THE REPUBLIC OF THE GAMBIA

DEPARTMENT OF PARKS & WILDLIFE MANAGEMENT

NIUMI MARINE NATIONAL PARK

MANAGEMENT PLAN

@ MAY 2011

SUMMARY

Compiling a management plan of a protected area is no easy task, but its obvious usefulness overrides the difficulty of the undertaking. It is difficult because it entails gathering, compiling and shifting through a daunting mass of information and data, as well as verifying their accuracy, since the future development and indeed, survival of the rich biodiversity of the Niumi National Park and Marine Protected Area is at stake. It is useful because it touches upon such a wide range of topics. History and culture are indissociable from environment and the flora and fauna.

We wish to commend and thank the men and women who have contributed in many ways to the compilation of this management plan, and we are convinced that such a high professional, accurate, and informative work will be an excellent guide for the noble and exciting mission which the DPWM staff under the support of FIBA has to fulfill in a new millennium full of hopes and challenges.

In updating this management plan, many people have been of immense assistance.
We wish to acknowledge our in-debtedness to the Government of The Gambia, the Ministry of Forestry and the Environment, Department of Fisheries and the Department of Parks and Wildlife Management. Their support has been a constant and unflinching source of encouragement.

We wish to record our particular gratitude to the coordination of the FIBA programme (Charlotte Karibuhoye) and other colleagues involved (Ahmed Fall, Sokhna, Julien).They have been the foundation pillars supporting this work at all times.

Sincere appreciation is expressed to the Directors of Parks and Wildlife Management and Fisheries Departments, the warden of Niumi National Park and his Management team and the fisherfolks for their valuable support and responsibilities.

Finally, we wish to leave on record our heartfelt thanks to our family members, friends and collegues, and all those who help in one way or the other for the implementation of this task, for the unfailing support and unlimited patience throughout this time demanding period.

Dr. Ebrima Njie (Consultancy team leader)
Anna Mbenga Cham: Senior Fisheries Officer, Assistant coordinator
Ousainou Touray: Senior Wildlife Conservation Officer:

TABLE OF CONTENTS

SECTION I:

DESCRIPTION OF ECOLOGICAL AND SOCIAL FEATURES

Summary

The need for the conservation and sustainable use of biodiversity and environmental protection in general, was not a high priority for The Gambia government until the early 1970s when the country was faced with serious drought coupled with increasing human population pressure. Hitherto, the country was still covered with vast areas of closed canopy forests with healthy wildlife habitats supporting numerous wildlife species. The level of natural resource destruction was insignificant as the human population was very low. The population was

able to satisfy their domestic needs from the environment and its resources without necessarily destroying it. However, by the mid- 1970s the situation had started to change from bad to worse. By 1977 the Government had started giving serious attention to environmental issues, and biodiversity in particular. For example, as a sign of commitment, the president in February 1977 made a declaration on biodiversity, popularly known as the Banjul Declaration.

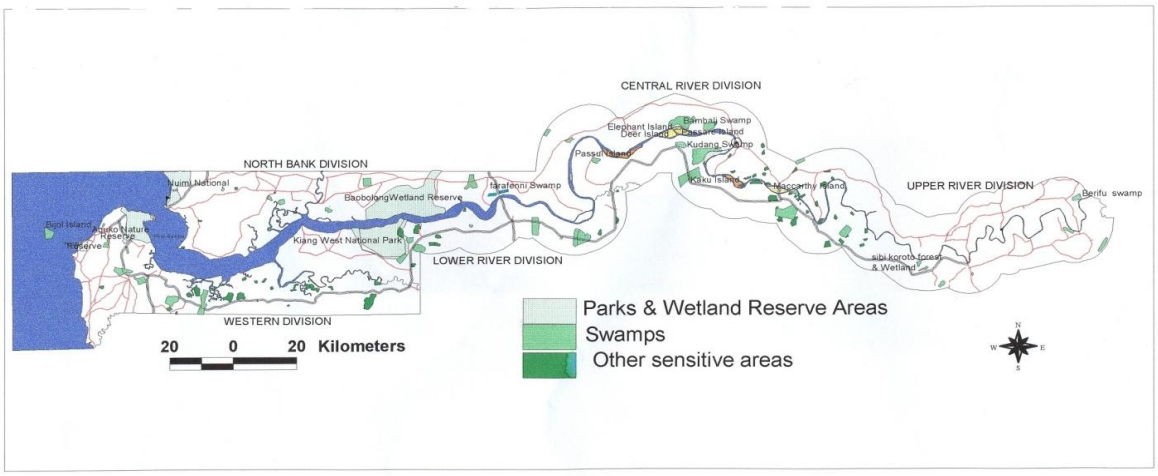
The Banjul Declaration of 18 February 1977.

It is a sobering reflection that in a relatively short period of our history most of our larger wildlife species have disappeared together with much of the original forest cover.

The survival of the wildlife still remaining with us and the setting aside of protected natural habitats for them is the concern of all of us. It would be tragic if this priceless natural heritage, the product of millions of years of evolution, should be further endangered or lost for want of proper concern. This concern is a duty which we owe to ourselves, to our great African heritage and the world.Thus, I solemnly declare that my government pledges its untiring efforts to conserve for now and posterity as wide a spectrum as possible of our remaining flora and fauna.

To further cement its commitment, the Government established and strengthened the departments responsible for the conservation and sustainable use of biodiversity, including the Departments of Parks and Wildlife Management, Forestry and Fisheries under a Separate ministry – Ministry of Natural Resources and the Environment. In addition, the National Environment Agency (NEA) was created under the office of the President. Environmental policies were developed and national policy

orientation took place with a focus on environmental protection and sustainable use of natural resources.



Map of the protected areas of the Gambia

1. General Information

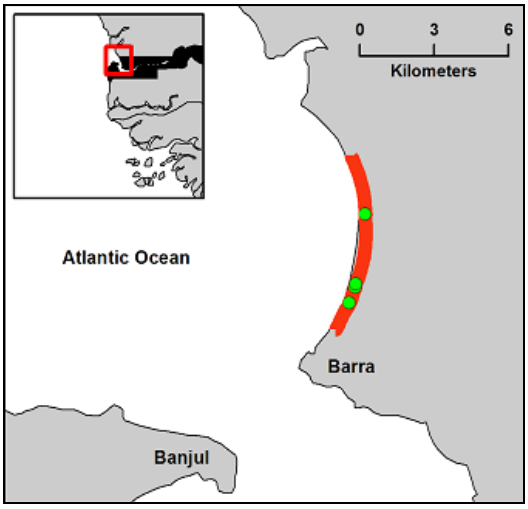
Niumi National Park encompasses the southern tip of the Sine-Saloum Delta. The wetland complex is primarily coastal in nature with seasonal variation in the hydrological regime of the inland component. The fauna of the area is diverse though not exceedingly abundant and includes the West African Manatee (Tricheus senegalensis) and Atlantic Hump-backed Dolphin (Sousa teuszii). Niumi National Park occupies the coastal strip of the north bank of the River Gambia and covers approximately 7758 ha of which 4940 ha of terrestrial and 2818.ha of marine waters. The park extends northwards to the Senegalese border where it joins with the Delta du Saloum National Park. Essentially Niumi National Park forms the southern limit of the vast delta complex, which is centered on the seasonal Sine and Saloum Rivers. Eleven peripheral villages use the Park. Three villages are located within the Park area. Bakindik Koto is the only village located well within the mainland area of the Park and the villages of Jinack Niji and Jinack Kajata are located on

the north-eastern end of Jinack Island. Several other villages lies on the eastern periphery fringes of the Park. The furthest is approximately half a kilometer from the boundary. The 2003 census puts the total population of the villages at 33146 inhabitants with a growth rate of 2.7%. The resident and peripheral villages are dependant on the park for numerous activities including the production of rice, millet and groundnuts, fishing and oyster collection, provision of timber and wood for cooking and construction purposes, grazing of stock (cattle, sheep and goats) and seasonal collection of salt.

a. Location, Site Definition, Boundaries

Niumi National Park is centered on $13^{0}31'N$, $16^{0}31'W$ on the north bank of the river Gambia, in Lower Niumi District in the North Bank Division. The Park boundary extends from Barra Point at the mouth of the River Gambia north to the border covering the low sandy island of Jinack, then east along the Masarinko Bolon to the upper limit of saline intrusion.

The detailed boundary demarcation survey has yet to take place. Therefore there is still no physical demarcation of the boundaries on the ground.



Location of the Niumi National Park

Niumi National Park occupies the coastal strip north of the river Gambia and extends around two nautical miles in the Atlantic Ocean. The terrestrial part contains very sparse wildlife though a wide diversity of habitat types, while the wetland component serves as an important fish breeding ground. Niumi National Park was gazetted in 1986 and encompasses the Island of Jinack and is contiguous with Senegal's, Delta du Saloum national park and Biosphere Reserve. The international character of the Delta as one ecological entity with vital and incalculable environmental value to the region and its people triggered the Gambia and Senegal, to recognize that the protection and management of this life support system and its resources are a crucial factor in the long-term management of the region. The area supports a complex of flora and fauna of great scientific interest. The two governments have recognized the combined potentials of the two protected areas as an ecological entity and have intiated discussions to harmorise their respective management strategies and plans. Niumi has in 1997 been assessed and subsequently designated as a Ramsar site in February 2009.

b. Land Tenure

Niumi National Park was gazetted in 1986 under section 5.2 of the Wildlife Act (1977). The mainland section of the park has been settled for an indeterminate time but extends back several generations. Settlement on the island of Jinack has occurred only within the last hundred and fifty years. The two villages within the Gambian side of the island of Jinack, Jinack Kajata and Jinack Niji, have a total of 1527 people (2003 census). Agricultural land is generally held in communal

ownership with allocations as required being granted by the village "Alikalo or Chief. Cultivation of agricultural land is done on a plot basis with a reciprocal approach to labour (Ramsar Wetland Study The Gambia, 1977).

2. Socio-economic caracteristics

2.1 The Socio – Economic Importance Of Niumi Wetlands

The communities peripheral to and within Niumi National Park are composed primarily of subsistence formers and fishermen, and resultantly they are dependant on natural resources for the maintenance of their livelihoods. The wetland areas of the park are of considerable importance in these subsistence economies such as for wet season rice cultivation and dry season market gardening, provision of dry season grazing for livestock, fishing and shellfish harvesting. Various materials are also derived from the wetland environment including mangrove poles for roofing and grasses for thatching and fence construction.

The dependence on natural resources by local communities places them in a key role position in the management of the park. Their present dependence on these resources for basic needs can only be continued sustainably if there is no significant increase in demand and deterioration in utilization practices.

Unfortunately, with the human growth rate of The Gambia exceding 4% and the increasing environmental degradation resulting from inappropriate techniques (the excessive use of firewood, over grazing by livestock, etc), the dependence on natural regeneration to meet both fuel

and timber wood requirements for sustainability of land use practices is being called into question. The diverse activities which people engage in and the seasonality of many of these operations, often require a co-operative effort which is a critical component in the maintenance of the community spirit and social stability.

This traditionally balanced form of resource utilization is the hub of most Gambian rural communities and the breakdown of this system for environmental reasons will result in a corresponding deterioration of the socio- cultural values as well. To maintain the vitality of a community, it is imperative that the trend of urban drift which is leaching off the youth in search of wider prospects is reduced by opening incentives and opportunities at the community level.

The recognition of the ecological value of the Niumi wetlands and a better understanding of its functioning enable a more balanced direction to be taken in the management of its resources.

In assessing the value of the wetland the diverse ecological and economical functions which it serves at both the local and national level must be adequately incorporated into any balance sheet. In the case of Niumi the functions of the wetland include fish breeding and nursery grounds for fish and fisheries species as well as regulation of saline intrusion and the protection of the coastal zone. Additional functions that could be tapped include the development of tourism, recreation and educational services.

2.2 Current Socio- Economic Activities

2.2.1 Agriculture

Seasonal production of early millet and groundnuts is confined to the plateau areas of the park where traditionally the crops were periodically rotated onto fresh ground in a shifting pattern. Natural vegetation was allowed to regenerate during the fallow periods, and mature trees left upon clearance for cultivation. This system has essentially broken down as the demand for land has increased and the more intensive cropping in combination with the practice of burning off crop residues prior to cultivating the land has led to a deterioration of soil fertility.

In the rain fed swamps and upper freshwater reaches of the bolons, seasonal rice cultivation is conducted using labour intensive methods, mostly by women. Some construction of earthen bunds has been conducted to either retain freshwater in the case of rain fed swamps or to prevent saline intrusion in the upper bolons. A number of villages outside of the parks utilize these wetlands with the consent of the Alkalo (Village chief) under whose jurisdiction the land falls.

Crop yields are quite variable due to rainfall patterns and husbandry techniques employed. Most rice is home consumed though invariably there is exchange through bartering and distribution among the extended family.

2.2.2 Market Gardening.

In the same areas utilized for rice cultivation dry season market gardening is carried out availing of the organic soils and the high water table. Hand dug wells are used for watering of tomatoes, peppers, cabbage, onions and bitter tomatoes. As with rice cultivation, the majority of people involved in horticulture are women who operate on a

collective and co-operative basis locally referred to as a “kafo”. Much of the produce is sold at the local level raising a small income for the women involved, and the balance of the crops are consumed in the household thereby improving nutrition intake.

2.2.3 Fishing.

Despite the good fishing grounds within the bolons and in the inshore waters, fishing activities are primarily at the subsistence level within Niumi National Park. A few individuals from each of the villages close to the bolons are involved in gill netting on a part- time basis and fish traps are also utilized on the upper bolons towards the end of the rains as the waters are subsiding. The catches are generally home consumed or bartered at the village level for other goods or services. On the Senegalese end of Jinack Islands, the villages of Barra and Diatako are more commercially oriented in their fishing activity which reaches the market of the larger towns.

Women are engaged in the harvesting of oysters clams and whelks in the Masarinko and Niji Bolons. The oysters are harvested from the roots of mangroves, and shellfish are collected from the mud flat during spring tides. Again these activities are primarily at subsistence level though

that is not to underscore their importance in the local economy and in nutrition.

2.2.4 Timber and Building Materials

The timber of mangrove is valued for its resistance to insect damage and it is used primarily for cross timbers and laths in roofing. As the amount of timber available in the dry woodland diminishes through over – exploitation and excessive use of fire, it is being turned to more and more for use in the provision of fuelwood and fencing posts.

Palm fronds are used for a variety of purposes including thatching of roofs, fencing construction of “kirinting” (palisade strips used for fences, walls, ceilings etc.) and basket making. The rhun palm (*Boranssus aethiopium*) swamp – date palm (*Phoenix reclinata*) and oil palm (*Elaeis guineensis*) are harvested off their leaves and with increasing demand; trees are often stripped of all but a tuft of emerging fronds. The elephant grass (*Andropogon gayanus*) is also harvested after reaching full maturity after the rains, when it provides stout and strong straw up to 2.5m in length.

The grass is used in the construction of walls of house where it is surprisingly durable, and is also woven into 3m long sections used in fencing. The availability of good grass straw is reducing due to the dry season increase in livestock densities which both consume and trample the grass.

2.2.5 . SAND MINING

No mining of sand is permitted within the confines of the National Park and all sand mining activities are under the control of the Geological Unit under the Ministry of Local government and lands. However in closed canopy dry woodland to the north of Kanuma, extensive mining of sand has been taking place over the last decade with serious negative consequences for the trees in the vicinity of the site. The excavation has left numerous trees standing on pedestals of soil 2m above the current ground level. Efforts are being made to control this activity through the cooperation of the Department of Parks and Wildlife Management, Geological Unit and the National Environment Agency.

2.2.6. Livestock Grazing

Within Niumi National Park sheep and goats are grazed, being let range over the bushland and on crop residues after the harvest. Small ruminants are generally grazed close to villages and are corralled within compounds overnight, cattle are corralled by tying to stakes in areas peripheral to the villages.

Livestock numbers are seasonally augmented during the dry season as cattle are brought to the coastal area to avail of the better grazing. On the island of Jinack, the number of cattle appears to double during the dry season and they are ranged over the entire island. In recognition of

the impact that small stock were having on the regeneration of trees on the island the communities of Niji and Kajata have regulated the numbers of small stock. The impact of cattle on regeneration is less obvious but there is an indication that through browsing and trampling damage to young saplings is occurring and the sensitive coastal vegetation (i.e the pioneer zone of plants on the dune fringe) is being degraded thereby exposing the stabilized dunes to erosion.

There is quite clearly a need to determine an appropriate stocking density for the various ecological zones of the park and to regulate grazing to a sustainable level.

2.2.8. Other Activities

Palm wine tapping is carried out by a small number of people around the park. As the oil palm is confined to areas with high ground water levels, the decrease in rainfall over the last 2 decades is likely to restrict the occurrence of this species. Palm wine tapping is sustainable to a certain level but excessive tapping can lead to the death of the tree.

The harvesting of wild fruits is widespread through out the park and forms an important supplement to local diets and incomes where children often sell their harvest to raise funds for school books and fees. Numerous species are harvested including *Detarium senegalensis, Adansonia digitata, Acacia albida, and Saba senegalensis*. Excessive harvesting of wild fruits can lead to shortages for wild primates and other frugivorous species and in certain instances damage to the tree by unscrupulous lopping of branches to access fruits.

Management Infrastructure

Niumi National Park was gazetted in 1986 in accordance with the principles of the Banjul Declaration to conserve and protect The Gambia's remaining fauna and flora while enabling the surrounding communities to sustainably utilize the resources within. The Provisions of the Biodiversity/Wildlife Act 2003, expressly prohibits all activities within gazetted areas which are not compatible with protected area status. Such activities include illegal felling, illegal parkland allocation, bush fires, illegal construction activities and illegal hunting among others.

"All non-management related activities within the boundaries of an officially gazetted protected area must first be recommended by the Director responsible for protected area management and then cleared by the Minister responsible for natural resources."

The Department of Parks and Wildlife Management is accountable for the management, administration and development of The Gambia's protected areas and handles all matters relating to wildlife conservation

and management. This includes the enforcement of the 1977 Wildlife Act, which prohibits the sale of wildlife products and the keeping of wild animals in captivity. The Department also controls and monitors hunting activities in the country.

Niumi National Park forms the southern limit of the vast delta complex, which is centered on the seasonal Sine and Saloum Rivers. Discussions between the Gambian and Senegalese Heads of states have led to a mutual agreement (Jinack Protocol) on the necessity to protect the entire delta system as a co-ordinated international park. Senegal gazetted the Parc National du Delta du Saloum in 1976, covering an area of 73,000 ha. The Delta du Senegal was designated as a Ramsar site in 1980 and listed as a Biosphere Reserve in 1984.

In 1998, the co-ordinated approach was further emphasized at a meeting between officials of the two Wildlife Departments and IUCN, when the three parties identified the following issues for co-operation.

- The elaboration of a framework for co-operation and partnership between the administrations of the two protected areas
- The possibility of giving the two sites a common international status such as an international Ramsar Site/International Biosphere Reserve
- The co-ordination of research programmes and the monitoring of certain common species
- Local community involvement in the efforts to conserve transfrontier biological resources.

Since it was gazetted, Niumi National Park has had minor intervention from the DPWM due to limited resources. From 1993 a cadre of honorary rangers was established with the aim of providing some monitoring and control on activities taking place in the park. Presently staff personnel (rangers, warden, cadet Parks and Wildlife officer) have been established for the management of the Park.

A management committee was formed for the Park in June 1996. It was made up of community representatives, resource stakeholders and DPWM staff following a series of meetings with the local communities. The newly elected committee was given a 2-day workshop to explain the committee's function and duties. A draft management strategy was formulated to guide the committee in its deliberations and to outline the proposed strategy of management for the park. The essence of the strategy was to define the optimum purpose for different areas of the park by incorporating views and concerns of all sectors. This allowed zoning of the park according to set criteria and applicable management approaches

A building has been constructed to serve as Park headquarters and shelters for meetings and accommodation. It is located near the boundary of the Park along the track from Kanuma to the crossing point for Niji and Kajata. Over the last two years one warden has been in place at Niumi National Park. He is therefore very limited in the activities that he can undertake i.e to take on sensitization operations and monitor activities within the park. No fire belt clearance has been undertaken for two years due to lack of resources.

The park has benefited tremendously from financial and technical supports of the Fondation International du Banc D'Arguin (FIBA) during the past years. This has enable the establishment and functioning of a site management committee, the renovation and upgrading of the office block, improvement of marine surveillance with the purchase of a patrol vessel, procurement of field materials for species and habitat monitoring, improvement of community livelihood projects, capacity building of the management staff and presently the review process and update of the management plan of the area.

In addition to the above, due to the increasing attention that the area is getting as an eco-tourism destination, government has entered into a Memorandum of Understanding with a private concession to construct and operate a modest facility within the boundaries of the Park. This is called Madiyana Camp and is located on the seaward side of Jinack Island.

3. Environmental Information

3.1. Physical

a. Climat:

The climate of the Gambia is generally described as Sudano-Sahelian. Rainfall is concentrated in the wet season between the months of May to October with an average of 850mm per annum. The rainfall is generally less in the northern half of the country and greatest in the south-west. There has been a reported 25 to 30% decrease in annual average rainfall over the period 1950 – 1990 (DPWM, 1997). No rain gauges are located within Niumi National Park, the closest being based at Fajara on the south bank of the River Gambia, under the supervision of the Gambia-German Forestry Project.

b. Hydrology:

The bolongs or creeks of Niumi National Park are subject to the daily rhythm of the tides, which have a maximum range of 2m in equinoxal springs. During the rains from May/June to October/November, the salinity of the bolons decreases in the upper reaches.

Low-lying areas on Jinack Island and on the mainland flood during the rains creating generally linear ponds and seasonal marshes in the salt pans and Tamarisk, *Tamarix senegalensis* scrub. The degree of flooding is a function of the extent of the rainfall, and in low-rainfall years flooding may be limited to relict bolons. Flooded areas gradually recede as the dry season sets in and salinity of the water increases through evaporation (Ramsar Wetland Study The Gambia, 1997).The ground water table on the island of Jinack fluctuates between 3 and 5m depending on the season. The complexity of the aquifer in this area has not been thoroughly surveyed, but in places freshwater is present at 3 to

4m depth in less than 100m away from the shoreline (Ramsar Wetland Study The Gambia, 1997).

c. Geology:

Niumi National Park occupies the southern portion of the Sine-Saloum Delta and has a surface geology greatly influenced by the formation of a Ria (drowned river valley) within the Niji Bolon during the Noukachottian transgression.During this transgression sea level rose 3 to 4m, flooding much of what is now Niumi National Park, resulting in sequences of unconsolidated sand, silts and clay. Beaches and sand dunes were subsequently left perched 4m above the existing high water mark, though they have subsequently been eroded and reworked. The sand deposits on the oceanic coast are referred to as Coastal Beach Complex. The Continental Terminal Series abuts onto this complex at Niumi with occasional exposure to laterite boulders as in the escarpment east of the Masarinko Bolon.

The Nouakchottian shoreline is evident along the Ker Saniang Bolon where it forms low eroding cliffs. Jinack island and the mosaic of islands to the north which form the Sine-Saloum Delta, are essentially shifting shoals of sand which have stabilized through colonization by vegetation though still maintain a degree of dynamism evident in the erosion-deposition occurring at the channel mouths eg Buniada Point (Ramsar Wetland Study The Gambia, 1997).

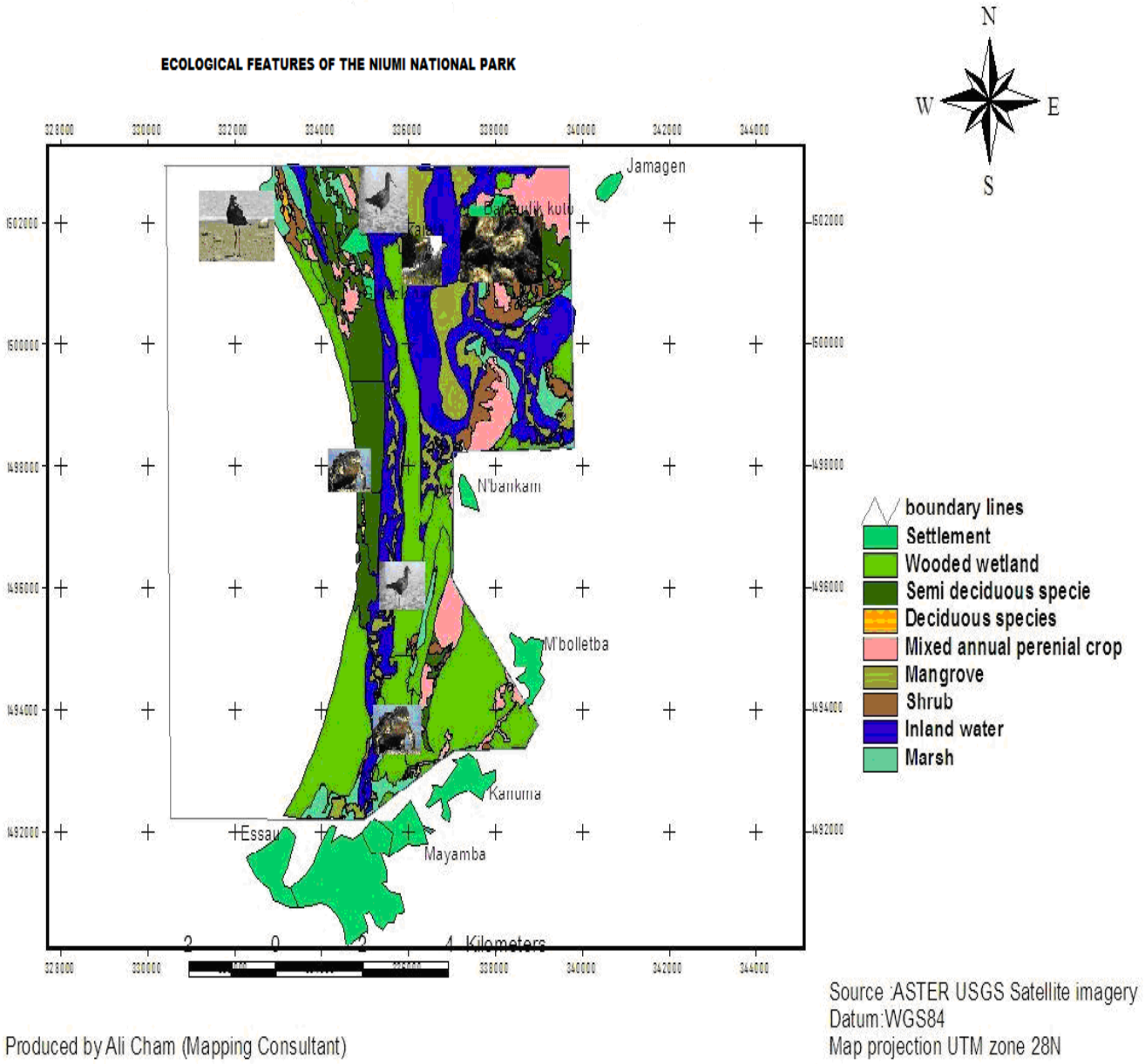
d. Geomorphology

The average elevation within the park is less than 5m, with a maximum of approximately 15m. The high ground occurs primarily along the Masarinko Bolon where a sandy escarpment fringes what presumably was an ancient shoreline.

e. Soils

A detailed soil survey (Ramsar study, 1996) as conducted in the vicinity of Kajata and Niji on Jinack islands as part of a program to rehabilitate rice fields that have been subject to saltwater intrusion over the last decade. The survey area was confined to two broad physiographic units: the elevated sand dune complexes and the low-lying flood plain area. The sand dune complexes are composed of relatively young under-developed, coarse textured soils that are low in nutrients and available water. The soil is unsuitable for most crops with the exception of coconuts (*cocos nucifera)*. The low-lying flood plain is loaded with sodium salts, though the soils are moderately drained and contain appreciable amount of nutrients. The problem of excessive sodium could be overcome if sufficient water is available to leach it out (Ramsar Wetland Study, The Gambia, 1997)

3.2. Ecological informations



a. **Flora:** The distribution of vegetation types within the park is presented in figure 2B and follows the classification of vegetation types according to the Ramsar Convention for Wetland types, and Whyte (1993) for dry vegetation types (Wetland Ramsar The Gambia, 1997).

Table 2a **Classification of Vegetation-Habitat Types**

Habitat Type	Symbol
Mangrove	M
High Mangrove	Mh
Low Mangrove	Ml
Coastal Grass/Scrubland	Cb
Grassland	Cg
Scrubland	Cs
Bush Scrubland	B
Forest/Woodland	F
Open Forest	Fo
Closed Forest	Fc
Mitragyna Woodland	My
Salt Marsh	Sm
Brackish Lagoon	Sl
Tamarisk Marsh	St
Salt Pan	Sp
Swamp Grassland	Sg
Freshwater Marsh	Fm
Freshwater Lagoon	Fl
Shallow marine waters	Ws
Intertidal mudflats	Im
Estuarine waters	We
Sand Beaches	Bs
Hort/Agricultural	H
Rice Cultivation	Hr
Industrial/Commercial	I
Existing Industrial	Ie
Proposed Industrial	Ip
Hotels	Ho
Institutions	In
Urban Development	U

b. Major Habitat and Vegetation Types

- Permanent Shallow Marine Waters:

Between Barra Point and Buniada Point the coastal profile is a gently shelving sand embayment with a predominantly northerly current. The depth of water at high tide is in the region of 5 meters up to 2km offshore. There is considerable movement of sediments in the vicinity of Buniada Point where sand bars extend up to 2km to the west. Much of this sand deposition is the result of erosion further south along the shoreline of Jinack Island. Anecdotal information suggests that the beach in front of Madiyana Camp has been eroded more than 15m in the past years. There appears to be little sub-tidal vegetation though the occasional presence of eel grass *Cymodocea nodosa* along the shoreline which suggests there may be beds within the confines of the park (Ramsar Study, 1996).

- Sand Shores:

The sand shoreline between Barra and Buniada on the island of Jinack is backed by a clearly zoned dune system. A herbaceous dominated

zone extends inland for 10-15m where it is abruptly terminated by an evergreen shrub zone backed by a belt of taller trees. Further inland from this belt, the ground dips slightly to a seasonally flooded strip. This varies in width and in the northern end of the island --- extends into a mosaic of shrub fringed, seasonally flooded pans. The clearly zoned dune system is comprised of the front dune, which is stabilized with Beach Morning Glory *Ipomea pes-caprae*, *Cyperus maritimus*, Seaside Purslane *Sesuvium portulacastrum* and *Cenchrus biflorus*. Behind this raised pioneer zone the same species occur in a more species-rich belt with a mean height of 75cm. Other species noted in this belt included Seaside Sword Bean Canavalia rosea, Ipomoea stolonifera, Philozerus vermicularis, Merremia tridentate, Alternanthera maritime, Pergularia daemia, Star Thistle Centaurea perrottetii, Cholris sp., Leptadenia hastate and occasional Bell-floweded Mimosa Dicrostachys glomerata and Scaevola plumeri. The evergreen shrub zone is comprised mainly of Confetti Tree *Maytensus senegalensis* and *Scaevola plumeri*. Other tree, shrub and climber species present in this zone include Tamarisk, Senegal Lilac *Lonchcarpus sericeus*, Gingerbread Plum *Parinari macrophylla*, *Macrosphyra longistyla, Cassytha filimormis, Capparis tomentosa*, Bell-flowered Mimosa, *Dalbergia ecasaphyllum*, Capparis tomentosa, Chinese Date *Zizphus mauritiana*, Bitter Leaf *Vernonia colorata, Leptadenia hastate, Pergularia daemia*, Burning Bush *Combretum paniculatum*, West Indian Alder Conocarpus erectus, Merremia aegyptia and *Tetracera alniflora*. The rich herb-layer composes in the main River Bean *Sesbania bispinosa*, *Ipomoea heterotricha*, *Ruspolia hypocrateriformis*, Glofy Lily *Gloriosa superba*, the locally common Fireball Lily *Scadoxus multiflrus* and African

Arrowoot Lily *Tacca leontopetaloides*, *Asystasia gangetica*, *Amorphophallus aphyllus*, Yellow Arum A. flavovirens, Star Thistle *Tephrosia platycarpa* and Rattle Box *Crotalaria retusa*. The next zone consists mainly of Thirsty Thorn, *Acacia seyal*, and reaches a height of 7-8m. Baobaa trees *Adansonia digitata* occur singularly or in small copses throughout this coastal zone. The parasitic *Cassytha filiformis* forms dense mats over some of the *Acacia-maytensus* belt. The seasonally flooded strip is dominated by tamarisk which reaches a height of around 4m and is interspersed with abundant Hibiscus, tiliaceus, Sporobulus spicatus, Rattle Box and River Bean.

- Estuarine Waters:

The northern tip of Jinack Island forms a estuary for the outflow of a number of bolongs, some of which derive from the Delta du Saloum. The Masarinko bolong is the main water body within the Niumi National Park and rises as two streams of 1km inland. The freshwater flow on these bolongs is negligible during the dry season and they are brackish to saline through out the year. The habitats associated with these water bodies includes mangrove forest, inter tidal mudflats and salt marsh. In their upper reaches freshwater pools persist into the dry season but ultimately dry completely. Rice is cultivated on the upper flood plains of the rivers under the canopy of relict gallery forest.

- Inter Tidal Sand and Mud Flats:

The bolongs are tidal for their entire dry season length. Their combined tidal outflow of these bolongs meeting the northerly currents arising from

the river Gambia have resulted in a sand bar formation of Buniada Point. The spit is covered on high tides and resultantly has no associated vegetation, though it is a regular roosting site for a variety of sterns gulls, waders and herons. Along the Masarinko and Niji Bolongs, Numerous mud banks become exposed during low water. No vegetation is associated with these mud banks possibly due to the tidal surge within the bolons. Backing the mangrove fringe of the bolons extensive areas of salt pan (bare tannes) occur where hyper-saline conditions limit the growth of plants. Colonization by halophytes is generally limited to the peripheries of these pans and consists mainly of *Sesuvium portulacatrum*, *Philoxerus vermicularis, Paspalum vaginatum*, and *Sorobolus spp*.

- Inter Tidal Marshes:

Halophytic vegetation associated with salt pans has been referred to above and the same complex of species is also associated with inter tidal marshes and seasonally flooded areas. On the island of Jinack the low lying nature of the island (essentially a vegetation spit) subjects a large portion of the island to seasonal flooding through rainfall. The salinity of these areas steadily rises due to residual salts from evaporation during the end of the rains and the dominant vegetation is essentially halophytic in nature. Rainfall swamps occur on the eastern side of the island and are utilized for rice cultivation.

Part of the seasonally flooded areas is also subject to periodic flooding during spring tides. Salt marshes are generally fringed by *Tamarix senegalensis* with occasional *Avicennia africana*. *Adansonia digitata* occurs on slightly elevated land fringing the marshes.

- Inter Tidal Forests:

Mangrove forest dominates the bolongs fringes within the Niumi National Park. The total area of mangrove within the park is approximately 800ha. Six woody species are found within the mangrove belt, namely.

- *Rhizophora harissionii*
- *Rhizophora racemosa*
- *Laguncularia racemosa*
- *Avicennia nitida*
- *Conocarpus erectus*
- *Rhizophora mangle*

All 6 species occur within the Niumi mangroves though the distribution of Rhizophora species has not been investigated in detail. Sukardjo (1995) has outlines four mangrove communities types found in The Gambia based on lugo and Sndaker's (1974) criteria. The communities identified are fringe forest, riverine forest, basin forest and scrub or dwarf forest. According to these criteria however it appears that a fifth mangrove community occurs within the Tanbi Wetland complex overwash forest. The fringe mangrove forests are found along waterways where the shoreline elevation is slightly higher than the mean high tide level and the salinity remains fairly constant through out the year.

This forest is composed of monotypic stands of Rhizophora mangle in the outer estuary of the River Gambia and in the Upper stretches of the bolongs within Niumi National Park.

All three Rhizophora species are found in this zone and tree height can reach more than 10m. Basin mangrove forests occur in areas subject to tidal inundation during spring tides only and with correspondingly high soil salinity levels. This forest type is dominated by *Avicenma nitida* and tree height may get up to 20m. Scrub or dwarf forests are to be found in areas with limited tidal inundation and high salinity levels, often backing the fringe forest. Avicennia predominates but may be accompanied by Rhizohora and Laguncularia.

Fringe Mangrove forest is predominant within Niumi and is found along the Masarinko and Niji Bolongs. The north – east tip of Jinack Island and the Mbankama spit have extensive stands of this forest type which is backed by scrub forest and bare tannes. Stands of riverine mangrove forests are found in the mid and upper tidal reaches of the Masarinko Bolon, reaching heights up to 12m though generally less than 10m. On the spits opposite and to the south of Bakindik Koto, this forest type occurs on a peat deposit which sporadically (occurs) in the Gambia as thin beds within the fluvial marine sequence (White and Russell, 1988). Here also, the forest grades to scrub mangrove in the inland reaches. The northern aspect of the park is demarcated by a labyrinth of Rhizophora mangrove creeks and channels that are presently not well researched in seasonal terms.

At low tide in January extensive mud flats are exposed harbouring a diverse range of feeding shorebirds that reflect the avifaunal content of the Bund Road area (Tanbi Wetland Complex). African Fish Eagle (Haliaetus vocifer) and Goliath Heron (Ardea goliath) are commonly seen but not numerous. Ble-cheeked Bee Eater (M. persicus) is

particularly abundant also in January. The creek systems are used by a variety of kingfisher species both resident and regionally migrant.

- Coastal Lagoons:

A single coastal lagoon occurs at Buniadu Point on the north Shore of Jinack Island occupying an area of ca 2ha. The lagoon is maintained by the accumulation of sediments arising from the outflow of the Mansarinko Bolon and the northerly currents from the mouth of the Rive Gambia. The sediments form a spit which runs north – west from Buniada point for a distance of ca 1km. the lagoon is periodically inundated by the sea on spring tide through a channel on the north east side, though in recent months tidal surges have pushed over the westerly bank and there is a possibility this will ultimately form a breach. The seaward fringe of the lagoon is vegetated with a pioneer community of *Ipomea pes-caprae, Sesuvium portulacastrum, Cenchrus biflorus* and *Cyprus spp*. Occasional Avicennia shrubs occur on the southern edge which grades into Dichrostachys thicket with emergent A. digitata.

- Permanent Creeks:

Niumi National Park has two main creek systems running through it. The Niji bolon connects to the ocean immediately north of Barra point and to the Mansarinko Bolon at the Senegalese border thereby forming the island of Jinack. This bolong is subject to the regular diurnal tidal cycle and as it has a small catchment area there is relatively little seasonal variation in salinity. The Mansarinko bolong divides north of Mbamkam to form the Ker Jatta and Duniajoes bolongs. These bolons have a combined catchment in the region of 100km square and

resultantly have a marked seasonal variation in salinity. During the dry season hyper – saline conditions exist in the upper reaches due to limited tidal flushing and high evaporation rates. As the rains commence dilution occurs and the salinity levels reduces progressively. The associated vegetation with these bolongs is predominantly mangrove where there is a gentle gradient on the banks. Elsewhere, the vegetation ranges from woodland to grassland. There appears to be no associated aquatic vegetation within the bolongs with the exception of the mangrove complex.

- Seasonal Creeks:

The upper reaches of Ker Jatta and Duniajoe bolongs have seasonal freshwater flow. There are a number of other small bolongs both on the island of Jinack and on the mainlands which are rains fed but due to small catchment areas are more prone to rapid salinisation through a combination of evaporation and intrusion. The Ker Jatta and Duniajoe bolongs have an associated floating / emergent freshwater vegetation dominated by *Nymphaea lotus* and *N. micrantha*, (atypha) and *Cyperus spp*, with *Marsilea sp*, *Ageratum sp, Urena lobata* and various graminae. The areas have relic gallery forest fringing the bolongs which in some areas has been cleared underneath for rice cultivation and seasonal vegetable gardening.

The freshwater stretches of these bolongs currently lies outside of the proposed park boundary though their inclusion is due to be negotiated with the neighboring communities in the near future for the proposed Niumi Biosphere Reserve initiative.

- Seasonal Saline Flats:

The saline flats which are found within Niumi National Parks are distributed primarily on the landward side of the mangrove belt. On the island of Jinack however low lying areas are seasonally flooded by rainwater forming temporary shallow lakes. After the rivers receded, the subsequent drying up of these water bodies primarily through evaporation results in increasing salt concentration. The associated vegetation is essentially halophytic with *Sesuvium portulacatrum, philoxerus vermiculatus, sporobulus spp* and *Paspalum vaginatum*, the shrubby *Tamarix senegalensis* occurs on the fringes along with occasional *Elaeis guineensis* and *Avicennia africana.*

- Seasonal Saline Marshes:

Areas peripheral to and often part of the saline flats and backing the mangrove forest in places develop as seasonal saline marshes with a combination of halopytic species and various cyperaceae. As the dry season commences, these areas undergo progressive desiccation and the vegetation cover dies back.

- Seasonal Freshwater Marshes:

With the overall low-lying topography of Niumi National Park, considerable areas are subject to flooding through freshwater runoff during the rainy season. Many of these areas are utilized for seasonal rice cultivation such as the headwaters of Ker Jatta and Duniajoe

bolongs. On the island of Jinack there are extensive areas immediately west of the villages of Kajata and Niji which flood through rainfall and support an essentially freshwater marsh plant community. These areas form the main rice fields on the island. A similar linear flood plain exists ca 1km west of Mbollet Bah, and a simillar area is found to the west of Kanuma. In the dry season some vegetable production is conducted in these areas with irrigation from shallow hand dug wells.

The head waters of the various bolongs both large and small support seasonal fresh water marshes. As the dry season advances most of these areas desiccate entirely or undergo an increase in salinity through evaporation and saline intrusion. The vegetation associated with these seasonal freshwater marshes is similar to that referred to under seasonal creeks above.

- Gallery Forest:

Gallery forest is found in relic patches in the upper (freshwater) reaches of the bolongs. These relic forest patches are comparable in composition and structure to the Fathala forest within the adjacent Delta du Saloum National Park with the most abundant woody species being *Anthostema senegalensis* and *Dialium guineense* (c,f Lykke. 1994).
Other notable species include *Khaya senegalensis, Detarium guineese, Alchorea cordifolia* and *Afzelia africana*. The forest on the Duniajoe Bolong is quite degraded through a combination of clearance of the understorey for rice cultivation, selective felling and fire damage.

- Dry Woodland and Wooded Grassland:

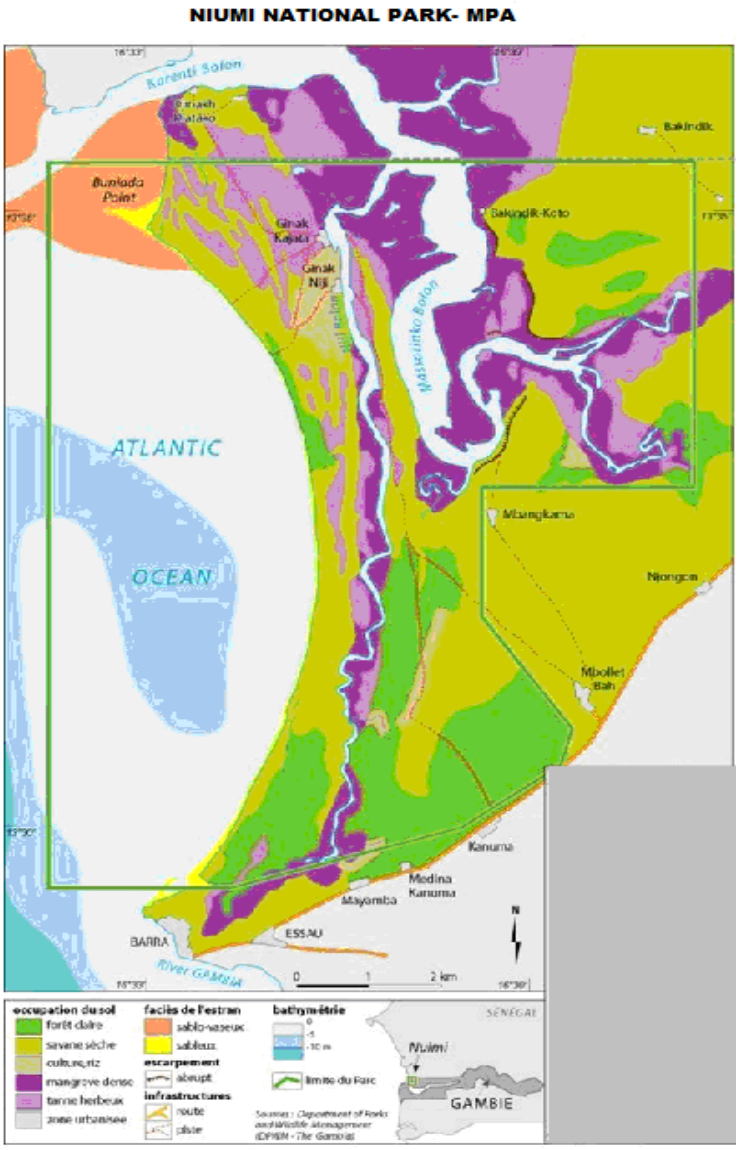
Woodland is defined as having a canopy cover of more than 40% and reaching a height greater than 8m, while wooded grassland has a canopy of 10-40%. [Within *Niumi National Park* land elevated above the seasonally flooded areas and valley bottoms falls within one or the other of these categories with the exception of some cleared agriculture land.] The dominant species found within these vegetation types are *Parkia biglobosa, Daniellia oliveri, and Pterocarpus erinaceus*. Shrubby species found in association include *Combretum nigricans, Dierostachys glomerate, Guiera senegensis* and Ziziphus mauritinia. These species are more dominant in locations where there has been clearance for agriculture in the past or a high incidence of fire damage to the vegetation giving rise to bushland or thicket. Dense regeneration of *Daniellia oliveri* is often found in fallow agricultural land. The understorey in both woodland and grassed woodland is dominated by the grass *Andropogon* gayanus which reaches heights of over 2m. Other grasses which occur include *Echinochloa colona* and *Chloris* spp. On the Island of Jinack and the sandier soils immediately east of the Niji Bolong, the woodland has a higher incidence of *Parinari macrophylla*, Ficus spp and *Tamarindus indica. Maytenus senegalensis* is common in this woodland type.

Threats to vegetation diversity and habitats

Niumi National Park has three resident communities within its boundaries and numerous others on its periphery. These communities depend to a large degree on resource utilization within the park area. The management of the park is based on the incorporation of the needs and views of the people to arrive at a sustainable approach to land use

practices compatible with the objectives of conservation. The direct human impact on vegetation and habitat includes cultivation, logging and collection of fuelwood, fruits, foliage and inappropriate oyster havesting methods, etc.

Traditional approaches to agriculture were based on leaving land fallow in a rotational system which enabled regeneration of bushland in the intervening years. With increasing populations the demands placed on the land have increased and clearance of agriculture constitutes a significant threat to the plateau areas of the park. The clearance of land prior to the onset of the rains is typically conducted through the use of fire, which frequently runs out of control.



Vegetation cover map of Niumi National Park

The impact of fire is most prevalent on forest area where young regeneration is often killed or severely set back and mature trees suffer successive damage. The impact fire has on forest composition and structure has been studied in depth in the neighbouring Senegalese fathala forest and plateau woodlands (Lykke, 1996) who concluded that fire was probably the most destructive single factor affecting vegetation.

Vegetation types associated with human occupation are profoundly altered and are characterized by a high percentage of introduced species most notably neem trees (*Azadirachta indica*) which have the habit of forming dense monotypic stands.

3. 3. Invertebrates (Ramsar Study, 1996)

- **Terrestrial Invertebrates:**

Due to the very large number of invertebrates that are likely to be found in Niumi National Park, and the consequent difficulties of identification, only main groups of terrestrial insects were sampled, to give an overall indication of the diversity of invertebrates present. Of 75 currently known species of Odonata (damselflies and dragonflies) recorded from The Gambia, at least 22 species are known to inhabit Niumi National Park. The sites that contain the richest assemblage of these insects are those habitats that are associated with fresh or brackish water, as all species of Odonata are reliant for the larval stage of their life cycle on the presence of water-bodies.

These habitats include permanent creeks, seasonal freshwater marshes and creeks, and to a lesser extent seasonal saline flats and marshes, and coastal lagoons. In the adult stage of their life-cycle damselflies and dragonflies inhabit a greater variety of habitats and can be seen on the wing almost everywhere, including sand beaches and dry woodland.

Of the estimated 160 species of butterfly (Lepidoptera) recorded from The Gambia, at least 32 species are known to occur within Niumi National Park.

Unlike the dragonflies, the butterflies are associated much more closely with terrestrial habitats; especially dry woodland, grassland and gallery forest.

A habitat that has a particularly rich assemblage of butterfly species is that associated with the dune belt and especially the coastal scrub. Of the Dermaptera (earwigs), at least three species are found in Niumi, including two species of the genus Forficula, and one of the genus Nala. The Dictyoptera include both cockroaches and mantids. One cockroach was identified, the Surinam Cockroach *Pycnoscelus surinamensis*. At least eight species of mantids were found, mostly of the family Mantidae (including *Mantis regligiosa*). One Oxypilus species of the family Amorphoscelidae was also found to be present.

Of the Orthoptera (grasshoppers and crickets) several species were identified in Niumi. These include grasshoppers of the families Catantopidae (*Eyprepocnemis spp*.) and Acrididae (*Acrida spp*.), bush crickets of the family Tettigoniidae, a mole-cricket of the family Gryllotapidae (*Gryllotalpa africana*), true crickets of the family Gryllidae (*Acheta spp*.) and **[**groundhoppers**]** of the family Tetrigidae (*Tetrix spp*).

Bugs of the order Hemiptera were very common. Species identified belong to the families Pentatomidae – shield –bugs (especially of the subfamily Pentatominae), Coreidae-squash-bugs (*Leptoglossus gonargra, Phyllomorpha spp*, and *Anoplocnemis curvipes*), Lygaeidae-seed-bugs (*Lygaeus spp*.) and Reduvilldae-assassin-bugs (*Periates spp.)* The largest order of insects is the Coleoptera (beetles).

Species identified at Niumi National Park include Cicindela spp. of the family Cicindelidae, and many species of the family Scarabaeidae (including the subfamilies Cetoniinae – flower chafers, Melolonthinae – leaf – chafers, *Scarabaeinae- scarabs*, *Onthophagus spp*. and Dynastinae-rhinoceros beetles*, Oryctes spp.) Bledius spp*. and *Paederus spp*. were recorded from the very large family known as the Staphylinidae-rove-beetles and *Agriotes spp*. from the Elateridae –the click beetles. Other beetles identified included members of the families Chrysomelidae, Bostrychidae, Lycidae-net-winged beetles, Meloidae-blister and oil beetles (especially *Mylabris spp*.), Tenebriondae – darking beetles and Caraabidae- ground beetles (*Harpalus spp*.)

The Hymenotera (ants, wasps, bees and related species) are represented in Niumi by members of the families Vespidae-social wasps (especially *Belongaster spp*.), Ichneumonidae-ichnumon wasps (*Osprynchotus violator*), Braconidae (*Iphiaulax spp*.), Chrysididae-gold wasps (Chrysis spelendens group – probably *C. minuta*, and *C. gabbula*), Formmicidae – ants, Sphecidae – solitary and digger wasps (*Bembix spp*.) and Pompilidae-spider-hunting wasps. The Diptera (flies) is another large order of insects. Species recorded included *Anopheles gambiae, A nili* and *A. funestris*, which are all malaria-carrying mosquitoes of the family Culicidae and *Atylotus albipalpus* and *A. agrestris* of the family Tabanidae-horse flies or clegs. Others *include phytomia spp*. of the family Syrphidae-hoverflies, *Promachus spp*. of the Asilidae – robber-filies, and *Cordobia anthropophaga* (the Tumbu-fly) and *Chrysomyia bezzina* of the sub-division Cyclorrhapha.

3.4. Aquatic Invertebrates:

The aquatic invertebrate fauna is composed predominantly of crustaceans and mollusks. Very abundant species include West African Fiddler Crabs Uca tangeri, African Ghost Crabs Ocypode Africana and mangrove oysters Grassostrea tulipa (Ramsar Wetland Study The Gambia, 1997).

3.5. Vertebrates

Fishes belonging to at least 13 families have been recorded in Niumi National Park. The most abundant of these species are Tilapia spp., followed closely by Mullets *Mugil spp.*, although fry and juveniles of Giant African Threadfin *Polydactylus quardrfilies*, shads, African red snaper, Sumpat grunt, Ethmalosa firmriata and Flagfin Mojarra *Gerres melanopterus* are also present in large numbers. A majority of the fish observed were in their early developmental stages, mostly as fry and juveniles, indicating that the waters of Niumi are very important as a nursery area (Ramsar Wetland Study The Gambia, 1997).

Table – 7.0 Families of Fish Occurring at Niumi National Park

Families	Mangrove	Lagoons	Seasonally Flooded Areas	Coastal Strip
Cichlidae	X	X	X	
Clupeidae	X	X		X
Carangidae	X			X
Drepanidae	X			X
Elopidae	X	X		X
Gerreidae	X	X	X	X
Lutjanidae	X			X
Mugilidae	X	X	X	X
Polynemidae	X			X
Pomadasyidae	X	X		X
Sciaenidae	X	X		
Sparidae	X			X
Tetraodontidae	X			X

NB: Sciaenidae is the only family not found in the coastal strip

Threats to fish and aquatic invertebrates:

The use of beach seine and the accompanying capture of juvenile and sub-adult fish have a depletive impact on the fisheries in the near future. Other animals such as crabs, skates and sea turtles which are usually included in these catches are also susceptible to this potential danger. The degree of Salinisation (up to 70%) in some of the water bodies is an indication of the need to monitor salinity trends and the possible impact they might have on the *piscifauna* in the area. Apart from some bivalves and gastropods, animal life was virtually absent in the water bodies with salinities greater than 55%.

3.6. Amphibians:

The amphibian fauna of Niumi is largely unknown. Common African Toad *Bufo regularis*, Savanna Toad *B. xeros*, Rocket Frogs *Ptychadena spp*. and Puddle Frogs *Phyrnobatrachus spp.* have been identified so far (Ramsar Wetland Study The Gambia, 1997). However, the seasonality of many species poses problem to their survey. More over surveys are not currently organized for this purpose. As such, many more amphibian species may be unknown within Niumi.

AMPHIBIANS OF NIUMI NATIONAL PARK

3.7. Reptiles:

Nile Crocodiles *Crocodylus niloticus*, appear to inhabit Niumi National Park in relatively fair number, with specimens of up to 4m in length resident in Niji Bolon (Ramsar Wetland Study The Gambia, 1997).

Green Turtles *Chelonia mydas*, Olive Ridley turtle *Lepidochelys olivacea* and loggerhead turtle *Caretta caretta* occur on the coastline of Jinack Island, where they probably feed on the offshore sea-grass beds. They also use the 11km of beach on Jinack Island as a breeding site, but to what extent is also far unknown.

Bells Hinged Tortoise *Knixys belliana*, may be present in the coastal strip (Ramsar Wetland Study The Gambia, 1997). Marsh Terrapin *Pelomedusa subrufa*, and pan hinged Terrapin *Pelusios subniger*, are likely to occur in the upper reaches of the bolons in Niumi.Lazards known to occur in Niumi National Park, include the Agama *Agama agama*, Brook's House Gecko Hemidactylus brooki *anulatus,* Fig-tree Gecko *Tarentola ephippiata*, Orange-sided Skink *Mabuya perrotetii*, Orange-throated Skink *M. affinis*, Senegal Chameleon *Chamaeleo senegalensis*, Bosc's Monitor *Varanus exanthematics* and the Nile Monitor V. *niloticus*.

All of these species are relatively common, especially the smaller species. The Nile Monitor is still found in goods numbers and large specimens are regularly encountered. The Chameleon *Chamaeleon gracilis* occurs. Snakes that have been recoded in Niumi include African Rock Python **[** Python S. sabae,**]** African Beauty Snake *Psammophis elegans*, olive Sand Snake *P. phillipsi*, Bush Snake *Philothamnus irregularis*, Black-necked Spitting Cobra *Naja nigricollis*, Forest Cobra *N. melanoleucha*, Wolf Snake *Lycophidion semicinctum albomaculatum*, Hose *Snake Lamphropsis fuliginosus,* Spotted Blind Snake *Typhlops punctatus* and Puff Ader *Bitis ariens*. Other species that are likely to be

present but have not been confirmed are Burrowing Vipers *Atracaspis spp.*, Royal Python *P. regius*, Green Mamba *Dendroaspis virdis* hallowelli and Night Adder *Causus rthombeatus*. Snakes are generally killed on sight by Gambians, so very large specimens, especially of the Pythons and Cobras are rarely seen.

TABLE 9.0. REPTILES OF NIUMI NATIONAL PARK

SCIENTIFIC NAME	COMMON NAME
Chelonia mydas	Green turtle
Lepidochelys olivacea	Olive Ridley turtle
Caretta caretta	Loggerhead turtle
Knixys belliana nougeyi	Bells hinged turtle
Pelidius subniger	West African mud turtle
Crocodylus niloticus	Nile crocodile
Tarentola ephippiata	Fig- tree gecko
Hemidactylus brooki angulatis	House gecko
Agama agama	Rainbow lizard
Chamaeleo senegalesis	Senegal chameleon
Mabuya affinis	Brown-flanked skink
Matuya perotettii	Red-flanked skink
Varanus niloticus	Nile monitor
Varanus exabthematicus	Bosc's
Python sebae sebae	Rock python
Python regius	Royal python
Lamphideion fuliginosus	House snake
Lycophideion semicinctum albo.	Wolf snake
Philothamnus irrgegularis	Common bush snake
Atractaspis atterima	Black burrowing viper
Psammonphis elegans	African beauty snake
P. philipsii	Olive grass snake
Naja malanoleuca	Forest cobra
N.nigricallis	Spitting cobra
Dendroaspis viridis	Green mamba
Bitis arietans	Puff adder
Causus rhombeatus	Night adder
Typhlops punctatus	Spotted blind snake

THREATS TO REPTILIES AND AMPHIBIANS:

The threats to the reptiles and amphibians of Niumi Park are of a similar nature as to those described for mammals.

In addition to the threats outlined preciously, the following more specific threats are pertinent.

Green turtles require undisturbed stretches of sandy beaches to breed with suitable dune vegetation. These conditions exist in abundance on the Atlantic shoreline of Jinack Island. However, the eggs are a favoured item for local consumption and despite their protected status, there is a risk that egg collection continues. The turtles are also at risk from entanglement in fishing nets both from drowning and from being slaughtered when encountered.

Crocodiles have been subject to considerable hunting pressure in the past, and though the pressure appears to have been reduces, there is evidence that some hunting continues. Whether this is for consumption or sale of skins or both is uncertain, though the trade in skins is quite effectively under control within The Gambia.

Within other West African nations, restriction in the trade of wildlife appear to be more lax, and poses the risk that animals and skins may be smuggled out of The Gambia for these markets. Snakes suffer continuously from the ill-founded hysteria of humans, though they resultantly remain shy and predominantly natural. The increase in human activity coupled with the reduction in vegetation cover through heavy grazing pressure and the continuing occurrence of fire makes them more vulnerable to encounters.

Fire also poses a greater thereat to reptiles in general due to their often slow movement. A decrease is the results in a reduction in the extent and longevity of rain fed swamps and water bodies which will invariably impact on the associated amphibian fauna. Amphibians are also likely to suffer should the use of pesticides increase in rice cultivation, which may have knock-on effects along the food chain through bio-accumulation.

3.8. Birds:

The current list of bird species for Niumi National Park stands at roughly 300 species from 63 families (Ramsar Wetland Study The Gambia 1997). The current survey has added the first record of the river Prinia *prinia fluviatilis*, for the Gambia. Two pairs of this species were located breeding on the island of Jinack and one nest was successful. There appears to be ideal habitat present on Jinack (waterside vegetation and rice fields) for this rare species, formerly only recorded from northern Senegal, Guinea-Bissau, Niger, Chad and Cameroun (Barlow, et al, 1997). Casual rangers' observations have shown a good number of migrating flocks of turnstone (Arenaria interpres) and sandaling (Calidris alba) in February- March. Ospreys are present the year round in the site.

It is also noted an increase of dry season oystercatchers (*Heamaropus ostralegus*). Mixed stands of gulls and terns are noted at the northern tip of the island. Large numbers of lesser blacked, blacked gulls (Larusfuscus) are present throughout the dry season. Remnant flooded areas in February remain active feeding spots for a variety for waders.

Many herons and egret species are found feeding on stranded fish during the falls in the island. In brief, the variety of the avifauna is patent even if each season has its own and specific cohorts.

Table 4.0 Avifaunal Diversity in Niumi National Park

FAMILY	GaM	NNP	PM	Res	IAF
Procelaridae: storm-petrels	3	1	*		
Pelicanidae: Pelicans	2	1		*	*
Sulidae Gannets	2	1	*		
Phalacrocoracidae Comorants	2	2		*	*
Anhingidae: Darter	1	1		*	
Ardeidae: Herons. Egrets Bitterns.Tiger Heon	18	13	*	*	*
Scopidae: Hamerkop	1	1			
CICONIDAE: Storks	7	2			
Threskiornithidae: Ibises spoonbills	5	2		*	*
Anatidae: Ducks, Gees	14	3		*	
Accipitridae: Vultures Hawks Eagles	44	20	*	*	*
Pandionidae: Ospery	1	1	*		
FALCONIDAE: falcons	9	6	*	*	
Phasiandae: Gamebirds	6	2		*	
Rallidae: Rails	9	1		*	
Jacanidae: Jacansa	1	1		*	
Burhinidae: Stone-Curlews	2	1		*	
Upupidae: Hoopoe	1	1	*	*	*
Phoeniculidae: Wood Hoopoes	2	2		*	*
Bucerotidae Hornibills	5	4		*	*
Capitonidae Barbets	4	3		*	
Indicatoridae: Honeyguides	3	2		*	
picidae: Woodpeckers	7	6		*	
Hirunididae: Swallows. Martins	15	8	*	*	*
Motacillidae: Wagtails Pipits	9	5	*	*	*
Laniidae: Shirkes	11	9	*	*	
Oriolodae: Orioles	2	1		*	*
Dicruridae: Drongos	2	1		*	
Sturnidae: Glossy Starlings, Oxpeckers	10	7		*	*
Pycononotidae: Bulbuls	7	1		*	

Corvidae: Crows	3	2		*	
Muscicapidae: Turdinae Chats Thrushes	17	8	*	*	*
Muscicapidae: Sylviinae warblers cisticolas	38	26	*	*	
Muscicapidae, muscicapinae flyeatchers	6	3	*		
Muscicapidae:Platysterinae wattle-eye, Batis	4	2		*	
Muscicapidae: Monarch Flycatchers	4	2		*	
Paridae: Tits	1	1			
Remizidae: Penduline Tits	1	1			
Nectatindae Sunbirds	9	6		*	
Zossteropidae: White-eyes	1	1			
Fringillidae: Canaries	2	2		*	
Plocedidae: Weavers, Sparrows Whydahs	23	19		*	*
Estrilldidae: Waxbills	19	9		*	
Alaudidae: Larks	8	2		*	*

Abbreviations used in the following table are: Gam= Total of species for the family recorded in The Gambia; NNP = Recorded in Niumi National Park; PM – Palearctic Migrant; Res = species with records in every month in The Gambia; IAF = species with known African migratory populations occurring in The Gambia and these may include movements within Senegambia.

3.9. Mammals

The mammalian fauna of Niumi National Park is relatively rich and is influenced heavily by the fairly undistributed habitats of parts of the park, such as southern Jinack. Large mammals such as Bushbuck *Tragelaphus.s scriptus,* Common Warthog *Phacochoerus africanus,* Spotted Hyena *Crocuta crocuta,* and Leopard *Panthera pardus*, are known to occur, though none of them in high numbers. Primates are still fairly well established; especially Callithrix Monkeys *Cercopithecus sabaeus*, Patas monkeys' *C. patas* and Senegal Galagos *Galago senegalensis,* Guinea Baboons *Papio papio* and Western Red Colobus *Piliocolobus badius temmincki* are also found but in much lower numbers.

Aquatic mammals probably fare much better that those tied to the land, as Niumi National Park contains a range of good quality aquatic habitats. Both West African Manatee *Trichechus senegalensis*, and African clawless Otter *Aonyx capensis,* are known to occur in the bolons, though probably in low numbers. Atlantic Hump-backed Dolphin *Sousa teuzil,* are frequently sighted off the coast of Jinack island, often close inshore, and appear to use this waterway to move between the River Gambia and the Parc National du Delta du Saloum

TABLE 8.0. MAMMALS OF NIUMI OF NATIONAL PARKS

SCIENTIFIC NAME	COMMON NAME	STATUS
Erinaceus albiventris	Four-Toed Hedgehog	PO
Epomophorus gambianus	Gambian fruit bat	C
Nycteris gambianus	Gambian Slit-faced Bat	C
Lavia frons	Yellow-winged bat	C
Galago senegalensis	Lesser bushbaby	
Papio Cynocephalis anubis	Western Baboon	C
Cercopithecus aethiops	Vervet or Green Monkey	C
Erythrocebus patas	Patas Monkey	C
Colobus badius temmincki	Red Colobus Monkey	O
Lepus crawshayi	Crawshay's Hare	C
Heliosciurus gambianus	Gambian Sun Squirrel	C
Euxerus erythropus	Striped Ground Squrrel	C
Gerbilidae	Gerbils	C
Muridae	Mice	C
Cricetomys gambianus	Giant Gambia Rat	C
Thryonomys Swinderiauns	Cane Rat	O
Hystrix cristata	Crested porcupine	R / O
Pedetes capensis	Spring hare	R /O
Tursiops truncatus	Bottle Nosed Dlphin	O
Sousa teuszii	Humpback Dophin	O
Trichechus senegalensis	West Africa Manatee	R
Canis aureus	Golden jackal	R/O
Vulpes pallida	Pale Fox	R/O

Mellivora capensis	Ratel	R/O
Aonyx capensis	Clawless Otter	R
Viverra civetta	Civet	O
Genetta Sp.	Genet	O
Herpestes palidinous	Marsh Mongoose	C
Herpestes Ichneumon	Egyptian Mongoose	C
Mungos mungo	Slender Mongoose	O
Crossarchus obscurus	Cussimanse	R/E
Panthera pardus	Leopard	R
Felis sylvestris	Leopard	R
Profelis aurata aurata	Serval	R
Crocuta crcuta	African Wild Cat	R
Crocuta Crocuta	West African Golden Cat	R
Orycterpus afer	Spotted Hyena	R/O
Phacochoerus aethiopicus	Aardvark	R
Tragelaohus scriptus	Warthog	O
Redunca redunca	Bushbuck	O
Ourebia ourebi	Oribi	R/E
Cephalophus monticola	Maxwell's Duciker	O
Sylvicapra grimmia	Grimms Duiker	

Key: A = abundant, C = common, O = occasional R = rare, PO = presumed occasional R/O = limited population, R/E = Possibly extinct

Threats to Mammals

Habitat degradation results from diverse factors including anthropogrenic activities such as the setting of fires, clearance of land for agriculture, sand-mining and harvesting of timber. The steady reduction in rainfall has reduced the seasonal flow of the various bolons (*tributaries*) and in combination with the anthropogenic factors is affecting the vegetation of the gallery forest and the extent of rain fed swamp vegetation of the associate watercourses.

Expansion of agricultural activity reduces the availability of corridors for movement of wildlife, and increased human activity may further exacerbate this isolation factor. Should there be further expansion, many larger mammals may become restricted to enclaves which are insufficient to meet their requirements or isolate a population too small too be genetically viable.The apparent increase in grazing pressure from livestock brought into the park during the dry season has a direst impact on the standing crop of herbage available for wild ungulates, as having the effect of reducing the amount of cover for wildlife in general. On the island of Jinack, the cattle are limiting the regeneration of trees and shrubs through browsing and trampling. The pioneer zone of vegetation on the dune front is also being damaged through trampling thereby increasing the risk of coastal erosion to which the island is extremely vulnerable.

The increased fishing effort in the coastal waters and inland bolons, requires regulation in terms of fishing sites, methods and engines to avoid impacting negatively on both the breeding and recruitment stocks. A reduction in the fish populations may result in a decrease in the utilization of the area by the humpbacked and bottle-nosed dolphins.

4. Cultural Informations

4.1 Archaeology:

Unlike the north central areas of The Gambia which boost numerous stone circles, Niumi is not endowed with archaeological remains. Recently a number of broken pots and clay cooking wares were washed ashore along one of the bolongs near to Jinack Island.

The remains were collected and taken to the national Museum in Banjul for dating. They have been estimated to be several hundred years old. The community intends to encourage further research and use the site as a tourist attraction.

4.2. Present Land Use:

The communities peripheral to and within Niumi National Park are composed primarily of subsistence farmers and fishermen, and they currently still depend on natural resources for the maintenance of their livelihoods. The wetland areas of the Park are of considerable importance in this subsistence economy such as for wet season rice cultivation and dry season market gardening, provision of dry season grazing for livestock, fishing and shellfish gathering. The major areas for rice growing are the floodplains of the Niji Bolong, located between the bolong and Mbollet Ba and Mbangkama.

Within the Park, cattle, sheep and goats are grazed, being let range over the bush land and on crop residues after the harvest. Small ruminants are generally grazed close to villages and are corralled within compounds at night. Cattle are corralled by tying them to stales in areas peripheral to the villages. Livestock numbers are seasonally augmented during the dry season as cattle are brought to the coastal area for better grazing.

It is at this time that the livestock have a major impact on the vegetation of the park. On the island of Jinack the number of cattle appears to double during the dry season and they are ranged over the entire island.

In recognition of the impact that small stock is having on the regeneration of trees on the island the communities of Niji and Kajata have regulated the numbers of small stock. However, the browsing and trampling of the cattle is causing damage to young saplings and the sensitive vegetation zone (ie the pioneer zone of plants on the dune fringe) is being degraded thereby exposing the stabilization dunes to erosion.

Various materials are also derived from the wetland environment including mangrove poles for roofing, grass for thatching and fencing, and dry sticks for fuel wood. These collection activities are carried out at a high intensity within the Park.

Seasonal production of early-millet, groundnuts, coos, corn and cassava is confined to the plateau areas of the mainland. This is around Kanuma, between Mbollet Ba and Mbangkama and around Jamagen. Traditionally crops were grown on a rotational basis, onto fresh ground in a shifting pattern. This allowed natural regeneration to take place during the fallow periods, which often extended up to five years, and mature trees were saved when land was cleared for cultivation. In addition the soil was weeded and cleared with hoes. This technique of farming consists in turning over a shallow amount of soil, and therefore causing very little nutrient loss due to wind and water erosion.

This rotation system of farming has essentially now ceased as the demand for land use is on the rise as a result of population growth. The intensive cropping and the farming techniques used (ie cattle ploughs

which cut deep into the soil exposing thus to erosion) in combination with the practice of burning off crop residues prior to cultivating has led to deterioration of soil fertility. There is a very limited farmland available on the island of Jinack, as the sandy soil is not suitable for the cultivation of many types of crops. However cassava is grown in substantial amount. The harvesting of wild fruits is widespread throughout the park and includes numerous species including *Detarium senegalensis*, *Adansonia digitata*, *Acacia albida* and *Saba Senegalensis*. Rhun Palm and Palm Oil Kernal harvesting is now practically non existent because of the scarcity of these trees species in the area due to illegal felling – one small Palm Oil groove is found just north of Barra at the mouth of the Niji Bolong.

Mangrove oyster collection also occurs in this area, and clams and whelks are collected along the Mansarinko and Niji Bolons. The collection of shellfish is primarily at subsistence level, and plays an important role in the local economy. Fishing is also mainly at subsistence level, but Senegalese fishermen are reported to fish with beach seines in the area of Jinack, sometimes landing considerable quantities of fish, mostly in their sub adult and juvenile stages (Ramsar Wetland Study, The Gambia, 1997). Turtle egg collection, although illegal, is thought to occur at low level in the Park and illegal hunting as well but at a low to medium level. Salt collection also now occurs at a low level in the Park. The main areas of community land use are shown below. In addition to the above activities, the Park area is now frequently visited by tourists and other visitors either on an individual ad hoc basis or by trips arranged through ground tour operators.

4.3. Past Management Nature – Conservation:

Members of staff of the Gambia and Senegalese Wildlife Department have attended a training course in Senegal (1999 -2000) to learn about monitoring bird populations. This activity is intended to promote a co-ordinated approach to survey and monitoring activities within the Niumi/Delta du Saloum Complex.

There has been little active conservation management within Niumi National Park apart from the creation and clearance of fire belts. This activity has not taken place over the last two years.

Also, there was very strict law against bush fires. This law is upheld on the island of Jinack with fires (apart from for cooking) being prohibited. Elsewhere in Niumi National Park, use of fire in the clearing of land prior to the wet season has resulted in numerous bush fires which sometimes run out of control. The increase in land use for agriculture means that such bushfires have increased in impact on vegetation.

4.4. Public Interest:

Most of the public interest towards the park is from tourists, who find the peace and tranquility of the area a far cry from the hustle and bustle of the urban tourist sites. The rich biodiversity present in Niumi National Park is also an attraction for visitors. The main tourist activities are bird watching, fishing and bolong cruises. In addition, there has been illegal commercialization of certain wild fruit e.g. “ditah”, and timber from the National Park that has attracted traders from neighboring Senegal.

4.5. Landscape:

There are eleven settlements within and peripheral Niumi National Park. In the north these are Bakindik Koto, near to the Massarinko Bolon, Jamagen on the east side, with Kajata and Niji on the north end of Jinack Island. The village of Mbangkam is situated in a small depression in the landscape just east of the Niji Bolon and north of Mbollet Ba. The remaining settlements (Kanuma, Mayamba, Medina Kanuma, Essau and Barra) are to be found along the highway, having shifted their original locations closer to the main road link. Barra is the major commercial centre in the district, but internal trading and commerce takes place in each of the other villages.

The landscape in Niumi National Park ranges from farmlands on the East to beach and coastal scrub in the West. The soil characteristics change accordingly; being sand at the beach side to loamy sand and sand further inland. Rice fields and farmland are found on the more fertile soil types. Millet and groundnuts tend to be grown on the elevated ridges of the farmland, whereas rice is cultivated in the depressions which flood during the wet season. There are major areas of bare land within the Park that also have salt deposits.

4.6. Ecological Relationships and Implications for Management:

Wetlands are amongst the Earth's most productive ecosystems. They have been described as 'the kidneys of the landscape' because of the functions they perform in the hydrological and chemical cycles and as 'biological supermarkets' because of the extensive food webs and rich biodiversity they support (Barbier, 1977).

They are dynamic systems, continually undergoing natural changes due to vegetation succession, erosion, subsidence, drought, sea-level rise or in-filling with sediment or organic material. The basic aim behind management plans for such areas is to retain as much diversity as possible within the areas (i.e. representation of the different succession stages), as well as keeping the functions of the system healthy.

The variety of habitats ensures the widest possible diversity of flora and fauna. The terrestrial habitats surrounding a wetland have to be considered as an integral part of the area not only for richness or uniqueness reasons which greatly add to the biodiversity of the area, but also for their role as part of the water catchments area of the wetland. They should thus be considered in any management program of the wetland as they have a profound influence on the positive ecological functioning. The interactions between different components within a wetland are complex and we cannot assume to understand them fully.

It is necessary therefore to apply the precautionary principle when designing management plans. The key elements in the ecological relationships of this wetland are mangroves, fish nursery grounds, water salinity, anthropogenic influences and seasonality.

Implications for Management:

1. To use resources in a sustainable manner.
2. To limit the effect of anthropogenic activities which cause erosion (e.g. cattle grazing, mangrove root-cutting during oyster harvesting).
3. Accept that wetland systems are dynamic and work within that framework
4. Minimize pollution, especially from urban areas and run off from agriculture, and maintain the integrity of the water input into the wetland.
5. Monitor and revise the management plan regularly.

In addition, the subsistence activities, the population growth patterns and the traditional forms of resources exploitation in the local villages, etc. are all indicative that villagers are the major beneficiaries of the Niumi National Park.

Participation of local communities in decisions and actions to promote conservation and sustainable exploitation of resources is vital. As such, planning and management in Niumi National Park must take on board surrounding villages with need assessment, education and development initiatives well insisted upon. Like the other parts of The Gambia, one of the major threats to the vegetation of the area is fire. The woody vegetation is affected more than the herbaceous that may regenerate from rhizomes and rootstocks. Although fire is a natural phenomenon within savannah habitats, the natural regeneration of the woodland is being hampered through successive fires.

Heavy grazing exacerbates this problem, which may increase the unpalatable, poisonous and extremely thorny plants species (Lykke, 1994), thereby also diminishing the overall diversity of the area.

The implication for management within the reserve is that all measure should be directed to retaining the integrity of the area, together with maximum biodiversity within each of the different biotopes. Stocking densities of cattle during the dry season in combination with repeated burning and timber harvesting have a cumulative effect on the vegetation and regenerative capacity of the woodlands and the coastal scrubs. With the increasing pressure on natural resources from a growing population it is necessary to regulate the harvest to a sustainable level and put in place measures to ensure that the multiple functions of the reserve are maintained in good working order. In order to make such measures stand, it is important to have community involvement at all levels of implementation. An additional management measure is the requirement to closely monitor the area.

Since the site is one with global significance and certainly one with great importance within The Gambia, it is necessary to detect any changes in the area at an early stage.

Evaluation of environmental and social features

1. Evaluations

1.1. Ecological:

This section provides an assessment of the major features of the site and is applied to the foregoing description in section 1. Value judgments in this section will lead to the formulation of objectives in the following section. It ascertains the ecological value of the site in a local, national and international context, identifying and appraising the relationships between biotic and a-biotic factors, not only of plants, animals and habitats within the site, but also those in the surrounding areas that may control or have influence on the site itself.

1.2. Size and Position:

Niumi National Park occupies the coastal strip north of the river. It is centered on 13^{o} 31'N, 16^{o} 31'W and is approximately 7,758 ha (77.5 Km^{2}) in extent. It is contiguous with the Delta du Saloum National Park and essentially forms the southern limit of the vast Delta complex that is centered on the seasonal Sine and Saloum Rivers. The coastline of Niumi National Park constitutes approximately a quarter of the Gambia's coastline. Despite the fact that much of the land in the East of the Parks' boundary is farmland and highly deforested, the wetland area is intimately connected to the River Gambia, forming part of a much larger wetland complex consisting of the Tanbi and Mandinary wetlands.

A significant component of the Nation's wetland avifauna utilizes habitat within Niumi National Park, e.g. Ospreys, Goliath Heron and White-fronted Sand Plover.

1.3. Biological Diversity:

A wide variety of vegetation types are found in association with the various wetland types within Niumi National Park. There is considerable overlap in the habitat utilized by any given species in general, though some species are more confined by their adaptation to either a freshwater or saline environment. The value of Niumi lies in the variety of habitat types found in close to each other which results in a rich array of ecozones (zones between major ecological communities).

The greatest variation in biodiversity is found within the invertebrate fauna and the avifauna. The avifauna is composed of both resident and inter-African and Palearctic migratory species. During the onset of the rains a considerable movement of African species occurs with many species utilizing the wetland areas for breeding and feeding purposes.

In the early autumn the Palearctic migration gets underway and a large diversity and abundance of species accumulate in the wetlands of Niumi. Many of these birds will stop off to build up fat reserves after their migration, before dispersing further into the continent. Niumi acts as one of the main staging posts on the Palearctic migration for being located as it is, at the mouth of the River Gambia.

The river is apparently used as a corridor to the inland areas of the continent as well as providing extensive wintering grounds for many

species. It is a spawning and nursery ground for fish and fishery species and as well it is used for fishing by the artisanal fishermen. Mangroves by the sides of the river are habitat for oysters. The area is also rich with cockles and clams. By the time the spring migration north commences, much of the Niumi wetlands have dried and its feeding value for waders and waterfowl is reduced. Nonetheless, it still keeps valuable feeding and roosting conditions for gulls, terns and certain wader species.

The biodiversity of the area should be maintained and improved, with emphasis on the reduction of bush fire frequencies, enhancement of the diversity and abundance of trees and woody plant, regulation of fishing activities and the exploitation of other marine and coastal resources, increasing the area of forest for community use and ecological purposes.

1.4. Naturalness:

The vegetation of Niumi National Park has to a greater or lesser degree been modified through anthropogenic influences, resulting today in a combination of derived and early vegetation types succession. The degree of modification varies according to the vegetation type and the proximity to settlement. On the mainland extensive clearing for agriculture has followed a shifting pattern in the past with areas left fallow allowing subsequent regeneration.

Generally such areas are not cleared off the larger trees and these act as mother trees for natural regeneration. The incidence of fires is also most prevalent on the mainland which kills young trees while scarring and weakening mature specimens. Such modifications will result in a reduced range of species compared with freshwater wetlands and terrestrial woodlands which have been less impacted by anthropogenic activities e.g. gallery forest and savannah at Abuko Nature Reserve.

However, parts of the Park remain relatively natural. This includes the coastline, which is the least modified habitat, and a large proportion of the mangroves which have only been used on a limited scale.

1.5.Rarity:

The waterways of Niumi are home to the regions rare aquatic mammals, the West African Manatee and African Clawed Otter. The Atlantic Hump-backed Dolphin also utilizes the Niumi waterways and coastal waters.

The sand shoreline between Barra and Buniado Point on the island of Jinack is used by nesting Green Turtles, a species that has suffered alarming declines in the last few decades (Eckert et al, 1999).

Nile Crocodiles are found in both permanent and seasonally flooded areas of Niumi National Park. The African Rock Python and Royal Python also occur within the Park. All of these reptiles have been hunted extensively (mainly for their skins) in West Africa and have declined in number (Pauwels and Meirtre, 1996).

1.6. Fragility:

Niumi National Park has three resident communities within its boundaries and numerous others on its peripheries. These communities depend to a large degree on resource utilization within the park. The management of the park is based on the incorporation of the needs and views of the people to arrive at a sustainable approach to land use practices compatible with the objectives of conservation. The direct human impact on vegetation and aquatic resources includes cultivation, logging and collection of fuel wood, fruits, foliage, fish and fisheries species, etc.

Traditional approaches to agriculture were based on leaving and fallow in a rotational system which enabled regeneration of bush land in the intervening years. With increasing populations the demands placed on the land have increased and clearance for agriculture constitutes a significant threat to the plateau areas of the park. The clearance of land prior to the onset of rains is typically conducted through the use of fire, which frequently runs out of control. The impact of fire is most present in forest areas where young regeneration is often killed or severely set back and mature trees suffer successive damage.

Lykke (1996) who has studied structure in depth in the neighboring Senegalese Fathala Forest and plateau woodlands concluded that fire was probably the most destructive single factor affecting vegetation. Vegetation types associated with human occupation are profoundly altered and characterized by a high percentage of introduced species, most notably the Neem tree (*Azadiracta indica*) that has the

predisposition of forming dense monotypic stands. Uncontrolled annual burning of the vegetation also constitutes a threat to the fauna. On Jinack Island, the potential dangers and damage of fire have been recognized (many of the houses have thatched roof), and the local law prohibits the lighting of fire on the island.

Utilization of the wetland areas for seasonal rice cultivation obviously sets back natural successions in marginal and submerged aquatic plant communities on a short term basis but due to the annual desiccation of most freshwater wetlands the long term impacts of this activity are probably insignificant.

Livestock is ranged throughout the national park with some seasonal immigration taking place during the dry season. As a result, high grazing pressure becomes a potential threat to plant variety. The communities of Kajata and Niji on the island of Jinack have observed a decrease in regeneration due to grazing/browsing by goats and sheep, and resultantly moved small livestock off the island. The trampling activity and feeding by livestock is adversely affecting the pioneer plant zone on the coastal strip thereby exposing the fringing dune to increased erosion events.

A recent increase in the amount of traffic using the national park is having a localized effect on the herbaceous vegetation in certain areas (most notably on the road from Kanuma to the crossing point of Niji or Kajata) through the use of multiple tracks to avoid deep sand or wet areas.

A number of threats hovers over the fauna in addition to those described above. Specifically some fishing activities (the use of beach seines) may have a depletive effect on the young fish population in the future. By-catch may also impact on other fauna e.g. crabs, skates and sea turtles. The diversity and even presence of fish is also affected by the salinity of the water bodies. The studies in 1997 showed that animal life was virtually absent in water with salinities of greater than 55%. The mammals and reptiles of Niumi National Park suffer from two main threats, namely illegal hunting and habitat degradation.

The management plan proposes to reduce the effect of the threats described, by addressing the underlying causes of the threats and involving the local communities in any implementation of action.

1.7. Typicalness:

Niumi National Park contains a variety of wetland types as detailed above.These are typical of the wetland types occurring in the Gambia, yet unique because of the coastal location of the area.

1.8. Recorded History:

There has been no recorded history of the area concerning the ecology.

1.9. Potential Value and Potential Improvement:

Niumi National Park is an area of considerable ecological richness. It currently supports a great diversity of life, including intra and inter-African and Palearctic migratory species of avifauna and globally

endangered fauna such as snakes and mammals. This is due to the diversity of the habitats present and their proximity to each other.

Potential improvement to the area can be envisaged through consideration of restricted zoning of the area. In some places completely restricting human activity rules while in others, the measures will allow access to restricted types of activities only. However the full potential of the area will only be realized if the water sources remain unpolluted. Habitat enhancement would improve the area, especially if for instance certain forest areas were extended to join fragmented habitats.

The interest of the reserve to visitors may also be improved by considering the re-introduction of certain antelope species e.g Bohor Reedbuck *Redunca redunca and* Oribi *Ourebia ourebi.*

It would be preferable to carry such re-introductions to the Jinack island area because it is least disturbed and there is no need to fence the area. The two species are still present in the Gambia, albeit in low numbers. It may be possible to have reasonable numbers of these animals in order to enhance chances for the visitors coming to the reserve to see them.

Due to the large threat and impact of bush fires, improved management to reduce the risk of fires within the area and increased public awareness both have effects of bush fires and legal implications and penalties associated with their occurrence

Fishing has to be regulated especially the use of appropriate mesh sizes and the fishing sites and gear types. Management measures should be in place especially the prevention of fishing close to the mangroves to avoid catching the juvenile species, since fish and fisheries spawned and nursed close to the mangroves.

In addition to the above, any potential improvement to the area is totally dependent upon an increased liaison between the communities and the Department of Parks and Wildlife Management. This in turn is dependent upon increased resources for the Department at the staffing, training, education and sensitization levels. Relations between DPWM and the communities will also be improved when the communities can understand that the park can provide alternative sources of income for them in the form of eco-tourism, and that there are alternative natural resources available other than those from the park. A substantial component of the management plan thus encompasses a strategy for community participation and involvement in the development and conservation of Niumi National Park.

1.10. Socio-economic

This wetland provides a large catalogue of resources for aesthetic, cultural, religious benefits. These include the medicinal plants found there, including “Sengeng”, mamkunkoyo, jambakatang, batiyo, sanfito and wonko. Each community has a designated area that is used for meditation and prayer. The area does not have a free access, and is usually relatively pristine. Thus the areas designated as traditional/holy grounds are preserved by tradition.

1.11. Recorded History

Over the past ten years the communities around the Niumi Wetlands were the main beneficiaries of resources contained within the Park. During this time, the land continued to be used as it had been by previous generations. The park provided land for rice cultivation, grazing and water points for animals. Mangrove oyster harvesting was quite common as was fishing, including the illegal collection of turtle eggs around the island of Jinack.

Other activities in the area included the collection of fuel wood, timber for fencing etc., illegal hunting of wild animals and bird, Rhun Palm and Palm Oil kernel harvesting, collection of wild fruits and honey, mangrove, grass and thatch grass for fencing and house construction.

Over the past 10 years there have been some noticeable changes in the use of the land. These changes were brought about by natural and man-made factors. Perhaps the most noticeable is the salt intrusion into rice fields. This intrusion covers most of the areas close to the river and it is most destructive around Jinack and Mbangkan. This has resulted in many of the rice fields being abandoned; as a result, rice cultivation and production have declined.

Over the past 10 years the only significant events associated with the Niumi area has been the banning of charcoal making and illegal felling of trees. The only other major government policy decision related to the method of fishing, and included the introduction of fishery laws governing mesh size (the barn of drift net).

Such laws have enabled the communities to realize bigger and better catches of fish, thus increasing their income. The ban on illegal felling of trees has not been adhered to and the dry woodland present within the park is now degraded. Besides, there is evidence that the collection of turtle eggs and hunting is still on the way within Niumi National Park, even though these activities are prohibited by the Biodiversity/Wildlife Act (2003).

1.12. Education and Public Awareness

Unfortunately there is very little public awareness of the value of the wetlands- it is rarely used as an educational resources center because of its inaccessibility from the various schools due to lack of transport. The main public awareness is centered on Jinack Island.

Socio-economic Evaluation of the Use of Resources in the Park

With increase in population growth, land use practices are also changing and becoming more intense. The five year rotational system of farming has essentially broken down as the demand for land has increased and more intensive farming and cropping techniques are now used, including the methods of ploughing (resulting in higher soil erosion) and increased use of chemical fertilizers (resulting in run-off and pollution).

In the past to ensure the sustainability of forest resources, only ripe fruits were harvested and no branches were removed to take fruits. Dead trees and branches were only harvested for timber, and oysters only harvested during the dry season (non breeding season), ensuring that the mangroves that provided their breeding sites were not damaged. Such practices are not adhered to today. Suffice it to say that such a high use of resources and change in land use practices are probably unsustainable. Over time more of the habitats within Niumi National Park will become degraded which will thus affect the diversity of the flora and the fauna. Consequently the functioning of the wetland ecosystem will be distorted which ultimately hampers the livelihoods of the peripheral populations.The current situation is thus the justification for implementing a zonation of where different management regimes are enforced. The management plan also provides for alternative resources for the communities so that they may continue their daily lives and tasks.

In addition, an alternative way for the communities to use their wetlands is through the development of eco-tourism projects. These are small-scale initiative for a small volume tourists and visitors. The market base is not the same as that of the mass “sun, sea and sand” worshippers but one of a smaller number of visitors who wish to partake in the culture and skills of the Gambia.

Such projects have the potential to provide the local people with income whilst having a relatively low impact on the environment.

Potential areas for such activities within Niumi National Park include the following; bird watching, horse/donkey cart tours, pirogue and canoe

creek tours, line fishing (the activity would include being taught by a local fisherman), guiding in the area and its culture, and specialist holidays and visits. Supporting activities could include tie and dye crafts related to the wetland ecosystem, the culture and the environment. Women's groups could embark in such income generating activities or horticulture/market gardening. Other possibility could be oriented towards holding accommodation facilities in the peripheral villages. Traditional drum, string or flute instruments playing could be promoted purely as public entertainment or through formal teaching.

1.13. Research and Study

Ecological studies in 1996/7 and 1999 (Ramsar The Gambia, 1996) have provided information on the flora and fauna of Niumi National Park. This includes a vegetation map for the area and flora species lists for the wet and dry season. Baseline data has also been collected on the common insects, aquatic invertebrates, fish, reptiles, birds and mammals. The African Waterfowl Census records the number of waterfowl species and their abundance during February/March/April each year. Sites within Niumi National Parks were included in the counts since 1999 and up to 2008. Under the Wings over Wetlands (WoW) and the sponsored FIBA projects, species monitoring are still ongoing. A baseline survey of endangered species (Marine turtles, manatee, dolphins and cetaceans) was established and regular monitoring exercises are currently implemented.

The coastal area around Barra and the waters around Jinack Island (coastal and bolongs) are both monitored during the Coastal Migratory Species (CMS)-funded project which studies cetaceans in The Gambia, as part of a larger project covering West Africa. Information is gathered on species sightings through volunteers and staff from the DPWM undertaking fieldworks.

Aquatic monitoring of the bolongs within Niumi and the adjacent estuarine area will provide a comprehensive database on the physical-chemical and biological conditions in the bolongs and how they might seasonally change as a result of the development of the Niumi area.

This research should be carried out by an experienced biologist, in collaboration with the Fisheries Department. The specialist is needed to design a routine data collection system and direct a catch assessment survey to monitor production levels.

There is a need to update the information and to further monitor fish species within the NNP. Future research and study should continue to gather basic ecological data both on biotic and non biotic factors throughout the area. This should be done in such a way to maximize the information gained. However, the monitoring carried out should also endeavor to give some indication about the healthiness of the ecosystem, and therefore also act as a warning in case of adverse effects of any reason.

Outside specialists should also be encouraged to carry out scientific research in their particular areas, and co-operate with different government departments to encourage collection of information about the area (e.g. soil sampling, water sampling, fish sampling and monitoring).

Future research and study might also cover other areas. Such subjects could include determining effective pest control methods and farming techniques (including fish pond development) as well as playing an active role for innovating sustainable levels in resource utilization in the Park area.

In participating to eco-tourism based projects, Niumi National Park also provides a fruitful ground for research and study in a variety of areas such as culture and eco-tourism itself.

1.14. Confrontation of Values and Interests

In the past, villagers within Niumi National Park were in conflict with the Department of Parks and Wildlife Management. People had the feeling of being marginalized and segregated. Presently with the establishment of the Site Management Committee which takes on board representatives of all peripheral villages and the intensive sensitization campaigns organized by DPWM and other relevant stakeholders, a better mutual understanding is created and a cooperation network between managers and the local communities has set the path for better natural resources management.

There is a high use and reliance on all the resources by communities that live in and around the Park area. Land use practices within the Park are also changing with deeper impact on the surrounding vegetation. The use of chemical fertilizers and intense farming techniques are source of conflict.

The dependence on natural resources of the local communities puts them at a key position in the management of the wetland and park. Since identified outside alternative resources for the local communities are few, it is not practical to think about implementing major constraints on the use of the within resources unless provision is made for alternatives within the management plan.

A strategy for the development of alternative community resources and land use are thus a major component of the management plan, alongside with priority conservation measures. This should go along with sensitization and educational programs to encourage the adoption of practical sustainable agriculture and natural resources exploitation practices.

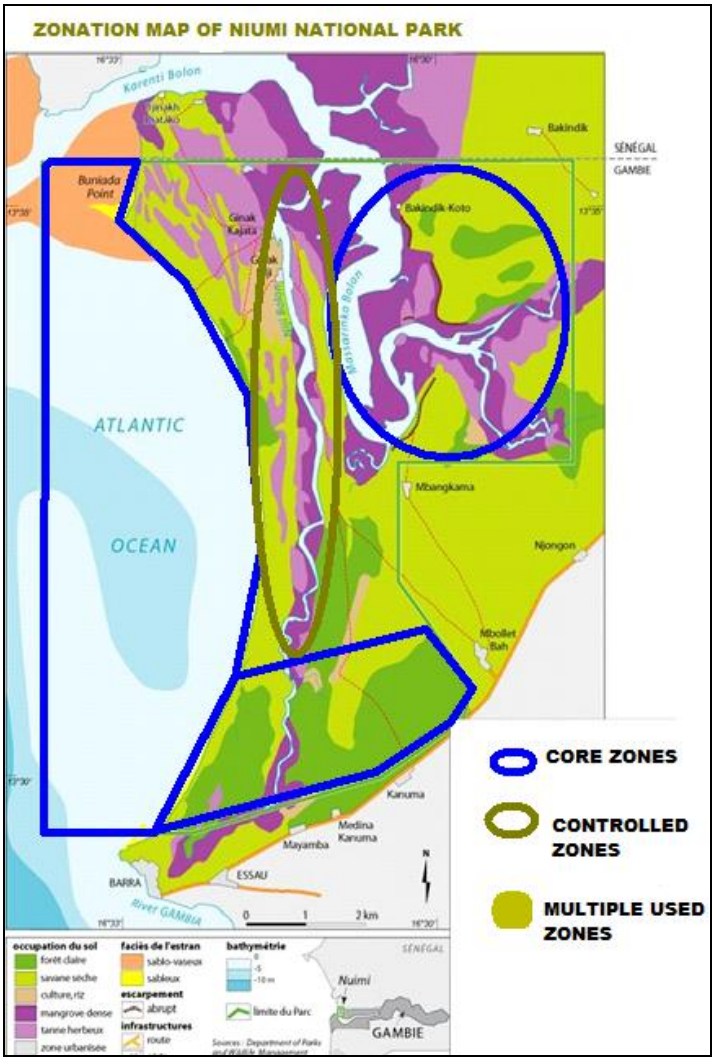
SECTION II: EVALUATION & MANAGEMENT ACTIONS

1. ZONING

A. Habitat Management

Land Zonation:

For effective management of the site, and also to ensure that both wildlife managers and local people's needs are catered for, consultative meetings were organised under the consultancy funded by FIBA to update the said management plan, to dicuss the zonation scheme to be adopted. According to the validation meeting organised on the 4th May 2011, three (3) zones are agreed (see zonation map)



i) Core Zone

This area comprises the coastline from Barra to the Senegalese border, all the marine side in front of the shore (from Buniado point to Barra) and the length of the Mansaringko Bolong featured in the park. These areas are currently very important for breeding, feeding, roosting and nesting sea birds, fish species, oysters and clams, marine turtles, and nursery grounds for fish and fisheries species. Grazing within this area should be totally prohibited to ensure minimal disturbance to the flora and fauna. Intensive fishing activities are banned in the area and agreement was reached by the local community members of the area to inform a park manager immediately as an intruder is seen fishing in the zone. Only locals are allowed to fishing with hook and line for sustainability reasons. The patrol boat should be diploid very rapidly to arrest the culprit and the site management committee should drastic steps to fine the wrong doer.

ii) Controlled Zone,

This comprises the length of the Niji Bolong and surrounding wetland areas. This portion of the park is considered sensitive in terms of the likely effects of human activities (e.g. agricultural practices and cattle grazing on the wetland ecosystem). Current traditional use of the zone (fishing, oyster collection and subsistence farming) would be allowed to continue, but monitored. Specific aspects that require monitoring include fish exploitation and bolon productivity, with the aim of initiating program to improve the bolon fisheries.

Green agriculture practices should be promoted which contributes to stop fire farming operations Use of selective pesticides/herbicides only should be permitted, and the use of agro-chemicals and fire in farming operations should be stopped and replaced by composting. This use of the land in the controlled zone would be compatible with the current legislation (Biodiversity and Wildlife Act 2003) governing protected areas.

iii) Multiple used area

This area includes the non-demarcated area (on the map) of the park and comprises scrubland, farms and small settlements. The land use patterns in this area have been mapped out, and the appropriate management measures and controls should be put in place to minimize any possible adverse effects (e.g. deforestation, soil erosion, agrochemical run-off) of land use practices in the wetland ecosystem. Particular efforts should be made to control bush fires and encourage tree planting of native species. Management should also seek to encourage agro-forestry to improve fuel wood supply outside the boundaries of the Park, thereby compensating for the restrictions on access elsewhere. Development of housing in this area would be restricted to only the immediate vicinity of existing villages within the park.

B. Habitat Management Prescriptions

Core Area:

No major habitat management is envisaged for this area. Only research activities should be allowed in the area.

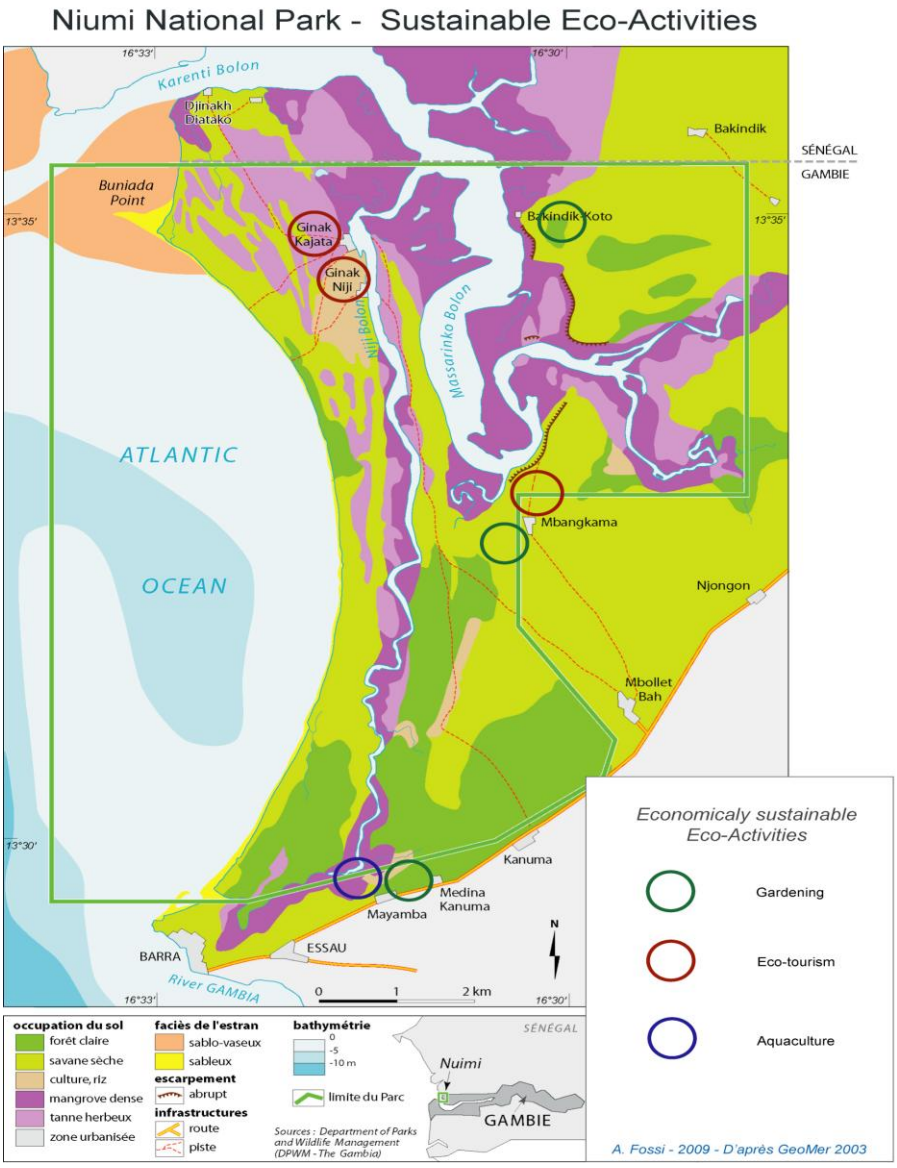
Controlled Zone,

The forests within this area should be monitored and secured to prevent cattle grazing. The areas should be used as low impacting activity area like sustainable fishing (using hook and line). Consideration should be given to increasing the size of these forests.

Land use Management Zone

Cattle grazing and traditional use of the area should continue at the current level with monitoring on the erosion and trampling effects. Current activity levels should not be exceeded.Any farmers in the area should be encouraged to take up agro-forestry and community wood lot projects, with the aim of increasing fuel wood supply, reducing pressure on trees in the area. During the current study, the communities of Mayamba, Jamagen and Mbankam have indicated that they feel that wood lots are a priority for their villages. A number of village wood lots could therefore be set up as pilot projects. The first would include Mayamba, Medina Kanuma and Essau, and the second Mbankam and Jamagen. A fire belt should be established and maintained on an annual basis along the eastern perimeter of this area, A thirty meter firebreak will serve the dual function of keeping fires out of the zone and clearly demarcating the boundaries of the park. In addition zoning for tourism should restrict visitors exclusively to cleared and marked vehicle tracks

and pedestrian trails and firebreaks. Tourist zoning has assist in the identification of boat landing, picnic, bird viewing and accommodation areas, (as indicated in the map below).Local communities have identified the need to develop ecotourism camps and activities in order to generate revenue and assist SMC members in their routine intervention in the management of the area.



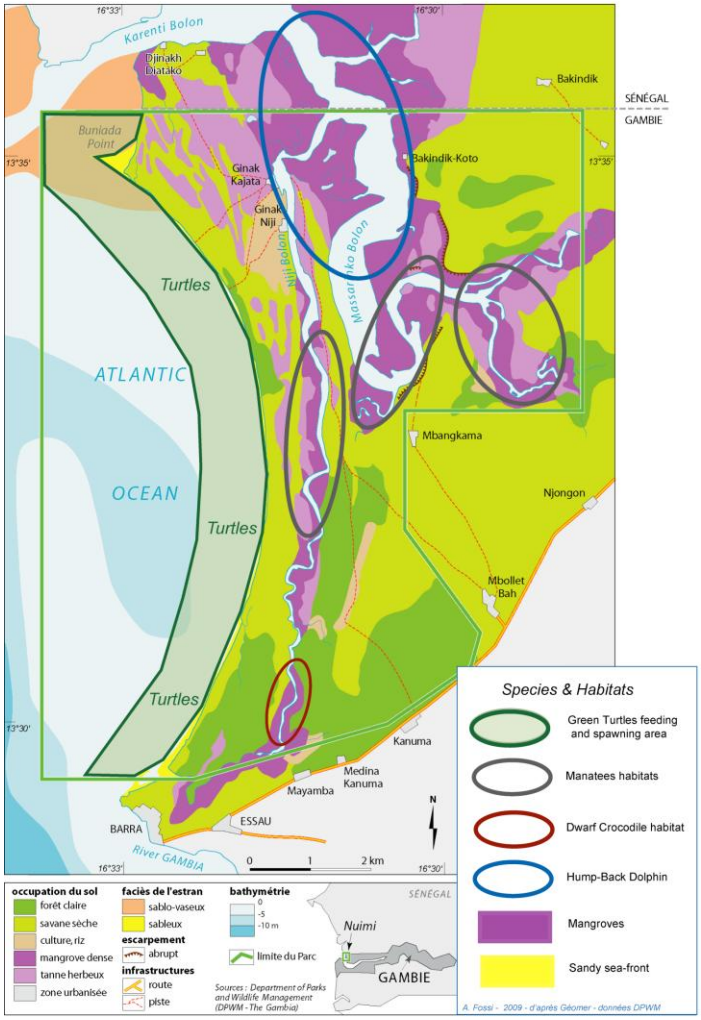
C. Species Management

Mammals: The current level of antelopes on Jinack Island should be investigated, in order to determine the level of restocking. Such restocking should be carried out together with a monitoring program as proposed in the Gambia Wildlife Authority (GAWA) initiative.

Reptiles: Turtles nesting areas have been identified under the implementation of the ICAM project (2005-2008) and thorough sensitization was done to raise awareness on the prohibition of the collection of turtle eggs and harvesting of turtles.

Fish: During the review meeting, communities recommended that only the indigenous should be allowed fishing within the Mansarinko Bolong and also agreed on the use of hook and line gear types. They, as well, recommended to respect a fishing rest period of three to four months which is to be further notified to the rest of the fisher folks.

Niumi National Park - Species & Habitats



D. Usage Regulation

Under the provisions of the Biodiversity/wildlife Act 2003, all activities that are not compatible with protected area status are prohibited. These include tree felling, illegal park land allocation, illegal construction activities, illegal hunting and that under the fisheries act of 2007 on illegal use of wrong mesh size and the use of drift net. In addition farming activities may only take place in areas where cultivation has occurred in the previous years.

E. Access Regulation

There will be public access to areas of the tourism zone. Tourists and visitors will be required to pay the fee levied by the Department of Parks and Wildlife Management.

F. Education

The education aspect at Niumi National Park should include guided school visits to the Park. The warden at the reserve should also visit local schools on a regular basis, on a general environmental program for sensitization. Such a program will require the acquisition of audio-visual equipment and the provision of education materials.

G. Research

A strong scientific database is required for effective management of wetland habitats and associated fauna and flora in Niumi National Park. Baseline data exists for the area from the 1997 and 1999/2000 surveys. However, there are gaps on some aspects of the wetland ecosystem, and these should be filled as soon as is feasibly possible.

Appropriate mechanisms should be developed for continuous monitoring of key elements by the wildlife staff on the ground with the assistance of specialists where necessary. The use of volunteer wardens and interested members of the community should also be considered in this role. In addition to the baseline studies and routine monitoring, research activities should be concentrated on areas where data is required. The research base should not be limited to ecology and can explore all aspects of the eco-tourism and community components.

2. Implementation of Management Activities

Management objective: To ensure sustainable management and conservation of resources of the park whilst encouraging stakeholders' involvement for community development.

Long term global objective 1	**To promote rational and sustainable management of species and habitats with involvement of the local communities.**		
Specific objective 1: To design and implement standard operation procedures for marine and terrestrial surveillance	**Indicators**	**Means of verification**	**Hypothesis**
	Reduction of illegal incedents	Patrol journal Quarterly report	Availability of adequate funding to conduct the activities
Activities			**Budget**
1.1.1 Develop standard operation procedures			**€ 500**
1.1.2 Train staff and local community members to implement SOP's			**€ 1,797**
1.1.3 Organise routine (marine and inland) patrol			**€ 11,428**
1.1.4 Procure materials (bins, GPS, cellular phones, digital camera,...)			**€ 7,057**
Specific objective 2: Develop and implement a research and species monitoring plan	**Indicators**	**Means of verification**	**Hypothesis**
	Available data	Database	Research capacity available among staff members
Activities			**Budget**
1.2.1 Develop research and species monitoring plan (5 years)			**€ 4,326**
1.2.2 Train staff on monitoring techniques			**€ 2,600**
1.2.3 Implement research and monitoring programme			**€ 16,266**
1.2.4.Input in database at the DPWM HQ & Fisheries Department			**€ 2,962**
Specific objective 3: Improve capacity of the park staff and local communities on management skills	**Indicators**	**Means of verification**	**Hypothesis**
	Availability of qualified staff	Certificates and Diplomas	Availability of literate staff
Activities			**Budget**
1.3.1 develop a training plan (5 years)			**€ 3,121**
1.3.2 Train (certificate and diploma level) staff overseas			**€ 28,756**
1.3.3 train staff and local communities (short courses, seminars and networking visits)			**€ 17,364**
Specific objective 4: restore degraded mangrove areas	**Indicators**	**Means of verification**	**Hypothesis**
	Planted stumps	Observation	No blockage of run off water
Activities			**Budget**
1.4.1 develop a nursery of mangrove stumps			**€ 3,121**

1.4.2 Train staff and local communities on mangrove replanting techniques			**€ 8,756**
1.4.3 organise replanting campaign with local communities			**€ 17,364**
1.4.4 monitor and evaluate regenerated areas			Not costed
Specific objective 5: Protect marine biodiversity	**Indicators**	**Means of verification**	**Hypothesis**
	catch of big and various species	Size of species	Protection of nursery and sawning ground
Activities			**Budget**
1.4.1 beach patrol to protect turtle nesting sites during the night			**Not costed**
1.4.2 monitor breeding birds and nests			**€ 2,756**
1.4.3 use of appropriate mesh size			**€ 987**
1.4.4 encourage community to use hook and line			**€ 500**
1.4.5 Monitoring of landing sites and catches			**€ 1,200**
Long term global objective 2	To encourage and support local participation in decision making process		
Specific objective: 2.1. support SMC members in decision making	**Indicators**	**Means of verification**	**Hypothesis**
	Quality of intervention in meetings	SMC Quarterly meeting reports	Local community involvement
Activities			**Budget**
2.1.1 Support quarterly SMC meetings			**€ 1,376**
2.1.2 Train SMC members on governance			**€ 1,843**
2.1.3 organise networking visits for exchange of experience			**€ 6,745**
Specific objective 2.2 To promote awareness of local people	**Indicators**	**Means of verification**	**Hypothesis**
	Number of participants in Park activities	Reports, observation	Commitment of the local communities
Activities			**Budget**
2.2.1 Develop awareness materials (brochures, leaflets, tee-shirts….)			**€ 1,887**
2.2.2 Organise outreach programmes in schools and communities			**€ 1,327**
Long term global objective 3	To promote sustainable fishing practices through the use of appropriate mesh sizes, gear type and recommended areas for fishing.		
Specific objective 2.3 Support fishermen and oyster collectors	**Indicators**	**Means of verification**	**Hypothesis**
	Sustainable practices	Size of fish catches and oysters harvested	Capacity built and communities willingness to cooperate
Activities			**Budget**
2.3.1 Organise sensitization with fishermen and oyster collectors			**€ 1,600**
2.3.2 Organise network visits to learn best practices			**€ 2,150**
2.3.3 Purchase adequate materials to change inappropriate ones			**€ 4,000**
2.3.3 market channeling and value added products			**€ 5,230**
2.3.4 monitor and evaluate catches and activities			**€ 1,350**
2.3.5 provide seed money for alternative activities			**€ 5,000**
2.3.7. demarcation and protection of breeding areas			**€ 1,200**

Long term global objective 4	Develop tourism for revenue collection		
Specific objective 4.1 Encourage private investment	**Indicators** Participation of private sector in park management	**Means of verification** Observation,financial report	**Hypothesis** Functional policy framework

Activities	Budget
3.1.1 develop investment plan	€ 3,500
3.1.2 develop ecotourism activities	€ 4,000
3.1.3 recruit potential and interested private investors	No cost
3.1.4 collect revenue generated for licensing entry fees	No cost
3.1.5 Monitor and evaluate performance	No cost

Specific objective 3.2 encourage community participation in ecotourism ventures	**Indicators** Ecotourism activities in the park	**Means of verification** Observation, on site bussinesses	**Hypothesis** Market innovation and promotion

Activities	Budget
3.2.1 develop an ecotourism and marketing plan	€ 3,500
3.2.2 encourage community participation in activities	€ 1,000
3.2.3 Organisation informal organisation as kafo, NGO…	€ 1,875
3.2.4 training and networking visits	€ 5,875
3.2.5 monitoring and evaluation	No cost

2.4. Factors Influencing Achievement of Long Term Objectives

A. **Lack of Resources**:

It is difficult to envisage how the long term objectives of this management plan can be achieved without some form of outside funding. Lack of resources will affect all areas from sensitization and education through to implementation of management plans and development of alternatives community resources.

B. **Community appreciation, understanding and involvement**

The role of the communities in the sustainable use and long term viability of the reserve cannot be over emphasized.

The degree to which the long-term objectives can be achieved will therefore be heavily relying upon the extent to which the community understands its role and wishes to play a part in the management of the area. The degree of commitment of the community will dependent upon addressing their needs (i.e. those living close to the reserve and indeed the farer who are also using the park's resources). In brief, achievement of the long-term objectives will rely upon provision of sound alternatives to the actual use of the natural resources (e.g. in the form of wood lots and other socio-economic activities).

C. Increased pressure through population growth.

Population growth means increased pressure on resources. The extent to which the population can be educated and sensitized to rationally use the resources would be hard to reach. There is a need for training in soil enhancement techniques, sustainable fishing and agricultural practices for optimum harvest.

Provision of high yield varieties should be considered.

D. Commitment of DPWM and Government

The extent of provision of resources, both monetary and personnel may be a limiting factor. There needs to be a continuous dialogue between DPWM and stakeholders throughout the whole process to minimize misunderstandings, and their escalation. In order to optimize the communication between parties, staff will be required to have appropriate training for such community work.

In turn the extent to which objectives will be affected by this factor will be determined by the government commitment and the resources provided to staff for these duties.

E. Socio-economic Activities

The socio-economic activities will be limited to those that are compatible to the aims of the management of the Park. The communities will be limited in the eco-tourism activities by the resources they have. Appropriate training and education are needed

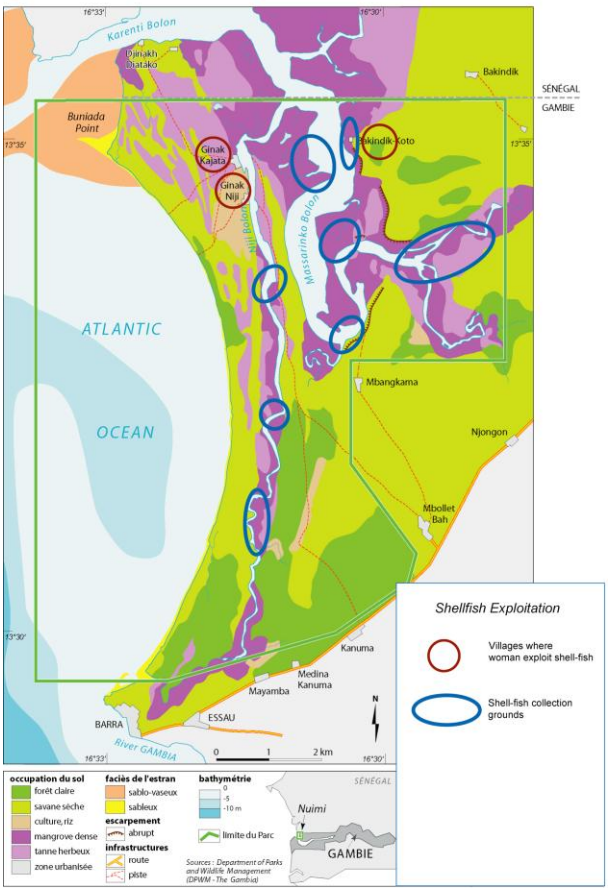
F. Seasonal Limitation

Limited activities will take place during the wet season due to accessibility in the park.

G. Prohibition

Catching juvenile species must be prohibited for sustainability sake. Communities should be strongly sensitized. In the process of developing community livelihood initiatives, sub projects must be envisaged to trade unsustainable fishing gears to recommended ones.

Niumi National Park - Shellfish collection



3. Community Development Component

3.1. Communities near Niumi National Park

The national park is bordered by a number of villages around its eastern and southern peripheries and has two villages within the park. Five villages have participated in clearing boundary fire lines on the eastern edge in the past. All communities farm subsistence crops, groundnuts and fish, and utilize forest areas for collecting subsistence foods and materials.

3.2. Community Development

The usual factors such as labor shortage, absence of investment capital, and marginal market economies hinder effective participation of individuals, families and villages who strive to promote sustainable natural resource use. The higher priority actions within the management plans thus are designed therefore to provide rapid material benefits that will ease true and effective participation of the communities in the integrated conservation development of Niumi National park. These benefits should be in the form of a village support funds, short-and long-term employment in the park management activities, training program to empower the village opinion leaders who represent community interests in the conservation and development process, and environmental education and extension programs to increase local understanding of their impact on natural resources and their ability to turn down adverse effects. The following specific actions should therefore be implemented as soon as funding becomes available:

- Provide permanent and seasonal employment opportunities to a limited number of residents of the villages inside and bordering the National Park.
- Implement a number of educational initiatives both in schools and the community at large to enhance village awareness and understanding of natural resource management issues and solutions;
- Ensure the continued effective participation of the local communities in the planning and management;
- Initiate access provision to, and ensure the adoption of, practical sustainable agriculture, fisheries and natural resources management practices.

Longer-term objectives are focused more on promoting sustainable land use practices and providing alternative and reliable sources of income to communities associated with Niumi National Park. These objectives are as follows:

- Expand initiatives designed to provide access to, and ensure the adoption of practical sustainable agriculture and natural resource management practices including:
  - Establishing and maintaining wood lots, fruit and fodder tree plantings, farm boundary and contour plantings
  - Constructing and maintaining soil and water retention or diversion structures
  - Elevating soil organic matter content to enhance water retention capacity and soil moisture content
  - Enrichment planting of rhun palms
- Commencing initiatives designed to sustainably diversify rural income generating capacity and by so doing, enhance rural income. These include:
  - Village accommodation
  - Tourist crafts industry including wood carving, pottery, soap making, tie-dye
  - Bee keeping
  - Fishing
  - Dry season vegetable production
  - Fruit production
  - Tourist activities e.g. providing pirogue and donkey cart transport and guiding.

3.4. Strategy for Implementing Activities

It is envisaged that the Village Development Committee (VDC) will be responsible for identifying critical issues and needs of the communities through a forum of regular meetings with park staff, and the GOTG and NGOs. It is hoped that such meetings will lead to the development of activities that are compatible with conservation of the park and surrounding area's natural resources. They should address the specific needs and concerns of the local communities. This can then be followed by meetings to consider the co-ordination of the implementation of the activities based on the involvement of donor and development agencies.

To aid in solving critical issues and needs identified by the VDC it is recommended that in the long term a percentage of the visitor fees collected by Niumi National Park be returned to the communities in the form of a community project support fund. This system of providing direct benefits to the communities that traditionally use the park area for subsistence needs will help ensure their commitment in the park development and management. However, this source of local project funding will not be realized until park infrastructures, both for management and visitor services is in place and functioning effectively. Nor are these funds likely to be adequate to develop all conservation activities identified by the TAC and planning team. Therefore, support will have to solicit from donors to establish a community project support fund, and to implement resource management and rural income generation activities that, when combined with park management actions will do much to reach the goals of the integrated conservation and development project at Niumi Nationa Park.

In addition to the VDC, an important element in the implementation of the Niumi National Park management plan will also be the ongoing decentralization program in North Bank Division. This program forms part of the ongoing Local Government Reform and Decentralization strategy that recognizes the participation of local communities as paramount in development.

3.5. Community Natural Resources Management Agreements

It is believed that community resource management agreements will enhance a community's sense of ownership over natural resources, and consequently will promote sound land management and sustainable land-use practices. Community resource management agreements are long-term contracts developed co-operatively by government technical departments, NGOs and local communities to help ensure the effective conservation and exploitation of natural resources. Typical agreements involve community guardianship over certain areas, in return for exclusive rights of exploitation and sale of predetermined types and quantities of natural resources.

There exists experience for developing an integrated approach to the management of Niumi National Park in The Gambia. The DPWM has experience in developing an integrated conservation development plan for KWNP and the Gambia German Forestry Project has initiated and implemented numerous community forestry program country-wide. The following activities can be developed in an integrated way:

- Fire management and control
- Greening activities and enrichment plantings
- Sustained subsistence use of park resources such as thatch-sedge, Rhizophora roofing poles and medicinal plants
- Social forestry
- Fisheries management, including shells resources
- Agriculture
- Water resource use and conservation
- Communal grazing scheme
- Development and management of tourist facilities and services

The development of the different community resource management agreements should happen over an extended period, in an open and participatory manner.

3.6. Decentralization of Government

The program includes the introduction of a community based planning process in three of the seven administrative areas of The Gambia and supports local participation in local development. The districts include the North Bank Division. Local communities are being encouraged to recognize their own needs, and to develop them into community action plans through village development committees (VDC). Such plans are further developed and integrated at the ward and divisional levels.

Implementation of community plans will be facilitated through the parallel development of multi-disciplinary Divisional Development Committees (DDC). All divisions have such a committee which is made up of a

variety of individuals including Heads of Government Departments, Heads of Area Councils, Representatives from NGOs and Chiefs. The DDCs have various subcommittees in Institutional Building, environment, Economic Sector and Health and Planning, and are entry points in divisional development. Multi-facilitation development teams (MFDT), made up of differently skilled extension workers, facilitate the development of community action plans and their implementation on the ground.

Decentralization will mean that the area councils and local area councils will have a more direct role to play in the continuing implementation of the management plans. The area councils would become very much more involved and their roles would include

1) the provision and acquisition of resources
2) Facilitation of capacity building program for local communities in the management of the park through multi-disciplinary facilitation approaches (MDFTs)
3) Ensuring capacity building of their own area council staff, including extension staff in order to monitor the implementation of the management plan.
4) Activities on alternatives to livelihood

4. Development Activity Descriptions

4.1. Community Development

Sustained success of the Niumi National Park management plan is intimately linked to the ability of, and extent that, rural communities bordering the park participate in the planning and implementation of park

management and rural development activities geared toward sustainable natural resource management, biodiversity conservation, and enhancement of rural incomes. It is therefore of extreme importance that TAC members be assisted to develop the capacity to participate more effectively in the development process. Both the Department of Community Development and NGOs active in the Niumi district will be invaluable in facilitating this process. Existing village development committees (VDCs), the TAC, and participating NGOs will provide leadership in proposing activities and administering funds.

4.2.Fisheries

Currently artisanal fishing activity is carried out on the coastal side of the Niumi area and remains very rudimentary. This may become an opportunity for alternative to the decreasing crop production and farm income*. However, as a priority development activity, this may be regarded as non cost-effective since transport of fish catch is a problem*. Communities living in and around Niumi National Park wish to increase their supply of fish protein from the area.

Fishermen living within villages around the park use a variety of small scale fishing gears. Catches are sold at village level or used for self consumption.

This activity provide small income for the small community of Barra fishermen, who use hook and line fishing on the rocky shore around the southern tip of the NNP. This community is actively involved in the joint surveillance of the NNP marine coastal area.

4.3. Water Resource

Fresh water resources are important to both community and park development. Pump wells and open wells are prevalent in Niumi communities, but the quality of water is sometimes poor. To provide for safe services to visitors at the park head quarters it is recommended that a bore hole be drilled which may provide water surplus that could be used by local community. The activity requires drilling, construction of storage tank and piped water distribution network, and installation of solar-powered pumping equipment. A geophysical survey will be needed to determine suitable locations for the bore hole. A hydrological engineer will be responsible for the design and lay-out of the most cost effective distribution system.

4.4. Rangeland management

In the Gambia range lands are being replaced gradually by farmlands due, in large part, to population growth. In Niumi National Park the current level of cattle and their grazing activity are beginning to have profound impacts on the vegetation especially in high biodiversity areas such as the coastline between Barra and Buniadu point. During the dry season, the impacts are thorough. Exclusion of the cattle from the park without concurrent improvement in the remaining range lands will adversely affect livestock production and livestock related income. To maintain rural income and avoid the adverse ecological impacts of unregulated pastoralism a comprehensive program of livestock management is needed.

4.5. Tourism

The department of Tourism plans to diversify the tourist industry through the promotion of speciality tours that will encourage tourists to visit up-country areas of their interest. This plan of action is being developed as part of the national eco-tourism strategy.

Eco-tourism has the potential to provide substantial benefits to the communities but effort is needed to properly conserve natural resources.This is an important objective of the project; and it could be achieved through proper planning, and assistance to provide comfortable and safe facilities such as accommodation in villages and services that motivate visitors to come to the area. Both the national park and the communities should become known for the high quality of services and experience they provide.

Activities, which enable members of the communities to provide guiding for visitors and interpretation of significant local themes, will enhance enjoyment and appreciation of the park. To achieve this there must be a commitment to train local residents as tour managers and tourist-guides. Incorporating local, educated persons into the tourist service industry will boost tourist appreciation and enjoyment in Niumi National Park. This will bring tangible benefits from park conservation to the local communities. The communities in Niumi National Park now produce agricultural tools, pottery, baskets and some weaving for their own use. With a little additional training to improvements in finishing tips, the marketability of existing village crafts could be increased substantially.

Higher quality crafts will expand the opportunities for sale to up-country tourists and allow local artisans to break into markets on the coast.

4.6. Social Forestry

As the population of upper and lower Niumi district continues to grow, pressure on the surrounding woodlands will increase for farming and wood collection. The areas of woodlands available to the communities near the national park are restricted by the existence of the park, yet there are still few other places for this purpose.

To re-address the balance and reduce the pressure on the woodland within the park, it is recommended that the communities establish wood lots and other agro-forestry system (e.g. farm boundary planting, on – farm planting like alley farming) using fast growing tree species. Wood lot creation will help ensure that the village can meet their short and long term needs for wood and construction materials, while other agro-forestry practices can aid farmers with fodder and wood material, as well as, wind breaker to reduce erosion in the fields.

It is recommended that one hectare wood lots be established by each village. Since the village of Myamba, Mbangkama and Essau have specifically identified this as a high priority need, they should be pioneers in this program. Vegetables can be grown within the wood plot for the first few wet seasons as an additional incentive for the communities to propagate trees. Each wood lot will need fencing, wells and gardening materials to begin operations.

Secondly, ten farm families per village will be asked to volunteer to plant seedlings around their farm boundaries as models for the communities. A nursery should be located in each participating village to supply necessary seedlings for both activities. The Stay Green NGO in Niumi could be a strong partner in the seedlings provision

It is anticipated that the wood lots/gardens would be a collaborative effort of the Dept of Forestry, the Dept of Planing (Ministry of Agriculture) and an appropriated NGO. Farm planting will involve the Dept of Forestry and the Soil and Management Unit. Beekeeping activities will be encouraged by the National Beekeepers Association with technical assistance from the Department of Forestry, to improve the income base of a number of family groups in village communities associated with the park.

Enrichment planting of socio-economically-important species both inside and around the park will ensure that local communities have continued access to resources that have been lost or exploited beyond sustainability. For example, planting of Rhun palm outside the park will provide a sustainable source of valuable construction material to the communities, and by so lessen pressure within the park on the same resources. Rare species planting inside the park and/or types identified by the communities and GOTG as important will benefit the communities and enhance park biodiversity.

4.7. Agriculture

Initially the degree and extent of resource degradation in the area will be accessed. This will be achieved through an analysis of information currently available and further detailed survey work on the soil, hydrology and vegetation of the farmlands of the communities in and around the park. This will enable land capacity maps to be produced which will aid the sound management of sustainable agriculture and resource use planning in the area. Such work should be undertaken or at least co-ordinated by the soil and water management unit.

Training of the extension agents in the Niumi area in conservation and farming techniques will go along challenging the attitudes of both extension agents and famers by increasing their knowledge and appreciation of the linkages between natural resource and farm productivity. Extension agents will carry out training course for farmers on their field as demonstration of conservation farming practices. Construction of model farms with dykes and contour berms that are used successfully in other area in the Gambia will provide the farmers of Niumi with hands-on experience of conservation agricultural methods.

4.8. Strategic work plan

The purposes of the Niumi National Park management plan are to conserve and restore natural habitats and the species they contain, and to provide direct benefits to the local communities through improved natural resource management practices and eco-tourism.

Such objectives cannot be achieved without cross-sectoral collaboration (including other government departments, international, national and local NGOs), as well as support of the local communities and strengthening of the DPWM. Many of the objectives of the management plan will not be possible without the support of outside funding from donors. The schedule of work may thus be subject to the availability of different funds. However, emphasis should be placed on acquiring co-operation and funding for the actions which will have the major impact on the area.

4.9. Local Participation

The support and involvement of the communities to Niumi Park is crucial for the successful management of the site. Thus, all effort should be made to encourage local participation e.g. voluntary wardens, active management committee, and seasonal employment and so on. Alongside such activities, a high priority should be given to the establishment of initiatives that are designed to provide access to and ensure the adoption of practical sustainable agriculture, fisheries and natural management practices. Such activities will include the establishment of wood lots and tree planting and the promotion of access to sutainable fishing gears, in order to provide alternative natural resources to those present and currently being utilised in the park. The longer term provision should also cater local communities involved in eco-tourism related activities.

4.10. Staffing

The following staffing level would be required for the effective management of Niumi National Park: one (1) Head Warden, ten (10) Paid Rangers, four (4) Voluntary rangers, one (1) Secretary, a Cleaner and a night watchman.

Presently the Park is managed by a team of 15 staff members ranging from the lone professional Cadet Wildlife Officer (head Warden) to the community volunteers from the villages around. Two officers under government payroll are redeployed in the area to assist in the improvement of the management in place. The site will also benefit from support in terms of staff time, expertise and equipment of the DPWM Headquarters in Abuko. e.g. the research and development unit, eco-tourism development unit, education officer and secretarial staff.

4.11. Management Committee

A management committee for the site will consist of two representatives from each village (one man and one woman). Each village should also choose two or more “back-up” persons to attend meetings when representatives are unable to attend. The committee will serve primarily as a forum for the various groups with interest in the wetlands to come together and air their views on the management of the site. The committee should meet on a regular basis, at least four times annually with representatives of the park.

4.12. Site management Requirements

A functional SMC was put in place with the support of the FIBA project composed of representatives of local communities living around the protected area to serve as a governing body responsible for the co-management of the marine protected area.

This was initiated to encourage community participation and to diversify governance types in the network of protected areas in the Gambia. A total of 31 representatives of the villages in Niumi with the park Warden form the SMC.

Presently, this body plays very important roles in surveillance and compliance, assist in management duties and labour.

4.13. Building tracks and trail

The site has benefited from the Project Wings of Wetlands in term of refurbishment of the current headquarters, visitor's information centre and, Toilet facilities. Fresh water and electrical power are also required as incentive for better management.Two bird hides and watch tower have been built to facilitate bird watching and to act as out posts for fieldwork. Marked trails and tracks have been cleared for pedestrian and vehicle used by tourists. All these developments were registered under the smooth implementation of the Wing of Wetlands and the FIBA support projects. A jetty for the anchoring of the Patrol boat donated by FIBA for surveillance is considered as a great achievement.

Access to monitoring points will be possible via tracks and trails that are already in use (e.g. the path that bisects Jinack Island from the boat crossing points to the seaward side).

4.14. Transport equipments

Basic office equipment and furnishing for the headquarters and the information centre should be provided. The staff on site would require field gear and some simple items of monitoring equipment to carry out their duties.

There is also need for communication from the headquarters at Abuko to Niumi National Park to coordinate management activities and monitor tourism arrivals. Closed User Group Mobile phones (CUG) communication is essential for all forms of park work and for the safely of tourists and park staff as well.

4.15. Roads and Access

In the wet season the track from kanuma to the crossing points for Niji and Kajata is in some places un-useable. Some consideration should therefore be given to up grading the track in the more difficult trenches to facilitate movements during the wet season.

4.16. Training

The success of the management plan will depend on the availability of qualified local manpower to carry out the work. Since there is little expertise for wetlands management at DPWM and collaborating institutions (fisheries, forestry, agriculture, etc.), training should be made an important component of the project and funds should be made available for the identified training needs.

In designing or selecting training programs the need for training in community relationships should be borne in mind. The training should promote local participation in wildlife management, rather than putting coercive mind in the trainees and the staff. The management plan of Niumi National Park seeks to adopt a multi-use approach, and encourages support and participation of local people. Staff assigned to the program should therefore, in addition to the training in wetland and MPA management, be trained in participatory approaches. This would help- develop a change in the current attitude of the staff and promote a good working relationship with the communities in and around the Ramsar site.

SECTION III: MANAGEMENT PLAN IMPLEMENTATION FRAMEWORK

Management

The overall management of the project will remain with DPWM. The department will have regular meetings with its collaborators. However, it may be appropriate for different aspects of the management plan to be managed by collaborating agencies/organisations, with a quarterly report submitted to DPWM.

Administration

Currently the DPWM is over stretched in its ability to administer projects on accountable basis. An additional member of staff would be required for this. Alternative collaborating partners may provide the administration infrastructure and staff to deal with administration of some projects

TABLE 2H: Year Work Plan for Niumi National Park

Activity	Year					Budget GMD
Infrastructure Development	1	2	3	4	5	
2 Motorcycles						120,000
10 all-terrain bicycles						50,000
Maintenance cost of bicycles and motorbikes						25,000
Staff Quarters						
Building construction						879,650
Bore hole system						300,000
Solar power						126,875
Furniture						975,000
Mobile communication (CUG)						95,000
Upkeep and maintenance						264,000
Visitor centre						
Carpentry and point work,						47,980
Mounting and display boards						14,250
Maintenance and routine upkeep						15,000
Way-marked trails and tracks(payment to community for clearing)						500,000
Construction of photohides (2)						136,000
Informational and promotional material						310,235
RECURRENT						

Salaries and allowances						
2 wardens						**240,000**
4 labour						**110,000**
Cleaner						**40,000**
Secretary						**50,000**
Infrastructure						
Trail and track clearance by communities						**425,000**
Repairs and maintenance						
Equipment						**70,000**
Infrastructure						**86,000**
Vehicle and boat						**75,000**
Surveillance (fuel)						**909,875**
Administration						
Capacity building for staff members						**713,542**
Management committee meetings						**156,790**
Capacity building for local community members						**652,890**
Purchase of field equipments (bins, camera, GPS, Tents, ….)						**275,875**
Develop standard operation procedures						**19,000**
Train staff and local community members to implement SOP's						**68,286**
Organise routine (marine and inland) patrol						**434,264**
Train staff on monitoring techniques						**93,600**

Implement research and monitoring programme						**585,576**
Input in database at the DPWM HQ & Fisheries Department						**106,632**
develop a training plan (5 years)						**112,356**
Train (certificate and diploma level) staff overseas						**1,035,216**
train staff and local communities (short courses, seminars and networking)						**625,104**
develop a nursery of mangrove stumps						**112,356**
Train staff and local communities on mangrove replanting techniques						**315,216**
organise replanting campaign with local communities						**625,104**
monitor and evaluate regenerated areas						**Not costed**
beach patrol to protect turtle nesting sites during the night						**Not costed**
monitor breeding birds and nests						**99,216**
Moinitor the use of appropriate mesh size						**35,532**
encourage community to use hook and line						**18,000**
Monitoring of landing sites and catches						**43,200**
Support quarterly SMC meetings						**49,536**
Train SMC members on governance						**66,348**
organise networking visits for exchange of experience						**242,820**
Develop awareness materials (brochures, leaflets, tee-shirts….)						**67,932**
Organise outreach programmes in schools and communities						**47,772**
Organise sensitization with fishermen and oyster collectors						**57,600**
Organise network visits to learn best practices						**77,400**

Purchase adequate materials for local communities to change inappropriate ones						**144,000**
market channeling and value added products						**188,280**
monitor and evaluate catches and activities						**48,600**
provide seed money for alternative activities						**180,000**
demarcation and protection of breeding areas						**43,200**
develop investment plan						**126,000**
develop ecotourism activities						**144,000**
recruit potential and interested private investors						**No cost**
collect revenue generated for licensing entry fees						**No cost**
Monitor and evaluate performance						**No cost**
develop an ecotourism and marketing plan						**126,000**
encourage community participation in activities						**36,000**
Organisation in formal organisation as kafo, NGO…						**67,500**
training and networking visits						**211,500**
monitoring and evaluation						**No cost**
Total Budget						**13,917,108**

Bibliographical references

Barbier, E.B., Acreman, M and Knowler, D. (1997) Economic Valuation of Wetlands. A Guide for Policy makers and Planners. Ramsar Convention Bureau, Gland, Switzerland.

Barlow, C.R., Wacher, T.J. and Disley, A.S. (1997) A Field Guide to Birds of the Gambia and Senegal. Pica Press.

Collar, N.J. and Stuart, S.N. (1985) Threatened Birds of African and Related Islands. Part 1 ICBP/IUCN. Cambridge.

Eckert, K. L., Bjorndal, K.A., Abreu-Grobois, F.A., and Donnelly, M. (1999) Research and Management Techniques for the Conservation of marine Turtles. IUCN/SSN Marine Turtle Specialist Group. Publication No. 4.

Jones, M. Flowering Plants of The Gambia (1994) A.A. Balkema/Rotterdan/Brookfield.

Kasper, P. (1999) Some Commoner Flora of the Gambia. Edited by Stiftung Walderhaltung in Afrika and Bundesforschungsanstalt fur Forst – und Hollzwirtschaft. Hamburg, Federal republic of Germany.

Lykke, A.M. (1994) The Vegetation of Delta du Saloum National Park, Senegal. AUU Reports, 33. Aarthus University Press.

Lykke (1996) Structure, Floristic Composition and Dynamics of Woody Vegetation – Studies from Fathala Forest in Delta du Saloum National Park, Senegal. PhD Dissertation submitted to the Faculty of Science, University of Arrthus, Denmark.

Ramsar Wetland Study. The Gambia (1997) Report produces by The Department of Parks and Wildlife Management under The Ministry of Fisheries and Natural Resources with The Ramsar Bureau.

Van Waereveeke, K, Ndiaye, E, Dhiba, A, Diallo, M, Murphy, P Jallow, A, Ndiaye, P and Tous, P. (1999). A Survey of the Conservation Status of Cetaceans in Senegal, The Gambia and Guinea-Bissau. Report to Secretariat of the Convention of Migratory Species of Wild Animals (UNEP/CMS).