

**Dinder National Park
Management and Utilisation Plan
2011-2015**

FINAL DRAFT

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Acronyms and Abbreviations

CDC	Conservation Development Corporation
DNP	DinderNational Park
DNPP	DinderNational Park Project - UNDP/GEF
ERV	Exceptional Resource Values
GEF	Global Environment Facility
HCENR	Higher Council for Environment and Natural Resources
KWS	Kenya Wildlife Service
LFA	Logical Framework Approach
MIC	Ministry of International Cooperation
MP	Management Plan
MTAW	Ministry of Tourism, Antiquities and Wildlife
NGO	Non-governmental organization
RAMSAR	Ramsar Convention (The Convention on Wetlands of International Importance)
TANAPA	Tanzania National Parks
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCGA	Wildlife Conservation General Administration

Summary

This 5-year (2011-2015) Management Plan (MP) for Dinder National Park (DNP) has been produced according to the model of the Protected Areas Planning Framework - Planning Manual developed and applied in East Africa, with some modifications to take into consideration the circumstances and needs of Sudan and to make the plan more relevant to the management needs of Dinder National Park. One difference between the PA Planning Framework and the current Management Plan is that the former sets 10 year Strategic Objectives, and 3-year Action Plans. The current Management Plan has a single 5-year horizon, and future versions of the Plan might consider adopting the twin-track approach of a longer term Strategic Vision, combined with shorter term Action Plans.

A consultative, negotiated approach has been adopted to develop the MP, which has brought together representatives from all the major DNP stakeholders: Wildlife Conservation General Administration (Headquarters and Dinder Park management), Ministry of Tourism and Wildlife, other federal ministries, State governments, conservation and social development NGOs, commercial farmers and local communities - including both farming and pastoralist groups.

The process involved a series of stakeholder consultations, working groups and planning team meetings, culminating in a Validation Workshop, which enabled the diverse interest groups to work together constructively and where necessary to reach compromises, aimed at achieving a consensus that will best protect the Dinder ecosystem in the long term. Consequently, the final product provides a strong beginning that could lead to the future management of the area that all are agreed upon. However, because the time was limited for such a broad-based process, and because the previously produced management plan was never subjected to the testing of its proposals, the Management Plan recommends a number of further development stages towards an operational management plan.

The Management Plan is organized under three Management Programmes. These Management Programmes are designed to facilitate plan implementation by building a sense of ownership and accountability for delivering specific components of the MP in the concerned section of DNP management. Each programme consists of a long-term strategy, with management objectives, targets, actions and, where appropriate, management prescriptions for the full 5 years of the MP.

Another key aspect of this Management Plan is the application of the "Logical Framework Approach" (LFA). The main feature of the LFA is the explicit and logical linkages established between the MP's management objectives, targets and the 5-year Action Plans. The application of the LFA has helped develop a Management Plan that can be effectively and efficiently implemented, as well as more easily monitored and evaluated.

To complement these innovations, the Dinder Management Plan should be produced in a loose-leaf format to ensure that the plan remains a dynamic document able to incorporate future additions, such as amendments and updates to the Action Plans as required. This adaptability will help keep the Management Plan up-to-date and better able to guide park management activities throughout its 5-year lifespan.

Park Purpose and Exceptional Resource Values

The purpose of DNP as defined through stakeholder consultation is:

The conservation of biodiversity in the park by encouraging species and habitat protection and the sustainable use of resources through the integration of local communities in the utilization and management of the natural resources of the park.

This purpose statement is derived from the Park's Exceptional Resource Values (ERVs), which have been divided into three categories: Natural, Social and Cultural. The most important of DNP's ERVs as identified by stakeholders include:

- the woodlands and wetland habitats provide the principal justifications for Dinder's Biosphere Reserve and RAMSAR site status;
- wild large mammal and bird populations and related biodiversity;
- a large water catchment area, which is vital to the people living outside the Park as well as Dinder's biodiversity;
- the last remaining example of intact natural savanna woodlands in the eastern part of northern Sudan, which is valued by the people of Sudan and by the local stakeholders as part of their heritage for its wilderness value
- natural resources of value to local communities for sustainable livelihoods
- the potential for revenue generation through carbon sequestration and the longer term potential to attract tourists and revenue to Gedaref, Sennar and Blue Nile States and to neighbouring communities.

Zoning Plan

The zoning of DNP aims to provide a framework for achieving and reconciling the twin management needs of protecting the natural qualities and environment of the Park and regulating and promoting sustainable resource use. The previous DNP zoning scheme contained three zones, which proved acceptable but were geographically complex; in the event they were never implemented for reasons described below. These zones are retained but the boundaries are realigned and simplified; their exact boundaries should be the subject of a participatory process involving DNP management and local stakeholders. The three zones are: Core Zone, Buffer Zone and Transition Zone.

The Core Zone covers 53 per cent of DNP and incorporates the key central habitat areas of the Park, including the mayas of the Dinder River drainage system and associated nearby savanna areas. The road network should be very limited in this zone and visitor activity should be limited to a few key maya sites, with the majority left undisturbed. This zone should contain no permanent structures; apart from a limited camp for use by DNP management.

The provisional Buffer Zone covers some 26 per cent of DNP and is contained between the Transition Zone and the Core Zone. This zone should have a lower intensity of use by people than the Transition Zone. The Management Plan stipulates that only low impact human use will be permitted in this zone, such as collecting dead wood, limited use of non-timber forest products and fishing in a small number of designated areas. Tourism use along designated roads may also be developed in future.

The Transition Zone, as currently outlined, covers roughly 21 per cent of DNP and for the most part is a 5km wide area just inside the boundary of the park, although areas enclosing villages – at the north end of the Rahad River and in the Kedalo village cluster in the south – include a wider area. This zone is the area with the highest level of human use. The land uses allowed in this zone must be compatible with the conservation of wildlife and habitats, but could include a controlled level of grazing and fishing, forest and fuelwood plantations, bee-keeping, horticulture (the growing of fruit trees), gum Arabic production and other activities that leave the soil structure intact. Agroforestry and small scale farming may be permitted within prescribed sub-zones around existing villages. Tourism activities, such as low impact tented camps may be considered in future. The land use rules of the different sub-zones and their geographical locations will be established in a participatory process involving local stakeholders in the small-farming and pastoralist communities. An additional area of Transition Zone of 5km width outside the park boundary would be promoted in coordination with State authorities.

Management Programmes

The MP's three Management Programmes are:

1. Ecosystem Management Programme – concerning management and activities inside the park
2. Land use and Community Outreach Programme – concerning activities aimed at conservation of the broader areas outside the park
3. Park Operations Programme – governance of the park and its relations with other stakeholders

The key features of these Programmes are described below:

1. Ecosystem and Park Management Programme

The MP's Ecosystem and Park Management Programme is based on a simplified ecological management and monitoring approach that has been adapted from the latest international conservation planning methodologies and best practice. In line with the Biosphere Reserve concept, the Ecosystem Management Programme aims to ensure that all components and processes of the naturally evolving Dinder ecosystem are conserved through strategies designed to reduce specific threats to the relevant ERVs and to provide significant, conservation-compatible benefits to human land users. Management actions to reduce threats to animal populations and the Dinder River system will concentrate on using sound ecological understanding to inform, influence and collaborate with key stakeholders. Fire plays a critical role in shaping the Dinder ecosystem and a Fire Management Plan will be developed and implemented during this Management Plan to control and minimize the damage caused by wildfire and direct the use of prescribed fires for management purposes. A Watershed Management Plan should also be developed.

A key aspect of the Ecosystem Management Programme is the development of a transparent, equitable and effective mechanism for planning and managing sustainable natural resource use in the Transition and Buffer Zones within the Park, in parallel with a similar approach in a Transition Zone to be promoted outside the park.

The Programme recognizes the need to develop a framework for a simple and cost-effective Ecological Monitoring Plan for DNP, based on the Park's ERVs and their key

attributes. The Ecological Monitoring Plan should be formulated so as to enable an assessment of the Ecosystem Management Programme's interventions as well as facilitating adaptive management.

2. Land Use and Community Outreach Programme

The Land Use and Community Outreach Programme aims to elicit the support and collaboration of the communities surrounding DNP in safeguarding the integrity of DNP's resource values. Proposed activities to achieve this will include a conservation education programme for park-adjacent communities, and improving park-community communication and cooperation. The major focus of this Programme will be to re-invigorate the community engagement activities begun under the earlier UNDP-GEF project. This will involve revising the UNDP/ DNP planning process to ensure that all current and future projects address both community development needs (especially of marginalised groups) and ecosystem conservation priorities. A key area for future support is to identify and establish conservation-friendly income generating activities and secondly, the mitigation of human-wildlife conflicts. Linked to this will be the provision of support for community-based natural resource management in the DNP Transition zones outside the park.

A second, broader objective of the Land Use and Community Outreach Programme is to develop a continuing dialogue and coordination with the State authorities responsible for planning and supporting natural resource based land use in the regions surrounding the park. The area of land use planning coordination that is of especial importance to the conservation of DNP is the scope for tradeoffs between the mechanized farming and the rangeland/ pasture/ forest management sectors, so as to reduce the pressure on the park resources for supporting local livelihoods. The development – within the current extensive landscapes of mechanized farms – of more substantial grazing and watering areas for pastoralists, multiple use forest areas and more space for small farmers will increase social equity, reduce the potential for civil conflict and benefit rural livelihoods, and will allow the development of wildlife-compatible land around the protected area.

A key opportunity for coordination is with international donors and donor-funded projects in natural resources sectors. There are several such projects underway or in the planning stages of each of the three States, which are generally aimed at improving rural livelihoods and reducing land use conflicts through improvements in agriculture and pastoralism. An irrigation and rural development programme relating to the proposed canal from the Roseiries dam offers both threats and opportunities for the Transition zone around DNP, as does the proposed exploration for oil and gas by the White Nile Petroleum Operating Company in the area of Sennar State including the park.

3. Park Operations Programme

The Park Operations Programme aims to enhance the efficiency and effectiveness of DNP park operations, such that DNP becomes a role model nationally and internationally. The Management Plan problem analysis identified unsustainable land use within and outside the park as the priority management issue to be addressed by this Programme. In response, DNP management will investigate and pilot new community engagement techniques; re-equip its protection department with the necessary modern equipment; build ranger-local community cooperation and anti-poaching rewards schemes; and provide training to Village

Development Committees to protect conservation areas in the DNP buffer areas. Another priority for this Programme is to achieve best practice in park administration and management systems. The first action to achieve this will be to build the capacity and motivation of DNP staff - through relevant training, the provision of better medical services, and improved education opportunities for staff and their dependents. Other management actions include:

Monitoring Plan

A Management Plan monitoring framework makes up the final section of this document. The framework is designed to provide guidance for the regular assessment of the impacts, positive and negative, resulting from the implementation of the major management targets and actions laid out in this MP, and a basis for subsequent adaptive management. The framework includes easily assessable indicators for measuring these impacts.

1. Introduction

1.1 Context

Dinder National Park (DNP) is one of the oldest parks in Africa. It was established in 1935 following the London Convention of 1933 for the conservation of African flora and fauna. Its boundaries were extended to the north and west in 1986, after concerns had been expressed that the area of the park did not provide sufficient land to encompass the wet season movements of some ungulate species. The inward migration of people to the area and steady and extensive conversion of rangelands to commercial, mechanized agriculture in the State lands surrounding the park since the 1960s had by then removed much of the habitat for wet season wildlife migrations.

DNP is one of ten national parks in Sudan and is the only one in the north-eastern savanna zone (Figure 1). It is the only park in northern Sudan with a management plan. This Management Plan is the second such plan to be written for Dinder National Park, and it is intended to provide guidance for the 5-year period from 2011 to 2015.

The first DNP management plan (2004-2009) was developed as part of a broader programme of planning and implementation undertaken during 2002-2005 in the Dinder National Park Project (DNPP), implemented by the Higher Council for Environment and Natural Resources (HCENR) in coordination with the Wildlife Conservation General Administration (WCGA), with funding from GEF (Global Environment Facility) through United Nations Development Programme (UNDP). The plan provided for the first time, in a single document, details of the policies guiding DNP's management objectives for the Park as a whole as well as for DNP governance. Task priorities and a provisional budget were laid out for establishing a comprehensive park-wide zoning scheme as well as for addressing the management issues facing the conservation threats facing DNP.

The DNPP confirmed the observations of many earlier studies that the problems facing conservation of nature in the park were enormous and were largely coming from outside the park. Land use conflicts and lack of coordination – particularly expansion of mechanized farming to the detriment of rangeland and forest cover for grazing and browsing animals, both domestic and wild – resulted in intensification of land use around and within the park. Similar conflicts over land use have led to armed struggles, and human death, injury and displacement, in other parts of the country. At the same time, there is no land for wildlife movements outside the park, and increasingly there has been habitat degradation and killing of wildlife inside the park. For the ecosystem of the park to survive, solutions to management problems must be rooted in solutions to conflicts over land use in the State lands surrounding the park. Such solutions are beyond the capacity of DNP managers to influence on their own, and require partnership with neighbouring groups and a broad scale vision.

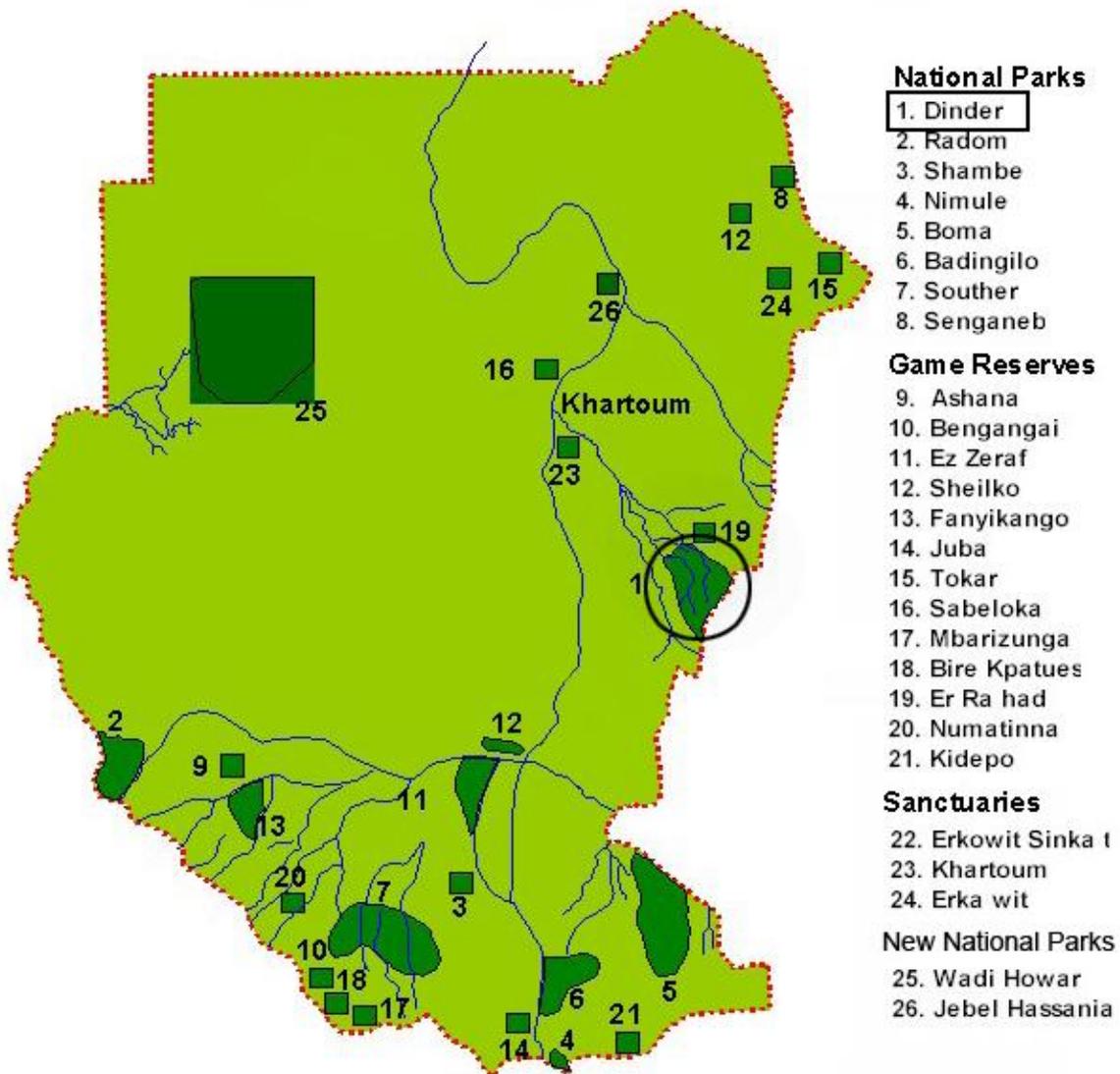


Figure 1. Location map of Dinder National Park (from DNPP - Dinder NP Management Plan 2004)

For the reasons noted above, the DNPP employed an ecosystem approach, in line with the Biosphere reserve concept; DNP had been designated a Biosphere Reserve under the UNESCO Man and the Biosphere programme in 1979, so the 2004 Management Plan was quite correct in emphasizing this principle. The ecosystem approach is a strategy for integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Thus, the application of the ecosystem approach would seek a balance of the three objectives of the Convention on Biodiversity; conservation, sustainable use and the fair and equitable sharing of the benefits arising from the utilization of genetic resources. Like the ecosystem approach, the Biosphere Reserve concept involves people in biodiversity conservation, linking ecology with economics, sociology and politics.

The management of the park as a Biosphere Reserve, with wildlife protection integrated with human social development, has faced administrative obstacles due to the nature of its governance structure. The WCGA has had an uncertain position within the government hierarchy, having been located within different Ministries, including the Ministry of Animal Resources, Ministry of Agriculture and most recently the Ministry Interior at various points in the past. The time spent under the Ministry of Interior involved the incorporation of the wildlife authorities within the national police service, and this experience established a culture emphasizing armed enforcement of wildlife legislation, with little opportunity for cooperative relations with local authorities and community members. This direction is in contrast to the best practice approaches developing in other countries in West, East and southern Africa, where coordination with local stakeholders is seen as the key for conserving protected area ecosystems. The DNPP activities in community-based development helped the WCGA build relationships with villagers, particularly along the RahadRiver, and these links must be revived and strengthened. At the time of writing, the WCGA has been transferred to the Ministry of Tourism, Antiquities and Wildlife (while some links such as salaries and pension payments have been retained to Ministry of Interior) has improved the potential for a more inclusive approach to wildlife conservation.

Unfortunately, the 2004 plan was never implemented,so the approach and proposed activities were not subjected to testing, and lessons could not be learned that could inform the development of the current revision. The intention of the DNPP had been to continue in a handover phase, but with bottlenecks in funding commitment from UNDP and the lack of a matching funds commitment from State governments, the project came to an abrupt and unexpected end in 2005. Funding from the federal government for DNP core activities was very limited during the time that WCGA was fully within the Ministry of Interior and the financial allocation has remained small even up to the present. When the DNPP ended, the social development activities it had begun were also suspended and the positive developments lost momentum. There was therefore no opportunity to test the approaches proposed in the first Management Plan, to see which were most effective and realistic, and where improvements or refinements could be made.

The production of this second version of a management plan for DinderNational Park was undertaken in a short-term consultancy during May-October 2010. Since such a limited time was available for the consultation and planning exercise, and in the absence of "lessons learned" from implementation of the first plan, the data gathered were supplemented with the "best practice" experience gained from attempts to develop and

refine park management plans in other regions. A successful model is the Protected Area Planning Framework that has been developed in East Africa by the Conservation Development Corporation (CDC) in partnership with protected area agencies in Kenya and Tanzania, and it is very similar to planning frameworks developed in Botswana and Ghana. A principal lesson from these exercises is the need for an effective and actionable plan, with clearly defined and distinct objectives at various levels and with explicit linkages between them, termed the Logical Framework Approach. Another key lesson is that zoning should be a management tool, not a planning tool per se, and that therefore this Management Plan should make use of zones but not be primarily organized according to them.

A clear lesson learned in other parts of eastern, southern and western Africa, as noted above, is that the wildlife populations and habitats of parks cannot persist in isolation from their surroundings, but must coexist with the land users in the areas surrounding them. This realization has led to a great diversity of attempts – with varying degrees of success – to involve local communities and land owners in benefits from the natural resources of the regions around the protected areas. While this principle was already recognized by the DNPP, there is one crucial difference between these examples and the situation in DNP: all such experiences in other countries have involved communities in the use of natural resources, wild plants and animals, in areas **outside** the park, so as to create a zone of conservation-compatible multiple land use around the core protected area which is the source of wildlife populations. In this multiple use zone, there is opportunity for ecotourism and safari hunting as well as other natural resource-based income generation mechanisms.

In the case of DNP, however, human land use and habitat conversion comes right up to the boundaries of the park on all sides, so there is at present little scope for multiple use zones outside the park, and the current prospects for tourism are very limited. For this reason, the models for achieving park-related community benefits developed elsewhere cannot be applied very easily in DNP. Instead, any social benefits for local people will have to be developed in zones of conservation-compatible land uses **within** the protected area, in the first instance at least. At the same time, land use conflicts must be reduced and more sustainable land uses must be encouraged outside the park, with the expansion of wildlife habitat and multiple use outside the park as a longer term objective.

1.2 Function and structure

A “best practice” Management Plan should guide and facilitate the management of park resources, the uses permitted within the area, and the infrastructure development needed to support that management and use. It is necessary to establish long-term strategies and management objectives aimed at addressing the area’s management problems and issues and for achieving a desired future state over the duration of the plan. The objectives provide the framework for determining what management actions need to be implemented, when to take them, and the human and other resource requirements needed to implement them. These management actions, with realistic targets and the specific activities needed to accomplish them should be developed on a shorter time horizon and re-developed every according to the changing Park management needs.

The best practice approach taken in some management plans sets long term strategic objectives on a scale of 10 years, with shorter term Action Plans on a cycle of, for example, 3 years. Since the problems facing DNP are so comprehensive, a new start is needed in its conservation. For this reason, the current Management Plan and its Action Plan is based on a single 5-year time period. Once the current plan is launched and there is the opportunity to learn from the experience, it may be appropriate for future versions of the Management Plan to consider adopting the twin approach of 10-year long term strategic objectives, and 3-year short term Action Plans.

The DNP Management Plan follows the generic General Management Plan structure established in East Africa by Tanzania National Parks (TANAPA) and Kenya Wildlife Service (KWS). However, the DNP Planning Team has made several adjustments to the planning process and plan structure to take into account the special needs of DNP. In particular, emphasis has been placed on making the plan more relevant to the management needs of DNP park managers. The key aspects of the plan structure are described below.

1.3 Strategic plans and action plans

Many general management plans typically have a 10-year planning horizon, with both management objectives and actions established on a 10-year timeframe. This Management Plan takes a similar approach, but on a shorter time frame, incorporating both 5-year strategic and 5-year action planning timeframes. As noted above, a future version of the plan might retain a longer term objective, but a shorter time Action Planning cycle. This structure would ensure that the GMP retains a long-term strategic vision while at the same time providing the required flexibility and responsiveness to changing Park management needs and priorities, such that the GMP remains relevant to the day-to-day management issues and needs of DNP management staff.

Either approach should aim to ensure that there is a strong link between the actions prescribed by the Management Plan and the Annual Work Plans (AWPs) developed by park management, which are directly linked to the corporate annual budgeting cycle of DNP Headquarters and the WCGA.

1.4 Logical Framework Approach

Another key innovation in this Management Plan is the application of the “Logical Framework Approach” (LFA), also known as the “logframe” approach. The LFA is now the methodology of choice in development project planning, and provides an efficient, accountable and logical rationale for planning that will result in a Management Plan that can be more effectively and efficiently implemented, as well as more easily monitored and evaluated. The main feature of the LFA is the explicit and logical linkages established between the Plan’s 5-year management objectives and the activities in the Action Plan, and ultimately the management tasks in an Annual Work Plan.

1.5 Participation

The DNP strategic planning process aims to ensure that the national park's stakeholders are given an appropriate opportunity to contribute to the design of the MP, as required by the Terms of Reference of the process. In this way, the stakeholders are encouraged to buy into the planning process, to ensure that the plan is both realistic and appropriate and that they are committed to its implementation. There is also the intention that stakeholders with differing interests will have an early opportunity to discuss and negotiate some of the aspects of the Plan structure and content.

At the outset, the DNP Core Planning Team developed a Stakeholders consultation plan for structuring the planning process. The planning process consequently adopted for the Dinder Management Plan involved a multi-layered approach to participation, the objective being to provide an opportunity for as many stakeholders as possible to contribute to the planning process within the relatively short time available.

With a limited time available for the current consultation exercise, there could be only a beginning of the negotiation process that would be needed to achieve full consensus on the many issues constraining conservation of DNP. The experience of best practice in the field of multi-stakeholder dialogue and conflict resolution has shown that successful negotiation through conflicts over natural resources requires a long and thorough engagement of the contending stakeholders, to build trust and explore fully the scope for compromise and agreement.

Within these constraints, some 300 stakeholders at all levels were involved in the direct consultations, working groups and Workshops. These stakeholders comprised:

- Federal level – Over 50 individuals in groups based in Khartoum included federal government Ministries and departments in environmental sectors including Tourism, Antiquities and Wildlife, Agriculture, Animal Resources, Environment and Natural Resources, Energy and Irrigation, as well as NGOs, international organizations, research institutions, donor-funded projects and donor representatives. Regular discussions were held with stakeholders in the EU Delegation and in the Ministry of International Cooperation.
- State level – Stakeholders in each of Gedaref, Blue Nile and Sennar States. These included State level Ministries and departments in environment and natural resources sectors, NGOs, university researchers, farmers and pastoralist union representatives, donor-funded project members. Staff from Dinder National Park, in either Dinder town or Galegu, were also consulted.
- Village and pastoral group level – Locality and village representatives, and individual villagers and nomadic pastoralists, from the many villages in the Rahad River area in Gedaref State, Kadahlo area in Blue Nile State and Dinder Locality in Sennar State.

It was notable that even after several weeks of investigation, new stakeholders with useful information and viewpoints were still being discovered. A summary of stakeholders interviewed is provided in Annex 1.

1.6 Process

As detailed above, this Management Plan has been developed through an exploratory, participatory process in an attempt to gain broad-based support from among the Park's varied stakeholders. The timeframe, main activities and outputs of the planning process are illustrated in Annex 2.

The planning process began with a meeting of the DNP Core Planning Team, which was followed by an intensive stakeholder consultations leading to the production of an initial summary of viewpoints. The initial site visits to Dinder National Park and each of Gedaref, Blue Nile and Sennar States took place during 3rd – 14th June, while meetings were held with stakeholders in Khartoum throughout the period from 25th May to 8th July. Additional stakeholder meetings were held in Khartoum during 12-28 October. Available data that could be applied with GIS was sought and an initial basemap was prepared but it is recognized that this is very rudimentary. A wide range of geographically referenced data have been collected by different groups, including UNDP's Crisis and Recovery Mapping and Analysis Project, but some of these data are still held within currently ongoing projects and were not yet available for use in the planning exercise. Their release and incorporation into a Dinder map system would be very useful, to help with zoning and infrastructure planning.

Outputs from stakeholder consultations include:

- An initial identification of DNP conservation threats
- Stakeholder interests and opportunities
- Information on research published on Dinder, and data gaps
- Key components for the structure of the management plan.

Socio-economic surveys of the communities along the Rahad River and ecological baseline surveys of DNP were undertaken in 2001 during the DNPP. There was, however, no up-to-date information on the socio-economic conditions or of the natural resources of the area, and this was identified both as a key information gap and an item needing directed action. Reliable survey data on wildlife populations and vegetation conditions are now a decade old and are in urgent need of updating. There has been no aerial census of the Dinder wildlife populations and few studies to establish the extent of and reasons for wildlife movements. The only data on human demography and household incomes date back to the time of the DNPP, and these surveys did not include communities inside the park in Blue Nile State or some kilometers outside the park in Sennar State.

The round of direct consultations was followed by structured one-day working groups held during the week of 23rd – 20th June. Stakeholders at the State and local level, who were actively consulted during the initial consultation process, were invited to attend working groups where the emerging issues identified during individual contacts were discussed and negotiated with everyone in the same room, together with a facilitator. The Working Groups were held in the capitals of each of the three States, with representatives of DNP management present.

Each group debated the value of the park, the threats to its existence and actions that could be taken to preserve it in general terms. There was discussion of management programmes that could be undertaken to:

- protect the ecosystem within the park and the activities that should be allowed in core, buffer and transition zones.
- encourage equitable land use planning and conflict resolution over land use outside the park, including conservation-compatible land use in the transition area around the park
- Improve governance of the park for management of wildlife protection, its human use zones and the relationship between its managers and land users outside the park.

The outputs of the three Working Groups were presented back for review at Validation Workshop in Khartoum on 7th July 2010. This workshop brought together the Working Group stakeholders from all the States and representatives of organizations with a national mandate, including federal Ministries and Departments, NGOs, donor organizations and projects.

The final stage in the process involved the draft Management Plan being reviewed by all stakeholders, revised according to comments received, along with additional information collected and discussion of the Management Plan, its Action Plan and Budget at a Presentation Workshop in Khartoum on 27th October 2010. Participants invited to the Presentation Workshop included all those who attended the previous workshop, as well as representatives from all the main donor organizations.

2. Park Values and Purpose

2.1 DNP Exceptional Resource Values

Exceptional Resource Values (ERVs) are the biophysical features of a national park that are assessed as being especially important to maintaining the unique ecological character and functions of the park and that provide outstanding benefits (social, economic and aesthetic) to local, national and international stakeholders. The identification of DNP's ERVs provides a foundation for formulating the Park's Purpose Statement, identifying the Park's management problems and opportunities, and generating management objectives and targets.

The consultation exercises and working groups confirmed that stakeholders consider DNP important for its natural, socio-economic and cultural values. It is the only remaining area of natural vegetation communities and wildlife populations, without conversion by other land uses, in the northern/ eastern Sudanese savanna zone. It also contains wetlands that are important sources of water and forage for herbivores and habitat for migratory birds.

The 2004 Management Plan documents a number of these ERVs, providing descriptions that are summarized below. These descriptions concur with and extend the views recorded during stakeholder consultations.

2.1.1 Natural values

Rainfall and seasonality

The climate of the Park is characterized by two seasons: the hot and humid rainy season (May-November) and cool and dry season (December-April). DinderNational Park lies in the zone of northeasterly winds, in which rainfall decreases to the northeast. The northeastern part of the Park has the least rainfall (600-800mm) with effective rains starting in June, which gradually increases with distance towards the southeast of the park (800-1000mm), with rains starting earlier in May. The rains generally continue to November, with a peak in August.

During the rainy season, the maximum temperature is approximately 30°C and the minimum is approximately 20°C. As the rains gradually subside, the temperature also gradually rises until it reaches a maximum of 36°C. On the other hand, the relatively cool months of December, January and February are followed by a general rise in temperatures that average 38°C in March, with an average humidity of 60-65%. The maximum temperature sometimes exceeds 40°C in April and May and then drops suddenly by the first rains of the new season.

In recent years there have been several years of lower than average rainfall, with the rainfall in the 2009-2010 so little as to be considered a drought. While it may be premature to conclude evidence of a trend based on just a few years of data, there is a widespread belief among the meteorological community that anthropogenic climate change may be leading to a drier climate regime in this part of Africa, with the incidence of extreme

events, both drought and floods, increasingly likely. A general reduction in total rainfall or an increase in drought frequency could pose serious problems for the persistence of water supplies for wildlife and livestock in the Dinder area.

Water catchment

Rivers

The Rahad and Dinder rivers drain from the Ethiopian highlands and are the largest tributaries, in Sudan, of the Blue Nile. They have nearly the same lengths, identical hydrology and comparable volumes of annual flows. River Rahad flows along the northern boundary of DNP, while the Dinder River flows through the centre of the Park. Indeed, the park derives its name from this river, rather than from Dinder Locality in Sennar State.

The catchment area of the Dinder River is around 16,000 km² and has average annual discharge of about three billion cubic meters. The channel traversing the Park ranges from 150 to 400m in width and is one to nine meters in depth. The river has a seasonal flow regime, with its surge starting in June and peaking around the middle of August each year. It ceases flowing sometime in November. The sandy riverbed, thereafter, is left with numerous pools, some of which may retain water throughout the dry season.

Mayas

These are wetland meadows found along the flood plains of the rivers. They have been formed due to the meandering character of the channel and the nature of flow of its waters. They occupy low-lying basins, meanders and oxbows. They are generally crescent-shaped with slight and /or no clear banks.

Mayas vary in area from less than 200m² up to 4.5km². Besides being an important source of water in the dry season, mayas are the only source of green fodder at that time. The mayas receive their waters through direct rainfall, sheet flow and riverine flow from the Dinder River and tributary feeder channels.

There are also a number of dry season pools in the sandy bed on the Dinder River. Very little is known about their numbers and locations, or volumes of water retained; they are known to be dynamic and unpredictable. The pools are of pivotal importance as a source of water for birds, wildlife, trespassing livestock, poachers, honey collectors and so forth, and to villagers within the park.

The hydrology of the mayas and the Dinder watershed is not well understood and more in-depth studies are required. However, recent work suggests that the recent series of years with lower than average rainfall has resulted in the mayas drying up more often than in the past. This drying of normally persistent water sources could be having serious impacts on wildlife populations that depend on them for water and forage in dry seasons.

The drainage system and mayas of Dinder NP are shown in Figure 2.

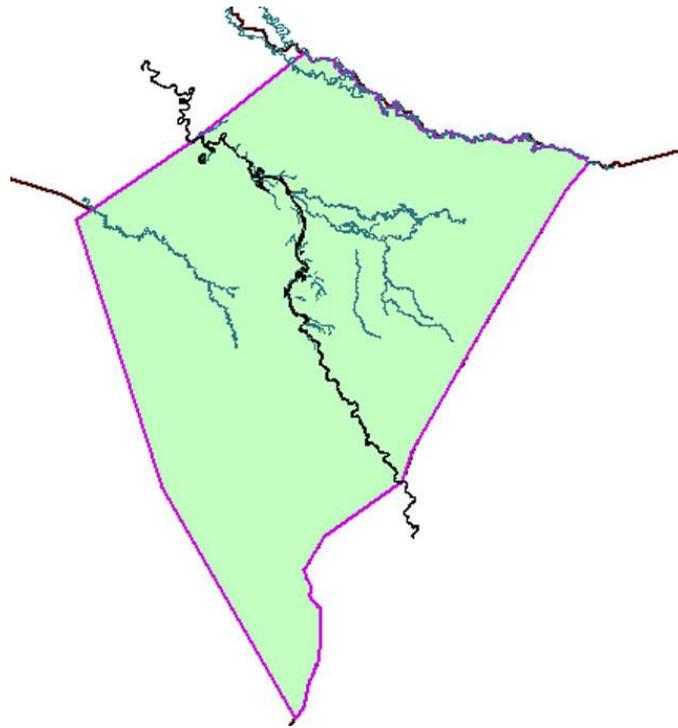


Figure 2. River drainage lines and mayas in Dinder NP

Ground Water

The area of the Park is dominated by the Al Atshan formation tapering off towards elTabia, underlain by shallower Basements outcrops. The water bearing formations, in the river Rahad area, lie in the superficial deposits along the banks of the river. Along the Dinder River, copious quantities of high quality water could be tapped from the superficial deposits of the river terraces.

The water budget of DNP has not been well described in anything beyond the broad trends described above, and there are contradictory reports on its extent and abundance.

At the time of the 2004 Management Plan, the installed facilities were limited to three boreholes (at Galegu, Ras Amir and Gererrisa) and two hand pumps at el Seneit and el Abyad. The borehole at Galegu is 8m deep while that at Gererrisa is 16m, Ras Amir being 60m deep. Given the dependence of wild and domestic herbivores, as well Park staff, on drinking water, it is clear that development and management of water resources is of key importance to the management of the Park as a whole.

Flora and fauna biodiversity

Plant communities

Acacia seyal-*Balanites* woodlands

The *A. seyal*-*Balanites* plant community is a woodland or wooded grassland, dominated by the species of *A. seyal*, *Balanites aegyptiaca*, and *Combretum hartmannianum*. This vegetation system occurs extensively on deep, cracking clay soils (vertisols). In relatively flat areas *A. seyal* predominates, while *C. hartmannianum* occupies the depressed areas, and *B. aegyptiaca* always occupies the higher ridges. Undulations in the topography and variations in soil types result in patches of mixed or pure stands of *Combretum*. The associates are *A. seyal fistula* and on the edges of watercourses are the *A. sieberiana*, *Ziziphus spina-christi* and *Z. abyssinica*. Three sub-communities have been identified, based on the relative amounts of rainfall and topography.

The *A. seyal*-*Balanites* areas are swept by fire frequently every dry season. *A. seyal* and *B. aegyptiaca* are fire resistant but the ground-level vegetation is often removed by fire and the clay soil left bare. The dominant perennial grasses in most areas have been replaced by annual species. The tall wild sorghum grass (*Sorghum sudanensis*) and *A. plumosa* are widespread.

Riverine communities

The riverine communities occur on the silty banks of Dinder River and Rahad River. The forest is a multilayered, diverse vegetation, dominated by *Ficus sycomorus*; *Hyphaene thebaica*, *Acacia sieberiana*, *Stereospermum kunthianum*, *Tamarindus indic* and *Combretum hartmannianum*, associated with *Z. spina-christi*, *Gardina lutea* and *Pilostigma reticulatum*. The main grasses include *Bekeroopsis uniseta*, *Eragrostis tremula* and *S. sudanensis* with different species of forbs and climbers in the ground layer.

The composition of the riverine forest changes gradually as one goes southwards. *Hyphaene thebaica* begins to thin out from the riverine forest and the soil progressively shows a finer and higher texture. The southern extreme of this ecosystem is dominated by *Anogeissus leiocarpus* and *C. hartmannianum*. Broad-leaved trees increase towards the Ethiopian borders and these are represented by *C. hartmannianum*, *Terminalia browni*, *Boswellia payrifera* and *Adansonia digitata*. This area has more rainfall, the clay soil becomes rocky and areas of sandy soil appear more frequently. Perennial grasses dominate over the annuals in this zone of which *Andropogon gayanus*, *Hyperrhenia ruffa* and *Setaria incrassate* are the major grasses. The high rainfall results in the growth of creepers such as *Caparis tomentosa*, and climbers such as *Cissus quadrangularis*; epi-phytes like *Lorauthus* sp.; lichens and mosses.

Maya communities

The most striking feature of DNP is the presence of Mayas. Because of the meandering of the river and due to the nature of water flow, erosion and deposition processes, a large number of mayas and pools were formed along the flood plain. There are about 40 major

mayas and pools that form parts of the Rahad and Dinder drainage system as described above.

Some mayas are almost devoid of vegetation, except for a few herbs and scattered shrubs, and serve as good habitats for waterfowl when completely filled with floodwater. Productive mayas are covered with mat-forming palatable species such as *Cynodon dactylon*, *Ipomea aquatica*, *Kyllinga* and *Brachiaria* spp. In these latter mayas, and in some river pools, the standing crop of green forage and persistent water support many species of fish and amphibians, as well as a large number of ungulates and birds throughout the dry season.

Several mayas have been degraded and thus have become non-productive. The accumulated sediments have raised the beds of these mayas (Beit el Wahash, Mayat Musa, Farsh el Naam, Ein Es Shamis, el Godaha, etc) and silted up their feeders. Hence, their capacities to hold floodwater have been reduced. In some cases the new invader "el sorrib" is advancing from the edges towards the centre.

Degradation in the catchment areas and repeated fires have apparently increased the rates of erosion and eventual siltation of beds of mayas. Mat-forming grasses have been replaced by unpalatable annuals like *Sorghum* spp. and eventually by trees. The decrease in the annual volume of discharge of the river and consequently the maximum water level is one of the main causes behind the dryness of many mayas.

The main vegetation zones are shown in Figure 3.

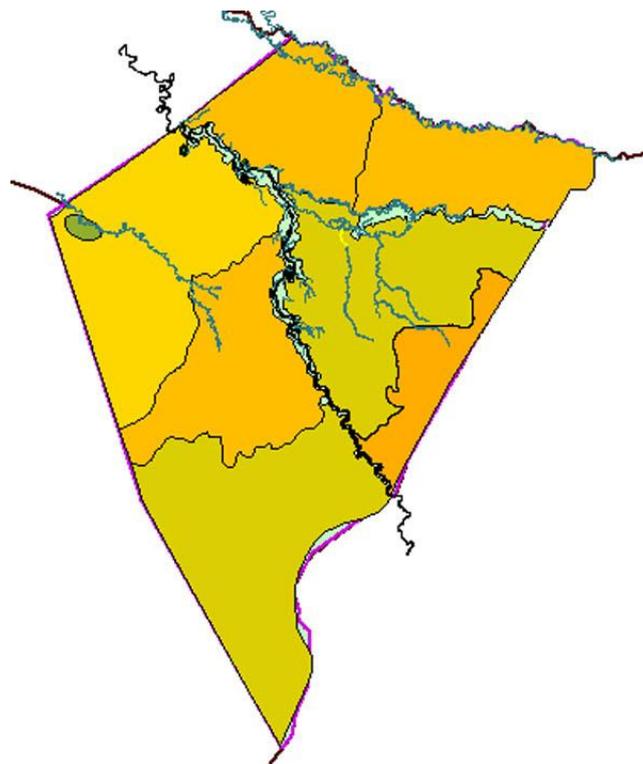


Figure 3. Vegetation zones in Dinder National Park (from Sven Oehm & Iris Andrzejak). The widespread orange and yellow areas are the *Acacia/ Balanites/ Combretum* zones, while the riverine and maya zones are along the main rivers.

[This figure, and other map layers, were made available by Sven Oehm and Iris Andrzejak, who worked on mapping projects in Sudan during 2005-2008 in an interdisciplinary programme between the Institute for Geo Research - TFH Berlin (The Free University of Berlin), El Neelain University (Khartoum) and SECS.]

Fauna

The Park has a high level of biodiversity with records of over 250 species of birds, 27 species of large mammals, some of which are listed by the IUCN as endangered, vulnerable or threatened species, in addition to an undocumented number of smaller mammals. The park also gives refuge to a large number of migratory birds in the wetland areas. Each of the major plant communities has associated fauna, contributing landscape-scale diversity to the wildlife community of the park as a whole.

The DNPP reported that the National Park has hosted a variety of wildlife species in the past: mammals, birds and reptiles, including monitor lizards and crocodiles, but there have been declines in many species over the past several decades.

The most important large herbivores are buffalo (*Syncerus caffer*), waterbuck (*Kobus defassa*), reedbuck (*Redunca redunca*), red-fronted gazelle (*Gazella rufifrons*), roan antelope (*Hippotragus equinus*), greater kudu (*Strepsiceros strepsiceros*), bushbuck (*Tragelaphus scriptus*), warthog (*Phacochoerus aethiopicus*), tiang (*Damaliscus korrigum*), oribi (*Ourebia ourebia*) and ostrich (*Struthio camelus*).

Several species that were reported to occur in the park during the 1950s have apparently disappeared as a result of habitat destruction and over-hunting. These species include the black rhino (*Diceros bicornis*) and hippopotamus (*Hippopotamus amphibius*). Giraffe (*Giraffa camelopardalis*) have not been seen in the park since 1984, when the last 5 of them were counted. Crocodiles (*Crocodilus niloticus*) were abundant until the 1940s, when an organized campaign drastically reduced their numbers. The Soemmering gazelle (*Gazella soemmeringi*), which was abundant until the 1960s, disappeared from the park by the 1970s.

The Park has supported large numbers of animals during the dry season and, apparently, lesser numbers in the wet season, when they are believed to migrate to wet season ranges (higher ground, including areas outside the park). This movement to unprotected areas outside the park, where hunting is said to occur, is thought to be one reason for the decline of tiang and roan antelopes in recent decades. Elephants may migrate from Ethiopia to the southern part of the Park during the rainy season. The red-fronted gazelle (*Gazella rufifrons*) and greater kudu (*Tragelaphus strepsiceros*) are now considered rare in the park.

Baboons (*Papio anubis*), vervet monkeys (*Cercopithecus aethiops*), and Patas monkeys (*Erythrocebus* sp.) are common in all areas of the park. Warthogs (*Phacochoerus aethiopicus*) are similarly found in all communities. The predators and scavengers include lions (*Panthera leo*), leopards (*Panthera pardus*), striped hyaenas (*Hyaena hyaena*) and spotted hyaenas (*Crocuta crocuta*). Black-backed jackals (*Canis mesomelas*) are apparently now rare, while wild dogs (*Lycaon pictus*) are considered to be eliminated from the park. Rock hyraxes (*Heterochyraxes brucei*) are commonly seen near the inselbergs and the crested porcupine (*Hystrix cristata*) is abundant all over the park. Other common smaller mammals are the

serval (*Felis serval*), caracal (*Felis carcal*), ground squirrel (*Euxrns* sp.), hare (*Lepus capensis*), genet (*Genetta genetta*) and cane rat (*Thryonomys swinderianus*).

Dinder is host to a variety of bird species, including colourful starlings (*Spreo* spp), bee-eaters (*Merops* spp), sunbirds (*Nectarinia* spp), herons (*Ardea* spp), egrets (*Casmerodius* spp), rollers (*Coracias* spp.), bustards (*Ardeotis* spp.), saddle-billed stork (*Ephippiorhynchus senegalensis*) and what is thought to be the largest population in the world of the tufted Guinea fowl (*Numida meleagris*) and many others. Migrant species include yellow-billed (*Mycteria ibis*), woolly-necked stork (*Ciconia episcopus*), yellow and European wagtail (*Motacilla* spp), Abdim's stork (*Ciconia abdimii*) and spur-wing goose (*Plectropterus gambensis*).

The Nile crocodile (*Crocodilus niloticus*), monitor lizards and many species of snakes represent the reptilian diversity. While crocodiles were said to have been abundant in the past, they are rarely seen nowadays, and poachers are thought to have drastically reduced the numbers of pythons and monitor lizards.

The habitats of the flood plain, depression, lakes, mayas and pools are rich in their ichthyofauna and are a major breeding ground for the fishes, amphibians, water dwelling insects and micro fauna which greatly enhance the biodiversity of these wetlands. They offer refuge and protection to fish after the flood season and therefore are a valuable reserve for reactive net when the next flood starts and join the pools and mayas to the main channel of Dinder and the Blue Nile. Many members of the fishes of the Nile are represented in these habitats. Of the 115 species of fish recorded in the Nile, 32 fish species are found in Dinder. Each pool or maya carries a community that differs in structure from others both in quantitative and qualitative terms.

The riverine ecosystem harbours specialized species of insects such as the small mound builder (*Trinervitermes geminatus*), and the great mound builder (*Macrotermes*) which are preyed upon by pangolins (*Manis temminckii*), aardvarks (*Orycteropus after*) and other species. The mounds are mostly found in high frequency in the south-eastern part of the park. Other insect species that are prevalent in the park during the wet season are the Tabanus fly (Tabanidae spp.), whose bite is painful, and Sand-fly (*Phlebotomus* spp.), which carries the parasite that causes "kalazar" (leishmaniasis). The appearance of biting flies may be one of the reasons that force the migratory species to leave the park in wet season.

A key insect species of economic importance to the local communities living around and within the park are the bees, which are exploited extensively by honey collectors.

2.1.2 Social values

The importance of the Park

The global significance of DNP arises from its geo-physical location. DNP lies along the transition ecotone between two floristic regions: the Ethiopian highland plateau and the arid Saharan Sudanian biomes. The park also lies along the boundary of two major faunal realms i.e. the Palearctic and Ethiopian region. DNP is also situated along the north-south flyway of migratory birds. Thus the protection of the park is of global importance as it

provides a refuge for large number of migratory birds and protects endemic species, which live in the region or are permanent inhabitants of the park. The DNP has been a Biosphere Reserve within the UNESCO network of protected areas since 1974, which is meant to integrate local communities in the conservation and sustainable use of biodiversity. The DNP is also a Ramsar site, containing wetlands of international importance.

On a national level, DNP is one of ten national parks in Sudan and is the only one in the north-eastern savanna zone. It is also the only park in northern Sudan with a management plan. With an area of some 10,029km², it is the last remaining area of significant size in this part of the country with a remnant, though depleted, sample of natural vegetation cover and wildlife. For these reasons, it is unique and of considerable national as well as local importance.

Direct economic benefits to communities

Human land use in the DNP area

The demands for efficient and immediate utilization of natural resources are increasing worldwide, especially in tropical countries with fast growing human populations. As a result, many national parks, like DNP, are subject to strong human influences. In addition, the land occupied by national parks, and Dinder is no exception, have been used by people for agriculture and pastoralism for centuries. In Gedaref State, there are some 40 villages of small scale farmers along the eastern bank of the Rahad River immediately outside the park and some 10 villages on the western bank inside the extended park boundary. In Blue Nile State, there is a cluster of villages in the Kadelo area now enclosed within the southwestern corner of the park, and gum Arabic plantations that had been established in the northwestern corner of the park before its 1986 extension. In Sennar State, the nearest villages are at least 10km from the park boundary but are nevertheless within short travelling distance.

Nomadic pastoralists from different ethnic backgrounds find dry season grazing in the vicinity of and within the park; livestock corridors in both Gedaref and Blue Nile States lead directly towards the park from wet season areas. In Blue Nile State, some of the areas that were included in the 1986 extension of the park boundaries had been traditional pastoralist grazing areas.

The small farmer communities neighbouring the Park receive direct economic benefit from the vegetation communities of DNP, predominantly from making use of several species of wild plants and animals for subsistence use as well as for commercial purposes, i.e. selling on to users in neighbouring towns and further away. Uses made of the park habitats include:

- Collection of wild plants for (palm) leaves, food and medicine
- Collection of deadwood and cutting of live trees for fuelwood
- Cutting of trees for production of charcoal
- Livestock grazing and watering, largely by nomadic pastoralists and to a lesser degree by sedentary small farmers
- Gum Arabic collection and, in some cases, plantations
- Fishing in river pools and mayas
- Hunting of wildlife for bushmeat

- Honey collection from wild bees

To survive these external pressures, DNP should be managed in ways that convey real benefits to the local and national human communities. There are many ways in which DNP can bring valuable benefits to the communities living near the park. Only a few will be discussed below.

Sustainable use of natural resources

The 2004 Management Plan proposed two zones (Transition and Buffer zones) within the park where people could use the resources of the Dinder ecosystem, subject to the principle that such use was sustainable rather than destructive, and compatible with conservation of ecological structure and processes. Such uses are described below.

Tourism

DNP could be developed to facilitate the growth of a tourist industry, through which local economies might benefit from the sale of handicrafts and local employment. At the national level, tourism could bring valuable foreign exchange into the country, and at the regional or local level, stimulate profitable domestic industries, hotels, restaurants, transportation systems, souvenirs, handicrafts and guide services. In its favour is its relative proximity to the Middle East and European countries than the Central and Southern African National Parks.

However, it is important to sound a note of caution here: international tourism is an economy that requires significant encouragement through enabling conditions, and tourists must be attracted – they will not come to an area unless it offers unique attractions. While DNP has some wildlife populations, they are dwindling rapidly and are already much depleted in recent years. Its topography is flat and featureless, and does not possess the scenic attractions of mountains, hills, or lakes that are found in other eco-tourism destinations in Africa. It is currently inaccessible for up to six months in each year. At the moment, the number of tourist visitors is very small and it is unlikely to increase without significant investment in basic infrastructure and easing of regulations from government. Studies are needed on the feasibility and requirements for expanding tourism activities, through partnership with private sector operators, to increase the potential for benefit flows to local economies.

Recreational use

Local communities and many other domestic and foreign residents may benefit from the recreational opportunities, or “domestic tourism” offered by DNP. These benefits could become even more valuable since DNP is the nearest park to the central big towns.

Educational use

DinderNational Park is a valuable site for school and university students to gain practical education in the fields of biology, ecology, geology, socio-economics and so forth. Such

educational uses should extend to, and ultimately benefit, a wider proportion of the local populations.

Research Facilities

Much applied research still needs to be done on natural tropical ecosystems, and protected areas serve an important role as ecological baselines, for comparison with the impact of agricultural, forestry and rangeland practices on vegetation and soil integrity. Dinder National Park is one of the few remaining natural sites for such studies on the national as well as on the global levels. The data and information from such research can be used in monitoring and assessing trends in comparable ecosystems.

Carbon sequestration

In recent years, the importance of reducing carbon emissions from human activity has been recognized with the development of international agreements and carbon markets. One of the key mechanisms identified for reducing emissions has been the protection of standing forests and savanna woodlands, and in intact soil structures, from deforestation and degradation (REDD), for which international payment mechanisms are being developed. DNP could play a significant role in Sudan's participation in this system, with the local stakeholders potentially eligible to receive funds in return for forest protection.

2.1.3 Cultural values

Traditional cultural sites

Human settlement in the Dinder region is recorded as dating as far back as the nineteenth century, and it is likely to have been occupied well before that time. Recent archaeological discoveries along the rivers Dinder and Rahad and their drainage systems in 1997 and 2002 have revealed an abundance of cultural sites. The sites are associated with mayas in the park as well as along the Rahad River and are tentatively dated to the late Meroitic period in the 1st to the 4th centuries AD, similar to excavations in the vicinity of Sennar. Archaeological work along the Dinder and southern Blue Nile regions in general is also pertinent to the question of Fung origins, which is one of the most complex problems in the medieval history of the Sudan. So far, the only remains attributed to this period were excavated at Abu Geili across the Blue Nile from Sennar. Additional sites of the Fung period are highly likely to turn up along the Dinder River. It is also possible that sites important to the origins of Early Man may occur in this the area, together with western Ethiopia.

Samuel Baker (the British explorer) described Dinder area as fairly heavily populated when he visited it in 1861. However, in the mid-and late-1880s, a massive outward migration occurred, either to support and defend the Mahdist revolution (1885 – 1898), or in response to the notorious famine of 1888, leaving the area effectively devoid of people by the turn of the 20th century. Resettlement of the area occurred gradually but became more intense in the early 1960s through to the 1980s, with immigration from western Sudan and West African countries because of conflict, severe droughts and famine in those areas. A large number of these immigrants have settled along the banks of the Rahad River. The ethnic

structure of these immigrants shows a multiplicity of tribes: Masaleat, Burgo, Dago, Fellata, Houssa, Salahab, Halween, Rezaigat, and many other smaller groups. Nomadic pastoralists of different ethnic background have also been attracted to the area during dry seasons to utilize the available water and grazing resources.

Two other factors have accelerated the influx and concentration of human populations in the Dinder area. The first is the unplanned and uncontrolled expansion of mechanized rain-fed agriculture in large parts of Gedaref, Sennar and Blue Nile State. This created a good market for wage labour, thereby attracting increasing numbers of workers who settled seasonally or permanently in the vicinity of the Park, while at the same time making the remainder of the countryside uninhabitable for small agriculturists and pastoralists. The second factor is the Land Registration Act of 1905, which confirms that all land, with a few exceptions, belongs to the public. Consequently, the Native Administrators and Tribal Leaders, as a means of consolidating their own powers and authority and to extend their influence over their domains, distributed traditional agricultural lands to migrants and encouraged them to settle in their respective areas.

Indigenous Community

DNP also has an indigenous community, the Magano or "Gumuz" tribe which has been living in the park since 1912. The population of Magano Mountain village was known to exist at the southwestern boundaries of the park when it was first established. This small community of some 300 people depends mainly on rain-fed agricultural crops and domestic small livestock and they move to the Tabia area in the southeast part of the Park each year in the dry season to be near a more reliable water supply. At the onset of the rainy season, usually in June, they return westwards to their village and the wildlife personnel at the nearby Tabia game post burn their temporary straw huts, as a means of preventing poachers and other intruders from using the huts. When the Park's boundaries were extended in 1986, the Magano population was directly affected by the new extension. Instead of being located outside the Park's boundaries, their wet season village became enclosed well inside the Park, and consequently all activities of the Magano inhabitants were practiced inside the park.

2.2 DNP Purpose Statement

The Park Purpose Statement summarizes the importance of the protected area based on the exceptional Resource Values of the Park, historical considerations, and prevailing national and wildlife policies. In this context, the primary purpose of Dinder National Park is:

<p>Park Purpose: The conservation of biodiversity in the park by encouraging species and habitat protection and the sustainable use of resources through the integration of local communities in the utilization and management of the natural resources of the park.</p>
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Objective 1: Long-term sustainable conservation of biodiversity in the park by encouraging species and habitat conservation and maintenance of the park as a coherent ecosystem.

Objective 2: Long-term sustainable management of the margins of the ecosystem, the Buffer and Transition Zones, through the integration of the local communities living inside

and along the borders in the sustainable utilization and management of the natural resources of the park.

Objective 3: Improvement and maintenance of infrastructure and human resource capacity within the park administration for management and protection of the park's ecosystems, coordination of sustainable land use with local stakeholders in the human use zones, and cooperation with authorities at State and National levels.

Supplemental and complementary purposes of the Park are:

- To safeguard the ecosystem's status as an area of national and international importance, as a Biosphere Reserve and a Ramsar Site
- To preserve all sites of archaeological, historical and cultural importance
- To maintain and promote the scientific research and educational functions of the Park.

The fulfillment of the Park Purpose and the maintenance of the Park's Exceptional Resource Values will be addressed in this Management Plan through three distinct management programmes, described in the following sections:

Section 3: Ecosystem Management Programme

Section 4: Land Use and Community Outreach Programme

Section 5: Park Operations Programme

2.3 DNP Zoning Scheme

The DNP Zoning Scheme aims to provide a framework for achieving and reconciling the twin management needs of protecting the natural qualities and environment of the Park and regulating and promoting sustainable use by local stakeholders.

The previous Dinder Management Zone Plan (2004) designated three zones, based primarily on the boundaries of the key riverine and Maya vegetation communities. However, these designations and their boundaries were not agreed upon in a participatory process involving land using stakeholders, and as noted earlier, they were never enacted in practice. In addition, the geographical distribution of the zones was not entirely practical, since their boundaries were complicated and contained areas of human use inside the core zones. This Management Plan has retained the principle of the zoning scheme, with adjusted boundaries, as below:

1. Core Zone
2. Buffer Zone
3. Transition Zone

In addition, there is a potential Transfrontier Zone, or Transfrontier Park arrangement in cooperation with the Ethiopian authorities, since just across the international border lies the Alatish National Park. There is a need for such cooperation, because the vegetation zones extend to both sides of the border, the wildlife of Dinder NP moves into Ethiopia and *vice versa* on a seasonal basis, the watershed for the Dinder and Rahad Rivers lies in Ethiopia and there is considerable movement of people in both directions across the border, both within and outside both protected areas.

It should be noted that current wildlife legislation does not allow human use within protected areas. Therefore, before any actions can be taken on zoning within Dinder NP, legislation or amendments must be passed clearly establishing the basis for implementing Biosphere Reserve principles. WCGA must then develop draft regulations for allowable human activities within the Buffer and Transition zones inside national parks. The development of such legislation and regulations at the national level should be undertaken in coordination with State authorities, in the understanding that there will be comparable zoning of transition areas outside the national park. Ideally such a zoning concept should be established in law and practice by State legislation. These ideas are discussed further in Sections 4 and 5.

Figure 4 below provides a provisional spatial definition of the zones, as well as showing the location of boundaries must be subject to a participatory exercise involving DNP and the land using stakeholders, so that their final alignment can be agreed by all parties. These boundaries should then be clearly marked, so that there are no grounds for dispute or misunderstanding in the future. As far as possible, zone boundaries should follow roads or clear topographic features, such as rivers, streams and hills.

The management zones are characterized below, with a brief description of the types and levels of human use permitted. Decisions on the specific human activities, prescriptions and acceptable use for each zone must come from a participatory exercise of engagement and negotiation between DNP management and the local land users, a process which is described in more detail in section 3 on the Ecosystem Management Programme.

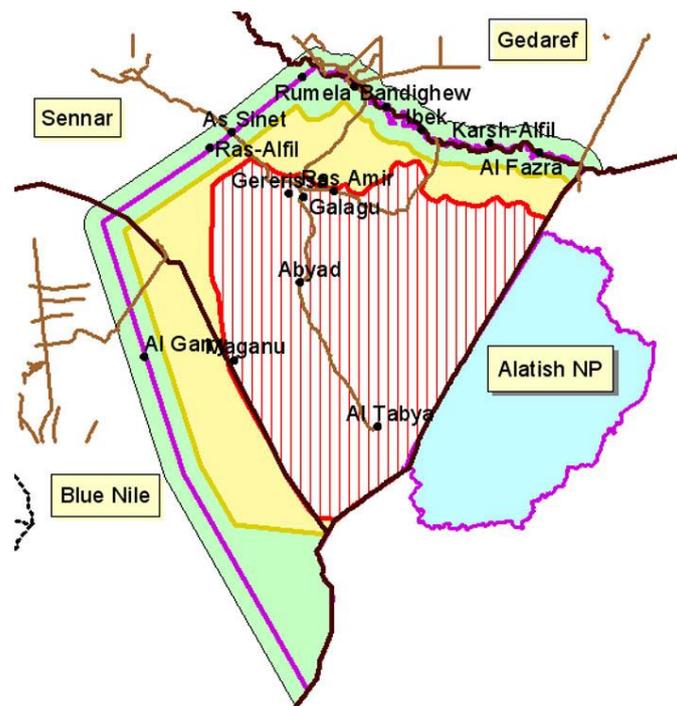


Figure 4. Provisional management zones, with current Ranger posts and tracks. The Core Zone is red hatching, the Buffer Zone is yellow shading and the Transition Zones inside and outside the park are light green. State boundaries and Alatish National Park in Ethiopia are also shown.

2.3.1 Core Zone

In the 2004 Management Plan, the Core Zone was focused on the riverine and maya communities, considered to be the most sensitive and important in biodiversity terms; all mayas in the park were to be included in this zone. Roads were intended to demarcate the boundaries of the core area.

The Core Zone was planned to include areas of special management or historical / cultural use: Galegu Camp site for tourism, El Suneit and Al Abyad as wildlife forces camps and Al Tabya (for dry season use by Magano indigenous community and Magano village). The protection of plant communities, wildlife populations and ecological processes, without human intervention, should be the priority in this zone. Limited management interventions would be practiced such as maya improvement and water pumping, road construction and research plots. Research on ecological processes can achieve accurate results only when habitat management is kept to a minimum, so such activities will be restricted to selected areas while all others will be left to evolve naturally. Other activities should include patrolling, road and fireline maintenance, and recreational/ educational visitor sight seeing.

In the current Management Plan, it is proposed that the Core Zone should have a simpler configuration than in the 2004 Plan, to focus on the central maya and riverine areas, together with woodland communities in between river branches. Riverine and maya areas at the periphery of the park, as well as the Al Tabya area used by the Magano community, could be included in other zones, allowing some human use. This provisional Core Zone covers 52.8% of the DNP area.

2.3.2 Buffer Zone

As discussed in the 2004 DNPP plan, the Buffer Zone would include much of the woodland "Dahara" ecosystem (except those included in the core area). Limited human activities that are not destructive of wild plants or animals by local stakeholders will be carried out, on a pilot basis, under agreements negotiated with DNP management. Removal of dead wood, collection of forest products, wild fruits, bee-keeping, etc, and fishing in available mayas at the periphery of the zone might be practiced on a small-scale pilot or experimental basis before expanding into larger areas, but the emphasis should be on a very limited human presence. Development and management of activities in this zone should be coordinated with relevant authorities in Forestry and rangeland management departments of the neighbouring States and, where appropriate, with relevant NGOs and donor programmes. Any development of human use in the Buffer Zone should be attempted only after successful implementation of the Transition Zone (see below). This provisional Buffer Zone would cover some 25.7% of the park area.

2.3.3 Transition Zone

This zone will extend some five kilometers within the boundary of the park on each of its three sides; as provisionally outlined, it will cover roughly 21.5% of DNP's area. It is intended that there will be a similar, 5 kilometre-wide zone on the State land along the outside of the park boundary in each of the three States, such a zone would add an area of

approximately 2,340km², equivalent to an additional 23.3% of the park area. Along the river Rahad, the western bank would fall within this zone, with 28 or more villages in Gedaref State sitting opposite on the eastern bank of the river and who depend partly for their livelihood on the resources of the park. This border strip should also apply to the other boundary lines, in Sennar State along the western border and in Blue Nile State along the southwestern border. A range of conservation-compatible natural resource uses, agreed upon with the village and pastoralist communities, should be developed in coordination with the DNP management and relevant technical stakeholders in government and NGOs. New income generating activities will address sustainable use of forest and savanna products as well as fuelwood and gum Arabic plantations. Activities should also include grazing area allocation and water provision in certain pilot areas for pastoralist use. Coordination with land users and government departments responsible for land use will assist the development of transition zone activities, as well as enabling conditions for farmers and pastoralists to practice more sustainable land use outside the park, as a means of relieving pressure on the park ecosystem. Mayas in both the buffer and transitional zones should be rehabilitated in the same manner as in the core zone. Viable mayas could be used by livestock, thus minimizing their trespassing into the core zone.

It has been noted that ten villages in the lower Rahad river area are currently within existing boundaries of the park. A broader area around this enclave should be defined, to allow these villagers scope to practice agriculture and related activities in a similar manner to their neighbours outside the park. The Kadalou area, with its scattered resident villages, should be also included in this zone with a similarly broader area to allow their livelihood practices. An alternative to both enclaves is a re-negotiation of the park boundaries to excise them from the park entirely. This would remove a large measure of conflict between park authorities and local citizens and would boost confidence and cooperation, although it would require special legislative and/or executive provision on the part of the federal government.

2.3.4 Transfrontier Zone/ Transfrontier Park

The 2004 DNPP plan noted that, since the southeastern boundary of park is the border with Ethiopia and there are cross-border movements of both wildlife and people in this region, the management of DNP should be coordinated with the Ethiopian authorities. A study by the Nile Basin Initiative's Transboundary Environmental Action Project reported on the potential for a Transfrontier Management Plan involving Dinder NP and the recently created Alatish NP in Ethiopia. Although such a plan remains on the drawing board, discussions with the Ethiopian authorities are currently underway on a range of issues concerning the State and national governments of both countries. Cooperation in wildlife conservation should be a key component in such discussions.

The Buffer and Transition Zones described above currently extend to the border with Ethiopia, but may be subject to change depending on the nature of protection offered in the Alatish NP across the international boundary.

2.4 Threat analysis

During the Working Groups in each of the three States, there was a discussion of the main threats facing Dinder National Park, with stakeholders contributing to a ranked listing. The results of this analysis are presented in the table below. It is interesting to note that seven threats were common to all three States, although their rankings may have been different in each State. We treat these threats as highest priority overall. There were seven additional threats that were noted in only two of three States (not necessarily the same two in each case) and twelve threats that were identified by only one State (again, these single points were different for each State). These latter items were considered as lesser threats.

Table 1. Analysis of threats to Dinder National Park - Rankings from each State

Threats to park	Ranking			
	Gedaref	Blue Nile	Sennar	Overall
Identified by three States				
Mechanized farming outside NP	2	7	4	4.3
Fire (honey hunters, pastoralists)	4	11	2	5.7
Overgrazing	1	3	13	5.7
Lack of extension services, awareness	5	8	5	6.0
Drought	3	10	6	6.3
Forest and land degradation outside DNP	6	6	7	6.3
Increase in animal & human numbers, encroachment	7	4	11	7.3
Identified by two States				
No clear DNP boundary/ boundary in wrong place	8	2		5.0
DNP poor coordination with States	14	1		7.5
No tourism development	9	13		11.0
Lack of services, support for communities	12	12		12.0
Shortage in resources for DNP management		15	9	12.0
DNP protection, enforcement weak	11	14		12.5
Bad fishing practices	16	17		16.5
Identified by one State				
Change in vegetation spp composition, mayas			1	1.0
Wildlife movement outside DNP, killed			3	3.0
Illegal hunting		5		5.0
Poor understanding by people in other states			8	8.0
Civil conflict/ war		9		9.0
Ethiopian encroachment	10			10.0
Villages inside NP			10	10.0
Lack of zoning inside DNP			12	12.0
Military present in DNP	13			13.0
No marketing of DNP and tourism	15			15.0
Spread of animal diseases between wildlife & livestock		16		16.0
Hunting licences given to tourists		18		18.0

The identified threats are categorized in relation to the Exceptional Resource Values described above, and to the management approaches to be taken to address them, and are summarized in Table 2.

Table 2. Analysis of threats to DinderNational Park - ERVs and management approach

Threat	ERV	Management Approach
Identified by all three States		
Mechanized farming outside NP	Natural, Social	Land use
Fire effects on vegetation (honey hunters, pastoralists)	Natural	Ecosystem
Overgrazing	Natural	Ecosystem
Drought	Natural	Ecosystem
Forest and land degradation outside DNP	Natural, Social	Land use
Lack of extension services, awareness	Social	Land use
Increase in livestock & human numbers, encroachment	Natural, Social, Cultural	Land use
Identified by two States		
No clear DNP boundary/ boundary in wrong place	Social	Governance
DNP poor coordination with States	Social, Natural	Governance
No tourism development	Social	Ecosystem, Land use
Lack of services, support for communities	Social	Land use
Shortage in resources for DNP management	Natural	Governance
DNP protection, enforcement weak	Natural	Governance
Bad fishing practices	Natural	Ecosystem
Identified by one State		
Change in veg spp composition, esp mayas	Natural	Ecosystem
Wildlife movement outside DNP, killed	Natural	Land use, Ecosystem
Illegal hunting	Natural	Ecosystem
Civil conflict/ war	Social, Cultural	Land use, Governance
Poor understanding by people in other states	Natural, Social	Governance
Ethiopian encroachment	Natural, Cultural	Governance
Villages inside NP	Natural	Ecosystem, Governance
Lack of zoning inside DNP	Social	Ecosystem, Governance
Military present in DNP	Natural	Governance
Spread of animal diseases between wildlife & livestock	Social	Land use
No marketing of DNP and tourism	Social	Ecosystem, Land use
Hunting licences given to foreign tourists, wildlife killed	Natural	Ecosystem, Governance

The management approaches will be discussed in the next three sections.

3. Ecosystem Management Programme - Inside the Park

3.1 Ecosystem management strategy

Programme Purpose: DNP's key ecological systems, communities and species will be managed and monitored to conserve ecosystem structure and processes and to support sustainable, conservation-compatible human activities, while minimizing their impact so that resource values are not impaired.

The ecosystem management strategy should seek to align the long-term management of the DNP ecosystem with the programme purpose defined above and with the relevant national policies. The aim of this strategy is to provide a general statement of principles and policy to guide the ecosystem management programme over the next 5 years.

There are general guiding principles that provide the foundation for this Ecosystem Management Programme:

1. DNP management will work to maintain all components and processes of the naturally evolving Park ecosystem, including the natural abundance, diversity, and ecological integrity of plants and animals. Change is recognized as an integral part of the functioning of natural ecosystems, which will not be preserved as though frozen at a given point in time
2. Although a non-intervention policy will be pursued in general, interference with natural processes may occur to maintain wildlife and plant species diversity, to preserve sensitive species [and] to restore native ecosystem functioning that has been disrupted by past or ongoing human activities
3. DNP management will work cooperatively with the surrounding communities, local and State governments, and other agencies, especially through State planning forums, to help ensure that activities occurring within the Buffer and Transition Zones with the Park improve local livelihoods while not impairing park resources and values.
4. Research and monitoring will be encouraged to provide an accurate scientific basis for planning, development and management decisions in pursuit of park objectives.

3.1.1 Threats to ecosystem values

The stakeholder Working Group process, described above, identified threats to natural and social ERVs inside the park. Other threats identified in consultations with stakeholders include cutting of trees for fuelwood and for charcoal production.

These are detailed and ranked below, with reference to their geographical scope and severity of impact.

Table 3. Threats to ecosystem values, with reference to components affected, scope and severity

Threat	Component	Scope	Severity
Fires caused by honey hunters, pastoralists	All plant communities	Very widespread	Very high
Overgrazing	All plant communities	Widespread	Very high
Drought	All plant communities; wildlife	Widespread	High; short term?
Wildlife movement outside DNP, killed	Wildlife populations, esp. mobile ungulates	Widespread	High
Illegal hunting	Wildlife populations	Widespread	High
Lack of zoning inside DNP	Social/ livelihoods	Widespread	High impact on poverty; community relations
Tree-cutting for charcoal production	Woodlands	Localized	Moderate to high local impact
Tree-cutting for fuelwood	Woodlands	Localized	Moderate
Villages inside NP	Vegetation, wildlife	Very localized	High local impact
Bad fishing practices	Fish populations	Localized	Moderate; short term?
Hunting licences given to foreign tourists, wildlife killed	Wildlife populations	Small scale	Moderate

The analysis below will describe these threats to these park-based values, as well as others identified in the 2004 Management Plan, and propose goals and actions to deal with them.

3.1.2 Ecological goals

Conserving ecosystem structure and processes

While the composition of plant communities may be expected to change through time in response to natural fluctuations, including short or longer term climate events, the effects of human impacts may be more extreme than natural change. As noted above, the three main plant communities (*A. seyal* - *Balanites* woodlands, riverine woodlands, mayas) are considered to be degraded, largely due to the impacts of human-caused fires, heavy grazing and tree cutting, but also in some cases to extreme climate conditions (drought) and erosional processes. Some intervention may be needed to restore and maintain the basic structure and function of these plant communities in the face of such impacts, bearing in mind that some amount of ecological change is natural. The challenge facing management is to do the minimum amount of intervention that will preserve ecosystem structure while allowing natural vegetation change.

It is clearly important to undertake research to determine the links between human and climate change or erosion on habitat change. The effects of some of these human impacts could be addressed through specific short term actions, while underlying causes of the human-caused impacts - the needs of people to supplement their livelihoods - can be addressed by a combination of improved enforcement and programmes encouraging use

that is more sustainable. A Habitat Management Plan should be prepared, with the help of technical experts from Sudan's research community and considering recommendations in the 2004 Management Plan, to prioritize and guide any future interventions.

Management of plant community structure and processes

Maintaining hydrological cycles

The integrity of riverine systems, water sources, floodplains, wetlands and riverine forest in the Park, is important to maintain, with particular focus on the Dinder system and associated mayas, for the benefit of the park but also for adjacent and downstream communities. A set of proposals for managing the watershed and water resources of the park was produced in the 2004 Management Plan and these should be considered in the preparation of a Watershed Management Plan. Such a plan may be developed in collaboration with the Eastern Nile Strategic Action Plan (ENSAP) Watershed Management Project (see Section 4). Ideally this plan should be supported by a thorough hydrological study of the Dinder drainage system. The impacts of climate change on the hydrology of the Dinder catchment, and recommendations for dealing with those impacts, should form part of such a study.

In the absence of good information on the effects of human impacts on the hydrology of the Dinder watershed, interim proposals should be based on the precautionary principle of "doing no harm". These proposals should include:

- Dinder ground water should only be withdrawn for consumptive use if absolutely necessary, and provided it does not significantly alter natural processes and ecosystems.
- The only year-round use of ground water within the Core Zone of DNP should be the Galegu well supplying water to the DNP camp, and any game posts requiring permanent water supply.
- Consideration should be given to improving the water-holding capacity of key mayas, and to pumping water into mayas in drought years.

Managing and monitoring of vegetation condition

The structure and condition of vegetation in the three plant communities provide watershed integrity, forage for populations of wildlife species and goods and services for people - including local livelihoods and carbon sinks/ storage. Forest resource assessments should provide reliable, cost-efficient information on the multiple functions of the DNP ecosystem. There is thus a need for forest inventory and monitoring approaches that provide information for the park managers to feed back into their management programme. Such monitoring should involve researchers, forestry officers, and local communities, particularly in the Transition Zone.

Managing fire regimes

Fire plays a critical role in the shaping of the vegetation of the Dinder ecosystem and its value as habitat for wildlife species. However, when fire intensity, frequency or extent is excessive habitats can become degraded and wildlife populations suffer. Therefore DNP

management should seek to bring under control and minimize the damage caused by a high frequency of wildfires. The specific objectives and strategies should be pursued in the development of a Fire Management Plan. Components of such a plan should include preventive measures, such as limiting the starting of fires by honey collectors and pastoralists and the maintenance of fire lines along roads.

Management of wildlife population processes

The Ecosystem Management Programme will seek to minimize human impacts on natural wildlife population dynamics. In particular, this will involve ensuring the preservation of wildlife populations, distributions and movements (both ungulates and predators). Wildlife populations are affected by changes in habitat condition and by, reportedly, excessive hunting of herbivores and predators, either by local people or other Sudanese nationals from outside the immediate area who come into the park to hunt illegally. The latter may include tourists who – according to reports from some stakeholders – may have been issued with some form of license to hunt wildlife. It should be noted that such reports are not well-supported by reliable evidence, which is an important information gap that needs better documentation. In addition to these impacts on populations inside the Park, there are problems when wildlife move outside the park on a seasonal basis to seek forage and are killed. The latter area will be dealt with in the Land Use and Community Outreach Management Programme.

As noted in Section 2.1.1, the populations of most large mammal species in Dinder NP have been declining steadily over recent decades and these changes have been recorded in a series of ground-based surveys along roads in the woodlands and in the mayas (Table 4). It should be noted that the surveys were undertaken by different people, using somewhat different methods and sampling regimes, and covering different areas so that the results are not directly comparable. However, it is clear enough that the populations of most species have declined over the past 30 years and that some species, notably giraffes, tiang, red-fronted antelope, buffalo and roan antelope have dwindled or disappeared. The only species that remain even moderately abundant are ostriches, warthogs and the smaller antelopes.

**Table 4. Population estimates from ground-based surveys of Dinder NP
(from DNPP 2004 Dinder NP Management Plan)**

Species	Year					
	1972	1983	1989	1994	2000	2001
Reedbuck	118,677	67,604	94,528	34,400	5,824	33,401
Oribi	23,037	4,374	26,880	9,900	5,824	7,366
Waterbuck	10,239	1,590	8,736	3,300	2,688	1,524
Warthog	8,144	119	5,600	--	17,912	12,954
Tiang	8,242		9,248			
Roan antelope	465	397	224	1,200	21	762
Bush-buck	233	795	2,016	2,600	1,344	2,038
Buffalo		5,965	300		85	
Greater kudu				500		1,524
Red-fronted gazelle			896		358	635

Giraffe		238				
Ostrich	1,852	1,590	3,808	6,000	22,400	6,477

Baseline surveys of wildlife populations were undertaken during the DNPP, but the data are now almost ten years old. In order to plan interventions to promote recoveries in the sizes and distributions of the wildlife populations, there should be an inventory of large mammals and birds and a monitoring program that includes annual road and trap counts. Inventories and monitoring of other species, including fishes, may be considered as well, in conjunction with the National Wildlife Research Centre, and researchers based at universities in Khartoum and in the States and, when possible, local communities.

3.1.3 Social development goals

Promotion of poverty reduction through sustainable natural resource use

Sustainable natural resource use ensures that the needs of the present generation are met without reducing the capacity to meet future generations' needs, and sustainable development should seek to improve livelihoods through the carefully planned utilization of natural resources. Sustainable development should lie at the center of the purposes for National Parks. The conservation of natural resources cannot be achieved without development to alleviate the poverty of people using natural resources and raising the standard of their living, which would in turn enable them to realize the well-being of future generations.

Local communities have, for some decades, used areas inside the park to supplement their livelihoods, or to obtain essential resources, including fuelwood, food supplies and grazing for livestock. Some communities, in the north (Rahad) and southwest (Kedalo), have made longer term use of the area now enclosed within the park boundaries. Transition and Buffer Zones, as described above, would allow and promote a range of activities by local people, although as also noted in Section 2 above, there must be a clear basis in wildlife legislation for this zoning. All these activities must be compatible with conservation, so that they do not do irreversible damage to the native vegetation, as habitat for wildlife, nor do they preclude the presence of wildlife within them at certain times of year. They should also provide genuine benefits to the livelihoods of the people concerned, either supplying critical resources – such as grass and water – during times of shortage outside the park, or a regular supplement and diversification for agricultural livelihoods which are otherwise based outside the park. The principle should be to discourage encroachment of land conversion within the park, and instead to supplement livelihoods that have their basis outside.

Policies in this respect should encourage resource use through local committees and cooperative societies rather simply than by individual users. Coordination with other initiatives by donors, projects and the private sector, as described in Section 4, should be sought. There would be a strong linkage between management targets for the Transition Zone within the park and the similar Transition Zone outside the park.

The villages that were enclosed within the park during the 1986 extension of park boundaries represent a special case. There was little or no genuine consultation of the

villagers in either the northern Rahad area of Gedaref State, nor in the Kedalo village area in Blue Nile State. Strong consideration should be given to a special negotiation process over the future of these villages; options include:

- the creation of special development zones within the park, which recognizes the rights of these villages to pursue identical livelihood activities to those of communities outside the park
- since these areas are relatively small and at the corners of the park extent, the re-drawing of the boundaries of the park to excise them from the park entirely.

Tourism management strategy

The level of tourism in Dinder National Park is low, especially in comparison to other countries in the region. With many parks in eastern and southern Africa receiving annual visitor numbers in the region of tens to hundreds of thousands, DNP has had fewer than 100 foreign visitors per year (average = 61) in the years since 2005, with the numbers of national visitors averaging 865 per year (see Table 5). The current potential for tourism development is equally low, or uncertain at best. The enabling conditions for tourism – basic infrastructure such as good (even all-weather) roads, and national administrative procedures such as tourist visas, ease of travel and photography, accommodation and leisure services – are at a very low level compared to competing tourism conditions in other countries in the region. As a small step in the direction of improved infrastructure, it should be noted that an EU-funded project aimed at developing rural infrastructure in Sennar State intends to provide an all-weather road up to the main park entrance gate at Suniet, although roads within the park would still be unimproved and accessible only during the dry months from December to May.

At the moment, one private sector company, Tigerland Safaris, has an operation that brings tourists from Khartoum to Dinder NP, where it has built a camp at Galegu, on a fairly small scale. For private sector investment in tourism to be viable, an economic return from sufficient visitor numbers must be expected. At current levels of tourism demand, the potential returns are likely to allow only a very small number of companies to operate at a profit. Until the enabling conditions change, it is unclear whether tourism is likely to be anything other than a marginal activity for the foreseeable future.

Table 5. Tourist numbers 2005-2010 (data from WCGA 2010)

Year	National	Non national (foreigners)	Total
2005	424	44	468
2006	827	97	924
2007	1354	55	1409
2008	752	51	803
2009	852	22	874
2010	981	98	1079
Average	865.0	61.2	926.2

For tourism development and management to form part of a future DNP management plan, there is a need for basic information, including a study or series of studies on the

feasibility of and market for tourism, with recommendations on the enabling conditions required to stimulate development of this sector. Outline plans for a tourism management strategy within DNP, with recommendations on zoning and viewing circuits, visitor densities and services, and other aspects of tourism management, could form part of the study. Such a study should include reference to any current or planned national tourism strategies.

In planning for a future tourism programme, there should be investigation of the role the private sector could play in developing tourism, while DNP would provide a catalytic role to regulate, promote and facilitate this development. In this respect, DNP management could develop public-private partnerships to encourage tourism professionals to invest and operate suitable tourism products within DNP; and where appropriate, will play an advisory role for transparent negotiations between private-community tourism ventures bordering the Park. These guiding principles of the DNP tourism strategy would be to provide the basis for the objectives of any future Tourism Programme that define the future desirable state at DNP and address the relevant problems and issues facing the DNP management. The four objectives should be:

1. Visitor access and use developed and enhanced in environmentally appropriate and sustainable ways
2. DNP visitor facilities improved in order to provide an optimal tourism experience with minimal environmental impact
3. DNP interpretive centre(s) and materials are high quality, relevant, informative and educational
4. Tourism management improved in collaboration with tourism industry partners.

3.2 Approach to Ecosystem Management Programme

In the ecosystem management strategy, DNP management should aim to maintain all components and processes of the naturally evolving Park ecosystem, including humans in parts of the system, in line with the principles of the Biosphere Reserve concept. Due to the inherent complexity of natural ecosystems, and the limited resources available, it is not possible for the current DNP staff to monitor and manage each individual ecosystem component on their own. In response, an Ecosystem Management Planning Process should be developed to identify representative ecosystem components and prioritize strategic decisions regarding their conservation. This approach would ensure the optimal allocation of time and resources for implementing conservation strategies to protect and monitor the long-term health and functions of the DNP ecosystem.

The consultation exercise leading to this Management Plan included exploratory discussions with stakeholders to identify generalized threats to the National Park. It did not have the time or resources to develop specific DNP Conservation Targets. These must be identified in an exercise involving experts, including researchers with experience in the Dinder ecosystem, to cover the various spatial scales and levels of biological organization of ecosystem function, from ecological systems and processes to individual species. Together the targets would identify the unique biodiversity of the Dinder ecosystem and the components that require special management actions. The underlying assumption behind establishing these Conservation Targets should be that, if they are truly representative, then focusing efforts on their conservation will also ensure the conservation

of all co-occurring ecosystem components and therefore the maintenance of a healthy ecosystem.

Since this Management Plan is an interim plan, action can be planned in the short term to address the two human factors identified by stakeholders as having the most serious impact on the vegetation composition of Dinder plant communities: fire and overgrazing. These effects were documented in the 2004 Management Plan as well. As noted, these factors should be the subject of specific management plan components.

Regarding threats to wildlife populations, the stakeholder process considered illegal hunting to be a relatively minor factor, but there are no firm data to back up this viewpoint. The loss of habitat to mechanized farming outside the park is an overhanging threat, in that some wildlife species appear to move outwards during the wet season, and then they are killed when they appear on farms. Indeed, this outward movement was given as the original reason for the park extension of 1986. Unsustainable fishing practices were also identified as localized threat to fish populations in mayas and river pools. These direct threats, together with the impacts on habitats, indicate that the pressure on wildlife populations is high to extreme. In addition to impacts caused by people, the effects of low rainfall or drought are likely to reduce vegetation cover and water availability, and wildlife populations depending on them. If climate change increases the likelihood of drought, then there should be some planning to deal with these impacts.

The Management Plan vision is to promote sustainable livelihoods, by encouraging:

- profitable and competitive farming, forestry and land management in and outside DNP aiming to improve land use that allows conservation of the DNP and makes a contribution to climate change mitigation (carbon sink and storage)
- increased awareness within different stakeholder groups leading to proper understanding of DNP and its social, environmental and economical value
- a continuous connection between the DNP managers and the adjacent communities, so that access to affordable services and facilities contributes to the appreciation of DNP

The planning of appropriate actions to conserve the Dinder ecosystem and improve local livelihoods requires accurate information on the status and trends of water resources, vegetation cover and forest resources, wildlife populations and the socio-economy of human populations in the area. The DNPP undertook a number of baseline studies in these areas, but these data are now almost a decade old and require updating.

Implementation of the Management Plan should work through close collaboration and effective partnership between formal sectors (including government departments at both national and state levels), NGOs, local communities and voluntary groups. There should also be synergy with ongoing and planned projects in the Dinder region. These connections are discussed in more detail in Section 4.

Action on ecosystem conservation and sustainable natural resource use will require improvements in the capacity of DNP management staff and equipment, as outlined in Section 5.

3.3 Objectives, targets and actions

The threat analysis provides the foundation for designing management actions and a monitoring system that will best achieve the Ecosystem Management Programme Purpose, set out above. The implementation of these tasks will be achieved through the three objectives of the Ecosystem Management Programme, which are:

1. The conservation and ecological status of DNP enhanced and threats reduced
2. Sustainable, conservation-compatible natural resource use in transition and buffer zones
3. Regular, management-oriented monitoring and assessment of key ecosystem values and processes strengthened.

Objective 1: The conservation and ecological status of DNP enhanced and threats reduced

The desired future state of DNP is one where the threats to the functioning of the Dinder ecosystem are eliminated and all components and processes are restored to their natural evolving levels.

To achieve this desired state, a number of challenges must be faced that are beyond the scope of this Plan. However, some interim management targets and associated management actions have been formulated. The first aim of strategy should be to reduce the threats themselves, under the assumption that the removal of threats will ensure the maintenance of the broader ecosystem. A longer term approach would identify specific Conservation Targets that would be the subject of specific targeted actions.

Target 1.1: Ecological management plans established

Action 1.1.1 Develop a prioritized list of Conservation Targets for target-setting in ecological conservation/ management plans.

Action 1.1.3 Establish a Watershed Management Plan, including a study of hydrology.

Action 1.1.2 Establish a Habitat Conservation Plan, including a plan for management of mayas, with a dredging and pumping plan and a Fire Management Plan.

Target 1.2: Human impacts threatening habitats minimized

Action 1.2.1 Improve firelines along existing road network

Action 1.2.2 Improve detection of and negotiation with livestock owners to reduce grazing levels in the park

Action 1.2.3 Improve detection and negotiation with illegal wood-cutters and charcoal producers to reduce wood-cutting levels in the park

Target 1.3: Human impacts threatening wildlife populations minimized

Action 1.3.1 Improve wildlife protection by preventing illegal and unsustainable hunting and fishing

Objective 2. Sustainable, conservation-compatible natural resource use in transition and buffer zones

Target 2.1 Participatory zoning plans agreed with local stakeholders

Action 2.1.1 Zoning project/ programme: A participatory negotiation between DNP and stakeholders, and between different groups of stakeholders in each State to define and demarcate Transitional and Buffer zones. The process must follow the development of appropriate legislation, and should be facilitated, with help of appropriate NGO(s).

Target 2.2 Sustainable use of natural resources programme initiated

Action 2.2.1 Collaboration on livelihood projects with State ministries/ departments, FNC, NGOs, donor-funded programmes to develop a programme of support to communities

Action 2.2.2 Preparation of a sustainable participatory forests management plan to involve local people in the managing, monitoring, evaluating and protecting DNP forests

Action 2.2.3 Investigation of the prospects for involvement in REDD+ / AFOLU programmes for international funding of carbon sequestration.

Target 2.3 Tourism development prospects and requirements assessed

Action 2.3.1 Feasibility study, including analysis of market, national tourism strategy and policy, requirements for enabling environment

Action 2.3.2 Develop a coordination process with Federal MTW, State Ministries of Finance, private sector operators to agree an appropriate tourism strategy for DNP

Action 2.3.3 Promote the enabling conditions for increased tourism, as appropriate, on both a national and international level.

Objective 3. Regular, management-oriented monitoring and assessment of key ecosystem values and processes strengthened

Target 3.1 Baseline data collected

Action 3.1.1 Baseline vegetation/ forestry data collection – integrate with monitoring programme

Action 3.1.2 Wildlife surveys; ground-based, collaborate with research institutions and universities

Action 3.1.3 Socio-economic surveys; Rahad villages, Kedalo villages, nearest Dinder locality small farmer villages; collaboration with government ministries, NGOs, projects and programmes

Target 3.2 Monitoring programme established

Action 3.2.1 Establish an ecological monitoring programme based on Conservation Targets and indicators, using reliable, sustainable methodology that is practical by DNP staff and research partners, providing information relevant to ecological management plans.

Action 3.2.2 Establish a socio-economic monitoring programme based on social development targets and indicators, with similar criteria as for the ecological monitoring programme.

4. Land use and Community Outreach Programme – Outside the Park

4.1 Land use and Community Outreach Strategy

Programme Purpose: The support and collaboration of the State governments and land users surrounding DNP elicited in safeguarding the integrity of DNP's resource values

This component aims at the followings:

1. Neighbouring community and local government support for conservation strengthened through Promotion of local people understanding of the Park and its importance.
2. Promotion of living standards among local communities, establishment of money generating projects that assist the local communities, and training of the local communities in various related aspects.
3. Threats to DNP resource values reduced through improved community natural resource management in transition zones; negotiating and agreeing land use plans in the transition zone.
4. Encouraging land use planning in the broader areas of the three States bordering and including DNP that is both socially equitable and compatible with the conservation of the Dinder ecosystem.
5. Rehabilitation of forests and rangeland in areas that have been subject to deforestation or removal of natural grassland, and establishment of new forest and rangeland areas where appropriate

The DNP outreach strategy should strive to align the long-term development of community outreach in DNP with the programme purpose as defined above, and the organizational goals of DNP. The aim of the strategy is to provide a general statement of principles and policy to guide the Land Use and Community Outreach Programme over the next 5 years.

The importance of increasing the value of the national parks to local people is widely recognized as best practice in many regions of Africa. It should also become recognized within Sudan; such development of community involvement with sustainable land use has been recognized in the forestry sector in Sudan for almost 30 years. The 2004 Management Plan recognized that DNP needed to extend its activities into surrounding communities, with a focus on the local people and in discussion with State governments. This outreach programme will be accompanied by mechanisms to ensure that the benefits of conservation and sustainable land use are shared with local communities in appropriate ways. The approach taken encouraged compromise and flexibility in order to meet the needs of both the park and local people.

During its period of activity during 2002-2005, the Dinder National Park Project attempted to embed community outreach as a key aspect of park management. However, the challenge of such a programme is significant, with a population of some 40 villages living along and within the park boundary of the Rahad River in Gedaref State and additional villages in the Kedalo area of Blue Nile State, with neighbouring communities outside the park boundary in Blue Nile and Sennar States. To work with these communities, the DNPP had a

professional staff with a generous budget allocation from UNDP/GEF, but as noted above, this project came to an abrupt and unexpected end before it could explore effectively the prospects for sustainability. After the DNPP ended, there was no additional funding for DNP community work from the federal government or from any other sources, and the community outreach programme came to a halt.

In the following years, staff within DNP structure were assigned to different postings, and there was no institutional set-up to follow up the community initiatives. There is an apparent, renewed willingness within WCGA to take on the work of community engagement and this process should be encouraged.

No other donor-funded programmes have filled the gap in the Rahad River area, apart from a small-scale village water supply and education-support programme funded by UNICEF and Italian aid. Some programmes are in the pipeline, including a component of the ENSAP Watershed Management Project, which was to include most of the Rahad villages but has now been scaled back to a small number. The Kedalo villages have received development assistance from more than one donor group, including the World Food Programme and other development agencies of which there are several active in Blue Nile State. A summary of projects and programmes in State lands is provided in Section 4.5 below.

There is still some residual goodwill amongst the communities along the Rahad River that had participated in the DNPP development activities, although unsustainable land use practices have returned and impatience with park authorities is building once again. Rahad villagers whose homes are within the park boundaries extended in 1986 are less happy than their neighbours on the outside, and they wish to have development rights that are equivalent. Attempts to involve the Kedalo villagers were not successful, even during the DNPP period, and they remain poor. The Kedalo villagers maintain that they wish their area to be removed from the park, and they certainly wish to pursue a farming lifestyle that has no restrictions placed on it by park authorities.

A 5-km wide zone outside the park, to complement the similar zone within the park, is proposed and should be negotiated and mapped in full collaboration with communities, their Village Development Committees, relevant State government officials and NGO partners.

4.2 Threats to community development and relations with DNP

The threats identified by stakeholders during the Working Groups and other consultations are summarized below.

Table 6. Threats to community relations and land use planning, with reference to components affected, scope and severity.

Threat	Component	Scope	Severity
Mechanized farming outside NP	Ecosystem, Land use	Very widespread	Very high
Lack of communication between DNP and other stakeholders	Land use, Outreach	Widespread	Very high
Forest and land degradation outside DNP	Ecosystem, Land use	Widespread	High
Lack of extension services, awareness	Outreach	Widespread	High
Increase in livestock & human numbers, encroachment	Land use	Widespread	High
Civil conflict/ war	Land use	Widespread	Very high, but rare (so far)
Lack of services, support for communities	Outreach	Widespread	High
Wildlife movement outside DNP, killed	Wildlife, Land use	Widespread	High
Rahad Canal development	Ecosystem, Land use	Localized	Very high
Spread of animal diseases between wildlife & livestock	Land use	Localized	Moderate
No tourism development	Land use	Localized	Moderate

A key threat to relations between DNP management and local communities has been the emphasis on enforcement, often at gunpoint, by DNP personnel to the relative exclusion of a more cooperative, consultative approach to relations with stakeholders. This form of interaction was apparently dictated by the mandate of the WCGA and DNP, which has been to enforce the wildlife legislation, which emphasizes protection of wildlife over the more people-oriented approaches that have become best practice in other countries in eastern and southern Africa.

4.3 Relations between DNP and local communities/ government

DNP is intricately linked and affected by the human activities and land-uses occurring on and outside its boundaries and vice versa. Stakeholder consultations with authorities in different departments in the Ministries of Agriculture in each of the three States have indicated that there is recognition of the problems caused by the conflicting land use interests of large-scale mechanized farmers, small farmers and pastoralists. In particular, it has been noted that previous policies of promoting the widespread conversion of rangeland, wooded savannas and forests into ploughed farm land has not provided sustained benefits for the commercial farmers and has alienated the land use needs of the other groups. Pastoralists have little grazing land left for their herds, and many are therefore forced to enter protected areas such as DNP for dry season grazing and water, where they have been forced into conflict with park protection staff who are implementing wildlife legislation. In other parts of Sudan, these land use conflicts have led to armed struggle, internal displacement of populations and massive social disruption; there is a real potential for such problems to develop in the Dinder region if there is not significant

reform of land planning and use. Thus, the issue of human land use conflicting with conservation objectives is only part of a broader picture of conflict between different users of land with each other.

In order to influence land use planning and development activities in different Ministries and Departments at the State level, and to work effectively on sustainable development activities with communities at the local level, there must be improved communications between DNP management and activities operating in each State. Proposals for organizing these communications on a formal basis are provided in Section 5 Park Operations Programme. However, it is possible and indeed necessary for DNP management to work on improving its communications with stakeholders on a less formal, one-to-one, basis to reduce conflict levels and pave the way for a more positive relationship.

As noted, some State agriculture authorities are already planning to develop a better balance between commercial farming and the interests of small farmers and of pastoralists. The forestry sector, in the form of the Forest National Corporation, is active in every State in promoting sustainable, community-based management of forest resources, in the context of agricultural landscape. Several donor-funded projects are underway or are in late planning stages in each State in the sectors of agriculture and/or livestock development. All of these activities are suitable, and indeed essential, partners for DNP management to engage with.

One possible source of conflict between the interests of wildlife conservation and pastoralists or livestock-owing farmers is the transmission of disease between the species. There should be a coordinated effort made by DNP and Animal Resources officials in State governments to address priority animal health and wildlife-domestic animal disease transmission issues.

As relations improve, DNP should develop the concept of village game scouts, which can help in the enforcement of sustainable use agreements in Transition and Buffer zones and of protection of wild habitats and wildlife. DNP should provide training for village game scouts, particularly providing 'on-the-job' experience and advice on the type of training required. Although budgets are limited, efforts will be made to assist with equipment provision. Moreover, collaboration with newly-formed village game scout forces will be developed in order to provide a coordinated and professional effort in law enforcement in the ecosystem.

4.4 Conservation and environmental education

Conflict and disputes between DNP and adjacent communities have often arisen from misunderstandings and a lack of communication about park regulations and boundaries. This lack of knowledge results in communities feeling distrustful of the Park, disempowered and unsure of their rights. To address these issues, DNP management should raise conservation awareness in the surrounding communities, and in particular clarify the rules, regulations and boundaries of the Park, through a well-structured education programme.

An initial effort at awareness-raising with communities in the Rahad village areas was undertaken by the DNPP, in collaboration with SECS. This experience should inform the development of a similar programme under this MP.

4.5 Conservation-compatible natural resource management initiatives

The sharing of park benefits with communities will be complemented by efforts by DNP management to improve land use and livelihood strategies surrounding the Park, in order to reduce their negative impacts on DNP natural resources, and increase the conservation compatibility of neighbouring land uses.

The guiding principles of the above strategy provide the basis for the three objectives of the Land Use and Community Outreach Programme that define the future desirable state at DNP and address the relevant problems and issues facing DNP management. The three objectives are:

1. Neighbouring community and local government support for conservation strengthened
2. Threats to DNP resource values reduced through improved community natural resource management in transition areas outside the park.
3. Encouraging land use planning in the broader areas of the three States bordering and including DNP that is both socially equitable and compatible with the conservation of the Dinder ecosystem.

The DNP management should work closely with State authorities in identifying suitable target communities adjacent to the Park with which to develop CBNRM initiatives. Once these communities have been identified, the DNP should assist in the identification of the major issues that need to be addressed from the perspective of DNP as well as the communities. The identified CBNRM initiatives will include resource substitution approaches as well as conservation compatible income-generating activities. These activities could include, but not be limited to:

- Forest plantations for fuelwood, building materials, charcoal.
- Gum Arabic plantations
- Agroforestry
- Horticulture
- Bee-keeping
- Fish farming
- Services for pastoralists including, grazing and watering areas well outside park boundaries, livestock health services

There are already a number of development activities in the State lands outside the Park relating to natural resource use and the reduction of conflicts between different land user groups. Coordination in action and planning between DNP management and these development programmes would benefit the park, through reduction of impacts on the natural ecosystems and promotion of sustainable use of their natural resources.

An outline list of these projects and programmes is provided in Table 7.

Table 7. Development activities affecting land use in areas adjacent to DinderNational Park

Organization/ Project	State	Activities
Watershed Management Project, Eastern Nile Subsidiary Action Program (ENSAP), NileBasin Initiative	Gedaref, Sennar, Blue Nile	Community development, habitat and water course management, watershed protection
Eastern Recovery and Development Programme (EU-EDF)	Gedaref, Kassala, Red Sea	Improvement of livelihood security of poor and marginalized groups
Market Access Feeder Roads Programme (EU-STABEX)	Sennar	Upgrading of rural roads to support agricultural production and marketing, including a road to Sinit Gate of DNP. Possibility of extending the road to Galegu in the centre of the Park.
Eastern Sudan - Reconstruction and development, (Kuwait Fund)	Gedaref, Kassala, Red Sea	Recovery, reconstruction and development needs, ranging from poverty reduction and basic services, to infrastructure, investment and human resource development
Kenana and Rahad II Irrigation Project	Blue Nile, Sennar	Canal from Roseires dam, irrigation and land use planning
Supporting the Traditional Rainfed Small-scale Producers in SennarState (IFAD)	Sennar	Support for small scale traditional rainfed producers in SennarState to increase their food security, incomes and resilience to shocks
Improving Livestock Production and Marketing Project (Multi-donor Trust Fund)	Blue Nile, Sennar, White Nile	Livestock production and marketing
Sudan Productive Capacity Recovery Programme (FAO/ EU)	Blue Nile	Capacity building, model projects livestock routes
Crisis Recovery Mapping and Analysis Project (UNDP)	Gedaref, Blue Nile	Situation analysis, mapping of livelihood and security threats as an aid to planning
Study of Sustainable Development of Semi-Mechanized Farming (Multi-Donor Trust Fund)	all States	Recommendations for improvement of productivity of rain-fed agriculture in Sudan
Child-Friendly Community Initiatives (UNICEF)	Blue Nile	Kadalo villages
Forest National Corporation	all States	Community forestry covering a range of livelihood activities, gum arabic production
World Food Program	Blue Nile, potentially other states	Food security, innovative approaches, including carbon finance

4.6 Objectives, targets and actions

In order to meet its objectives for the Land Use and Community Outreach Programme, a series of 5-year management targets, with accompanying management actions, have been formulated, as described in the following sections. For each management target there is a brief description of the relevant management issues and opportunities, which provide the specific context and justification for the management actions.

Objective 1: Neighbouring community and local government support for conservation strengthened

The desired future state of DNP is one where the neighbouring communities and local government are fully aware and supportive of the aims and objectives of DNP. The three management targets to achieve this desired state involve enhancing park-community communication mechanisms, redressing the imbalance between conservation costs and benefits for neighbouring communities, and improving the educational programme.

Target 1.1: Park-community cooperation, communication and conflict resolution mechanisms enhanced

Action 1.1.1: Enhance the two-way flow of information between park and communities

Action 1.1.2: Carry out training on communication and conflict resolution to improve community liaison skills of rangers and wardens

Target 1.2: Community benefits from DNP enhanced and costs reduced

Action 1.2.1: Implement priority community-initiated projects as identified in planning

Action 1.2.2: Provide support for conservation-friendly, income generating activities

Target 1.3: Conservation education programme improved and expanded to be more accessible and relevant to local needs

Action 1.3.1: Improve the scope and content of education materials

Action 1.3.2: Scale-up education programme to all park-adjacent districts

Action 1.3.3: Organise park visits for children and traditional leaders

Objective 2: Threats to DNP resource values reduced through improved community natural resource management in Transition zones

Target 2.1: DNP collaboration in CBNRM initiatives with government, NGO, donor programme and private stakeholders strengthened

Action 2.1.1: Participatory mapping of Transition Zone areas outside the park completed.

Action 2.1.2: Work with stakeholders to identify promising CBNRM initiatives.

Action 2.1.3: Support and participate in planning and management capacity building for CBNRM initiatives

Action 2.1.4: Train village game scouts in collaboration with other stakeholders

Objective 3 Encouraging land use planning in the broader areas of the three States bordering and including DNP that is both socially equitable and compatible with the conservation of the Dinder ecosystem.

This work should be done in coordination between DNP and State authorities, in collaboration with donor programmes that may already exist or be in the planning stages.

Target 3.1 Land use options for pastoralists outside DNP improved.

Action 3.1.1: Encourage State Ministries of Agriculture to develop Plans for improved livestock corridors, rest areas, grazing areas and watering areas, creating space within the matrix of mechanized farmland.

Action 3.1.2: Collaborate with State Ministries of Animal Resources in implementing veterinary outreach activities in local communities

Target 3.2 Land use options for small farmers outside DNP improved.

Action 3.2.1: Encourage State Ministries of Agriculture to develop plans for improved conditions for small farmers within the matrix of mechanized farmland.

Target 3.3 Forestry leave strips on mechanized farmland enforced and consolidated.

Action 3.3.1: Encourage State Ministries of Agriculture to enforce licence conditions for mechanized farmers to devote a minimum 10% of farm areas to forestry.

Action 3.3.2: Encourage State Ministries of Agriculture to instruct mechanized farmers to consolidate forestry leave strips in blocks to maximize the benefits of improved forest cover.

Target 3.4 Improved productivity of mechanized farmers, reducing need for large land areas

Action 3.4.1: Encourage State Ministries of Agriculture to work with national programme to improve and rationalize mechanized (rain-fed) farming sector

Target 3.5 Impact of Rahad Canal development on park minimized

Action 3.5.1: Communication between DNP and Dams Implementation Unit to agree alignment of the canal and development options for areas of Dinder Locality adjacent to the park, to minimize the impact on wildlife populations.

5. Park Operations Programme- Governance

5.1 Park operations strategy

Programme purpose: Efficiency and effectiveness of DNP park operations enhanced and mechanism(s) established for effective two-way communication and coordination with relevant stakeholders at local, State and federal levels.

The DNP park operations strategy seeks to align the park infrastructure, services and operations with the programme purpose described above and with relevant national policies. The aim of this strategy is to provide a general statement of principles and policy to guide the Park Operations Programme over the next 5 years.

The principal national policy-level instruments that the DNP park operations strategy needs to take into account are the Wildlife Act of 1986 and, if relevant, the Code of Conduct for rangers.

Threats to the effective operation of DNP were identified in the stakeholder consultation process.

Table 8. Threats to Park operations and governance, with reference to scope and severity

Threat	Scope	Severity
DNP poor coordination with States	Widespread	Very high
Shortage in resources for DNP management	Widespread	Very high
No clear DNP boundary/ boundary in wrong place	Widespread	High
Lack of zoning inside DNP	Widespread	High
DNP protection, enforcement weak	Widespread	High
Civil conflict/ war	Localized to widespread	Very high, but currently unlikely
Military present in DNP	Localized	High
Poor understanding by people in other states	Localized	Moderate
Ethiopian encroachment	Localized	Moderate
Villages inside NP	Very localized	Moderate
Hunting licences reportedly given to foreign tourists, wildlife killed inside the park	Small scale	Low

5.2 Wildlife legislation and enforcement

The current wildlife legislation, the Wildlife Act of 1986, places an emphasis on strict protection of wildlife and habitats. The interpretation of this mandate, with abrupt arresting of offenders and the holding of cases in Dinder town, some considerable distance from the home base of most of the park's stakeholders, has led to an increasingly antagonistic relationship between DNP management and its neighbours. The Biosphere Reserve concept, which forms the basis of this Plan, as well as that of the 2004 plan

developed by the DNPP, is not recognized in the Wildlife Act. The DNP management and WCGA are required to implement and enforce the existing legislation and have recognized that changes to the legislation and regulations must precede a new approach to changes in zoning and stakeholder involvement.

A critique of the current wildlife legislation is provided in Annex 3. New legislation has been drafted, and with a new government freshly appointed, there is now an opportunity for this legislation to be enacted. Such an action is essential for the DNP management to be able to engage cooperatively with local stakeholders, in zoning and other activities, and to build a significantly improved relationship with the support of the law behind it.

The process of getting the legislation passed may take time. Once the legislation is in place, there will be a need to develop policies and regulations, particularly for the specific circumstances of Dinder NP. Both these processes might benefit from support from legal or constitutional advisers.

5.3 Institutional arrangements with the wildlife sector

The “wildlife sector” should not be seen as peripheral to social development interests, of special and marginal interest only to tourists or students from wealthier sections of society. Wildlife conservation has the mandate for land management with the primary purpose of preservation of biodiversity and functioning natural ecosystems, the global importance of which to human livelihoods have been emphasized at the recent conference of the parties to the Convention on Biological Diversity in Nagoya, Japan. Intact ecosystems also have a role to play in the mitigation of greenhouse gas emissions, through mechanisms such as REDD+. As such, the WCGA has much in common with land use Ministries such as Agriculture, Animal Resources and Environment, and with the Forests National Corporation.

As noted above, the WCGA is body responsible for technical management and enforcement of DNP. It has been located in different Ministries in the past, and recently in the Ministry of Interior, but is now under the administration of the Ministry of Tourism, Antiquities and Wildlife. The responsibility for policy development and budgetary allocation now lies with MTAW. The relationship with the Ministry of Interior requires clarification, since it appears that WCGA salaries and benefits are still provided by that Ministry.

The development of partnerships between the Sudanese wildlife sector and external partners is of crucial importance, both for technical and financial support and cooperation. There is need for the building of capacity in an External Partnerships Unit and an active strategy to build cooperative relationships with different partners, both with other sectors in the Sudanese government, the private sector, national and international NGOs, and the donor community.

5.4 Protection of resources and sustainable use

Local communities, who are pastoralists, farmers, hunters, fishers and woodcutters, surround the Park and some are involved in the illegal and unsustainable extraction of its wild resources. Wildlife offtake within the Park remains a substantial threat to the natural resources of the Dinder, as does livestock grazing and wood cutting. The officer in charge at Galegu Camp has indicated that illegal hunting, fishing and tree-cutting for charcoal by villagers living adjacent to the park on both eastern and western sides is prevalent. According to WCGA records, there appears to be a gradual upward trend in the total number of hunters, livestock herders and wood cutters arrested in the Park (see Tables 9 and 10), although care must be exercised in interpreting the data, as there is no indication in the data series of the relative levels of effort invested in resource protection and patrolling in different years.

Table 9. Number of cases 1998-2003 (DNP Management Plan 2004)

Year	Livestock grazing	Illegal hunting	Wood collection	Palm trees collection	Fishing	Honey collection
1998	37	4	12	4	7	7
1999	45	2	0	2	3	7
2000	6	2	2	1	10	2
2001	4	0	3	1	1	0
2002	No data available					
2003	7	0	22	1	0	1

Table 10. Number of cases 2005-2010 (WCGA 2010)

Year	Livestock grazing	Illegal hunting	Illegal tree cutting	Gum production	Agriculture
2005	44	7	-	1	-
2006	59	4	2	-	1
2007	22	1	3	-	-
2008	43	14	2	1	-
2009	93	7	3	-	-
2010	101	3	6	-	-

In line with the principles outlined in Sections 3 and 4, the DNP management should continue to protect the park's resources for present and future generations, by strengthening law enforcement, but also by supporting conservation-compatible in-park activities and influencing conservation-compatible land use practices in surrounding protected areas and communities.

Anti-poaching operations are high risk and dangerous, therefore it is critical that the rangers are properly equipped to maximize their safety as well as their effectiveness. It is understood that the resources available at certain ranger posts are insufficient for effective anti-poaching operations. To improve this situation, a series of targets and actions should be aimed at improving DNP's capacity for anti-poaching, with equipment and with training in modern anti-poaching techniques including improved reporting of enforcement efforts.

To plan more successful anti-poaching activities, it is necessary to know what are the effort levels of game scouts/rangers in the field in relation to where and how often they encounter poachers or evidence of poachers. At the moment, DNP record-keeping and reporting systems for enforcement data are very limited. In recent years in many parts of Africa, a great deal of progress has been made to develop techniques in conservation that utilize emerging technologies, such as GIS and computer-based record-keeping. These techniques include a recording and reporting system for assessing patrolling effort, known as MIST¹, but simpler systems could also be recommended.

In addition to enforcement by DNP staff, efforts should be made to work with local communities to raise awareness of the impacts of unsustainable use of wildlife and habitats on future benefits, and to involve community members in resource protection efforts.

5.5 Staff management

It is clear that the effectiveness and efficiency of park operations is related to individual and group commitments to perform to a high standard and to work in tough and at times risky situations. Therefore, DNP management will aim to provide incentives in the form of good work facilities, equipment, salaries, housing, training and social amenities to assist staff in better undertaking their assignments.

When WCGA and DNP officers were employed directly under the Ministry of Interior, as noted above, they were considered as part of the police system. Now that WCGA lies within MTAW, this connection is less direct but there remains some apparent connection with the Ministry of Interior in relation to the payment of salaries and provision of staff benefits. An outward sign of this relationship is that WCGA and DNP staff continue to wear police-type uniforms and their internal operations resemble the chain of command of a policing organization.

Under the Ministry of Interior, DNP officers who had received training in wildlife-related disciplines and in community outreach work could be transferred to other police postings, while police officers with no wildlife background were transferred into DNP. With the transfer to MTAW, and recent appointment of the current Director of Wildlife, an officer with a background in wildlife/ natural resources, there is now a commitment to recruit and maintain officers with more relevant experience and motivation in the wildlife sector. Nevertheless, the staffing level of DNP remains very low compared to the large tasks of protection and outreach that will be required under this MP; there remains a gap between the staff numbers approved and those actually in post (see Table 11).

¹Ecological Solutions Software LLC <http://www.ecostats.com/software/mist/mist.htm#>

Table 11. DNP staff in 2010 (WCGA 2010)

Category	Approved	Actual (existing)
Officers	51	11
non-commissioned officers and game scouts	336	212
Total	783	223

At the time of writing of this Management Plan draft, there was no more detailed information available on the qualifications or duties assigned to these staff members, nor was there an organogramme of the staffing structure. These details should be made available and there should be an assessment of staffing needs.

Given the staffing levels available, DNP management should use all means possible to develop a dedicated, committed and disciplined workforce to achieve the Park Operations Programme purpose.

There is a need for data on the relative strength of protection staff, so that the needs for strengthening can be assessed. Resource protection patrols are carried out from ranger posts, which are located at strategic locations throughout the Park. It is likely that a number of stations are lacking equipment, with which to carry out their patrols effectively. It may be necessary to reduce or increase the number of ranger posts, or to move existing posts to better locations. An assessment of needs would address these issues.

The move of the Park Headquarters to from Dinder town to Al Sinai at the main park entrance on its western boundary was proposed in 2004. Such a move would increase the engagement of management staff with the local area but would require providing for staff welfare - in terms of having better services, especially fresh water, education for staff children, social interaction, mains electricity, food supplies and expanded health facilities. However, this movement was not implemented. The advantages and disadvantages of such a move, as well as the costed requirements for staff facilities, should form key parts of such a study.

The need to share knowledge and experiences to better understand and apply global best practices for addressing conservation challenges currently facing protected areas will also be an important focus of this management action. To achieve this, exchange programmes could be established and developed with other protected areas. Options will be investigated for developing exchanges with other protected areas.

5.6 Development of park budget/ business plan

Since conservation must be cost-effective, DNP management should endeavour to manage its running costs within the limits of its income streams. Since, apart from its budget allocations from the federal Ministry of Finance, the prospect of direct revenue generation is limited at the moment to the collection of fines from violations of park regulations, there should be efforts made to assess the potential revenues from other activities, such as tourism but also joint ventures with communities in forest management - following the model of and in possible partnership with the Forest National Corporation - and other

activities in order to fund the costs of managing the Park. These operational costs include: administration, field patrols, road and building works, equipment, uniforms and maintenance.

The budget allocations for park operations in the past, and certainly at the time of writing of the 2004 Management Plan, for DinderNational Park from the federal government were extremely low. If the conservation of Sudan's ecosystems is to be a priority for the government of the country, then sufficient financial resources must be given to its national parks. It may be necessary for the WCGA and DNP management to make its case to the federal budget process; an awareness-raising programme at the national level was part of the activities of the DNP Programme, and could be part of this MP.

5.7 Improved park infrastructure and services

In the past, and particularly during the DNPP, there was investment in park infrastructure, including the road network and park management buildings such as the Galegu office and game ranger posts. However, the roads have become degraded by vehicle use and lack of maintenance, and the buildings are of poor standard. DNP will need work to upgrade and maintain the existing road and building infrastructure and strategically locate new ones, as appropriate under the other Management Programmes. Services to visitors and staff should also be improved. Plans for infrastructure development must be formulated and initiated.

The new GMP Zoning Scheme not only requires the removal of roads that no longer comply with the zonal use prescriptions, but also necessitates the appropriate development of tracks and circuits that support the monitoring of human use within the Park. In the Core Zone, the maintenance and construction of access roads to zone edge camps may be required. In the Buffer and Transition Zones, tracks may be appropriate for access to community use areas. Wherever possible, the development of tracks will utilise existing disused tracks and where these are not available, new tracks will be constructed on the condition that they meet all the requirements of the DNP management. The environmental impact of any new roads should be minimized, in line with EIA guidelines established by HCENR.

A good communications network is one of the key foundations for the DNP security operation. Rapid and appropriate responses to illegal activities are only possible when information of incidences can be communicated immediately from throughout the Park and the surrounding area to a coordinating centralised system. To achieve this, the network will be expanded and maintained to include park staff, tour operators/ concessionaires, authorities in charge of neighbouring land and other land-users within the ecosystem.

5.8 Working with other stakeholders

As well-noted already, the wildlife and habitats in the Park depend on the broader community outside the DNP for their survival, and yet the communications with external stakeholders by DNP management has been poor. In addition, there are many neighbouring land-users that are affected by the presence of the Park and numerous other

stakeholders interested in the future of the Park. Therefore, DNP must cooperate and collaborate with others in order to understand their perspectives, expand DNP's sphere of influence and ensure the survival of the Park within the larger ecosystem.

Poor park-community relationships in the past have both initiated and led to the escalation of conflicts over access to land and natural resources. A prime example, which is still a source of much anger in Blue Nile State, and to a lesser extent in Gedaref State, was the nature of the park extension in 1986. There was little, if any, consultation of the residents of villages in the Kedalo or northern Rahad River areas before they became enclosed within the park. After the extension was enacted in 1986, there was no exercise to delineate the park boundary until the DNPP undertook the work in 2002. Therefore DNP management should develop and elaborate mechanisms to promote dialogue and improve communication with local communities and State governments in order to enable conflicts to be amicably resolved and to develop modes of cooperation for mutual benefit.

By forming better relationships with the local communities, it is hoped that progress will be made to change the attitudes that lead to poaching practices. This will principally be achieved by strengthening the relationship and trust with the traditional leaders and encouraging them to instil discipline and responsibility in their young members towards conservation of park resources. To resolve disputes, and to minimise the chance of future boundary disputes arising, the DNP should work with the States to clearly demarcate the park boundary, with particular attention given to contentious areas. Disseminating clear maps within the neighbouring districts and amongst park staff should support the enforcement of the demarcated boundary. When intelligence identifies new boundary disputes, the DNP management should rapidly respond to resolve the conflict at an early stage.

It was agreed during the stakeholder consultation process that a necessary step towards improved communications between DNP management and the government, NGOs and donor programmes would be the establishment of a forum or Advisory Committee in each State, that would meet on a regular basis. A broader forum including DNP and all three States should also be constituted, with meetings on perhaps an annual basis. This idea had been developed during the DNP Project, with a meeting held in August 2003 to agree the regulations of such a three-State committee, so there is already a template to draw upon (for the agreed regulations, see Annex 4). Unfortunately, this initiative was not followed up with subsequent meetings, and the DNPP terminated in 2005, but at least the precedent was set. An additional precedent is the Steering Committee of the ENSAP Watershed Management Project, which includes stakeholders at various levels from all three States. A new effort should be made to establish State-level and multi-State advisory committees, perhaps by building upon the process begun with the Watershed Management Project.

These committees should be composed of representatives from DNP management, State Wildlife officers, small farmer committees, Locality governments, pastoralist communities, mechanized farmers, State-level unions of farmers and pastoralists, State government officials in natural resources and planning Ministries, Forest National Corporation, conservation and social development NGOs, and relevant private sector companies.

Another development reported in the 2004 Management Plan was that the Council of Ministers decided to establish a National Council for Protected Areas. This council was to

have members from all Natural Resources Departments as well as other stakeholders related to protected areas. The Council was to have a technical steering committee to advise the Director of Wildlife. Unfortunately this council was also not followed up. The idea should be resurrected, as either a National Council for Protected Areas or for Wildlife.

Formal mechanisms should be developed for two-way communication, such as the Advisory Committees noted above, should be actively pursued.

Transboundary issues have become an increasingly central focus of global biodiversity conservation and the broader Dinder ecosystem has a number of pressing issues between Sudan and Ethiopia that will need to be addressed during the MP. In particular, these relate to the potential wildlife movements and the Dinder River catchment that spans the two countries. A report by the Nile Basin Initiative outlined the need and prospects for creating a transboundary national park, including both DNP and Alatish NP on the Ethiopian side. Contacts with the Ethiopian authorities have already been established. DNP management recognises the importance of increasing the level of cooperation with the Ethiopian side of the ecosystem and this will be a focus of this management action.

5.9 Objectives, targets and actions

These guiding principles of the DNP park operations strategy provide the basis for the objectives of the Park Operations Programme that define the future desirable state at DNP and address the relevant problems and issues facing the DNP management.

The four objectives are:

1. Natural resource values and human life and property are effectively and efficiently protected
2. Efficiency of DNP park operations strengthened
3. DNP infrastructure and service standards improved
4. Local, national and international collaboration in the long-term conservation and management of DNP and the wider ecosystem strengthened

In order to meet the objectives of the Park Operations Programme, a series of 5-year management targets, with accompanying management actions, have been formulated, as described in the following sections. For each management target there is a brief description of the relevant management issues and opportunities, which provide the specific context and justification for the management actions.

Objective 1: Natural resource values and human life and property are effectively and efficiently protected

The desired future state of DNP is one where natural resources are protected and the safety to personnel and their property is ensured by a well-coordinated and committed management force.

Target 1.1: Resource protection operations strengthened in collaboration with surrounding communities and other stakeholders

- Action 1.1.1: Provide modern equipment for anti-poaching activities at park ranger posts
- Action 1.1.2: Carry out an assessment of new anti-poaching techniques, including improved recording of poaching levels and patrolling effort, and implement pilots
- Action 1.1.3: Establish cooperation with local leaders in raising local community awareness
- Action 1.1.4: Investigate prospects for training Village Game Scouts for protection of community conserved areas
- Action 1.1.5: Improve management of law enforcement and coordination with State authorities, other law enforcement agencies and local communities

Objective 2: Efficiency of DNP park operations strengthened

The desired future state of DNP is one where there is an optimal number of well-trained and motivated personnel, who are performing their functions to a high standard and have the necessary facilities and management systems in place to achieve this. Below are described the management targets to achieve this desired state.

Target 2.1: Staff welfare improved

- Action 2.1.1: Assess the need for and feasibility of movement of park headquarters from Dinder town, as well as removing permanent structures from the Galegu ranger post, to Al Sinait
- Action 2.1.2: Motivate and build capacity of staff – assess capacity needs and provide training

Target 2.2: Performance and professionalism of DNP staff improved

- Action 2.2.1: Assess and develop sectoral units – Administration, Maintenance, Enforcement, Research/Monitoring, Outreach – within DNP organogram structure.
- Action 2.2.2: Evaluate need for, and if necessary develop a Code of Conduct, staff regulations, job descriptions and incentives.

Target 2.3: DNP staff establishment strengthened to meet Management Plan implementation needs

- Action 2.3.1: DNP Community Outreach capacity assessed and strengthened

Target 2.4: Park business plan developed

- Action 2.4.1 With professional support, develop an efficient framework for assessing investment and annual operational costs and a strategy for raising awareness within government funding channels.

Objective 3: DNP infrastructure and service standards improved

The desired future state of DNP is one where appropriate and well-maintained infrastructure supports and enables a high standard of services within the Park. These high

standards will enable improved patrolling, fire-line maintenance, oversight of land use activities in Buffer and Transition Zones and the potential for future increased tourism and visitor numbers, whilst not compromising the status of the Park resources and values. The management targets to achieve this desired state are focused on the road network and communications network.

Target 3.1: DNP road network maintained and improved

Action 3.1.1: Assess road network, recommend best combination of retaining existing roads and developing new roads where needed in line with the Management Plan Zoning Scheme, design and implement a road construction programme.

Action 3.1.2: Ensure Environmental Impact Assessment is undertaken according to HCENR guidelines, and recommendations are followed.

Action 3.1.3: Regularly monitor road wear and tear and carry out necessary maintenance and construction, especially transit roads

Action 3.1.4: Assess needs for and plan procurement of road maintenance equipment.

Target 3.2: DNP communication network improved

Action 3.2.1: Assess needs and plan procurement of communication equipment and provision of training

Objective 4: Local, national and international collaboration in the long-term conservation and management of the Dinder National Park and wider ecosystem strengthened

The desired future state of DNP is one where the full spectrum of stakeholders within the broader ecosystem is coordinated and effectively working together to ensure the long-term conservation of DNP and the broader ecosystem upon which it functions. The role of DNP management will have been central in instigating and coordinating this cooperation, with the strength and support of enabling wildlife legislation and regulations.

Target 4.1 Improved wildlife legislation enacted and DNP regulations established in line with Biosphere Reserve.

Action 4.1.1 Support for finalization of new wildlife legislation and its passage into law.

Action 4.1.2 Development of DNP regulations in line with Biosphere Reserve principles, defining the basis for zoning plans.

Target 4.2 Stakeholder collaboration and partnerships established and strengthened

Action 4.2.1: Build collaboration with other relevant Ministries that are responsible for land use and management, such as Agriculture, Animal Resources and Environment and the Forests National Corporation.

Action 4.2.2: An External Partnerships Unit is established, with the purpose of identifying funding sources and implementation partners and preparing proposals for funding.

Action 4.2.3: Improve communication with Ethiopian authorities on transboundary collaboration

Action 4.1.4: Develop exchange programmes with other protected areas

Target 4.3 Advisory committees established within each State, and between States

Action 4.3.1 Establish an Advisory Committee at State level, adopting regulations, and holding regular meetings.

Action 4.3.2 Establish a "Committee of Committees" - an Advisory Committee with representatives from each of the three State-level Committees

Target 4.4 A National Council for Protected Areas/ Wildlife established.

Action 4.4.1 Encourage establishment of a National Council for Protected Areas/ Wildlife

6. Action Plan

6.1 Ecosystem Management Programme

Objective/ Target/ Action	Year				
	1	2	3	4	5
Objective 1: The conservation and ecological status of DNP enhanced and threats reduced					
Target 1.1: Ecological management plans established					
Action 1.1.1 Develop a prioritized list of Conservation Targets	5000				
Action 1.1.3 Establish a Watershed Management Plan	5000				
Action 1.1.2 Establish a Habitat Conservation Plan	5000				
Target 1.2: Human impacts on habitats minimized					
Action 1.2.1 Improve firelines along existing road network	5000	10000	5000	5000	5000
Action 1.2.2 Improve management of livestock grazing	5000	10000	2000	2000	2000
Action 1.2.3 Improve management of wood-cutting	5000				
Target 1.3: Human impacts on wildlife populations minimized					
Action 1.3.1 Improve wildlife protection*	*	*	*	*	*
Objective 2. Sustainable, conservation-compatible natural resource use in transition and buffer zones					
Target 2.1 Participatory zoning plans agreed in DNP					
Action 2.1.1 Zoning project/ programme.	5000	10000	5000		
Target 2.2 Programme for sustainable NR use initiated in DNP					
Action 2.2.1 Programme of community projects with external agencies	5000	10000	15000	15000	15000
Action 2.2.2 Forests management plan involving local people	7500	5000	5000		
Action 2.2.3 Involvement in REDD+/ AFOLU programmes	5000	5000	5000		
Target 2.3 Tourism development prospects and requirements assessed					
Action 2.3.1 Feasibility and requirements study	25000				
Action 2.3.2 Develop appropriate tourism strategy for DNP		10000			
Action 2.3.3 Promote enabling conditions for tourism		5000	10000	10000	10000
Objective 3. Regular, management-oriented monitoring and assessment of key ecosystem values and processes strengthened					
Target 3.1 Baseline data collected					
Action 3.1.1 Vegetation/ forests inventory	20000				
Action 3.1.2 Wildlife surveys; ground-based	50000				
Action 3.1.3 Socio-economic surveys	100000				
Target 3.2 Monitoring programme established					
Action 3.2.1 Establish ecological monitoring programme		10000	5000	5000	5000
Action 3.2.2 Establish socio-economic monitoring programme		20000	10000	10000	5000
Total costs	247500	95000	62000	47000	37000

* Linked to anti-poaching in Park Operations

6.2 Land use and Community Outreach Programme

Objective/ Target/ Action	Year				
	1	2	3	4	5
Objective 1: Neighbouring community and local government support for conservation strengthened					
Target 1.1: Park-community cooperation, communication and conflict resolution mechanisms enhanced					
Action 1.1.1: Develop comms mechanisms w communities	10000	5000	5000	2500	2500
Action 1.1.2: Training in communication & conflict resolution	10000	5000	5000	2500	2500
Target 1.2: Community benefits from DNP enhanced and costs reduced					
Action 1.2.1: Implement priority community-initiated projects	5000	10000	15000	15000	15000
Action 1.2.2: Provide support for income generating activities	5000	10000	15000	15000	15000
Target 1.3: Conservation education programme improved and expanded					
Action 1.3.1: Develop and improve education materials	5000	10000	5000	2500	2500
Action 1.3.2: Scale-up education programme to all park-adjacent areas	2500	5000	10000	10000	10000
Action 1.3.3: Organise park visits for children & traditional leaders	2500	5000	5000	5000	5000
Objective 2: Threats to DNP resource values reduced through improved CBNRM in Transition zones					
Target 2.1: DNP collaboration in CBNRM initiatives strengthened					
Action 2.1.1: Participatory mapping of Transition Zone outside park	10000				
Action 2.1.2: Identify promising CBNRM initiatives with stakeholders	5000	5000			
Action 2.1.3: Support capacity building for CBNRM initiatives		5000	5000	5000	5000
Action 2.1.4: Train village game scouts *		2500	2500	5000	2500
Objective 3 Encouraging socially equitable and conservation-compatible land use planning in States lands					
Target 3.1 Land use options for pastoralists outside DNP improved					
Action 3.1.1 Encourage improved State plans for livestock rangeland	5000	2500	2500	2500	2500
Action 3.1.2: Support State veterinary outreach activities	5000	2500	2500	2500	2500
Target 3.2 Land use options for small farmers outside DNP improved					
Action 3.2.1 Encourage improved State plans for small farmers	5000	2500	2500	2500	2500
Target 3.3 Forestry leave strips on mechanized farmland enforced and consolidated					
Action 3.3.1 Encourage State enforcement of 10% forest areas in farms	5000	2000	2000		
Action 3.3.1 Encourage consolidation of forestry leave strips in blocks	5000	2000	2000		
Target 3.4 Improved productivity of mechanized farmers, reducing need for large land areas					
Action 3.4.1 Encourage programme for improved mechanized farming	5000	1000	1000		
Target 3.5 Impact of Rahad Canal development on park minimized					
Action 3.5.1 Comms w DIU to minimize impact of Rahad Scheme	5000	2000			
Total costs	384500	294500	217500	137500	67500

* Linked to anti-poaching in Park Operations

6.3 Park Operations Programme

Objective/ Target/ Action	Year				
	1	2	3	4	5
Objective 1: Natural resource values and human life and property are effectively and efficiently protected					
Target 1.1: Resource protection operations strengthened in collaboration with other stakeholders					
Action 1.1.1: Provide anti-poaching equipment at ranger posts	10000	10000	5000	2000	
Action 1.1.2: Assess new anti-poaching methods & implement	5000	5000	5000	2500	2500
Action 1.1.3: Cooperate w local leaders in raising awareness	5000	5000	2500	2500	2500
Action 1.1.4: Train Village Game Scouts	2500	2500	2000	2000	2000
Action 1.1.5: Coordinate w agencies & communities	1000	1000	1000	1000	1000
Objective 2: Efficiency of DNP park operations strengthened					
Target 2.1: Staff welfare improved					
Action 2.1.1: Assess & move park HQ to Al Sinait	5000	2000	10000	5000	5000
Action 2.1.2: Assess capacity needs & train DNP staff	7500	5000	5000	2500	2500
Target 2.2: Performance and professionalism of DNP staff improved					
Action 2.2.1: Asses & develop DNP organogram structure	7500	5000	2500		
Action 2.2.2: Develop Code of Conduct, job descriptions etc	10000	5000	2000		
Target 2.3: DNP staff establishment strengthened to meet Management Plan implementation needs					
Action 2.3.1: Assess, strengthen Outreach capacity	5000	5000	5000	2500	2500
Target 2.4: Park business plan developed					
Action 2.4.1 Develop financial planning & fund-raising	7500	5000	5000	2500	2500
Objective 3: DNP infrastructure and service standards improved					
Target 3.1: DNP road network maintained and improved					
Action 3.1.1: Assess & implement improved road network	5000	15000	15000	10000	5000
Action 3.1.2: Ensure EIA undertaken in road development	15000	2500			
Action 3.1.3: Monitor & maintain road network	5000	5000	5000	5000	5000
Action 3.1.4: Assess needs & procure road equipment	10000	15000	15000	10000	5000
Target 3.2: DNP communication network improved					
Action 3.2.1: Assess needs, procure & train for radios	5000	5000	2500	1000	1000
Objective 4: Local, national & international collaboration in conservation & management of DNP ecosystem					
Target 4.1 Improved wildlife legislation enacted & DNP regulations lined up with Biosphere Reserve					
Action 4.1.1 Support passage of new wildlife legislation	5000				
Action 4.1.2 Align DNP regulations w Bio Reserve zoning	2500	2500			
Target 4.2 Stakeholder collaboration and partnerships established and strengthened					
Action 4.2.1: Build collaboration w other land use Ministries	5000	2500	2500	2500	2500
Action 4.2.2: Establish effective External Partnerships Unit	7500	5000	5000	5000	5000
Action 4.2.3: Transboundary communication w Ethiopia	5000	5000	5000	5000	5000
Action 4.1.4: Develop exchange programmes w other PAs	5000	2500	2500	2500	2500
Target 4.3 Advisory committees, meeting regularly, established within each State, and between States					
Action 4.3.1 Establish an Advisory Committee at State level	10000	10000	10000	10000	10000
Action 4.3.2 Establish Committee w the 3 States	7500	7500	7500	7500	7500
Target 4.4 A National Council for Protected Areas/ Wildlife established					
Action 4.4.1 Encourage National Council for PAs/ Wildlife	2500				
Total costs	156000	128000	115000	81000	69000

7. Plan Monitoring

The DNP Authority, with State Committees that meet regularly, have a key role in monitoring progress of the Plan and the continuous monitoring of the DNP condition to assure that the Plan is succeeding in achieving its vision and outcomes. If necessary, there is an opportunity to review elements, targets and priorities of the MP. This can be done through annual review of progress against the objectives and targets set out in the MP.

Management Plan monitoring should use the Action Plan, with reference to the long-term vision, objectives, targets and outcomes to be achieved during the period of the MP. This approach would provide guidance for the regular assessment of the impacts, positive and negative, resulting from Management Plan implementation, with a set of indicators for easily measuring these impacts, and the most likely sources of this information.

The achievement of the targets set out in the Plan relies on commitment from a wide range of all stakeholders. The DNP management with State Committees have a key role in monitoring progress of the Plan. Regular monitoring of Management Plan implementation will enable adaptive management of DNP, in particular through the subsequent adjustment of the next 5-year Plan, in order to maximise the positive impacts and to mitigate the negative impacts of Management Plan implementation. As such, the implementation of this monitoring framework is a key factor in the ultimate success of the plan.

8. Annexes

1. Summary of stakeholders consulted
2. Timetable of planning process
3. Critique of wildlife legislation
4. Terms of reference of Advisory committee