



Republic of Namibia
Ministry of Environment and Tourism

Management Plan
Khaudum National Park

2013/2014 to 2017/2018

Foreword

National parks are a vital tool for conserving Namibia's essential biodiversity. By managing parks, their irreplaceable assets and unlimited potential will be conserved for future generations. In addition, every year Namibia's National Parks draw large numbers of tourists to Namibia, generating employment and stimulating development nationwide. National Parks also provide a unique opportunity to benefit local communities through rural development while providing research, education and recreation opportunities.

Wilderness is the Khaudum National Park's comparative advantage. The park, situated in north eastern Namibia bordering Botswana, has less than 3000 visitors annually and there are few tracks through the deep Kalahari sand. More elephants than people frequent the park. It is a refuge for African wild dog and roan antelope. Lion, cheetah and leopard are also found in the park.

This management plan sets out the objectives and guidelines for the management and development of the Khaudum National Park. As such, it represents the policies and intentions of the Ministry of Environment and Tourism (MET) on how the park should be managed.

Park neighbours, traditional authorities, line Ministries, Regional Councils, conservancies, private sector, tourists, contractors, organisations, institutions, parastatals, researchers, professional hunters, and any entity or individual dealing with the park, in any way, must ensure that any actions and decisions relating to this park are in accordance with the park management plan. In addition, specific rules and regulations in accordance with the applicable legislation will apply.

Shorter-term operational plans or work plans will also be developed in accordance with the activities provided in the park management plan. These will identify specific or annual prioritised actions, which need to be performed to address the priorities specified in the park management plan.

The park management plan must be viewed as valuable and central document by all management and policy level staff involved with a specific park. They should be familiar with its contents, and should make use of it to familiarise new staff with the aims, objectives, management principles and strategies for the park.

It is every staff member's (involved with Khaudum National Park) responsibility to ensure that the park management plan is implemented accordingly.

Uahekua Herunga, MP
MINISTER

Preface

In a briefing paper presented to the Namibian Cabinet in 1999, the North East Parks were identified as development engines for the region, due to their natural assets and the resulting tourism potential. While this management plan applies specifically to Khaudum National Park, it takes particular account of the Park's position within a wide, regional network of conservation areas: conservancies, community forests and conservation zones in neighbouring countries.

The management plan for Khaudum National Park was derived from several workshops involving the management of the MET, local communities and other stakeholders. The plan has been designed and structured to be priority focused and action oriented, to facilitate implementation and the achievement of outputs and outcomes.

It gives a brief background to the Park, including its purpose and objectives, and placing it in a regional setting, before focusing on park management aspects. Chapter 2 focuses on the management of natural resources in the Park while Chapter 3 addresses aspects of regional conservation, park neighbours and resident relations. The zonation of the Park is detailed in Chapter 4. The management of prospecting and mining, and tourism development are covered in Chapters 5 and 6, respectively. Detailed management considerations for infrastructure are included in Chapter 7, while the last chapter covers aspects of administration and management.

The plan is designed around a uniform structure for easy reference and use and should be used in conjunction with park legislation and regulation. The plan therefore articulates, at the strategic level, the 'What' must be done; with a brief description of the 'Why' these actions must be implemented to attain the specified objectives. It is imperative to operationalize these actions in a clear and detailed annual work plan.

The Ministry of Environment and Tourism would like to thank all its staff members, partners and stakeholders who participated in developing this management plan, specifically the Caprivi Parks Consultants, a partnership of Namibian firms appointed to help implement the Bwabwata Mudumu Mamili Parks Project which is co-funded by the Government of the Republic of Namibia and the German Government through KfW, who facilitated the compilation of the plan.

Simeon N. Negumbo
Permanent Secretary

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Abbreviations and Acronyms

| | |
|-----------|--|
| BMN | Bwabwata, Mudumu and Nkasa Rupara National Parks |
| CBPP | Contagious Bovine Pleuropneumonia |
| DNRM | Directorate of Natural Resource Management |
| EIA | Environmental Impact Assessment |
| EMP | Environmental Management Plan |
| EPL | Exclusive Prospecting Licence |
| HWC | Human-wildlife conflict |
| IBMS | Incident Book Monitoring System |
| IUCN | International Union for the Conservation of Nature |
| KAZA TFCA | Kavango Zambezi Transfrontier Conservation Area |
| MET | Ministry of Environment and Tourism |
| NBRI | National Botanical Research Institute |
| NGO | Non-government Organisation |
| SSCFU | Small-scale commercial farming units |
| TB | Pulmonary tuberculosis |

Chapter 1

Introduction

Located in the Kavango Region, Khaudum National Park occupies some 385,000 ha of Kalahari Sandveld in the north-eastern part of Namibia.

As elaborated below, the reserve protects northern Kalahari Sandveld and provides refuge for threatened species such as roan, tsessebe, African wild dog as well as other species, including elephant.



Map 1: Khaudum National Park is located in the Kavango Region and is one of the North-East Parks.

1.1 Overview of Khaudum National Park

Khaudum National Park is bordered by Botswana to the east, where a double electrified game fence provides a barrier to free and large scale animal movement, although periodic breaks and subsequent movements of species such as elephant do occur. The purpose of these fences is to control the movement of cattle and people, and thus curtail the spread of diseases such as Foot-and-Mouth Disease and Contagious Bovine Pleuropneumonia (CBPP or 'lung sickness'). There are no indications of livestock presence within the Park. The presence of the poisonous plant *Dichapetalum cymosum*, which is prevalent on the dystrophic (nutrient poor) northern sandy soils of the *Burkea africana-Eragrostis pallens* veld, is a major deterrent to cattle.



Map 2: Khaudum National Park covers 385,000 ha and shares its eastern border with Botswana.

Conservancies to the north (George Mukoya and Muduva Nyangana), and south (Nyae Nyae and N#a-jaqna) are not fenced, and there is evidence of seasonal movement of elephant in particular, from Nyae Nyae into Khaudum during the wet season, and back to Nyae Nyae during the dry season. This emphasizes the importance of Khaudum National Park as a core conservation area from where animals may populate the neighbouring conservancies, thereby contributing to their economic success.

Historically, movement of wildlife out of the Park, from east to west along omiramba during the wet season, is reported. The establishment of small-scale farms along the western boundary will of course impact on these movements and potentially increase human-wildlife conflict.

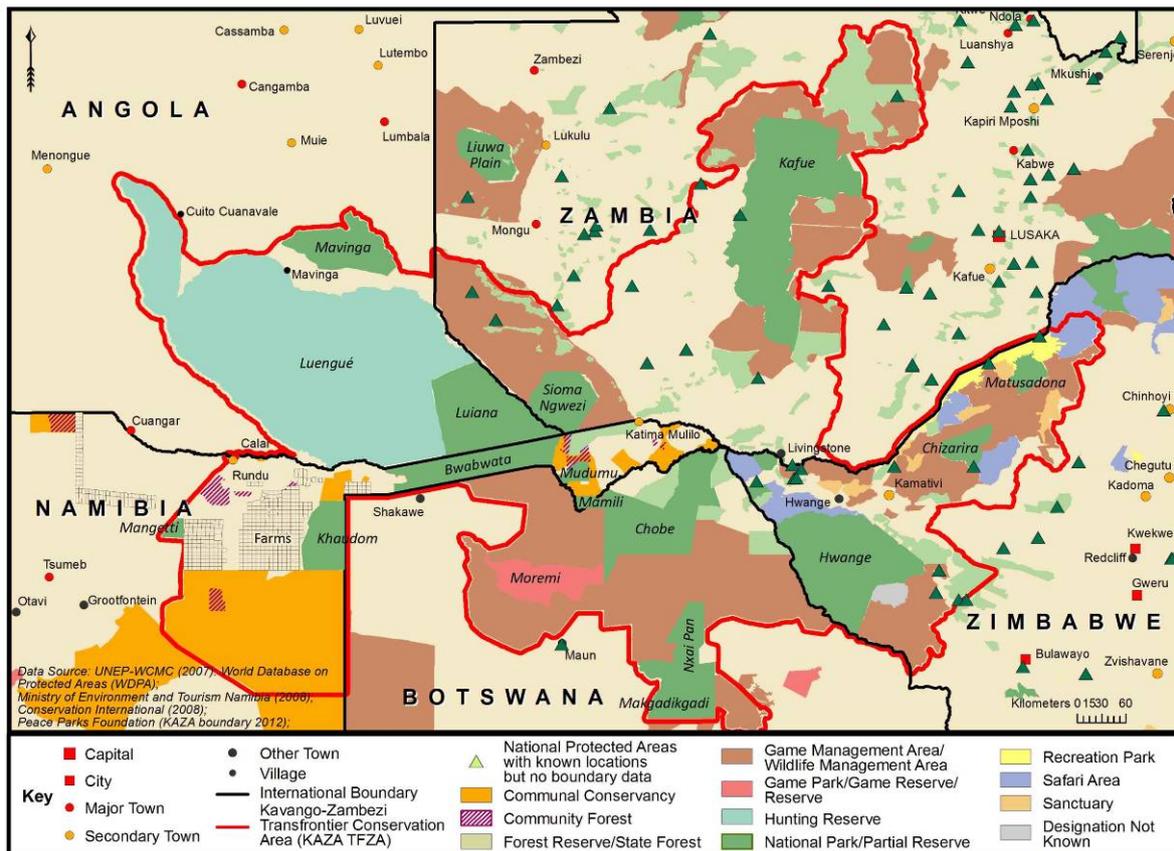
Khaudum is one of the few refuges in which rare and endangered species such as roan antelope, tsessebe and African wild dog can roam freely, underlining the Park's important conservation status. In addition, Khaudum is the only Park in Namibia that protects large expanses of the Northern Kalahari Sandveld forest and woodland biome, and one of the few areas where species such as oryx and roan overlap.

In the northern section of Khaudum, deep sandy dystrophic soils predominate, with broadleaf savanna woodland interspersed with omiramba. To the south, soils on quartzite with calcrete predominate, giving rise to a relatively more mixed *Acacia*-broadleaf vegetation, interspersed with 'fingers' of teak woodland (*Baieka plurijuga*) on deeper sands.

An agreement between the Administration for Kavango and the Department of Agriculture and Nature Conservation to proclaim Mahango, Khaudum and Popa Falls as State protected areas was signed in December 1982. Khaudum was eventually proclaimed as a game reserve in 1989. Following independence, the Ministry of Environment and Tourism (MET) immediately initiated a socio-ecological survey that included the North-East Parks and surrounding areas. One outcome of the survey led to the introduction of legislation in 1996 to allow residents on communal land to form conservancies, thus allowing them the same rights over wildlife and tourism as people owning private land. At the time of writing, there are three conservancies registered that directly border Khaudum National Park: George Mukoya and Muduva Nyangana to the north and Nyae Nyae to the south. All three conservancies are also in the process of being gazetted as community forests.

In 1998, also following recommendations of the socio-ecological survey, a vision for the North-East Parks was developed. This document created a joint vision among stakeholders for conservation, tourism development, equity and the creation of partnerships. Cabinet approved this vision in 1999. It was further decided that neighbouring communities or those living in Bwabwata, Nkasa Rupara, Mudumu and Khaudum were to be given conditional tourism rights in these parks; and the Khaudum Game Park was renamed as Khaudum National Park.

North-East Parks are also important corridors for animal movement within the greater region in Namibia and surrounding countries. It is in this context that the North-East Parks are the geographic heart of the Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA). This massive area includes numerous proclaimed national parks, game reserves, community conservation areas, forest reserves, and iconic tourism destinations such as the Victoria Falls and the Okavango Delta. The KAZA TFCA aims to broaden the protected areas network, thus increasing biodiversity, expanding historical game migration and seasonal dispersal routes and drawing more tourists to the area. In a place where local people often bear the costs of living with wildlife, KAZA TFCA aims to make the protection of wildlife and wild places more economically attractive to rural communities. Khaudum National Park forms part of a western corridor, linking the Okavango Delta through northern links with Bwabwata National Park (Mahango Core Area), and to the south east, through the south-eastern corner and adjacent Nyae Nyae conservancy.



Map 3: The Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA), a five-country initiative involving Angola, Botswana, Namibia, Zambia and Zimbabwe, encompassing an area of about 44,000,000 ha.

1.2 Purpose

This management plan describes the objectives, principles and strategies for the management of Khaudum National Park so that all interventions can be planned, focussed and co-ordinated according to agreed principles.

As an official document issued by the MET, the management plan is secondly a statement of commitment that binds its staff to manage Khaudum National Park according to provisions of the plan. Senior public servants of the MET are ultimately accountable for implementation of the plan. Timelines for activities are included and it is incumbent on MET management to agree on responsibilities for ensuring that approved activities are timely addressed.

Thirdly, the plan obliges the wide variety of people and organisations (private sector contractors, public service agencies, neighbours, tourists, etc) associated with Khaudum National Park to ensure that their activities are congruent with provisions of the plan.

Finally, implementation of the principles provided in this plan will reduce the need for reactive, unplanned responses to unexpected events. Indeed, the management plan should provide guidance over the next five years, and may only be changed with the approval of senior management in the MET. In line with MET's management plan guidelines, this plan should be reviewed every five years, and amended as objectives are met and new activities identified.

1.3 Objectives

1. **To protect and maintain biodiversity** - this captures all the management strategies directly related to the MET's first core function of protecting and maintaining biodiversity. This specifically includes the protection of indigenous species, red data species, diversity of habitats and natural ecological processes, law enforcement, monitoring and research as well as rehabilitation of human-degraded habitats.
2. **To maximise regional economic development, based on the principle of sustainable utilisation** - this captures all the management strategies directly related to the MET's second core function of maximising the sustainable economic benefit from biodiversity. This includes all aspects of tourism management and direct consumptive use of resources by local people. The aim is to support the MET's strategic theme of rural development by utilising the basic resource of biodiversity.
3. **To develop, implement and maintain effective and efficient systems, infrastructure and equipment that can support core functions** - this captures all management strategies related to the non-human resources that the Park Warden can use in his management activities (infrastructure, equipment and the management system itself), as well as an outreach programme.
4. **To develop, implement and maintain an efficient and sensitive human resources management programme** - this captures all management strategies related to the Park's human resources. This is the main theme through which health, education and gender issues can be mainstreamed into park activities.
5. **To develop, implement and maintain regional conservation synergy through effective interaction with all park neighbours** - this captures all management strategies related to liaison with park neighbours, including local communities, conservancies, other ministries, regional development planning institutions (government and non-governmental organisations) and processes, regional and local business and neighbouring countries (in particular Botswana). The latter is specifically included with reference to the KAZA TFCA initiative.
6. **To develop, implement and maintain an efficient and functioning management system** - this captures all management strategies related to the design, review, revision and implementation of the Park's operational plans (annual work plan, monthly work plans, development plans, and financial planning systems). It also includes the monitoring of effectiveness of planning systems, in terms of both the biodiversity resource and the achievement of annual targets.

Chapter 2

Management of natural resources

Khaudum National Park is relatively flat to slightly undulating in parts, and crossed in an east-west direction by two major omiramba – the Khaudum/Cwiba Omuramba in the north and the Nhoma Omuramba in the south. There are numerous smaller omiramba and pans scattered throughout the Park. Few if any hold water through the dry season unless artificially supplemented. There are 14 boreholes in the Park (refer to Map 2).

The Park is broadly divisible into two major vegetation zones based on the underlying soils and geology. The north is largely composed of *Burkea africana-Eragrostis pallens* savanna woodlands of variable density on deep Kalahari sand, while the south is predominantly shrubland on soils derived from the Nosib group quartzites with calcrete. The dunes have been degraded over geological time in some areas and are only recognisable from the vegetation.

Temporary wetland development over deep Kalahari sands is usually limited to interdune areas where drainage is impeded by clays or calcretes. These wetlands are often localised and small, within depressions and omirambi. There are peat fires in the Khaudum/Cwiba Omuramba, which have apparently been burning for decades.

2.1 Habitats and special sites

Vegetation within the Park will be managed to achieve the overall objective of maintaining, as far as is practicable, viable ecosystems that form part of the larger Kalahari Sandveld woodland system. Essential ecological processes, such as fire, will be managed to obtain the best outcomes for biodiversity in general. Sensitivity, scarcity and threats are not static, and can be expected to change as different pressures or forces are brought to bear on the Park and its surrounding areas.

Objective

To actively maintain all habitats in the Park, with special emphasis on omiramba and surrounds, and to minimise the negative impact of fire on woodlands and optimise its use as a management tool.

Strategies and Principles

Three categories – of high, medium and lesser significance – are recognised for park habitats. A habitat's significance may be adjusted as conditions change, and additional habitats may be added. Khaudum does not contain rivers, swamps or extensive floodplains. The omiramba and associated grasslands, the seeps and seasonal pans are critical areas within the Khaudum context, especially for roan and tsessebe. The deciduous woodlands similarly provide grazing and grazing reserves, as well as corridors for movement between the preferred omiramba grasslands. Therefore two categories have been identified in Khaudum National Park, these habitats and their status are (also see Chapter 4):

Very important: All omiramba and immediate surrounds, seasonal pans and natural seeps.

Important: Deciduous woodlands, including *Burkea africana* savanna, *Baikea plurijuga* savanna, *Terminalia sericea* woodland, *Acacia spp* thickets and shrublands.

In addition, cultural, historical or archaeological sites, such as Tsoanafontein, require appropriate protection and conservation.

Tools to manage habitats include the use of fire, adjusting wildlife numbers and species ratios, changing the distribution and temporal management of man-made water points, protecting specific high-value areas against damage by elephants, and rehabilitating degraded areas.

Activities

- a) Key habitats, special sites and invasive alien species should be clearly identified and mapped, and management guidelines developed for each (year 1, ongoing until completed).
- b) The status and threats to habitats and special sites must be reviewed every five years and new management strategies developed to counter any significant threats. Should this be necessary, this plan must be systematically revised to reflect changes.
- c) Threats posed by aliens must continually be assessed and addressed (year 1 and then annually).
- d) An active, adaptive fire management programme (see below) must be used to achieve specific stated habitat objectives (e.g. to maintain suitable habitat, including dry season 'green bite', for rare species like roan and tsessebe) (year 1 and then ongoing according to the fire management strategy).

2.2 Fire

Fire has, and will continue to play an important role within the Park. Fire is deemed crucial as a management tool to achieve other objectives. These include the reduction of fuel loads to minimise destructive run-away wildfires as well as the crucial provision of dry season 'green bite', in the proximity of available water, for species such as roan and tsessebe.

Objective

To pro-actively use fire as a management tool to maintain habitats in the Park, including those for important species such as roan and tsessebe; as well as to reduce risks of runaway destructive wildfires.

Strategies and Principles

- a) An adaptive fire management strategy, which harmonises with the Integrated Fire Management Strategy for Protected Areas, must be developed. Since different habitats may require different fire regimes, this should include:
 - the spatial designation of the habitats on maps;
 - the purpose of fire management for each area;
 - an outline of the specified fire regime, which should include burning frequency, the percentage of area to be burnt in a season or burning cycle, the type of burn, and the season of burn.

- b) The fire management strategy will guide the development of a three-year burning plan. The plan must be revised late in the wet season of each year to take into account:
- the extent and severity of the previous seasons' fires;
 - the current standing biomass (fuel loads) in different areas of the Park;
 - the need to protect life and property;
 - the availability of forage and refuge for wildlife, especially for 'Important Species'; tourism requirements and logistical considerations.
- c) Management should strive to prevent the occurrence of extensive wildfires that burn more than 35% of a contiguous area in a season (with this target being regularly reviewed in the context of fire monitoring data). Appropriate pro-active fire management strategies must be developed to reduce extensive burns. The strategies are to:
- take account of past woodland losses due to killing of mature trees and lack of recruitment and regeneration, and address these in the future;
 - institute preventive measures such as fire breaks near the Park boundaries and to protect property;
 - ensure the reduction of fuel loads to minimise the severity of fires;
 - use early burning as a strategy to reduce the danger of late season hot wildfires;
 - take note of the impact of fires on tourism;
- d) Proactive fire management must be used to protect infrastructure.
- e) Park staff will work, as far as possible, with neighbours (communities, other departments and institutions, other countries) to manage burning with specific reference to the Park's position in the proposed KAZA TFCA.
- f) Fires will only be controlled or suppressed under the following conditions:
- when they pose a threat to life or property;
 - once the specific goals of set fires have been met;
 - if they are likely to burn excessive areas or threaten the survival of certain species and/or habitats.

Activities

- a) Develop a fire management strategy that addresses the specific requirements of each habitat or sub-habitat in year one.
- b) Develop a three-year burning plan in year one which will be revised at the end of each summer growing season, based on the results of the previous season's fire patterns, and on monitoring data.
- c) Establish a burning 'team' to evaluate past burns and future possible burning areas every year.
- d) Continually improve the knowledge and understanding of fire in these ecosystems every year.

- e) In collaboration with the Bwabwata Ecological Institute, make use of remote sensing data, as well as field surveys, to detect and map fires in year one and regularly at a period advised by the responsible MET officer.
- f) Establish fire emergency procedures in year one.
- g) Establish forums with local communities and other agencies to manage burning in year one.

2.3 Rehabilitation

Human activities have left a currently negative, albeit localised, impact on parts of Khaudum National Park, requiring appropriate rehabilitation. These include degraded moats around some borehole/pump structures, as well as decrepit tourism and management structures at Khaudum and Sikeretti camps and administrative centres. Some hides at waterholes are also rundown, aesthetically unattractive and need either demolition or rehabilitation after a thorough assessment of their usefulness or otherwise.

Objective

To rehabilitate degradation caused by humans especially where it impacts on ecosystem functions and processes as well as aesthetic considerations, and where rehabilitation is practicable and appropriate.

Strategies and Principles

The visual or other impacts of degraded areas must be assessed against the costs and benefits of rehabilitation.

Activities

- a) Identify areas where degraded, rundown or unnecessary structures occur, including hides, moats protecting boreholes and old tourism and staff structures every year.
- b) Make use of old structures or material for building and/or recycling where practical, cost-effective and feasible in years two and three.
- c) Explore the possibility of allowing tourism operators to rehabilitate areas allocated to them within concessions (once concessions are awarded).

2.4 Wildlife population management and introductions

Appropriate and strategic management of wildlife is required for a number of reasons. First, several animal species in Khaudum National Park have been identified as priorities for management within Namibia. Second, some species of large mammals have become uncommon or rare in the Park. Third, the North-East Parks, including Khaudum, form part of important corridors for animal movement across the greater region of Namibia and surrounding countries. Fourth, there is a need to increase wildlife numbers to develop the tourism potential of Khaudum. Finally, some species cause human-wildlife conflicts, which increase tensions between neighbours and the MET.

A variety of interventions may be employed to manage wildlife. These include the provision and innovative management of artificial water sources; creation of wildlife

corridors and grazing areas around the Park that can act as buffer zones; monitoring of populations; patrolling; fencing; park zonation; and control of livestock and wildlife/livestock diseases.

Objectives

To sustainably manage, and reintroduce where necessary, the full complement of species that occurred recently, with special emphasis on priority species (listed in Appendix 3).

Strategies and Principles

- a) Identify (through appropriate research), remove or minimise factors that lead to local species extinctions or significant declines in their numbers.
- b) Where practical, manage wildlife populations to:
 - maintain the ecological integrity and sense of place of Khaudum National Park;
 - develop and maintain tourism attractions of high quality;
 - support management practises that improve habitat for fauna both inside and outside the Park, particularly the conservancies to north and south;
 - reduce or eliminate the impacts of alien species, with an emphasis on species that pose an immediate and high threat, such as domestic cats that may cross-breed with wild species.
- c) Manage key species, which have been prioritised by the MET (such as elephant, roan, tsessebe, wild dogs) to achieve conservation targets for those species.
- d) Ensure that only appropriate species, and no ‘genetically exotic species’¹, are introduced and that re-introductions are cost-effective.
- e) Permit the migration and inter-seasonal movement of fauna where possible, and investigate anthropogenic factors that may limit movements (such as inappropriate land-use practices on the Park boundaries), with a view to existing with them.
- f) Ensure that introductions inside the Park and into neighbouring conservancies are harmonised.
- g) All introductions are to be approved in advance by MET.

Activities

- a) Implement and maintain the Incident Book Monitoring System (IBMS) to monitor populations of key species each year.
- b) Investigate, and if necessary develop strategies to meet population performance targets for important species which are threatened or rare in year two and three.
- c) Update (if necessary) in collaboration with the Directorate of Natural Resource Management and implement existing species management plans (e.g. elephant, roan/ tsessebe) in each year.

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¹ Only animals of the same genetic origin as those already present in and around Khaudum National Park.

- d) Develop effective anti-poaching programmes to eliminate or reduce the impact of poaching, as a major potential threat to the economic value of the Park and surrounding areas in year one.
- e) Take the following steps before species are re-introduced or populations bolstered through introductions:
 - explore what management actions may be taken to create conditions for the species to increase or re-populate the areas;
 - undertake appropriate research to understand why populations are low or locally extinct, and to determine whether causal factors can be eliminated;
 - develop re-introduction plans to ensure that pre-release and post-release management strategies and resources are in place (prior to any introductions).

2.5 Artificial water points and management

The provision and management of artificial water is a complex matter, particularly in an area that is devoid of surface water for much of the year, but hosts certain animal species, which have adapted to these conditions. While the provision of artificial water points may increase populations of these species, it may affect other species adversely. These impacts are often poorly understood and any intervention to supply water must therefore always be carefully considered.

Objectives

To maintain existing water points in good working condition, and accessible to all species. Additional artificial water points for wildlife within the Park are discouraged. However, subject to risk analysis, water may be strategically located (a) to increase the numbers of vulnerable, rare or threatened species, or (b) for economic reasons, such as tourism in the Park and hunting in neighbouring conservancies, provided this does not adversely impact on priority habitats or important species.

Strategies and Principles

- a) To maintain all artificial water installations in good working order throughout the year, with special emphasis on the hot dry periods.
- b) The provision of any additional artificial water points must demonstrably contribute to one or more of the goals of the above objective. The goal(s) must always be clearly stated.
- c) The effects of water points must be reviewed regularly in the light of objectives.
- d) Total benefits (environmental and economic) must outweigh the likely management and environmental costs.
- e) In natural ecosystems water may be a highly variable resource; provision of artificial water should thus, as far as possible, mimic natural variability over time and space.
- f) For the placement of artificial water points, the following should be considered:
 - the preferable location of water points near existing natural pans and omiramba to supplement ephemeral supplies, bearing in mind where

adequate groundwater supplies occur (see Artificial Water Point Assessment in Appendix 5);

- the possible location of water points in conservancies to encourage dispersal to these areas where wildlife can contribute to sustainable uses such as trophy hunting.
- g) Where artificial water points are used for tourism, conservation objectives will remain as the highest priority; as a result such water points may be decommissioned or left dry to promote conservation or if serious negative environmental impacts occur.

Activities

- a) Conduct risk analyses for any proposed new artificial water points as needed.
- b) Evaluate access to current water points for all wildlife species, and if necessary, design and implement suitable waterhole structures for different wildlife species in year two and three.
- c) Establish a baseline monitoring system to assess negative impacts on vegetation and key animal species; particular attention must be paid to roan, and tsessebe and other priority species in year one and annually thereafter.
- d) Develop and maintain a register of all borehole data (such as depth, delivery, infrastructure specifications) in year one and annually thereafter.
- e) Develop a water-point monitoring system for the availability of water for all artificial water points in year one.
- f) Investigate the possible value of developing a water-point rotation strategy to encourage wildlife movement in year two and three.
- g) Liaise with other ministries to ensure any water provision in the area does not conflict with objectives of this management plan (ongoing).

2.6 Domestic animal management

While domestic animals are important resources for some neighbouring communities, animals must be managed to contain associated risks. For example, contact with certain wildlife species can result in the spread of disease and human-wildlife conflict, and habitats may be degraded by concentrated grazing and browsing of livestock entering the Park.

Objective

To ensure exclusion of domestic animals, which pose or are exposed to animal health and other risks.

Strategies and Principles

- a) Management of domestic animals will be done collaboratively between MET, local neighbours (conservancies and community forests) and other ministries and agencies (such as Ministry of Lands and Resettlement, Ministry of Agriculture Water & Forestry and NGOs).

Activities

- a) In collaboration with relevant stakeholders, develop and enforce a livestock management strategy aimed at reducing human-wildlife conflict, preventing the spread of disease, and domestic animals from straying into the Park in year two then ongoing.
- b) Implement the National Policy on Human-Wildlife Conflict Management and ensure that neighbouring communities are aware of the requirements of the policy (ongoing).
- c) On an ongoing basis, assess the need, desirability and impacts of a western boundary fence as livestock numbers increase on the small scale farms on the western boundary in year one and annually.

2.7 Fencing

Khaudum National Park is an important link for wildlife movement between Namibia, northern Botswana and southern Angola. However fences and increased human settlement have reduced this function, but the Park still provides a 'sink' for animals, especially elephants, moving from Botswana and dispersing further westward along omiramba.

While fences can disrupt wildlife movements, they may contribute to effective management if the barriers are properly located, designed, erected and maintained. Fences may therefore be provided in strategic locations to achieve specific goals, but always with due regard to animal movement.

Objective

Fencing is to be discouraged but may be strategically used to (a) significantly reduce livestock and/or wildlife diseases, (b) reduce human-wildlife conflict, (c) demarcate national borders, and (d) increase cross-border disease control.

Strategies and Principles

- a) The objectives of each fence must always be clearly stated, and feasibility studies undertaken to ensure that the aim will be achieved.
- b) Environmental assessments including risk analysis must be undertaken for any new fencing projects.
- c) Planning and implementation of any new fences or fence upgrades should always be done in consultation with the relevant stakeholders.

Activities

- a) In co-ordination with the Directorate of Veterinary Services and Directorate of Natural Resource Management, contribute to disease control and other livestock/wildlife interactions (ongoing).
- b) MET should map and maintain a register of all fences around the Park. Registers should include the type of fence, reason for establishment, condition and any impacts in year two and three.

2.8 Human wildlife conflict management

The unrestricted movement of wildlife between the Park and surrounding areas leads to serious conflicts between humans and wildlife (HWC).

The small scale commercial farming units (SSCFUs) on the western boundary are likely to result in increased incidences of HWC, as domestic stock and water points provide attraction for predators and elephants in particular. In addition to damage suffered by people, conflicts pose a significant threat to the viability of conservation in and around the Park. Ways of mitigating the impacts of conflicts therefore need to be found and managed.

Objective

To actively engage with communities and other relevant stakeholders to ensure there are effective and responsive mechanisms in place to minimise conflicts.

Strategies and Principles

- a) Manage HWC in line with the National Policy on Human Wildlife Conflict Management (2009).
- b) Due to the mobility of wildlife, HWC should be managed at a local level and collaboratively between park managers, conservancies, and other relevant stakeholders.
- c) Within the parameters allowed by legislation, greater decision-making authority should be given to local MET officials to manage problem animals.
- d) In line with national policy on HWC management, plans and operating protocols should be developed collaboratively with neighbours.

Activities

- a) In line with the National Policy on Human Wildlife Conflict Management (2009), develop and refine HWC management plans and procedures in collaboration with local communities, and ensure these are widely communicated to community members and relevant staff within MET in year two.
- b) Investigate the possibility of creating a buffer zone between the Park and its neighbours and engage relevant stakeholders and authorities in this regard in year one and two.

2.9 Diseases and parasites

Many diseases and parasites are a threat to people and the economy of the region. Some, such as malaria, are detrimental to humans while others are exclusively animal diseases. Management of these diseases and their control have wide ramifications, including environmental impacts.

Objective

To work with other relevant public service agencies to find solutions to the management and control of notifiable and contagious human, livestock and wildlife diseases.

Strategies and Principles

- a) Wildlife introduced from other areas should not be infected with exotic diseases such as TB or with diseases that are already endemic to the area.
- b) National veterinary acts and regulations should be adhered to.
- c) Fences may only be used to control the risk of diseases when this is absolutely essential and following environmental assessment and feasibility studies.

Activities

- a) Work with other government agencies and local institutions such as conservancies to find environmentally acceptable solutions to the control of human, livestock and wildlife diseases and ensure that appropriate technologies and methods are applied (ongoing).

2.10 Alien species

Alien species are species that were introduced since historical times by humans into habitats far outside their native range. These species have the potential to cause significant ecological damage, often out-competing native species or changing the environment to such an extent that entire indigenous ecosystems may become threatened. Not all alien species are invasive, however, the chances of an invasive species being introduced increases rapidly with the number of alien introductions. It is therefore widely accepted that alien species should be controlled, or better still, removed from areas where biodiversity conservation is the main objective.

Although Khaudum National Park is relatively free of alien species, continuous vigilance is required to maintain this status.

Objective

To identify and control invasive species.

Strategies and Principles

- a) Staff must be vigilant and report any occurrences of alien species immediately.
- b) Alien species control must be planned and implemented in a systematic manner with clear targets, and the results must be monitored regularly.

Activities

- a) Clearly identify and map incidences of invasive alien species, and develop management guidelines for each in year one and annually.
- b) Manage and where practical eradicate invasive alien species (ongoing).
- c) Continually assess and address threats posed by all alien species (ongoing).

2.11 Law enforcement and crime prevention

The illegal use of natural resources generally poses a threat to conservation and remains a major management issue for MET. As illegal activities are generally conducted in unsustainable ways, they further undermine the ability of the environment to support growing human populations and plant and animal life. Poaching of plants and animals, indiscriminate cutting down of trees and

unsustainable land uses are a few examples. In addition to these illegal activities, people may also enter the Park to intimidate, harm and rob tourists.

To ensure that the Park is able to offer a product of high quality to tourists, it is important to undertake law enforcement at the appropriate scale and apply a zero tolerance approach on the illegal use of resources and inappropriate use of the Park in general.

Objective

To control and limit the illegal use of wildlife and natural resources within Khaudum National Park and, through all efforts possible, to ensure the safety and security of tourists.

Strategies and Principles

- a) Develop a practical, harmonised approach to the implementation of law enforcement within the context of this management plan, relevant legislation and regulations, by working closely with law enforcement agencies and neighbouring communities.
- b) Plan, develop and implement an efficient and effective tourism management and access control system.
- c) Ensure security and anti-poaching patrols and surveillance are conducted for all natural resources (including harvesting and theft) in partnership with neighbouring communities, at regular but unpredictable intervals.
- d) Develop a system of rewards (financial or otherwise) for the reporting of illegal activities and let it be widely known in the area.
- e) Ensure that MET staff members are adequately trained in law enforcement to ensure that they operate within relevant policies and laws and to preserve and collect evidence so that arrests result in convictions.

Activities

- a) Develop a collaborative law enforcement working group with neighbouring conservancies and other relevant stakeholders in year one.
- b) Develop (with relevant partners) a practical plan for implementing law enforcement in the context of this management plan and relevant legislation. This plan will include but not be limited to patrolling (foot, vehicle), roadblocks, informer network, and communication with a particular focus on identified poaching problem areas in year one but reviewed annually.
- c) Regularly review and inspect poaching problem areas (ongoing).
- d) Develop (with relevant partners) an effective tourism management and access control system with particular attention to holiday seasons in year one but reviewed annually.
- e) Develop good relations with all tourism operators and, with their help, develop a systematic reporting process whereby they can report any illegal activities that they observe during their normal activities (ongoing).
- f) Disseminate information on law enforcement approaches and reward schemes (ongoing).
- g) Carry out regular patrols to ensure a high level of presence and visibility (ongoing).

2.12 Environmental impact assessment and management

Activities associated with both conservation management and tourism may degrade or change vegetation, disturb or alter animal populations, destroy archaeological artefacts and sites, and affect cultural habits and social systems. The assessment and subsequent management of these potential impacts are key principles in ensuring that the utilisation of Park resources is done sustainably.

Objective

To prevent and mitigate negative effects and enhance positive effects of conservation management and tourism activities on the environment, by conducting a due environmental impact assessment and management process.

Strategies and Principles

- a) Environmental Impact Assessments (EIAs) are to follow relevant legal and policy guidelines as provided by Namibia's Environmental Management Act of 2007.
- b) Some conservation management activities undertaken in the normal course of biodiversity protection are intended to affect habitats or populations of species. Such types of conservation management actions (e.g. burning regimes, elephant management and the provision of water) are not subject to a formal environmental assessment process, but decisions should always be taken within the framework of adaptive management and be fully informed of potential outcomes and risks.
- c) Guidelines provided for each zone in the Park are the key management tool to guide the environmental assessment and management process during planning and implementation of tourism activities and the development of any infrastructure to be used for Park management.
- d) Environmental management should always include a careful evaluation of potential impacts and of ways to prevent, avoid or mitigate these impacts to a point where the environmental cost is commensurate with the overall purpose of the Park as well as with any legal requirements.

Activities

- a) Ensure that zonation plans and guidelines are followed in the planning and implementation of all activities and developments (ongoing).
- b) Ensure Environmental Management Plans (EMPs) are prepared and included in the tourism concession agreements and work contracts (as concessions are identified and tenders requested).

2.13 Consumptive resource utilisation

It is widely agreed that while protected areas should serve the purpose of conservation, natural resources within those areas may be used on a sustainable basis for economic and social gain. In the case of Khaudum National Park, based on historic agreements, this applies to reed and thatching grass harvesting in particular. The consumptive use of these resources in the Park will therefore occur within the guidelines directly and indirectly stated in this management plan.

Objective

To facilitate and manage the sustainable use of reeds and thatching grass and any other resources that may be determined by MET from time to time.

Strategies and Principles

- a) All resource utilisation in the Park will be done in accordance with the National Policy on Utilisation of Game in Protected Areas and other State Land, and should be economically and ecologically sustainable.
- b) All plans for resource utilisation must be approved by MET.
- c) Park neighbours will be allowed to utilise natural resources within the Park in terms of written agreements with conservancies or community forests.
- d) All harvesting must be cost effective, and should take into account the full costs of managing the resource, including the costs of control, monitoring and effects on the environment.
- e) The Park may be used as a source of wildlife for introduction to other areas.
- f) While trophy hunting can provide important economic benefits, it may conflict with the priorities of the Park. In deciding on any possible future hunting zones and wildlife quotas for removal, the following need to be considered:
 - the purpose of the Park;
 - economic returns from trophy hunting compared to other uses;
 - the practicalities of implementing and controlling trophy hunting;
 - the implications of trophy hunting for other tourism operations or visitors; and
 - other potential negative impacts of trophy hunting activities, such as the increase in aggressiveness of elephants.

Activities

- a) Before any harvesting is undertaken, assess the resource to ensure that ecological objectives are not violated (prior to any harvesting).
- b) Establish procedures and protocols for how, where and when the harvesting will be conducted and managed (on a case-by case basis).

2.14 Research

Objective

To base Park management on pertinent available information and data to support an adaptive management approach and to create a research-friendly environment that encourages relevant and focussed research.

Strategies and Principles

- a) A coordinated approach to research will be created between park staff and other research agents, such as the MET Directorate responsible for research and the other relevant research bodies.
- b) A supportive environment will be created for national and visiting scientists, including the facilitation of research permits, with preferential support given to

applied research projects in support of priority Park information or management needs.

- c) A prioritised and open-ended list of key research topics will be developed for the Park and disseminated to appropriate research institutions.
- d) Research will be supported, primarily through collaboration, and will focus on the following:
 - regional game movements, paying particular attention to the appropriate ecological spatial scale and context;
 - predator-prey relations;
 - elephant impacts, including competition for space, water etc with other species;
 - improving management effectiveness, especially that which pertains to human-wildlife conflict, fire, community wildlife-and-tourism-related impacts;
 - the socio-economic impact of the Park.
- e) Appropriate mechanisms will be developed to ensure that optimum feedback and other values from national and visiting researchers are obtained to inform Park management decisions on all levels.

Activities

- a) 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 (ongoing).
- b) Develop an open-ended list of priority research topics based on information needs for the management of Khaudum National Park in year one and as need arises.
- c) Ensure research outputs and findings are made available to MET park staff and integrated with monitoring data in the Park to inform park management decisions on all levels (ongoing).

2.15 Monitoring

Regular monitoring and data collection will feed into adaptive management and decision-making and inform all relevant management decisions. Modern methods such as the Incident Book Monitoring System (IBMS) will be used to collect data on the variables to be monitored.

Monitoring on an operational level is not limited to the natural resource base, but also includes management efficiency.

Objective

To monitor carefully selected indicators of ecosystem integrity (in general) and wildlife population dynamics to allow for timely and judicious adaptive management; to monitor the efficiency of management systems and procedures.

Strategies and Principles

- a) Natural resource monitoring will focus on key indicator processes, impacts, habitats and species, with an emphasis on ensuring regular data collection at appropriate intervals, cost efficiency and sustainability.
- b) Monitoring will also assess the effectiveness of management using standardised park inspection sheets and performance assessment.
- c) Monitoring systems shall apply approved tools already being widely used, e.g. IBMS, and shall also continue with systems already established and running within the Park.
- d) Monitoring systems will be balanced to ensure that the entire range of critical information needs is covered.
- e) Information will be made widely and freely available, in accessible format to all stakeholders to feed into adaptive management decision-making.

Activities

- a) Develop an appropriate monitoring framework to include the monitoring requirements of the Park and incorporate ongoing monitoring initiatives and where appropriate, adapt other national systems such as the IBMS, with appropriate training for staff and other implementing partners, and ensure alignment with the KAZA TFCA monitoring system in year one.
- b) Ensure that relevant monitoring and research outcomes are shared with Park staff for adaptive management purposes, and distributed to stakeholders as appropriate (ongoing).
- c) Conduct annual game counts (annually).

Chapter 3

Regional conservation and park neighbour relations

The Khaudum National Park is a key 'core conservation area' within a larger regional context. The Park forms an important source of wildlife for conservancies to the north and south. Clearly relationships between parks and neighbouring communities are more harmonious if they also derive benefits from conservation.

It is therefore in everyone's interests to promote conservation activities, compatible land use practices, and management and development initiatives to the benefit of all collaborating partners throughout the broader area around the Park. This should be achieved through effective and collaborative integrated park management, monitoring and development with local and international neighbours. Good working relations must be pursued with all neighbours to achieve regionally integrated conservation.

Collaboration and integration will occur at three levels: internationally through the KAZA TFCA initiative, locally through liaison and collaborative management with communities and public service agencies, and finally with the private sector.

However, agricultural developments around the Park present challenges for the future. As currently planned, the small-scale commercial farming units (SSCFUs) to the west of the Park are a cause for concern due to the potential increase in conflict with wildlife. In light of this, extraction of groundwater will increase, thus potentially

affecting water availability in the Park. The proximity of numerous fenced farms to the western boundary of the Park will to a large extent “block” free wildlife movement, which would impact the viability of KAZA TFCA in this area. Furthermore, there are additional agricultural projects planned in Botswana to the east of the Park, with potentially similar HWC and KAZA TFCA implications as mentioned above.

3.1 Transfrontier conservation

As described above, the North-East Parks including Khaudum National Park form a critical component of the KAZA TFCA shared by Angola, Botswana, Namibia, Zambia and Zimbabwe.

Objective

To contribute to the viability of, and to be managed within the context of, a regionally integrated conservation area that encompasses nearby North-East Parks and conservancies, as well as neighbouring Botswana.

Strategies and Principles

- a) Where appropriate and to the extent possible, management of the Park should harmonise with management approaches used for other regional conservation areas in Namibia and neighbouring countries.
- b) KAZA TFCA institutions will be used for purposes of collaboration and dialogue with conservation managers in Angola, Botswana, Zambia and Zimbabwe.
- c) The integrity of the Namibian natural resources will not be compromised by activities or requirements of neighbouring countries.

Activities

- a) Collaborate at the appropriate level with and through KAZA TFCA structures and other inter-governmental cross-border structures to ensure that the objectives of this plan are aligned with the plans and objectives of other conservation areas in Namibia and in neighbouring countries (ongoing).
- b) Encourage and support knowledge and information exchange programmes between conservation managers in Namibia and neighbouring countries (ongoing).
- c) Develop and conduct collaborative management activities with neighbouring countries (ongoing).

3.2 Regional land use planning and landscape level management

A number of ministries are responsible for various planning programmes within and around the Park. It is important that key provisions of this management plan and other MET plans be accommodated within these planning initiatives. For example, the likely impacts on the Park of increased groundwater extraction, fencing and increased human and livestock presence along the western boundary warrant a co-ordinated regional planning approach

Objective

To engage with relevant Ministries and other authorities and stakeholders involved in regional land use planning, to ensure that requirements for the management of the Park are incorporated into regional land-use plans where appropriate.

Strategies and Principles

- a) MET should cooperate with relevant authorities in the regional planning process to ensure that the conservation of biodiversity is recognised as a vital use of land and a component of the regional landscape.
- b) Land-use planning outside the Park should, wherever appropriate, be aligned and fully integrated with zoning plans for the Park and conservancies, as well as agreed KAZA TFCA plans.
- c) MET management must keep abreast of all regional government initiatives, and ensure that Park plans are brought to the attention of relevant authorities.

Activities

- a) Ensure that the key elements of this management plan are accommodated in all regional planning (ongoing).
- b) Ensure that regional authorities are fully aware of the negative impacts that inappropriate planning will have on conservation and its ability to contribute to the national conservation objectives and regional economy (ongoing).
- c) Pro-actively embark on planning at the local and regional level, including the possibility of buffer areas around the Park, to mitigate conflicts and maximise synergies between land uses in year two and three.

3.3 Park neighbours

Khaudum National Park has and can continue to contribute the wellbeing of neighbouring communities through the establishment of viable businesses based on natural resources. Communities around the Park therefore have much to gain, especially if it is managed as a core area from which economic benefits extend to beyond the Park's borders. However, such a scenario is only possible if relations between park management and communities are constructive and based on an integrated approach. The interactions must be based on trust so that the wider landscape of the Park and community areas can be managed and developed for mutual benefit.

The need to encourage, support and use established collaborative management structures is critical for engagement between the Park and its neighbours. Simplicity, operational efficiency and the achievement of common goals are vital to the success of these structures. Following this, the obligations of park managers and community members should also guide the process.

Objective

To establish and maintain Park neighbour relations between Park staff and existing collaborative management structures, including the conservancies and community forests north and south of the Park and the SSCFU farmers, for the mutual benefit of communities and the objectives of the Park.

Strategies and Principles

- a) Engage with communities through appropriate structures and according to the MET's National Policy on Protected Areas, Neighbouring and Resident Communities² to:
 - agree on areas and activities for collaborative management;
 - agree on working arrangements to achieve shared visions and goals;
 - leverage benefits from the Park, and optimise economic benefits from natural resources;
 - achieve regional conservation priorities.
- b) Use existing collaborative management structures and community institutions and where necessary develop further structures to fully engage with all Park neighbours.
- c) The rights and obligations of the various parties should be defined and secured in collaborative management agreements between appropriate institutions.
- d) The communities must be partners in the formulation of ongoing collaborative management policies and procedures, which should be binding to both park managers and communities.
- e) The MET will be guided by the National Policy on Tourism and Wildlife Concessions on State Land (2007) when awarding any rights to communities. In addition, the MET will:
 - give priority to concessions that add security to the Park, promote corridors between conservation areas and those that improve conservation in areas that surround the Park;
 - reach agreement on the management of the broader landscape and the benefits that may be achieved through wider planning, often beyond the park boundaries;
 - support the development and long term economic and environmental sustainability of conservancies and community forests.

Activities

- a) Identify areas within and adjacent the Park that are critically important for biodiversity and animal movements, engage with the relevant communities and explore opportunities for leveraging benefits to communities for the integrated protection of these areas in year one and two.
- b) Establish and maintain collaborative management forums with neighbouring communities and SSCFU farmers in year two.

3.4 Private partnerships

The private sector, either through small local enterprises or large businesses can contribute in various ways to the achievement of the vision and objectives of the Park.

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² At time of preparation, this was still in draft form.

Strategies and Partnerships

- a) Partnerships with the private sector must achieve one or more of the following outcomes:
 - add value to the product, including conservation and biological diversity;
 - reduce the risk to government of some activities and investments;
 - bring investment and skills development;
 - provide employment and other economic benefits.
- b) Partnerships must be driven by needs and initiated by the MET, and may not detract from the core function of the Park.
- c) All partnerships must be restricted to parties that understand and contribute to the achievement of the vision, goals and policies of the MET and this management plan, and must:
 - be regulated by formal contractual agreements that define the roles, responsibilities, term and other conditions of operation;
 - comply with relevant policies and procedures, in particular the concessions policy;
 - be cost-effective to the MET.

3.5 Environmental education

Education plays an important role in building strong environmental awareness among people, especially the youth. The MET should identify and implement mechanisms to ensure that local people have access to the Park. Particular attention should be paid to school children, leaders and business people.

Strategies and Principles

- a) Ensure that the Park becomes more easily accessible to local people (subject to statutory Park entry requirements), including schools and environmental groups.
- b) Interact with other public service agencies or donors to support environmental education.
- c) Engage with custodians of indigenous knowledge to use this information for environmental education.
- d) Actively pursue an environmental education programme through directed outreach activities.

Activities

- a) Create awareness of the Park within the local communities, including schools and environmental clubs (ongoing).

Chapter 4

Zonation

As an important tool for planning and managing parks, zoning helps prioritise management activities and resources, focuses economic opportunities, and provides guidance for medium to long-term development.

The determination of zones follows a hierarchy of requirements and objectives. Those of primary importance are the legally delimited areas of the Park, the scarcity and sensitivity of natural resources, and features that require special management, for example as a result of heritage or social factors. Economic and management uses are zoned at a secondary level, taking into account the objectives of the Park, as well as management, social and practical considerations, such as existing or planned infrastructure. Special attention is given to the potential for tourism and its marketability.

Objective

To develop a defensible zonation based on ecological criteria, and on economic and management factors intended to achieve the purposes of the Park.

Strategies and Principles

a) Zonation will be applied to:

- comply with formal agreements or legislation;
- protect scarce and sensitive landscapes, habitats and organisms;
- protect important ecological processes, such as game movements;
- protect cultural, heritage and other important sites;
- achieve the economic goals of the Park;
- achieve specific management requirements.

b) The following will be used in applying this hierarchy:

- habitats will be classified into zones according to sensitivity, scarcity and threat using an appropriate scale such as high, medium and low, using the same criteria and system as other North-East Parks; whilst recognising and addressing the character and attributes of Khaudum;
- all unique landscape features, plant assemblages, cultural, historical or heritage sites should be identified and zoned appropriately to ensure correct conservation management;
- areas for tourism and other public use must be identified in pursuance of the broader economic objectives of this management plan;
- areas allocated for public use must be located in zones where environmental costs are least and economic benefits greatest. EIAs are to be undertaken if significant environmental costs are anticipated;
- all developments inside the Park should be subject to a cost/benefit analysis through an environmental assessment process. The analysis should examine all costs and benefits, including those of an ecological, economic, social and political nature;

- activities or developments are not automatically precluded from zones having 'high conservation' status. However, higher levels of EIA scrutiny will be required in these zones.
- c) The zonation may be reviewed periodically if new information becomes available. The following principles apply to amendments:
- zones of primary importance will be modified if new legislation or Cabinet decisions are passed requiring amendments to boundaries, or if information shows that existing economic or management uses have, or may have high negative impacts;
 - modifications to tourism zones may require consultation with affected parties if existing rights have to be altered.

Activities

- a) Refine the boundaries of the two zones, using data on preferred habitats based on recorded animal distribution in year two.
- b) Continually assess zones and sites allocated for economic purposes to ensure that socio-economic goals are optimised. This should be done in collaboration with interested and affected parties in year one and two.
- c) Continually update and refine the habitat zones as new information is obtained (ongoing).

Chapter 5

Prospecting and mining

Although kimberlite pipes purportedly occur within the area, there are no current indications of active exploration or threat from mining. Any future prospecting should comply with the relevant conservation, environmental and economic regulatory framework. The potential economic value of prospecting and mining for Namibia is acknowledged, but both environmental and other socio-economic costs should be taken into consideration before commencing any activities.

Objective

To ensure that any future prospecting and mining activities are controlled and that rehabilitation and restoration will take place. In addition, to attempt to prevent any prospecting and mining activities in very sensitive areas in order to avoid any negative impacts to the character, ecology and tourism potential of the Park.

Strategies and Principles

- a) Key zones categorised for high conservation values will be marked and closed to prospecting and mining.
- b) Prospecting and mining in other parts of the Park will only commence when rehabilitation is guaranteed.
- c) Any prospecting and mining activities are done in accordance with the National Policy on Prospecting and Mining in Protected Areas.

- d) The long-term national benefits from the use of the land for mining must clearly outweigh benefits from other appropriate forms of land use, such as recreation and sustainable tourism. The onus is on the proponent to demonstrate such national comparative benefits, taking into account ecosystem services and non-monetary benefits of peoples' perceptions and how residents and visitors wish to use their countryside.
- e) Applying safeguards is a key strategy for avoiding and/or reducing impacts to acceptable levels. All prospecting and mining activities MUST be preceded by an EIA in accordance with the word and spirit of Namibia's EA Policy (1995) and legislation (Environmental Management Act No. 7 of 2007, and Minerals (Prospecting and Mining) Act, 2003. The logical consequence of the EIA is the compilation of an EMP. The EMP must define objectives as well as both outcomes and the methodology (in some detail) as to how the outcomes will be achieved.
- f) The costs of any reclamation, restoration and/or decommissioning must be included in any feasibility (cost-benefit) studies and in any agreement, concession, mining licence or exclusive prospecting license (EPL).
- g) Bio-prospecting, if it is to occur, and other uses of biodiversity must take place within a formal agreement. This may require an EIA and EMP to determine the impact and rehabilitation needs.
- h) Mining areas should be rehabilitated and/ or landscapes restored. Priority areas should be identified with MET and an approach put in place for rehabilitation/ restoration.

Activities

- a) Compile an inventory of all prospecting and mineral licenses in the Park, noting type of license, its boundaries, conditions of approval, ownership, status, timeline and contact person in year one.
- b) Develop and implement a monitoring schedule (as needed).

Chapter 6

Tourism development and management

Tourism in the Park has potential to bring socio-economic benefits to the neighbouring communities, the region and the State as a whole. This may be achieved by generating income from entry and concession fees, creating jobs and business opportunities and attracting investment. Furthermore tourists derive information, and aesthetic and recreational enjoyment from their visits to the Park.

The Park's tourism attractions include its sense of remoteness and inaccessibility, and the opportunity of seeing rare and endangered species (e.g. roan, tsessebe and wild dog), large herds of elephant (particularly at waterholes during the dry season), lion and other predators. There are also archaeological sites (such as at Tsoanafontein) and historical routes of the Dorsland Trekkers traversing through the Park. These attractions combine to provide a 'unique and authentic, frontier bush experience' which is hard to surpass in Southern Africa.

Current visitor numbers are low (in the context of Namibian parks and the North-East Parks in particular). This is due primarily to difficult access (deep sandy tracks)

and the Park's location in terms of established tourism routes and gateways. In 2011 the Park received 1,611 tourists of which 65% were African (majority South African and Namibian) and 35% were from overseas (majority European). A total of N\$71,000 was generated from entry fees. Most (if not all) African visitors travel through the Park using their own vehicles, while half of the overseas visitors travel with tour operators and the other half travel with rental vehicles. It should be noted that only few car rental companies and tour operators allow their vehicles into Khaudum National Park, because of the aforementioned accessibility challenges. This forms a large constraint to growing the Park's attractiveness to overseas markets.

The upgrading of access roads into the Park by the Namibian Roads Authority combined with the opening and subsequent growing popularity of the Dobe Border Post west of Tsumkwe, may result in the Park becoming a more popular tourism destination. This is especially in light of the emerging development of KAZA TFCA, which targets strategic interventions in order to increase transboundary tourist movement.

As there are currently no lodges inside Khaudum National Park, camping is the only option for overnight visitors. A tourism concession for re-developing the current Khaudum and Sikeretti campsites into lodges with exclusive camping sites was awarded to the Gciriku community (Gciriku Traditional Authority, George Mukoya and Muduva Nyangana Conservancies) in 2008. At the time of writing, these planned developments had been delayed due to problems with the community's contracted private partner.

The Park serves as an important core wildlife area in support of trophy hunting concessions on all boundaries, including two community hunting concessions to the north (with George Mukoya and Muduva Nyangana Conservancies) and to the south (with Nyae Nyae and N#-a-jaqna Conservancies). There are also State hunting concessions awarded beyond the western and eastern boundaries.

Objective

To promote tourism in the Park in order to help address the socio-economic needs of the region (particularly adjacent communities), while also providing access to 'wilderness' experiences for local, regional and overseas tourists, without compromising the conservation and integrity of the natural resources.

Strategies and Principles

- a) Although it is not immediately required due to the limited tourism options and markets, in future MET may prepare a tourism plan for the Park that provides detailed guidelines for the development of tourism. In the interim, MET will be guided by this management plan, the Cabinet Decision (18th/20.07.99/004), the National Policy on Tourism for Namibia (2008) and the National Policy on Tourism and Wildlife Concessions (2007).
- b) Based on the Cabinet Decision of 1999 regarding the North-East Parks (18th/20.07.99/004), MET should award tourism rights inside the Park to the neighbouring communities.
- c) Tourism developments or activities may be undertaken by MET, or by external partners such as communities or the private sector. Tourism developments or activities undertaken by communities or the private sector must be done in accordance with the concessions policy and regulated through written

agreements (see Appendix 4 for tourism concession recommendations for Khaudum National Park).

- d) MET should establish forums with relevant stakeholders such as conservancies, other line ministries and private sector, to ensure effective cooperation and liaison, and create synergy in the management of tourism in and around the Park.
- e) MET should engage with the KAZA TFCA project to ensure strategic interventions are implemented that will increase the viability of tourism in the Park.
- f) Feasibility studies should precede any tourism developments or concessions inside the Park. Such studies should include, among other components, a cost/benefit analysis whereby objectives are stated, and where financial/economic, environmental and social costs and benefits are evaluated. This would include costs and benefits to all relevant parties, such as MET, communities, and the private sector.
- g) Tourism developments in the Park should (a) cover the full³ cost to the MET of managing and developing the products and related infrastructure, and/or (b) meet defined socio-economic goals, and/or (c) meet defined access goals in terms of attracting local, regional and overseas tourists into the Park.
- h) MET will plan and develop tourism in the Park to take account of different source markets, product types and affordability, and the experience required by the respective markets.
- i) Tourism zonation (see Chapter 4) may be periodically reviewed in line with changing demands and environmental considerations, while being mindful of the possible impacts on any existing products.
- j) High levels of exclusivity should only be considered where the economic returns are also high, or where potential environmental impact is high if there are too many different users.
- k) The maintenance of accommodation facilities and support infrastructure (water, sewerage, electricity, etc.) will be the responsibility of the operator of the facilities. The standards for these must be agreed to, monitored and controlled by the MET.
- l) The density of visitors can affect enjoyment or experience of an area. If densities increase to unacceptable levels, MET may impose temporary or permanent limits on the number of users or use other mechanisms to ensure that tourism experiences are commensurate with the type of product offered.

Activities

- a) Periodically review the recommended tourism developments and activities for the Park (see Appendix 4), taking into account the purpose of the Park, the needs of different target markets, and the intended experience offered to tourists in year one, then follow up annually.
- b) Implement the Park's tourism use zones (see Chapter 4), based on the following:
 - environmental zoning and considerations;

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³ Includes administration, infrastructure, staff time, equipment, marketing and supplies, as well as any opportunity costs, which may be relevant.

- proximity of services and support infrastructure;
 - the sense of place offered by an area;
 - the need to separate different users groups, especially in small areas;
 - optimisation of economic benefits and costs (year one, then follow up annually).
- c) Based on the Cabinet Decision of 1999 regarding the North-East Parks (18th / 20.07.99 / 004), identify priorities for the award of tourism rights to neighbouring communities and start implementation in accordance with the concessions policy in year one.
- d) Clearly state and monitor the objectives of each tourism product or concession to ensure they are achieved, and to implement corrective action where objectives are not being met in year one.
- e) The existing lodge and campsite concession should be evaluated and restructured with a new private partner or partners. In this regard, a feasibility assessment should be conducted to determine whether the concession should be divided into two separate lots (north and south) and offered on tender to the market in year one and two.
- f) Identify priorities for visitor management such as maps, interpretative materials, visitor facilities, etc. from this management plan and other associated plans, and start implementation in year two.
- g) MET and the Namibia Tourism Board, working in partnership Botswana through KAZA TFCA secretariat, should promote the tourism route and gateways between Etosha National Park and the Okavango Delta (via Khaudum) in year two, then follow up annually.

Chapter 7

Infrastructure

Infrastructure within Khaudum National Park can play a critical role in realising the economic potential of the Park, and in improving management efficiency. However, infrastructure may also have negative impacts on landscapes, biota and tourism if not properly planned, designed, located and developed.

Existing derelict buildings at Khaudum and Sikeretti and infrastructure at water points should be removed and rehabilitated according to MET guidelines and, where possible, old building material should be incorporated into new structures.

Infrastructure requires maintenance if it is to function properly. Annual budget allocations for maintenance can be kept low if these fixed improvements are properly designed, appropriately located, constructed by skilled contractors using materials of good quality, staff are properly trained, quarterly inspections are carried out on time and small maintenance tasks are carried out immediately.

7.1 Access and roads

There are two official access points to the Park, both of which have unmanaged entry gates. An un-proclaimed sand track (cut-line) known as 'Katere Road' starts at

TR8/4, the B8 Trans-Caprii Highway between Rundu and Divundu, and meets the north-western park boundary corner from where it leads to the northern park station of Khaudum. A proclaimed graded track DR3315/ D3303 from Tsumkwe leads to the southern park station of Sikeretti. Another access point to the Park is a track following the Nhoma Omuramba to Tsoanafontein. A well-developed network of tracks traverses the Park.

Strategies and Principles

- a) Official entry points should be kept to a minimum, they must be signposted and the entry control measures must be commensurate with their costs and benefits.
- b) The following must be complied with at controlled entry points:
 - opening and closing times are agreed and publicised;
 - a register is maintained of all people and vehicles entering and leaving;
 - an operating protocol is agreed and enforced;
 - all permits or entry fees are collected and paid, and there is an audit procedure.
- c) At official park entry points, visitor facilities and management infrastructure must be physically separated.
- d) To add value to the benefits of conservation and tourism, concessions for special access may be given to tour operators/concession holders provided the benefits outweigh the costs of management.
- e) Internal Park roads should remain as un-graded/un-surfaced 4x4 tracks to maintain the Park's "wilderness" appeal and to keep management costs to a minimum.
- f) MET should participate proactively in relevant regional road network development programmes to ensure Park accessibility is addressed in a sustainable and appropriate manner and that negative impacts on the Park are mitigated.
- g) Where possible, the impacts of roads and tracks on biodiversity and tourism must continually be assessed and options explored to minimise the impacts.
- h) Environmental clearance, an EMP and approval by MET are required before any road-building material is collected in the Park. Where necessary, the reclamation of the site of extraction must be secured with a performance bond.
- i) Park roads should be kept to a minimum, and be designed to be cost-effective so that development and maintenance costs (financial and environmental) are commensurate with the benefits of the roads.
- j) Existing road networks are to be reviewed and recommendations made regarding any changes including the realignment of roads to improve tourism, to reduce environmental impact and to improve management efficiency.
- k) Where possible, road construction needs to be done with minimal use of local material and disturbance of soil, to ensure minimal environmental and visual impact. The grading of un-surfaced Park roads is strongly discouraged.
- l) The Park road network must be provided with appropriately branded signage.

Activities

- a) MET should meet regularly with regional planning authorities to provide input to relevant public road network upgrades and extensions, especially those directly adjacent to the Park such as the two main access roads (ongoing);
- b) MET should regularly review the implications of relevant road network upgrades with regard to possible benefits and threats, and mitigation measures for the Park (ongoing).

7.2 Buildings

All management and tourism infrastructure in the Park are currently dilapidated and in a state of neglect. Most of the structures still originate from old military bases and are beyond their intended design life. A few new structures have been added in what appears to be an unplanned fashion and new staff ablutions are currently being erected.

Strategies and Principles

- a) Restrict building height and ensure that the building style blends with the environment to reduce visual impact.
- b) Use building materials produced in an energy-efficient manner⁴, including local and recycled materials, provided they are cost effective.
- c) Make use of alternative, environmentally friendly energy sources (such as photovoltaic electricity and solar water heaters) wherever practically possible.
- d) Use water and energy efficient fittings in all facilities.
- e) Design buildings so they are protected from damage by elephants and fire.
- f) Use cross ventilation, high ceilings, cavity walls and other passive cooling methods as far as these are practical.
- g) Position buildings to maximise cooling in summer and heating in winter.
- h) Design compact development sites to minimize disturbance footprints.
- i) Standardise materials, fittings and fixtures for easy maintenance.
- j) Ensure that structures containing fuels meet national requirements, and erect containment structures to minimise the effects of leakage and spillages.
- k) The location of staff accommodation should be determined to optimise:
 - management efficiency;
 - proximity to entrance gates;
 - proximity to visitor areas;
 - proximity to services such as schools, clinics, shops, etc;
 - the desirability of being accommodated in nearby towns or formal settlements.

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⁴ This implies materials, which are energy efficient in their manufacture and transport to site.

- l) Staff facilities must comply with acceptable safety standards for people who reside in the Park and commute to work, and comply with MET staff housing policy.

Activities

- a) MET should regularly review and assess Park buildings to ensure they comply with the above principles and commission upgrades when deemed appropriate in year one then review annually.

7.3 Tourism infrastructure

For the purpose of this plan tourism infrastructure includes accommodation and all its associated support infrastructure (which should be constructed and maintained by concessionaires), as well as facilities provided by MET specifically for visitors, such as park entry facilities, access roads and tracks, signage, view points, hides, etc. Such infrastructure should adhere to the relevant strategies and principles specified within this chapter.

Strategies and Principles

- a) Tourism infrastructure should be commensurate with the needs of the dominant markets visiting the Park and their specific needs. In the case of Khaudum National Park, the majority of visitors seek a 'wild, natural and authentic bush experience'. Infrastructure should therefore be simple, unobtrusive, rustic and in-keeping with maintenance of a 'bush experience'.
- b) Tourism infrastructure should be located in accordance with a cost-benefit analysis to maximise tourism appeal and value, while complying with zonation parameters and other conditions, which may be applicable.
- c) Infrastructure should be located as close to existing services and major access routes as the product will allow.
- d) Environmental guidelines for tourism infrastructure should be prepared and included as part of all concession agreements and works contracts.

7.4 Airstrips and aircraft

The Park has one 1,500 metre graded airstrip at Sikeretti, which was developed by MET and is used primarily for natural resource management purposes (i.e. game counts, game capture, etc.). This airstrip is on natural ground with no additional gravel or other surface. MET is currently responsible for maintenance of the airstrip.

Strategies and Principles

- a) While airstrips provide important access to the Park for tourists and management, new ones should only be considered following thorough investigation.
- b) Where possible, existing airstrips are to be used and new ones should be located outside the Park.
- c) Construction of new airstrips and major renovations of existing ones should require environmental clearance certificates.

- d) Helicopters should use airstrips, and helipads should only be permitted if there is no impact on other Park users.
- e) A 'no flying' restriction below 1,000 metres will generally apply, and no low level aerial sightseeing will be permitted without written approval of MET.
- f) Noise pollution and disturbance of other Park users should be avoided as far as possible.

Activities

- a) MET will annually review and assess the need for upgrading or closing and rehabilitation of existing facilities in year one and then review annually.

7.5 Waste management

The disposal of waste is often problematic in remote areas, and the volume of waste will grow as the use of the Park increases. The proper treatment and discharge of wastewater is especially critical where developments are close to boreholes and omiramba.

Strategies and Principles for solid waste

- a) Management should be based on the principle of 'use less, use the correct materials and recycle more'.
- b) In the long term, management will strive to remove all waste from the Park to formal waste management sites, although biodegradable waste may be composted where appropriate and environmentally feasible.
- c) Tourism providers and employers of staff living in the Park are responsible for the removal of their own household waste, or that generated by tourists and staff, to approved waste disposal sites.
- d) Waste storage facilities must be properly enclosed to prevent access by wildlife and pollution by wind-blown litter. These facilities must be approved by the MET and may hold waste for a maximum of 28 days; shorter periods will apply if high volumes accumulate and health issues arise.
- e) Where practical, waste must be sorted for recycling.
- f) Transport of waste to storage or dumpsites must be in properly constructed vehicles or containers to ensure that no littering occurs.
- g) All new and existing developments must develop an EMP for waste management.

Activities for solid waste

- a) Park management must assess existing sites and if necessary initiate a monitoring programme to ensure they comply with national legislation, policy and standards in year one then review annually.
- b) Disposal sites/temporary storage sites that are found to be inadequate, especially where water is being polluted, or at risk, must receive urgent attention to resolve any problems, if necessary closing the existing sites and relocating them outside the park (ongoing).

- c) Park management must develop an appropriate waste management procedure and enforce compliance by all staff, tourism providers and other agencies (ongoing).

Strategies and Principles for liquid waste

- a) Liquid waste must be processed according to the most appropriate system, taking into account the practicalities, volumes of waste, availability of water, costs of disposal and environmental impact.
- b) The MET and other relevant ministries must approve all liquid waste handling systems, which should comply with national standards and legislation.
- c) The pollution of groundwater is to be avoided, but also monitored, if necessary by enlisting the help of relevant government departments.
- d) Any toxic substances and the disposal of the empty containers must comply with national regulations and the use of all cleaning and other potentially toxic substances must be approved by MET.

Activities for liquid waste

- a) Park management must assess the existing sites and if necessary initiate a monitoring programme to ensure that they comply with national legislation, policy and standards in year one then review annually.
- b) Those found to be inadequate, especially where water is at risk of or is being polluted, are to receive urgent attention and a strategy implemented to resolve any problems (ongoing).

7.6 Human safety

Wildlife and wildfire pose threats to tourist and staff safety within Khaudum National Park. Park management must monitor those instances and areas where this is likely to happen. Proactive action can often prevent or minimise these problems and therefore strategies and activities for human safety need to be set and implemented.

Strategies and Principles

- a) Protective barriers, e.g. trenches or electric fencing, should be erected where the threat of elephants is likely to be high. These barriers should be monitored to assess their effectiveness.
- b) Clearing of firebreaks or regular back-burning around key infrastructure should be done to minimise risks to staff and visitors. Other strategies and activities related to fire management outlined in this plan should be adhered to.
- c) Proactive and adaptive management principles should be applied to human safety in the Park, particularly if new threats have been identified or incidents occurred.
- d) Information leaflets, notices and warning signs must be displayed in appropriate places and in relevant languages.
- e) Access to the Park should be conditional on a waiver of liability for visitors and families of staff.

- f) 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.
- g) 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.

Activities

- a) All protective and precautionary measures, such as barriers, firebreaks, notices, and signs should be regularly maintained and assessed for their functionality and effectiveness in year one and then review annually.
- b) New threats or human safety incidents need to be monitored and acted upon immediately by park management and staff (ongoing).

7.7 Fencing

The Park's eastern border with Botswana is fenced with two parallel north-south running fences. These were erected by and maintained by the Directorate of Veterinary Services in the Ministry of Agriculture, Water & Forestry. Approximately a third of the western boundary is fenced with a cattle/domestic fence. The remainder of the Park is not fenced and enables wildlife movement. In addition to boundary fences there are also some internal fences that protect infrastructure and provide for human safety. This section addresses fencing issues primarily related to infrastructure protection and human safety.

Objective

To protect staff and tourists, protect key infrastructure from wildlife damage, contain disease transmission, and to prevent harm to wildlife.

Strategies and Principles

- a) Appropriate fencing and protective barriers, e.g. electric fencing, should be erected to keep wildlife away from existing infrastructure to ensure the safety of staff and tourists, to protect the infrastructure from damage as well as protect the wildlife from harm.
- b) Fences and barriers should be monitored to assess their effectiveness and removed, replaced or upgraded if their intended purpose is not achieved.

Activities

- a) MET should map and maintain a register of all fences and barriers. Registers should include the type of barrier, reason for establishment, condition and any impacts in year two and ongoing.

7.8 Water supply

Water provision within the Park is critical for wildlife, park staff and tourists. Water for domestic and wildlife consumption is supplied primarily from underground water by means of engine and/or photovoltaic driven pumps, and from a limited number natural springs. The underground water supply is potentially under threat due to the development of approximately 200 small-scale commercial farms to the immediate west of the Park, and combined with an increasing elephant population. An artificial

water point assessment was conducted as part of this management plan process (see Appendix 5), and detailed recommendations are included in that report.

Objective

To secure the supply of water in the Park for staff and wildlife use.

Strategies and Principles

- a) Water extraction and use by Park management should be environmentally sustainable and cost effective.
- b) MET must work with relevant authorities and stakeholders to assess and manage the impact of groundwater abstraction on a regional level.

Activities

- a) In cooperation with relevant authorities and stakeholders, a regional geo-hydrological study should be undertaken to determine the groundwater potential and safe yield. This is of utmost importance for the future management of a sustainable water supply in the Park and in the region in year three.
- b) All water supply points should be assessed and each designed to the optimal needs and sustainable potential in year one and two.
- c) All water supply points must be regularly maintained and assessed for their functionality and effectiveness (ongoing).
- d) Park management must monitor the water installations on a continuous basis and when found to deteriorate, to be acted upon immediately (ongoing).

8 Administration and management

Since management and administration underpin all operations, an efficient administrative structure is required to support financing, procurement, human resources, stores and supplies, and maintenance of the Park. Many of these aspects are controlled by public service and/or MET policy, procedures or legislation. These measures limit the autonomy of park administrators and managers. Innovative operating procedures could nonetheless be implemented to address issues specific to local conditions.

Objective

To ensure compliance with public service policies and procedures within which an efficient operating system is implemented for the conservation and economic development of Khaudum National Park.

Strategies and Principles

- a) MANAGEMENT PLAN: The current document represents Khaudum National Park's management plan that includes the following minimum components: the purpose and objectives of the Park; a summary of core ecological, social, and economic principles and drivers. The management plan must be in standardised, useable, practical format that is easy to implement and adapt and complies with the MET's 'Framework and Guidelines for Development of Park Management Plans'. Khaudum National Park further has an operational management plan that summarises and guides all the normal activities and developments conducted by park management. The operational plan comprises eight management tools: 1) a summary of the policy framework, 2) an annual work plan, 3) a monthly work

plan, 4) a development planning calendar, 5) zonation plan and guidelines, 6) a financial planning system, 7) a compilation of background information, and 8) a monitoring and evaluation system.

- b) **LAW ENFORCEMENT:** Illegal hunting remains a major management issue for MET as well as conservancies and community forests since poaching poses a major risk to wildlife and tourism products. Vigilance against wildlife crime is therefore a very high management priority.
- c) **COMMUNITY INVOLVEMENT:** Since communities have close links to the Park and its natural resources, mechanisms must be found that improve management efficiency by employing or outsourcing work to local people, and through collaborative implementation of key activities such as law enforcement, fire management, etc.
- d) **RESEARCH AND MONITORING:** An active monitoring system of carefully selected and agreed indicators, both bio-physical and socio-economic, is essential if management effectiveness is to be improved and adapted as conditions change. Monitoring systems, such as the IBMS must therefore provide key information, especially regarding threats or opportunities. Monitoring on an operational level is not limited to the natural resource base, but also includes management efficiency. Research will be supported, primarily through collaboration, and will focus on the following:
 - Important areas such as omiramba, as well as game movements and re-introductions;
 - improving management effectiveness, especially that which pertains to human-wildlife conflict, fire, community wildlife-and-tourism-related impacts;
 - the socio-economic impact of the Park.
- e) **HUMAN RESOURCES** play a critical role in the management of the Park, and therefore training and continuous staff development are essential. The MET policy on HIV/AIDS must be implemented. Procedures should be implemented to redress past gender imbalances.
- f) **FINANCIAL CONTROL AND FUNDING:** Financial controls as required under MET and other policies and legislation must be complied with. However, a broader, proactive business approach that continually resets targets of performance must be adopted. Resource and cost estimates must be monitored to ensure that targets for specific deliverables are met and improvements made. Alternative sources of funding should continually be explored to improve the management and operating efficiency of the Park.
- g) **GENERAL ADMINISTRATION:** Mechanisms, which improve effectiveness of delivery, must always be explored. All assets must be accounted for, maintained and applied to their intended uses. Where appropriate, new technologies, equipment and fixed infrastructure must be explored and introduced.

Activities

- a) Prepare and implement the eight management tools of the operational plan for Khaudum National Park, namely a summary of the policy framework, an annual work plan, a monthly work plan, a development planning calendar, a zonation plan and guidelines, a financial planning system, a compilation of background

information, and a monitoring and evaluation system in year one, then annually follow up.

- b) Formulate annual work plans with outputs and budget allocations (this task falls to park managers) that are agreed to by senior staff. Monitor implementation of the plans. Plans are to address major challenges and should ensure that important opportunities are optimised, for example:
 - activities must be resourced with appropriate staff, equipment and funding;
 - mechanisms should be provided to overcome challenges;
 - opportunities to review and modify work plans must be created, and adaptive management applied as circumstances change;
 - work plans with expected deliverables and dates should always be communicated to people responsible for these functions in year one, then annually follow up.
- c) Decision-makers at all relevant levels should support park managers in their endeavours to implement this plan (annually).
- d) Ensure that all MET assets are accounted for, protected and maintained in working order and deployed to contribute towards this plan (annually).
- e) Monitor any changes in legislation and advise on their impact on the Park and associated operations (annually).
- f) 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 (annually).
- g) Establish a system of monitoring and recording all aspects of the Park so that control can be exercised and management improved, especially with respect to:
 - the socio-economic benefits which result from the Park;
 - the development and responsible operation of tourism products;
 - compliance with all collaboration agreements;
 - adherence to budgets, and accountability for finances in year one, then follow up annually.
- h) Develop an efficient working relationship with staff and other stakeholders, especially neighbouring communities in year one, then follow up annually.

Glossary

ALIEN SPECIES: Any plant or organism that has been introduced to by humans into habitats far outside their native range, either directly or indirectly and intentionally or unintentionally. These species have the potential to cause significant ecological damage, often out-competing native species or changing the environment to such an extent that entire indigenous ecosystems may become threatened. Not all alien species are invasive, however, the chances of an invasive species being introduced increased rapidly with the number of alien introductions.

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.

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.

OMURAMBA: Herero word for an ephemeral river, plural omiramba.

SUSTAINABLE: Using a resource so that the resource is not depleted or permanently damaged

SUSTAINABLE USE / UTILISATION: Harvesting of a given species of plants or animals in such a way that their stocks do not decline in number over time.

WILDLIFE: All the indigenous biota, which occur within the area.

Appendices

Appendix 1: Biophysical zoning of the North-East Parks and its application to the Khaudum National Park

Introduction

The management plan for Khaudum National Park prescribes the two core purposes of the Park, namely to protect biodiversity and to maximise the potential for regional economic development. The Plan further explicitly recognises the position of Khaudum National Park within in the KAZA TFCA.

The management plan also prescribes the zonation scheme to be used. This is applied as different layers in a hierarchical manner, with the legally prescribed or agreed land uses zoned first, followed by zonation of the biological and physical aspects of the Parks, and finally by zonation of the economic uses.

The approach taken therefore allows economic uses in most areas, but only after assessment of environmental impacts and with significant regulation. Crucially, and in line with the prescriptions of the MET Concessions Policy, utilisation is to be regulated through the standard process of EIA. In the zonation of the Khaudum National Park emphasis is thus placed on guiding the level and intensity of the EIA process.

For comparative purposes, and in order to contextualise Khaudum within the region and relative to the other North-East Parks, this Appendix describes the approach to biophysical zonation of all the North-east Parks. The term *biophysical* here includes two aspects:

- a) It defines zones based on the sensitivity, scarcity and threat to different habitats, and in terms of their social, cultural, historical or biological uniqueness. These represent the *Habitat* and *Special Management Zones*.
- b) It defines the positions of infrastructure development sites related to a) park management, and b) tourism developments.

In addition, rules and guidelines applicable to the respective zones are described, and maps that define the zones for each of the Parks are provided.

Types of zones

- **Very important:** All rivers, floodplain and swamp areas, and riparian forests.
- **Important:** Omuramba grasslands and pans and fringe woodland, mopane woodlands in Mudumu and deciduous woodlands.

These zones are relative within each park. For example, Khaudum does not have rivers, floodplains or swamps as such, but the omiramba and associated grasslands, as well as seeps and seasonal pans, are very important within the context of Khaudum. Therefore, these areas, which are preferred habitats for important species such as roan and tsessebe, are zoned “Very Important” in Khaudum. The areas between these habitats are important grazing areas, contain “reserve” grazing and function as movement corridors, and are zoned as “Important” within the Khaudum context

- **Special management Zones:** Sites that contain features of particular significance such as unique plant communities, important breeding sites, special landscape features, cultural, historical or archaeological sites, highly erodible soils, etc.
- **Infrastructure Development Sites:** These are divided into those that relate to park management, and those that relate to tourism use. Park management zones consist of sites where management buildings, including housing, offices, and workshops and related infrastructure are located. This includes infrastructure of other ministries, which is accommodated inside parks. The boundaries of the management-related infrastructure development sites have been determined in the Park planning process; however environmental assessments are still required for the proposed infrastructure in Khaudum. Tourism-related infrastructure development sites include actual and potential sites of lodges, camp sites, and picnic sites, but none of these have undergone an EIA process yet. Some tourism development sites have not yet been identified, in particular those that form part of concessions that will have to undergo an EIA process before the sites are determined.

Zonation maps

Habitats in Bwabwata, Mudumu and Nkasa Rupara were identified using the Caprivi Vegetation Map as a basis. Each vegetation type was assigned a diversity and conservation value.⁵ These values, together with the basic division between riparian, omuramba and woodland habitats, were used to define the zonation. A similar process was followed for Khaudum, except that vegetation data were assembled from a mapping project done for Kavango.⁶

All riparian and wetland vegetation (floodplain grasslands, and riparian thickets, woodlands and forests), and open water types were assigned to the *Very Important* category. All *omuramba* grasslands and their associated fringe woodlands were assigned to the *Important* category. Mopane woodlands in Mudumu were also assigned to this category because of their intact state, the presence of many tall, mature trees, and the special nature of the clay and clay-loam soils on which they occur. All deciduous woodlands, comprising mainly *Baikiaea* and *Burkea*-dominated woodlands with differing canopy cover and stature of the woody species were grouped in the *Less important* category.

Cross-cutting guidelines and rules for zones and uses

Within some broad thresholds, and with specific exceptions, many types of activities may be conducted in all types of zones provided an appropriate EIA process is conducted to manage specific impacts. Although there are therefore no strict limitations on developments, there are a few critical factors to consider in assessing (a) the desirability of development and activities and (b) the management of environmental impact. The guidelines below apply across all the parks.

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⁵ C.J. Hines in Mendelsohn, J. & Roberts, C. (1997) An environmental profile and atlas of the Caprivi. Directorate of Environmental Affairs, Ministry of Environment and Tourism, Republic of Namibia.

⁶ InterConsult. 2001. *Natural resource mapping of the Kavango*. Report for the Directorate of Environmental Affairs, Windhoek.

- a) An important principle to be used during the EIA process is that tourism facilities and activities should maximise social, economic or political benefits and minimise environmental costs.
- b) Proposed developments (including tourism and management infrastructure or road developments) must be evaluated against the total number of developments recommended in this management plan and any tourism development plans for the parks.
- c) Development will not be permitted in areas that have a special appeal. These areas are zoned as *Special Management Areas*.
- d) The whole region has a long history of settlement and contains some pre-historical sites that have not been adequately mapped. EIA processes must thus consider the potential occurrence of sites of archaeological significance in proposed development areas.
- e) Preference must be given to developments close to park boundaries and existing service infrastructure such as major access roads, power lines and so on.
- f) Where possible new developments should be done on so-called *brownfield* sites (sites that have previously been impacted, such as old military bases).
- g) In keeping with the general aim of sustainable utilisation, preference will be given for developments with small environmental footprints. This means that low-impact building materials⁷ and techniques must be used and energy and carbon budgets minimized.
- h) Sites may be secured against large mammals or predators through the use of appropriate fencing material, and against fires through the use of firebreaks. Fencing material should blend in as much as possible with the immediate environment.
- i) The emphasis is on managing total environmental impact, from construction or implementation to operational environmental impacts.
- j) In general, road construction should be minimised to conform to the agreed road network. Emphasis must be placed on the re-alignment and upgrading of existing roads, rather than construction of completely new roads. New road construction will be allowed only with a very good justification. Where roads are re-aligned, redundant roads should be ecologically restored.
- k) EIA processes for all road construction activities should include at the very least a scoping and an EMP.
- l) Each development proposal will be required to show, even in broad terms, how it will minimise waste and carbon production and energy use (the detail of these plans will depend on the total extent of the proposed development or activity). In addition, waste management protocols must be drafted wherever relevant, with the general aim to reduce, re-use and recycle (in that order of priority).
- m) Commercial tourism operations are required to dispose of their waste outside the parks in a properly appointed facility designed for that purpose. No permanent waste disposal is allowed inside the parks.
- n) No potentially polluting activities (such as frequent vehicle servicing and/or other mechanical maintenance or repair activities) may be conducted in any zone. Within reasonable limits, vehicles may undergo small services, providing all hydrocarbon fuels, lubricants and waste products are handled

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⁷ For example, locally-sourced materials usually have less embedded energy than materials that have to be transported from far, steel has less embedded energy than concrete for a similar range of structural strengths, and second-hand building materials have already discounted some of the embedded energy.

- according to national regulations and in line with the applicable EMP, and disposed of outside the Park in a properly appointed facility.
- o) Where relevant, handling, storage and disposal of all hydrocarbon or any other potentially polluting substances must be an explicit part of all EMPs. The use and storage of pesticides and herbicides are not allowed, except in small quantities such as may be required to control insect pests in dwellings.
 - p) The regulatory framework for hunting provided by the Nature Conservation Amendment Act of 2004 takes precedence over these guidelines. However, the following additional measures apply to hunting in the North-East Parks. Hunting activities – including the construction of camps or roads, hunting on foot, and use of vehicles during hunts – will not be limited to specific zones, and are thus subject to the same usage rules as any other form of tourism or consumptive use. In certain places where photographic tourism and hunting overlap, and depending on the terms of concession contracts, hunting may be limited to certain times of the year when normal tourist access may be controlled.
 - q) No off-road driving is permitted in any zone.

Guidelines and rules for each zone

VERY IMPORTANT HABITAT ZONE

Environmental impact assessment (EIA) process

- a) There is a very high likelihood that a full EIA will be required for any development in this zone. The justification for anything less than a full EIA must be strong. At the very least the EIA process will include a scoping and an EMP. In each case the benefit of placing a development in this zone must be compared with the option of placing it in an *Important or Less Important Zone*.
- b) The EIA process must include the potential cumulative impacts of all tourism activities, including number and periodicity of game drives, as well as the environmental impact of existing and other planned lodges.

Construction guidelines

- c) Although some level of EIA will still be required, locating a development on a *brownfield* site will mean less chance that a full EIA will be required. *Greenfield* sites can be used, but this must be well justified and the EIA process must show not only that the impacts will be minor or positive, but that they can be easily managed.
- d) Non-permanent structures are preferred for tourism developments, with a strong emphasis on using low-impact building materials and building methods (in terms of energy, carbon and waste).
- e) Where possible, fencing should preferably be limited to a few electrified strands. Other types of fencing may be needed provided there is an appropriate justification.

Management approach and particular activities

- f) Park management must prioritise their resources to reduce or eliminate threats to these areas.
- g) Management actions must include the monitoring and regulation of tourism activities.
- h) The provision of artificial water to attract game is not allowed in this zone.
- i) No waste storage, other than temporary storage for sorting activities, is allowed in this zone. No permanent waste dumpsites are allowed here.

- j) A road that has become redundant because it has either been re-routed or replaced must be restored. Trenches dug for services (water, sewer or power lines) must be restored, regardless of whether it is inside a concession construction area or not.

General tourism rules and guidelines

- k) The intensity and frequency of game viewing and other recreational uses will be frequently reviewed in terms of their single and cumulative impacts on ecological processes and/or biodiversity properties and/or physical geography. Limits of use may consequently be changed as part of the overall adaptive management approach.

IMPORTANT HABITAT ZONE

Environmental impact assessment (EIA) process

- a) The likelihood that a full EIA will be required is smaller than in the *Very Important Zone*. At least an environmental scoping and a full EMP may be necessary for new structures and activities.
- b) The EIA process must include the potential impacts of all tourism activities, including number and periodicity of game drives, and must assess these in view of potential cumulative impacts across the whole Park.

Construction guidelines

- c) Developments should ideally be located on sites that are already impacted. *Greenfield* sites can be used, but these must be well justified.
- d) Semi-permanent structures (e.g. wood and thatch with concrete bases) are permitted, within the limits imposed by the specific site conditions, such as by the clay soils in Mudumu.

Management approach and particular activities

- e) This zone has lower priority in the allocation of management resources for reducing or eliminating threats. Management actions must still include the monitoring and regulation of tourism activities, but the frequency and intensity of such monitoring may be less than in the *Very Important Zone*.
- f) Subject to the conditions defined in the management plan, artificial water provision is allowed. Conditions include the definition of the intended purpose of the water provision, an appropriate risk analysis, and a management strategy. The risk analysis must include clear ecological and/or economic goals, potential cumulative effects on the wildlife, habitat structure and ecological processes. The management strategy must consider all options, which range from seasonal or even longer-term closing of the water hole through to continuous operation.
- g) No waste storage, other than temporary storage for sorting activities, is allowed in this zone. No permanent waste dumpsites are allowed here.
- h) A road that has become redundant because it has either been re-routed or replaced must be restored. Trenches dug for services (water, sewer or power lines) must be restored, regardless of whether they are inside a concession construction area or not.

General tourism rules and guidelines

- i) The intensity and frequency of game viewing and other recreational uses will be frequently reviewed in terms of their single and cumulative impacts on ecological processes and/or biodiversity properties and/or physical geography. Limits of use may consequently be changed as part of the overall adaptive management approach.

LESS IMPORTANT HABITAT ZONE

Environmental impact assessment (EIA) process

- a) The likelihood that a full EIA will be required is very small, but at least an environmental scoping and a full EMP may be necessary for new structures and activities. Development on previously impacted sites may require only an EMP.
- b) Areas in these zones should be considered as alternatives for developments assessed by EIAs in the *Very Important* or *Important Zones*.

Construction guidelines

- c) There are few restrictions on permanent structures used in this area, but low-environmental impact materials are to be preferred.
- d) Developments should ideally be located on sites that are already impacted. *Greenfield* sites can be used, but such use must be justified.

Management approach and particular activities

- e) This zone has lowest priority in the allocation of management resources. Management actions must still include the monitoring and regulation of tourism activities, but the frequency and intensity of such monitoring may be less than in the *Important Zone*.
- f) Subject to the conditions defined in the management plan, artificial water provision is allowed. Conditions include the definition of the intended purpose of the water provision, an appropriate risk analysis, and a management strategy. The risk analysis must include clear ecological and/or economic goals, potential cumulative effects on the wildlife, habitat structure and ecological processes. The management strategy must consider all options from seasonal or even longer-term closing of the water hole through to continuous operation.
- g) Permanent disposal and storage of domestic waste produced by the MET during the course of their normal park management activities is allowed in this zone, subject to national standards on the management of domestic waste. Wild animals should not have access to waste disposal sites.

General tourism rules and guidelines

- h) The intensity and frequency of game viewing and other recreational uses will be frequently reviewed in terms of their single and cumulative impacts on ecological processes and/or biodiversity properties and/or physical geography. Limits of use may consequently be changed as part of the overall adaptive management approach.

SPECIAL MANAGEMENT ZONE

- a) No construction of any infrastructure will be allowed, other than that required to protect specific areas (such as grave sites) if this proves to be necessary.
- b) Site-specific guidelines will regulate activities conducted there. For instance, some *Special Management Zones* in Mahango Core Area are Baobab trees where picnicking may be allowed, while highly erodible soils in Mahango are generally off-limits to vehicle or foot access (except on existing roads). Some grave or sacred sites that have special cultural significance may also be off-limits.

- c) *Special Management Zones* that are defined because of their unique species or other biological features may be fenced (using appropriate material) to secure them from elephant or other agents that may cause damage.
- d) Except in very unique situations, no hunting, including commercial and management hunting or culls, is allowed in any *Special Management Zone*.

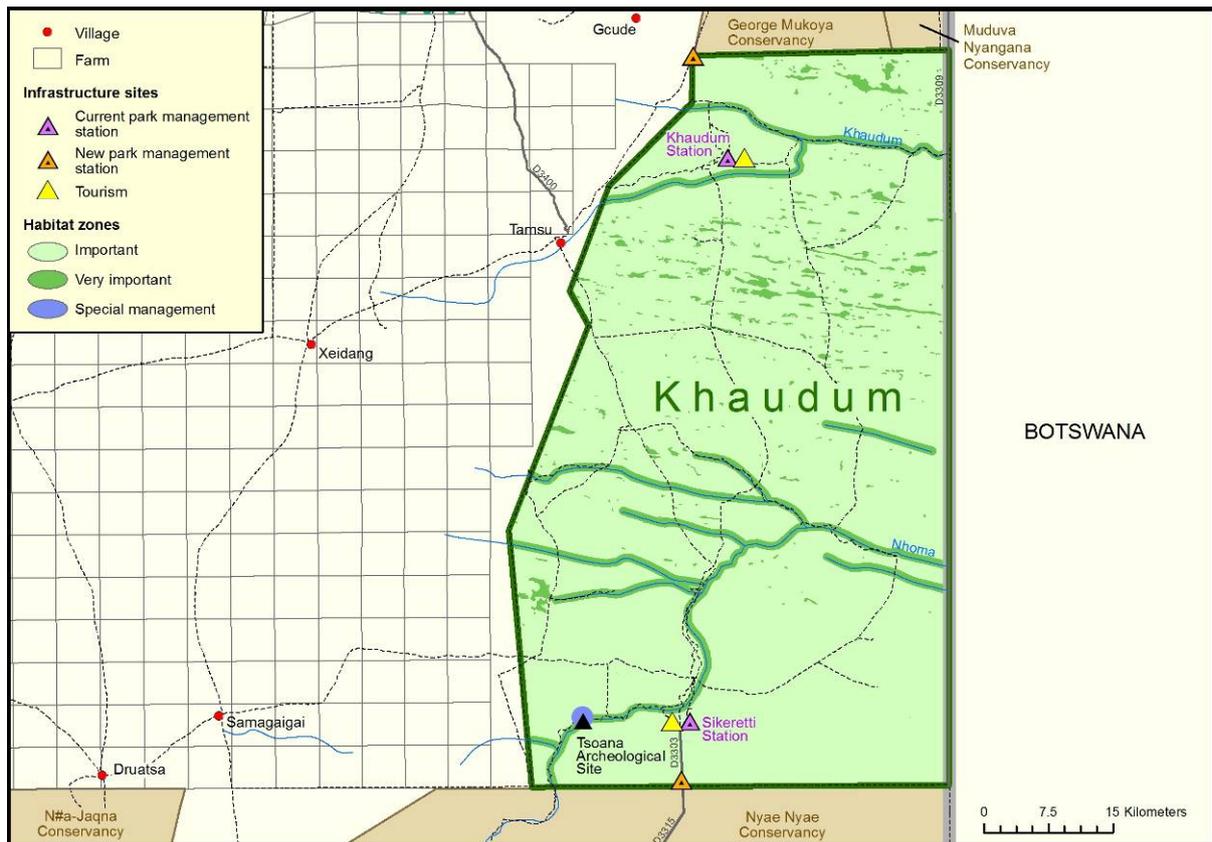
INFRASTRUCTURE DEVELOPMENT SITES

- a) Development of these sites will be subject to the environmental and other guidelines outlined in this plan and Appendix. Additional development zones may be added following the conclusion of concession agreements and further planning at park level. However, the total number and extent of these development zones will be subject to the assessment and management of potential cumulative impacts by all developments.
- b) Construction is allowed here, within the limits imposed by the management plan, business plan for Bwabwata, Mudumu and Nkasa Rupara, tourism development plans, specific concession agreements, and guided by the MET's Concessions Policy and the strategic objectives of the North-East Parks. These limits, and the approved extent of construction within each development area, must be reviewed from time to time.
- c) Some sites may be secured against large mammals or predators through the use of appropriate fencing material, and against fires through the use of firebreaks.
- d) Waste production must be minimised through implementation of sound strategies that focus on reduce, re-use and recycle.
- e) Energy use must be minimised through adopting appropriate technologies and sensible energy use policies.

Zone descriptions and guidelines for Khaudum National Park

Descriptions of the zones in Khaudum National Park are provided in Map 4 below. The key properties that should be considered during the EIA process are listed for each zone, as well as general guidelines and rules for use and management, and red flags (critical issues that have to be incorporated in planning and management).

Locations for tourism developments are indicated as point features on Map 4 and 5 (refer to Appendix 2).



Map 4: Habitat zones and infrastructure development sites in Khaudum National Park.

Khaudum National Park

| Zone descriptions | Key properties | Specific rules and guidelines |
|--|---|--|
| <p>Very Important Zone:</p> <ul style="list-style-type: none"> All seasonal and other pans The total extent and all branches of the Khaudum Omuramba and the Nhoma Omuramba | <ul style="list-style-type: none"> The omiramba contain depressions that fill seasonally and may last throughout the dry season in some cases, providing a valuable resource for wildlife, particularly roan and tsessebe. Other pans, unrelated to the two main omiramba, are also critical seasonal resources for a number of important species such as roan. Soils are loamy clays to clays, but may be more sandy, especially in the south-eastern corner. | <ul style="list-style-type: none"> Less suitable for roads than the <i>Important Zone</i> Where re-routing of roads is required, old parts should be rehabilitated. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Red flags</p> <ul style="list-style-type: none"> None </div> |
| <p>Important Zone:</p> <ul style="list-style-type: none"> The rest of Khaudum, comprised mainly of <i>Burkea africana</i> woodlands on deep sands in the north and mixed <i>Terminalia sericea-Acacia spp</i> shrubland on shallow soils overlying rock (south and southeast of Nhoma Omuramba). | <ul style="list-style-type: none"> Fire prone vegetation type. Soils mainly deep sands in the north and finer textured in parts in the south. | <ul style="list-style-type: none"> This is the preferred area for locating tourist and management roads, service infrastructure and artificial water points. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Red flags</p> <ul style="list-style-type: none"> None </div> |
| <p>Special Management Zone:</p> <ul style="list-style-type: none"> An archaeological dig site at Tsoanafontein water hole in the southwest section of the Park. | <ul style="list-style-type: none"> NA | <ul style="list-style-type: none"> NA <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Red flags</p> <ul style="list-style-type: none"> NA </div> |

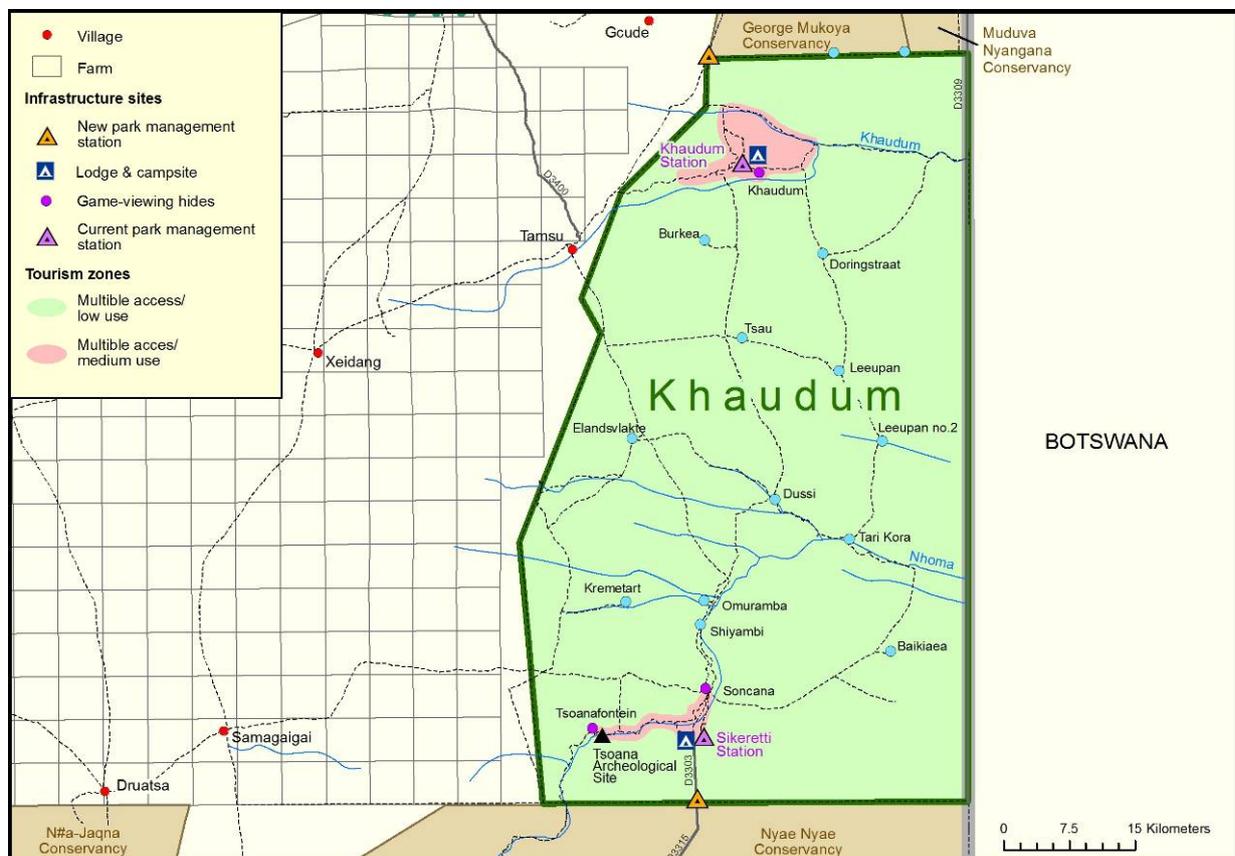
Appendix 2: Application of Tourism Zoning for Khaudum National Park

Level of use: **low use** throughout the Park, accept for waterholes and tracks in close proximity to main tourism camps of Sikeretti and Khaudum, which are zoned for **medium use** (acknowledging that use of these areas will increase at peak times - sunrise and sunset).

Tourism activity: tourism activities permitted include **game-viewing drives** and **walks** in the Park.

Tourism infrastructure:

- **Lodge sites:** Khaudum and Sikeretti camps, to be developed, operated and maintained under an existing concession agreement with the Gciriku Traditional Authority, George Mukoya and Muduva Nyangana Conservancies, and in association with their chosen operating partner;
- **Bush-camping sites:** to be identified by MET, and included within the aforementioned concession agreement;
- **Game-viewing hides or view points:** at the following waterholes – Khaudum Omuramba, Soncana and Tsoanafontein. To be upgraded, maintained and operated by the concessionaire (and their operator) in after prior consultation and agreement with MET;
- **Park entry facilities:** North-eastern corner and south-central boundary developed, operated and maintained by MET.



Map 5: Tourism zones and infrastructure development sites in Khaudum National Park.

Appendix 3: Species of special concern in Khaudum National Park

List of common mammals in Khaudum National Park

| Common name | Scientific name |
|---------------------|---------------------------------|
| African wild dog | <i>Lycaon pictus</i> |
| Antbear, Aardvark | <i>Orycteropus afer</i> |
| Bat-eared fox | <i>Otocyon megalotis</i> |
| Black-backed jackal | <i>Canis mesomelas</i> |
| Blue wildebeest | <i>Connochaetes taurinus</i> |
| Common duiker | <i>Sylvicapra grimmia</i> |
| Eland | <i>Taurotragus oryx</i> |
| Elephant | <i>Loxodonta africana</i> |
| Gemsbok, Oryx | <i>Oryx gazelle</i> |
| Giraffe | <i>Giraffa camelopardalis</i> |
| Kudu | <i>Tragelaphus strepsiceros</i> |
| Leopard | <i>Panthera pardus</i> |
| Lion | <i>Panthera leo</i> |
| Red hartebeest | <i>Alcelaphus buselaphus</i> |
| Roan Antelope | <i>Hippotragus equinus</i> |
| Spotted hyena | <i>Crocuta crocuta</i> |
| Steenbok | <i>Raphicerus campestris</i> |
| Tsessebe | <i>Damaliscus lunatus</i> |
| Vervet Monkey | <i>Ceropithecus aethiops</i> |
| Warthog | <i>Phacochoerus aethopicus</i> |

List of common trees in Khaudum National Park

| Common name | Scientific name |
|------------------------------------|--------------------------------|
| Camel Thorn | <i>Acacia erioloba</i> |
| Blade Thorn | <i>Acacia fleckii</i> |
| Candle-pod Acacia | <i>Acacia hebeclada</i> |
| Kalahari Sand Acacia | <i>Acacia luederitzii</i> |
| Black Thorn | <i>Acacia mellifera</i> |
| Paperbark | <i>Acacia sieberiana</i> |
| Umbrella Thorn | <i>Acacia tortilis</i> |
| Baobab | <i>Adansonia digitata</i> |
| Worm-cure Albizia | <i>Albizia anthelemintica</i> |
| Sickle-leaved Albizia | <i>Albizia harveyi</i> |
| Zambezi Teak | <i>Baikiaea plurijuga</i> |
| Sand Camwood | <i>Baphia massaiensis</i> |
| Kalahari Bauhinia, Coffee Bauhinia | <i>Bauhinia petersiana</i> |
| Shepherd's Tree | <i>Boscia albitrunca</i> |
| Wild Seringa | <i>Burkea africana</i> |
| Trumpet Thorn | <i>Catophractes alexandrii</i> |
| Red Bushwillow | <i>Combretum apiculatum</i> |

| Common name | Scientific name |
|----------------------------------|---|
| Trailing Bushwillow | <i>Combretum celastroides</i> |
| Weeping Bushwillow | <i>Combretum collinum</i> |
| Small Sand Bushwillow | <i>Combretum engleri</i> |
| Russet Bushwillow | <i>Combretum hereroense</i> |
| Leadwood | <i>Combretum imberbe</i> |
| Peeling Bushwillow | <i>Combretum psidioides</i> |
| Large-fruit Bushwillow | <i>Combretum zeyheri</i> |
| Sand Corkwood | <i>Commiphora angolensis</i> |
| Poison-grub Corkwood | <i>Commiphora africana</i> |
| Tall Firethorn Corkwood | <i>Commiphora glandulosa</i> |
| Firethorn Corkwood | <i>Commiphora pyracanthoides</i> |
| Lavender Croton | <i>Croton gratissimus</i> |
| Sickle Bush | <i>Dichrostachys cinerea</i> |
| Blue Bush | <i>Diospyros lycioides</i> |
| Horn-pod Tree | <i>Diplorhynchus condylocarpon</i> |
| White-leaved Raisin | <i>Grewia bicolor</i> |
| Velvet Raisin | <i>Grewia flava</i> |
| Sandpaper Raisin | <i>Grewia flavescens</i> |
| False Sandpaper Raisin | <i>Grewia retinervis</i> |
| Large False Mopane | <i>Guibourtia coleosperma</i> |
| Confetti Spikethorn | <i>Gymnosporia senegalensis</i> |
| Northern Lala Palm/Real Fan Palm | <i>Hyphaene petersiana</i> |
| Cork Bush | <i>Mundulea sericea</i> |
| Peeling-bark Ochna | <i>Ochna pulchra</i> |
| Resin Tree | <i>Ozoroa paniculosa</i> |
| Tarberry Resin Tree | <i>Ozoroa reticulata</i> |
| African Wattle Huilboom | <i>Peltoporum africanum</i> |
| Kalahari Apple-leaf | <i>Philenoptera nelsii</i> (<i>Lonchocarpus nelsii</i>) |
| Kiaat | <i>Pterocarpus angolensis</i> |
| Yellow Rhigozum | <i>Rhigozum brevispinosum</i> |
| Rolled-leaf Currant | <i>Rhus tenuinervis</i> |
| Manketti Tree | <i>Schinziophyton rautanenii</i> |
| Spine-leafed Monkey Orange | <i>Strychnos pungens</i> |
| Snake Bean | <i>Swartzia madagascariensis</i> |
| Purple-pod Cluster-leaf | <i>Terminalia prunioides</i> |
| Silver Cluster-leaf | <i>Terminalia sericea</i> |
| Blue Sourplum | <i>Ximenia Americana</i> |
| Buffalo Thorn | <i>Ziziphus mucronata</i> |

List of common grasses in Khaudum National Park

| Common name | Scientific name |
|-----------------------|-----------------------------|
| Long-awned Grass | <i>Aristida stipitata</i> |
| Common Signal Grass | <i>Brachiaria brizantha</i> |
| Foxtail Buffalo Grass | <i>Cenchrus ciliaris</i> |
| Feather-top Chloris | <i>Chloris virgata</i> |

| Common name | Scientific name |
|-------------------------------|---------------------------------|
| Broad-leaved Turpentine Grass | <i>Cymbopogon excavatus</i> |
| Couch Grass | <i>Cynodon dactylon</i> |
| Giant Crowfoot | <i>Dactyloctenium giganteum</i> |
| Common Finger Grass | <i>Digitaria eriantha</i> |
| Nine-awned Grass | <i>Enneapogon cenchroides</i> |
| Tick Grass | <i>Eragrostis echinocloidea</i> |
| Love Grass | <i>Eragrostis pallens</i> |
| Curly Leaf | <i>Eragrostis rigidor</i> |
| Pearly Love Grass | <i>Eragrostis rotifer</i> |
| Hairy Love Grass | <i>Eragrostis trichophora</i> |
| Yellow Thatching Grass | <i>Hyperthelia dissoluta</i> |
| Small Buffalo Grass | <i>Panicum coloratum</i> |
| Kalahari Buffalo Grass | <i>Panicum kalaharensense</i> |
| Guinea Grass | <i>Panicum maximum</i> |
| Common Reed | <i>Phragmites australis</i> |
| Sand Quick | <i>Schmidtia pappophoroides</i> |
| Common Bristle Grass | <i>Setaria sphacelata</i> |
| Common Wild Sorghum | <i>Sorghum bicolor</i> |
| Red Dropseed | <i>Sporobolus festivus</i> |
| Dropseed Grass | <i>Sporobolus fimbriatus</i> |
| Red Grass | <i>Themeda triandra</i> |
| Blue-seed Grass | <i>Tricholaena monachne</i> |

Appendix 4: Tourism concession recommendations for Khaudum National Park

| Concession name | Concession type | Implementation method |
|---|---|---|
| Khaudum Lodge & Campsite Concession – existing concession but requires re-evaluation and restructuring | Two lodges and campsites located at Khaudum and Sikeretti Camps, plus a limited number of associated unserviced bush-campsites | Direct award to the Gciriku community (Gciriku Traditional Authority, George Mukoya and Muduva Nyangana Conservancies) , followed by tendering to identify a new development and operating partner |
| Khaudum Activity Concessions | Special activity concessions for neighbouring lodge / campsite operators Provide regulated special use for alternative Park entry, walking, after hours access, and use of exclusive unserviced bush-camping sites | Depends on the individual circumstances of each concession, but with priority given to concessions that directly benefit neighbouring communities |

Appendix 5: Artificial water point assessment

1. Introduction

In preparation of the management plan for Khaudum National Park, field trips and meetings involving the Directorates of Regional Services and Park Management and Natural Resource Management, local communities, private sector and other stakeholders were conducted. During the field trips and meetings with the relevant stakeholders it became clear that the water supply and management thereof within the Park poses severe challenges. The current and future sustainable water supply in the park is potentially under threat and needs to be addressed as a matter of urgency.

For proper wildlife population management and introductions, the provision and innovative management of artificial water sources is critical, especially for the key species, which have been prioritised by the MET such as roan, tsessebe and wild dogs.

However, the provision and management of artificial water is a complex matter, particularly in an area that is devoid of surface water for much of the year, but hosts certain animal species, which have adapted to these conditions. While the provision of artificial water points may increase populations of these species, it may affect other species adversely. These impacts are often poorly understood and any intervention to supply water must therefore always be carefully considered.

The objective is thus to maintain existing water points in good working condition whilst additional artificial water points for wildlife within the Park are discouraged. However, subject to risk analysis, water may be strategically located to increase the numbers of vulnerable, rare or threatened species, or for economic reasons such as tourism in the Park and for Park management facilities, provided this does not adversely impact on priority habitats or important species. In natural ecosystems water may be a highly variable resource; provision of artificial water should thus, as far as possible, mimic natural variability over time and space.

Thus, in order to secure the supply of water in the Park for domestic and wildlife use an extensive hydro-geological study on regional level, to determine the groundwater potential and safe yield is of utmost importance for the future management of a sustainable water supply in the Park and in the region.

2. Findings

The information or rather lack of information on the current water supply situation obtained during the drafting of the management plan for Khaudum prompted to call for a desk study on the hydrogeology of the Khaudum National Park and surrounding areas. The objective is to evaluate all existing information and prepare recommendations for the development of a sustainable water management plan. Although very little data of valuable use could be obtained, several obvious shortcomings were identified.

- a) Insufficient information is currently available to fully understand the extent of the aquifer and the flow mechanisms thereof.

- b) Borehole construction and development seems to have been neglected and not done appropriately to suit the local conditions, resulting in a decline in yield.
- c) Pump installations appears to be based on historic installed capacities and not on scientifically established individual borehole yields.
- d) The actual safe yields of the boreholes are not known and thus not utilised to its ideal correct potential.
- e) Maintenance of the boreholes and the installations is severely neglected with no emergency plans in place.

3. Recommendations

From the desk study it appears that no immediate threat to the long-term underground water potential exists. The finding however is based on very limited information available for the assessment and further studies are required in order to safely develop a water management plan.

In order to secure the future sustainable water supply within the Park, the following tasks should be undertaken as a matter of urgency.

Phase 1

Embark on a water point survey in the Park and surrounding areas, evaluate the data obtained and assess the current situation. The water point survey consists of the following information gathering: Verify the location, depth, water level, diameter, yield, installed equipment, current abstraction, water quality, etc. Based on the findings, prepare a status report and recommendations for the next task. The duration of this task will be approximately four (4) weeks.

Phase 2

Embark on the rehabilitation of existing boreholes and or site and drill new boreholes as standby where required, for wildlife management where appropriate, for Park stations and tourism facilities and test pump all boreholes in the Park as identified under the first phase. Evaluate all data obtained during this task and prepare a final report. The duration of this task will be approximately twelve (12) weeks.

Phase 3

Establish seasonal water demand patterns and peak demands and based on safe borehole yields and wildlife management requirements, identify water points to be developed for standby, for antelope troughs only and others for both antelope and elephant. Based on wildlife management requirements, design and install each water point to the identified purpose including standby storage and generator pumping for dry season where appropriate.

Establish a proper groundwater monitoring system and early warning systems and capacitate Park staff to continuously monitor and maintain the installations. Due to

the long periods required to perform these activities, it is highly recommended to start with the process as soon as possible.

4. Development requirements

Based on the identified requirements in the Park management plan, the following new water supply points should be developed:

- a) A new borehole for the proposed new Park station to the west of the southern entrance road from Tsumkwe (New Sikeretti).
- b) A separate borehole for the current Sikeretti station to be utilised for tourism only. The status of the existing borehole should be investigated and if appropriate be reinstated.
- c) A new borehole for the proposed new Khaudum station to the north western corner of the Park (New Khaudum)

Based on the current status of the existing water points in the Park, the following water supply points should be further investigated and where appropriate, be rehabilitated:

- a) **Kremetart:** The reason for not being utilised should be established and if appropriate, this water point should be reactivated possibly only for antelope.
- b) **Elands Vlake:** The reasons for collapse of both boreholes should be established and the boreholes rehabilitated and developed accordingly. Due to apparent reasonable yields in the area, the water point should be developed for antelope and elephant.
- c) **Dussi:** The exact status of both boreholes should be established and the boreholes rehabilitated and developed accordingly. Due to apparent limited yield in the area of Dussi, the water point should be activated for antelope only.
- d) **Omuramba:** The condition of the borehole and safe yield should be established and the water point developed for antelope and elephant.
- e) **Ciambi:** No information could be obtained. The status should be established and if appropriate, the water point should be developed for antelope only.
- f) **Soncana:** The status of the well and borehole(s) and safe yield(s) should be established and the water point upgraded accordingly. The borehole should supply the water point only and Sikeretti should receive a dedicated borehole.
- g) **Baikia:** The condition of the borehole and safe yield should be established and the water point developed for both antelope and elephant due to the apparent reasonable yield and for attracting elephant west and possibly to Botswana.
- h) **South East:** The status of the undeveloped borehole should be established and if appropriate, this water point should be developed.

- i) **Tari Kora:** The condition of the borehole and safe yield should be established and the water point developed for antelope and elephant.
- j) **Leeupan:** The condition of the borehole and safe yield should be established and the water point developed for antelope and elephant. Information indicates that another borehole might exist (Leeupan 2) or even a third (Leeupan Suid) which should also be investigated and if found to be appropriate, be developed for antelope only or as a standby for emergencies.
- k) **Tsau:** The condition of the borehole and safe yield should be established and the water point developed for antelope and elephant.
- l) **Doringstraat:** The exact status of the borehole should be established and the borehole rehabilitated and developed accordingly. Due to apparent limited yield in the area of Doringstraat, the water point should be activated for antelope only.
- m) **Burkea:** The condition of the borehole and safe yield should be established and the water point developed for antelope and elephant.
- n) **Khaudum 1:** The condition of the borehole and safe yield should be established and the water point utilised for tourism only.
- o) **Khaudum 2:** The condition of the borehole and safe yield should be established and the water point developed for antelope and elephant.
- p) **Unknown:** Any other boreholes in the Park should be identified and their status established and where appropriate should be developed for antelope only or as standby for emergencies.

5. Recommended water point infrastructure

Due to the high water demand in the dry and hot season from August to December, each water point should be developed to the specific wildlife management requirements and the safe yields of the borehole in order to optimise on the sustainable yield of each. For ease of management and maintenance, the installations should be standardised with optional extensions as the needs might change.

The pump and photovoltaic installation has to be designed individually according to the head (depth) and established required yield for each borehole. The storage should be designed individually for each water point based on the safe yield and demand. Where appropriate, the supply to the antelope trough and to the elephant trough has to be designed individually in a fashion that supply can be regulated where needs dictate such. Each borehole has to be installed with proper water management devices to monitor abstraction rates, groundwater levels and rainfall. Each borehole with installation has to be protected with a properly constructed trench (ringsloot).

a. Borehole

The pump, photovoltaic controls, sun tracking device and water management devices should be housed in an enclosed structure. This structure should form part

of the elevated storage structure which should also form the frame for the solar panels. Solar batteries for the water management devices and electric fence around the antelope trough as well as the standby generator should also be housed in the enclosure. The storage should be at least three meters above ground, consist of pressed steel panels and have a capacity of at least forty cubic meters. Water should only be pumped into the elevated storage from where it is gravity fed into the antelope trough and elephant trough. Only excess supply should flow into the mud bath. Where supply is limited, the pumps should be switched off once the trough(s) and storage are full. The entire photovoltaic and standby generator controls should be designed and installed to allow for continuous supply during emergencies.

b. Antelope Trough

The antelope trough should be provided at least one hundred meters away from the borehole and the elephant trough respectively. The trough should be of a small shallow depression, containing not more than five hundred litres of water. Supply to the trough should be regulated with a valve preventing overflow and spillage, fed from the storage. The outlet for cleaning of the trough should drain into the natural depression (pan) for the elephant mud bath located at least one hundred meters away. An electric fence, two to two and a half meters high should be erected at least twenty five meters around the trough. The fence posts should be protected with sharp stones or in the absence of such, with pre-cast concrete cones installed for two meters around the posts. An additional straining wire above the electric wires should be installed to prevent avian casualties. *(The need for giraffe access has to be confirmed)*

Alternatively, the same trough could be protected with a five meter wide perimeter ring of pre-cast concrete cones, installed approximately three hundred millimetres apart to prevent elephant from crossing the ring but still allow antelope to step between the cones. *(The suitability for rhino has to be confirmed)*

c. Elephant Trough

The elephant trough should be provided at least one hundred meters away from the borehole and the antelope trough where provided separately. The trough should be of a medium shallow depression, containing not more than five cubic meters of water. Supply to the trough should be regulated with a valve preventing overflow and spillage, fed from the storage. The outlet for cleaning of the trough should drain into the natural depression (pan) for the elephant mud bath. Only where adequate sustainable supply is available, the overflow from the storage should drain into the mud bath. The mud baths should be kept small to prevent unnecessary loss of valuable water due to infiltration and evaporation. In the event of severe hot and dry conditions, adequate water for the mud baths should be provided by standby generator and possible standby boreholes.

d. Ringsloot

The trenches around the boreholes (ringsloot) should be at least one meter deep and one meter wide with the excavated material forming an elevated outside ring which in turn should be approximately half a meter high and half a meter wide. The walls around the trenches should be constructed with natural stone or in the

absence of such, with brickwork or concrete. No crossing over the trench should be installed at all.

e. Pipework

All pipe work should be laid at least one meter below natural ground level and be of a high pressure quality.

f. Borehole Monitoring

The borehole monitoring system should comprise of the following:

1. Water meter to record abstraction
2. Flow meter to record pump rate/usage
3. Level meter to record water level
4. Rain gauge to record rainfall

With proper record keeping, the annual recharge can be determined and the long term sustainable yields established.