

Eastern Africa Region

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1 About

1.1 Overview

The Eastern African region is fringed with coral reefs and mangroves. The Indian Ocean hosts an abundant amount of fish with at least 3,000 varieties of shore fish. The mangrove swamps provide oysters, crabs and mullet for the commercial market. However recent studies undertaken by UNEP in 1981 found that damage to coral reefs was widespread. The region is a major oil tanker route and suffers from oil pollution throughout the coastal zone. In addition land-based sources of pollution from fertilizers, industry, untreated sewage and litter and deforestation are also common resulting in problems such as eutrophication and excess sedimentation.

A meeting of experts selected by their Governments (Seychelles, September 1982) prepared the first draft of an action plan, identified problems to be tackled as priorities, and invited UNEP to help in solving them without waiting for the formal adoption of the action plan. The workshop participants named 10 first priority regional projects which UNEP and United Nations agencies were asked to initiate during 1983. They included work on developing a network of environmental pollution laboratories, on providing training facilities for environmental control technicians, and on developing a network of oil pollution monitoring centres. Two other priority projects were concerned with assessment of the environmental impact of economic and social developments and a regional environmental education programme.

In 1985 the Conference of Plenipotentiaries on the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region was held in Nairobi, to adopt the Action Plan, Convention and the associated protocols. This paved the way for the establishment of the Eastern African Regional Co-ordinating Unit (EAF/RCU) in Seychelles, formally adopted in 1997, the latest link in a consolidated approach to the protection of the marine environment of the region. The mission of the EAF/RCU is "to provide leadership and encourage partnerships by inspiring, informing and enabling nations and people of the Eastern African Region and their partners to protect, manage and develop their Marine and Coastal Resources in a sustainable manner."

Today all ten East African countries have ratified the Convention: Comoros, France (La Reunion), Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia and Tanzania and South Africa. Following a regional workshop in Zanzibar (6-9 October 1997) the GPA has produced a regional overview and action plan on land-based pollution. Among its activities: to assess pollution loads affecting the marine environment, and their harmful effects; to set up monitoring programmes and development strategies; prepare and implement a regional action plan; and strengthen capacity of coastal States to intervene in case of accidents and emergencies.

1.2 Key Dates

1980	East Africa becomes part of the Regional Seas Program in April.
1981	As the first step toward an Action Plan for Eastern Africa, a fact-finding mission visits the region to sound out governments on an action plan.
1982	A meeting of experts selected by their Governments (Seychelles, September) prepares the first draft of an action plan.
1985	Conference of Plenipotentiaries on the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region held in Nairobi in June; eight States adopt the Action Plan for Eastern Africa and sign the Nairobi Convention on the Protection and Management of the Coastal and Marine Environment of the Eastern African Region and its two protocols, the Protocol concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region, and the Protocol concerning Co-operation in Combating Marine Pollution in Cases of Emergency in the Eastern African Region.
1989	A meeting of Eastern African experts is convened in Nairobi (1-3 November), followed by an Intergovernmental Meeting on the Action Plan (8-9 November), to review the progress of the action plan since it was adopted, and approve the programme documents including a detailed workplan and budget for the 1990-1991 biennium.
1990	An IOC/FAO/WHO/IAEA/UNEP Workshop on Regional Aspects of Marine Pollution is held in Mauritius, 29 October - 9 November.
1996	The Nairobi Convention enters into force on 30 May. In October informal consultations are held in Seychelles on the process of establishing the Eastern African Regional Coordinating Unit (EAF/RCU).
1997	The first meeting of the Conference of the Parties to the Nairobi Convention is held at Mahé, Seychelles on 17-18 March. On 12 August the EAF/RCU is inaugurated on St. Anne Island, Seychelles.
1998	In July the Maputo Pan-African Conference on Sustainable Integrated Management (PACSIKOM) begins considering options for revitalising and strengthening the Nairobi and Abidjan (West and Central African) Conventions. At this meeting the Regional Environment Programme of the Indian Ocean Commission (CO/PRE), the Secretariat of Eastern Africa Coastal Area Management (SEACAM, Maputo), and the Secretariat of the Nairobi Convention and Action Plan (UNEP EAF/RCU) sign a draft agreement on co-operation. A follow-up ACOPS Conference on Co-operation for Development and Protection of the Marine and Coastal Environment in Sub-Saharan Africa is held in Cape Town, South Africa (30 November-4 December). The resulting Cape Town Declaration requests UNEP, as the secretariat to the Nairobi and Abidjan Conventions, to lead the development of a plan for the revitalization and co-ordination of the two Conventions through the establishment of a joint implementation mechanism. A meeting of legal and technical experts to review the Nairobi Convention and the Protocol Concerning Protected Areas and Wild Flora and Fauna in the Eastern African Region in Quatre Bornes, Mauritius, 15-18 December.
1999	The second Conference of the Parties on 2-4 November adopts the biennial workprogramme.
2000	In May a twinning agreement is signed with the Baltic Marine Environment Protection Commission to promote the exchange of experience.

1.3 Geographic and General Information

Region: East Africa

Participating States: Somalia, Kenya, Tanzania, Mozambique, South Africa, Comoros, Madagascar, Mauritius, France (La Reunion), Seychelles

Total Population: About 148 million (2002)

Total Sea Area: Each State has an EEZ of 200 NM

Total Length of Coastline: About 16,470 km

GIWA Region: Subregion 44 Benguela Current; Subregion 45 Agulhas Current; Subregion 46: Somali Coastal Current

Large Marine Ecosystem: LME #31: Somali Coastal Current; LME #30: Agulhas Current

1.3.1 Oceanographic Information

Oceanic current patterns and monsoon seasons have a major influence on the biogeography and biodiversity of the region. The permanently west flowing South Equatorial Current, is partly diverted south along the eastern Madagascar coast where it turns into the Madagascar Current. The main South Equatorial Current, on approaching the mainland, splits to form the northward flowing East African Coastal Current (EACC), and the southward flowing Mozambique Current. The latter joins the Madagascar Current to form the Agulhas Current (Gaudian *et al*, 2003).

From April to October the EACC is under the strong influence of the Southeast monsoon, causing it to flow faster (mean velocities 4-5 knots) along the Somali coast. The increasing offshore component of the winds north of the equator causes a cold water upwelling resulting in an area of potentially high fishery productivity (Gaudian *et al*, 2003). The North east monsoon (November to March) generates the southward flowing coastal Somali current which joins the EACC at about 2-N and generates the east flowing Equatorial Counter Current (Gaudian *et al*, 2003).

The Mozambique and Madagascar currents generate internal currents and eddies within the Mozambique Channel. The southward flowing Agulhas Current is dominant along the eastern coast of South Africa. The tides in the region are predominantly diurnal with a range of up to four m in some areas. Tidal currents can be extremely strong, particularly along breaks in the reef or narrow passages. The surface water temperature affects the distribution of both benthic species and fish (Gaudian *et al*, 2003).

1.3.2 Coastal Geography and Geology

The continental shelf is narrow, averaging 15-25 km in width. Along the mainland, it varies from as narrow as a few 100 m off Pemba on the coast of Mozambique to nearly 145 km in the Bight of Sofala, also in Mozambique. The shelves and banks are areas of intensive biological activity and productivity and the narrower the shelf, the less productive the sea area. The sea bed drops rather sharply after the continental shelf,

plunging to depths of about 4,000 m which extend eastward across the Indian Ocean except where interrupted by submerged platforms and islets associated with the island countries (Gaudian *et al*, 2003).

Fringing inter tidal platforms dominate the coastal morphology in the region. Terraces and platforms are incised by major creeks draining the hinterland (e.g. Dar es Salam and Mombassa) (UNEP 1998). Mangrove forests are developed in sheltered embayments as deltaic areas (e.g. Rufiji River, Tanzania). Sand dunes are associated with river mouths where there is a high discharge of terrigenous sediment (Sabaki River, Kenya). Water resources are dominated by groundwater in coastal areas of highly permeable Pleistocene limestone (UNEP 1998). Much of the eastern coast of Madagascar is relatively unindented due to the absence of large rivers and the parallel coastal currents. Further south however, notably in Mozambique, low energy coasts are found which are protected from the Indian Ocean waves, resulting in the deposition of large volumes of riverine sediments. The west coast of Madagascar consists of sandy beaches and fluvial deposits; the east coast has steeply shelving shores and a wave-battered narrow strand on rocks (Alusa and Ogallo 1992; Cooke 1994 cited in Gaudian *et al*, 2003).

The Seychelles Ridge is principally granitic and is believed to be a fragment of a previously existing continental mass. It supports the Seychelles, a group of about 100 islands spread over a large area. The islands to the northeast are granitic, but to the south and west there are a number of coralline islands and limestone banks. The Comoros comprise four isolated, volcanic seamounts at the northern end of the Mozambique Channel, with a number of smaller islands. The Mascarene Plateau is a major discontinuous mid-Ocean ridge which breaks at the surface in a series of islands and banks stretching from Reunion to the Seychelles; it includes Mauritius, Reunion and Rodriguez and numerous shoals, sea mounts and large submerged shallow banks (Gaudian *et al*, 2003).

The 3,000-kilometer coastline of South Africa shows a wide variety of habitats, affected by the different ocean currents running parallel to the coast in the east (warm water) and west (cold water). The southern region is a transition zone between these water masses, having fauna and flora representative of both systems as well as its own endemic species (Wells and Bleakley 2003).

1.3.3 Ecosystem Diversity

The coastal ecosystems of the region are both rich in natural resources and highly productive. Important habitats include mangrove forests, coral reefs and seagrass meadows (UNEP 1998).

1.3.3.1 Coral

Well developed fringing reefs and patch reef complexes occur along major sections of the narrow continental shelf of the East African mainland and around the oceanic islands between 5-N and 25-S. They are most extensive where the shelf broadens out around islands, and are broken by major river outflows (Gaudian *et al*, 2003).

Seasonal cold upwelling inhibits coral growth along much of the northern coast of Somalia. Reef growth increases toward the Kenyan border to the south. These northern Kenyan reefs are predominantly rocky/algal reefs and have low coral cover, perhaps

related to the comparatively nutrient-rich waters in this region, and different ecology of the area generated by the alternating current system: in the northeast monsoon, these reefs receive larvae from the Somali coast and Arabian Sea; in the southeast monsoon, recruitment is from the coastal areas to the south (Samoilys 1988 cited in Gaudian *et al*, 2003).

South of northern Kenya to the border of Mozambique, there is high coral diversity and good coral reef growth in many areas. Coral reefs along the coastline of Tanzania and Kenya form an almost continuous fringing reef, broadly following the contours of the coastline and consequently are situated relatively close to the shore. The fringing reefs are generally only broken in the vicinity of rivers and bay mouths. On islands such as Zanzibar, Pemba and Mafia, patch reefs predominate on the western sides and well developed fringing reefs on the eastern sides, which may be among the finest remaining reefs in the region. Given the direction of the prevailing currents, these reefs may be sources of larvae to supply other reefs along the mainland coast (Gaudian *et al*, 2003).

There are no true reefs in Mozambique but abundant coral assemblages occur on beach rock reefs, fossil relics of past continental shores, and the distribution of coral growth is influenced by the 25 river systems that discharge onto the coast. One of the southernmost areas of shallow coral growth in the region is around Inhaca Island, Mozambique (Salm 1976; Mondego 1992 cited in Gaudian *et al*, 2003), an area, which is close to the southernmost limit of the littoral fauna and flora characteristic of the east African coast. Other major coral assemblages include isolated reefs such as Silvia and Zambia between Inhambane and Bazaruto, the Bazaruto Archipelago, the Primeiras Segundo Archipelago, the coast between Angoche and Pemba, and the Quirimbas Archipelago (Gaudian *et al*, 2003).

Madagascar, despite the temperature difference between the northern and southern coast, has high coral species diversity on most reefs (over 60 coral genera have been recorded). The barrier reefs in the south west are the most extensive in the Indian Ocean and among the largest in the world, with about 200 km of true barrier, 200 km of fringing reefs and a number of offshore coral islands. There are also extensive fringing reefs on the east coast, particularly at Nosy Boraha and the Baie d'Antongil, and on the northeast and northwest coasts (Gaudian *et al*, 2003).

Coral reefs and associated organisms are diverse and abundant around the oceanic islands in the region. The Seychelles is the only part of the region in which atolls, such as Providence, Cosmoledo, Aldabra, Astove, Farquhar and Desroches, are found. The islands have small fringing reefs and reefs also occur around the coralline islands and on the submerged limestone banks such as Saya de Malha and Nazareth. In the Mascarene Islands, reef development decreases from east to west, reflecting the volcanic ages of the islands. Extensive reefs surround Mauritius and Rodrigues (the oldest island, with the best reef development, covering an area of 200 km²). There is some reef development around Tromelin, Europa, Bassas de India and Juan de Nova, and only a small amount around Reunion which is still volcanically active (Montaggioni and Faure 1980 cited in Gaudian *et al*, 2003). The Cargados Carajps Shoals, a submerged bank which is a dependency of Mauritius, has over 190 square km of coral reef and a massive algal ridge, probably the largest in the Indian Ocean. The Comoros have well developed reefs, and there is a large barrier reef around Mayotte (Gaudian *et al*, 2003).

Coral communities are present off the Maputoland coast on the northeast coast of South Africa (Wells and Bleakley 2003).

1.3.3.2 Mangrove Forests

A total of 11 mangrove species are known from the region: *Rhizophora mucronata*, *Ceriops tagal*, *C. boiviniana*, *Bruguiera gymnorhiza*, *B. cylindrica*, *Avicennia marina*, *A. officinalis*, *Sonneratia alba*, *Xylocarpus molluccensis*, *X. granatum*, *Heritiera littoralis*. Eight have been recorded from Kenya, eight species have also been recorded from Tanzania of which two (*X. molluccensis* and *A. officinalis*) are very rare (Semesi 1990 cited in Gaudian *et al*, 2003); nine species have been recorded from Zanzibar (Jiddawi and Muhando 1990 cited in Gaudian *et al*, 2003) and from Madagascar (Jenkins 1987). Mangrove diversity in Somalia is much lower, with only about two species having been recorded (UNEP 1987 cited in Gaudian *et al*, 2003).

The total area of mangrove in the region is about 1,200,000 ha. Mangrove distribution can be correlated with the presence of coastal indentations and large river discharges. Much of the mainland coast, especially north of Kenya, is relatively unindented. Relatively few mangrove stands are found in northern Somalia. More extensive mangrove forests are found in the extreme south of Somalia in the Bay of Buur Gaabo and along the coasts of Kenya and Tanzania where there are suitable conditions for growth (Gaudian *et al*, 2003).

Kenya has some 65,000 ha of mangrove (Ferguson 1993 cited in Gaudian *et al*, 2003), the largest area being Lamu with 46,229 ha (Gaudian *et al*, 2003). In Tanzania, stands are more extensive, totalling 115,500 ha (Semesi 1991), of which 3,200 ha are found in the Rufiji River delta, 1,200 ha on Pemba and 4,700 ha on Unguja (Zanzibar) (Gaudian *et al*, 2003). As a result of the many river systems in Mozambique, mangrove forests are extensive, totalling up to 500,000 ha, of which 79 % are located on the Zambezi River (Gove 1994 cited in Gaudian *et al*, 2003). On Madagascar all large river estuaries are in the west and support about 327,000 ha of mangroves, with only a few stands covering about 5,000 ha on the east coast (Gaudian *et al*, 2003). There are small stands in the Seychelles, and the two best undisturbed stands are on Curieuse at the end of Bay Laraie and at one site on Mahe. Mangroves are rare on the atolls except on Aldabra which has a stand fringing the shore of its large lagoon. On Mauritius, very narrow mangrove stands are found along the east, southeast and northeast coasts, totalling about 1-2 km². The best developed of these are on the east coast islands such as Ile aux Cerfs (Turner 1994 cited in Gaudian *et al*, 2003). There are relatively undisturbed but very small stands on the Comoros, notably in a few bays on Moheli, and small stands occur on Mayotte. Reunion has about 12 km² (Gaudian *et al*, 2003).

1.3.3.3 Seagrass Beds

Seagrass beds are found in all countries in the region, in total nine seagrasses have been identified in the region, seven of which are common; however 12 species are known from Madagascar alone (Vasseur 1994 cited in Gaudian *et al*, 2003). In Somalia, there are few on the north coast, but they are extensive along the south coast, from Adale to Chiamboni (UNEP 1987 cited in Gaudian *et al*, 2003). In Tanzania seagrass beds are found in all bays and on the west side of Pemba, Unguja and Mafia Islands; the

inshore area from Njao Gap to Port Cockburn is particularly productive with extensive algal and seagrass beds. In Kenya, seagrass and algal beds are well represented in the Mombasa, Diani and Malindi areas. Dense seagrass beds are found in sheltered waters in Mozambique probably along the entire coast but notably at Inhaca I., Inhambane, the Bazaruto Archipelago which reportedly has the most extensive beds in the region and Angoche (Dutton 1994 cited in Gaudian *et al*, 2003). In Madagascar, there are extensive seagrass beds in the lagoons north of Toliara, in bays around Nosy Be (Cooke 1994 cited in Gaudian *et al*, 2003) and in many other areas around the coast (Vasseur 1994 cited in Gaudian *et al*, 2003). In the Seychelles, seagrass beds are dense throughout the islands, especially those on the Seychelles and Amirantes Banks and at Desroches Atoll (Salm 1994 cited in Gaudian *et al*, 2003).

1.3.3.4 Other Wetlands

Bays and estuaries with intertidal sand and mud flats and other wetland types are found in most parts of the region, but tend to cover very small areas in the island nations, and are also infrequent along the coast of Somalia. Brackish coastal barrier lagoons are found only in Mozambique and Madagascar (Gaudian *et al*, 2003). There are a few tidal wetlands in Somalia along the Gulf of Aden, the best developed in the west between Saada Din Island and Saba Wanak where 24 water courses approach the sea. There are several lagoons on the east coast. The Juba discharges into the Indian Ocean near Kismayo, and there are a number of seasonal streams elsewhere. Major deltas in Kenya are the Tana River Delta (20,000 ha) which is some 10 km wide at its mouth, and the Galana/Sabaki River which enters the sea north of Malindi through a swampy floodplain (Gaudian *et al*, 2003). Tanzania has several major estuaries including the Ruaha/Rufiji delta (the confluence of the two rivers forming a massive headwater floodplain at the point of entry into the Indian Ocean), the Pangani River and floodplain in the north, the Ruvu River and the Wami estuary, floodplain and tidal swamps. In Mozambique, about 25 rivers discharge along the coast (e.g. Limpopo, Savea and Zambezi), giving rise to swampy lagoonal areas. Rivers on the northeast coast (Rovuma, Messalo, Montepuez, Megaruma, Lurio) have very seasonal flows and carry less alluvium and water to the coast than those further south; in some cases they spread into long narrow lakes and estuaries immediately prior to the coast. Important estuaries are also found along the west coast of Madagascar (Gaudian *et al*, 2003).

1.3.3.5 Beaches, Dunes and Cliffs

Sand dunes are found in all countries except the island nations of La Reunion, Comoros and Seychelles. They are best developed in Mozambique in the south; dense undisturbed dune forest occurs along a considerable part of the central coast, and more or less continuously from Inhaca south to the border (Salm 1994 cited in Gaudian *et al*, 2003). About 50 % of Mozambique's coast is made up of sandy beaches (Dutton 1994 cited in Gaudian *et al*, 2003). In Kenya, there are limited dunes north of the Galana River mouth and south of the Tana River delta. Sandy beaches are widespread on the mainland coast, particularly along the Somalia coast where they are interspersed by rocky cliffs and headlands, on the Tanzania coast where they are sometimes backed by steep limestone cliffs, and along the Mozambique coast. Large coral sand barrier beaches and dunes are found along the east coast of Madagascar (Alusa and Ogallo 1992 cited in Gaudian *et al*, 2003), and there is a small fragment of dune forest in the private reserve at Ste Luce in the southeast (Cooke 1994 cited in Gaudian *et al*, 2003).

1.3.3.6 Open Ocean

Small islands are found offshore in all countries (IUCN/UNEP 1984 cited in Gaudian *et al*, 2003), these include Kiw aiyu, Simambaya, Pate, Manda, Wasini Islands in Kenya; Yambe, Karange, Mafia, Songo Songo, Mbundya off mainland Tanzania; Chepani, Kepandiko, Chango, Bawi, Mesali, Latham, Mwemba off Zanzibar and Pemba; Chiamboni, Famau Uali, Ciandara, Hagi Bulle, Dorcasi and Ciula off Somalia; and a number such as Bazaruto, Benguerua, Amato, Primeiras and Segundas, Inhaca, and Matemo and Agoche off Mozambique. Numerous others are found in the island nations of the Indian Ocean (Gaudian *et al*, 2003).

The region has a number of large, partly or completely submerged limestone plateaux notably around Mauritius, including Hawkins, Soudan, St Brandon and Nazareth Banks and the Cargados Carajos Shoals; the Seychelles and Amirante Plateaus and Constant, Saya de Malha, Platte and La Perle Banks around the Seychelles; and the St Lazarus and Almirante Leite Banks off Mozambique. The Paisley Seamount off Mozambique and Tromelin and La Perouse are major seamounts in the region (IUCN/UNEP 1984 cited in Gaudian *et al*, 2003). The Banc du Geysier, a large horseshoe-shaped reef, lies in international waters and is probably part of the Comoros volcanic chain (Gaudian *et al*, 2003).

Small upwellings probably occur seasonally throughout the region, and more significant ones are found in the offshore waters of Somalia (the Ras Hafun upwelling), and off the coast of Mozambique (IUCN/UNEP 1984a). Minor deep sea trenches occur off Reunion and Mauritius (the Mauritius trench) and Seychelles (the Amirante Trench) (IUCN/UNEP 1984 cited in Gaudian *et al*, 2003).

1.3.4 Species Diversity

1.3.4.1 Seaweeds

Seaweed is widely distributed in the region. A total of 350 marine algae have been recorded in Kenya (Gaudian *et al*, 2003). Several seaweeds (*Gracilaria*, *Euchema*, *Sargassum*, *Turbinaria*) are of commercial importance in the region and are exploited or farmed, notably in Kenya and Zanzibar (Jiddawi and Muhando 1990 cited in Gaudian *et al*, 2003). Relatively high levels of endemism are found in algae around the southwest Cape of South Africa (Wells and Bleakley 2003).

1.3.4.2 Invertebrates

The region is rich in a wide array of invertebrates. Marine invertebrate species found in the region, include mollusks (e.g. green snail, pearl oysters, gastropods and bivalves, octopus and squid), crustaceans (e.g. spiny lobsters, crabs, prawns), coral (e.g. black and stony corals for the curio trade; stony corals for construction and lime) and echinoderms (e.g. sea cucumbers) (Gaudian *et al*, 2003). Kenya has 135 species of coral reef associated gastropods (McClanahan 1989 cited in Gaudian *et al*, 2003). The main species of prawn present in the coastal waters of Kenya are *Penaeus inicus*, *Metapenaeus monoceros*, *Penaeus monodon*, *Penaeus semisulcatus* and *P. japonicus* (UNEP 1998a) A number of endemic mollusks are known from Mauritius, such as the Double Harp *Harpa costata* and the Violet Spider Conch *Lambis violacea*, but there is

little endemism along the mainland coastline. Cosmoledo and Aldabra in the Seychelles are important areas for green snail in the Seychelles (IUCN/UNEP 1984 cited in Gaudian *et al*, 2003). The globally threatened coconut crab is found on some offshore islands of Tanzania (e.g. Mbudya I. and islets off Mafia Island), and also in the Comoros and some of the outer Mascarene Islands, for example in the Cargados Carajos shoals (IUCN/UNEP 1984 cited in Gaudian *et al*, 2003).

1.3.4.3 Fish

Madagascar and the islands "to the north and east" have been described as areas of high reef fish diversity; 552 species of fish have been recorded from the Toliara reefs along (Harmelin-Vivien 1979 cited in Gaudian *et al*, 2003). About 900 species of fish are known from the Seychelles, of which one third are associated with reefs (GEF 1992 cited in Gaudian *et al*, 2003). The most common species of fish found on the Kenyan coastline are the scavengers (*Lethrinidae*), rabbit fish (*Siganidae*), parrot fish (*Scaridae*) and snapper (*Lutjanidae*) (UNEP 1998a). There is a significant difference in Kenya in fish diversity and community structure between the northern rocky/algal reefs and the southern coral reefs; highest diversity in the 15 families studied, comprising 121 species, were found in the Shimoni region; Kiunga, in the north, was least diverse. Over 150 species of fish were recorded from a 100 m wide section of reef at Kisite Island in the south. The deep waters around the Comoros are the home to a unique fish, the coelacanth which is a living fossil (Gaudian *et al*, 2003).

1.3.4.4 Reptiles

Five species of marine turtle nest along the mainland coast of East Africa and on the islands of the western Indian Ocean (UNEP 1998a): Green *Chelonia mydas*, Hawksbill *Eretmochelys imbricata*, Loggerhead *Caretta caretta*, Leatherback *Dermochelys coriacea* and the olive ridley *Lepidochelys olivacea*. Green and hawksbill turtles are most common and are found in localized nesting populations throughout the region. The main nesting beaches for green and hawksbill turtles are on islands. Europa, Tromelin and Aldabra have the highest nesting density of green turtles and hundreds nest on St Brandon in the Carjados Carajos Shoals (Turner 1994 cited in Gaudian *et al*, 2003). Smaller numbers nest in the granitic and southeast islands of the Seychelles, on the west coast of Madagascar and in the Comoros (Itsamia and Nioumachoa islets on Moheli; Sima on Anjouan; and Mayotte) (IUCN/UNEP 1984, 1985 cited in Gaudian *et al*, 2003). The nesting density of hawksbills is lower, with the largest populations on the granitic islands and in the Amirantes (particularly Poivre and Coetivy) in the Seychelles (Gaudian *et al*, 2003).

Much lower densities of turtle nesting occur on the mainland coast. In Mozambique, four species nest at Bazaruto, two at Inhaca and the largest site for green turtles is the Primeiras and Segundas Islands. Mozambique also has significant nesting areas for loggerhead and leatherbacks and in the north for olive ridleys; in the north there is also an important feeding area for loggerheads (Gaudian *et al*, 2003).

Although most species also occur in Tanzania and Kenya, nesting populations are smaller or have declined in these countries. In Kenya, only green and hawksbill turtles have been recorded recently (UNEP 1998a). There are 22 known nesting beaches in Kenya from Funzi on the south coast to Manda island in the Lamu archipelago (UNEP

1998a). Misali Island, off Pemba in Tanzania, has important nesting sites for two turtle species (Gaudian *et al*, 2003).

Green turtle and hawksbill nest in Somalia with highest numbers at Basaso and Habo in the north and also in Marca, Brava and Kismayo waters (UNEP 1987 cited by Gaudian *et al*, 2003). Crocodiles and sea snakes may occur in coastal waters.

1.3.4.5 Birds

The region has a diverse assemblage of seabirds, including frigate birds, tropic birds, boobies, shearwaters, terns, noddies and gulls. Numerous islands and islets support large seabird colonies, including Aldabra, Aride, Cosmoledo, Desnoeufs, Cousin, Cousine, Recif, Farquhar, Boudeuse, Bird, African Banks, Astove, Providence and the Amirantes in the Seychelles; St Brandon, Round, Serpent off Mauritius as well as islets around Rodrigues; Tromelin and Ile du Lys in Reunion; I. Magnougni and I. M'Chaco in the Comoros (Gaudian *et al*, 2003).

Major colonies along the mainland coast include islands off Kisite/Mpunguti, Kiunga (which has the single largest population in the world of Roseate Terns *Sterna dougalli* (8,000 breeding pairs)) in Kenya, Latham I. in Tanzania, and some of the outer islands of the Quirimbas Archipelago in Mozambique (Gaudian *et al*, 2003). The coralline island of Nosy Manitra, off the southwest coast of Madagascar has a population of about 4,000 *Sterna dougalli*, about 10-15 % of the world population (Cooper *et al* 1984 cited in Gaudian *et al*, 2003). More than 450 species of birds are found along the coastal strip of Kenya (UNEP 1998a).

There are also several important areas for waders and migrating birds, particularly on the African mainland coast, such as Inhaca Island and the Zambezi River delta in Mozambique. The Tana River Delta in Kenya is a major wintering ground for hundreds of migrant birds and home to thousands of resident species. Other important coastal and marine birds include the Madagascar fish eagle *Haliaeetus vociferoides*, which is endemic to Madagascar, of which fewer than 40 pairs occurred in the mangroves and on offshore islets of the northwest coast in the 1980s (Collar and Andrew 1988 cited in Gaudian *et al*, 2003).

There are important seabird colonies off the coast of South Africa, the most important areas being Shark Island, Namibia and Bird Island, Lambert's Bay and Marcus Island (Wells and Bleakley 2003).

1.3.4.6 Mammals

The extent of the dugong's distribution and migrations along the mainland coast of East Africa is not known, but its most important remaining habitat is thought to be in Mozambique (IUCN/UNEP 1984 cited in Gaudian *et al*, 2003), particularly in the Bazaruto Archipelago and Inhaca. Small populations occur in other areas such as Kiunga, Ras Tenewi (Kenya) (Olendo 1993 cited in Gaudian *et al*, 2003), Rufiji Delta and Kilwa region (Tanzania) and possibly also Antonio Enes and the Primeiras and Secundas Islands in Mozambique and in the mangrove areas between Kismayo and Chiombo in Somalia. The dugong is very rare in the island states, and has never been resident in some island groups such as the Seychelles (Nicholls 1994 cited in Gaudian

et al, 2003); it is extinct around Mauritius and Mayotte (IUCN/UNEP 1984 cited in Gaudian *et al*, 2003). In Madagascar, they still occur, although they are not common. Cetaceans are abundant in the productive areas of the Indian Ocean. At least 15 species have been recorded (Gaudian *et al*, 2003).

1.3.5 Information on Participating States

1.3.5.1 Comoros

Total Population: 585,940 (World Bank 2002)

Total GDP (current US\$): 255,878,000 (World Bank 2002)

Total sea area: exclusive economic zone: 200 NM

territorial sea: 12 NM

Length of coastline: 350 km (UNEP 1998)

Coastal and Marine Protected Areas

There are no marine protected areas so far.

Proposed new MPAs:

- South coast of Mohéli, to include the Nioumachoua Islets
- Grand Comore (Chindini-Malé Marine Park and Bangoi Kouni, Ivoine Marine Park)

(Gaudian *et al*, 2003).

1.3.5.2 Kenya

Total Population: 31,344,580 (World Bank 2002)

Total GDP (current US\$): 12,140,115,968 (World Bank 2002)

Total Sea Area: continental shelf: 200-m depth or to the depth of exploitation

exclusive economic zone: 200 NM

territorial sea: 12 NM

Length of Coastline: 500 km (UNEP 1998)

Coastal and Marine Protected Areas

There are currently four Marine National Parks and six Marine National Reserves

- Kisite Marine National Park and Mpunguti Marine National Reserve
- Kiunga Marine National Reserve and Biosphere Reserve
- Malindi/Watamu Marine National Parks and Malindi/Watamu Marine National Reserves and Biosphere Reserve
- Mombasa Marine National Park and Mombasa Marine National Reserve Diani Chale National Marine Reserve

Proposed New MPAs:

- Tana River Delta
- Ras Tenewi

(Gaudian *et al*, 2003).

1.3.5.3 Madagascar

Total Population: 16,437,220 (World Bank 2002)

Total GDP (current US\$): 4,514,385,920 (World Bank 2002)

Total Sea Area: contiguous zone: 24 NM
territorial sea: 12 NM
exclusive economic zone: 200 NM
continental shelf: 200 NM or 100 NM from the 2,500-m deep isobath
Length of Coastline: 5,100 km (UNEP 1998)

Coastal and Marine Protected Areas

- Nbsy Mangabe Special Reserve

Proposed New MPAs:

- Lokobe Strict Nature Reserve
- Grand Recif and coastal zone of Toliara
- Baie de Bombetoka
- Baie de la Mahajamba

(Gaudian *et al*, 2003).

1.3.5.4 Mauritius

Total Population: 1,212,350 (World Bank 2002)
Total GDP (current US\$): 4,531,992,576 (World Bank 2002)
Total Sea Area: continental shelf: 200 NM or to the edge of the continental margin
territorial sea: 12 NM
exclusive economic zone: 200 NM

Length of coastline: 320 km (UNEP 1998)

Coastal and Marine Protected Areas

There are no effective MPAs in Mauritius. The six fishing reserves

- Flacq Fishing Reserve
- Riviere du Rempart-Poudre d'Or Fishing Reserve
- Black River Fishing Reserve
- Grand Port-Mahebourg Fishing Reserve
- Port Louis Fishing Reserve
- Trou d'Eau Douce Fishing Reserve
- Coin de Mire (Gunner's Coin) Nature Reserve
- Ile Plate Nature Reserve
- Ile aux Aigrettes Nature Reserve
- Ile aux Serpents Nature Reserve
- Ilot Gabriel Nature Reserve
- Ilot Marianne Nature Reserve
- Round Island Nature Reserve
- Ile aux Cocos Nature Reserve (Rodrigues)
- Ile aux Sables Nature Reserve (Rodrigues)

Proposed New MPAs:

- The Cargados Carajos Shoals
- Le Chaland Blue Bay MP
- Balaclava MP, Turtle Bay

(Gaudian *et al*, 2003).

1.3.5.5 Mozambique

- **Total Population:** 18,438,330 (World Bank 2002)
 - **Total GDP (current US\$):** 3,919,510,016 (World Bank 2002)
 - **Total Sea Area:** exclusive economic zone: 200 NM
territorial sea: 12 NM
 - **Length of Coastline:** 2,770 km (UNEP 1998)
 - **Coastal and Marine Protected Areas**
 - Ilhas da Inhaca e dos Portugueses Reserve
 - Parque Nacional do Bazaruto
 - Marrromeu Game Reserve
 - Pomene Game Reserve:
 - Maputo Game Reserve.
- Proposed New MPAs:
- The Primeiras and Segundos Islands
 - Nacala-Mossuril
 - Bartolomeu Dias area
- (Gaudian *et al*, 2003).

1.3.5.6 Reunion

- **Total Population:** 755,171 (CIA 2003)
 - **Total GDP (current US\$):** \$3.6 billion (CIA 2003)
 - **Total Sea Area:** exclusive economic zone: 200 NM
territorial sea: 12 NM
 - **Length of Coastline:** 207 km (CIA 2003)
 - **Coastal and Marine Protected Areas**
 - Cap la Houssaye, covering part of the barrier reef
 - Saline l'Hermitage, covering part of the barrier reef
 - Saline l'Hermitage, lagoon
 - Saint-Leu, lagoon
 - L'Etang, lagoon
 - St Pierre, lagoon
 - Ile Europa Reserve Naturelle
 - Iles Glorieuses Reserve Naturelle
 - Ile Tromelin Reserve Naturelle
 - Ilot de Bassas de India Reserve Naturelle
 - Ile Juan de Nova
- (Gaudian *et al*, 2003).

1.3.5.7 Seychelles

Total Population: 83,590 (World Bank 2002)
Total GDP (current US\$): 629,986,624 (World Bank 2002)
 Total sea area; contiguous zone: 24 NM
 territorial sea: 12 NM
 exclusive economic zone: 200 NM
 continental shelf: 200 NM or to the edge of the continental margin
Length of Coastline: 600 km (UNEP 1998)

Coastal and Marine Protected Areas

- Aldabra Atoll Strict Nature Reserve and World Heritage Site
- St. Anne Marine National Park
- Curieuse Marine National Park
- Port Launay Marine National Park
- Baie Ternay Marine National Park
- Silhouette Marine National Park
- Cousin Island Special Reserve
- Aride Island Special Reserve
- African Banks Protected Area
- Ile Cocos Protected Area (includes Ile la Fouche and Ilot Platte)
- Desnoeuifs Protected Area
- Brulee-Pointe au Sel Reserve
- Northeast Point Reserve: Marine mollusks
- La Passe-Grosse Roche Reserve
- Anse-Boudin-Pointe Zanguilles
- Ile Seche Nature Reserve
- Ile aux Fous Nature Reserve
- Les Mamelles Nature Reserve
- Ile aux Vache Nature Reserve
- Lamperiaire Nature Reserve
- Boudeuse Nature Reserve
- Etoile Nature Reserve

(Gaudian *et al*, 2003).

1.3.5.8 Somalia

Total Population: 9,390,830 (World Bank 2002)

Total GDP (current US\$): \$4.1 billion (CIA 2003)

Total Sea Area: territorial sea: 200 NM

Length of Coastline: 3,025 km (CIA 2003)

Coastal and Marine Protected Areas

There are currently no MPAs and no legislation concerning their establishment and management, although the WCMC Protected Areas Database lists Bushbush Game Reserve as an MPA

Proposed New MPAs:

- Bajuni Archipelago and adjacent coastal area
- Maydh Island

(Gaudian *et al*, 2003).

1.3.5.9 Tanzania

Total Population: 35,181,300 (World Bank 2002)

Total GDP (current US\$): 9,383,031,808 (World Bank 2002)

Total Sea Area: exclusive economic zone: 200 NM
territorial sea: 12 NM

Length of Coastline: 800 km (UNEP 1998)

Coastal and Marine Protected Areas

- Mbudya Marine Reserve

- Bongoyo Marine Reserve
- Pangavini Marine Reserve
- Fungu Yasini Marine Reserve
- Maziwi Island Marine Reserve
- Tanga Coral Gardens Marine Reserve
- Tanga
- Mafia Island and the Rufiji Delta
- Kilwa Kiswani
- Mbegani proposed MPA
- Ras Buyuni proposed MPA
- Lindi proposed MPA
- Mtwara/Ruvuma proposed MPA
- Latham
- Pemba (Misali, Mtangani, Matumbe and NW Pemba)
- Misali Island
- Mtangani
- Unguja (Mnemba Island, Islets off Zanzibar)

(Gaudian *et al*, 2003).

1.3.5.10 South Africa

Total Population : 43,580,000 (World Bank 2002)

GDP (current US\$): 104,234,901,504 (World Bank 2002)

Total Sea Area: contiguous zone: 24 NM

territorial sea: 12 NM

continental shelf: 200 NM or to edge of the continental margin

exclusive economic zone: 200 NM

Length of coastline: 2,798 km (CIA 2003)

Ramsar Sites: De Hoop Vlei (De Mond (Heuningnes Estuary), Turtle Beaches/Coral Reefs of Tongaland, St. Lucia System, Langebaan, Wilderness Lakes, Verlorenvlei, Orange River Mouth, Kosi Bay, and Lake Sibaya).

Marine Protected Areas

West Coast Province:

- Cape of Good Hope Marine Reserve
- Elephant Rock Marine Reserve
- Glencairn Marine Reserve
- Gxulu Marine Reserve
- Kalk Bay Marine Reserve
- Miller's Point Marine Reserve
- Kommetjie Rock Lobster Reserve
- McDougall's Bay Rock Lobster Reserve
- Saldanha Bay Rock Lobster Sanctuary
- St. Helena Bay Rock Lobster Sanctuary
- Table Bay Rock Lobster Sanctuary
- Orange River Mouth Wetland RAMSAR
- Verlorenvlei Wetland (Elands Bay) RAMSAR
- West Coast National Park

South Coast Province:

- De Hoop Marine Reserve
- Gonubie Nature (Marine) Reserve
- Robberg Marine Reserve
- Tsitsikamma National Park
- East Coast Province:
- Sodwana Bay National Park
- St. Lucia Marine Reserve
- Trafalgar Marine Reserve
- Umdoni Park Marine Reserve

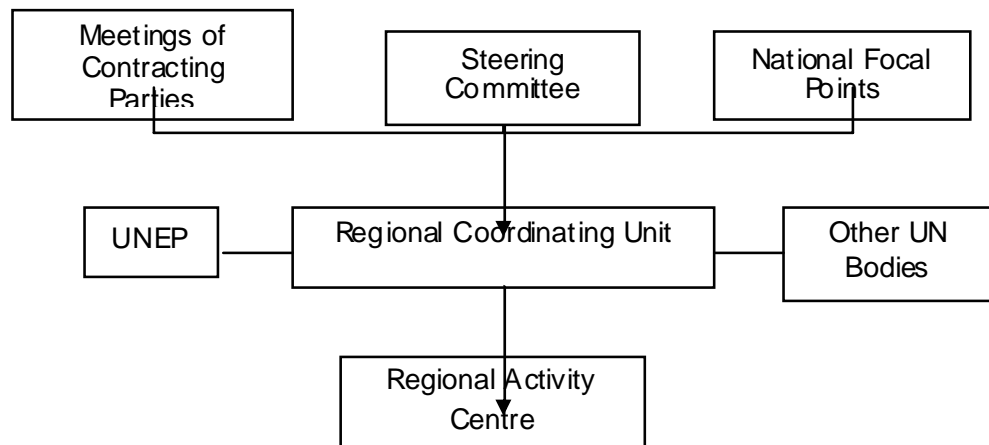
Proposed new MPAs:

- The Richtersveld
- The Namaqualand Coast
- The Elands Bay coast
- The Longebaan Coast
- The Cape Peninsula Coast
- The De Hoop Coast
- The Garden Route Coast
- The Woody Cape Coast.
- The Southeast Coast
- The Mtamvuna Coast
- The Maputuland Coast

(Wells and Bleakley 2003)

1.4 Organization

1.4.1 Institutional Structure



1.4.2 Conference of Parties

Conferences of the Contracting Parties to the Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region

Chairperson for the Nairobi Convention:

H.E. Mr. John William Kachamila
Minister for Coordination of Environmental Affairs
Ave. Acordos de Lusaka 2115
P.O. Box 2020, Maputo, Mozambique
Tel: (258-1) 495 408/465843/48/51/492403/496109
Fax: (258-1) 495 408/ 466243/496108/465 849
E-mail: jw.kach@vircom.com / micoa@ambiente.uem.mz

Frequency of meetings: Every two years

Date and place of last meeting: 5-7 December 2001. Maputo, Mozambique

Date and place of next meeting: - April 2004

1.4.3 Bureau of Contracting Parties

Composition

Office bearers from last COP	Special tasks
Chair – Mozambique	To provide overall co-ordination and to provide direction guidance in close collaboration with the secretariat of the Nairobi Convention.
Vice-chairs 1. United Republic of Tanzania	To provide guidance in the development of a costed work programme.
2. Mauritius	Resource mobilisation and sustainable financing mechanism
3. Re-union	Relations with the secretariat (UNEP) promoting closer relations with the Abidjan Convention and other conventions
Rapporteur – Madagascar	Resource mobilisation and sustainable financing mechanism

- Term expiring: Next Conference of Parties, April 2004

1.4.4 The Coordinating Unit

Co-ordinating Unit

Regional Co-ordination Unit - Programmatic Co-ordination, Secretariat for the Nairobi Convention

Year established: 1997

Headquarters with contacts

Coordinator: Mr. Dixon Waruinge, Programme Officer, Kenyan

United Nations Environment Programme (UNEP),

Division of Environmental Conventions,

P. O. Box 30552,

Nairobi, Kenya,

Tel: 254 2 622025

Fax: 254 2 624300

Email: dixon.waruinge@unep.org

Staff:

Mrs. Patronila Njuki, Project Assistant

Mrs. Annabelle Olum, Secretary

Regional Co-ordinating Unit -Intergovernmental Political Co-ordination Mahé, Seychelles

Year established: 1999

Headquarters with contacts

Interim Coordinator
Regional Coordinating Unit for the Nairobi Convention
Policy, Planning & Services Division
Ministry of Environment
PO Box 677 Victoria Mahé
Republic of Seychelles
Tel. +248 224 644 / 225 672
Fax. +248 322 945 / 224 500
rolph@seychelles.sc

Coordinator

Mr. Rolph Payet
Interim Coordinator
Regional Coordinating Unit for the Nairobi Convention

1.4.5 Regional Activity Centres

1.4.5.1 *Western Indian Ocean Marine Science Association*

Promoting the educational, scientific and technological development of all aspects of marine sciences throughout the WIO region (consists of 10 countries: Somalia, Kenya, Tanzania, Mozambique, South Africa, Comoros, Madagascar, Seychelles, Mauritius, Reunion(France)), with a view toward sustaining the use and conservation of its marine resources. The Association has about 600 individual members as well as about 20 institutional members from within and outside the region. WIOMSA promotes marine science research through the award of research grants under the Marine Science for Management (MASMA) and the Marine Research Grant (MARG) programmes. MASMA is a competitive research grant scheme designed to support research activities in the region as well as organization of training courses/workshop. The grants, which range from US\$ 15,000 to US\$ 50,000 per annum, are available to teams of scientists or individual researchers from the region.

In addition to the ongoing capacity building program in ICM and MPA, WIOMSA has organized/hosted a number of regional workshops and meetings that provided the linkage between science and management.

WIOMSA signed a Memorandum of Understanding with UNEP as the secretariat to the Nairobi Convention, whereby WIOMSA will be responsible for providing research, technical, managerial and advisory support to UNEP as requested.

WIOMSA in collaboration with UNEP is hosting a regional Group of Experts on Marine Protected Areas for the Eastern African region (GEMPA). GEMPA has been established with the aim of building a constituency for marine protected areas in the region and to provide a forum for linkages and dialogue between MPA practitioners and experts, and between government and non-government organizations.

1.4.5.2 Coral Reef Task Force

The Nairobi Convention Coral Reef Task Force (CRTF) was established by The Third meeting of Conference of Parties of the Convention for the Protection, Management, and Development of the Marine and Coastal Environment of the Eastern African Region decision CP.3/2 Protection of coral reefs and associated ecosystems. The COP3 decision urged all parties to the Nairobi Convention to: to establish national bodies to co-ordinate coral reef activities within each country and to develop national coral reef action plans or strategies where appropriate. The COP decision further requested the Executive Director of the United Nations Environment Programme to establish a Coral Reef Task Force to co-ordinate work on coral reefs throughout the region, including the development of a regional action plan, with particular reference to the work program of the Nairobi Convention, initiatives and projects being implemented within the region.

1.4.5.3 Group of Experts on Marine Protected Areas (GEMPA)

A Group of Experts on Marine Protected Areas in the Eastern Africa (GEMPA-EA) was established in August 2000, with the aim of providing a forum for individual experts, practitioners and representatives of regional and international organizations dealing with MPAs in the region, to work together towards improving the management of MPAs. GEMPA-EA provides a framework which can facilitate implementation of activities ranging from technical and institutional capacity building to assisting countries to meet their obligations under the relevant global and regional conventions and initiatives.

1.4.6 National Focal Points

Country	Name and Contact
Somalia	To come
Kenya	To come
Tanzania	National Environment Management Council (NEMC), Republic of Tanzania Dr. Magnus Ngoile, Director General, NEMC and Mr. Stephen Nkondokaya, Senior Fisheries Officer, Division of Environment, Vide President's Office
Mozambique	Ministry of the Co-ordination of Environmental Affairs (MICOA), Mozambique Mr. Evaristo Baquete, National Director of Natural Resources
South Africa	To come
Comoros	To come
Madagascar	Association Nationale pour la Gestion des Aires Protégées (ANGAP), Madagascar Focal Point: Ms. C. Andrianarivo, Chef de Cellule Recherche et Biodiversity
Mauritius	Department of Environment, Mauritius

	Mr. Phosun Kallee
France (La Reunion)	
Seychelles	Ministry of Environment, Seychelles Mr. Maurice Loustau-Lalanne, Principal Secretary, Environment Division.

1.5 Financial Arrangements

PROVISIONAL FIGURES FOR RESOURCES FOR REGIONAL SEAS ACTIVITIES

Projects	The Nairobi and Abjidan Conventions												
	Trust Fund-Nairobi Convention			Special contributions by:			UNFIP			Trust Fund - Abjidan			
	2002	2003	Total	Belgium	SIDA	2002-2003	2002	2003	Total	2002	2003	Total	
RESOURCES													
Balance of resources brought forward	685,292	665,148	685,292	1,692,679	1,138,751		97,580	70,093	97,580	70,093	97,580	97,580	
EAWA Trust funds (Contributions received)	152,980	148,791	301,771					15,000		15,000	15,000	15,000	
UNFIP						169,966							
Total Resources available	838,272	813,939	987,063	1,692,679	1,138,751	169,966	97,580	85,093	97,580	85,093	112,580	112,580	
COMMITMENTS													
The Coordinating Unit for the Eastern African Action Plan of the Nairobi Convention	153,207	175,793	329,000										
Eastern Africa Coastal and Marine Environment Resource Database and Atlas - EA/5101-93-01, EA/0401-95-03 and EA/1100-96-20				1,358,551			24,325	39,364				63,689	
Sub-regional Ministerial Consultations on the Environment - EA/0401-94-13, EA/1100-96-70					956,035								
ICRAN						161,872							
Sub total	153,207	175,793	329,000	1,358,551	956,035	161,872	24,325	39,364				63,689	
13%	19,917	22,853	42,770	176,612	124,284		3,152	5,117				8,280	
5% (UNFIP)						8,094							
Total	173,124	198,646	371,770	1,535,163	1,080,319	169,966	27,487	44,481				71,969	
Balance of Resources	665,148	615,293	615,293	157,516	58,432		70,093	40,611				40,611	
Earmarked Contributions by the USA	2000	2001	2002	2003	Total								
Coral Reef Activities	50,000	50,000	50,000	50,000	200,000								
GPA activities	56,667	58,333	83,333	-	198,333								
Total	106,667	108,333	133,333	50,000	398,333								
RESOURCES													
Swedish Government	188,802	299,479	429,688	332,031	1,250,000								

1.6 Partners

GEF projects: WIOLab

The Project named Addressing land-based activities in the West Indian Ocean (including TDA and SA P updates) – WIOLaB is a three years project with a total cost of US \$ 7.823 million. The WIOLaB project has three main objectives:

- Reduction of stress to the ecosystem by improving water and sediment quality
- Strengthening regional basis for preventing land-based sources of pollution and
- Developing regional capacity and institutions for sustainable less polluting development.

The WIOLaB focus on the Global Program for Action is expected to result in National Plans of Action for abating land based sources of pollution, as well as a regional protocol for Existing Environmental Convention (Nairobi Convention) with Annexes. Broad stakeholder participation and private sector cooperation form another strong focal points of this project. The African Process solid waste pollution project addresses several other countries than those in WIOLaB, namely the western African coastal countries. Another added component is that of preventive methods of solid waste management through creation of business opportunities out of waste (re-use, recycling, incineration). In addition the African process has already generated invaluable information on the hot and sensitive spots, the WIOLaB stands to benefit from the available data-base for its project. The African Process POL 1 project has therefore direct linkages to the WIOLaB in West Indian Ocean countries in the sense that the two are complimenting each other. To the West African coastal participating countries no project such as WIOLaB is in place, thus all components apply.

<http://www.gefonline.org/home.cfm>.

Ministry of the Co-ordination of Environmental Affairs (MICOA), Mozambique

Focal Point: Mr. Evaristo Baquete, National Director of Natural Resources

Government Ministry

Government Ministry in charge of environmental affairs in Mozambique.

Mozambique is the current Chair of the Nairobi Convention.

Ministry of Environment, Seychelles

Focal Point: Mr. Maurice Loustau-Lalanne, Principal Secretary, Environment Division

Government Ministry

Government Ministry in charge of environment in Seychelles.

The Ministry hosts the Interim Co-ordinator for the Regional Co-ordinating Unit of the Nairobi Convention which co-ordinates the intergovernmental political matters for the Nairobi Convention.

Seychelles has signed an MOU with the Nairobi Convention for the support of the Interim Co-ordinator and for implementing all the activities that enhance the political goodwill and commitment to the Convention by regional governments.

National Environment Management Council (NEMC), Republic of Tanzania

Focal Point: Dr. Magnus Ngoile, Director General, NEMC and

Mr. Stephen Nkondokaya, Senior Fisheries Officer, Division of Environment, Vice President's Office

Government Department

The National Environment Management Council (NEMC) is under the Vice President's Office. The main role of NEMC is to provide advice to the Vice President's Office on all matters pertaining to environmental conservation and management.

Dr. Magnus Ngoile, Director General, NEMC is the Tanzania's Focal Point for the Nairobi Convention.

Tanzania is the Vice-Chair for the Nairobi Convention responsible for the work program development and implementation

Department of Environment, Mauritius

Focal Point: Mr. Phosun Kallee

Government Department

Department of environmental matters in Mauritius

Mauritius is the Vice-Chair for the Nairobi Convention responsible for Finance and Fund-raising for the Convention.

Association Nationale pour la Gestion des Aires Protégées (ANGAP), Madagascar

Focal Point: Ms. C. Andrianarivo, Chef de Cellule Recherche et Biodiversité

Government Department

Government Department that deals with environmental matters in Madagascar.

Madagascar is a Member of the Bureau and Rapporteur for the Nairobi Convention.

ANGAP manages the ICRAN demonstration site in Madagascar - Nosy Atafana Marine Parks.

Ministry of Environment and Nature Protection, Senegal

Focal Point: Ms. Fatima Dia Toure,

Directeur, Direction de l'Environnement et des Etablissements Classés

Government Ministry

Ministry of Environment and Nature Protection is in-charge of environment in Senegal and hosts the Interim Secretariat of the Environment Initiative of the New Partnership for Africa's Development (NEPAD)

Coordination in the implementation of the Marine and Coastal Environment Component of NEPAD.

Kenya Marine and Fisheries Research Institute (KMFRI), Kenya

Contact Person: Dr. J. Kazungu, Director

Government Department

KMFRI's mandate is to carry out research on aquatic and fisheries resources in the Republic of Kenya and to provide information on the resources therein. The Institute falls under the Ministry of Research, Technical Training and Technology. It is administered by a Board of Management constituted under the Science and Technology Act of 1979.

Collaborates with the Nairobi Convention on the coastal erosion issues.

Eastern African Regional Office of the World Conservation Union (IUCN)

Contact Person: Marine and Coastal Co-ordinator

Intergovernmental Organisation

EA RO-IUCN operates in the ten countries in East Africa, the Horn of Africa and the Western Indian Ocean. In partnership with 20 Members in the region, representatives of

IUCN Commissions and Government and Non-Government partners, the Secretariat addresses local conservation and natural resource management issues.

IUCN is a partner of the Nairobi Convention and collaborates in the implementation of the work programme of the Nairobi Convention.

IUCN has signed an MOU with the Secretariat for the Nairobi Convention (16th October 2002) under the framework of the East African component of the ICRAN project, in support of the project for Improving Management Effectiveness of Marine Protected Areas in the Western Indian Ocean.

IUCN is a member of the Coral Reef Task Force as well as member of the Group of Experts in Marine Protected Areas (GEMPA)

IUCN collaborates with the Nairobi Convention in the implementation of the Jakarta Mandate in Eastern African region.

Western Indian Ocean Marine Science Association (WIOMSA), Zanzibar

Contact: Dr. Nyawira Muthiga, President and Dr. Julius Francis, Executive Secretary
NGO

WIOMSA is a network of experts and institutions dealing or with interest in coastal and marine issues and provides research, technical, managerial and advisory support to Regional Co-ordinating Unit of the Nairobi Convention. WIOMSA also promotes and fosters inter-institutional linkages within and beyond the region for co-ordination and support of marine science development.

- Implementation of the GPA for the protection of the marine environment from land-based activities in the Eastern African Region.
- Preparation of a Transboundary Diagnostic Analysis and a Strategic Action Programme for the Marine and Coastal Environment of the Western Indian Ocean Region.
- Development and implementation of public awareness through production of educational materials.
- Implementation in Eastern Africa of the UNEP/GPA Strategic Plan on Sewage and Municipal Waste Water

Memorandum of Understanding has been signed between UNEP and WIOMSA (23 July 2002). WIOMSA will act as the Regional Activity Centre for the Eastern African Programme. WIOMSA will also implement GPA projects in Eastern Africa. On behalf of the secretariat, WIOMSA organised the workshop on municipal wastewater management in May 2001.

Oceanographic Research Institute (ORI) in Durban, South Africa

National Institute

The Oceanographic Research Institute, situated on Durban's beachfront, conducts applied research on marine resource use with emphasis on the waters of the east coast of South Africa.

ORI has been a partner through IUCN before South Africa ratified.

ORI would form a suitable Activity Centre in the Eastern African region.

Wild Wildlife Fund (WWF)

Contact: Mr. Dr. Sam Kanyambwa
Regional Representative

WWF – Eastern Africa Regional Programme Office (EARPO)

IGO

The Third Meeting of the Contracting Parties to the Nairobi Convention recognised the WWF work in the Eastern Africa ecosystem and particularly the Ecoregion Programme. WWF Marine Ecoregion Programme offers an appropriate mechanism for the management of large scale ecosystems and also provides a platform for bringing together different stakeholders to set conservation strategies and mobilize resources. WWF has signed a Memorandum of Understanding with UNEP (30th April 2002) through the Secretariat for the Nairobi Convention for the implementation of programmes in the marine and coastal areas of the Western Indian Ocean region. The MOUs aim to strengthen coordination between the Secretariat and the NGOs in implementing aspects of the Convention Work Programme.

International Maritime Organization (IMO)

Contact Mr. John Paul Muindi, Programme Officer for East and Central Africa
UN-Agency

The IMO encourages and facilitates the general adoption of the highest practicable standards in matters concerning maritime safety, efficiency of navigation and prevention and control of marine pollution from ships.

IMO has cooperated with UNEP in facilitating the application of the Nairobi Convention and its Emergency Protocol and has assisted Governments of the Eastern African region in the development of national contingency plans as well as in the training of personnel. The GEF/UNDP/IMO Global Ballast Water Management Programme (GloBallast) is assisting developing countries to; reduce the transfer of harmful aquatic organisms and pathogens in ships' ballast water, implement the IMO ballast water Guidelines and prepare for the new IMO ballast water Convention.

HELCOM and OSPAR Conventions

Mr. M. S. Ostojski, Executive Secretary, Helsinki Commission
Mr. Alan Simcock, Executive Secretary, OSPAR Commission

Regional Seas Conventions

- The HELCOM administers the Convention on the Protection of the Marine Environment of the Baltic Seas provides a legal regime for the prevention of pollution of the sea by land-based sources and for the protection of marine and coastal biological diversity (habitats and species). HELCOM works with other organizations responsible for environmental management of major drainage basins, coastal areas and marine systems to identify lessons learned and transfer of experience.
- The OSPAR Commission administers the Convention for the Protection of the Marine Environment of the North-East Atlantic (the "OSPAR Convention") and develops policy and international agreements in this field.

HELCOM Commission has signed a twinning agreement with the Nairobi Convention to strengthen the horizontal cooperation in the management of coastal and marine ecosystems in the Eastern African Region.

KWS

Memorandum of Understanding signed between KWS (11th March 2002) and UNEP in support of ICRAN activities in the Malindi and Watamu National Marine Parks and Reserves.

Government of the Seychelles

Memoranda of Understanding signed between Government of the Seychelles, which hosts the Regional Coordinating Unit, and UNEP and WIOMSA:

- (a) To support the work of the Interim Coordinator's Office:
- (b) To organize a workshop on Coastal Erosion to be held in Reunion.

Dar-es-Salaam Marine Reserves System

Memorandum of Understanding signed between Dar-es-Salaam Marine Reserves System (DMRS) and UNEP in support of ICRAN activities (18th July 2002).

Coastal Zone Management Centre (CZMC)

NGO

Implementing in collaboration with regional institutions, a programme for capacity building in Marine and coastal protected area (MPA) management, management efficiency

CORDIO

The Governments of Belgium, Finland, France, Sweden, the United States of America, Ireland, Norway etc.

(Regional Seas 2003)

2 Our Work

2.1 Programme Strategy

Link to Regional Seas Strategic Directions 2004-2007, downloadable document.

2.2 Action Plan

Full title: East African Action Plan

Year adopted: Mahé, Seychelles, 27-30 September 1982

Entered into Force: 1996

Participating Countries: Comoros, France (La Reunion), Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, the United Republic of Tanzania and South Africa (joined in 2003)

Main Objectives:

1. To promote the sustainable development and sound management of regional marine and coastal resources by:

- Enhancing consultations and technical co-operation among the States of the region;
- Emphasising the economic and social importance of the resources of the marine and coastal environment;
- Establishing a regional network of co-operation on concrete subjects/projects of mutual interest for the whole region;

Preparing the Action Plan <http://www.unep.ch/seas/main/eaf/eafap.html#prep>.
Text of the Action Plan <http://www.unep.ch/seas/main/eaf/eafap.html#act>.

2.3 Convention

Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region

Short title: Nairobi Convention

Year adopted: Nairobi, 21 June 1985

Year entered into force: 30th May 1996

Contracting Parties: Comoros, France (La Reunion), Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, the United Republic of Tanzania and South Africa (UNEP 2001)

Ratified by all states

Country	Date of Ratification
Comoros	26 September 1994
France (La Reunion)	18 August 1989
Kenya	11 September 1990
Madagascar	26 June 1990
Mozambique	4 March 1999
Mauritius	03 July 2000
South Africa	16 May 2003
Seychelles	20 June 1990
Somalia	1 March 1988
Tanzania	1 March 1996
South Africa	

Depository state: Joint Secretariat for the Nairobi and Abidjan Convention, Division of Environmental Conventions (DEC), UNEP HQ, Nairobi, Kenya

Link to Text: <http://www.unep.org/eastafrica/EasternAfricaNairobiConvention.cfm>

2.3.1 Protocols

Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region

Year adopted: Nairobi, 21 June 1985

Year entered into force: 30 May 1996

Parties: Comoros, France (La Reunion), Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, the United Republic of Tanzania and South Africa

Link to text: <http://eealink.net/~asilw/ildlife/EastAfrPro.html>.

Protocol Concerning Co-operation in Combating Marine Pollution in Cases of Emergency in the Eastern African Region

Year adopted: 1985

Year entered into force: 30 May 1996

Parties: Comoros, France (La Reunion), Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, the United Republic of Tanzania and South Africa

2.4 Issues and Threats

2.4.1 Land-based Sources of Pollution

The important and heavily fished reef zone close to shore is particularly vulnerable to pollution and silting along the east African coastline. In recent decades, the growth of industry has brought an increasing volume of effluents to coastal waters. The use of agricultural chemicals has continued to grow, and sewage treatment continues to be inadequate in many parts of the region (UNEP 1992).

Eastern Africa is undergoing an extraordinary rate of urbanization. As the cities have become overcrowded, water supplies have proven insufficient, and systems for drainage, sewerage and refuse disposal inadequate. Domestic sewage is discharged directly into rivers and in some cases the sea. Although industrialization remains slow relative to other parts of the world, it takes place without proper environmental impact assessments legislative controls, leading to further pressure on the environment. Rivers, creeks and the sea have become dumping sites for industrial wastes. Industries of major environmental concern in the region include textiles, tanneries, paper and pulp mills, breweries, chemical factories, cement factories, sugar factories, fertilizer factories, and oil refineries. In some countries, slaughter houses near the sea are a serious land-based sources of pollution (UNEP 1992).

The increased use of agricultural fertilizers has lead to increased concentrations of nutrients in drainage waters, which in turn has lead to environmental problems such as eutrophication of freshwater and near shore coastalwaters (UNEP 1998). The mining of mineral sands in coastal environments has lead to short term, site specific but catastrophic effects due to the mobilization of sediment and damage to coral reefs (UNEP 1998).

For further information refer to:

UNEP (1998) Overview of Land-Based Sources and Activities Affecting the Marine, Coastal and Associated Freshwater Environment in the Eastern African Region. UNEP Regional Seas Reports and Studies No. 167. UNEP/Institute of Marine Sciences, University of Dar es Salaam/FAO/SIDA, 1998. (38 pages).

UNEP/FAO (1999). Strategic Action Plan for Land-Based Sources and Activities Affecting the Marine, Coastal and Associated Fresh Water Environment in the Eastern African Region. 63p. Nairobi, Kenya By UNEP/FAO/IMS/SIDA.

2.4.2 Marine-based Sources of Pollution

Oil is a major pollution threat to coastal ecosystems, owing to the heavy use of the tanker route along the East African coast. On any given day there are hundreds of

tankers in the region, many of them Very Large Crude Carriers (VLCCs), adding to the risk of disastrous oil spill event. Slicks are brought in from spills in the open ocean by coastal currents, while operational discharges from ships and refineries add to the load.

For further information refer to:

GEF. (1998). Western Indian Ocean Islands Oil Spill Contingency Planning. Project Document. GEFw eb

2.4.3 Exploitation of Fisheries

Many marine invertebrate species are of high commercial value in the whole region, these include mollusks (green snail, pearl oysters, gastropods and bivalves for the shell trade, a wide range of edible species, including octopus and squid), crustaceans (spiny lobsters, crabs, prawns), coral (black and stony corals for the curio trade; stony corals for construction and lime) and echinoderms (sea cucumbers) (Gaudian *et al*, 2003). Prawn larvae and other marine larvae are transported to the Mozambique coast from along the mangrove and prawn rich western coast of Madagascar (Gaudian *et al*, 2003), which has led to major shrimp and lobster fisheries in Madagascar waters. There are also lobster and sea cucumber fisheries in Tanzania, and the two main prawn fishing grounds in Tanzania are Bagamoyo and areas adjacent to the Rufiji Delta and an important tiger prawn fishery in Mauritius (Gaudian *et al*, 2003). Subsistence fisheries for numerous invertebrate species also take place throughout the region (Gaudian *et al*, 2003). There are indications that in several areas commercially valuable invertebrate resources are over-exploited. There have been decreases in the catches of shrimp (prawns) by trawler off the coast of Mozambique perhaps due to silt reduction or mangrove destruction as a result of damming of rivers, or most likely a combination of both (Gaudian *et al*, 2003).

Tuna are heavily exploited by foreign vessels and recent indications show over-exploitation (Andrill 1984 cited in Gaudian *et al*, 2003), although in the Seychelles stocks may still be under-exploited. Artisanal fishermen in the region have also noticed marked decreases in catches of large pelagic migratory species (Gaudian *et al*, 2003). Fishing with trawlers is becoming increasingly common in the region and may be having a detrimental effect on benthic communities and non target species, such as turtles, dolphins etc. Another important fishery in the region is tourist game fishery for marlin, tuna and shark in deep waters around the island shelves (Gaudian *et al*, 2003).

Reef fish are heavily exploited in the region and, with a few exceptions, in Kenya are found in larger sizes and higher population densities within marine protected areas (MPAs) showing the importance of MPAs. The Seychelles are unique in that MPAs have been created specifically for mollusks (IUCN/UNEP 1984 cited in Gaudian *et al*, 2003). Other countries have introduced legislation to prohibit or regulate the collection of various marine invertebrates, either by seasonal closures or other licensing and enforcement procedures. Mauritius has banned the collection and sale of shells and coral since March 1985 (Gaudian *et al*, 2003).

For further information refer to:

IUCN (December 2002.). Silence on the Reefs IUCN news website. By IUCN

Pinto M.A. (2001). Gear selectivity for three by-catch species in the shallow-water shrimp trawl fishery at the Sofala Bank, Mozambique In: Richmond, M.D. and Francis, J.

(editors), 2001. Marine Sciences Development in Tanzania and Eastern Africa. Proceeding of the 20th Anniversary Conference on Advances in Marine Science in Tanzania. 28 June-1 July 1999. 489-505pp Zanzibar, Tanzania. By IMS/WIOMSA IUCN (December 2002.). Fishy Business in the Western Indian Ocean. 1p. IUCN website

Pereira M.A.M. (2000.). A Review on the Ecology, Exploitation and Conservation of Reef Fish Resources in Mozambique. Presented at the 2nd National Conference on Coastal Zones Research, Maputo 27-29 September 2000. By Ministry for Coordination of Environmental Affairs - Mozambique.

2.4.4 Endangered Species

Some species of marine animals are already endangered as a result of human activities, particularly the dugong or manatee, which is often caught in fishing nets and drowned. Marine turtles continue to decrease in numbers as their eggs are poached and the adults are killed for their meat and decorative shells. In the deep waters around the Comoros a unique fish, the coelacanth, which is a living fossil, is found and is now under threat from collectors (Gaudian *et al*, 2003). Birds are also facing the recent pressures with Boobies being of particular concern as they have declined throughout the western Indian Ocean, and the Abbot's booby *Sula abbotti* is now extinct in the region. Also the globally threatened coconut crab that is found throughout the region is now extinct in the Seychelles (Gaudian *et al*, 2003).

For further information refer to:

UNEP (1991) E - S. LEATHERWOOD and G.P DONOVAN (eds.): Cetaceans and Cetacean Research in the Indian Ocean Sanctuary. Marine Mammal Technical Report No: 3. UNEP

2.4.5 Coastal Erosion

Human encroachment and activities such as animal husbandry and agriculture are rapidly degrading the coastal environment of Eastern Africa, resulting in deforestation, destruction of mangroves and disappearance of other vegetation; a decline in soil fertility, and the death of wildlife (UNEP 1992). The shoreline in most of the region is receding as a result of coastal erosion: the shoreline retreat over parts of Tanzania has been estimated at between three and five meters per day.

For Further Information refer to:

Nyandwi N. (2001). Survey of the extent of human-induced beach erosion problems in Tanzania. In: Richmond, M.D. and Francis, J. (editors), 2001. Marine Sciences Development in Tanzania and Eastern Africa. Proceeding of the 20th Anniversary Conference on Advances in Marine Science in Tanzania. 28 June-1 July 1999. pp 121-129. Zanzibar, Tanzania. By IMS/WIOMSA

2.4.6 Habitat Destruction

Mangroves were once common in sheltered bays and estuaries, providing shelter to many important fish species and prawns. They are now threatened by intensive cropping to provide firewood, poles, tannin, medicinal products, paper pulp and timber, and to open up new space for aquaculture and salt production. Mangrove swamps are also threatened by fluctuations in the amount of fresh water and sediment reaching them caused by upstream hydraulic works, and indirectly by destruction of protective reefs, poles, firewood and by large-scale clearing for salt production (UNEP 1992). Seagrass beds in the region are under threat from intensive use of bottom traps and beach seines, explosives fishing (UNEP 1989 cited in Gaudian *et al*, 2003), sand mining and dredging.

Coral reefs have been damaged by excessive siltation resulting from poor agricultural practices, deforestation along riverbanks, the dredging and dumping associated with harbor development (UNEP 1992), over-utilization and coastal development, compounded by lack of awareness and lack of trained and experienced personnel available for reef management (Gaudian *et al*, 2003). Many were damaged by fishing with dynamite and poison, especially before these methods were outlawed in part of the region. Tourists collect coral as souvenirs (UNEP 1992). More recently the bleaching of corals and cyclonic events have become a severe problem in the death of corals.

For further information refer to:

The mangrove of the Eastern African Region. ISBN 92-807-1348-5. (UNEP, 1992).

The International Coral Reef Initiative (ICRI) Western Indian Ocean and Eastern African Regional Workshop Report. UNEP/IUCN. (UNEP 1997).

World Resources Institute (2001). Coastal and Marine Ecosystems, 7p. Washington By World Resources Institute – Tanzania, South Africa, Somalia, Seychelles, Reunion, Mozambique, Mauritius, Madagascar, Kenya, Comoros

Schleyer M.H., Obura D., Motta H. and Rodrigues M.J. (June 1999.). A preliminary assessment of coral bleaching in Mozambique. Unpublished Report No. 168. p16. By South African Association for Marine Biological Research

Obura, D., M. Suleiman, H. Motta and M. Schleyer (2000). Chapter 4. Status of coral reefs in East Africa: Kenya, Mozambique, South Africa and Tanzania. Status report by the Global Coral Reef Monitoring Network. p. 65-76. By GCRMN

Bigot, L., L. Charpy, J. Maharavo, F. Abdou Rabi, N. Ppaupiah, R. Aumeeruddy, C. Villedieu and A. Lietaud (2000). Chapter 5. Status of coral reefs of the Southern Indian Ocean: The Indian Ocean Commission Node for Comoros, Madagascar, Mauritius, Reunion and Seychelles. Status report by the Global Coral Reef Monitoring Network. p. 77-93.

Semesi A.K., Mgya Y., Muruke M., Francis J., Julius A., Lugomela C., Mtolera M., Kuguru B., Kivia D., Lilungulu J., Magege D., Mposo A., Kaijunga D., Mwinoki N., Msumi G. and Kalangahe B. (2001). Coastal resources of Bagamoyo District, Tanzania In: Richmond, M.D. and Francis, J. (editors), 2001. Marine Sciences Development in Tanzania and Eastern Africa. Proceeding of the 20th Anniversary Conference on Advances in Marine Science in Tanzania. 28 June-1 July 1999. 517-534pp Zanzibar, Tanzania. By IMS/WIOMSA

Pereira, M.A.M., Gonçalves P.M.B., Motta H., Rodrigues M.J. (2000.). Coral Reef Monitoring in Mozambique: The Program and 1999 Results. Presented at the 2nd National Conference on Coastal Zones Research Maputo 27-29 September 2000. 4p.

Mozambique

Sigana D.A. (2001). Coral reef structure at Zanzibar Island, Tanzania. In: Richmond, M.D. and Francis, J. (editors), 2001. Marine Sciences Development in Tanzania and Eastern Africa. Proceeding of the 20th Anniversary Conference on Advances in Marine Science in Tanzania. 28 June-1 July 1999. pp 263-275. Zanzibar, Tanzania. By IMS/WIOMSA

UNEP. (1997.). Global Coral Reef Monitoring Network (GCRMN) workshop. Mombasa, Kenya, 28th February 1997.

Mohammed M.S. and Mgaya Y.D. (2001). Nutrient levels and their dynamics in the coral reefs off Zanzibar Town. In: Richmond, M.D. and Francis, J. (editors), 2001. Marine Sciences Development in Tanzania and Eastern Africa. Proceeding of the 20th Anniversary Conference on Advances in Marine Science in Tanzania. 28 June-1 July 1999. pp 171-183. Zanzibar, Tanzania. By IMS/WIOMSA

Obura D., Celliers L., Machano H., Mangubhai S., Mohammed S.M., Motta H., Muhando C., Muthiga N., Pereira M. and Schleyer M. (2002). Status of coral reefs in eastern Africa: Kenya, Tanzania, Mozambique and South Africa GCRMN Status Report 2002. Chapter 4. By GCRMN

Ahamada, S., L Bigot, J. Bijoux, J. Maharavo, S. Meunier, M. Moyne-Picard and N. Paupiah (2002). Status of Coral Reefs in the South West Indian Ocean Island Node: Comoros, Madagascar, Mauritius, Reunion and Seychelles. GCRMN Status Report 2002. Chapter 5.

Muhando C.A., Francis J. (2000). The Status of coral reefs in the Dar-es-Salaam Marine Reserves System and the state of reefs in other marine protected areas of Tanzania. 23p. Nairobi, Kenya By International Coral Reef Action Network. IMS

Mrambah, G. (1994). A report on the state of mangroves. pp. 11-16 In: Proceedings of a Workshop on Ruvu River Mangrove Ecosystem. 23-15 September 1994, NEMC

Shunula, J.P. (1990). A survey on the distribution and status of Mangrove forests in Zanzibar, Tanzania. Zanzibar Environmental Study Series No. 5, pp. 1-35

Mackentley, N. (1999). Assessment of the potential for mangrove ecotourism in Mweni Village. Department of Zoology and Marine Biology, University of Dar es Salaam and the School for International Training, College Study Abroad, Tanzania: Biodiversity and Conservation, Iringa, Tanzania, 27 pp.

Semesi, A.K. (1990). Conservation and utilization of mangrove plants along the coast of Tanzania. Proceedings of the First Natl. Workshop on Plant Geneticp. 267-279 In: F.S. Shao, A.N. Magingo, H.F. Bitanyi and R.L.A. Mahunnah. Proceedings of the First National Workshop on Plant Genetic Resources and Biotechnology. 16-20 January 1990. Arusha, Tanzania

Darwall, W.R.T. (1993). Conservation of marine habitats: Coral reefs, seagrass beds and mangroves. Mahali Magazine, pp. 18-21

2.4.7 Climate change

A task team report on the implications of climate change for the Eastern African region concluded that the region's low-lying coastal areas and marine ecosystems, water resources, terrestrial ecosystems and human settlements and coastal infrastructure are at risk as a consequence of climate change impacts (UNEP 1992). The economies of the region are dominated by agriculture, fishing and tourism. The effects of climate change will be felt everywhere, perhaps most obviously in altered patterns of rainfall, coastal weathering, atmospheric pressure and evaporation. The spatial and temporal

distribution of storms and cyclones will change their paths and frequency, and could well increase in intensity. Besides the direct toll on human lives, there will be impacts on coastal habitats such as coral reefs, lagoons, and mangroves. The reefs will be vulnerable to wave action and sea-level rise as well as sedimentation. Their destruction will lead to a decline in natural coastal defences and further encourage coastal erosion (UNEP 1992).

The quality and quantity of water available from rainfall, rivers and ground water will be affected by changes in the distribution and amount of rainfall, evapo-transpiration, surface runoff, river discharge, recharge, and aquifer volumes. Drier and hotter conditions would place an inordinate pressure on water resources (UNEP 1992).

Ecosystem effects could include latitudinal and altitudinal shifts in plant and animal species as well as, loss of biodiversity due to water scarcity and arid soil conditions. While agriculture might benefit somewhat from a global increase in CO₂, moisture deficits would lower crop yields and require additional irrigation. Sea-level rise would increase the intrusion of saline water up river mouths and also decrease the area available for cultivation on low-lying coastal areas and river estuaries (UNEP 1992).

Fisheries would be affected by changes to the breeding and migratory habits of most fish, hence, year to year variability of stocks could increase leading to a planning and management problems. Socio-economic activities, and infrastructure such as port facilities, waste disposal, roads, are already under stress. Climate change would create additional stress, hence reducing economic performance and growth (UNEP 1992). The potential threat of climate change and sea level rise is a serious issue that must be taken into consideration with the development of appropriate management plans.

For further information refer to:

UNEP (1992) Implications of Expected Climate Change in the East African Coastal Region: An Overview. Regional Seas Reports and Studies No.149, A.L Alusa and L.J.Ogalo, UNEP

Intergovernmental Panel for Climate Change <http://www.ipcc.ch/>.

2.4.8 Integrated Coastal Zone Management

For further information refer to:

UNEP/FAO/PAP. (2001). CASE STUDY REPORT: Protection and Management of the Marine and Coastal Areas of Eastern Africa Project - EAF/5. East African Regional Seas Technical Reports Series No. 10. Split, Croatia. By UNEP/FAO/PAP.

Motta H, Sdrjan T. (1996). The integrated coastal area management of the Xai-Xai District. Gaza province - Mozambique. 14 p. By Ministry for Coordination of Environmental Affairs – Mozambique

UNEP/FAO/PAP/CDA. (2000). Progress in Integrated Coastal Management for Sustainable Development of Zanzibar's Coast: Unguja Island Coastal Profile and Management Strategy. East African Regional Seas Technical Reports Series No. 7. Split, Croatia. By UNEP/FAO/PAP

Wagner, G.M.; Mallya, U.; Juma, S.; Mgaya, Y.D.; Wahure, O.; Mahika, G. (1999). A preliminary investigation for an integrated, community-based approach to conservation

and restoration on marine ecosystems along the Dar es Salaam coast. African Development Foundation, Dar es Salaam, 124 pp.
Tanga Coastal Zone Conservation and Development Programme (1997). Action Speaks Louder than Plans: Tanga Coastal Zone Conservation and Development Programme, Phase 1: Final Report. Tanga Coastal Zone Conservation and Development Programme, Tanga, Tanzania, 78 pp. + 54 App. pp

2.5 Current Activities

2.5.1 Protection and Management of Marine and Coastal Areas

Project: EAF/5

Partners: Sida, National Governments, UNEP, FAO (Funding)

Objective: The projects main objective is to develop in collaboration with other UN agencies and Multilateral/Bilateral donors national self-reliance in all matters related to integrated development and management of the environment of the coastal areas.(achieved through a series of integrated activities aimed at protection, sustainable use and management of coastal zone resources)

Pilot Phase:

- An interactive participatory learning process; The process is adaptive enough to reconcile already conflicting and diverging interests over resources e.g. fisheries, forestry, tourism etc.; in heavily developed sites; and pro-actively evolving into a management tool that is dynamic to facilitate resource allocation in developing sites.
- The pilot phase equally proposes Pilot project activities in well defined pilot areas with clear boundaries and representative issues (Few defined issues, attainable objectives, short term management actions).
- Pilot Sites: Comoros, Kenya, Mozambique, Tanzania

Planning and Implementation phase:

The process in the Planning and Implementation phase is continuous and interlinked. Activities in these phases requires national teams to consider lessons learned from the pilot phase and to reassess program strategies.

Major Activities:

The following activities are geared towards the development of Integrated Coastal Management programmes

- Development of Integrated Coastal Management (ICM) strategies for selected pilot sites
- Implementation of demonstration projects (e.g. fish landing sites, dune restoration, public beach facility improvement) on selected sites
- Development and implementation of priority bankable projects identified within the ICM strategies developed
- Development and implementation of national public awareness material and campaign strategies

Outputs: <http://www.unep.org/water/regseas/eaf/eaf5/eaf5.pdf>.

2.5.1.1 Projects

Project a) West Indian Ocean Marine Science Association (WIOMSA)

Cost (\$): 40,000

Period: 2002-2003

Partners: Nairobi Convention, Western Indian Ocean Marine Science Association (WIOMSA)

Objective: To facilitate the operation of WIOMSA as the Regional Activity Centre for the Eastern African Programme in performing the following activities:

- Assessment of Integrated Coastal Management Programmes in the Eastern African Region;
- Organization of Coral Reef Task Force
- Co-organization of Regional Training Course in Marine Protected Area (MPA) management at St. Lucia, South Africa.

Expected Outputs:

- Progress Report
- 1st Coral Reef Task Force Meeting, held in Nairobi, 5 Sept. 2002 and Meeting Report produced.
- Training Course held at St. Lucia, South Africa in June 2002.

Activities on assessment of integrated coastal management are ongoing.

Project b) WIOMSA

Cost (\$): 50,000

Period: 2002-2003

Partner: WIOMSA, UNEP-GPA, Nairobi Convention

Objective:

- To implement the GPA Project entitled: "Physical Alteration and Destruction of Habitats" in the Eastern African Region.
- To organize the workshop on municipal wastewater management

Expected Output:

- Eastern Africa Regional Meeting on PA DH, August 2003;
- Reports of the Meetings.
- Municipal Wastewater Management Training was held in Mombasa in April 2003.
- Preparations for the Regional PA DH Meeting are ongoing.

Project: International Coral Reef Action Network (ICRAN) - East African Component (EAF)

Cost (\$): 300,000

Period: 2002-2003

Partners: ICRAN Secretariat for the Nairobi Convention, IUCN, Kenya Wildlife Service, Dar es-Salaam Marine Reserves Systems (DMRS) in Tanzania, WIOMSA, Association Nationale pour la Gestion des Aires Protégées (ANGAP) in Madagascar, St. Anne Marine Parks with Seychelles Marine Parks Authority.

Objective: The East African Component of the ICRAN Project aims to halt the trend of degradation of coral reefs in the Eastern African Region.

Expected Outputs:

- Network of demonstration and target sites in participating Regional Seas.
- Enhanced capacity for ICM and MPA management and communication at demonstration sites.
- Enhanced capacity for ICM and MPA management, including stakeholder involvement in the participating regions.

- Exchange of experiences and lessons learnt among countries.
- Capacity enhanced among coastal managers, policy and decision-makers and Government.
- Strengthened stakeholder participation in coral reef management.
- Benefits to local community groups.
- Regional guidelines and recommendations for best practices

The following MOUs signed under the Framework of the Eastern African Component of the ICRAN project are ongoing:

- MOU with IUCN
- MOU with Kenya Wildlife Service (KWS)
- MOU with Dar es Salaam Marine Reserves System (DMRS) in Tanzania
-

Project: IUCN

Cost (\$): 50,000

Period: 2002-2003

Partners: ICRAN, IUCN Regional Office, Kenya, Secretariat for the Nairobi Convention, WIOMSA/CZMC

Objective: To improve management Effectiveness of Marine Protected Areas in ICRAN Demonstration Sites in the Western Indian Ocean by:

- Developing specific indicators and guidelines for MPA Managers to evaluate the effectiveness of their sites;
- Design pilot projects and field test the MPA management effectiveness indicators and guidelines; and
- Increase awareness and use of monitoring and evaluation in the management of MPAs.

Report of all activities covered under the MOU:

Expected Outputs:

- Training Workshop for MPA Managers on use of guidelines;
- Implementation of pilot sites;
- Documentation and dissemination of lessons learned.

A programme on marine mammals, notably the Dugong has been initiated by UNEP, WWF and IUCN.

Project: Kenya Wildlife Service (KWS)

Cost (\$): 50,000

Period: 2001-2003

Partners: ICRAN, KWS, Nairobi Convention

Objective:

- Preparation of a detailed provide for the demonstration and implementation of management action strategies for the MPA complex;
- Demonstrate of a small infrastructure developments to enhance the management of the MPA complex;
- Review of social and poverty alleviation issues in order to develop a better understanding of the stakeholder issues;
- Review of current management plans;
- To develop training and education network through the Malindi Resource and Training Centre.

Expected Outputs:

- Capacity enhanced among key MPA stakeholders;

- Information required for the profiling exercise compiled;
- Improved facilities.

ICRAN demonstration site in Tanzania.

Project: Dar es Salaam Marine Reserves Systems (DMRS)

Cost (\$): 50,000

Period: 2002-2003

Partners: ICRAN, Secretariat for the Nairobi Convention

Objective:

- To create an enabling environment for action participation of all stakeholders in Dar es Salaam Marine Reserves System (DMRS);
- To improve capacity of key stakeholders and institutions for conservation and management of DMRS
- To protect natural resources, cultural heritage and tourist attractions from illegal use;
- To promote, diversity and develop ecotourism opportunities.

Expected Outputs: General Management Plan for Dar-es Salaam Marine Reserves Systems developed.

Government of Seychelles

Cost (\$): 38,000

Period: 2002

Partners: Seychelles Ministry of Environment and Transport, UNEP/Nairobi Convention

Objective:

- To support the work of the Interim Coordinator, Regional Coordinating Unit of the Nairobi Convention;
- Main contact and consult regularly with all Parties to the Nairobi Convention

Expected Outputs: Political goodwill from all Parties to the Convention.
(Regional Seas 2003)

Coral Reef Task Force (CRTF)

At the first meeting of the Coral Reef Task Force (CRTF), 4th September 2002, it was announced that CRTF will undertake the following:

- Improve reporting mechanisms nationally and within the region on all coral reef work;
- Prepare regional coral reef action strategies to be implemented through the framework of the Nairobi Convention by the collaborating partners of the Nairobi Convention as well as national institutions;
- Encourage each country to examine the need for appropriate mechanisms to design be implemented through the framework of the Nairobi convention by the collaborating partners of the Nairobi Convention as well as National institutions;
- Encourage each country to effectively establish coral reef programs in the country and recommend better co-ordination within and between countries in the region;
- Facilitate and encourage communication and the dissemination of information within the region using mechanisms appropriate to the technology of the Nairobi Convention Area i.e. a) simple text newsletter that would collate information from various coral related activities in the region, and b) discussion groups;
- Encourage the development of capacity building and training opportunities, materials, and manuals for national groups involved in coral reef programmes.
- Encourage the establishment of national coral reefs task forces and support the development of local capacity in research, management and government, co-

ordinate communication at the national level, and serve as a platform to share information on regional initiatives;

- Review the recommendations and other relevant information from ICRI-CPC as well as other regional and international initiatives, and to recommend the inclusion of relevant activities in the Nairobi Convention work program;
- Serve as the regional ICRI co-ordinating committee for Eastern Africa;
- Raise awareness and improve knowledge on coral reefs through information exchange in the region and among regions, through various tools;
- Promote both biophysical and socio-economic monitoring, and more effective co-ordination with regional and international monitoring programmes;
- Review legislation and policy change at national level;
- Facilitate communication with other organizations working on large scale monitoring of ecosystems.
- Raise the profile of coral reef issues in the region in a bid to attract funds.

2.5.2 Assessment and control of pollution in the Coastal and Marine Environment

Project: EAF/6

Objective:

- i) to increase the capability of the Eastern African States to assess and control marine pollution, and
- (ii) to promote the adoption of measures to contain site-specific problems identified during the execution of the project.

Activities:

- Establishment of a network of cooperating institutions;
- Regional survey of land-based sources of pollution;
- Site-specific pollution assessment and
- control programme Monitoring of reference sites

Outputs:

- By the end of June 1994, 6 country reports were produced
- Technical report of the IOC/FAO/UNEP Workshop on Regional Aspects of Marine Pollution: Mauritius, 29 October-9 November 1990 Authors: Professor Davide Calamari, Institute of Agricultural Entomology, University of Milan, Italy; Professor Kenneth Iwugo, Department of Civil Engineering, University of Lagos, Nigeria
- IOC/FAO/UNEP Training Course on Nutrient Analysis and Water Quality Monitoring, Zanzibar, Tanzania, 21-26 November 1994. IOC Reports No. 32.

All the country reports have been used in the preparation of National Coastal Management strategies and coastal profiles within the EAF/5 project. The country reports have also been used to prepare strategies within the framework of the global programme of action for the protection of the marine environment from land based activities in each country.

2.5.2.1 Ongoing Projects

Addressing Land-Based Activities in the Western Indian Ocean (WIO-LaB).

Cost (\$): 3.9 Million USD

2.5.3 Contingency Planning for Marine Pollution Emergencies

2.5.3.1 Contingency Planning for Marine Pollution Emergencies (EAF/7)

2.5.3.2 On Going Projects

[To come]

2.5.4 Control of Coastal Erosion

2.5.4.1 Control of Coastal Erosion (EAF/10)

At the Coastal Erosion Workshop, 27-29th November 2002, Nairobi, Kenya, Dr. Isabelle NIANG-DIOP presented the Project of Coastal Erosion of the African Process. The African Process is a result of the Maputo and Cape Town Conferences on coastal management held in 1998. A GEF MSP project was initiated to conduct problem analysis of the major environmental problems facing a number of countries in the Sub-Saharan Africa and to develop an integrated programme of intervention. Eleven countries from Africa representing Nairobi and Abidjan Conventions areas participated in the process. A portfolio of 20 project proposals representing about 312 million US \$ were developed within five thematic areas: coastal erosion, tourism, management of key habitats, pollution, and sustainable use of living resources. Three projects deals with coastal erosion and aiming at: addressing coastal erosion problems by coastal protection structures in identified hot spots, to overcome constraints to ICAM and implement pilot projects in selected areas and to assess the vulnerability of the coasts to all the impacts of Climate changes.

2.5.4.2 Ongoing Projects

Physical Alteration and Destruction of Habitats

Partner: GPA

2.5.5 Environmental Impact Assessment

Environmental Impact Assessment (EAF/11)

2.5.5.1 On Going Projects

2.5.6 Database Resources

East African Coastal and Marine Environment resources Database and Atlas Project EAF/14

Objective: The Eastern African Action Plan database intends to facilitate access to environmental information in the region. You can find documents, contacts, pictures, illustrations and maps concerning the region using the search functions indicated above.

2.5.6.1 Ongoing Projects

Indian Ocean Global Ocean Observing System (IOGOOS)

The main objective of IOGOOS is to set an oceanic observing system in Indian Ocean as a whole.

2.5.7 Land-based Sources of Pollution

GEF-WIO Project

Cost (\$): 4.3 million

Period: 2003-2006

Partners: GEF, GPA, Secretariat for the Nairobi Convention

Objective: To support the land-based activities in the West Indian Ocean (including TDA and SAP updates) (WIO-LaB)

Expected Output: Sustainable framework for managing land-based sources, including geographically-specific TDA and concrete SAP with legal/institutional reforms and sound investments

The Project was approved by the GEF Council in May 2003.

NORWAY

Cost (\$): 5.3 million

Period: 2002-2006

Partners: Norwegian Government, GPA

Objective:

- To strengthen regional legal basis for preventing land-based sources of pollution, including through the implementation of the Global Programme of Action of the Protection of the Marine Environment from land-based Activities;
- To reduced stress to the ecosystem by improving water and sediment quality;
- To develop regional capacity and strengthen institutions for sustainable, less polluting development, including the implementation of the Nairobi Convention and its action plan as approved by participating Governments.

Expected Outputs:

- Enhanced capacity developed for sustainable environmental management in the region;
- Improved knowledge of priority pollutants and carrying capacity;
- Cross-sectoral policy documents and mutually supportive financial budgets explicitly targeting the reduction of GPA pollution source categories;
- Six demonstration projects successfully implemented.

Awaiting approval by Norway

(Regional Seas 2003)

3 Publications

3.1 Regional Seas Reports and Studies

Link to RSRS:

http://www.earthprint.com/show.htm?url=http://www.earthprint.com/cgi-bin/ncommerce3/CategoryDisplay?cgrfnbr=21240&cgmenbr=27973&CGRY_NUM=&nxt=1

3.2 Technical Reports

EARS 2 - E - UNEP/FAO/PAP/MICOA: Xai-Xai District Coastal Area Management Strategy. East African Regional Seas Technical Reports Series No: 2. Split, Croatia, UNEP/FAO/PAP/MICOA. 1998. (84 pages).

EARS 4 - E - PNUE/FAO/PAP: L'île de Grande Comore Profil Côtier et Stratégie de Planification. Série de rapports techniques des Mers régionales de l'Afrique de l'Est No: 4. Split, Croatie, PNUE/FAO/PAP. 1998. (136 pages).

Link to East African Coastal Database: <http://www.unep.org/easternafrika/>. Or search the Environment Directory (LINK)

3.3 Meeting Reports

Report of the second meeting group of experts for Marine Protected Areas in the Eastern African Region (GEMPA-EA), 5th September 2002, Nairobi, Kenya.

Report of the first meeting of the Coral Reef Task Force (CRTF), 4th September 2002, Nairobi, Kenya.

Report of the Coastal Erosion Workshop, 27-29th November 2002, Nairobi, Kenya.

Link to East African Coastal Database: <http://www.unep.org/easternafrika/>. Or search the Environment Directory (LINK)

3.4 Other Publications

Link to East African Coastal Database: <http://www.unep.org/easternafrika/>. Or search the Environment Directory (LINK)

3.5 Website Links

[Pan-African Conference on Sustainable Integrated Management \(PACSICOM\)](http://www.unep.ch/seas/main/eaf/pacsicom)
<http://www.unep.ch/seas/main/eaf/pacsicom>

East African Coastal Database: <http://www.unep.org/easternafrika/>.

Cape Town Declaration <http://www.unep.ch/seas/main/eaf/eafctd.html>.

Amara Conservation <http://www.amaraconservation.org/>.

FARM Africa <http://www.farmafrika.org.uk/>.

Save the elephants <http://www.savetheelephants.org/>.

The David Sheldrick Trust <http://www.sheldrickwildlifetrust.org/>.

Wildlife Management
<http://www.cc.colorado.edu/Dept/EC/Faculty/Hecox/erichecox/kenzim.html>.
Parcs Nationaux et Réserves Naturelles Madagascar <http://www.parcs-madagascar.com/>
Tandroy Conservation Trust <http://www.tandroyconservation.org.uk/>
Earthshots: Satellite Images of Environmental Change: Mozambique
<http://edcwww.cr.usgs.gov/earthshots/slow/Mozambique/Mozambique>
Integrated Analysis and Modeling <http://mozambique.gecp.virginia.edu>
Empowerment for African Sustainable Development <http://easd.org.za/>
Endangered Wildlife Trust <http://www.ewt.org.za/>
Environmental Justice Networking Forum <http://www.botany.uwc.ac.za/infcreep/ejnf.htm>
Institute of Natural Resources <http://www.inr.unp.ac.za/>
Natural Resource Management in Semi Arid Areas of South Africa
<http://www.york.ac.uk/inst/sei/safrica/intro.html>
The Centre for Wildlife Management <http://www.wildnetafrica.com/wildlifetraining/cw/m/>
East African Crossborder Biodiversity Project <http://x-borderbiodiversity.tripod.com>
GTZ Wildlife Programme in Tanzania <http://wildlife-programme.gtz.de/wildlife/>
Tony Fitzjohn-George Adamson African Wildlife Preservation Trust
<http://www.mkomazi.com/>
Somalia Environmental Protection and Anti-Desertification Organisation
<http://members.tripod.com/~sepado/>
Resource Africa <http://www.resourceafrica.org/directory/2/index.html>.
A Global Representative System of Marine Protected Areas
<http://www.deh.gov.au/coasts/mpa/nrsmpa/global/volume3/chapter12.html>

3.6 Newsletter

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4 Calendar of Events

	Title	Venue	Dates
A	Joint GEMPA Task Force Meeting	Nairobi - IUCN	4 February
A	Work Programme Meeting - Nairobi Convention	Nairobi	15-18 March
C	Regional AfriCat Synthesis & Futures Meeting (LOICZ Project)	Mombasa	16-18 February
B	Workshop on Marine Pollution Prevention and Environmental Management in Ports in Eastern Africa	Mombasa	26-30 April
C	London Convention Scientific Group Meeting	Mombasa	3-7 May
A	COP-4 for The Nairobi Convention	Madagascar	17-19 May
A	Work Programme Meeting - Abidjan Convention	Not decided	July
A	COP-6 for The Abidjan Convention	Not decided	November - tentatively
A	Inception Meeting for the GEF-WIO-LaB Meeting	To be determined once the project is operationalized in April - May 2004.	

- A- Organized by The secretariat.
- B- Organized in collaboration with Others
- C- Organized by UN agency with some limited support from the secretariat.
- D-

5 Professionals

5.1 List of Technical Consultants

[To come]

5.2 List of Institutions

[To come]

6 Advertisements

[To come]

7 References

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