Etosha Management Plan

2007

ETOSHA MANAGEMENT PLAN
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1. Definitions and abbreviations

Definitions

Alien: Any plant or organism that has been introduced to southern Africa by humans, either directly or indirectly and intentionally or unintentionally.

Conservation: The management of the human use of the biosphere so that it will yield the greatest sustainable benefit to present generations, while maintaining its potential to meet the needs and aspirations of future generations. It includes preservation, maintenance, sustainable use, restoration and enhancement of the natural environment.

Endemic: An animal or plant species which is naturally only restricted to the habitats which form part of the Etosha National Park.

Habitat: The natural home of a plant or animal species. Generally those environmental features or characteristics of an area, which are essential to the survival of an animal or a plant.

Endangered: Species in danger of extinction (globally) and whose survival is unlikely if the causal factors continue operating. Included are species whose numbers have reduced to a critical level or whose habitat has been so drastically diminished and/or degraded that they are deemed to be in immediate danger of extinction. Also included are species that may already be extinct (based on the IUCN definition).

Vulnerable: Species believed likely to move into the endangered category in the near future if the causal factors continue operating. Included are species which all or most of the populations are decreasing because of overexploitation, extensive destruction of habitat or other environmental disturbance, species with populations which have been seriously depleted and whose ultimate security is not yet assured, and species with populations which are still sizable but which are under threat from serious adverse factors throughout their range (based on IUCN definition).

Sustainable Development: A pattern of social and structural economic transformations (development) that epitomises the economic and other society benefits available in the present without jeopardising the likely potential for similar benefits in the future. The primary goal is to achieve a reasonable and equitable distributed level of economic well-being that can be perpetuated continually for many human generations (Goodland and Ledoc 1987. Neoclassical Economics and Principles of Sustainable Development, Ecological Modelling, Vol. 38).

Sustainable Use: Harvesting of a given species of plants or animals such that their stocks do not decline in number over time.

Wildlife: All the indigenous biota which occur within the Park.

Abbreviations

EIA - Environmental Impact Assessment
EMP - Environmental Management Plan
MET - Ministry of Environment and Tourism

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2. Layout and Purpose of the Plan

Initially an assessment of the Etosha National Park's strengths, weaknesses, opportunities and threats (SWOT) was undertaken by staff within the MET (see Appendix 1); who have had extensive experience of the Park and the area. From this assessment a Mission Statement and Strategic Goals were developed. This plan therefore follows a format, and under each section a background introduction is provided which outlines the issues that are considered important in the context of the Mission and Strategic Goals. This provides a background to the Policy Statement, which outlines the broad management approach or philosophy for that section. Following on from the Policy, a set of Guiding Principles are then outlined. These provide a more detailed description of the principles which will guide decisions at a more specific level. The Introduction, Policy and Guiding Principles all form the basis and logic of the management approach to issues in the Park.

The above must be viewed as the 'constitution' for the area - a broad mandate that includes values, policies and principles on which management decisions will be made. Although the process will be improved over time, it is not anticipated that there will be significant or radical changes. The document must therefore be regarded as being relatively constant and will only be altered when it is deemed necessary. Under this framework, the MET may develop medium-term development plans, which will set specific targets over a defined period and will be linked to outputs. These plans will probably require resources, which must be identified, and mechanisms needed to acquire them, which will be detailed in this process.

Shorter-term operational plans may also need to be developed. These will identify specific actions, which need to be performed to address issues in this plan. Not all items in the plan necessarily need constant attention and many issues may 'manage themselves.' However, for most, some management intervention may be appropriate. These will be addressed by means of short-term operational plans, which will also identify and allocate resources to achieve them. It is anticipated that the Development Plans and Operational Plans will be 'internal' issues within the MET, and will be dealt with accordingly. Unless otherwise stated, the order of presentation of issues does not represent any particular hierarchy of importance for the issues.

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3. Mission Statement for Park Management

The SWOT assessment strongly suggests that Etosha National Park has three major core elements, namely:

- Conservation of biodiversity, especially black rhino;
- Potential to deliver socio-economic benefits, especially from tourism
- Existing and potential new tourism developments.

These three elements, and the degree to which their potential can be optimised, is strongly influenced by the capacity and capability of management. It is strongly suggested that management, especially at the Park level, must be empowered to deal with many issues which require a rapid response. Management has been influenced in some instances by a policy and procedure vacuum, inadequate funding and lengthy reporting lines. This Plan may assist in providing a wider policy framework which will enable management to operate in a better defined operating environment. By providing a longer term strategic Mission, some stability to decision making can be introduced, and a comprehensive development strategy and plan can be initiated with defined goals and milestones. The overall Mission for Etosha National Park is therefore the following:-

> ***The effective management and sustainable use of biodiversity to develop and enhance socio-economic benefits through the development of appropriate opportunities, especially tourism, for present and future generations, locally, nationally and internationally***

To achieve this Mission, management must afford priority attention to the following issues:

3.1. Strategic Objectives

- To restore and sustainably utilise the biodiversity and cultural heritage of the region in such a manner as to conserve its complex and varied structure, function and composition over time and space, if necessary through active intervention and adaptive management;
- To actively manage the selected Important Species so that they can be used to populate other areas within Namibia, and to increase the range of these species through enhancing animal movement corridors adjacent to the Park;
- To implement a decentralised and professional (trained) management team and system to efficiently and adaptively manage the natural, cultural and fixed assets to optimise economic benefits, especially those focussed locally;
- To further expand and develop sustainable and appropriate opportunities with an emphasis on tourism to contribute to the financial sustainability of the Park, and to regional socio-economic development while ensuring access to all citizens to at least some areas;
- To actively engage with neighbouring and local communities to ensure that the concerns which they may have regarding the Park are dealt with and associated socio-economic opportunities are optimised; and
- To restore and thereafter to maintain the international status which the Park has gained as a conservation and tourism icon.

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4. Natural Resources

The natural resources of the Etosha National Park are largely undisturbed by human impact. The pan, which is a central feature of the Park, has remained largely unused by wildlife but it does provide an important nesting area for flamingos when it contains sufficient water during the flamingo's breeding season. The landscape of the region is essentially flat although there are a few hills and ridges which punctuate the area, especially in the south and west.

The arid nature of the area means that the availability of surface water, together with soil type, plays an important role in the movement and density of many large mammal species. Those species which are dependant on water have to remain close to water or move in response to changes in water distribution over time. This wildlife: water interaction impacts on floral communities, both in their composition and structure, and also impacts on those animal species which are less dependant on surface water.

Fire, which is also an important component of this ecosystem, is influenced by the abundance of fuel, especially grass in the dry season. The standing fuel load can be significantly influenced by the relative abundance and concentration of grazers on an area over time. Those areas which contain grass species which are especially palatable to grazers, and located in close proximity to water, are less likely to burn as frequently as are other areas. Where fire does occur, these areas subjected to grazing burn at lower heat intensities.

Rainfall, which ultimately determines the primary production, is also highly variable across the Park, with an average annual rainfall of over 500mm in the north-east declining to less than 300mm in the south-west. The total rainfall is highly variable over the years, and can be very patchy in its distribution both within the seasons and over the Park.

Park management can directly influence the seasonal water distribution by manipulating the supply of surface water beyond the period when it would be naturally available. The supply of water may impact on game movement, species composition (both plant and animal) and the likelihood of fire occurring. Water, and to some extent fire, can also impact on the tourism use and enjoyment of the Park. Tourism is, and probably will continue to be in the future, an important financial and socio-economic benefit.

The large size of the Park, its long boundary fence which exceeds 800 km in length, and the abundance of large mammals (especially dangerous game), which is an important ecological attribute of the Park, increases the risk of human/wildlife conflict. The socio-economic costs to the neighbouring communities must be considered when managing these human/wildlife conflicts. The large size of the Park does present major logistical problems to management who must continually strive to find cost-beneficial solutions to these problems. The Park contains the largest free-ranging populations of elephant, lion and black rhino in Namibia. The first two species often escape from the boundaries of the Park and create conflict with humans. To reduce the damage these individual animals can create requires rapid and appropriate management action.

Several diseases are endemic to the Park and one of particular importance is Anthrax (*Bacillus anthracis*). This has been present for many years with many predators developing some immunity to it. It still, however, impacts on most species especially elephant whose populations numbers have been regulated by the disease in recent times.

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Policy

> *To sustainably use the biodiversity and cultural heritage of the region in such a manner as to conserve its complex and varied structure, function and composition, through time and space with appropriate active intervention and management when necessary*

4.1. Biotic

The major biological attributes of Etosha are directly linked to its large surface area. But despite its size, the Park contains relatively few Red Data species and/or endemic species, especially when compared to other comparable areas within Namibia. The Park's large size does, however, present opportunities to conserve sufficiently large populations of animals which require large areas to roam and interact freely. In particular the lion, elephant, white rhino and black rhino populations are important in a regional context. The Park's area also allows for game movement of the larger herbivores of which elephant, zebra and blue wildebeest are the more important. This is especially important in these arid landscapes where rainfall is highly variable in both time and space. The need to maintain the large size is therefore critical if the major biological attributes of the Park are to be conserved.

Policy

> *To sustainably manage the biotic resources to ensure the continued survival of Important Species[1] and/or sub-species for which ENP has internationally and nationally important and significant populations*

Guiding Principles

1. To implement management strategies which enhance (short- to medium- term) and ensure (long-term) the conservation status of Important Species (see Appendix 2);
2. To proactively explore and if necessary develop strategies on how biodiversity values (including species) may contribute to local and national socio-economic development;
3. To ensure that Etosha National Park receives the appropriate level of protection by ensuring its proclamation protects and enshrines the Mission and Strategic Goals, and that Legislation is proclaimed and/or amended if necessary to support the implementation of this Plan;
4. To design and implement monitoring programmes to ensure that the strategic goals are met, threats addressed and management adapted if necessary. The monitoring must be cost-effective and provide answers to critical management questions and improve management of the system;

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[1] Important species are those which generally require a large area in which to live and interact freely. The long-term survival of the population can be enhanced as 'near' natural selection processes can operate on and between species and populations. This definition also includes any endemic species and/or Red Data species which may occur in the Park as well as any species which offer particular interest. Species which fall into this category are listed in Appendix 2.

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5. If evidence exists that a species occurred in the Park previously, they may be considered for introduction subject to an EIA which will at least include the following issues:-
    a. The availability of appropriate founder stock populations;
    b. The influence they may have on neighbours;
    c. Their contribution to the Mission;
    d. They are first screened for diseases. If any are found, the impacts these may have on existing wildlife must be evaluated as well as the impacts that any existing diseases in Etosha or the region may have on them. These must be identified and brought to the attention of the appropriate Director or Directorate for their consideration for any further action;
    e. The likely success of the introduction, considering the number to be introduced, and their ability to survive in Etosha. Although their initial introduction may require specific management intervention, they must be able to exist as free-ranging viable populations within the greater Park in the medium to long term;
    f. Their potential economic impact;
    g. Any regional species attributes must be considered; and
    h. Specific management plans and procedures with performance standards and cost estimates must be set when motivating for these interventions, and these must be monitored to ensure they are attained, and if not appropriate action must be taken;
6. Thresholds of performance must be developed for all Important Species and these must be monitored and reported at least annually (National management plans may be developed for some species, if so, then these must be applied where practical and feasible). Any negative deviation from these performance thresholds must be investigated and corrective action investigated and implemented;
7. Species or products may only be removed from the Park subject to the following:
    a. The impacts on the species and the system are generally understood and not seen as negative in the medium- to long- term;
    b. The relative proportion of the population to be removed does not exceed the average annual increase for the species; harvesting beyond the sustainable yield for the species is not permitted unless specific goals are to be achieved. These would need to be motivated and approval from the Minister obtained;
    c. The cost-benefit ratio of the operation; as a general principle species removed for commercial reasons must be financial beneficial to the MET (this must include all costs). Removal for biodiversity or socio-economic reasons may not need to be financially beneficial to the MET, but in these cases the reasons for the removal must be clearly stated and if necessary monitored to ensure these are achieved. These must be approved by the appropriate Director;
    d. Applicable legislation is complied with;
    e. When considering areas for removal, preference should be given to using populations from any enclosed camps within the Park and/or those at higher risk of being lost from the Park through migration into adjacent areas;
    f. Those species which are Important Species may only be removed or translocated if there is an agreed management plan, which the MET must assess for its suitability and these must be approved by the appropriate Director;
    g. Have been introduced in the past and are considered extra-limital;
    h. There is an agreed framework (approved at the appropriate level) in place and this can be monitored and controlled;
8. For the collection and use of natural resources within the Park by *bona fide* Park staff and their families; management must develop a policy and procedure for responsibly and fairly making resources available. This will only be permitted under exceptional circumstances and after agreement from the Director;
9. Diseases which may be of economic importance and/or impact on biodiversity will be monitored. This may require monitoring of meat and plant product movements through the Park;

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10. Wildlife exclosures/enclosures may be erected in strategically located areas to protect or enhance the viability of Important Species, or to allow recently introduced species, or certain individual animals from the Park to acclimatise to local conditions or recover from any disturbance or injury. These exclosures/enclosures must be managed according to the following criteria:
    a. They must have a specific plan and management objective/s, these must be monitored and the costs associated with this must be identified and secured for the duration of the project;
    b. They must not negatively impact on the Mission, Strategic Objectives and policies of this Plan;
11. There will be a 'no tolerance' approach to illegal harvesting, use or poaching of any natural resources in the Park;
12. All alien species (outside designated development areas) should be removed from the Park subject to the following considerations, (except for those species for which a separate provision has been made):
    a. It must be practical and cost-effective to do so and within budget constraints;
    b. It is recognised that tourism and staff accommodation facilities (development areas) contain alien plants; the threat these may pose must be assessed and if this is high then a strategy must be implemented to eliminate or significantly reduce this threat;
    c. Priority must be focussed on those species that pose the greatest threat;
    d. For flora, the most practical method must be used and where possible biological (subject to appropriate screening and legislation) or mechanical control methods (if disturbance is minimal) are preferable to chemical control.

4.1.1. Flora

The flora of Etosha does generally not contain any vegetation types which are threatened or require special protection. However the saline and dwarf shrub savanna and associated salt pans occurs almost totally within the boundaries of Etosha. The *Moringa* forest is also unusual and, if it is threatened, may require special management measures if they will assist and are practical and cost-effective to implement. There are some important small wetland areas and salt mashes, but these are mostly seasonal. There are some species which are listed as Red Data and these, where known, are listed in Appendix 2. The general management principles for flora are:

1. The saline and dwarf savanna and associated salt pans habitat is critically important and special monitoring systems may be required to ensure its continued existence;
2. Special measures may be required to protect habitats or assemblages (such as Sprokieswoud) or individual plants of special significance.

Fire management, although it can influence these two issues as well, is more directed at reducing the extent, severity and intensity of fires, especially wildfires and the damage to property and life these may pose.

Background

A vegetation map of the 31 vegetation types recognised is given in Figure 1.

Figure 1

Etosha vegetation map
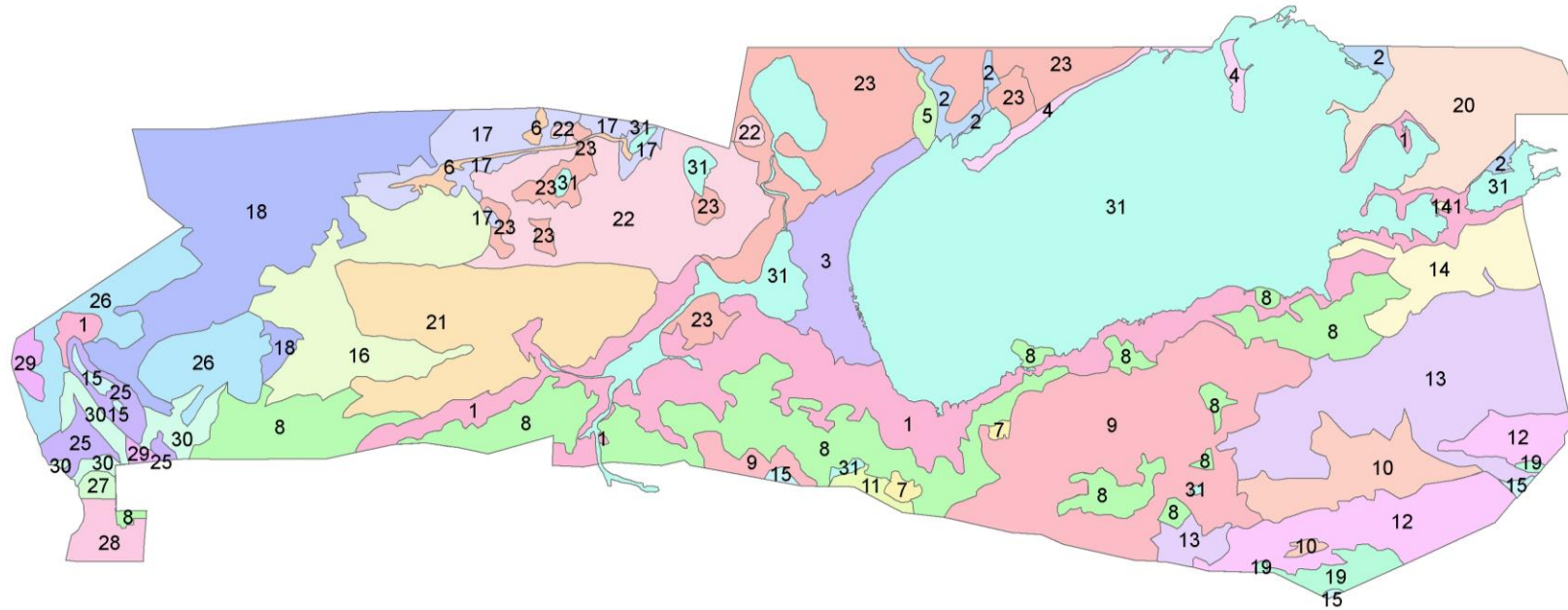
Legend

- 1, Sweet grassveld on lime
- 2, Andoniveld
- 3, Okondeka duneveld
- 4, Poacher's peninsula
- 5, Ekuma grassland
- 6, Omuramba Onaiso
- 7, Karstveld turf pan
- 8, Mopane treeveld
- 9, C.mopane/C.apiculatum/T.pruniodes bushvled
- 10, Dungaries vegetation mapping unit
- 11, Marble hillocks
- 12, Thai-Tkab woodlands
- 13, Marula association
- 14, T.pruniodes/S.africana forest
- 15, Dolomite inselberg
- 16, Sandy shrub mopane
- 17, Paradys vegetation mappning unit
- 18, Sandy T.seicea/Acacia shrubveld
- 19, southeastern sandy bushveld
- 20, northeastern sandveld
- 21, Nineteenth lat. shrub mopane veld
- 22, Narawandu shrub mopane veld
- 23, Ekuma woodlands
- 25, Shrub mopane on Escourt form soils
- 26, A. reficiens/C.mopane/T.pruniodes from shrub
- 27, C.mopane/C.apiculatum/S.querichii bushveld
- 28, Otjivasandu hilly mopane veld
- 29, Kowares sandt mopane veld
- 30, Renostervlei mopane/C.hereroensis/S.querichii shrubveld
- 31, Saline and or depressed areas

Guiding Principles

1. Fire is an integral part of the environment in ENP and will be applied primarily to reduce fuel loads to limit the size and scale of fires, especially wildfires as and when they occur. This will be implemented according to the following guidelines:
    a. Management must develop a fire programme which creates a mosaic of different fire intensities and frequencies which must be applied over time. This can be achieved by having an extended burning season, with some fires initiated early in the season which may burn with lower and variable intensity and affect a smaller area (this can provide security for more fire-prone areas later in the season), applying different burning techniques (head and back fires, point and line source of ignition etc) and varying the time of day or the climatic conditions (wind, temperature, humidity etc) when the fire is applied;
    b. Not more than 30% (excluding the pan) of the Park should be burnt in any one year;
    c. Protective measures may be required near boundaries and to protect property within the Park;
    d. Cognisance must be taken of tourism needs and the impact fires may have in certain areas on the tourism use and enjoyment of the area;
    e. Where possible the burning areas must have natural boundaries (pans, areas of low vegetation cover, low fuel loads etc) rather than straight artificial structures like roads and firebreaks;
    f. The safety of staff and guests must be considered;
    g. Management must decide on a provisional, rolling three-year burning plan. This plan must be revisited and revised each year late in the wet season subject to the following:
        i. The extent and severity of the previous season's fires;
        ii. The current wet season rainfall and the standing biomass in different areas of the Park;
        iii. The need to protect areas from wildfires to ensure the protection of life and property, maintaining sufficient feed and refuge for wildlife (especially Important Species), tourism requirements and logistical considerations;
2. Fires will only be controlled/suppressed under the following conditions:
    a. when they pose a threat to life or property (in the Park or to neighbours);
    b. are controlled burns to achieve specific goals (once these are achieved they may be extinguished assuming this is possible);
    c. are likely to burn an area of the Park that is too large and may therefore impact on the survival of certain species;
3. Species and communities which are identified as being important and are listed in Appendix 2 may require special management attention. If necessary and appropriate this must be explored, and if it is practical and cost-effective to implement must be affected.

4.1.2.   Fauna

Etosha has many of Namibia's largest 'contained' wildlife populations, including Red Data species such as black rhino. In addition, because of the size of the protected area, most populations are large enough to be self-sustaining in the long-term without management intervention. The system and its wildlife populations therefore require less management than a smaller park per unit area, except for the black rhino that are managed under a national strategy. The Park's large land area does, however, present logistical problems when issues require

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attention at some distance away from management centres. Management of the fauna is therefore essentially one of less rather than more management with only water distribution, fire and human/wildlife conflict being the major issues, except for black rhino which are actively managed for optimum population growth. Fauna management is therefore guided by the following principles:

Background

Table 1

An overview of management actions in relation to game translocation and culling in Etosha, for the 30 year period between 1967 and 1997

Species	?[1]	Culled	Introduction	Translocated out	Translocated within
Black rhino	2		57	69	72
Black-faced impala			376	298	204
Burchell's zebra	18	128		3757	8
Eland	2				528
Elefant		525		43	
Gemsbok	666	1492		86	1140
Giraffe	1			371	667
Hartebeest					3
Hartmann's zebra	10	310		2837	
Kudu	350	197		9	296
Ostrich				43	
Reedbuck			21		
Roan antelope		2	74	78	156
Sable antelope	19		92	57	8
Springbok		1290		28	
Tsessebe			25	9	
Warthog		25			
Wildebeest				100	

[1] Not clear what management action this entailed

Guiding Principles

1. Wildlife populations will be allowed to fluctuate in response to climatic conditions and other natural short-, medium- and long- term impacts and fluctuations (except for species of national importance; where they may be managed specifically to maximise growth);
2. Anthrax is identified as an integral part of the environment. No direct management intervention will be taken (except as is required by legislation), however this will be continually monitored and researched because of its wider potential economic and ecological impact;

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3. Other endemic diseases and their impact on wildlife will be monitored and efforts made to prevent other diseases from entering the system, such as bovine TB, FIV etc;
4. Migration and natural movement of wildlife must be allowed to occur and, where barriers exist, mechanisms should be explored to allow these movements to occur more freely;
5. Domestic animals may only be used in the areas for tourism or for MET approved activities, for which both require a specific management agreement;
6. Pets and other domestic species must be regulated by specific procedures which must ensure the Park's Mission, Objectives and Policies are not compromised;
7. Staff and visitors may not bring into or keep any domestic animals or pets in the Park without a permit. There is a specific policy regarding pets and domestic stock in the Park and this is attached in **Appendix 3**.

4.2.   Abiotic

The pans of Etosha are probably the most significant geological features. This very flat and slightly basin-shaped landscape has a major impact on drainage, water (distribution and quality) soils and associated vegetation and fauna. This presents both opportunities and problems for the management and use of Etosha. The flat nature of the pans means access is generally good, although some soils are prone to water-logging in the wet season making access seasonally difficult. Soil erosion from run-off is not as problematic as in other areas, although wind erosion can be high on exposed soils. As a result of the open nature of this landscape, it is more difficult to make structures less visible over long distances, especially higher buildings. The saline depositions also influence water quality, although generally water is available relatively close to the surface.

Although no significant strategic or commercially valuable minerals or resources have been exploited or found in Etosha, the impact of mining and extraction activities always poses a threat to protected areas. Because of this the policy must be vigilant to any threat of this nature. Equally, water is a critical resource in this area and, as seen in the Faunal section of this Plan; it plays a significant role in influencing wildlife densities and species composition. Its use must therefore be carefully monitored and limited to ensure it is effectively used.

Policy

> *Prospecting will only be permitted for those resources which potentially have important strategic value, or contribute significant national economic value. Any subsequent use must demonstrate significant economic benefit and be subjected to an EIA and associated EMP and a full cost-benefit analysis. Water use must be monitored and if necessary restricted.*

4.2.1.   Water

Water is an extremely scarce and limiting resource in this environment. There is little information on the dynamics of the ground water and the effects of extraction on the system.

The water quantity is generally good over most of the Park, although the quality is highly variable. Monitoring extraction and its effects on the greater system is important, as is the continual checking of water quality. Almost all the water is extracted from underground sources. In tourism and administrative centres the water extraction points are located near these centres. As the sewerage systems are also situated in close proximity, and the possibility of groundwater pollution is a real threat, this must be monitored and if necessary appropriate action taken.

Guiding Principles

- All sewerage discharge to conform with the Water Management Act and to be monitored by the MET at the cost to those who generate the waste, this must be defined in an agreement between the parties;
- All water for human consumption to meet the required health and safety standards;
- A water evaluation and monitoring system be initiated in the Park to check on regional hydrological issues as well as local water quality issues, especially at tourism and administrative centres;
- Use of water within the Park must only be considered if its use is efficient and sustainable in the medium- to long- term;
- All new boreholes for Park and tourism use must be subjected to a detailed EIA and, if approved, then an associated EMP must be compiled and implemented;
- All water use must include water conservation management strategies and must be monitored and controlled by the MET at the user's cost. Recycling must always be investigated and where practical implemented;
- Guidelines on monitoring activities and adaptive decision-making need to be drafted by management of the Park;
- The impact on water use of the permanent and natural game water points must be included in this monitoring.

4.2.2.   Soil

Soil erosion and deposition is an important dynamic process within the Park. This must be allowed to continue subject to the following:

- If there is evidence of significant accelerated soil loss or accumulation due to local anthropogenic factors, and Important Species or unique habitats are threatened, then management actions must reduce the impact.

Figure 2

Soil map for Etosha (Buch *et al* 1996)

Map labels (geographic): N, Namutoni, Halali, Okaukuejo, Otjovasandu, 4th Approximation

Soil unit labels on map: A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, B5, C1, C2, C3, C4, C5, C6, C7, D1, D2, D3, D4, D5, D6, E1, E2a, E2b

Coordinate grid: 14°30' E, 15°00' E, 15°30' E, 16°00' E, 16°30' E, 17°00' E, 18°30' S, 19°00' S

Scale bar: 0 10 20 30 40 50 km

Design: M.W. Buch & H. Beugler-Bell
Cartography: H. Klessinger & H. Beugler-Bell '94
Field Mapping: M.W. Buch '89, '90,'91,'92
C. Trippner '91,'92
H. Beugler-Bell '92

A: SOIL ASSOCIATIONS FROM DEEP (>1m) SANDY SUBSTRATA

A1 *Chromi/(Rhodi) Ferralic ARENOSOLS* from aeolian sands above Omatako Sandstone ('Kavango Dunefield') and above sandy Etosha Limestone ('Paradys')

A2 *Cambic ARENOSOLS - Xanthi/Chromi Ferralic ARENOSOLS* from sands above Andoni Sand-/Siltstone and Etosha Limestone ('North-Eastern Sandfield')

A3 *Xanthi/Chromi Ferralic ARENOSOLS - Cambic ARENOSOLS - Calcaric CAMBISOLS - Calcaric ARENOSOLS* from aeolian sediments above sandy Etosha Limestone ('Paradys Pans Topo-chronosequence')

A4 *Cambic ARENOSOLS* from aeolian sands above Etosha Limestone - *(Psammi) Vertic/Eutric CAMBISOLS - Dystric/(Eutric) PARA-VERTISOLS* from sandy Etosha Limestone

A5 *Cambic ARENOSOLS* from sandy sediments above Etosha Limestone - *(Humi) Eutric CAMBISOLS* from sandy Etosha Limestone

A6 *(Hyper)calcaric REGOSOLS - (Hyper)calcaric ARENOSOLS - Haplic CALCISOLS (petrocalcic phase)* from calcareous sediments above Etosha Limestone and Andoni Sand-/Siltstone

B: SHALLOW TO MODERATELY DEEP (<1m) SANDY LOAMY TO SANDY SOIL ASSOCIATIONS

B1 *Lithic/(Eutric) LEPTOSOLS - (LITHI) Rhodi Eutric CAMBISOLS - Rhodi Ferralic ARENOSOLS* from Otavi Dolomite

B2 *Rudi Dystric/(Eutric/Umbric/Lithic) LEPTOSOLS* from Khoabendus Rocks (Quarzite, Dolomite, Shist, Rhyolite, Granodiorite, Andesite) and Calcrete

B3 *(Lithi/Skeletti)-Chromi Dystric CAMBISOLS - (Rudi) Dystric LEPTOSOLS* from Granite - *(Lithi) Dystric/(Eutric) FLUVISOLS* above Calcrete or Granite

B4 *(Chromi/Rhodi) Haplic/(Cambic) ARENOSOLS - Areni Eutric LEPTOSOLS* from aeolian Arenosol-sediments above Etosha Limestone

B5 *(Chromi) Haplic ARENOSOLS* from aeolian Arenosol-sediments above Etosha Limestone - *(Psammi) Eutric VERTISOLS* from sandy Etosha Limestone

Notes:
- 'Inclusions' which cover less than 20% in a mapping unit, are not listed in the legend
- Associated 'Units' and 'Groups' of the same 'Major Unit' are seperated by a virgule
- When in brackets, the 'Units' or 'Groups' are of less importance (cover a small area) or/and the diagnostic properties cannot be clearly defined in taxonomic terms

C: SHALLOW TO MODERATELY DEEP SANDY-LOAMY TO LOAMY-CLAYEY SOIL ASSOCIATIONS

C1 *(Psammi) Vertic CAMBISOLS - Eutric VERTISOLS* from (partly sandy) Etosha Limestone

C2 *Lithic/Rendzic/(Mollic) LEPTOSOLS - (Psammi) Eutric/(Dystric) VERTISOLS* from Etosha Limestone

C3 *Lithic/Eutric/Rendzic LEPTOSOLS* from Etosha Limestone

C4 *(Psammi) Lithic/Rendzic LEPTOSOLS - (Hyper)calci Sodic SOLONCHAKS - (Hyper)calcaric REGOSOLS* from Etosha Limestone, partly from calcareous sediments above Etosha Limestone

C5 *(Hyper)calcaric REGOSOLS - (Psammi) Rendzic/Eutric LEPTOSOLS* from calcareous aeolian sediments above Etosha Limestone

C6 *(Chromi/Rhodi) Dystric CAMBISOLS - Rendzic/Eutric LEPTOSOLS* from Khoabendus Rocks (Quarzite, Dolomite, Shist, Rhyolite, Andesite) and Calcrete

C7 *Eutric LEPTOSOLS - Rhodi Eutric CAMBISOLS from Otavi Dolomite* (eroded soils of MU B1) - *Eutric FLUVISOLS* above Etosha Limestone and Calcrete (correlate sediments of MU B1) - *Lithi-(Psammi) Eutric VERTISOLS* from Calcrete

D: SOILS FROM FLUVIAL SEDIMENTS

D1 *Dystric/Eutric FLUVISOLS* above Calcrete

D2 *(Lithi) Eutric/(Calcaric) FLUVISOLS - Calcaric REGOSOLS - Lithi/Rendzic LEPTOSOLS* above/from Etosha Limestone

D3 *Calcaric FLUVISOLS - Calcaric REGOSOLS* above Etosha Limestone and Calcrete

D4 *(Gleyi)-Verti-(Hyper)calcari (Hyper)salic FLUVISOLS* above Andoni Sand-/Siltstone

D5 *(Gleyi)-Areni-Calcari Salic FLUVISOLS* above Andoni Sand-/Siltstone

D6 *Mollic FLUVISOLS* above sandy Etosha Limestone

E: SALINE SOILS/ SODIUM-RICH SOILS

E1 *(Sali) Stagnic SOLONETZS* from Andoni Sand-/Siltstone or from shallow fluvial sediments above Andoni Sand-/Siltstone

E2 *Calci Sodic SOLONCHAKS - Sali Calcic SOLONETZS* from sandy Etosha Limestone (E2a) or from Andoni Sand-/Siltstone (E2b)

4.2.3.   Geology & Minerals

Fortunately Etosha does not have a history of large commercial mining activities and there has not been any significant interest in the underlying geology, although the presence of oil is a possibility.   While it is recognised that mining is unsustainable, the economic value to the national economy cannot be simply discounted. There are, however, scores of quarries located throughout the Park. Although these quarries are necessary for road building and other construction activities, their environmental impact can be high. The size of the Park means that gravel cannot be cost-effectively transported into the Park from outside.   The need to use existing and perhaps new quarries must therefore be accommodated, but their impacts must be minimised. The following principles will be applied:

- Management will proactively engage with any prospective operations to ensure their impact in the Park is minimised.   Cooperation and mutual understanding are observed when finding solutions to any problems;
- Other ministries and agencies will be consulted to assist in reducing the impact and ensuring control over any proposed operations. Their policies and regulations must be enforced;
- Any environmental or management conditions which have been imposed through the license, or EIA and EMP, must be monitored and enforced;
- Material for use within the Park, or areas immediately adjacent to it, may be extracted from quarries situated within the Park for the Park's benefit. These shall be subject to an EIA and an associated EMP. Old quarries must be appropriately rehabilitated;
- Only mining activities, which contribute significantly to economic development of the country, should be considered and allowed. This must be weighed against the economic contribution of tourism and impact on the environment.

4.2.4.   Landscapes

The landscape of Etosha is predominantly flat with a few small hills and ridges scattered mostly in the south and west. The pans account for almost 25% of the surface area of the Park. The tourism product is mostly centred on game-viewing almost exclusively around and near to the largest pan. Future tourism products could be developed in the hills and ridges. The absence of significant variations in topography has not made the landscape an important feature, although the flatness of the Park is characteristic, and any development should not detract from this.
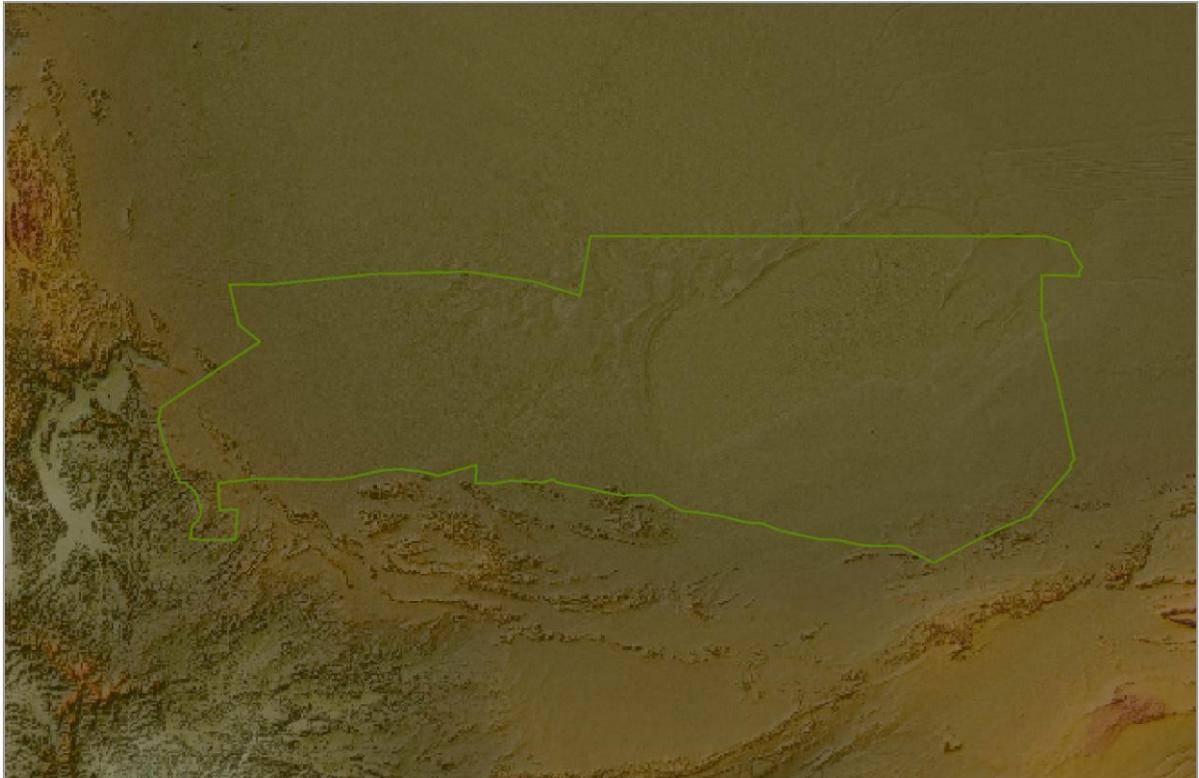
Figure 3

Map showing topography of Etosha and vicinity
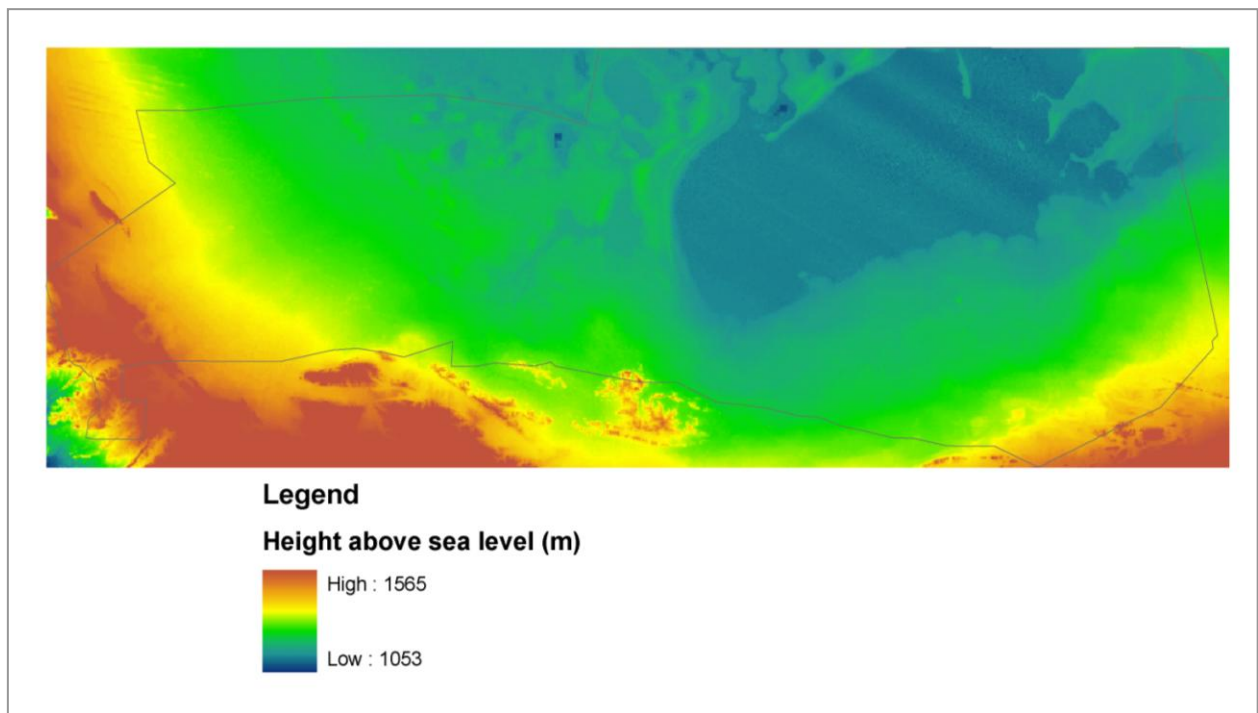
Figure 4

Map showing the height above sea level for Etosha, based on a Digital Elevation Model.

The following guiding principles must be adopted:

All developments must be located so as to reduce their visual impact, especially developments which will be visible over long distances;

Services of national importance must explore all alternatives and must be subjected to a comprehensive EIA where wide (national) public input is solicited and cost-benefit analyses of all the options must be considered;

Local developments (including staff and tourist accommodation, offices and their associated infrastructure such as roads, water, electricity and communication) must be designed, constructed, located and managed in such a manner that they do not detract from other Park users' enjoyment of the Park, especially in terms of their visual impact. Accommodation and other buildings must not be visible to the naked eye outside of their Restricted Use Areas (see Zonation), while the location of services must be agreed to by other users and the MET;

Park staff accommodation, workshops, storage facilities, etc should not be located on key sites that have high tourism development potential;

The geological formations and their use for tourism, education and interpretation are important, and the value of this must not be compromised by development activities;

Where practical and cost-effective previous excavations must be restored to at least reduce their visual impacts.

5. Cultural, Historical and Archaeological Resources

Etosha has relatively few known cultural, historical and archeologically sites and artefacts compared to other areas in Namibia. There are areas of important historical and cultural significance and many of these are accessible and have been interpreted for tourists. There are others where access may need to be limited or controlled to respect the cultural values of the community. Others are of broader historical appeal either locally, nationally or internationally. The customs and traditions of people and communities must be the primary guiding principle in this issue and management of any sites must be agreed to by all relevant parties. Any tourism use must be sensitively approached and protection and control of artefacts must be ensured. Although management of these sites and issues is not seen as a primary function of the MET, it is recognised that the sites are located in areas under their control, and the role of other agencies and ministries in developing appropriate management practices is therefore critical.

Policy

> *To ensure that the cultural, historical and archaeological sites are identified, conserved and where appropriate, sensitively used, to improve society's understanding and knowledge of the people and their cultures who used or use the area.*

Guiding Principles

Conservation of the cultural, historical and archaeological resources will be guided by the following:

- Technical and financial assistance from other agencies and ministries is critical in the management of these resources, and the MET is to establish and agree on a framework with these groups in this regard;
- Where appropriate communities must identify and demonstrate why any areas of cultural or historical significance need to be conserved, and then agree on the management of these areas/sites jointly with the MET, especially those sites which will result in financial implications (any management must be appropriate and must consider the costs of it);
- All sites used for development must include the cultural, historical and archaeological aspects in their EIAs and EMPs;
- A register must be maintained of all sites;
- Where appropriate sites may be made accessible to the public, but this must be done in a sensitive and responsible manner. Sites that add to the tourism experience must be interpreted and conserved.

6. Zonation

The rationale underlying the existing use and development of Etosha is not known, but it would seem that the tourism products are generally located in good game-viewing areas and in close proximity to water. This rationale seems logical to apply more widely and, although there are some important considerations determining the location of facilities and use, Etosha does offer relatively wide parameters. The delineation for zonation is therefore determined more by management and administrative issues than by the underlying ecological attributes, but these are still extremely important. In addition, the large size of the Park implies that it can accommodate many different use types.

There are potentially many different levels of zonation which can be used in the management and development of Etosha, and some of these are mutually exclusive while others can exist in different layers. Some of these aspects, such as water distribution (Map 1), may help delineate other areas but may not impose definite restrictions. Other areas may be mapped for management purposes, such as fire maps, and these may change in response to many issues and are therefore not appropriate to include in a Plan of this nature.

The multidimensional nature of the Mission suggests that zonation may be the most appropriate mechanism to accommodate the different objectives, uses and users. The zonation must therefore optimise the environmental attributes, the socio-economic benefits and the tourism products for which an area can be used.

Policy

> *Zonation will be determined on access, infrastructural considerations and the opportunity the area offers in relation to the Mission, while taking due cognisance of the underlying natural and cultural resources and requirements of different users.*

The policy attempts to place facilities where it is cost-effective to do so, but facility location must consider other aspects (biodiversity and cultural) in the Park, as well as the potential value of a site for alternative uses. When developing the different use zones and delineating them spatially in the Park, it is necessary to identify those areas which present development obstacles, are important ecologically and would not necessarily offer optimal financial or economic returns when compared to the possible impacts. The large size of the Park also implies that there is likely to be sufficient space for many users. The strategy is to try and accommodate as many opportunities as possible in the most cost-effective manner and to position administrative infrastructure in the areas where management efficiency can be maximised. The following parameters must be applied when setting the zones:

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Background
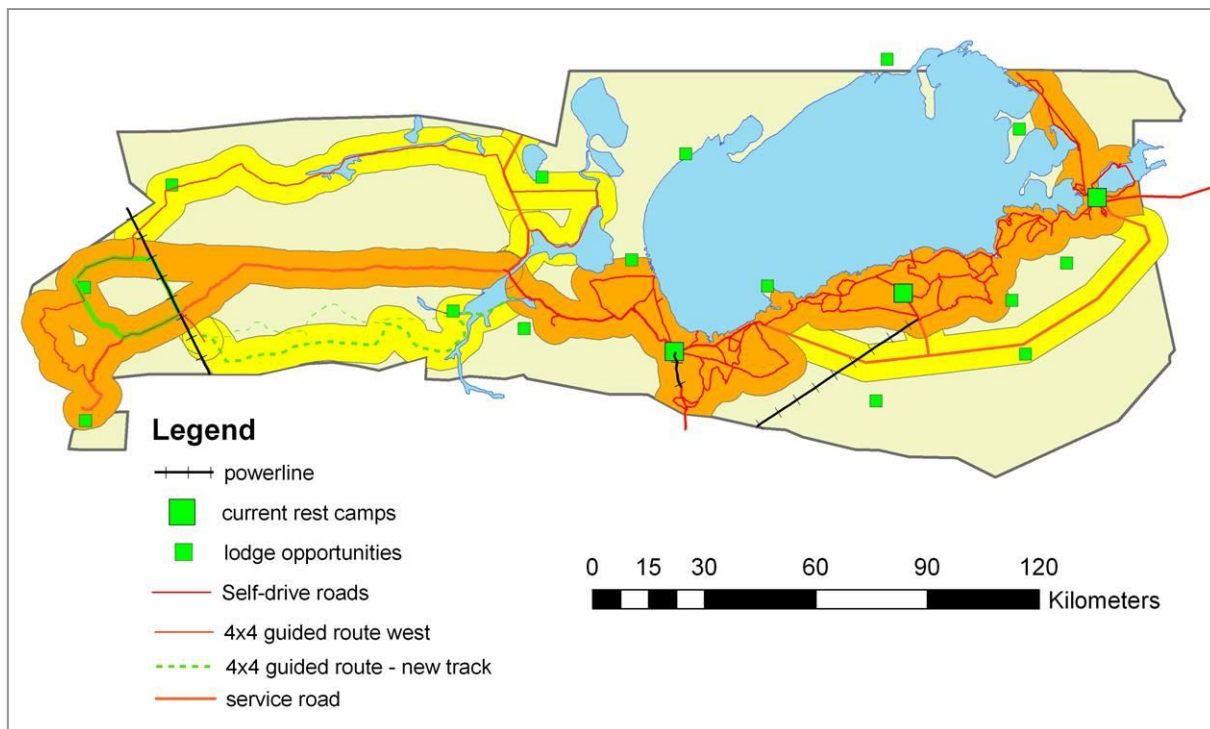
Figure 5

Map showing broad zonation of the Park. Orange areas indicate 5km buffers around existing, self-drive tourist roads, yellow areas indicate 5km around new roads.

Guiding Principles

1. The ecological importance of the area nationally and in the context of this plan;
2. Areas will be used to optimise the potential of the area to generate income for the MET and increase socio-economic benefits;
3. Existing facilities, products and infrastructure will guide the location of the different zones;
4. A wide range of different uses and users must be accommodated;
5. Support infrastructure such as roads, reticulated power and water must be kept to a minimum. Hardened roads must also be limited to reduce the need for further extraction from quarries and the financial costs associated with this;
6. The quality of the tourism product (game densities, waterholes, unspoiled landscapes etc) needs to be considered in all future planning.

From this a hierarchy of increasing use and access has been developed.   The following zones have been demarcated and are indicated on **map in Appendix 4: Use Zonation**

Zone name	Attributes	Uses
Severely Restricted Access (demarcated	This is an area of high sensitivity, it offers restricted and guided low tourism use	Limited management, predefined access, which may be seasonally limited and strictly controlled for specified

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generally by the pans and saline and dwarf savanna)		purposes. No fixed infrastructure, only management tracks, no motorised tourist access, only pedestrian access
Areas for Infrastructure Re-alignment (these are areas within the severely restricted access zones where roads have been built)	Infrastructure has previously been poorly positioned. These areas must be investigated and if necessary more appropriate alignments for the roads found, these must reduce financial and environmental costs.	To reduce existing impact and hopefully restore to Severely Restricted Access.
Restricted and Guided[2] Pedestrian[3] Access (This generally applies to areas where road access is difficult either due to soils [seasonally]or topography)	Areas where road building (importing foundation material and grading) is not permitted. These are generally areas of low wildlife densities (at least seasonally) and/or difficult terrain and/or sensitive areas. The tourism use will be low density (see below).	Only limited vehicle access to access sites (not for game-viewing), general use will be guided pedestrian. This will be regulated and controlled by The MET through time. No fixed infrastructure permitted. Temporary[4] camps and facilities would be permitted for limited periods.
Restricted and Guided Access (characterised by areas with good game-viewing and generally good access)	Areas where use will be restricted to either medium- or low- use. Roads and tracks would be permitted, would mostly be for 4x4 access and the development and maintenance would be set by the MET but paid for by the users.	Fixed infrastructure would be permitted subject to suitable sites with water available, would be subject to EIA and associated EMP. May also be used for filming or research. May be located only immediately adjacent to waterholes.
Restricted Self-drive Access (characterised by areas that offer good access but restricting use could increase income to the MET by limiting numbers, especially to waterholes)	Areas of low- or medium- use where numbers of users may be limited, but can be self-drive. Specific entry requirements, including additional fees may apply.	Roads and tracks as required for the type of access but are restricted by management. It may apply to hides, waterholes and other facilities.
Open Access (generally the areas currently open to the public)	Areas of high use where numbers are very high and all facilities are accessible to users who comply with general entry requirements.	Intensive use areas where multiple services and facilities are supplied including retail outlets, fuel, restaurants,

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[2] Guided means a suitably qualified and approved (by MET) guide, who may need to be registered and have minimum qualifications in order to undertake defined activities.
[3] Pedestrian means on foot which may include animal transport such as horseback, elephant back etc.
[4] Temporary implies no fixed improvements, no concrete to be laid; all structures must be removed from the site after use.

		conference facilities etc.
Entrance Gates (those existing gates and any new planned for the future)	Areas where general public access may be permitted at present or in the future. These may be low-, medium- or high-use in the designation of the other facilities which may be supplied.	Areas of possible development depending on facilities and the ability of services to support infrastructure. To accommodate a shift to the major administrative facilities to the periphery. Here schools and clinics may be developed as well as solid waste sites and other facilities.
Administrative Centres, high density (those currently in use, plus new ones near the gates)	These are areas where management is located. They would be high use and include a wide range of facilities.	High infrastructure development including fixed staff accommodation, offices, workshops, storage areas, schools, clinics and other staff support infrastructure as required.
Administrative Centres, medium density (existing but must be kept small)	Areas of lower staff use. These would have fewer facilities than the high density areas	Medium density to include staff accommodation, offices, workshops and sheds
Administrative, low density (existing and new but only as 'patrol posts')	Low use areas, perhaps only used seasonally or temporarily	Limited to basic accommodation, ablutions and small offices as required.

For the purposes of 'use densities' it is realised that these change over time as society's perception of use change in response to increasing use of an area. Absolute parameters are therefore not appropriate for a plan of this nature which may have a lifespan of many years or even decades. The following parameters are provided as an indicative guideline for the three different use densities:

- **Low use**: Human use of these areas will be limited to ensure the feeling of some exclusivity, solitude and non-congestion. The density of users as expressed per square kilometre or kilometre of road, or any other appropriate unit, will be less than 15% of that in the High Use areas.
- **Medium use**: People densities will be higher than the Low Use areas, but significantly lower than the High Use areas. The density parameters as defined in Low Use would be less than 35% of High Use areas.
- **High use**: These are areas where the upper limits of use will be set. These may have absolute ceilings from time to time which will be set by management after considering the type of tourism experience being offered, the capacity of the facilities and resources to support this, and the ability of management to control visitors.

Any area defined as 'Limited Access' may only be utilised by people with an agreement to enter these areas. This may be in the form of a temporary permit, or a longer term agreement. This has been done to increase the area of Etosha available to the public, but this must not decrease the overall operating profit of the Park. The costs of any additional infrastructure required, and the ongoing maintenance thereof, must be recovered in the 'access/user fees' agreements.

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Ideally these costs and risks must be passed onto the third party, and ideally the areas must return some profit to the Park after deducting the additional costs incurred in managing access and use of these areas.

Areas set aside for administration must be positioned so as to improve management efficiency and must not be in an area where it will significantly reduce the future tourism use of an area or impact on biodiversity. These areas should ideally be close to utilities and other local or national support services such as schools, clinics etc. This consideration has informed the current zonation for high and to some extent medium-use administrative sites. This zonation may change in the future should additional services, towns and utilities develop near the Park boundary.

6.1. *Natural Resource Use Zones*

Management may need to designate areas for the collection or harvesting of natural resources. The rationale for these must be motivated to the appropriate Deputy Director and then, if agreed, designated. The use must comply with any policies outlined elsewhere in this Plan or comply with departmental/national requirements. These must be motivated and designated from time to time by management, if necessary in consultation with other users. Conflicting uses will be negotiated between users to minimise impact. They may be temporary (a few days or weeks) or longer (10 years or more).

7. Management interventions

7.1. Artificial Water provision for Wildlife

The major management focus for the biotic component for Park management is the distribution of artificial water over time and space, fire (frequency, intensity and quantity) and human/wildlife conflict. Water distribution in particular can have very important tourism impacts as it concentrates wildlife at points located near to tourist roads, influences in some way the possibility of human/wildlife conflicts and impacts on the fire regime. The positioning of artificial waterholes, the time of year when water is provided and the management of the water quality are important tools which management may use to achieve certain objectives.

Background

The majority of the perennial water points are borehole fed, particularly so in western Etosha. Springs are found on the southern edge of the pan, fed by water drained from the higher lying Karstveld to the south of the Park. Developments at natural waterholes need to be considered very carefully, because they are limited and spatially fixed. Artificial waterholes, by contrast, can be moved and new ones created.
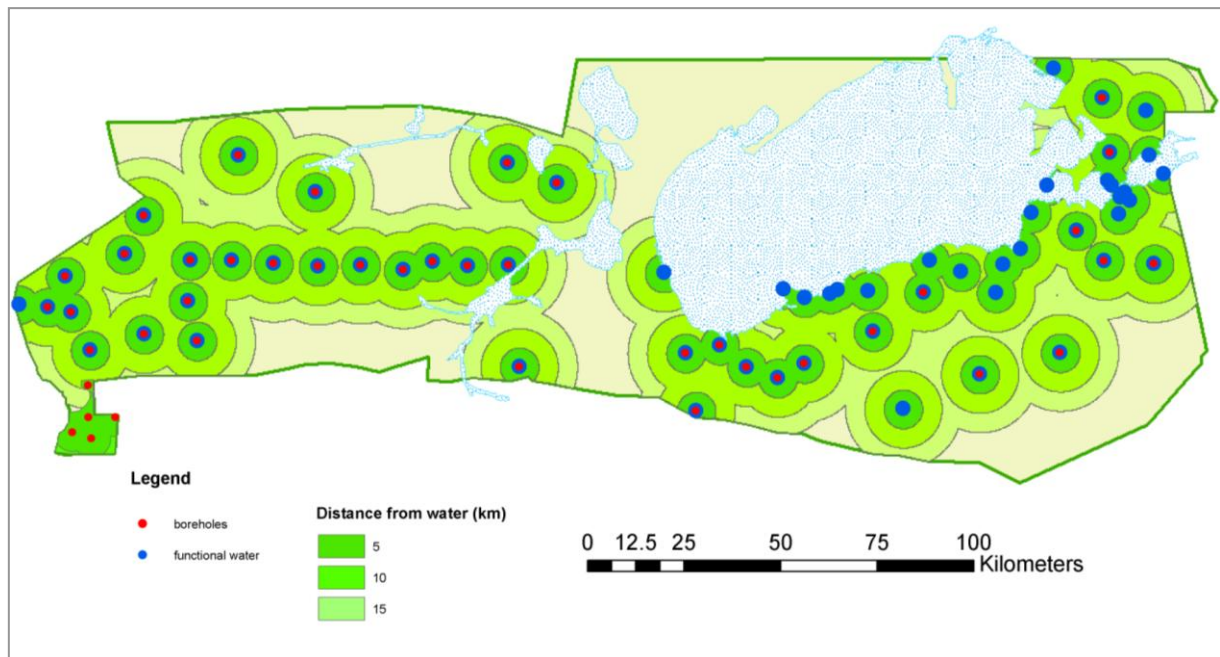
Figure 6
Map showing the distribution of both springs and boreholes and the areas lying within
a certain distance from these water points.

Table 2

Areas that lie within a certain distance to the nearest water point

Maximum distance (km) from water point	Area (km²)	Area (ha)
5	3676.093	367 609
10	5700.202	570 020
		937 629

The data in the above Table shows that half area of the Park, excluding the big pans, is situated more than 10km from the nearest water point. Water distribution, in addition to water quality, can reasonably be expected to be significant constraints on wildlife densities and distributions.
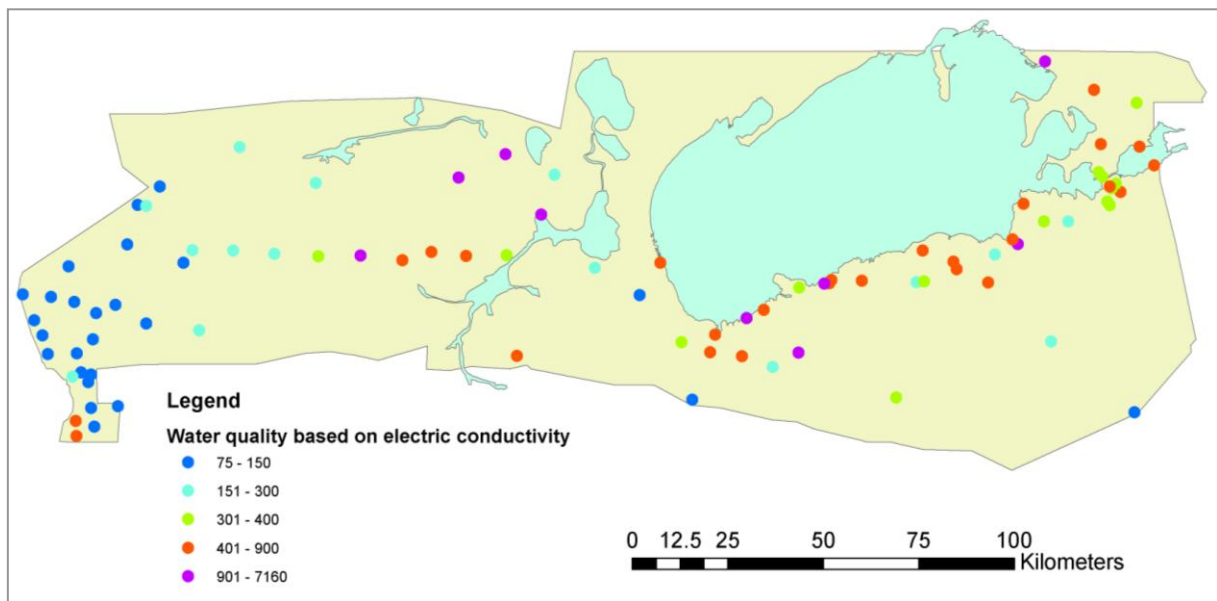
Figure 7
Map showing water quality based on electric conductivity measurements

Table 3

Water quality classes and their suitability implications

Electric conductivity (mS/m)		
Class A	<= 150	excellent water quality
Class B	> 150 -<= 300	good water quality
Class C	> 300 -<= 400	Suitable, low risk
Class D	> 400	unsuitable for human consumption
Class E	>XX	unsuitable for stock watering

Guiding Principles

1. Artificial water has been and will continue to be supplied, manipulated and maintained in the Park subject to the following:

    a. To meet tourism needs, however if there is a quantifiable and significant impact on Important Species (specifically including the flora) then specific management action may be required which may include the permanent or temporary closure of the waterhole;

    b. If it can be demonstrated that it will reduce animal/human conflict in the medium- to long- term;

    c. To enhance the area available for Important Species. However this is subject to the developing of the individual species management plans, and these must be agreed to by the Director. This may require zonation to accommodate conflicting needs of different species;

    d. Where water in situated in close proximity on neighbouring land and may be impacting on species in the Park, or increasing management problems, then this must be addressed through bilateral discussions with the affected landowners or land managers;

    e. Critical water distribution areas must be identified and all reasonable efforts made to ensure water availability is maintained in them; while other areas will not be supplied with artificial water (see Figure 6), and changes to this must be agreed by a Deputy Director or higher;

    f. The water quality must be tested as appropriate to reduce the likelihood of any negative effects on wildlife;

    g. All new boreholes must be tested to ensure the water is of suitable quality for game and that it will be able to supply sufficient quantities before the water is made available to wildlife;

    h. Before any new boreholes are drilled, existing water sources must be explored and only if these are inadequate should new holes be found, drilled and equipped.

    i. Natural waterholes and fountains must not be closed to wildlife or water extracted for other uses;

    j. Natural springs must not be enclosed and 'converted' to permanent waterholes, or interfered with in any way. However the waterhole at Okaukuejo will remain operational. Those which have been interfered with must be rehabilitated and restored where practical and possible.

7.2. Human/wildlife Interaction

Human/animal conflict is another area which consumes management resources, especially when animals leave the confines of the Park. It can also have negative impacts on relationships between the Park and the affected parties. The animals which generally cause problems are lion, elephant, and spotted hyaena. Two of these are listed as Important Species in Appendix 2. There are several options which are available to management to reduce this impact, and the best will be determined by the specific circumstances. Most options are costly to implement, and the size of the Park and its lengthy perimeter boundary simply compounds this problem. A universal solution is therefore unlikely to suffice for all situations. However speed is of the essence when dealing with these matters, as life and property are at risk and any delay in effecting a solution may increase this risk. Management must therefore have a policy and procedure for dealing with the most frequent types of events. Solutions which will require input from officials in Windhoek are unlikely to be appropriate. To help solve this, the following framework is proposed:

Guiding Principles

1. Individual animals which are causing conflict must be dealt with according to national legislation or other agreements[5]. Should this prove inefficient or inappropriate then motivations to amend the legislation must be initiated and motivated through the system. This process must identify the practical cost implications of the existing legislation and the impacts amendments may have on wildlife in general and on Red Data species in Namibia generally;

2. Park management must develop a policy and procedures for dealing with conflict-causing individuals, and these may need to be species- and location- specific. This policy must be approved by the appropriate Director and must consider the following:
   a. The international conservation and biodiversity value of the species;
   b. The cumulative cost of the damage, either as groups or as individuals. This must include specific damage to neighbour's life or property and the management costs of controlling this impact;
   c. Any legislative restrictions or limitations;
   d. Availability of expertise, resources and knowledge of the species and its behaviour;
   e. The potential number of individuals which create problems annually and the ecological impacts any proposed procedure may have on the species (different solutions may be required in different areas, on different age and sex classes and group sizes);
   f. Possible and most likely causative factors leading to the conflict and likely long-term solutions which may be available;
   g. The most appropriate and humane measures which can be applied;
   h. The cost-effectiveness of any potential solution.

3. The decision-making process with regard to the implementing of the policy and procedure will be dealt with by the Park Head[6];

4. For any species, other than Important Species, management must deal with the problem in the most cost-effective and humane way possible with due consideration to any long-term impacts on the population within and around Etosha. The Park Head must ensure that any incidents in which animals are destroyed must be investigated and reports written. Incidents must be reported to the appropriate Director at least quarterly;

5. The assistance of other Divisions within the MET or other Departments or neighbouring landowners may be sought in dealing with animals which have left the Park and are creating a nuisance or threatening life or property, subject to them having appropriate authority and the skills to take any action;

6. No compensation will be paid for any damage caused by animals leaving the Park.

7.3. *Human Safety*

Wildlife may also pose a threat to tourists and staff within Etosha. Management must monitor those instances and areas where this is likely to happen. Proactive action can often prevent or minimise these problems. The following guidelines must be implemented:

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[5] These may include international conventions or agreements, local, regional or national policies and any local bilateral or multilateral agreements.
[6] The Park Head is the most senior MET official based in Etosha National Park.

Guiding Principles

- Protective barriers must be erected where the threat is likely to be high, such as near waterholes close to rest camps. These barriers must be monitored to assess their effectiveness;
- Notices and warning signs must be displayed in appropriate places and in several languages;
- Access to the Park is conditional on a waiver of liability for visitors and families of staff;
- Actions which will increase the likelihood of injury or death must be prohibited and drawn to the attention of all Park users. These may include feeding animals, and straying from vehicles etc;
- Facilities must be designed and developed to ensure risk to life or property is minimised, while allowing visitors to still enjoy the wildlife viewing and tourism experience.

8. Tourism

Etosha National Park has, over the years, developed into a world-renowned wildlife tourism destination. In the 2003/4 financial year, Etosha attracted over 155 000 visitors. These visitors only use a small percentage of the Park to the south of the pan, although there are limited trips permitted to the west. Visitors are concentrated in the three existing tourism camps of Okaukuejo in the west, Halali and Namutoni in the east. These camps are managed by Namibian Wildlife Resorts (NWR) and offer accommodation ranging from camping sites through to VIP lodges with camps offering restaurant and kiosk facilities. The camps are large and all three can accommodate in excess of 100 overnight visitors. They provide accommodation to the self-drive market, busses and overland vehicles. All have a flood-lit waterhole where guests can view game at all hours of the day.

The camps are joined by a very wide (in excess of 10m in places) gravel road. There are numerous smaller loop and link roads which lead off this road to game-viewing areas, mostly waterholes. In total, approximately 1 000km of roads are available for tourism use.

The tourism product is centred on game-viewing, which is undertaken from vehicles or from the camps. The best game-viewing is usually concentrated at waterholes, especially during the dry season. These waterholes can provide a continuous spectacle as game gathers at them for watering. There is considerable scope to increase the number and type of tourism products available. There are no small exclusive lodges in Etosha, and no expensive 'five-star' lodges. The Park is one of the largest in Africa, and there are still many areas which have not been developed but certainly have excellent potential.

Generally tourists are prepared to pay more for an experience when the total number of users is limited to relatively low numbers. As visitor numbers increase, so their willingness to pay often decreases. Although the Park is large there are potentially many additional sites that people may want to visit if the right conditions are created. A balance must therefore be found which does not detract from the sense of place, allows reasonable controllable access, generates income and adds economic and social value, especially to the local region.

The best tourism areas will be focussed near permanent, good quality water, and where game-viewing is good. The environmental constraints to developing further tourism products are generally not limiting, and sites can be found where habitat and species impacts can be minimised and/or mitigated. Water is the single most important limiting factor if access can be obtained.

The range of visitor activities should also be improved, and this may include later gate times for limited numbers of guided visitors, improved viewing at some of the waterholes including game-viewing hides, trails, and open vehicle drives in some areas, etc.

The Etosha tourism brand has not been finalised but the following are proposed:-

> _Etosha: Predators and pans_
> _Note proposals are sought for this brand._

Policy

> _Tourism must be significantly enhanced and developed, while increasing the_
>
> _nature and type of products on offer to meet social and financial objectives_

Guiding Principles

1. The existing tourism products must be kept accessible to the public to provide a wide range of affordable tourism products;
2. The tourism support infrastructure (roads, waterholes, public facilities) supporting the affordable tourism access areas will be maintained at existing quantity and quality by the MET to meet these objectives;
3. Responsibility for the maintenance of the accommodation facilities and their support infrastructure (water, sewerage, electricity etc) will be the responsibility of the facilities operator. The standards for these must be agreed to, monitored and controlled by the MET;
4. Where the support services are shared, the largest user (by volume) will maintain and operate the assets, and the other user will pay the pro-rata operational costs;
5. Tourism will be limited by the MET in areas to a defined number of users. This may be via concession agreements (or direct regulation) with one or more parties who will then be responsible for the maintenance of the support infrastructure in these areas, as well as for controlling access, maintaining environmental integrity and for training and controlling guides. These activities will comply with the zonation;
6. Low environmental impact developments are essential which must blend in with the landscapes and natural environment;
7. The different products will be priced, allocated and regulated broadly using the following criteria:
   - Differential pricing may be applied between seasons and user groups;
   - The more exclusive the use the higher the fee levied by the MET for the use of an area or product;
   - The higher the demand for the product the higher the user fee;
   - Areas will be zoned to accommodate different users, subject to suitable activities;
   - The costs to mitigate tourism impacts or undertake, control and maintain tourism products and support associated infrastructure and management must at least be offset by the income earned from tourism by the MET (user pays principle).
8. Should any party other than the MET operate, manage or develop any of the tourism rights or opportunities within the Park, it will be done through a defined procedure and regulated through a formal agreement according to predefined parameters and standards;
9. To improve the tourism experience; roads may be zoned to limit the size and mass of vehicles and this can also apply to some visitor attractions such as waterholes;
10. All public entry points will be under the control of the MET. Additional entry points, beyond the existing ones, will only be considered if the parties using them pay all the costs for MET to control them and the benefits which the entry generates are significant and contribute to the Mission and Strategic Objectives of the Park;
11. Tourism rights within the Park (with nearby access) may be granted to communities adjacent to the Park in exchange for agreed conservation management activities on significant parcels of adjacent community land; these agreements must contribute to alleviating management problems or achieving conservation and/or socio-economic objectives;
12. Additional activities will be pro-actively explored which will add value to the public access facilities; to add to the tourism experience, contribute to socio-economic development and to contribute to the financial sustainability of the Park;
13. The MET must ensure that a system of controlling tourism-related infringements is implemented which can be effectively managed.

9. Collaboration and Partnerships

The Etosha National Park is a national icon for the people of Namibia and it offers substantial opportunities for further development, especially through the involvement of third parties. The private sector can offer investment, skills and development, while communities can benefit through a more structured relationship with the MET in Etosha. This is articulated in the Mission, and the potential benefits which could arise from it, will require collaboration at all levels, including communities, government, NGOs and the private sector. However any collaboration with the private sector must take place to achieve specific outcomes and these are:

> to add value to the product, including biodiversity;
> to reduce the risk to government of some activities and investments;
> to bring investment and skills development;
> to increase jobs and other economic benefits;
> to increase empowerment in this sector; and
> to hasten the delivery of the above.

Mechanisms must be developed which ensure that this will be achieved and implemented. Any collaboration must be driven and directed by the MET and must build synergy between the partners.

Policy

> *Collaboration with outside parties must only be considered when there is a need*
>
> *for it as identified and initiated by the MET and where roles, responsibilities and*
>
> *outputs are defined via formal contractual agreements, where it is cost-effective*
>
> *to do so and it can be managed and controlled.*

Guiding Principles

1. Collaboration must be needs driven and initiated by the MET and must not detract from their core function and responsibility;
2. The ultimate control function, which the MET is responsible for under law, must not be contracted out to other parties. It may be possible to outsource functions and activities, but the ultimate control and responsibility will still vest with the MET;
3. There could be opportunities to better manage the human/wildlife conflict through better collaboration with other departments, ministries, NGOs, private landowners and communities. These must be actively explored and if necessary formal agreements concluded to assist with this and widening the Objectives and Policies of this Plan;
4. All collaboration must only be with parties who understand and contribute to the achievement of the Vision, Goals and Policies of this Plan, and:
   o must be regulated by a formal contractual agreement which defines the roles, responsibilities, term and other conditions of operation;
   o the agreement and its outcome must be cost-effective to the MET, who must have the capacity and ability to draft the agreement and manage it for its duration.

10. Community and Social

The Etosha National Park is situated north of the Foot and Mouth Veterinary Cordon Fence. The predominant land-use in the region is extensive grazing, either with domestic stock, especially cattle, or with game. The presence of potentially dangerous and problem animals, especially elephant, lion and spotted hyaena increases the risk for human/wildlife conflict. The size of the Park increases the management difficulties and costs of dealing with these incidences as and when they occur. Improved game fencing and management would help to reduce the risk, but the initial development cost and ongoing management cost of this would be enormous. Solutions need to be found with neighbours which are more cost-effective and assist both parties.

The presence of an abundant wildlife does, however, open many other opportunities. Etosha is the most-visited park in Namibia and is internationally renowned for its excellent wildlife viewing. The costs of the human/wildlife interaction, and the benefits which tourism offers, must be balanced so as to increase benefits locally. Once again the large size of the area makes this more difficult, but many undeveloped tourism opportunities exist and these need to be explored and where possible developed. This may be possible through aligning land uses, developing compatible businesses and improving communication between the Park and its neighbours, especially those in more remote areas.

The local regions also need to be more closely integrated into the benefit stream emanating from the Park. Tourism initiatives which have developed, and which can still develop, as a result of the Park must maximise this linkage.

To achieve the above goals it is critical that Park management establish appropriate mechanisms to deal with these issues, and that communication and collaboration with the local and regional councils must be strengthened and if necessary formalised. This may also assist with ensuring that inappropriate land uses and business are not pursued or developed within the Park and the region. Also, where possible, opportunities will be focussed on those most disadvantaged individuals or groups in society.

There are also many different interest groups, NGOs and academic institutions which could assist management. There are many advantages which can be gained through forging formal arrangements with these groups, but the benefits to the MET must outweigh the costs.

Policy

> *To proactively engage via formal mechanisms/institutions with the local and regional councils around the Etosha National Park to ensure as many benefits as possible arising from opportunities in the Park are captured locally and to, where possible, actively facilitate compatible land- use and business practices.*

Guiding Principles

1. Management must proactively engage with local councils to establish better communication and help foster an understanding of the challenges and opportunities which management face in the operation of the Park;

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2. Regional and local authorities are recognised as key role-players and collaboration with them must be actively pursued and effective working mechanisms formed;
3. The MET must deal with interest groups via formal and agreed mechanisms;
4. The MET to actively facilitate compatible economic opportunities with regional authorities in collaboration with other ministries and agencies, and assist in removing obstacles to economic development, subject to the following:
   - The business activities and land uses are compatible with the Visions and Goals of this Plan;
   - In the economic development and procurement process preference will be given to people from the local region and who are the most disadvantaged; provided they meet with procedural requirements, can compete on quality and it is practical to do so;
   - Many opportunities are likely to arise from tourism developments within the Park, and these must be communicated by Park staff to the appropriate local public institutions in the early planning stage, so they can prepare to capitalise on them.

10.1. Environmental Education

The role of environmental education cannot be overstated in fostering an understanding of the value of conservation and the costs and benefits derived from effectively managing this resource. Long-term benefits can be gained by investing in education which focuses on the values of wildlife, Etosha, and its associated culture and history. There is a strong synergy between environmental education and the tourism product. Research must therefore focus on unlocking this knowledge for use by both groups.

Policy

To facilitate environmental education via formal partnerships targeted mainly at tourists, schools, students, decision makers and community leaders. Formal facilities will be made available subject to funds and availability.

Guiding Principles

1. Environmental education will be achieved through the establishment of formal partnership agreements with interested parties, and these will focus on:
   - The interpretation of Etosha and its ecosystems, its functioning, threats to it and its value;
   - Ensuring those most disadvantaged have the opportunity to experience the Park and its unique ecosystems;
   - Schools and community leaders will especially be targeted by these programmes;
   - The MET will, subject to availability and funding, make facilities available for environmental education; this may require additional funding as the costs of providing the service may exceed what the users can afford to pay.

11. Land

The Etosha National Park contains the largest extant populations of a number of species of wildlife in Namibia. Some of these animals are potentially very valuable, and can contribute to economic activity either through consumptive or non-consumptive use. Many of these animals range over considerable distances within the Park, and where it not for fences would range further than the existing Park boundary. Some species do move beyond this fence and cause conflict with humans, their livestock or farming activities. These interactions will continue, as mentioned under Collaboration and Partnerships, but there may be some scope to manage these potential conflicts differently through changed land-use, should neighbours be willing to explore this option. The presence of the Foot and Mouth fence on the southern boundary does limit the options potentially available to those landowners south of this fence, but more options may be available to those in the north, east and west.

There is a possibility of linking the Park with the Skeleton Coast Park to the west via state and conservancy land, and the original protected area proclaimed in 1907 did in fact include much of this land. This option should be explored, although there are some limitations which result from a main road passing through this region.

Policy

> *To increase the area of land within contiguous parts of the area, which is*
>
> *controlled and managed under the principles, set out in this Plan.*

Guiding Principles

1. The process and the location of any possible land expansion and co-management (including both time and spatial issues) will be initiated and directed by the MET;
2. The 'ineffective fence' (its quality and the resultant ongoing need to deal with human/wildlife conflict) increases management costs. This needs to be improved through securing co-management agreements with landowners to permit a uniform land-use, and the MET needs to initiate this process;
3. Areas of high biological value, or wildlife corridor areas on adjacent land, must be identified by the MET and co-management agreement explored to ensure the long-term conservation of these assets;
4. Increase the land area under the management principles in this Plan, to ensure game movement and wider economic benefit with no loss of economic value to the Park. This would be addressed through the following procedure:
5. Proactively engage with relevant parties and where possible reach agreement on the following issues:
    * The precise alignment and procedure required for delineating the boundary;
    * The type and standards for any perimeter fence which may be required;
    * How access to the co-managed area will be controlled and managed;
    * What activities would be permissible on these properties in terms of conservation management;
    * Where game populations are significant, or important game species occur, then the parties must agree on the following issues especially for the mobile wildlife resources:

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- Should any consumptive use of game be agreed, then a framework for controlling and regulating this must be agreed upon before any fences are removed (the Park quota to be relocated to other MET-approved areas);
- Access by landowners or their guests to the Park is specifically excluded if and when a fence is removed, and if this is allowed then any access would be subject to a separate agreement and procedure which would be controlled by the MET;
- The management policies and procedures between the Park and landowner/s must be harmonised and agreed in writing, and there must be agreement on a working protocol to control wildlife management and its use;
- Removal of fences or the re-introduction of game to areas which are co-managed, will only be possible where land-use is compatible with this Plan;
- If any agreement is reached then it may have to be registered against the title deed;
- Any benefits ascribed to the removal of any fence must exceed the cost, therefore larger areas are preferred to smaller pieces of land;
- Through negotiations, the parties must strive to achieve 'win-win' solutions;
- In priority areas where agreement cannot be reached, management must pursue other options for securing the appropriate conservation management of the area.

11.1. Unresolved Land Issues

There are some unresolved land issues which fall within the boundaries of Etosha National Park. These must be resolved to the mutual agreement of all parties so that the working environment is defined (this must detail what rights and responsibilities the different parties have). The MET is committed to resolving these issues. In order to achieve this, the following steps will be followed:

1. The MET must identify any problems and internally seek a possible solution to them;
2. The MET must engage with other ministries and achieve acceptance of the solution so as to ensure that a uniform and cohesive approach is followed.

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12. Marketing

The development of the *Etosha* brand must enhance the already well-known park, but this should focus on new tourism activities and products while building on the old. Marketing is a critical element of branding and creating an awareness of the area, and is essential for attracting tourists to use and understand the product. Marketing should ideally be focussed on the brand, the experience offered and the market niche targeted. The strategy adopted will operate at many different levels within the Park and within the MET.

Policy

> *Those who are likely to benefit the most from the marketing of a product will be responsible for the costs of that marketing.*

Guiding Principles

The following principles will guide the marketing of the tourism product:

- The MET will, within budgetary constraints, undertake limited marketing of the Etosha National Park as a product within Namibia, and this will be done in collaboration with other state agencies. This will focus on the Etosha brand and will ensure as much knowledge of all the benefits of this remarkable park are communicated to as wide an audience as possible;
- The individual product 'owners' will be responsible for their own marketing costs and initiatives, but they must be aligned with the brand articulated in this Plan; and
- The MET will market opportunities for tourism concessions as and when they become available on terms and conditions that will apply from time to time.

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13. Infrastructure

This section defines all the physical structures and developments that are required in the Park to achieve the goals and objectives of this Plan. The land is state-owned and any physical permanent structures will therefore be the property of the state, although the MET may conclude user agreements from time to time to permit defined uses of these assets and associated opportunities in the achievement of the Goals and Vision of this Plan. Infrastructure is required within the Park both to assist management and for the promotion of tourism and other opportunities. It is a critical element for the achievement of these objectives and it does add value to both. There are unfortunately costs associated with providing infrastructure, either directly through development and maintenance (financial costs), or broader environmental costs. To reduce these costs, only essential infrastructure, which contributes directly to this Plan, will be placed within the Park. Where possible, service infrastructure should be located on the periphery or outside of the Park. The visual impacts of this infrastructure must always be considered because of its potential negative impacts on the Mission of the Park.

Etosha has substantial existing infrastructure. The road and track network alone accounts for over 2 000 km, of which 1 100 km is gravelled and 29 km is tarred. The value of this capital asset is enormous as is the associated maintenance cost. Roads are a critical element in a park of this size, as they link tourism areas and permit rapid management access to areas far from management centres. The need for them is therefore critical. The costs of maintenance are however high, and tourist roads for example need monthly grading. The width of some of the roads may need to be assessed in an attempt to reduce this cost and to create a sense of a game-viewing 'track' rather than game-viewing 'highway'. The main access roads may also need to be re-aligned, and in the long-term possibly tarred to reduce the ongoing maintenance and need for quarry extraction.

The tourism and staff facilities are also old and in need of renovation. The possibility exists for the tourism facilities and associated staff accommodation to be developed at the cost of the tourism supplier. The conservation office, workshop and staff facilities and support infrastructure, however, need regular maintenance and refurbishment, and these will remain the responsibility of the MET and associated works departments.

Large tourism facilities and staff quarters can be costly to maintain and can also generate large quantities of waste, which is expensive to manage in a protected area. In addition, at those sites where there are large concentrations of staff, services and facilities should be provided because of the distance staff need to travel to schools, clinics and shops. Where possible, steps should be taken to relocate non-essential staff out of the centre of the Park, and from the larger centres such as Okaukuejo, to the periphery where they will be closer to towns and other services.

Policy

> *Infrastructure is required to add value to the Park. However only essential infrastructure is permitted and its financial, economic and environmental benefits must significantly exceed its costs.*

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Guiding Principles

1. All infrastructure must be planned and developed in appropriate Zones (**see Zonation Map**). All new development must have a plan which must be approved as per departmental procedures, and in terms of an EIA which will consider the following:
    The environmental impact will include the following considerations:
    - The type and nature of any building material and its suitability in the Park;
    - The architectural style must reflect the appropriate branding for the Park;
    - The visibility of the infrastructure to other Park users;
    - The provision of services including water, electricity and communications if applicable and their impact on other users;
    - Special attention must be paid to waste management and site reclamation;
    - All construction related impacts;
    - The location within the Park and the possible presence of any Species of Special Interest or habitats which may be significantly impacted;
    - The site specific terms of reference for the EIA;
    - The need for an EMP - this document must form part of all developments;
    - Consideration of any alternative sites, design or specifications; and
    - The Zonation Plan for the Park.
    - The ongoing maintenance requirements to the Park and other parties, and this must indicate what the annual average financial operating requirement is;
    - The wider benefits to the Park;
    - Developments, especially service infrastructure, should where possible be peripheral. Most tourism developments may have game waterholes located nearby, and this may mitigate against having them too close to the boundary;
    - Community involvement during construction and operational phases;

2. If any assets are leased or used by parties other than the MET, then as a general principle the users may have to pay a user fee for the rights to occupy or make use of the structures or facilities. This will be done via formal agreement with the MET where the type of use, period of use, rental and any other restrictions must be specified.

13.1. Access and Roads

The Park has significant road infrastructure and it accounts for a large portion of the Park's capital assets. The road network also requires significant maintenance, as the nature of the tourism product requires an appropriate road and track network.

There are currently three public entrance gates to Etosha and these are located at Ombika, King Nehale and just east of Namutoni. Although these are well positioned for the existing tourism use, the western and north-western areas of the Park have poor public access if additional tourism products are considered.

Background

About 750 km of gravel tourist roads exist from M'Bari to the east, open to self drive tourists. A further 250 km are open to registered tour operators in the area west of M'Bari. The tourist roads can be classified into four categories, where a Category 1 road would represent the main road between Okaukuejo and Namutoni, and a Category 4 track would be a so-called "adventure track" like the short piece of track onto the pan. The width, and thus the maintenance cost, would be influenced through this categorisation.
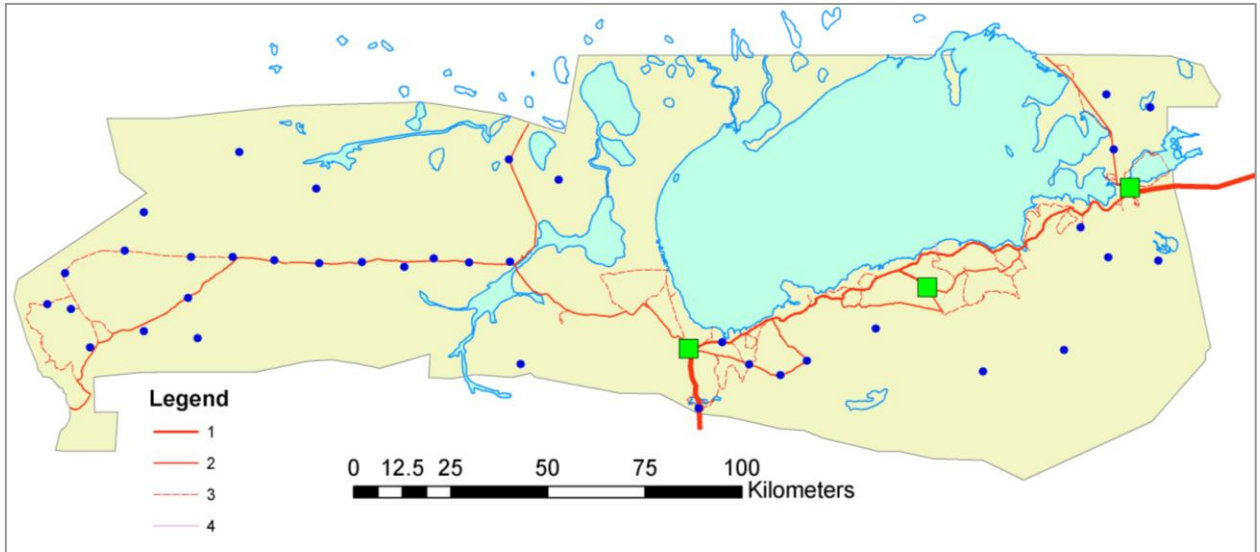
Figure 8

Map showing current road network open to tourists, with categories indicating the width of the roads.

Figure 9

Map showing potential service roads (thick orange); roads currently open to tourists (thin red) and possible new roads (green) for guided tourism.
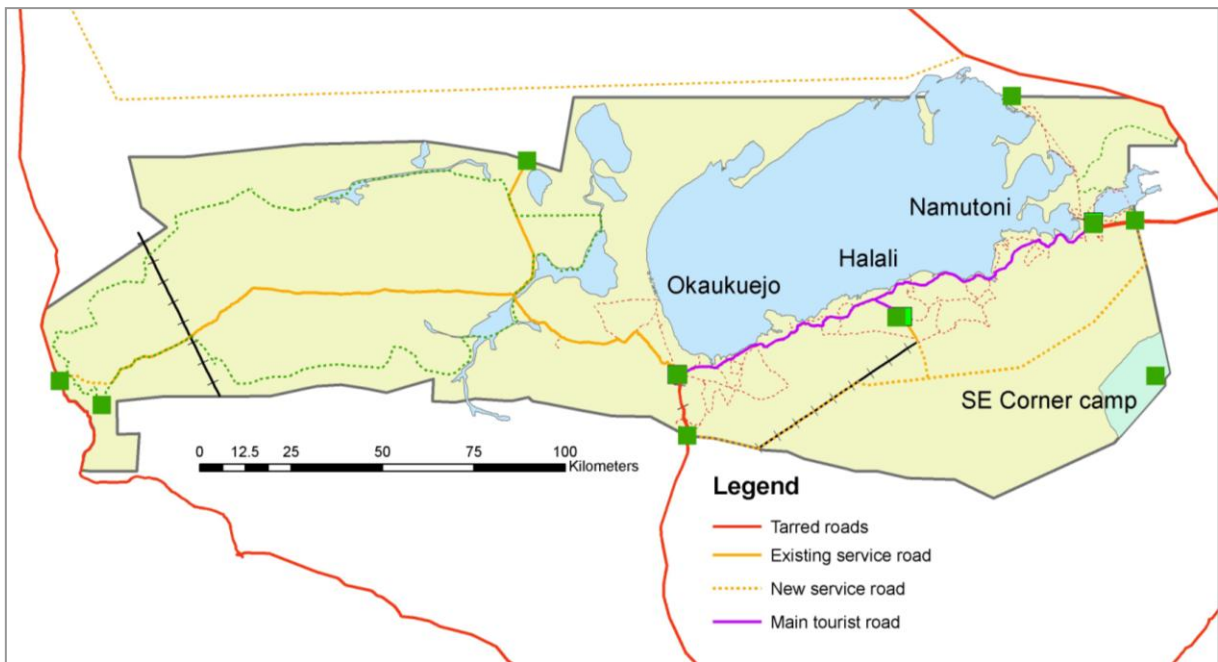
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Table 4

Break-down of the kilometre of tourist road in the self-drive - and tour operator zones.

Category	Open to tourists	Only tour operators	Subtotal
A-Primary	275	140	415
B-Secondary	313	57	370
C-Tertiary	157	69	226
D-Adventure	3		3
	748	**266**	**1 014**

Principles

1. Entry points to be kept to a minimum, they must be signposted and there must be control measures at all entry points to implement management actions (including entry fees and security) and to improve tourist's access to nearby opportunities. There are three existing entrance gates, two new gates are planned although these will have limited access;
2. If new areas are opened to the public, even for limited access, then additional entry points may be required. These must be positioned so as to decrease road distance to the facilities and must be cost-effective to implement. Those that are exclusively for a limited number of tourism products will be controlled by the MET, but the costs of developing and managing them will be carried by the operators of the tourism products;
3. The MET to ensure all entrance gates comply with the following:
   - Opening and closing times are agreed and publicised;
   - A register of all people and vehicles entering and leaving is maintained;
   - An operating protocol is agreed and enforced;
   - Speed limits are set for the area and signposted;
   - All permits or entry fees are collected and paid and there is an audit procedure;
4. Any road building material which is collected in the Park must have MET approval and this approval must include a plan (EMP) with funds allocated to reclaim the area after each extraction;
5. Park roads will be kept to a minimum and subject to the following:
   - Roads will be designed to be cost-effective;
Existing road network to be reviewed and recommendations made regarding any changes. This must consider the following:
   - Service roads should be separated from game-viewing roads and the current width of tourist roads reconsidered to reduce cost and increase visitor enjoyment;
   - Upgrading and all weather surfaces should be considered for all major service roads in the long-term;
   - Realignment of roads may be necessary to improve tourism use of the area, reduce environmental impact and improve management efficiency;
   - Game drive roads are categorised for vehicle use from heavy (busses and trucks) to light sedan, to 4x4 use and some only available for guided access in the above categories (including new roads). This may require restricting vehicle mass and size on some roads;
   - Low maintenance roads for high clearance or 4x4 vehicles and for low speed will be the preferred design but demand, cost and benefit will help inform this;
   - Minimum disturbance of soil and use of local material will be preferred in road construction, ensuring minimal environmental and visual impact; and
6. Ensure appropriate interpretive material and maps are available to Park users.

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13.2. Fences

Etosha has an extremely long perimeter boundary. The Park is currently fenced along its entire length, although the quality of the fence varies significantly with some areas enclosed by a two-metre-high fence containing cable, wire mesh and electrification, while other sections are merely enclosed by a 1.2-metre-high stock fence. The quality of the fence does reduce the incidence of human/wildlife conflict, but this is often costly to achieve and even the best game fence does not eliminate it. Elephant- and lion-proof fences cost in excess of N$100 000 per km to construct and need almost daily checking. Where 800 km of boundary fence has to be maintained, this becomes an extremely expensive option and virtually beyond the reality of the Park. When considering fencing, the need for the fencing and the costs associated with erecting and managing it must be considered.

The Veterinary Cordon Fence to the south was erected as a foot and mouth disease barrier, and as such this should be maintained to these standards by the relevant department.
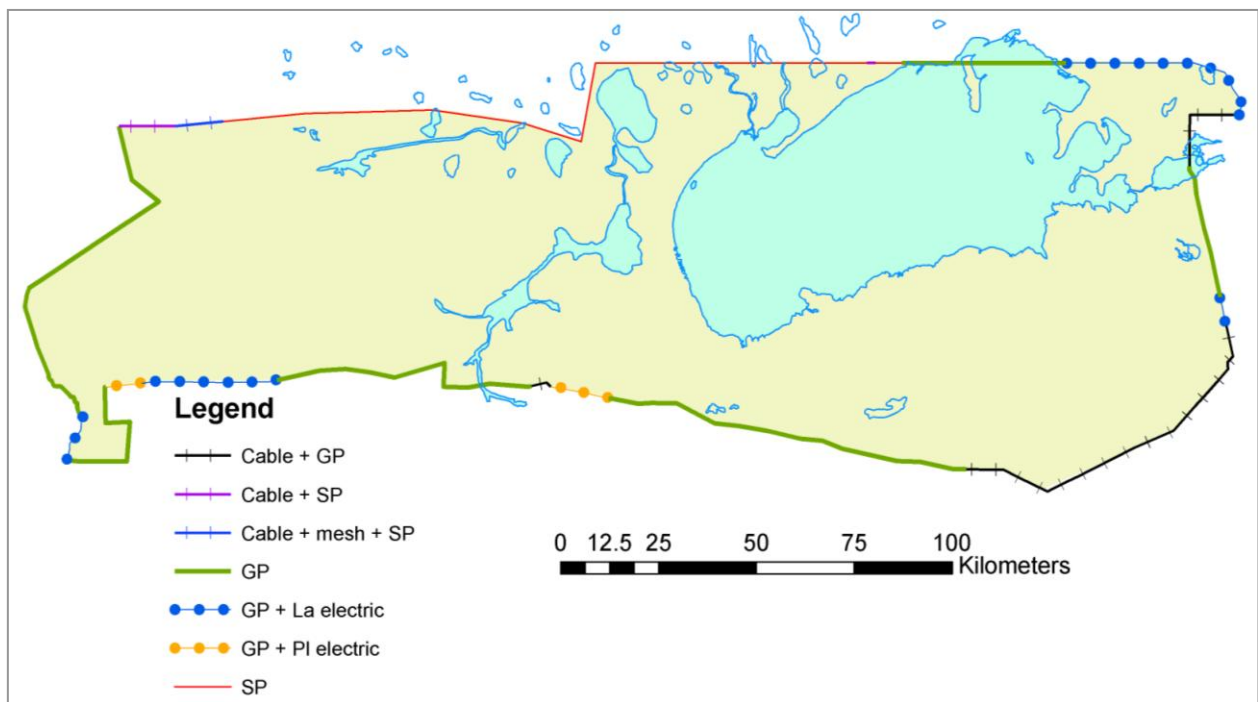
Background

Figure 10

Map showing different types of fencing used along Etosha boundary
(La – elephant, Pl – lion, SP – stock proof, GP – game proof)

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Table 5

The length of the different types of fencing used, unit costs and annual depreciation calculated

	length (km)	Unit cost (/km)	Value (N$)	Expected life (years)	Ave depreciation per year N$
Cable + mesh + Stock Proof	11.80	100 000	1 179 902	25	47 196
Cable + Stock Proof	15.80	75 000	1 185 136	25	47 405
Game Proof + lion electric	23.02	55 000	1 266 043	25	50 642
Game Proof + elephant electric	105.52	55 000	5 803 728	25	232 149
Cable + Game Proof	116.33	100 000	11 633 298	25	465 332
Stock Proof	180.20	10 000	1 802 032	25	72 081
Game Proof	371.37	45 000	16 711 589	25	668 464
Total	**824.05**		**39 581 728**		**1 583 269**
Average			48 033		

Principles

1. The entire boundary of the Park must be fenced, unless agreements with neighbours exist; in which case their perimeter must be fenced according to agreed standards;
2. The fence must be maintained to at least keep domestic stock out of the Park;
3. In areas where human/wildlife conflict is high (measured in terms of the nature of the incidence, the number of incidences and the distance management must travel to investigate or take action) then upgrading and maintaining the fence at a high level should be considered. This must be motivated, demonstrating the likely cost-effectiveness of this intervention, and is unlikely to be a viable solution in all areas;
4. Fencing may be required in certain areas to secure assets, exclude animals or protect staff and visitors. These instances must be considered on a case-by-case basis and motivated accordingly;
5. However, as a general principle fences must be kept to a minimum and designed to achieve their specific task; and
6. Fencing may be required to protect Park assets (including animals and plants) and control access; in these situations the cost: benefit of the fence and its implications must be considered.

13.3. Buildings

Buildings are required to accommodate staff and tourists and as support infrastructure for these and other activities. In a flat landscape such as most of Etosha, buildings should be kept low in height so as to reduce their visual impacts.

Principles

1. Where possible buildings should be located as close to existing services and major access routes as the product will allow;
2. Their location must add to the overall value of the tourism product;

3. Any new buildings or improvements must take into account the long-term management costs and responsibilities;
4. Conservation staff must be concentrated near areas where management and control demands are highest, ideally they should be located near services, and where practical in towns or villages where support infrastructure and services are available for staff and operations. This has implications for Okaukuejo where consideration must be given to moving non-essential staff to the periphery of the Park;
5. All staff residing within the Park must be accommodated in facilities that meet acceptable standards including their safety when residing in the area and commuting to work or facilities;
6. All structures must be constructed to blend in with the environment, the local architectural style and not create high visual impacts;
7. Structures containing fuel, gas and oil must meet national requirements and containment structures must be erected to minimise the effects of leakage and spillages.

13.4. Airstrips and Aircraft

Etosha is located a long distance form Windhoek and other urban centres. This consideration, and the flat nature of the terrain, make aircraft access a good alternative and could add value to the tourism product. There are several existing airstrips in the Park and each existing camp has an airfield, although these are not generally available to the public.
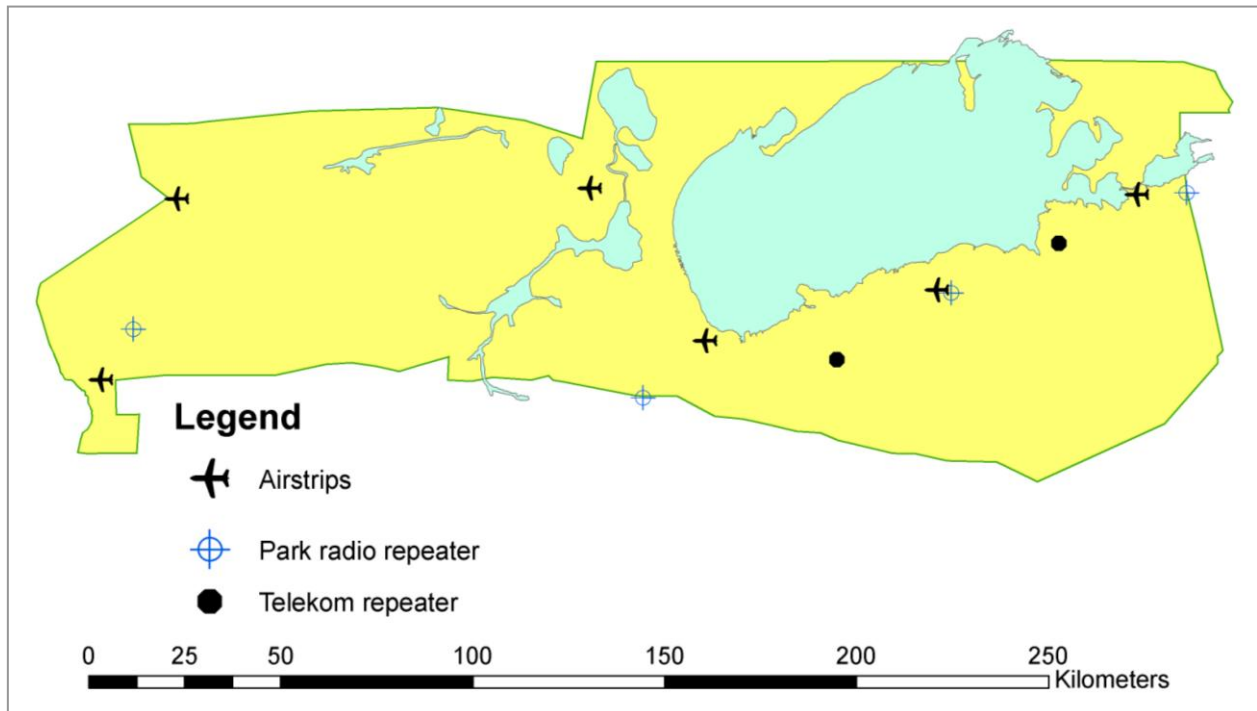
Background

Figure 11

Map showing the six airstrips, four repeater stations for the Park radio system as well as the two Telecom repeater stations (outside the camps)

Principles

1. The use of the existing and possible new airstrips for public use should be investigated. The demand for this type of access needs to be explored with operators and tour companies. If the demand is high, then this must be motivated and the most cost-effective solution found. This may require a specific operating procedure which may limit hours of access and impose other conditions (it may not require the registering of the strip);
2. Helipads associated with developments may be permitted only if there is no impact on other Park users. If airstrip access is permitted then helicopters could use these facilities;
3. The 'no flying' restriction below 1000 m will still generally apply over the Park although there may be designated corridors for approved landings;
4. Disturbance of the flamingos at their nests during the breeding season is not permitted or in their feeding areas at other times;
5. No low level aerial safaris will be permitted; and
6. Noise pollution to other Park users must be considered in any flying operations.

13.5. Waste Disposal

Ideally solid waste should not be deposited in a Park, and it should be transported to the periphery or to an appropriate site outside. The reliance on groundwater for both human and game water consumption underlines the need to ensure that proper sites are used for both solid and liquid waste to preserve the quality of this water. The solid waste sites must be located preferably near the Park boundary or outside.

In developing all waste sites they must be subjected to an EIA and, if appropriate to develop as a waste site, then an EMP must be developed, implemented and monitored. The type and quantity of the waste may need to be limited to ensure it does not pose an environmental hazard. In the long-term a policy of recycling and 'take in - take out' should be encouraged where practical. In the interim all the sites must be assessed for their suitability and simple monitoring procedures implemented, and a working plan and procedure must be developed for those found to be inadequate or inappropriate. The proper management of waste needs appropriate attention and the working policies listed below must receive urgent attention.

Principles

Solid Waste

1. Park management must assess the existing sites and if necessary initiate a monitoring programme to ensure they comply with national legislation, policy and standards;
   - Those found to be inadequate, especially where ground water is at risk of or is being polluted must receive urgent attention and a strategy must be put in place and implemented to resolve any problems;
2. Park management must develop an appropriate waste management procedure and all tourism providers and staff in the reserve must comply with it. This procedure must develop the guidelines set out in this Plan and specifically in this section;
3. Tourism providers and employers of staff living in the Park are responsible for the removal of their own household waste, or that generated by their guests, to approved dump sites designated by management;
4. Any waste 'storage' facilities must be properly enclosed to prevent wildlife from gaining access or from secondary pollution from wind-blown litter. These facilities must be

approved by the MET and may only hold waste for a maximum of 28 days, although this period may be shorter where high volumes accumulate and health issues may arise;
5. Where practical waste must be sorted for recycling;
6. Waste management must be closely monitored and any infringements must be controlled by the MET;
7. Transport of waste to storage or dump sites must be in properly constructed vehicles to ensure further littering does not result;
8. Any toxic substances and the disposal of the empty containers must comply with national regulations and all cleaning and other potentially toxic substances must be approved by the MET; and
9. All new and existing developments must develop an EMP for their waste management.

Liquid Waste

1. Park management must assess the existing sites and if necessary initiate a monitoring programme to ensure they comply with national legislation, policy and standards;
   - Those found to be inadequate, especially where ground water is at risk of or is being polluted, must receive urgent attention and a strategy must be put in place and implemented to resolve any problems;
2. Liquid waste must be processed by the most appropriate system with cognisance taken of practicalities, quantities, availability of water, cost and environmental impact;
3. The MET and other relevant ministries must approve all liquid waste handling systems, which must comply with national standards and legislation; and
4. Particular attention must be paid to avoid polluting groundwater, and a programme to monitor this must be implemented, if necessary with the relevant departments.

14. Administration and Management

The Mission Statement articulated in this Plan calls for a very different approach to managing this Park compared to past management. To maintain an internationally renowned product implies that management and systems will have to be more adaptive to changing circumstances. As the product grows, especially if this happens quickly, then additional funding will need to be sourced rapidly and improved decision-making processes must be implemented.

Etosha National Park contains the largest staff compliment of any park or nature reserve within the Ministry. The profile and status of the Park, the scale of the operations, the number of staff and the issues which need urgent attention implies that management 'on the ground' should be of a sufficiently high rank to solve problems promptly and efficiently. Increasing the rank of the most senior official in the Park may assist in the short-term in alleviating and improving problem solving. These issues often require immediate attention if they are not to rapidly escalate. It would also assist in facilitating and enhancing the roll-out of additional tourism products in the Park. Ideally, a medium-term solution would be to allow for more decentralised management as described below.

The skills that managers require must also focus on those which are solution orientated and to do this requires some autonomy. Ideally, there must be a stronger link between income and expenditure, and other/additional sources of revenue must be available for operations and development. Management must proactively guide the process and pre-empt problems, therefore systems must be in place and operational so that this reaction can be quick, efficient and effective.

To achieve this, a commitment at all levels must be made to implement the operational consequences of this Plan. Either significantly improved decision-making will be required, or more autonomy will have to exist at lower levels within the organisation, or both. There may also be an opportunity to improve the viability of the local economy by purchasing supplies and equipment locally. This can increase the benefits to the local economy and this should be explored where possible. This may stimulate small- and micro- businesses and diversify and strengthen the local economy. Benefits should where possible be kept within the local economy to prevent leakage to large towns and cities.

One office must be accountable for delivering the outputs associated with this new Vision and acquiring the resources to achieve it. The holder of this office must proactively plan new developments for each planning period and pre-empt additional or new management needs. This will include identifying obstacles and mechanisms to solve them. Staff will almost certainly need to be trained to adopt a more business-like approach. This may require a re-assessment of the current staff and reporting structure. Problem solving at all levels within the policy framework of this Plan, the Ministry and Government will be critical. The ability to understand the management system, know where resources can be accessed and what approach should be adopted is critical. A strong and determined persistence to solve problems will be a definite requirement. The large geographic area and general infrastructure requiring ongoing maintenance also poses a huge challenge. Deploying people over this large area and supporting them is a logistical exercise, but the need for a presence 'on the ground' cannot be overstated.

Background
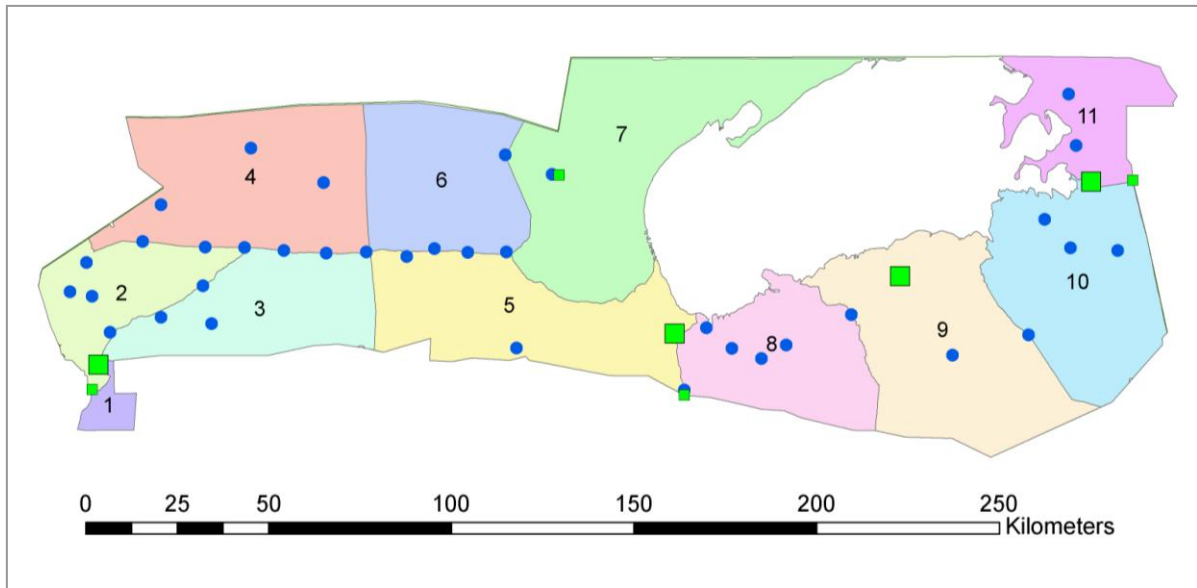
Figure 12
Map showing the eleven "Ranger areas" in relation to the four camps and the smaller
stations/ gates, where staff is also accommodated

Table 6

**The eleven "Ranger areas" with their sizes, km of boundary fence and
artificial water holes**

Area Id	Area (km²)	Area (ha)	Fence (km)	Boreholes
1	157	15 694	50.8	5
2	1 016	101 575	59.4	7
3	1 452	145 242	68.2	4
4	2 278	227 816	108.1	5
Subtotal	**4 903**	**490 327**	**286**	**21**
5	1 982	198 168	84.1	5
6	1 554	155 369	41.9	3
7	2 777	277 655	115.6	1
8	1 462	146 230	50.6	4
Subtotal	**7 774**	**777 423**	**292**	**13**
9	2 467	246 713	63.4	2
10	2 046	204 561	69.2	3
11	967	96 738	112.8	4
Subtotal	**5 480**	**548 012**	**245**	**9**
Total	**18 158**	**1 815 761**	**824**	**43**

Policy

Management systems must be implemented which will ensure that sufficient resources (financial, human and equipment) exist to implement this plan.

A flat organizational structure needs to be strived for and staff needs to be empowered so that authority can effectively be delegated for many decision-making tasks to the Park Management staff.

Guiding Principles

The MET must appoint a senior official to take overall responsibility for all the issues arising from this Plan. This official must develop a work plan, which, once agreed to, they must be permitted to implement. They must ensure that the following issues are addressed:

1. A strategy is developed and adopted to implement this Plan, including the following:
    - Activities must be identified to address the actions which are required to implement this Plan, and this must be reassessed periodically in response to changing environmental conditions;
    - These activities must be resourced with appropriate staff, equipment and funding;
    - Mechanisms and options are explored to overcome challenges and solutions agreed to where this is required;
    - A work plan is adopted and progress against it is monitored by senior staff;
    - The work plan is reviewed and modified as circumstances change by applying the principle of adaptive management;
    - The work plan with expected deliverables and dates are communicated to relevant people tasked to carry out these functions;
    - Monitoring and research frameworks are developed and implemented to improve the management of the system and its expected outputs;
    - Staff needs are considered when making management decisions, especially improving access to social services such as schools, hospitals etc; and
    - Ensure that an appropriate, effective and efficient management system is investigated and applied;
2. Decision-makers at all levels must support management in their endeavours to implement this Plan.

This must occur within the following framework:

1. All the MET assets are accounted for and if necessary protected and maintained in working order and deployed to contribute towards this Plan's Vision and Goals;
2. Close control of maintenance is required to ensure assets do not deteriorate;
3. Ensure all relevant MET policies are complied with and, where there are obstacles, recommendations must be made and solutions sought to improve the system;
4. Establish a system of monitoring and recording all aspects of the Park so that control can be exercised and management improved, especially of the following:
    - The socio-economic benefits which result from the Park;
    - That tourism products are developed and operated responsibly;
    - All collaboration agreements are complied with;
    - Financial records are kept and budgets adhered to;

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5. Identify gaps in knowledge relating to management and where appropriate, through collaboration, find solutions to improve the understanding of the natural system and the socio-economic benefits from the Park;
6. To develop a respectful and efficient working relationship with staff and other groups and ensure the MET policies are complied with in this regard;
7. Ensure all areas of the Park are adequately managed and controlled;
8. To make recommendations and follow-up on any reviews or changes to this Plan, relevant legislation, development requirements, funding, research and other management related issues;
9. Monitor any changes in legislation and advise on their impact on the Park and associated operations;
10. Research will be supported, primarily through collaboration, and will primarily focus on the following (the findings with recommendations must be developed from all research projects and communicated to management and tourism for action, especially those which will significant information enhance the 'brand' of the Park):
    - Establishing the status of Important Species, their interactions with other species and the environment. The studies must have a very strong focus on the practical management of the species or system;
    - Studies, which must be identified jointly with management, which are directed at improving management efficiency, especially those concerning human/wildlife conflict, water extraction, fire and tourism related impacts;
    - The socio-economic impact of the Park;
    - The cultural, historical and archaeological value including management implications of important sites, areas or artefacts;
    - Management and Scientific Services must maintain a list of priority projects which need to be undertaken, as outlined above. Academic institutions and/or funding bodies must be proactively approached to undertake and fund these studies; and
    - Must operate within a code of conduct which must be developed by Scientific Services and agreed to by management and the Deputy Director (Scientific Services).

15. Appendix 1 SWOT Analysis

An assessment was undertaken with the staff in Etosha in March 2005 of the unique strengths, weaknesses, threats and opportunities (SWOT) which Etosha National Park presents. These were used to develop this Plan. The major salient issues which emerged are summarised below. As these issues are likely to change over time they need to be tested against the Plan to ensure the strategic direction and associated polices are still appropriate.

Strengths

- Good basic Infrastructure (although decaying, see weaknesses)
- Large size (buffer mechanism)
- Good information base
- Internationally known tourism and conservation asset
- Biodiversity, large mammals, endemics, bird endemics, wetlands
- Most populations self regulating, and genetically viable (anthrax)
- Well known tourism brand
- Icon tourism product
- Viable populations of most species, no major threats to wildlife
- Largely unmodified landscapes
- Large pan, almost enclosed by Park
- Political commitment to the Park
- Park's socio-economic impact to the region and country
- Education, through centre in Namutoni
- Etosha Ecological Research Institute
- Source of wildlife for other areas
- Focussed game-viewing
- Park management structure and systems are operating
- No international boundary, all in one country
- Cultural and archaeological heritage
- Low incidence of poaching

Weaknesses

- Human pressure in some areas
- Human/animal conflict
- Location of some management infrastructure, too central in the Park
- Decaying infrastructure
- Quality of tourism product, not maintained and product not diversified
- Budget limits and insufficient funding for proper management
- Limited institutional memory as many staff do not stay long
- Training and development of staff, poor existing staff capacity
- Poor community interaction (especially those inside the Park)
- Communication channels not followed especially from above
- Lack of re-investment in the Park especially from tourism
- Motivation of staff
- Lack of defined authority at different levels
- Poor shared Mission, centralised control
- Lack of supportive policies and strategic direction, orders inconsistent
- Budgetary authority not devolved
- Structure and level of authority too low in the MET and government structures
- Structures within the MET do not facilitate easy communication
- Dependence on other Govt structures/Departments and inability to influence their decision
- Tourism infrastructure not suited to new tourism trends (and Park management in general)
- NWR and its relationship does not properly pass the risk of tourism operations
- NWR potential opportunities not being fully realised
- Uncontrolled settlement, inside the Park at existing rest camps
- Location of Etosha between highly populated north and Windhoek
- Positioned north of the Red Line
- Adaptive management not optimised
- Poor information from past research

Threats

- Water abstraction inside and outside the Park, some springs drying up
- High water use by tourists and staff
- Human encroachment especially in and around rest camps
- Land claims
- Introduction of alien organisms
- Disease, FIV, TB, Distemper
- Mining, dominant legislation which may override conservation legislation which established Etosha
  - Lack of "National Park" legislation
- Further declining funding for management and maintenance
- High staff turnover
- Climate change
- If tourism product does not change, it may impact on tourism use and its value as a destination
- Threats to some wildlife species from problem animals leaving the Park
- Possibility of a new 'main road bisecting' the Park from north to south
- Poaching threat to valuable species, however low game densities limits other poaching
- If Park expands to the west, road crossing will be a problem
- Park may be used as a protein source to supply meat and game harvested in large numbers
- If certain strategic infrastructure not maintained may threaten some wildlife species (fences and roads)
- Are there too many artificial water points?
- Management for one species may threaten many other species
- Lack of clear policies which hinder the ability of management to proactively manage potential problems
- For many species their major population in Namibia is dependent on the existence of Etosha
- Poor communication between Parks and Wildlife sections within the MET
- Poor appointments with no training and little career development opportunities
- HIV
- Poverty in neighbouring areas
- Staff related infrastructure inadequate (housing and offices)
- Poor support and appointments from and of HQ staff

Opportunities

- Improved collaboration with existing and new conservancies/communities
- New conservancies, especially north and west
- Diversifying tourism and increasing revenue
- Conservation 'link' with Skeleton Coast Park
- Improve research opportunities and standards and the Institute as a facility of excellence
- Improve the legal status of the Park to more appropriately reflect its value to the Namibian people
- Improve on control of minor and major legal infringements , especially controlling tourism and behaviour of tourists
- Improve management efficiency
- May be able to boost rhino numbers with improved management
- Improve community relationships
- Improved linkages with private operations around the Park
- Mentorship and learning from existing staff
- Improved training (and interpretation) for staff and other users of the Park
- Appoint staff with specialist skills to undertake specialised jobs and improve management efficiency and management quality.

16. Appendix 2 Important Species and Habitats

Important species are those which generally require a large area in which to live and interact freely. The long-term survival of the population can be enhanced by this and as 'near' natural selection processes can operate on and between species and populations. It would also include any Red Data species which may occur in the Park as well as any species which offer particular interest. Any species on the list whose 'motivation' is only 'Red Data', will be removed from the list should it be removed from the National or Regional Red Data list; similarly any species subsequently listed as Red Data will automatically be listed in this list . (The Red Data list for birds is based on the South African Red Data Book – Birds, 1984, R K Brooke, South African National Scientific Programmes Report No 97, FRD:CSIR Pretoria)

There are two important habitats which occur within Etosha, and these are also listed. Species which fall into this category are listed below together with their reason for inclusion:

Name	Common Name	Motivation
Loxodonta africana	Elephant	Contains a free-ranging population large enough to sustain itself in the medium- to long- term
Panthera leo	Lion	Largest free-ranging population in Namibia and large enough to sustain itself in the medium-term FIV free.
Diceros bicornis bicornis	Black rhino	Largest population in Namibia, and as well as the largest population in a protected area internationally. Red Data species and large enough to sustain itself in the medium-term. Need to be actively managed for optimum growth as is stipulated in the national black rhino strategy.
Ceratotherium simum	White rhino	Red Data species which has been recently introduced and is rare in Namibia.
Aepyceros melanpus petersi	Black-faced impala	Large population size and endemic to the region. The population is also the source population to provide black-faced impala to other suitable areas in Namibia.
Equus zebra hartmannae	Hartmann's zebra	Species is virtually restricted to Namibia
Pternistis hartlaubi	Hartlaub's Francolin	Endemic

Eupodotis rueppellii	Rüppell's Korhaan	Endemic
Poicephalus rueppellii	Rüppell's Parrot	CITES
Tockus monteiri	Monteiro's Hornbill	Endemic
Parus carpi	Carp's Black Tit	Endemic
Turdoides gymnogenys	Barecheeked Babbler	Endemic
Achaetops pycnopygius	Rockrunner	Endemic
Lanioturdus torquatus	Whitetailed Shrike	Endemic
Ciconia nigra	White stork	Red Data
Ephippiorhychus senegalensis	Saddlebilled stork	Red Data
Leptoptilos crumeniferus	Marabou stork	Red Data
Phoenicopterus ruber	Greater flamingo	Red Data
Phoenicopterus minor	Lesser flamingo	Red Data
Gyps coprotheres	Cape vulture	Red Data
Gyps africanus	White backed vulture	Red Data
Polemaetus bellicosus	Martial eagle	Red Data
Terathopius ecaudatus	Bateleur	Red Data
Falco peregrinus	Peregrine falcon	Red Data
Falco chicquera	Rednecked falcon	Red Data
Ardeotis kori	Kori bustard	Red Data
Neotis ludwigii	Ludwig's bustard	Red Data
Charadrius pallidus	Chestnutbanded plover	Red Data
Agapornis roseicollis	Rosyfaced lovebird	Red Data
Tyto capensis	Grass owl	Red Data
Apus bradfieldi	Bradfields swift	Red Data
Alectra pseudobarleriae		Red Data, Endemic
Aloe dinteri		Red Data, CITIES Category 2, Nature Conservation Legislation, Endemic
Aloe littoralis	Mopane aloe	CITIES Category 2, Nature Conservation Legislation
Aloe zebrina		CITIES Category 2, Nature Conservation Legislation
Ceropegia multiflora		CITIES Category 2, Nature Conservation Legislation
Dombeya rotundifolia	Wild pear	Red Data, Endemic.
Elephantorrhiza suffriticosa	Skew-leaved sumach bean	Red Data
Euphorbia guuerichiana	Western woody euphorbia	CITIES Category 2
Euphorbia gummifera		CITIES Category 2
Euphorbia matabelensis (ex currorii)	Three forked euphorbia	CITIES Category 2
Euphorbia monteroi		Red Data, CITIES Category 2, Endemic
Euphorbia venenata		Red Data, CITIES Category 2, Endemic
Euphorbia sub spec monteroi		CITIES Category 2
Kirkia dewinteri	Kaoko syringa	Red Data, Endemic

Moringa ovalifolia	African moringo	Nature Conservation Legislation. Also the specific population which occurs on the open plains.
Pachypodium lealii	Bottelboom	CITIES Category 2, Nature Conservation Legislation
Geigera odontoptera		Endemic
Harpagophytum procumbens	Devils claw	Nature Conservation Legislation
Justicia platysepala		Endemic
Kirkia acuminata	White syringa	Forestry Legislation
Kirkia dewinteri	Kaoko syringa	Red Data, Endemic
Kohautia azura		Endemic
Lonchocarpus nelsii	Kalahari apple leaf	Forestry Legislation
Lontonis stipulosa		Endemic
Manuleopsis dinteri		Endemic
Maerua schinzii	Ringwood tree	Forestry Legislation
Monechma tonsum		Endemic
Moringa ovalifolia	African moringo	Nature Conservation Legislation. Also the specific population which occurs on the open plains.
Ochna pulchra	Peeling bark ochna	Forestry Legislation
Ornithoglossum calcicolum		Endemic
Ozaroa crassinerva	Namibian resin tree	Forestry Legislation
Pachypodium lealii	Bottelboom	CITIES Category 2, Nature Conservation Legislation
Peltophorum africanum	Weeping wattle	Forestry Legislation
Petalidium luteo- album		Endemic
Petalidium rautanenii		Endemic
Sclerocarya birrea	Maroela	Forestry Legislation
Solanum rigescentoides		Endemic
Spirostachys africana	Tamboeti	Forestry Legislation
Stercula africana	African star chestnut	Forestry Legislation
Stercula quinqueloba	Large leaf sterculia	Forestry Legislation
Stigmatorhynchus hereroensis		Endemic
Stipagrostis hochstetteriana		Endemic
Strychnos cocculoides	Corky bark monkey orange	Forestry Legislation
Sueda articulata		Endemic
Tamarix usnoides	Wild tamarisk	Forestry Legislation
Ptaeroxylon obliquum	Sneezewood	Rare in park, only about 10 trees known to occur here.
Habitat	**Characteristic**	**Motivation**
Pan		Its large size and unique

		characteristics, supporting flamingo breeding sites, pans are considered wetlands
Saline dwarf savanna		Almost entirely contained within the Park, endemic. A habitat with unusual characteristics and poorly conserved elsewhere in Namibia.

The following species are not classified as Important Species, however they do have other important characteristics which may need to be considered when making management decisions beyond those which would result from consideration of their legal status.

Name	Common Name	Motivation
Acacia erioloba	Camel thorn	Certain specimens are important landscape features
Barleria damarensis		**Endemic**
Barleria kaloxytona		**Endemic**
Barleria merxmuelleri		**Endemic**
Blepharis gigantea		**Endemic**
Ceraria longipedunculata		**Endemic**
Commiphora anacardiifolia	Large-leaf commiphora	**Endemic**
Commophora virgata		**Endemic**
Cyanella amboensis		**Endemic**
Eriocephalus dinteri		**Endemic**
Geigera odontoptera		**Endemic**
Harpagophytum procumbens	Devil's claw	**Nature Conservation Legislation**
Justicia platysepala		**Endemic**
Kohautia azura		**Endemic**
Lontonis stipulosa		**Endemic**
Manuleopsis dinteri		**Endemic**

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Monechma tonsum		**Endemic**
Ornithoglossum calcicolum		**Endemic**
Petalidium luteo- album		**Endemic**
Petalidium rautanenii		**Endemic**
Solanum rigescentoides		**Endemic**
Stigmatorhynchus hereroensis		**Endemic**
Stipagrostis hochstetteriana		**Endemic**
Sueda articulata		**Endemic**
Ptaeroxylon obliquum	Sneezewood	**Rare in Park, only about 10 trees known to occur**

17. Appendix 3 Pets and Domestic Stock Policy

Available on request

18. Appendix 4 Use Zonation

Draft, still to be finalised
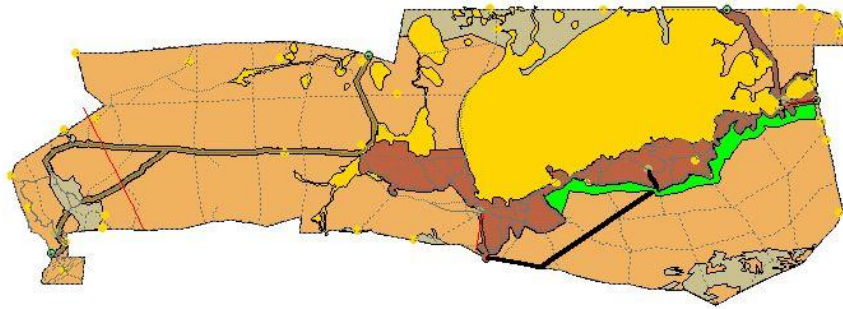
Enp roads.shp
 ⌇ Graded
 ⌇ Gravel
 ⌇ Tar
 ⌇ Track
Powerlines.shp
Admin.shp
 ● High
 ● Low
 ● Medium
 ⊙ Gates.shp
Enp_zones.shp
 Open access
 Pans - no access
 Realignment zones
 Restricted guided access
 Restricted guided pedestrian
 Restricted self drive

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19. Appendix 5 Recorded incidences of poaching and species involved

Species	**Period**				
	1975-79	1980-84	1985-89	1990-94	1995-98
Black rhino	0	12	30	3	2
Black-faced impala	1	0	0	1	0
Burchell's zebra	1	0	8	1	0
Eland	13	0	0	0	2
Elephant	0	1	3	2	0
Gemsbok	6	6	10	0	2
Giraffe	1	1	6	3	0
Hartmann's zebra	1	0	0	0	0
Kudu	5	0	0	0	0
Leopard	0	0	0	0	1
Lion	1	0	0	0	1
Ostrich	0	0	1	0	1
Spotted hyaena	0	0	0	1	0
Springbok	8	5	7	1	0
Warthog	0	0	1	0	1
Wildebeest	0	0	3	3	0
	37	25	69	15	10