persistence necessary for improving river flows and quality in our perennial rivers and the acceptance of the rationale and thresholds for elephant management options and implications, both of which should not be underestimated, particularly when feelings of lack of progress and even hopelessness may need to be countered. A newer and equally significant thrust focuses on sustainable natural resource utilisation and its implementation within Kruger. In its early developmental phases this will require ongoing evaluation of both societal acceptance and implementation consequences.
- *Feedback as to whether the monitoring programme and list of TPCs is parsimonious and effective:-* This is generally the responsibility of the scientific custodians involved, but overall responsibility for the programme as a whole rests with the Conservation Services Management Committee in Kruger. It is broadly challenged during each 5-yearly management plan revision cycle, although smaller-scale challenges are ongoing and adaptive. It is anticipated that the financial and logistical cost implications of carrying out the revised

biodiversity monitoring procedures may require ongoing motivation, justification and discussion. Thresholds set to evaluate unacceptable levels of herbivory impacts, particularly those associated with elephants, will and should be challenged on an ongoing basis, but with the agreement that it is much better to have roughly defined TPCs, learn from their evaluation and refine and improve them later as new information and knowledge comes to light rather than wait for near-perfect ones to be developed, which may take years, or never happen. As highlighted earlier, the need for additional non-biophysical thresholds to be set and monitored for is great in Kruger and this will require urgent attention to help us manage the park to within its overall all-encompassing desired state.

- *Feedback as to whether overall park objectives need adjustment in the longer-term:-* This is dealt with effectively at the 5-yearly management plan review step. However, in the case of perceived “emergencies” park management is constrained within the limits of agreement. It is likely that monitoring procedures for vegetation-herbivory interactions, associated habitat integrity and biodiversity patterns will be perceived as either onerous or not detailed enough and suggestions may arise over time to either scrap or downgrade these, or unrealistically intensify them to “prove beyond any doubt” any trends. This will spark a critical debate with stakeholders and within SANParks as to our obligation to maintain overall biodiversity in all its facets and fluxes, and the ultimate feasibility of marrying elephant management options and constraints with biodiversity heterogeneity requirements. Socio-political and socio-ecological objectives are expected to change and evolve as we move forwards in a unified and adaptive manner in Kruger.
- *Feedback regarding, or at least latent preparation for, surprises:-* By definition these cannot be predicted, although it is an explicit obligation of park management to take responsibility to stimulate contingency and risk management assessments. These include illegal activities that pose a threat to the brand and reputation of Kruger and SANParks and securing the tourism income stream, as well as the positioning of Kruger’s nature-based, and anticipated associated heritage-based tourism product into the future. From an ecosystem perspective, dealing with surprises is best handled through generating scenarios and we must aim for at least two structured scenario planning session per 5 year cycle. It is suggested that scenarios significantly appropriate in the Kruger situation, and which should assist in us achieving our desired state, revolve around different futures regarding the implementation and delivery of the environmental reserve of the Water Act, biodiversity-driven elephant management scenarios traded off against other attitudes and values in broader society, scenarios reflecting alternative cooperative governance and constituency building approaches and successes (or failures), and balancing the biodiversity conservation and wilderness protection mandate with appropriate nature-based ecotourism development and accompanying economic models. Formulating and contemplating these scenarios will significantly promote the survival of Kruger into the future.

If these obligatory feedbacks continue to be effectively honoured into the future, Kruger National Park will continue practicing sophisticated adaptive management. Attention will however need to be given in the measurement feed-back system to an integration of the overall business objectives with the biodiversity objectives else KNP will continue to strain against the biodiversity-tourism tensions. In addition, attention and time must be focused on improving knowledge harvesting and appropriate and efficient reflection in all spheres of learning, also extending further into the socio-political realms. Then, in accordance with our overarching and integrated SANParks conservation values, Kruger should be well-positioned to achieving the desired state in a sustainable way.

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## 5. LIST OF SUPPORTING DOCUMENTS TO THIS PLAN

- Supporting Document 1: An objectives hierarchy for Kruger National Park
- Supporting Document 2: Integrated biodiversity management Programme for KNP (volumes I and II)
- Supporting Document 3: Kruger National Park Zoning Programme
- Supporting Document 4: Rehabilitation Programme
- Supporting Document 5: Wilderness Management Programme
- Supporting Document 6: Problem- and Damage-causing Animal Responses Programme
- Supporting Document 7: Cultural Heritage Management Programme
- Supporting Document 8: Tourism Programme
- Supporting Document 9: Environmental Education and Interpretation Programme
- Supporting Document 10: Stakeholder Relationship Management Programme
- Supporting Document 11: Local Socio-Economic Development Programme
- Supporting Document 12: Communications Strategy
- Supporting Document 13: Solid Waste Management Programme
- Supporting Document 14: Effluent Management Programme
- Supporting Document 15: Water Management Programme
- Supporting Document 16: Infrastructure Development Programme
- Supporting Document 17: Electro-mechanical Programme
- Supporting Document 18: Roads Management Programme
- Supporting Document 19: Safety and Security Programme
- Supporting Document 20: Costing Programme

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