HISTORICAL DEVELOPMENT OF THE MAFIA ISLAND MARINE PARK:

The idea of establishing a marine park at Mafia Island began in the 1960s when recommendations were made for the protection of coastal areas and marine resources in Tanzania through the establishment of marine parks, reserves and sanctuaries.

These resulted in the declaration of eight small reserves along the Tanzanian coast under the Fisheries (Marine Reserves) Regulations of 1975, two of these are in what is now the Mafia Island marine Park (MIMP), namely Chole Bay and Kitutia Reef.

The small size of these areas and the lack of financial and human resources for enforcement meant that the marine reserves were essentially paper parks; Dynamite fishing and other destructive and unsustainable resource utilization continued unabated.

The inadequacy of management of these small areas led to the realization that the creation of a larger marine protected area would make it possible to combine conservation of reefs and other key coastal and marine areas with; management or resources to ensure sustainable long term local economic development.

From 188, baseline studies were conducted through the frontier-Tanzania project, a collaborative programme of the University of Dar es salaam (including the institute of Marine Sciences, Zanzibar) and a UK-based conservation research organization. The studies aimed to determine the use could be sustainable. The results provided important baseline information for developing recommendations for the marine park management plan.

In 1991, the Principal Secretaries of the Ministry of Tourism, Natural Resources and Environment appointed a steering Committee to oversee the development of the marine park. The Committee included representatives from the fisheries division, the Institute of Marine Science (IMS), the MP for Mafia, the World Wildlife Fund (WWF), the Regional Natural Resources office (Coast Region), and wildlife Conservation Society for Tanzania.

The Steering Committee together with a FAO legal team, working in collaboration with the Attorney General's Chambers, developed the legal framework for the Marine Parks and Reserves Act and Regulations. Also during 1992 the same year, WWF initiated a programme of support for the development of the marine park.

The Steering Committee next recognized the need for public forum at which the inhabitants of Mafia Island and other interested parties could air their views. The result was a major public workshop held in October 1991 on Mafia, to consult the communities and initiate the planning process.

Over 70 participants divided equally between residents of Mafia and mainland Tanzania and including representatives from national, regional and local government agencies and institutions attended the workshop. The outcome of the workshop was positive and the Ministry of Tourism Natural Resources and Environment published the proceedings.

A lengthy but ultimately successful process ensued, culminating in the preparation of
the Parks and Reserves Act No 29 of 1994. Under the provisions of this Act, the National Assembly passed a Resolution on 27th April 1995 declaring Mafia Island, Marine Park, to take effect from 01 July 1995.

The park initiated operations during that Month. The boundaries of the park were later gazetted under Government Notice No. 200 published on 6th September 1996.

RESOURCE DESCRIPTION: >>> See map here

The waters around Mafia Island host an outstanding mosaic of tropical marine habitats with coral reefs, sea grass beds, mangroves, and inter-tidal flats. In addition, a remnant block of threatened lowland coastal forest survives along the eastern seaboard of the island.

The area has been recognized internationally as a critical site for biodiversity. It has national importance as one of the few remaining reef complexes within Tanzania's coastal waters, relatively intact and the productive fisheries and other marine resources provide food and income for the local community.

LOCATION:

Mafia Island and its chain of small islets lie approximately 120 km south of Dar es Salaam and 20 km offshore from the eastern extent of the Rufiji is one of the largest delta systems in Africa. To the east of Mafia Island is the Indian Ocean. The main island of Mafia is about 48 km long and 17 km wide at its widest point. Several smaller islands and islets are scattered to the west and south.

Mafia Island Marine park covers an area of 822 km2 and is located between S 07 45'07" and E 39 54'01" and S 08 09' 40" and E 39 30'00. Annex 1 of this plan provides a detailed description of boundaries. The park covers the Southern part of Mafia Island and includes the inhabited islands of Chole, Juani Jibondo and Bwejuu and several uninhabited islets and the associated waters.

PHYSICAL ENVIRONMENT:

Bathymetry

More than half of the marine area of the park is less than 20 metres depth below mean; tide levels, including much of Chole Bay, the extensive area South of Chole Bay enclosed by Mafia island, Juani Island and Jibondo Island and several ref areas south of Bwejuu, extensive intertidal flats stretch along the southern part of mafia Island, around Juni and Chole Islands, and between Jibondo Island and Kitutia Reef..

A deeper channel of 20-30 meters carried tidal water through Kinasi pass and Chole Bay as far as Chole channel. The waters on the South-western side of the marine park, especially west of Kitutia are also deep reaching down to 40m.

Currents

The main oceanic current affecting Mafia Island is the permanent north flowing current known as the East African Coastal Current (EACC). This reaches a maximum
speed to some extent during the contrary north-east Monsoon during Dec-Jan.

The flow of the main current into and through the marine park area is interrupted by islets and reefs, and is also strongly influenced by diurnal tidal currents generated by a tidal range of up to 4m range. This results in a complex and multidirectional current system.

**Tides**

The tidal range in the marine park is consistently large throughout the year. The mean springtide range is 3.3 metres with a maximum of 4.0 metres. The mean neap-tide range is approximately

**Geology and Topography**

Mafia Island is of recent origin and was formed during the Pleistocene period when basal limestone rock was laid down while the islands were raised above the seal level through rifting of the continental shelf. The entire island consists of coral rag overlain by sandy loam soil; with a maximum altitude of 20 m. soils are mainly alkaline with mean pH of 7.5.

**CLIMATE:**

Mafia receives an average annual rainfall of 2,000mm (80 inches). The island experiences two main rainy seasons: the short rains in November / December and long rains from March to May. Over 80 per cent of the rain occurs during the second phase.

The temperature on the island is firmly stable rarely dropping below 20°C or rising above 33°C. June to September is the coolest period.

In common with coastal Tanzania, two monsoons influence the climate. (Kaskazi) that blows from November to March and the more vigorous southeast monsoon (Kusi) from April to August. An intermediate easterly monsoon (matlai) occurs in September and October.

There are few large industries on the island that has three tourist lodges and one on Chole Island with a combined tourist bed-capacity of 140.

In 1971 the government opened the 80-bed Mafia Island Lodge. This lodge, after a period in the doldrums, is earmarked for privatisation. Since 1995, three private lodges have opened at Utende and Chole Island. These are Kinasi Lodge, Pole Pole (Kiswahili for 'slowly slowly') Bungalow Resort and Chole Mjini.

But although Mafia coral reefs offer some of the best snorkeling and scuba diving opportunities in East Africa, visitor numbers are very low despite the high place tourism in Tanzania's overall economy.

The largest land-based agricultural activity is the five coconut estates at Ng'ombeni, Dundani, Chunguruma, Ras Mbizi and Minaki. These cover a total area of 2,186 hectares with some 200,000 palms. In their hey day they were processing 6 million nuts a year into coconut oil and they had a herd of 650 Jersey dairy cattle.
But the estates fell on hard times largely because of the decline in world coconut oil prices and the stagnant economic climate of the 1970s and 1980s. Nevertheless they are still in operation and run by the Stanley family who planted many of the trees on the island 50 years ago.

The Stanley now in their third generation with a strong allegiance to Mafia Island, are not related to the Journalist / explorer Henry Morton Stanley, who met Dr. David Livingstone at Ujiji in northwestern Tanzania.

The Ng'ombeni headquarters is located 3 km from the airport. This estate contains the offices, workshop, housing and a factory that includes machinery for oil pressing and filtering, fibre processing and bailing, and a peg mill for making shell flour.

Coconut palms have been exported from Mafia Island since the 19th Century. Ownership of coconut trees is still seen as a sign of wealth and they represent a source of income and nutrition in comparison to the more hazardous pursuit of fishing.

**TRANSPORT:**

*THE MV Obus*, a 110 tonne schooner, sails for Dar es Salaam every six weeks with fuel oil for the islands’ electricity generators. Built in the 1930s as a munitions ship, she beaches at Kilindoni wharf at high tide and the fuel is pumped ashore.

Being the only vessel to regularly service the island, she comes laden with cars, trucks, tractors and other heavy goods that are manhandled ashore with an array of winches and derricks amidst much shouting and gesticulations. The Obus leaves Mafia loaded to the gunnels with island produce.

Beyond that, the transport of goods to the mainland is by sail or engine- powered dhow. The dhows sail northwest to the village of Kisiju on the mainland from where the goods are transported to Dar es Salaam.

Domestic consumption of fish on Mafia is relatively small. Traditionally, fish were sun-dried on the islands and shipped to the mainland coastal markets of southern and central Tanzania.

In the second half of the 1980s and early 1990s this began to change with the availability of outboard motors and ice. This brought an expansion in the flotillas of boats of private fish traders from the mainland.

The fish traders arrive in Mafia for the spring tide staying from 3 to 10 days depending on how good are the catches. When the 2-tonne iceboxes are filled the transport the catch to Dar es Salaam.

The catch is not gutted, and the ice serves only to chill, rather than freeze. Fish caught and brought at the start of the spring tide in Mafia can take up to 12 days to reach markets in Dar es Salaam.

In some cases the fish traders also supply local fishers with fishing nets on the condition that the entire catch is sold to the trader at a price substantially below market rate. Fishers involved in such arrangements are obliged to sell catches at sea direct to the traders and in certain villages, relatively few fish are landed in the
village for consumption by local households.

Chunks of both live sea coral and land based-fossilised coral rock are a traditional construction material for domestic houses, especially in the island villages that luck mud.

In the early 1990s, it was estimated that 90 tonnes of fossilised offshore limestone was being mined annually in what is now the marine park.

Mangroves prior to 1995, in areas now encompassed by the marine park, were heavily exploited for the production of lime from mined coral. Mangroves provide the high-calorie fuel wood needed to convert the mined coral to lime.

Despite the fall in coral mining, mangroves are important for both boat building and for building poles although the latter are largely imported to the island from Rufiji delta.

Mlola forest inside the park is important for building materials, especially to the villagers at Beleni, Jimbo, Kirongwe and Kungwi.

Mangrove branches are used as firewood and leaves, fruit and bark are used for medicine and colour dyes. Some sites within Mlola forest are considered highly sacred by local people and are used for traditional ceremonies.

The proposal to establish marine parks in Tanzania was first made in the late 1960s after Tanzania's independence from Britain. Protection of coastal areas and marine reserves was recommended along the 800km Tanzanian coastline through the creation of marine parks, reserves and sanctuaries.

This led to the creation of eight small reserves under the Fisheries (Marine Reserves) Regulations of 1975. Two of these reserves (Chole Bay and Kitutia Reef) have been incorporated into the Mafia Island Marine Park.

The small size of the original eight reserves, coupled with their limited financial and human resources, meant that they were essentially "Paper parks". Dynamite and unsustainable resource exploitation continued.

This in turn led to the recognition that there is a high level of economic dependence on marine resources in Tanzania and that the traditional approach (in terrestrial areas) to conservation of establishing exclusion zones is unlikely to be effective in the marine context.

An alternative approach is to establish larger marine areas where protection of fisheries, reefs and marine resources can be conducted in conjunction with sustainable resource-management, and through zoning and participatory management attempt to minimize conflicts between livelihoods and conservation goals.

In 1991, a committee was appointed to oversee the development of Mafia Island Marine Park. This committee comprised the Fisheries Department, Institute of Marine Sciences, the Mafia Member of Parliament, the World Wildwire Fund for Nature, Regional Natural Resources office and the Wildlife Conservation Society of Tanzania.
Late that year, the Rome based Food and Agricultural Organisation and the Tanzania Attorney-General's office began drawing up the enabling legislation. In 1992 the Worldwide Fund for Nature (WWF) instituted a programme of support for the development of marine park.

In October 1991, a public workshop drew over 70 participants to consult the communities involved and initiate the planning process. The proceedings of this workshop were published.

This long and typically bureaucratic but very democratic, process was finally concluded on November 1994 when the Tanzanian parliament passed the Marine Parks and Reserves Act No 29.

Approximately 18,000 people live within the 14 villages that lie wholly or partially within the boundary. Four of these on Chole, Jibondo, Juani islands and Kungwi near Mlola forest are entirely within the park. Another uninhabited island, Bwejuu, is wholly within the park boundary and is a sub-village of Killindoni.

**FLORA AND FAUNA:**

The sea around Mafia Island hosts an outstanding mosaic of tropical marine habitat including coral reefs, sea grass beds, mangroves and inter-tidal flats. In addition, a remnant block of threatened lowland coastal forest on the eastern side of the island is incorporated into the park.

Most of the marine area of the park is less than 20 metres below mean tide levels. This area includes much of Chole Bay, the extensive area south of the bay enclosed by Mafia Island, Jibondo and Juani islands and several reef areas south of Bwejuu.

Extensive inter-tidal flats stretch along the southern part of Mafia Island, around Chole and Juani islands and between Jibondo Island and Kitutia Reef.

A channel of 20 to 30 metres in depth carries tidal water through Kinasi Pass and Chole Bay as far as the Chole channel. The waters on the southwester side of the marine park, especially those west of Kitutia reach a depth of 40 metres.

The main ocean current affecting Mafia Island is the permanent north-flowing East African Coastal Current. This reaches a maximum speed of 4,5 knots during the peak of the southeast monsoon (kusi) in June- July. This is somewhat countered by the northeast monsoon (kaskazi) during December- January.

The flow of the main current into and through the marine park area is interrupted by the islets and reefs, and is also strongly influenced by diurnal tidal currents generated by a tidal range of up to 4 metres. This results in a complex and multi-directional current system.

The tidal range in the marine park is consistently large during the year. The mean spring-tide range is 3.3 metres with a maximum of 4 metres. This neap-tide range is approximately 1.5 metres.

The sheltered western side of Mafia Island is heavily influenced by sedimentary material discharged from the mainland.
What direct influence the Rufiji Delta, facing Mafia, has on this is unclear. The visible sediment plume emanating from the delta appears mostly to be carried northwards by the prevailing East African current before it reaches Mafia's west coast even after heavy rains.

Sub-tidal habitats are largely sandy or soft-bottom, including extensive sea grass beds. There are a number of hard reefs to the southwest of Mafia, further from the reach of the delta that are sheltered by Bwejuu Island.

The eastern side of Mafia is exposed to the full force of the Indian Ocean and a 33 km outer fringing reef stretches along of the full length of the eastern seaboard and encompasses Mafia, Jibondo and Juani Islands with Kitutia Reef lying at the southernmost point.

The main fringing reef is gently sloping and dominated by hard corals though in some sections these coral suffered high mortality as a result of abnormally high sea temperatures following the 1997 El Nino.

The outer part of Kinasi Pass is characterised by shallow platforms dominated by soft coral and algae giving way to dramatic vertical reef wall which bottom out into sandy platforms between 20 and 50 metres in depth. Mafia Island lines the edge of the continental shelf and the underwater area shelves steeply into the open ocean.

Chole Bay, a large enclosed body of water, floods and drains twice every day through Kinasi Pass. The main inner section of Kinasi Pass, together with the sheltered area south of the pass, has a highly diverse topographic structure and hydrology, and the highest diversity of hard coral and other reef species is found in this area.

Other sheltered sub-tidal areas going west from Chole and Juani Islands across to Mange Reef and Bwejuu Island, are less species rich, characterised by shallow algae and coraline reef platforms and sandy areas studded with coral bommies. There are also significant patches of sea grass in these areas especially to the western side.

The predominantly north flowing current may place particular emphasis on the importance of reefs at the southern end of the marine park, especially Kitutia Reef, in terms of the dispersal of seed and larvae of corals, fish and other marine organisms.

Habitat distribution, level of disturbance and species diversity vary greatly between the eastern and western sectors. Habitats in the western sector towards the Rufiji delta show greater levels of disturbance, are in comparatively poorer condition and contain less species diversity.

In contrast, Chole Bay and outer parts of Kinasi Pass have greater habitat diversity, greater species diversity within these habitats and are less disturbed. The deeper reef walls in Chole Bay and on the outer reef are still relatively pristine.

The presence of mangroves, sea grass beds, algae, sponge and soft coral beds, the fringing coral reef and adjacent algae-dominated reef outside Kinasi Pass, means that Chole Bay possesses representative examples of the majority of tropical marine ecosystems.

Mangrove are known to play an important role in the life cycle of some fish and
shellfish, as well as protecting coastlines from wave action and storms. Most of the mangroves in Mafia are relatively narrow stands fringing the shores and creeks.

Within the marine park mangroves are concentrated along sections of the northern shore of Chole Bay at Mchangani, Kapingwi, Kipandeni and Marimbani around Juani Island except where it faces the ocean and at Mto wa Arusha to the north of Ras Kisimani.

Outside the marine park there are relatively large mangrove stands at sites up the west coast, especially at Chunguruma and around Jojo and Banja villages. There are none along the eastern coast because of the exposure to the ocean.

The extensive inter-tidal flats dominating the south of the park were formerly abundant in mollusk and other invertebrate fauna that have been heavily exploited. Today they are an important and productive habitat for octopus.

**MAFIA DIVERS PARADISE:**

For the expert or novice diver, as well as for the beginner and snorkel, Mafia Island Marine Park offers dramatic underwater viewing with a wide variety of choices- and all this only 30 minutes away from the hotels.

The visibility is roughly 5 to 10 metres from June to September and 20 to 25 metres from October to February. Visibility in Chole Bay can be poor at low tide but you can dive or snorkel in the bay in any weather. Mafia Island justifiably claims to be one of the best diving locations on the African coast.

The favourite dive at Mafia is Kinasi Pass where the ocean comes into the bay. A slope drops into a wall from 16 to 26 metres in height and a massive ‘pinnacle’ greets divers. There is reasonable coral in shallower water 5 to 15 metres below the surface.

In many Indian Ocean coastal regions, living shallow water corals, terrestrial fossil coral rock and even mollusk shells are used as sources of calcium carbonate and baked in kilns for lime production. Mafia is no exception and the non-branching shallow water genera such as porities are frequently the victims.

**FISH:**

The coral lumps are taken from the seabed at low tide and heaped on timber (usually mangrove or coconut wood) that are then set on fire converting the calcium carbonate to calcium oxide. The calcium oxide is lime that, mixed with water, produces whitewash or, mixed with sand or earth, produces a simple mortar. Sometimes coral lumps are used as building blocks.

The removal of the coral affects inshore current patterns and wave action exacerbating coastal erosion. This all has a detrimental impact on the productivity of shallow lagoons and bays and this is part of the reason why Mafia Island marine Park has been established.

Nevertheless, fire, starghorn and foliose (48 genera of hard corals) are plentiful and there is a good range of coral throughout the main reefs in the bay while branching corals are also common.
This existing coral cover provides the perfect ecosystem for small reef fish like angel with their pouted lips, distinctive black-and-white striped Moorish idols, damsel fish, parrot fish with beak-like mouths, fusiliers and the colourful wrasse family that is both large in numbers and variable colour.

There are nine species of fusiliers in the region and they are colourful, fast swimmers that are seen in shoals. They feed on plankton and are distinguished by their small mouths with protruding jaws and forked tail fins.

One of the most common is the goldstriped fusilier that is known in Kiswahili as mbono or kiunda and scientifically as Caesio caerulaureus. This 24 cm fish has a blue-edged stripe running along the centre of its body separating a darker blue on its back and upper side from a lighter blue on the belly. It is to be found around coral reefs and deep lagoons and it shelters in cervices at night.

The wrasse is usually an elongated fish with continuous dorsal fin. They have well-developed lips, protruding canine teeth and most species are brightly coloured. Like land animals and birds their colouring can vary greatly between juveniles/adults and male/females.

The cigar wrasse, known in Kiswahili as mboo ya mvua or mgeema is scientifically called Chelio inermis. It is shaped like a long cigar and is about 50 cm in length with variable colours ranging from yellowish to greenish or brown. This fish may have a mid-lateral dark stripe and the males may have a dark spot near the pectoral fin. They feed on sea grasses or dense algae beds.

The somewhat longer queen coris (scientifically known as Coris formosa) and the Goldbar wrasse (Thalassoma hebraicum) are the most colourful members of the whole family.

The juvenile queen coris is bright reddish-orange with three balck-edged white patches on the back and flanks and two smaller white patches on the head. Adults have elongated front rays on the first dorsal fin and a blue stripe from the front of the dorsal fin to the mouth.

The females are brown with large dark spots and red bands across white-edged tail fin while the males are lavender-blue with light orange bars on their flanks. They are to be found among coral and sea grass beds.

Juveniles of the goldbar wrasse have black longitudinal rows of yellow spots and yellow bar from the front of the dorsal fin to the belly. Adult males have yellow heads with diagonal stripes, a greenish-blue body with thin yellow stripes.

Groupers, known in Kiswahili as chewa, are robust-looking fish. Off Mafia they can be two metres in length. They have large mouths and are generally inquisitive. But in areas of intense fishing, particularly where spear fishing is practiced, they are wary. They are much sought after as food for humans and reef stock are easily over-fished.

Small scholars of barracuda are often sighted, especially in Kinasi Pass. They are distinguished by their elongated bodies and pointed heads, large jaws and big teeth and two widely separated dorsal fins. Seven species of barracuda exist in the Indian Ocean.
In Kiswahili different species of barracuda are variously known as tengezi and mzira. The pickhandle barracuda is about 125 cm in length, silvery in colour with 20 darker vertical bars running halfway down its body. It has large eyes, a lower jaw projecting beyond the upper and it feeds off medium-sized fish and squid.

Rainbow runners, black jack and lockdown jack compete for the best positions and black-spotted ribbon-tail stingray surround the divers in circular dance. Spotted eagle rays often add their spectacular acrobatic show.

Black-spotted ribbon-tail stingrays grow to 250 cm in length, including their tails, and 100 cm in width. They are called nyenga in Kiswahili and are large, heavy-set rays with a rounded body and short tail that is mottled blue and grey above and white below. They are often found in caves and their preferred habitat is close to reefs, down to deepwater.

The blue-spotted ribbon-tail stingray that also exists in the western Indian Ocean, is slightly smaller and is found in shallow, sheltered waters around reefs and under coral patches. It has a broad oval body, is olive-brown in colour with many bright blue spots and its blue-striped tail has a single sting.

There are at least two species of eagle rays in the Indian Ocean and they are known in Kiswahili as pungu pua or pungu piji. They are 350 cm wide, have numerous white spots and long tails with one or more serrated barbs at the base. They feed on mollusks and crustaceans and are found inshore near coral reefs.

Powerful manta rays known in Kiswahili as taa chui also can be seen near the surface, occasionally jumping clear of the water. They are 670 cm wide and weigh up to two tonnes, have broad heads with paddle-like head flaps, five pairs of gill openings for filtering plankton and thin whip-like tails.

Inside the bay as a result of conservation, most of the corals are increasing in number and size and the fish inside the bay are greater in numbers but smaller in size than those found in deeper water.

Dindini Wall (also known as Mchangani Wall), together with Jina Wall, is one of the best dive site outside the bay. Long vertical walls start at 5 metres and drop to 25 metres. While coral variety is not as good as in the bay, the vista is nevertheless dramatic with a few caverns and a good range of big fish.

The outer reef on the ocean side of Juani Island (to the left/ south of Kinasi Pass) is also a beautiful reef rich in soft corals in myriad shades of mauve, indigo and purple. There is also a high chance of sighting green turtles on this reef.

Torpedo-shaped and robust yellow-fin tuna known in Kiswahili as jodari swim swiftly in shoals while kingfish or narrow-barred Spanish mackerel (nguru in Kiswahili). Indian mackerel or bigmouth (kibua), queen or spotted mackerel (kanadi), stroped bonito (salehe), skipjack or oceanic bonito(zanuba), kawa kawa (sehewa) and wahoo (nguru ngazija) may also be seen.

Cobia (songoro) with its elongated body, flattened head and large mouth, is often found in open coastal water, often in association with other larger fish and sharks. Often there are reef sharks that have narrow and slender bodies and are known i
Kiswahili as papa. These sharks have been known to attack people although of the more than 50 species of shark that exist in the Indian Ocean the majority are completely harmless.

Sharks, barracuda, groupers, needlefish, moray eels and triggerfish are capable of inflicting bites on the overly intrusive diver. Shark attacks are the most feared but are very rare. Sensible behaviour around sharks and other large fish and consultation with local people will minimise the danger of them attacking you.

There are over 2,000 different fish from more than 150 families in the western Indian Ocean that encompasses the African coastline and new species are being added.

**TURTLES:**

Mafia and the surrounding islands, are important nesting sites for Green and Hawksbill turtles while Leatherback, Olive Ridley and Loggerhead also occur in Mafia, although they do not nest.

The green turtle is the biggest of the species weighing from 120 to 208 kg and being up to 140 cm in length. In colour they vary from dark brown or black to greenish-brown. Adults are mainly herbivorous feeding on sea grasses and occur in relatively shallow water.

In contrast, juvenile Hawksbill feed on floating vegetation while the adults mainly feed on bottom-dwelling invertebrates such as corals, sea urchins and sponges.

The Hawksbill is identifiable by its thick overlapping plates, its narrow, pointed head and long, almost bird-like beak.

An ongoing protection programme has recorded over 150 nests in 2002 and this is certainly an under-estimate. Each female nests 2-3 times in one year and then not for 3-4 year which confuses the picture on how many turtles there actually are.

It is estimated 70-100 female green turtles visit per year (so maybe 3-400 in total over a 4 year cycle). Hawksbill are much fewer, perhaps 10-20 females per year.

A major protection initiative over the past 2 years has drastically reduced the number of nests that were being poached (for eggs) and females slaughtered by fishermen. The rate of poaching was at least 50 % before and has gone down to 5%.

Through snorkeling or diving, these fish can be observed in their natural environment. Their colours, behaviour and relationships with other marine organisms are an endless source of fascination. That is rather like viewing land mammals (that arrived on this planet later than fish).

There is a word of warning for divers and snorkels, particularly the first timers. The western Indian Ocean, in common with other oceans, contains marine animals that can inflict harm on the unwary. Furthermore, the tropical coastal environment carries its own dangers. Most coastal people are fully aware of these dangers and although very few visitors are infected but it is as well to be aware of them and to treat them accordingly.

Sunburn is one of the most common infections, particularly as the hottest season in
Tanzania coincides with the best diving season. Sensible covering such as a T-shirt, even when swimming, a hat when onshore and sun creams will minimise this threat.

Small wounds in the high humidity and temperatures can swiftly become septic unless treated early. Beyond that, care and sensible foot protection when walking on the beach or in the sea, is advised.

Malaria is a common tropical disease. Mosquitoes are active from sunset to sunrise so sleeping under mosquito net, repellants, long trousers and socks at night are vital. Before leaving home consult your local doctor about the prophylaxis you should take.

A simple rule for all divers and snorkels is do not handle anything at with your hands and not stand up- stay horizontal/ floating. Beyond that you should always wear shoes if you are wading through intertidal or shallow waters.

**OTHER WILDLIFE:**

Some years ago I put my right hand down beside a chair I was sitting on and quite accidentally grasped a fruit but that had taken sanctuary in the dark confines of the cushion. I don’t know who was more startled for I had been brought up on the misplaced western belief that all bats are malignant.

The bat fled and, like a trapped bird, flapped noisily around the room until it found a window to escape. My reaction to this chance encounter was how amazingly soft it felt. Since then I have been fascinated by these animals, although I must confess that ingrained fear still inhibits me during inadvertent encounters.

Those who deliberately handle bats grow to appreciate their cleanliness and the intricateness of the ears that allows many species to locate and capture their prey in total darkness. The bats' clicks or bleeps bounce off the intended victim like radar allowing them to home in on the victim.

The bat is both the transmitter of impulses and the receiver. The outer ears are the amplifiers, the inner ears the receiver and booster. The brain acts like a computer transmitting the information to the body.

The call of bats is frequently above the range of human hearing. Most people hear at about 20 vibrations a second; bats can emit sounds at 230,000 vibrations a second shortening their calls when nearing their prey while making adjustments for the intended victim's evasive tactics.

Bats obtain different information through different calls. A steady call allows them to estimate the victim's speed and direction. They may use frequency modulation or change of pitch with the brain interpreting the heading and range; they may use harmonic calls or raise the pitch of the call thereby sacrificing their range of 10 metres on the intended prey.

I had heard from a friend in northern Tanzania about the Pemba Island Flying Fox. For some time I was mystified: a fox that could fly? It was only after my visit to Chole Island just off Mafia that I realised that the Pemba Island Flying Fox was in fact a bat related to Mafia's Comores Lesser Flying Fox!
Both species like moist tropical islands in the Indian and Pacific Oceans. They are vegetarians, eating fruits and flowers (not humans as I had been told) and are endangered because of habitat loss. They weigh 400 to 650 grams and are identifiable by their large dark wings, yellowish and red heads and fox-like pointed faces.

During the day, some of the Chole bats fall to the ground from their perches. They make short daytime flights around four or five tall trees where they roost, hanging upside down with wings folded. Those in trees emit quarrelsome screams and harsh sounds as the arrivals flop somewhat clumsily onto branches.

The bats roost in large trees, usually in vast colonies restricted to oceanic islands. Chole Island is the best place to witness as many as 1,200 Comores Lesser Flying Foxes leaving their roost at dusk to fly across Chole Bay for their nightly feed on Mafia Island.

Through sight and smell they locate ripe fruit. Then, rather like monkeys, they consume only the juice of the fruit and the seeds before discarding the remainder. Such consumption of bananas, mangoes and oranges made them unpopular locally. But their role in pollination, distributing seeds and as a tourist lure has now been recognised.

Today the only danger to the Comores Lesser Flying Fox comes from the fish angle, snakes, disease and the weather, although on Pemba the flying foxes are also consumed by local people.

Up to 40 hippopotamus live in the freshwater ponds at Chunguruma, Kirongwe and Baleni. They are thought to have been swept across from the Rufiji delta during a storm and are today causing conflict with local communities.

Duiker, monkeys, bush-pigs, mongooses and elephant shrews also exist as does an endemic toad.

Mafia has the largest, shiny-black millipedes (colloquially known as "Tanganyika Trains") that I can recall seeing. They are harmless scavengers that gather around buildings at night, and are like large caterpillars. They curl up into tight rings when disturbed.

Mafia rains, as do those elsewhere in Africa, brings a number of butterflies. Among these is the citrus swallowtail that is tail-less. It is blackish in colour, heavily spotted and dusted with yellow with orange and blue eyespots on the rear wing.

More than the 116 species of birds have been seen and identified at Mafia Island. Among these not shown as having been sighted at Mafia is the African pygmy goose that I saw.

**PARK REGULATIONS:**

The list of permitted and prohibited activities in Mafia Island Marine Park covers the extraction of living and no-living resources, construction, tourist activity, net sport and octopus fishing, coral mining, mangrove and other forest harvesting, brick and salt making, construction and research. Fuller details are contained in the parks general management plan.
* Sports fishing is prohibited in core and specified-use zones
* Sport fishing licenses are necessary
* Sports fishers are required to release all fish not exceeding specified weights to ensure reproduction of the species
* Octopus fishing in core zones is prohibited
* The warden of the park may require sport fishers to accommodate a marine park observer on their boats and cover the costs of this person
* Spear-guns and harpoons are prohibited
* Jet-skiing is prohibited
* Sea-planes are prohibited
* Trawling is prohibited
* The use of specified nets is prohibited
* The killing of dugong or turtles, whether accidental or deliberate, and removal of turtle egg is prohibited
* The dumping of solid waste, untreated wastewater, sewage or chemically polluted water or liquid is prohibited
* The use of SCUBA to collect marine organisms except for research is prohibited
* Scientific research is regulated by a permit issued by the warden