

CONSERVATION AND ECOTOURISM

FOREST PARKS AND RESERVES

Arabuko-Sokoke Forest

The Arabuko Sokoke forest in Kilifi District, was gazetted in 1932 as a Government Forest Reserve and is managed jointly by the Forestry Department and the Kenya Wildlife Service. It is one of the last remaining tracts of lowland forest on the East African Coast and is the largest stand of indigenous coastal forest in Kenya. It lies near Malindi with the Sabaki River to the north and Kilifi Creek to the south and it covers an area of approximately 42,000 hectares, 4,330 hectares of which are gazetted as a nature reserve. The forest is low-lying, barely rising above 60m at its highest point and contains a number of ephemeral pools and flooded sandpits. On its eastern side, the forest reaches down to the sea where it incorporates Mida Creek with its stands of red mangrove (*Rhizophora mucronata*).



Figure 59 : Satellite view of Arabuko Sokoke Forest

The forest is part of the coastal forest mosaic in East Africa believed to be isolated at present from the other coastal forest areas because of post-Miocene climatic changes. Botanical links between particular plant families indicate that the forest has on more than one occasion formed part of a more extensive coastal forest system. It is the isolated biogeographical nature of the forest and the resultant species endemism which give this particular coastal forest its status as an area of high conservation importance.

The average annual rainfall in the forest is 800mm and the mean air temperatures are high. The diverse soils vary between white to pale brown sandy soils and the red lateritic soils characteristic of the Magarini ridge.

The forest has a high degree of plant endemism with many species occurring in only a few other coastal forests including the Kayas. It has at least nine of Kenya's rare trees and shrubs including *Buxus obtusifolia*, *Pteleopsis tetraptera*, *Ellipanthus hemandradenioides*, *Aristogeitonia monophylla*, *Lasiodiscus mildbraedii*, *Canthium kilifiensis*, *Canthium robynsianum* and *Nesogordonia holtzii*. Many of the most notable trees are M'bambakofi (*Azelia quanzensis*). Also prominent is the spreading *Brachystegia spiciformis* which is a typical miombo tree all the way down to Mozambique. Somewhat less common and more sought after as a carving timber, is the muhuhu (*Brachylaena huillensis*).

The forest is home to over 130 species of birds including a number of rare species namely, the Sokoke Scops-owl (*Otus ireneae*), Clarke's Weaver (*Ploceus golandi*), Sokoke Pipit (*Anthus sokokensis*), Spotted Ground-thrush (*Turdus fischeri*), East Coast Alkalat (*Sheppardia gunningi*) and the Amani Sunbird (*Anthreptes pallidigaster*). Of these, the Sokoke Scops-owl and the Clarke's Weaver are found nowhere else. In fact, of the 72 bird species in Kenya that are of national and international concern, 26% are found in Arabuko-Sokoke Forest.



Spotted Ground Thrush



Sokoke Pipit

Figure 60 : Two of the bird species that abound in Arabuko-Sokoke Forest

Coastal Resources and Their Use

The mammal population in Arabuko-Sokoke Forest is not very large. A small population (between 60 and 90) of elephants inhabit the forest together with three rare mammals, the Ader's Duiker, the Sokoke Bushy-tailed Mongoose and the Golden-rumped Elephant-shrew. Among the amphibians in the forest is the remarkable African Foam-nesting Frog which suspends its eggs in moist foam bubbles on tree branches above pools. The forest has many insect species including 81 species of butterfly of which four are endemic - *Acrae matuapa*, *Charaxes bland kenya*, *Baliochila latimarginata* and *Baliochila africanus*. The termites are represented by a sole rare species, *Grallatotermes africanus*.

The attractions of this unique coastal forest are slowly coming to the notice of visitors and tourists. To cater for this interest and to exercise a controlling influence, the Kenya Wildlife Service and the Forestry Department have set up a small information centre at the Gede Forest Station. In 1990 some 500 tourists visited the forest and by 1992 the number had grown to 1,300 visitors. It is hoped that before too long, the numbers will increase to include the majority of the 40,000 tourists who visit the Gede historical ruins, only 10 minutes drive away.

Shimba Hills National Reserve

The Shimba Hills National Reserve was gazetted in 1968 under a joint management arrangement between the Kenya Wildlife Service and the Forestry Department. The Kenya Wildlife Service is responsible for animals while the Forestry Department is responsible for the production forest estate (there are about 800 hectares of *Pinus caribaea* planted for timber). Topographically, the Reserve consists of a dissected plateau rising steeply from an altitude of around 120m and comprising 19,251 hectares set aside for multiple use management combining protection for

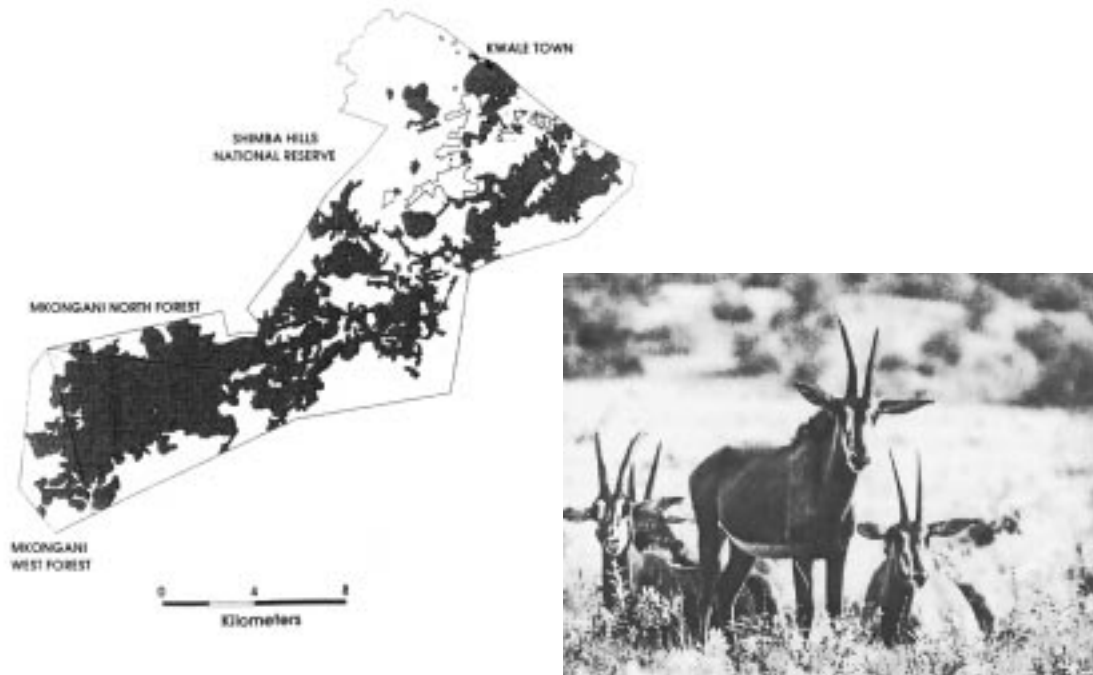


Figure 61 : Shimba Hills National Reserve and the best known of its inhabitants, the Sable Antelope

tourism, protection of fragile water catchments, and wood production. The Reserve is situated in Kwale District, about 33km from Mombasa.

The best known of its inhabitants is the Sable Antelope (*Hippotragus inger*) and although not thought to be the only population in Kenya, this was considered as the most robust at 260 individuals when studied in the late 1970's. Four types of forest exist in Shimba Hills, namely, *Paracrolobium* forest, Riverine forest, *Combretum* dry forest and *Chlorophora* wet forest. From the biodiversity point of view, the Shimba Hills forests are very important for their high proportion of endemic plants - about 25% of over 1,000 species recorded. In addition, because the area is so small, most of these are considered rare.

The prolific and varied plant life supports a vast array of insects which include nearly 300 species of butterflies - some 35% of Kenya's total. Of these, 13 species are very rare and two are endemic. The insects in turn provide food for a number of forest and coastal birds. Three of these bird species, also found in the Arabuko-Sokoke Forest, are internationally rare and a further ten are rare in Kenya. In addition, the forest supports some 35 mammal species including the bulk of the Kenyan population of the Angolan Black-and-white Colobus Monkey (*Colobus angolensis*).

The 600-strong herd of elephant is a management dilemma. The high density is not only having an impact on the forest; this impact is spilling over into people's gardens in Kwale. Monitoring is being undertaken in an attempt to resolve this direct conflict between wildlife and the rural community.



Figure 62 : Elephants, Shimba Hills Reserve

ANCESTRAL KAYA FORESTS

Until comparatively recently, the nine Mijikenda tribes and their Kaya forests have received surprisingly little attention. Few anthropologists have worked on an individual group in its own right and while their fascinating history has recently been well-documented, many aspects of Mijikenda culture are still unknown. Neither have any major botanical studies been conducted on their Kaya forests.

The nine Mijikenda tribes today are linguistically and culturally distinct. However, while the exact account might differ from tribe to tribe, the Mijikenda all agree that they derive their group identity from the common history of their migration from "Singwaya". According to the Giriama, the migration (from a location somewhere north of the Juba River in Southern Somalia) was to escape the Galla. But while that may have been the reason for the first migration, there have been many subsequent wanderings which seem to have been brought about by competition for land. These competing claims have continued to the present day.

The Kambe suggest that they were instrumental in setting up many of the Kayas such as, Wao, Rabai, Kambe, Kamboga (Ribe), Solokero, Mudzimiri near Vipingo, Mbuyuni and Jibana. However, both the Ribe and the Jibana assert that they were already settled when the Kambe arrived. Such differing accounts are to be expected from an oral tradition and do not detract at all from the historical fact that the Mijikenda tribes who are nowadays spread throughout the Kenyan Coast region, arrived here after extensive migrations and wanderings. The Mijikenda could now aspire to a more settled existence in their recently established Kayas.

It is thought that Kayas flourished during the 17th and 18th Centuries. The entire tribe lived in their traditional thatch grass houses within the Kaya boundary, protected from the marauding Galla by a palisade and a forest penetrable only by two narrow paths. Along these paths were three wooden gates which were

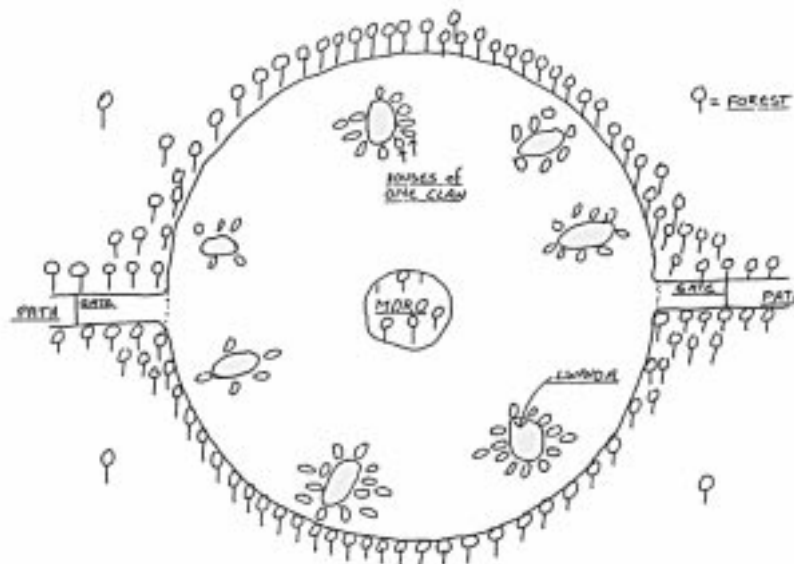


Figure 63 : A generalized plan of Kaya - protected from the marauding Galla by a palisade and a forest penetrable only by two narrow paths

heavily defended. The area immediately surrounding a Kaya forest was farmed intensively, with sorghum and millet being the staple crops at this time. Land was communally owned and its division amongst the clans and sub-clans (like the division of ground within the Kaya) was determined by the elders.

Farming was carried out on three out of a four-day week operated traditionally by the Mijikenda. The fourth day was a day for trading with other tribes, a day for rest and relaxation, and a day during which the elders would assemble at moro (the meeting place in the centre of the Kaya) to discuss the affairs of the tribe.

Various areas of the Kaya and surrounding forest are set aside as burial areas. Graves are frequently marked by either plants or posts. Some grave posts still remain in the Kaya today, but the majority have been stolen primarily for sale to collectors of "ethnic art". The wood used for grave posts was muhingo and pieces of cloth in red, blue and white, were tied onto the posts representing clothes.

By the start of the 19th Century, the Mijikenda, and the Giriama and Rabai in particular, were part of elaborate trading systems in which they acted as middlemen trading ivory and cattle from the Galla, Waata and Kamba, to the Swahili, and returning with trade goods such as cloth and beads. They also traded directly with the Swahili, exchanging agricultural and forest products such as gum copal, honey and beeswax for the Arabs' more exotic goods.

It was also around this time, and for a number of reasons, that the Kayas ceased to be the central residence of the entire tribe, although people returned to them for important ceremonies and as a place of refuge in attack. And, attacks there were, this time from the Iloikop Masai who had ousted the Galla and taken over their marauding role. This must have been the force which discouraged the total abandonment of the Kayas by the Mijikenda. However, the Duruma, Chonyi, Jibana and Ribe left their Kayas in the 1850's and 60's, while the Kambe and the Kauma were the last to leave in the 1870's



Figure 64 : Giriama grave markers and ancestral figures, Arabuko-Sokoke Forest

Coastal Resources and Their Use

Also during this time, drastic changes occurred to the trade routes and the role of the Mijikenda as middlemen was diminished. Colonial rule arrived late in the 19th Century when the British established the East African Protectorate. In this, they dealt directly with the Swahili and by the time the Mombasa - Nairobi railway was complete in 1901, the Coast was in direct contact with the interior and the Mijikenda middlemen were bypassed completely.

This decline in the Kaya was probably inevitable in the face of the many changes brought about by the 20th Century. A handful of Mijikenda, mainly wazee (old men) still live in the Kayas although all are in a bad state of disrepair. Some local people go into the Kaya occasionally as representatives of their clan to do harambee

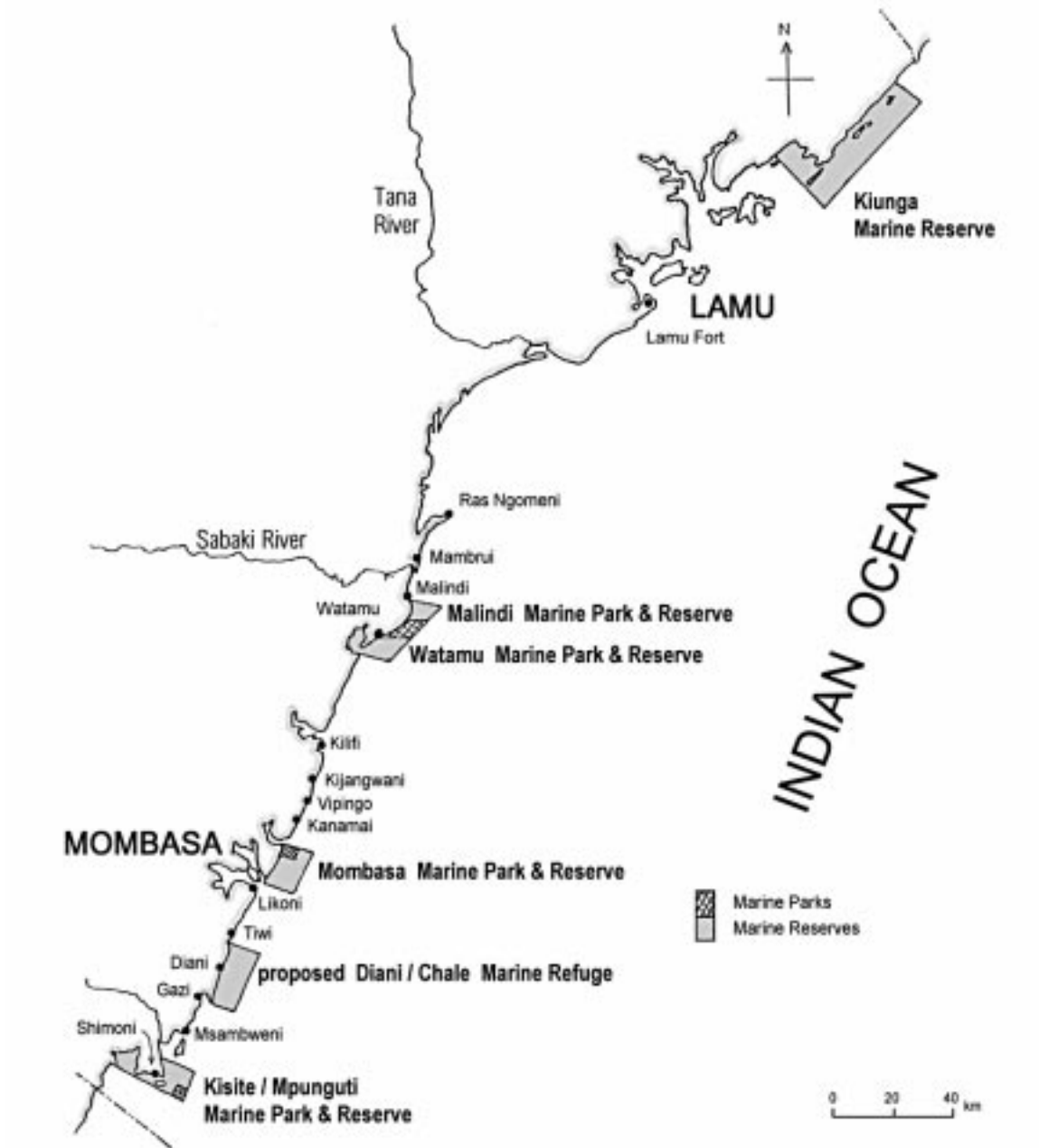


Figure 65 : Marine protected areas along the Kenya coast

work. But while the abandoned Kayas decay only slowly by a natural process, the surrounding forests are usually damaged rather quickly by opportunists who cut down trees for sale.

The increased interest being shown by ethno-botanists, the greater respect being shown for cultural heritage, the heightened sensitivity to environment and conservation issues and the effective implementation of existing legal protection measures, may enhance the survival chances of the Mijikenda Kaya forests.

MARINE PROTECTED AREAS

Kenya led Africa with the establishment of the continent's first marine protected areas in 1968. These areas are primarily designed to conserve Kenya's coral reefs which run along most of the coastline and which form a biodiversity hotspot second only to the tropical rainforests. The larger protected areas also enclose important breeding sites for migratory marine birds, marine mammals and three species of turtle.

There are four Marine National Parks in total - those at Malindi, Watamu, Kisite and Mombasa. Their total area is 54km² and all are managed by the Kenya Wildlife Service. Fauna and flora in the Marine National Parks are fully protected and the introduction of species is prohibited.

In addition there are five Marine National Reserves - Malindi, Watamu, Mpunguti, Mombasa and Kiunga. Their total area is 706km² and they are administered by the Kenya Wildlife Service with traditional fishing being allowed within their boundaries.

Two more protected areas have been proposed, one at Ras Tenewi and the other at Diani.



Figure 66 : Groper amongst coral

Coastal Resources and Their Use

Table 11 : Summary of marine parks and reserves on the Kenyan Coast

name	area (ha)	year set up	location	resources
Malindi/Watamu Marine National Park and Biosphere Reserve	20000	1968	South of Malindi to Mida Creek. Close to Gedi Ruins and Arabuko Sokoke Forest.	Fringing reefs; coral 'gardens' in lagoons; seagrass beds; mangroves; mudflats; shorebirds.
Kiunga Marine National Reserve and Biosphere Reserve	250000	1979	South of Somali border to within a few kilometres north of Lamu. Close to Dodori and Boni National Reserves.	Coral reefs; islets with large nesting bird colonies (e.g. Roseate Tern); dugong; nesting turtles; pristine mangrove stands; remote and undisturbed.
Kisite Marine National Park and Mpunguti Marine National Reserve	39000	1978	Off Shimoni south of Wasini Island.	Coaral reefs; 4 small islets important for nesting birds; fisheries etc.
Mombasa Marine National Park and Reserve	200000	1986	To 13km offshore from Nyali to Mtwapa Creek.	Coral reef ecosystem with associated beaches. High tourist use.
Proposed Tana River Delta Wetland Reserve	20000	proposed	Southwest of Kipini.	Undisturbed wetland (ramsa candidate); birds, turtles, numerous fish.
Diani Chale Marine Reserve	approx 250	being set up	25km south of Mombasa from Mwachema River to Chale Island.	Coral reefs; fishing grounds; mangroves; seabird nesting sites; limestone caves; high tourist use.

In some cases, a marine national park is surrounded by, or is contiguous with, a marine national reserve with the latter serving as a sort of buffer for the more valuable marine national park resources.

Of the 0.75 million tourists who visit Kenya annually, about half are attracted to the Coast with a significant percentage of these visiting the marine parks and reserves. This means opportunities for commerce, tourist business and employment for the local people. Essentially, the Coast economy depends, to a significant extent, on the tourism industry which in turn is dependent on Kenya's coastal and marine resources.

Following below is a closer look at the three most popular marine protected areas.

Mombasa Marine National Park and Reserve

Mombasa Marine National Park and Reserve were established under the Wildlife Conservation and Management Act in 1986. They are continuous and are located between Nyali Creek and Mtwapa Creek just north of Mombasa.

The objectives of the Mombasa Marine National Park and Reserve are :

- To preserve and maintain a representative area of the coral reef ecosystem including the beaches and other ecological features.
- To encourage public understanding, appreciation and enjoyment of the natural resources through interpretation, education and provision of recreational opportunities.
- To undertake the development of these natural resources in a manner which will generate income.

The Park and Reserve have the following ecological features : the coral reef, the reef flat, the lagoon, extensive beaches and the cliffs.

As can be expected, corals abound in the Park and include the branching types (*Acropora* sp.), encrusting corals (*Turbinaria* sp.) and massive corals (*Porites* sp.). Coral fish that are commonly found in the Park/Reserve span more than 15 families and the flora is mostly *Thalassia* sp.

The reserve can be reached from the Mombasa / Malindi road through at least 19 hotels which have frontages on to the Park beach at Nyali, Bamburi and Shanzu.

Traditional sailing boats and glass bottomed boats ferry visitors into the park and reserve and vessels can be hired for sailing into the reserve.



Figure 67 : Traditional sailing canoe, popular with tourists for visits to the reef

Coastal Resources and Their Use

Common recreational activities in the Park include goggling or snorkelling, jetski rides, sailing, windsurfing, sun bathing, beach walking etc.

Currently, visitors to the Park total over 50,000 annually.

Malindi and Watamu Marine National Parks and Reserves

The Malindi Marine National Park has been designated a Biosphere Reserve under the Man & Biosphere programme of UNESCO.

Among the physical features of the Parks are Barracuda Reef and North Reef, coral gardens, Turtle Island and Whale Island, many kilometres of sandy beach, cliffs and underwater caves.

The coral families that are represented in the Parks include Favidae, Poritidae and Acroporidae. The Parks also hold hundreds of species of fish from more than 12 families. The underwater flora comprises mainly Cymodocea algae, however, the Parks extend on to land where Casuarina and palm trees are common and include a significant mangrove forest in Mida Creek. The mangroves attract large numbers of migratory and resident birds. Also in the Parks, the Green Turtle is making a comeback.

Some 17 hotels provide access to the Parks through their beach frontages and visitors to the Parks are estimated at over 70,000 annually.

Siltation brought down by the Sabaki River during the rainy season has increased as a result of changing land use practices inland. This impedes visibility in the Parks and is a threat to the health of the coral ecosystem. A further threat is the domestic sewage emanating from the major population centres adjacent to the Parks and the felling of mangrove trees in Mida Creek for commercial purposes.



Figure 68 : Acropora coral

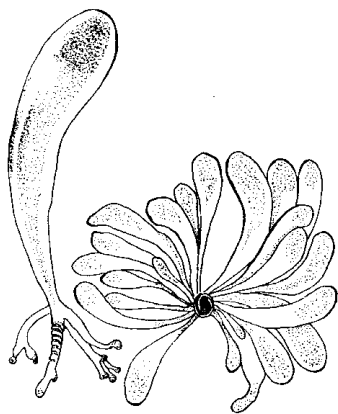
Kisite/Mpunguti Marine National Park and Reserve

Kisite Marine National Park and Mpunguti Marine National Reserve were gazetted in 1973 and 1978 respectively . Together they cover an area of 39km² situated south of Wasini Island in Kwale District, Coast Province. The Park Headquarters is situated at mainland Shimoni, a distance of 80km south of Mombasa and the Park/Reserve proper is about 8km from the Park Headquarters.

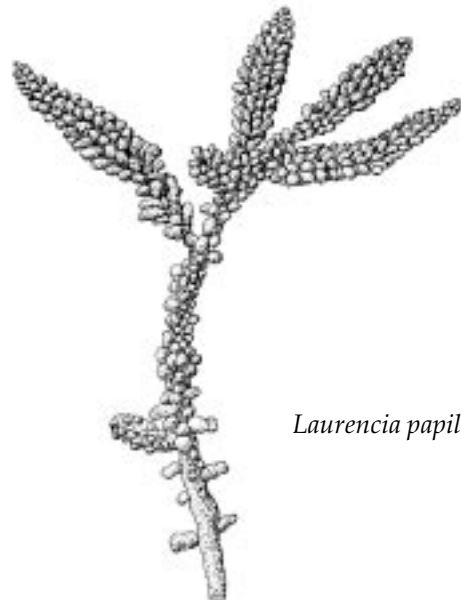
A list of the park resources starts with vegetation found in front of the Park Headquarters. These include a number of different ecosystems - *Bostrychia* on the shaded vertical cliff wall. Moving down the coast there are large quantities of a *Chaetomorpha* spp. in the overheated reef pools; then *Gracilaria salicornia*, *Acanthophora spicifera*, *Ulva* sp., some *Laurencia papillosa*, *Hypnea cornuta*, *Boergesenia forbes*, *Enteromorpha* , and *Champia* sp. etc. in the mid-littoral and the seagrasses *Halodule wrightii*, *Thalassia hemprichii*, *Syringodium isoetifolium* and *Enhalus acoroides* a bit further down. These give way first to isolated coral and then the very healthy coral growth, with some *Turbinaria decurrens* and locally very short mats of mixed small seaweeds and encrusting Corallinaceae.

The fauna on land includes the rare Colobus and Vervet monkeys, while terrestrial plants of note include *Azalia*, *Baobab (Adamsonia digitata)*, *Casuarina*, *Lantana*, *Cammelina*, various mangroves and various types of grasses on the five coral islands within the park.

The coral gardens in the Park are among the best in the world. Common families include - Pocillaporidae, Acropodae, Agaricidae, Fungidae, Poritidae, Faviidae, Oculinidae, Musidae, Pectinidae, and Milleporidae. The Park is famous for the abundance of coral fish and other marine flora and fauna including representative species of no less than nine families of coral fish and ten groups of aquatic birds.



Boergesenia forbesii



Laurencia papillosa

Figure 69 : Two of the seaweed species common in the marine park

Coastal Resources and Their Use

The number of visitors to the Park annually has increased in leaps and bounds from 597 in 1975 to over 32,000 in 1991.

Future plans for the Park include diversifying tourism activities by finding new visitor attraction sites and implementing new ways to increase the revenue base for the Park. This will be done without compromising conservation and management aspects of the Park and the environment as a whole.



Figure 70 : Kenya administrative boundaries