

Biodiversity and War: A Case Study of Mozambique

By John Hatton, Mia Couto,
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Biodiversity Support Program

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Acronyms and Abbreviations

ANC	African National Congress
CBD	Convention on Biological Diversity
CMBMP	Coastal and Marine Biodiversity Management Project
CBNRM	Community-Based Natural Resource Management
DBS	Department of Biological Sciences
DFID	Department for International Development
DNFFB	Direcção Nacional de Florestas e Fauna Bravia (National Directorate of Forestry and Wildlife)
EIA	Environmental Impact Assessment
FRELIMO	Frente de Libertação de Moçambique (Mozambique Liberation Front)
GDP	Gross Domestic Product
GERFFA	Gestão dos Recursos Florestais e Faunísticos (Forestry and Wildlife Resources Management Project)
GKG	Gaza-Kruger-Gonarhezou
GNP	Gorongosa National Park
GOM	Government of Mozambique
HIPC	Heavily Indebted Poor Countries
IUCN ROSA	World Conservation Union, Regional Office for Southern Africa
MC	Maputaland Centre of Endemism
MICOA	Ministério de Coordenação de Acção Ambiental (Ministry for Coordination of Environmental Affairs)
MNR	Movimento de Resistência Nacional (National Resistance Movement)
MT	Ministério de Turismo (Ministry of Tourism)
NCSD	National Commission for Sustainable Development
NEMP	National Environmental Management Programme
NSIMA	Northern Sofala Integrated Management Area
RENAMO	Resistência Nacional Moçambicana (Mozambican National Resistance)
SRN	Sociedade para a Gestão e Desenvolvimento da Reserva do Niassa (Company for the Management and Development of Niassa Reserve)
TFCA	Transfrontier Conservation Area
UNCED	United Nations Conference on Environment and Development
UNOMOZ	United Nations Operation in Mozambique
WWF SARPO	Worldwide Fund for Nature, Southern Africa Regional Programme Office
ZANU	Zimbabwe African Nationalist Union

Abstract

Mozambique has experienced a turbulent history: several centuries of Portuguese administration, a long war of Independence, an abrupt transition to Independence in 1975, a short period of post-Independence stability (1975-1980) followed by a long and bloody armed conflict which finally came to a conclusion in 1992.

The twelve-year armed conflict that followed Independence resulted in large-scale social upheaval (an estimated 50 percent of the rural population was displaced) and stalled economic development. The two opposing forces (Mozambique Liberation Front, FRELIMO and Mozambican National Resistance, RENAMO) finally signed a Peace Accord in Rome in October 1992. The large-scale intervention by the United Nations peace-keeping force in Mozambique (UNOMOZ) contributed to the maintenance of peace and the holding of Mozambique's first democratic elections in October 1994. A critical feature of the UN intervention was the successful demobilization of the armed forces of both parties.

The successful transition to peace was only possible due to the genuine will of all parties to make the necessary compromises to bring the bloody armed conflict to an end.

The natural resource base of the country was severely affected during the armed conflict. The wildlife resources, especially large mammal species, were decimated in many areas inside and outside of protected areas. Hunting for meat and trophies was particularly severe in areas where troops were stationed for long periods of time e.g., Northern Sofala Province including Gorongosa National Park and the Zambezi Delta. South African and Zimbabwean troops (supporting RENAMO and FRELIMO respectively) contributed to the decline in large mammal species. Infrastructure within the protected areas was largely destroyed.

The natural resource base in peri-urban areas and areas adjacent to guarded transport corridors also came under heavy pressure due to the large influx of displaced persons.

The immediate post-war period was followed by largely uncontrolled (and often illegal) harvesting of wildlife and forestry resources that accompanied the de-mining process and the rehabilitation of roads and bridges in the absence of adequate enforcement.

The implementation of community-based natural resource management (CBNRM) projects has been hampered by the breakdown in traditional authority and traditional

management in some areas. This is exacerbated by a degree of relocation of people from one area to another due to the armed conflict.

The adoption of a number of national policies and laws has resulted in improved control over the harvesting of natural resources since the mid-1990s. Gradually, the Wildlife Service has established improved management (including law enforcement) in most of the protected areas. The process is ongoing, but is hampered by inadequate operational support and funds.

Contrary to the expectations of many, lasting peace and stability have returned to Mozambique. This has been accompanied by unprecedented economic growth. In many ways Mozambique is a success story on the African continent. The main challenge now facing the country and her people is to ensure the sustainable use of the natural resource base upon which the country's development depends.

1. Introduction

This case study focuses on the impacts of Mozambique's 1980-1992 armed conflict on biodiversity. It covers both impacts occurring during the conflict, and post-war effects, some of which are still being felt in 2001. Less is known about the impacts of previous conflicts in Mozambique, particularly the independence war.

In order to understand the impacts of the last conflict it is important to understand its historical, geographical, political and ecological setting.

Mozambique, with a land area of 799,000 km² and a population of 16.1 million, has experienced a turbulent history, as documented in Newitt (1995):

- 9th to 16th centuries: Arab trading occurred along the coast including trade in ivory.
- 16th to 19th centuries: Areas of present-day Mozambique came under Portuguese influence. This was a period of major social upheaval characterized by conquering, acquisition of land (mainly by force), warlordism and breakdown of traditional authority systems.
- 1891 to 1975: Following the Berlin Conference the present-day boundaries of Mozambique were defined as a Portuguese colony. Colonial administration was weak and large areas were effectively administered by charter companies. Forced labor was common.
- 1964-1974: War of liberation was waged by the Mozambique Liberation Front (FRELIMO).
- 1975-1980: This was a brief period of post-Independence peace for Mozambique as a one-party state with a FRELIMO government.
- 1980-1992: Armed conflict between FRELIMO and the National Resistance Movement (RENAMO) affected most of the country. Fifty per cent of the rural population was displaced, development stalled, and a breakdown in natural resource management occurred in much of the country.

- 1992- 2001: The Rome Peace accord was signed in October 1992. Democratic elections were held in October 1994, and displaced persons returned. De-mining and opening up of access routes ensued, along with emergency assistance, consolidation of peace and stability, and economic growth (since 1995). During the initial post-war phase uncontrolled harvesting of resources occurred, followed by progressively improved management of natural resources associated with improved policy, legal and institutional developments.

The 12 year armed conflict (1980 to 1992) waged between FRELIMO and RENAMO impacted on the lives of all Mozambicans in one way or another. It is estimated that at least 50 percent of the rural population was displaced during the war (either internally or as refugees in neighboring countries). The armed conflict stalled economic development and Mozambique was registered as one of the poorest nations of the developing world.

As Newitt (1995) highlights it is important to place the recent armed conflict in the context of Mozambique's turbulent history that has been characterized by long periods of war, banditry and warlordism interspersed with only occasional periods of peace and stability (see Section 2.1). This does not imply that the recent armed conflict was "pre-ordained" as many other factors contributed to the return to instability, most notably South Africa's attempts to destabilize its neighbors combined with the inherent fragility of Mozambican institutions after Independence in 1975.

Following Independence most trained Portuguese nationals left Mozambique and capacity across all sectors was critically weak including the forestry and wildlife sectors. During the ensuing armed conflict, management of natural resources broke down in many areas inside and outside of protected areas, where local communities were forced to flee, protected areas were abandoned, and government controls ceased. Exceptions included protected areas in isolated locations (e.g. Niassa Reserve on the Tanzania border in the north) and offshore (e.g. Bazaruto National Park and Inhaca Island Biological Reserves).

Wildlife populations in most protected areas were decimated during the armed conflict including Gorongosa National Park, the flagship conservation area (see section 5.1). Wildlife populations were particularly affected in areas where troops were stationed over long periods. The South African army (supporting RENAMO) and the Zimbabwean army (supporting FRELIMO) are reported to have hunted for, and exported, wildlife trophies including ivory and rhinoceros horn.¹

1. <http://www.und.ac.za/und/indic/archives/crime/issue10/conserv.html>;
<http://www.beyond-the-illusion.com/files/Issues/sawdlif.txt>.

Peri-urban and urban areas, coastal areas and transport corridors experienced a large influx of displaced people. This resulted in a dramatic impact on the local natural resource base through hunting, and cutting of woody vegetation for firewood and shelter.

The period immediately following the onset of peace in 1992 was characterized by largely uncontrolled exploitation of forestry and wildlife resources in many areas. This accompanied the progressive de-mining of rural areas and the rehabilitation of roads and bridges. The Forestry and Wildlife Services were critically understaffed and lacked the necessary operational support to control the harvesting of natural resources in the immediate post-war period.

Since 1994 the Government of Mozambique has adopted a number of policies and passed legislation for improved natural resource management. These include:

- The Environmental Framework Law
- The Land Law
- The Forestry and Wildlife Law.

The new policy and legislative framework has been accompanied by institutional strengthening and gradually the management of natural resources is improving.

The first post-war priority of the wildlife sector was the rehabilitation of the existing protected area network. The new policy and legislative framework recognizes the role of local communities in the management of Mozambique's natural resources. Currently, there are several donor-funded community-based natural resource management projects involving the forest and wildlife services, local communities, non-governmental organizations (NGOs) and the private sector.

It was not possible to carry out biodiversity research during the armed conflict, and at the end of the war knowledge of the status of Mozambique's biodiversity was very poor. In recent years there have been several research projects aimed at documenting Mozambique's biodiversity. As these results become available there are new opportunities for biodiversity conservation, emphasizing co-management with local communities.

2. Political history, population, and economy of Mozambique

2.1 Political history

Mozambique has experienced a long and turbulent history, documented by Newitt (1995).

Arabs traded along the Mozambican coast since at least the 9th century, some 500 years before the first arrival of the Portuguese. One of the most important Arab trading posts was located at Sofala (about 40 km south of the present-day city of Beira) where the main trade involved the export of ivory and gold and the import of cloth from India.

The Portuguese first landed on the Mozambique coast at Mozambique Island in 1498 during Vasco da Gama's voyage to India. In 1506 that they established a permanent presence on the coast at Sofala, coming into contact and conflict with the Arab traders. From 1520 the Portuguese occupation of the coast widened, a settlement was established at Sofala, and the trade in gold and ivory by the Portuguese "captains" increased markedly.

During the third quarter of the 16th century the Portuguese attempted to conquer the lands of the Karanga kingdom of Monomotapa, in order to control the gold mines that were believed to occur in the interior. This ended in failure, although they managed to establish a presence at Sena and Tete on the Zambezi River, from where they traded with the interior. In the 17th and 18th centuries Portuguese state control over the most of the interior of Mozambique was weak or non-existent although they managed conquer the Karanga kingdoms in the interior of the country south of the Zambezi River.

De facto control and administration during this period fell to powerful Afro-Portuguese (*mestizo*) families who were to dominate Mozambican affairs until the late 19th century. It was the Afro-Portuguese that enabled Portugal to retain its Mozambican territories when almost all the other settlements of the *Estado da India* were lost; through them Portugal remained an imperial power. The wealthier Afro-Portuguese families maintained private armies and they effectively became warlords, alternately forming alliances with local African chiefs, and acquiring land from them by force. In this way the *mesti-*

zos formed a parallel establishment which challenged both the formal authority of Portuguese officialdom as well as traditional African chieftaincy.

Ironically, though the Afro-Portuguese families were the agents through which domination and conquest were achieved by the Portuguese in Mozambique, they were also central to the nationalist movement that sought to end Portuguese rule in the mid-20th century. As Newitt (1995) states: “understanding the history of these *mestizo* families is therefore essential to understanding the uniqueness of Mozambique’s history”.

The “*prazos*” were inseparably linked with the fortunes of the Afro-Portuguese. *Prazos* were a form of land grant by the Portuguese but from the African perspective they were essentially chieftaincies. *Prazos* were sometimes acquired through concessions or gifts from African chiefs, but mostly through the private armies of the leading Afro-Portuguese families. The Afro-Portuguese warlords recruited fighters from various ethnic groups who were rewarded with booty and captive women. The greater the success of a warlord, the more assured he could be of retaining a large body of supporters. This entire period was therefore one of lawlessness and factional strife. The Portuguese authorities attempted to control banditry and to use the warlords to serve imperial purposes by granting them titles to land. The majority of these *prazos* were established in Zambezi River valley. The *mestizo* families and warlords held sway in the Zambezi valley area until the late 19th century. For more than two centuries, therefore, the area was characterized by warlordism and faction fighting and it was only in the early 20th century that the Portuguese authorities managed to re-assert control over the “Zambezi territories”. The major export during this period continued to be ivory; there was also extensive illegal trade in slaves.

The present-day frontiers of Mozambique were mainly drawn up in 1891 following the Berlin Conference that formalized the “Scramble for Africa”. In the early 20th century the Portuguese attempted to assert control of its new colony by offering vast concessions to “charter companies”. For example, the Niassa Company acquired a vast area comprising the entire area of Niassa and Cabo Delgado Provinces in northern Mozambique (around 150,000 km²) whilst the Mozambique Company acquired large area of south-central Mozambique. Forced labor in these areas was a common practice. Between 1891 and 1926 Portugal attempted to establish colonial administration under those areas not occupied by the charter companies, with varying degree of success.

In 1926 a revolution in Portugal overthrew the Republican Government which eventually led to the setting up of a fascist regime under Antonio

Salazar; this regime lasted until 1974. Under the new regime the quasi-sovereign right of the concession companies was ended and the colonies were incorporated into a single legal entity as part of the Portuguese State (the *Estado Novo*)- in effect Mozambique became a province of Portugal.

Nationalist opposition to Portuguese rule in Mozambique began in the 1950s. In 1964 the nationalist liberation movement FRELIMO started the armed struggle to liberate the country by attacking a military base at Chai in northern Mozambique. The liberation war continued for 10 years during which time FRELIMO controlled many rural areas in northern Mozambique.

Compared to most other African countries, Mozambique gained independence from its colonial power relatively late in the decolonization process, in 1975. This followed a long war of independence waged by FRELIMO between 1964 and 1974. Struggle for independence was being waged in other Portuguese African colonies at the same time (Angola, Guinea Bissau, Cabo Verde, and São Tomé e Príncipe). The cumulative effect of these civil armed struggles resulted in increasing dissatisfaction with the right wing dictatorship in Portugal. The Portuguese government was eventually overthrown in 1974 by left-wing members of the armed forces. This popular uprising in Portugal, known as the Carnation Revolution, led to the independence of all Portugal's African colonies.

At independence in 1975 Mozambique adopted a one-party socialist system, led by FRELIMO with Samora Machel as President. Attempts to destabilize the FRELIMO government were made by Rhodesia and later South Africa to counter support that Mozambique was providing to the liberation movements of these two countries: the African National Congress (ANC) and the Zimbabwe African Nationalist Union (ZANU) respectively. The Rhodesian armed forces made frequent incursions into Mozambique, ostensibly to attack terrorist bases, but also destroying Mozambican infrastructure such as railways and bridges.

In 1978, three years after independence, the first signs of internal armed conflict by disaffected Mozambicans were recorded. Attacks were made on selected infrastructure, villages and military bases. A group named the National Resistance Movement (MNR) claimed responsibility for the attacks. This group later developed into RENAMO, led by Alfonso Dhlakama. Originally RENAMO received significant support from the Rhodesian armed forces, and with the independence of Zimbabwe in 1980 this role was taken over by South Africa. From 1980 onwards the internal armed conflict increased in tempo and brutality. By the mid-1980s much of the country was experiencing the effects of war with the rural population suffering the most. It is estimated

that by 1990, 50 percent of the rural population were displaced either internally (mainly to larger towns and cities) or externally (mainly to neighboring countries).

After a long period of negotiation between FRELIMO and RENAMO, the two parties signed a Peace Accord in Rome in October 1992. A massive intervention by the United Nations Operation in Mozambique (UNOMOZ) managed to demobilize the opposing armies and create a single scaled-down army. Internally and externally displaced Mozambican refugees were assisted to return to their places of origin. By 1994 the demobilization process was complete and most displaced people had returned. Unlike the Angola situation, the UN in Mozambique managed to pacify and stabilize the tense situation leading up to first multi-party election in 1994. Fortunately, the peace in Mozambique has held since the signing of the peace accord and the country is experiencing a peace dividend in the form of reconstruction, investment and unprecedented economic growth.

In 1990, prior to the signing of the peace accord a new constitution was adopted, accepting a multiparty system with a separation of powers. The adoption of the constitution facilitated subsequent negotiations between the opposing parties. The system has a strong president who appoints the government, a parliament that must approve the annual budget and plan as well as all legislation, and an independent court system.

The first democratic multiparty election was completed successfully in October 1994. Voter turnout was high (65 percent). The two main parties contesting the elections were FRELIMO led by President Joaquim Chissano, and RENAMO headed by Alfonso Dhlakama. Several smaller parties participated in the elections. The results of the election were surprisingly close: FRELIMO won with 54 percent of the vote, capturing only 129 of the 250 parliamentary seats.

A second multiparty election was held in December 1999. The opposition parties united to form a single party: RENAMO-Electoral Union. Again voter turnout was high (64 percent). The ruling party FRELIMO and President Joaquim Chissano were re-elected with a reduced majority compared to 1994 (52.3 percent of the vote). FRELIMO increased its parliamentary majority, from 129 to 133 seats.

The changing political process runs much more deeply than simply elected bodies. A vibrant civil society of pressure groups, associations of business people, women, peasants, trade unions and churches is growing and becoming more active, having been suppressed during colonial and socialist times. An independent press is now well established, ensuring that a broad spectrum of political views and interest groups is heard.² This political growth and

vibrancy is particularly remarkable considering the national context: a country only recently emerging from a long and bitter period of conflict, low levels of literacy and widespread poverty, and all of this in a large country with poor communications.

2.2 Population

The population of Mozambique according to the 1997 national census (Instituto Nacional de Estatística, 1999) was 16.1 million. The population growth rate is 2.2 percent per annum. The country is relatively sparsely populated with an average population density of 19 people per km². Some provinces such as Niassa have population densities below 10 persons per km². The greatest population concentration occurs in Maputo Province in the contiguous urban area of Maputo and Matola cities where approximately 20 percent of Mozambique's population live. About 73 percent of the population live in rural areas, though the urban population has been increasing in all areas of Mozambique. This increased markedly during the armed conflict. At the beginning of the 1980s, 13 percent of the population were located in urban centers. By the mid-1990s this figure had increased to 27 percent.

2.3 Ethnicity

There are fourteen broad ethnic groups in Mozambique. The diversity of population is reflected in the variety of languages spoken, with approximately 60 languages and dialects. The official language is Portuguese although only 10 percent of Mozambicans speak it as their first language.

Mozambicans have been mixing with different cultures for centuries and have absorbed many different characteristics and customs. Arabs had been trading and living along the coast for hundreds of years before the arrival of the Portuguese, and when the new colonizers arrived they quickly settled and intermarried, creating a rich cultural mix. Mozambicans today reflect that melding of races.

2.4 Economy

Mozambique made significant economic and social progress in the years immediately following independence in 1975, particularly in terms of rapidly

2. However, in November 2000, one of Mozambique's most vocal and independent journalists, Carlos Cardoso, was assassinated in Maputo. This attempt to stifle independent journalism in Mozambique provoked a widespread public outcry.

rising literacy rates. Unfortunately the onset of armed conflict rapidly eroded any gains made and ultimately resulted in the collapse of the economy and civil society in general. Economic damages were estimated at more than \$20 billion (10 times the annual GDP in 1992).

Mozambique has undergone a period of significant economic recovery since the signing of the Peace Accord in 1992. Annual economic growth rate as defined by gross domestic product (GDP) in the past three years has been calculated at 8.8 percent, 9.7 percent and 7.3 percent, respectively. Inflation has fallen from a level of almost 50 percent in 1996 to a current level of below 6 percent per annum. This economic growth is attributed to major privatization, increased foreign investment and strict fiscal policies. Traditional exports, notably prawns, cashew nuts and cotton, have remained steady over the past three years, at \$230 million per year.

Despite the progress made, post-war reconstruction has still not been completed. Infrastructure remains generally poor especially in the rural areas. Floods, such as those that occurred in southern Mozambique in February 2000, set farmers, fishermen and other small businesses back many years.

Mozambique has received large amounts of foreign aid. Immediately following the end of the armed conflict, aid programs focused on emergency assistance, food aid and resettlement assistance. With the consolidation of peace and stability there has been a shift towards longer-term development goals. Nevertheless, Mozambique remains one of the most aid-dependent countries in the world. Partly in recognition of the moves towards democracy and lasting peace, debt relief under the first phase of the Heavily Indebted Poor Countries (HIPC) initiative was granted to Mozambique in mid-1999. Roughly half of Mozambique's public and publicly guaranteed debt was cancelled. Mozambique had a further amount of debt cancelled in 2000 under the modified Cologne terms of HIPC and more, recently, by the United Kingdom.

Despite impressive economic growth, Mozambique remains one of the 10 poorest countries in the world. It was ranked 169th of 174 countries in the human development index for 1997. Average income was estimated to be about \$170 per capita per year in 1998. In accordance with the overall economic growth per capita income in Mozambique in 1999 had risen to \$230. Increasing life expectancy, higher enrolment rates and rising GDP are beginning to push up the human development index, with improvements of more than 3.5 percent expected for both 1998 and 1999. Approximately two-thirds (69 percent) of the population fall in the category of poor. (Economic data from World Bank 2000.)

3. The biodiversity of Mozambique

3.1 Vegetation and flora

3.1.1 Vegetation types

At a broad level at least 22 vegetation/habitat types can be distinguished in Mozambique. The most common vegetation type is miombo woodland characterized by the presence of *Brachystegia* spp. and/or *Julbernardia* sp. There are many types of miombo woodland in Mozambique varying from dry to moist miombo. The second most extensive woodland type is mopane woodland occurring in the Limpopo-Save area and in the mid-Zambezi Valley.

Other vegetation types include:

- *Acacia* woodland (in drier southern and central areas);
- tall dune forests along the southern sector of the Mozambican coast;
- sub-littoral coastal woodland in southern coastal Mozambique;
- “islands” of Afromontane forests and grasslands along the eastern border with Zimbabwe and other isolated montane areas;
- inland halophytic communities in the valley of the Changane River, a tributary of the Limpopo River;
- vegetation formations on alluvial and deltoid plains of the Zambezi, Limpopo and Nkomati valleys;
- mangrove forests especially along the northern and central parts of the coast.

The broad vegetation types of Mozambique are shown in Figure 1 (adapted from Wild and Barbosa, 1968; Ministério de Coordenação de Acção Ambiental, 1997 and 1998).

3.1.2. Forest cover

A total of 19,054,000 hectares has been identified as high and medium potential for forest production mainly in the northern and central provinces (Saket and Matusse, 1994). This is illustrated in Figure 2 (adapted from Ministério de Coordenação de Acção Ambiental, 1997). The most commercially valuable hardwood tree species occurring in these forests include: *Pterocarpus angolensis* (umbila), *Millettia stuhlmannii* (panga panga), *Azelia quazensis* (chamfuta),

Figure 1. Main vegetation/habitat types

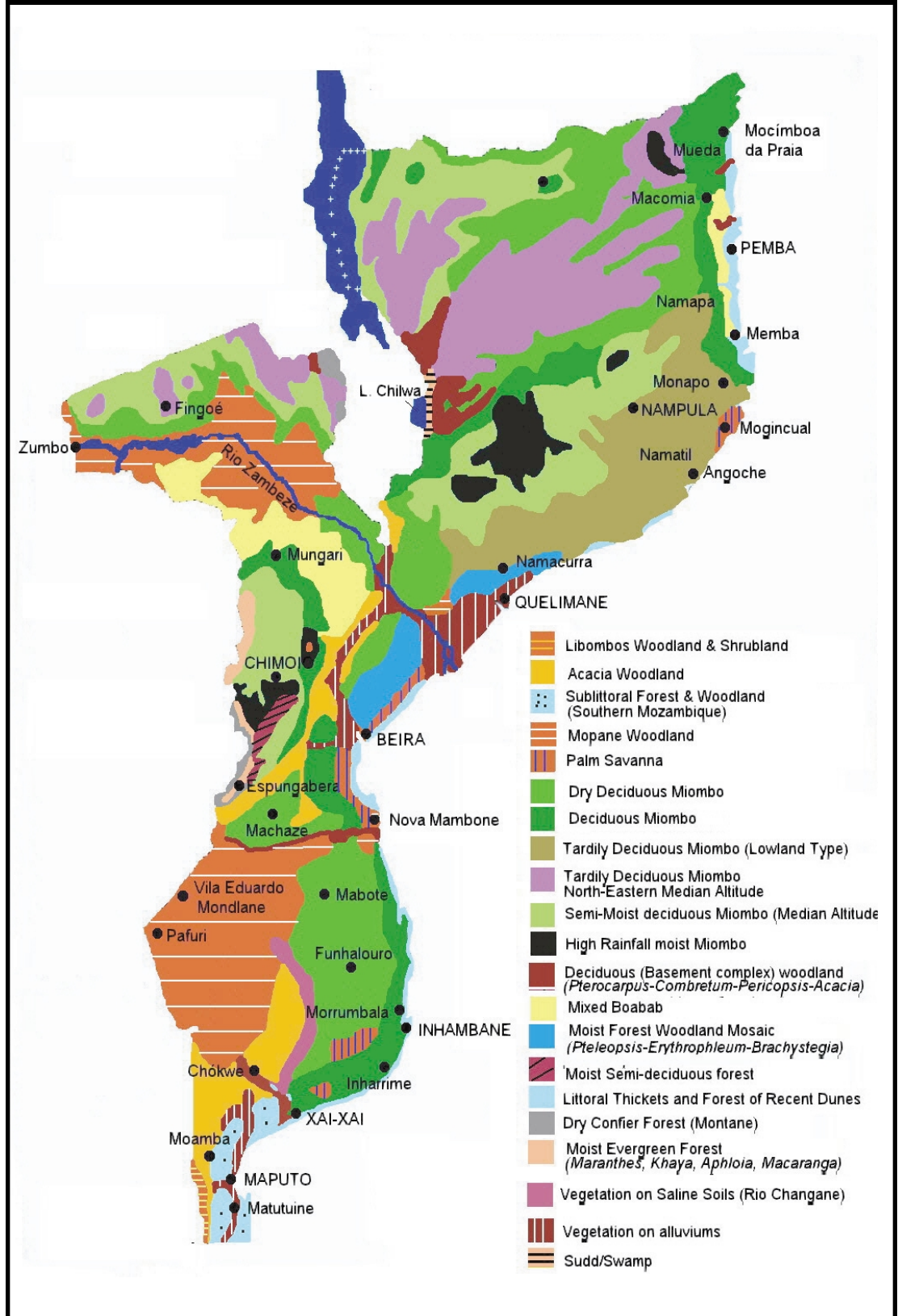
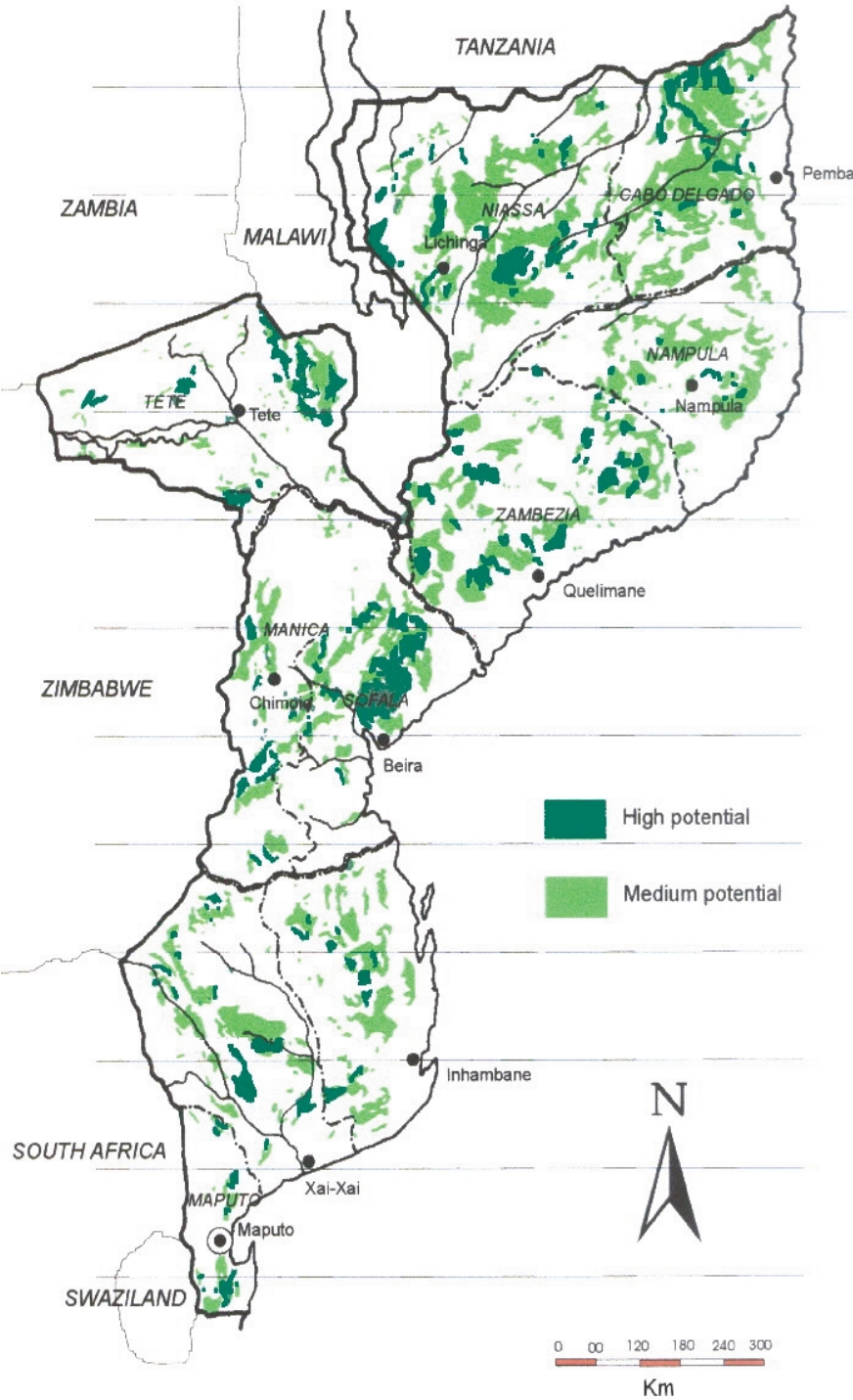


Figure 2. Forest areas of medium and high production potential



Dalbergia melanoxylon, *Khaya nyasica* and *Berchemia discolor*. All these species are being heavily exploited in Mozambique.

3.1.3. Plant conservation status

Due to the long period of armed conflict, together with the vast size of the country, lack of trained personnel and lack of operational support, large areas of Mozambique are poorly documented from a biological perspective. The current conservation status of Mozambique's flora is therefore poorly known. A preliminary estimate indicates that, of the 5500 plant species recorded for Mozambique, some 247 plant species in 67 families may be of conservation concern.

Areas with large numbers of endemic plant species include Afromontane areas (e.g., the vegetation of the Chimanimani and Gorongosa Mountains) and southern Mozambique. The latter is known as the Maputaland Centre (MC) of Endemism and contains an estimated 2000 to 3000 species of vascular plants, of which at least 168 species/infraspecific taxa and 4 genera are endemic/near-endemic (van Wyk 1994). The biological importance of these areas is discussed further in Section 3.5.

3.2. Fauna

The fauna of Mozambique, besides mammals and birds, is poorly documented. The known number of species per major taxonomic group is given in Table 1 (Ministério de Coordenação de Acção Ambiental, 1997 and 1998).

3.2.1. Terrestrial mammals

Mozambique is characterized by a rich diversity of mammal fauna. According to Smithers and Tello (1970) there are 211 terrestrial mammal species in Mozambique (Table 2).

Table 1. Summary of animal species of main taxa in Mozambique

Group	Number of species	Rare/endangered
Mammals	222	10
Birds	580	24
Reptiles	167*	1
Amphibia	39*	0
Total	1008	35

*Groups poorly documented; probably an under-estimate.

Table 2. Summary of the terrestrial mammal biodiversity in Mozambique

Order	Families	Genera	Species	Endangered
Insectivora (Shrews)	3	9	20	0
Chiroptera (Bats)	7	21	62	0
Primata (Monkeys and baboons)	3	5	8	0
Tubulidentata (the aardvark)	1	1	1	0
Hyracoidea (hyraxes)	1	3	3	0
Artiodactyla (Antelopes, warthog and bushpigs)	3	19	26	4
Lagomorpha (rabbits and hares)	1	2	4	0
Rodentia (rodents)	9	32	51	0
Pholidota (pangolins)	1	1	2	0
Carnivora (carnivores)	6	25	30	2
Proboscidea (the African elephant)	1	1	1	1
Perissodactyla (rhinoceros)	1	2	2	2
Total	42	132	211	10

There is only one mammal species considered to be endemic to Mozambique: a white-bellied red squirrel confined to Namuli Mountain.

Although there are a large a large number of mammal species their populations, especially of the larger mammals, have been significantly reduced both inside and outside of protected areas due to lack of enforcement during the armed conflict (see Section 4).

At a national level several large mammal species are believed to be extinct or on the verge of extinction e.g., black and white rhino, giraffe, roan antelope, tsessebe, mountain reedbeek and African wild dog.

Niassa Reserve in northern Mozambique on the Tanzanian border was less affected by the armed conflict. This is the only protected area that still supports significant populations of large mammals including elephant, buffalo, sable antelope, Lichtenstein's hartebeest, greater kudu and leopard. Three endemic large mammal subspecies occur in the area:

- the blue Niassa wildebeest (*Connochaetes taurinus johnstoni*) which is characterized by a white band across the muzzle (believed to be endangered);
- a sub-species of Burchell's zebra (*Equus burchelli* subsp. *bohmi*); and
- Johnson's Impala (*Aepyceros melampus* subsp. *Johnstoni*), considered to be rare.

3.2.3. Marine mammals

Eighteen species of marine mammal have been recorded for the marine waters of Mozambique, mainly dolphins and whales. The largest population of dugongs along the East African coast is found in the littoral waters of Bazaruto Archipelago (estimated at around 75 individuals) and a smaller population occurs in Inhambane Bay. Recent observations indicate that the Bazaruto Bay dugong population is declining due fishing nets set in the main channels.

3.3. Birds

Five hundred and eighty-one bird species have been recorded for Mozambique, out of approximately 900 species recorded southern Africa (Maclean, 1985).

There is one recorded endemic bird species, the Namúli apalis (*Apalis lynesii*), known to occur only in the woodlands and forests of Mount Namúli. It is one of the world's most restricted bird species.

There are a number of near endemic species, mostly associated with isolated montane habitats such as Gorongosa, Chipero and Namuli Mountains including the Dappled-mountain Robin (*Modulatrix orostruthus*), the Chirinda Apalis (*Apalis chirindensis*), Swynnerton's Forest Robin (*Swynnertonia swynnertoni*), the Whitebreasted Alethe (*Alethe fuelleborni*) and the Greenheaded Oriole (*Oriolus chlorocephalus*).

One of the most important wetland sites in Mozambique is the Zambezi Delta; over 50 species of waterbirds have been recorded there. The Delta supports numerous vulnerable and threatened species of global concern, including the Wattled Crane (see also section 3.5.3).

3.4. Reptiles

One hundred and sixty reptile species have been recorded for Mozambique (including marine turtles). The conservation status of reptiles, with the exception of sea turtles, is largely unknown.

The flat rock lizard (*Platysaurus ocellatus*) is reported to be endemic to the Chimanimani Mountains on the western border with Zimbabwe.

Two new reptile species were recently discovered in coastal evergreen forest in Zambezia Province: a species of snake belonging to the genus *Dromophis*, and

a dwarf day gecko (*Lygodactylus* sp.). They are currently considered to be endemic to this forest.

One snake species, the African Rock Python (*Python sebae natalensis* A. Smith) is considered endangered and is protected by law. Threats include habitat destruction; collecting for food, skins, medicinal purposes and the pet trade; and destruction due to its perceived danger to man and livestock. Crocodiles are becoming threatened due to hunting for skins.

All five species of Indian Ocean sea turtles nest on beaches along the Mozambique coast: loggerhead turtle (*Caretta caretta*), leatherback turtle (*Dermochelys coriacea*), green turtle (*Chelonia mydas*), hawksbill turtle (*Eretmochelys imbricata*) and olive ridley turtle (*Lepidochelys olivacea*). All species are legally protected in Mozambique.

3.5. Areas of outstanding biological value

Eight areas have been identified with outstanding ecosystem, biological and/or scenic value, which warrant special attention in Mozambique.

3.5.1. Gorongosa Mountain – Rift Valley Complex

This area encompasses the isolated Gorongosa Mountain which rises to 1863m, and the southern-most Mozambican section of the African Rift Valley.

Gorongosa Mountain is an isolated montane block 160 km inland from the sea. Orographic rainfall provides the mountain with an annual rainfall of over 2000 mm per year. The mountain supports tropical to montane rainforest, with heath grasslands on its summits.

Several endemic and near-endemic plants and animals occur on the mountain. Examples include Greenheaded Oriole (*Oriolus chlorocephalus*) sub-species *O.c. speculifer*, characterized by a white wing patch; Dappled-mountain Robin (*Modulatrix orostruthus*); Chirinda Apalis (*Apalis chirindensis*) a restricted range species; Swynnerton's Forest Robin (*Swynnertonia swynnertonii*); and separate subspecies of Whitebreasted Alethe (*Alethe fuellebornii*).

A variety of wetland habitats occur in the Rift Valley including rivers, lakes, temporary pans, reed swamps, floodplain grassland and palm savanna. The diversity of habitats in the Rift Valley makes it one of the finest wildlife ecosystems in Africa as reflected by the spectacular wildlife that inhabited the valley prior to the most recent armed conflict. The southern portion of the Rift Valley is protected within the Gorongosa National Park. Wildlife populations

were severely depleted during the armed conflict and some species are believed to be near extinction or extinct e.g., tsessebe, hippopotamus, roan antelope and black and white rhinos.

3.5.2. The Cheringoma Plateau

The Cheringoma Plateau in central sub-littoral Mozambique comprises tropical forests containing a mixture of equatorial, north-east coast and southern African flora, with local endemics. The forest contains several commercially important hardwood species.

3.5.3. Zambezi Delta grasslands and swamps

The Zambezi Delta covers an area of about 18,000 km², from its apex to its 120 km front with the Indian Ocean coast. Marrromeu Buffalo Reserve is located on the southern portion of the Delta. In addition to buffalo, elephant, water buck and reedbuck occur in the Delta although their numbers have been much reduced by hunting.

The Zambezi Delta represents an important wetland for resident and migratory bird species. The Delta also supports numerous vulnerable and threatened species of global concern, including Wattled Crane (*Bugeranus carunculatus*), the Saddle-billed Stork (*Ephippiorhynchus senegalensis*), Grey Crowned Crane, African Skimmer (*Rynchops flavirostris*), White Pelican, Pinkbacked Pelican, Woollynecked Stork (*Ciconia episcopus*), Openbilled Stork (*Anastomus lamelligerus*), Saddlebilled Stork, Yellowbellied Stork (*Mycteria ibis*), Black Stork (*Ciconia nigra*), Redwinged Pratincole (*Glareola pratincola*) and Caspian Tern (*Sterna caspia*).

Wetland scientists believe that the Zambezi Delta qualifies as a Wetland of International Importance under the Ramsar Convention, and is of great socio-economic and cultural value to Mozambique.

3.5.4. The Great Inselberg Archipelago

The inselberg archipelago presents a remarkable landscape of tall granite core remnants in a savanna plain. This series of habitats occupies a rectangular area of approximately 500 km by 160 km, lying in a south-west to north-east direction (approximately between 14° to 17°S; 35°40' to 38° E; thence north-eastward to 39°40'E).

Several endemics and biogeographical outliers are known to occur in the isolated rainforest, patches of which form aprons around the flanks and bases of the inselbergs. Many of the areas are unknown biologically and it is highly likely that undescribed species remain to be discovered.

Mount Namúli is an isolated mountain peak rising from a plateau at 800m to a height of just over 2400m. The slopes of the peaks support a mix of moist montane forests and grassy meadows. The forests are characterized by high levels of biodiversity and endemism. The Namúli Apalis (*Apalis lynesii*) is one of the world's most restricted bird species and is known to occur only in the woodlands and forests of Mount Namúli. The Namúli forests are also home to a further five globally threatened bird species and 14 biome restricted species including the Thyolo Alethe (*Alethe choloensis*), the Dapplethroat (*Modulatrix orostruthus*) and the Oliveheaded Weaver (*Ploceus olivaceiceps*). The forests of Mount Namúli include an endemic small mammal (the white-bellied red squirrel).

3.5.5. Chimanimani Massif

The Chimanimani Massif forms part of the great eastern escarpment along the Mozambique-Zimbabwe frontier. The Massif, although relatively small in area, has an exceptionally high diversity of habitats and species.

Nearly 1000 vascular plant species have been recorded for the area, of which 45 are endemic (Dutton and Dutton, 1975). Five *Aloe* species are endemic to the Chimanimani mountains and three species of *Erica* and two species of *Protea* are considered endemic.

Large mammals are well represented although populations are depleted. Two amphibians and one reptile species are considered endemic. Over 160 bird species have been recorded for the Chimanimani (Dutton & Dutton 1975), some of which are considered endemic to the Afro-montane regions of eastern Africa.

3.5.6. The Maputaland Centre of Endemism

The Maputaland Centre of Endemism (MC) covers 26,734 km² in southern Mozambique and northern KwaZulu-Natal in South Africa. Its coastline is characterized by a parabolic dune system rising to almost 200 m in certain places, considered to be the tallest vegetated dunes in the world. The MC contains extensive wetlands in the form of shallow lakes behind the dunes (see section 3.5.7).

The MC flora is very distinct, comprising to 2000 to 3000 species (van Wyk 1994). Of these, at least 168 species/infraspecific taxa (this is probably an underestimate) and 4 genera are endemic or near-endemic to the center. The associated fauna of the MC is interesting and rich. More than 472 species of birds occur (57 percent of South Africa's total), of which 47 subspecies are endemic or near-endemic to the center. Other endemic/near-endemic species

and infraspecific taxa include 14 mammals (out of 102 total species indigenous to the center, with about 4 locally extinct); 23 reptiles (about 112 species/subspecies total); 3 frogs (45 species/subspecies total); and 7 freshwater fishes (67 species total).

3.5.7. Coastal barrier lakes

A characteristic feature of southern coastal Mozambique is the extensive coastal lakes, swamps and temporary rain-filled pans that occur behind the parabolic dune systems. See Figure 3 (adapted from Ministério de Coordenação de Acção Ambiental, 1998).

The coastal lakes provide habitat for many bird species including White Stork (*Ciconia episcopus*), Little Egret (*Egretta garzeta*) and Greater Flamingo (*Phoenicopterus ruber*) that occur in the lakes of the Maputo Special Reserve.

Besides their importance biologically, these coastal systems have high scenic value. A proposal has been developed to declare the Maputaland wetlands (between Ponta do Ouro and Inhaca island) a Natural World Heritage Site. This has been submitted to the Mozambican Government for consideration. The South African component (St. Lucia Estuary/Kosi Bay) of this unique wetland system has Ramsar Convention wetland status.

3.5.8. Pebane Evergreen Coastal Forests (Zambezia Province)

Recent surveys (Branch, 1998) have highlighted the biological importance of the evergreen coastal forests of Zambezia Province. Remarkably a new (and possibly endemic) tree species was discovered in these forests during an environmental impact assessment (EIA) carried out in 1998. The forests also have a rich and diverse reptile and bird fauna.

The location of these areas of high biological importance is shown in Figure 4 below.

Figure 3. Coastal barrier lakes

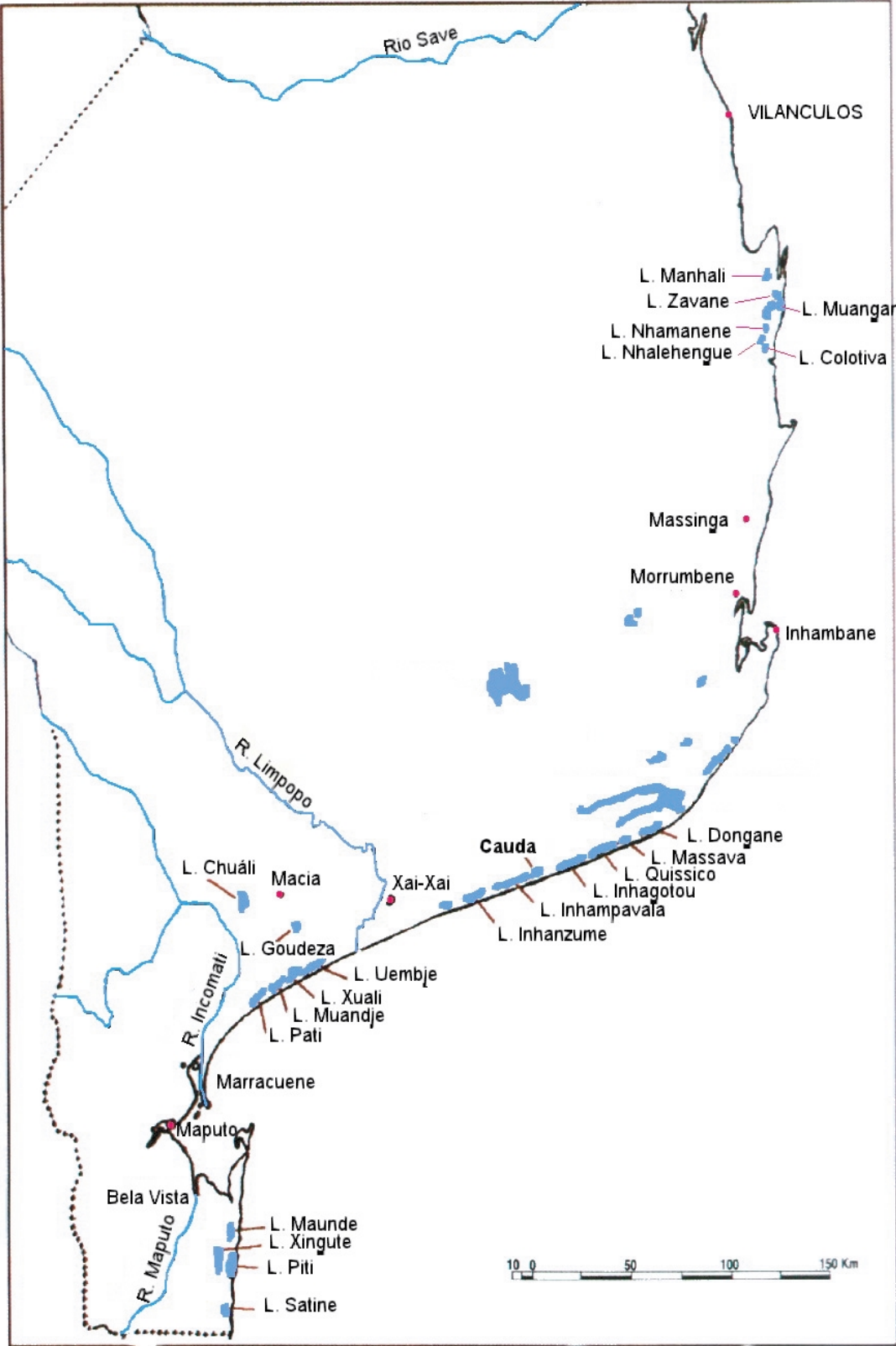
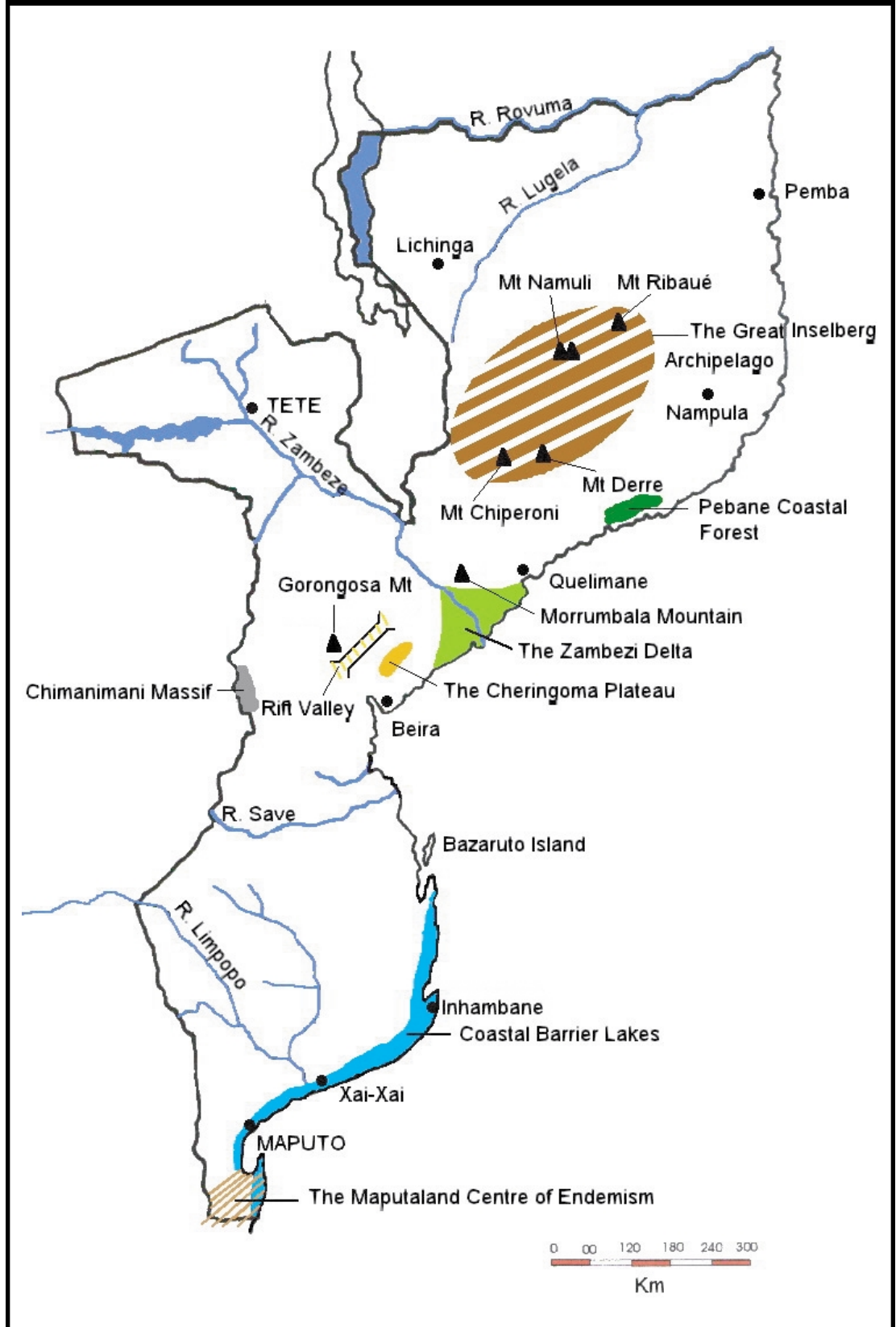


Figure 4. Areas of known biological importance



4. Protected areas

There are several categories of protected areas in Mozambique, the most important being national parks, game reserves, vigilance areas, coutadas (safari hunting areas) and forest reserves. Until recently the National Directorate of Forestry and Wildlife (DNFFB) was responsible for their administration. In January 2001 the responsibility for National Parks and Reserves was transferred to the newly created Ministry of Tourism (MT). A National Directorate for Conservation Areas has been established under the ministry with the mandate to manage Mozambique's national parks and reserves.

The numbers (in parentheses) of protected areas per category are: National Parks (4), Game Reserves (5), Coutadas (13), Vigilance Areas (2) and Forest Reserves (16). The list of protected areas and their size is presented in Table 3, and their locations are shown in Figure 5 (from Ministério de Coordenação de Acção Ambiental, 1997 and 1998).

In accordance with the new National Forestry and Wildlife Policy and Strategy (section 6.2), the government of Mozambique (GOM) is encouraging private sector participation in the management of protected areas. A joint management structure involving the private sector and the state was established in 1998 for Niassa Reserve in northern Mozambique (Company for the Management and Development of Niassa Reserve, SRN). In 1998 the original Niassa Game Reserve (ca. 15,000 km²) was expanded to include a Multi-Resource Utilization Area to the north-east of the reserve. The total area now covers 23,400 km². A buffer zone of five hunting blocks surrounding the reserve brings the total conservation area to over 42300 km² (Gibson, 2000). See Figure 6 (adapted from Gibson 2000).

A new Forestry and Wildlife Law was passed in 1999. It recognizes three categories of protected areas for the conservation of biodiversity and fragile ecosystems: national parks; national reserves; and historical-cultural use zones.

National parks and national reserves are designated for the protection of rare species of fauna and flora; endemics; species in decline or threatened with extinction; sensitive ecosystems such as wetlands, dunes, mangroves and

Table 3. Gazetted protected areas

Province	Designation	Area (km²)	Year of gazettelement
NIASSA	Niassa Game Reserve	24 400	1969
NAMPULA	Mecuburi Forest Reserve	1954	1950
	Baixo Pinda Forest Reserve	196	"
	Matibane Forest Reserve	42	"
	Mpalwé Forest Reserve	51	"
	Ribawé Forest Reserve	52	"
ZAMBEZIA	Gilé Game Reserve	2100	1960
	Derre Forest Reserve	1700	1950
MANICA	C.H. Area 4	8900	1969
	C.H. Area 7	5450	1969
	C.H. Area 9	4450	1969
	C.H. Area 13	5680	1960
	Maronga Forest Reserve	83	1950
	Zomba Forest Reserve	31	"
	Moribane Forest Reserve	53	"
SOFALA	Gorongosa National Park	5370	1960
	Marrromeu Special Reserve	1500	1961
	C.H. Area 5	6860	1972
	C.H. Area 6	4560	1960
	C.H. Area 8	310	1969
	C.H. Area 10	2000	1961
	C.H. Area 11	1930	1969
	C.H. Area 12	2960	1969
	C.H. Area 14	1350	1969
	C.H. Area 15	2300	1969
	Nhamitanga Forest Reserve	1067	1943
	Nhapakwé Forest Reserve	170	1953
	Mucheve Forest Reserve	90	1950
INHAMBANE	Zinave National Park	3700	1972
	Bazaruto National Park	150	1971
	Pomene Game Reserve	?	1972
GAZA	Banhine Nat. Park	700	1972
	C.H. Area 16	10000	1969
	Chirindzene Forest Reserve	?	1974
MAPUTO	Maputo Special Reserve	700	1969
	Boboli Forest Reserve	13	1961
	Likwati Forest Reserve	33	1943
	Inhaca and Portuguese ³ Island Reserve	Ca. 16	1965

Figure 5. The protected areas network

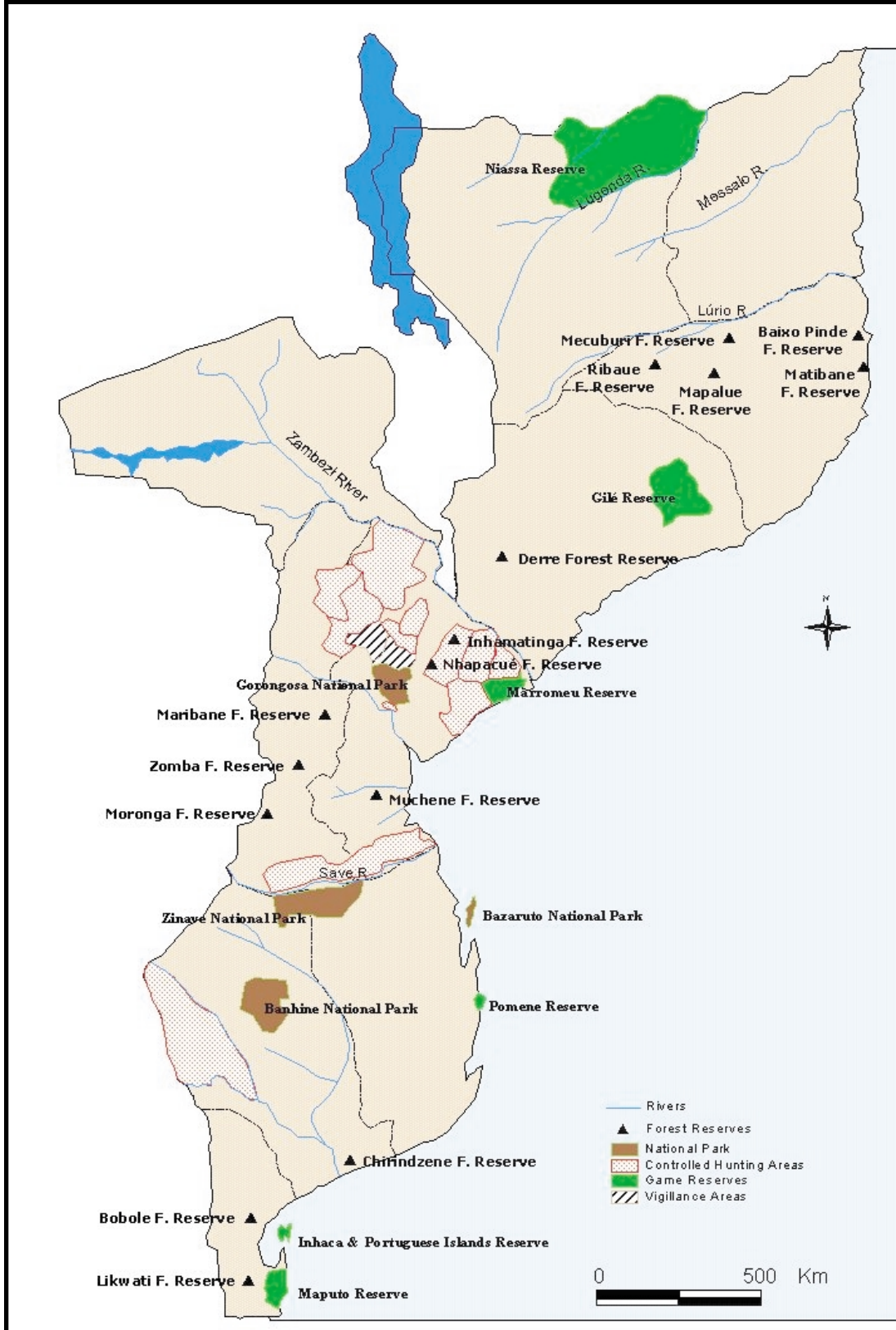
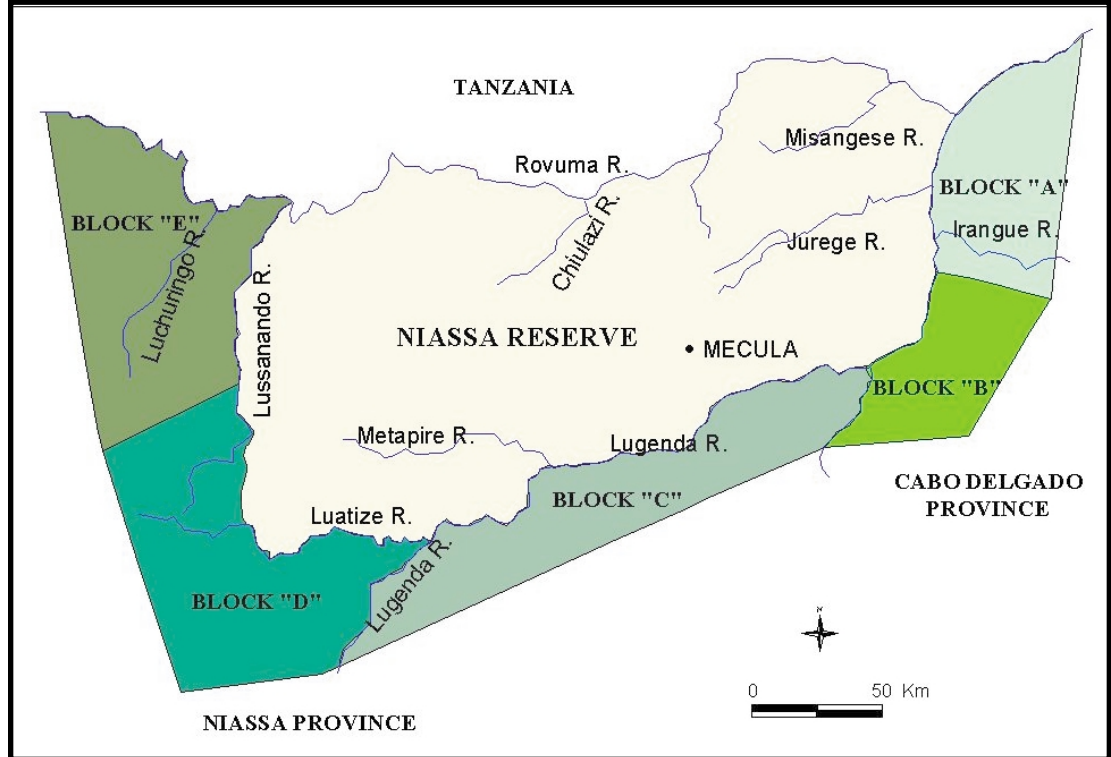


Figure 6. Niassa Reserve and buffer zones



corals; as well as the conservation of flora and fauna within these ecosystems. Private sector co-management for tourism may be permitted in national reserves.

The category of historical-cultural use zones is a completely new category for Mozambique, reflecting new policies to ensure that local communities are involved in natural resource management. These use zones are areas for protection of forests of cultural importance. The forestry and wildlife resources within the zones may be used in accordance with customary norms and practices.

Existing conservation areas will be reclassified under the new law, and new conservation areas are being proposed.

4.1 Transfrontier Conservation Areas (TFCAs)

The Government of Mozambique is currently implementing a Transfrontier Conservation Area (TFCA) Project funded by the World Bank GEF. The project is developing conservation areas (rather than national parks) that place

greater emphasis on multiple resource use and management by local communities living in or adjacent to these areas.

Three TFCAs are currently being developed:

The Lubombos TFCA, southern Mozambique.

This area lies in the extreme south-east of Mozambique. It includes the Maputo Special Reserve (700 km²), a proposed “elephant corridor” which would link the Maputo Reserve with the Tembe Elephant Park and the Ndumo Game Reserve in Kwa-Zulu in South Africa, and the Lubombos Mountains on the border with Swaziland. The area forms part of the Maputaland Centre for Plant Diversity which ranks as a first order site of global botanical significance. The area has a high potential for ecotourism-based development.

Gazaland TFCA south-west Mozambique.

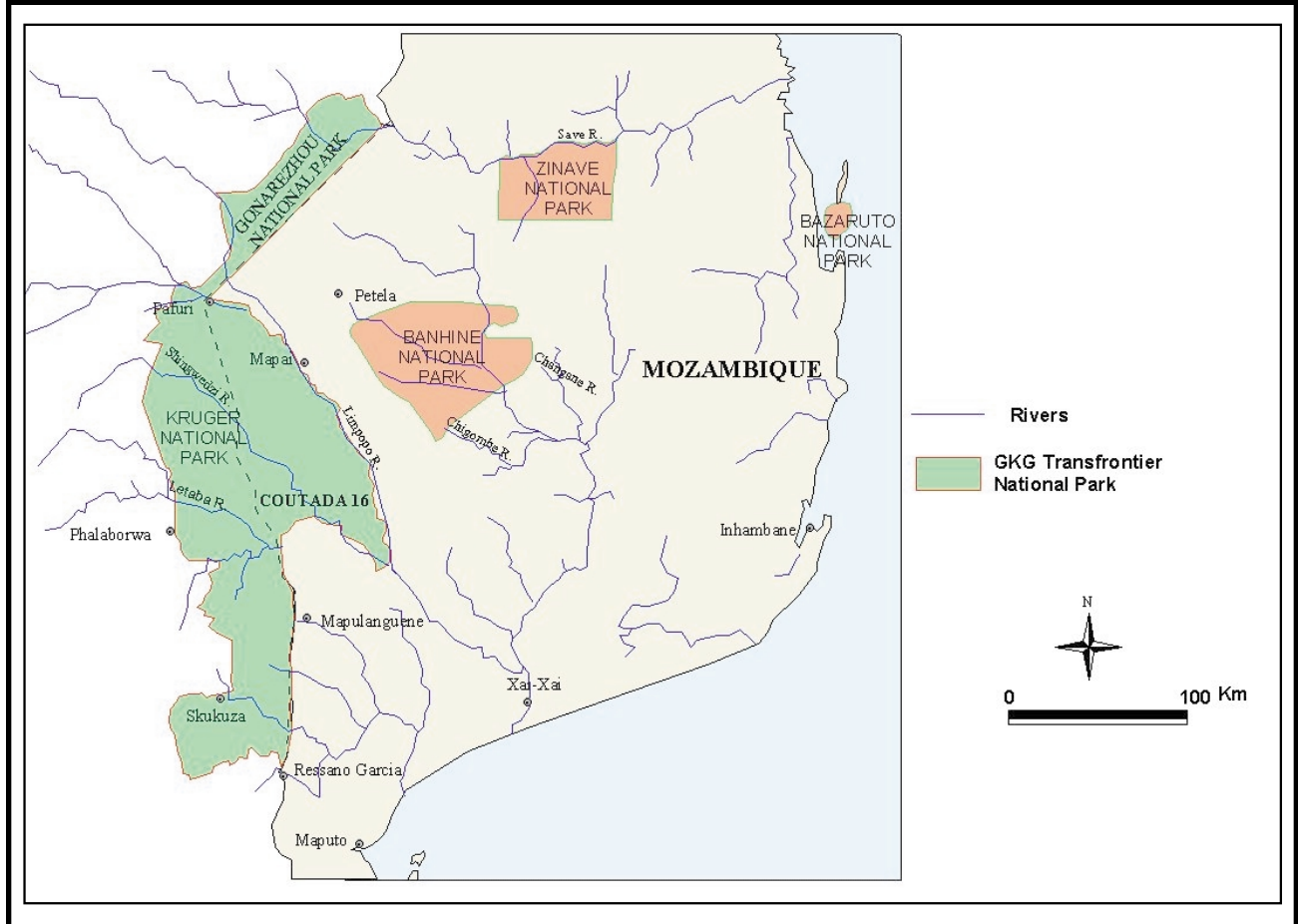
The Gaza TFCA covers 20,700 km² of protected area bordering with Zimbabwe and South Africa. In Mozambique this TFCA includes three main conservation areas: Zinave and Banhine National Parks (3,700 km² and 7,000 km² respectively) and Coutada 16 (a 10,000 km² wildlife utilisation area). The latter is contiguous with Kruger National Park in South Africa. The Gaza TFCA also borders on the Gonarezhou National Park in Zimbabwe.

In November 2000, the Government of Mozambique signed an agreement with the Governments of South Africa and Zimbabwe to incorporate Coutada 16 into an expanded transfrontier national park to be named the Gaza-Kruger-Gonarezhou (GKG) Transfrontier National Park (Government of the Republic of Mozambique, Government of the Republic of South Africa, and Government of the Republic of Zimbabwe, 2000). See Figure 7.

The authorities undertake to remove all barriers so that animals can roam freely. The South African authorities are committed to ‘drop’ the fence between the Kruger National Park provided that the Mozambican authorities upgrade the protected status of Coutada 16, fence the area and establish an adequate level of law enforcement. The German Government, through the German Development Bank intends to support the process of developing the GKG Transfrontier National Park. USAID has also agreed to support some components of the GKG initiative. It is intended to open the GKG Transfrontier National Park in April 2001.

If this ambitious plan is fulfilled it will represent a new spirit of cooperation between two southern African countries that only 10 years ago were diametrically opposed both politically and militarily.

Figure 7. Proposed Gaza- Kruger- Gonaarhezu National Park

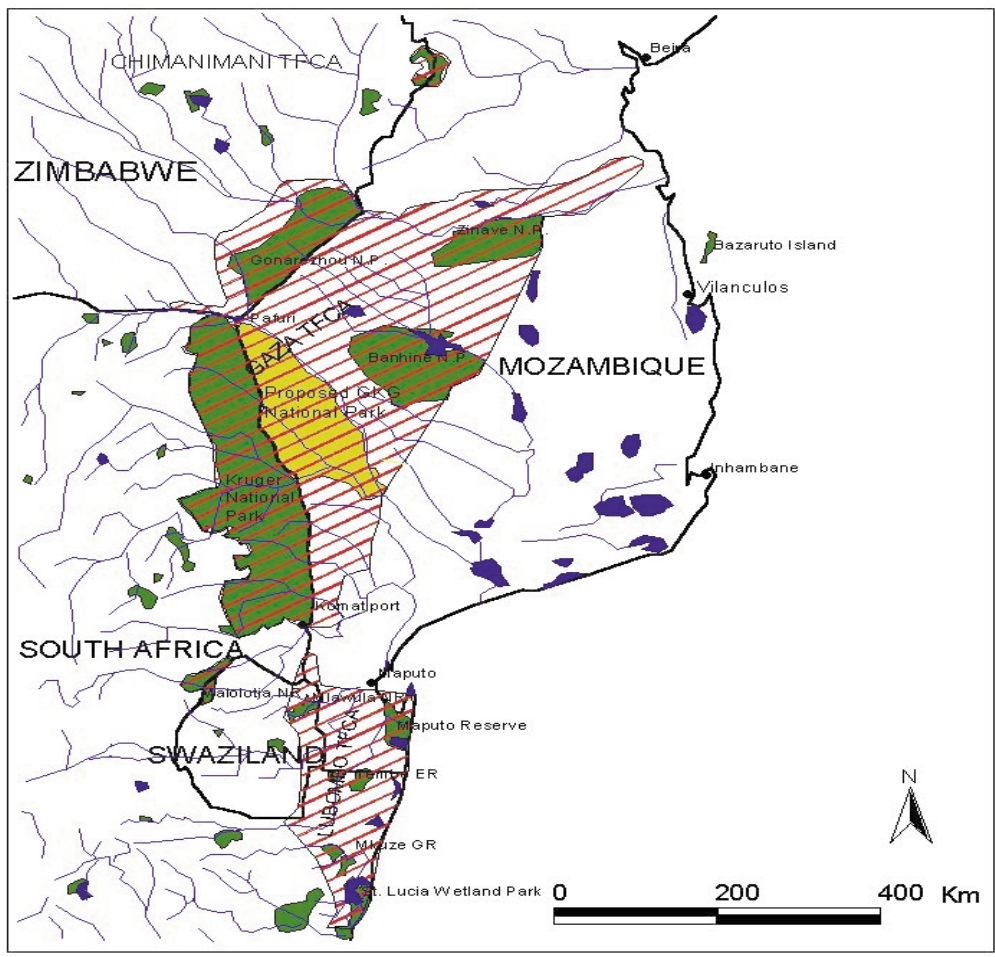


Chimanimani TFCA, west, central Mozambique




The Chimanimami TFCA is contiguous with the Chimanimani National Park in Zimbabwe. This TFCA in Manica Province is a relatively small area of 1,740 km², and includes the eastern escarpment and foothills of the Chimanimani massif. The area in Mozambique is better preserved, and represents a relatively intact Afro-montane ecosystem, with high species endemism (notably plants), and rich wildlife and bird populations (see section 2.3).

The locations of the TFCAs are shown in Figure 8.

Figure 8. Location of TFCAs in Mozambique



Legend

-  Proposed Transfrontier Conservation Areas
-  Proposed expansion of the Gaza-Kruger-Gonarezhou National Park
-  National Parks

5. Consequences of armed conflict

5.1. Reduction in wildlife and impacts on protected areas

5.1.1. Impacts on wild animal populations

One of the most visible consequences of the armed conflict in Mozambique was the decimation of wildlife populations both inside and outside of protected areas. As highlighted in Section 3, Mozambique has a rich diversity of terrestrial fauna. Prior to the armed conflict large mammal populations were reported to be healthy and increasing in most of the protected areas. During the long period of conflict it was not possible to carry out surveys in any of the protected areas, except for Bazaruto National Park and the Biological Reserves on Inhaca Island – both island settings located some distance from the mainland and hence safe from the conflict.

During this period there was much speculation regarding the status of large mammals inside and outside of the protected areas – with most biologists surmising that wildlife populations were being greatly depleted. It was only in 1992, following the signing of the Peace Accord and the gradual consolidation of peace throughout the country that biologists and wildlife experts were able to gather primary data through field surveys. Unfortunately, the gloomy predictions proved to be true for most of the protected areas. The flagship Gorongosa National Park suffered massive declines in large mammal populations (Figure 9, adapted from Cumming *et al.* 1994). The number of elephants prior to the conflict was in the order of 3000 whilst in 1994 only 108 elephants were recorded during an aerial survey. Massive declines were also recorded for buffalo (14,000 in 1979 and zero in 1994), hippo (4800 in 1979 and zero in 1994), wildebeest (5500 in 1968 and zero in 1994) and waterbuck (3500 in 1988 and 129 in 1994). Similar trends were observed for Marrromeu Buffalo Reserve originally famous for its large numbers of buffalo and waterbuck. More recent counts (1999 and 2000) reported a slight increase in the number of elephant. A small population of hippopotamus was also recorded. Official census data is still being awaited from these recent aerial surveys.

A similar devastating trend was recorded for Marrromeu Buffalo Reserve. Famous for its large herds of buffalo, the reserve boasted 20,000 buffalo in

1968, and in 1994 the estimate was 2346 animals. Other large mammal species showed similar declines. Aerial surveys carried out in 1998 indicate that most large mammals are increasing in number, especially buffalo (See Tables 4 and 5, and Figures 9 and 10. Gorongosa and Marromeu survey data from Tinley, 1969; Tinley, 1971; Tello and Dutton, 1979; Anderson *et al.* 1990; Dutton *et al.* 1994; Cumming *et al.* 1994; Direcção Nacional de Florestas e Fauna Bravia, 1998).

Although no quantitative data are available for Zinave and Banhine National Parks and Maputo Special Reserve, the trends appear to be the same: all species of large mammal have suffered significant declines. In Maputo Reserve elephant numbers appear to have declined by about 50 percent from 350 before 1978 to approximately 150 in 1997 although these data need to be confirmed.

Table 4. Population data for large mammals, Gorongosa National Park (N/D = no data)

	1968	1970	1979	1993	1994	*2000
Elephant	2200	1900	3000	4	108	160
Buffalo	14000	11900	18000	0	0	0
Hippo	3000	3200	4800	0	0	40-50
Wildebeest	5500	4900	1900	7	0	0
Waterbuck	3500	2500	800	200	129	500
Zebra	3000	N/D	N/D	7	65	50
Eland	500	N/D	N/D	0	0	
Sable	N/D	N/D	N/D	700	12	
Hartebeest	800	N/D	N/D	0	156	

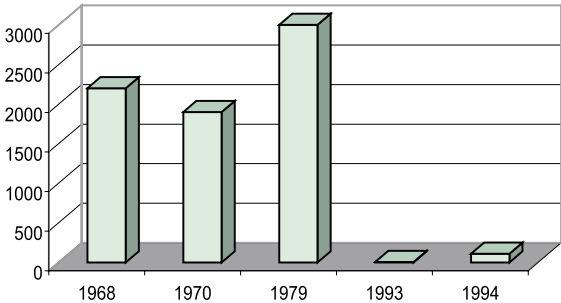
* Unofficial data, Felipa Carvalho, pers. comm.

Table 5. Population data for large mammals, Marromeu Complex (N/D = no data)

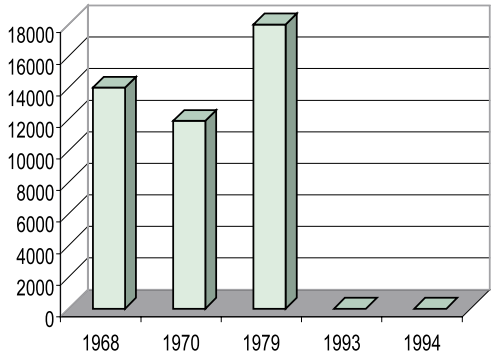
	1968	1977	1978	1979	1988	1990	1994	1998
Elephant	257	331	361	373	?	326	0	589
Buffalo	20000	45000	43992	30394	11575	3696	2346	7757
Hippo	250	2820	1010	1770	N/D	260	0	12
Waterbuck	40300	36380	47227	45653	6455	4480	142	109
Zebra	673	1340	2120	2720	N/D	1205	0	N/D
Sable	N/D	N/D	N/D	250	N/D	N/D	0	
Hartebeest	N/D	N/D	N/D	100	N/D	520	0	44
Reedbuck	N/D	N/D	N/D	250	N/D	N/D	20	506

Figure 9. Changes in large mammal populations, Gorongosa National Park

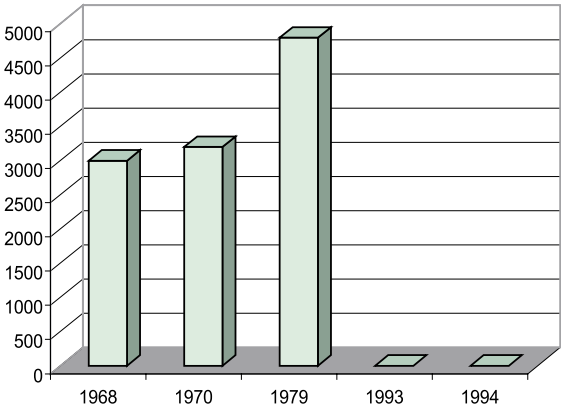
ELEPHANT - GORONGOSA NATIONAL PARK



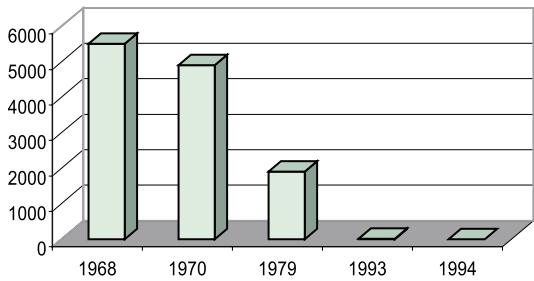
BUFFALO - GORONGOSA NATIONAL PARK



HIPPO - GORONGOSA NATIONAL PARK



WILDEBEEST - GORONGOSA NATIONAL PARK



WATERBUCK - GORONGOSA NATIONAL PARK

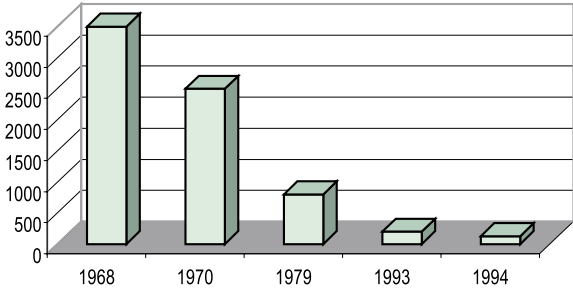
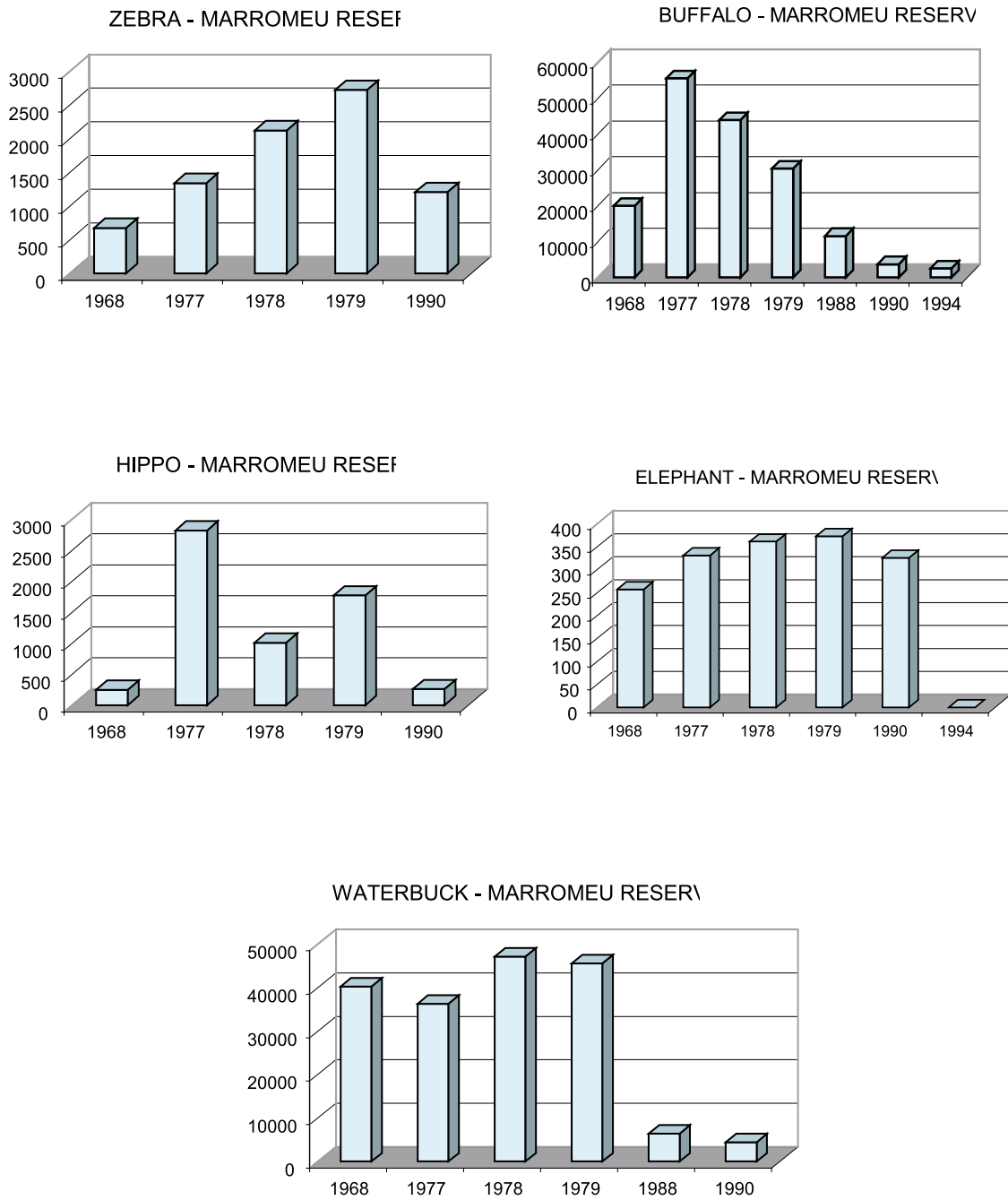


Figure 10. Changes in large mammal populations, Marromeu Reserve



Much of the decimation of wildlife during the armed conflict was due to hunting for meat and trophies by both the FRELIMO and RENAMO armies. In addition, South African forces (supporting RENAMO) and Zimbabwe forces (supporting FRELIMO) hunted for meat and trophies. The Zimbabwean army⁴ is reported to have hunted for meat in the Gorongosa area whilst guarding the Beira-Zimbabwe transport corridor. There are also reports that South African forces and Zimbabwe forces exported large quantities of trophies, mainly ivory, from the Gorongosa area. Wildlife populations were particularly affected in areas where troops were stationed for long periods, rather than just passing through. Hunting by the armies during the armed conflict resulted in the massive decline in mammal species the Gorongosa National Park and surrounding areas and the Zambezi Delta (including the Marrromeu Buffalo Reserve located in the delta) where troops were stationed for a long periods, often with little local action. There are reports of troops hunting hippopotamus by helicopter in inaccessible wetland areas in both areas. Hunting was also heavy in areas immediately adjacent to large concentrations of displaced people.

Hunting continued after the cessation of armed conflict in 1992, with very significant impacts on the remaining wildlife populations. Post-war reconstruction focused on de-mining and rehabilitation of roads and bridges, gradually improving civilian access to wildlife areas. This was closely followed by resettlement of displaced people, mostly to their places of origin. Although the resettled communities initially received food aid they also hunted to supplement their diets. Target animals were mainly small mammal species and birds, since larger species were already scarce. Besides subsistence hunting, game meat was heavily traded in local markets and along major access routes. For example, in mid-1994 an IUCN team estimated that between 30 and 60 tonnes of carcasses were being removed from the abandoned Gorongosa National Park per month (DNFFB 1994).

At the same time, urban areas were starved of red meat since livestock throughout the country had been stolen or eaten during the armed conflict. Urban-based citizen hunters with vehicles mobilized as soon as access reopened, mainly hunting illegally at night with spotlights since the few remaining large mammals were already wary of hunters. As the more accessible areas were hunted out and as access improved, hunters travelled progressively further from urban areas to hunt. Post-war illegal logging followed a similar pattern after the onset of peace.

4. Large numbers of Zimbabwean troops were stationed in Mozambique during the armed conflict mainly to guard the Beira-Zimbabwe and Malawi-Zimbabwe transport corridors but also to mount offensive operations. The latter were mostly carried out in the Gorongosa area.

The uncontrolled harvesting of wildlife and forest resources immediately following the Peace Accord in 1992 was further exacerbated by the lack of effective enforcement by government or traditional authorities. Local chiefs who previously often had some form of control over outsiders hunting in their areas were either absent, or they were still re-establishing their subsistence activities and their authority was weak. The Provincial Services of Forestry and Wildlife responsible for law enforcement lacked capacity and funding and suffered from low morale. For example, forest and wildlife technical personnel in the whole Province of Sofala in 1994 totalled 55 medium-level, basic level and unqualified personnel, with only three four-wheel drive vehicles used exclusively by forestry personnel in Beira, the provincial capital. Many of the wildlife staff among them were reported to be unmotivated and demoralized due the low level of support, concern about corruption, lack of leadership at provincial level, lack of contact with DNFFB headquarters, and lack of equipment and transport (DNFFB 1994).

Although there are no data to indicate the relative amounts of wildlife extraction that occurred during and immediately after the war, it is likely that the latter had a serious impact on remaining stocks, which could otherwise have made a much more rapid recovery. Rural communities and the private sector are now faced with a considerably depleted resource base for future economic activities.

However, not all wildlife areas fared badly. Significant large mammal populations still occur in Niassa Reserve located on the northern border with Tanzania. This area was relatively unscathed by the armed conflict due to its isolation. Population estimates⁵ for selected large mammal species in the Niassa Reserve are given below:

- Elephant (*Loxodonta africana*) population in the Niassa Reserve and Buffer Zone may be one of the largest in Africa. Recent estimates for the Niassa Reserve, the proposed extension and buffer zone indicate that there are nearly 12,000 elephants in the area.
- African or Cape buffalo (*Syncerus caffer*) are abundant within the Reserve and buffer zone and occur in herds of up to 500 in the Niassa Reserve. The estimated total population is 2500 animals.
- Sable antelope (*Hippotragus niger*) are widely distributed throughout the Reserve especially in woodlands surrounding wetlands and open grasslands. The estimated total population is 9445 individuals.

5. Based on an aerial survey carried out in 2000 (Gibson, 2000).

- Greater kudu (*Tragelaphus strepsiceros*) are scattered in small groups throughout the area, although not in large numbers. The estimated total population is 1297 individuals.
- Eland (*Taurotragus oryx*) occur in small herds from 10-50 individuals throughout the Reserve and Buffer Zone. The estimated total population is around 2000 animals.
- Blue Niassa wildebeest (*Connochaetes taurinus johnstoni*) occur in woodlands dominated by knob-thorn acacia. The estimated total population is around 800 animals. This species should be considered endangered.
- Burchell's zebra (*Equus burchelli* subsp. *bohmi*) occur in wooded grassland. The estimated total population is ca. 2800 animals.
- Lichtenstein's hartebeest (*Alcelaphus lichtensteinii*) have an estimated total population of 2500 individuals.
- Waterbuck (*Kobus ellipsiprymnus* subsp. *kondensis*) are confined mainly to the larger river systems: the Rovuma, Lugenda, Chuilezi, Misangeze and Miuro Rivers. Their numbers are limited (around 700 animals) and their status should be considered vulnerable.

From census data for 1998 and 2000 for Niassa Reserve there appears to be a significant increase in the number elephants, bushbuck, duiker, impala, reedbuck, sable and warthog although the grysbok populations have declined dramatically (see Table 6). Notwithstanding, illegal hunting continues in the Reserve as indicated by the increase in the number of elephant carcasses recorded (336 in 1998 and 644 in 2000).

5.1.2. Other impacts on protected areas

In addition to the decimation of wildlife during and immediately after the war, the equipment and infrastructure in many of the protected areas and conservation areas were severely damaged or totally destroyed. The most affected was Gorongosa National Park which had well developed tourist, management and training facilities prior to the armed conflict. The park headquarters (Chitengo) was captured by RENAMO forces in 1981 and all park management ceased until after the end of the armed. During a surprise attack in 1981 most of the park staff, researchers, students, lecturers and other personnel managed to escape into the park and flee, though a some were taken hostage and a few were killed. The park was retaken briefly by FRELIMO forces in the mid-1980s, but recaptured by RENAMO very shortly after, and the newly arrived park management staff were forced to flee again. The park

Table 6. Population estimates for large mammals in Niassa Reserve and surrounding buffer zones

	1998.	2000	t value	trend
	Estimate	Estimate		
Elephant	8707	11828	2.16*	Up
Elephant family groups	7390	10643	2.33*	Up
Elephant bull groups	1317	1185	-0.37	Stable
Bushpig	591	696	0.41	Stable
Buffalo	2095	2513	0.33	Stable
Bushbuck	203	443	2.34*	Up
Duiker	5166	16074	16.74***	Up
Eland	1358	2121	1.09	Stable
Grysbok	786	57	-6.04***	Down
Hartebeest	1531	2504	1.88	Up
Hippo	463	305	-0.64	Stable
Impala	124	530	2.51*	Up
Kudu	949	1297	1.43	Stable
Reedbuck	69	636	4.94***	Up
Sable	7134	9445	2.44*	Up
Warthog	3681	6312	4.08***	Up
Waterbuck	334	719	1.53	Stable
Wildebeest	778	777	-0.00	Stable
Zebra	2854	2788	-0.10	Stable

* significant (95 percent probability) ** highly significant (99 percent probability) *** very highly significant (99.9 percent probability)

headquarters were used as a base by RENAMO during the war, along with other sites at various times during the conflict including Casa Banana in the north of the park, and Gorongosa Mountain. Much of the park infrastructure was damaged, destroyed, or left to decay. Both REMAMO and FRELIMO laid landmines in the vicinity of the headquarters at various times. (John Burlison, Roberto Zolho, Mateus Chambal, Baldeu Chande, pers. comm.).

During the drought of the early 1990s before the Peace Accord RENAMO authorities permitted a community to resettle inside the park boundary at Bunga on the Vunduzi River, an area with perennial water and fertile soils (Boyd & dos Santos, 1997). This community had previously lived in the area, but had been evicted from the Park in colonial times when the park was gazetted.

Management in Maputo Special Reserve was less severely affected by the war. Senior management staff were forced to leave, but junior staff maintained a

presence. Junior staff remained in Niassa Reserve on the Tanzanian border throughout the war. Despite having no contact with the Wildlife Services and not receiving pay for a number of years they partially continued with their duties in the Reserve.

Bazaruto National Park (comprising islands and associated marine areas offshore from Inhassoro) continued to be staffed throughout the war. The park was mainly affected indirectly due to an influx of displaced people and their livestock to the islands from the mainland, with resulting pressure on natural resources including over-fishing and goat-grazing. Even though many of the displaced people returned to the mainland after the war the livestock remained and removal of vegetation cover due to overgrazing continues to be a problem.

Mozambique's forest reserves were not provided with effective protection measures even before the armed conflict although there was little encroachment. Following the signing of the Peace Accord in 1992 and the return of displaced persons the most of the forest reserves have been encroached upon. For example about 40 percent of Derre Forest Reserve (1,700 km²) in Zambezia Province is now under small-scale agriculture.

Moribane Forest Reserve situated at the foothills of the Chimanimani Mountains in central Mozambique was the "frontline" between RENAMO forces to the south and FRELIMO forces to the north. After the signing of the Peace Accord most of the demobilized RENAMO soldiers settled in the forest reserve (see also Section 5). A Ford Foundation-funded project is currently underway to encourage settlers to leave the reserve and to control slash and burn within the reserve and surrounding areas.

5.2. Impacts on natural habitats

The armed conflict resulted in the displacement of an estimated 50 percent of the rural population of Mozambique. Very extensive rural areas were depopulated, for a period of up to 12 years. In the absence of slash-and-burn agriculture natural vegetation re-established on deserted farmland in these areas, unhindered by people or livestock. Timber stocks increased as commercial harvesting and transport of precious hardwoods was significantly reduced (although a few loggers managed to negotiate "rights" to harvest hardwood with one or other of the opposing armed forces).

Internally, a large proportion of the displaced rural populations (mainly subsistence farmers) relocated to urban and peri-urban zones, transport corridors and the coastal zone. The massive relocation had a direct impact on the

natural resource base: satellite images clearly show large-scale habitat destruction around major urban areas and along transport corridors. Activities contributing to habitat destruction included clearing of woodlands (slash and burn) for small-scale farms, firewood harvesting, and charcoal production to supply the energy requirement for the burgeoning urban populations.

Woodland in the Beira-Machipanda transport corridor linking Beira port to Zimbabwe was cleared of vegetation for security purposes, to reduce the risk of attack by REMAMO forces. This area was further degraded by thousands of internally displaced people who settled in this relatively safe haven and needed fuel and construction materials. Destruction was localized: a few kilometers to either side of the road and railway the natural vegetation remained mostly intact.

Externally, large numbers of Mozambicans sought temporary refuge in nearby countries: South Africa, Swaziland, Zimbabwe, Malawi, Zambia and Tanzania. Refugees had large environmental impacts on many border areas in neighbouring countries, and placed a heavy burden on local communities there. In Zimbabwe, for example, rehabilitation projects were necessary to repair environmental damage after the refugees returned home.

There was a significant increase in the commercial logging of precious hardwoods (much of it illegal) following the signing of the Peace Accord in 1992. The Provincial Services of Forestry and Wildlife received a large number of requests for "simple" licenses (*licenças simples*) for the harvesting of hardwoods and many licenses were issued.⁶ The Services were supposed to ensure that the number of licenses issued and quotas were within sustainable limits but this was rarely done. Similar to the case with hunting the loggers took advantage of newly opened access, logging valuable timber in the easiest areas and progressively moving further afield as accessible areas became logged out. Due to lack of human resources and logistical support such as transport and radio communication it was not possible to control the legal and illegal harvesting of hardwoods in the immediate post-war period. This lack of capacity throughout the country continues one to be the major constraints for the enforcement of forestry and wildlife regulations.

In recent years there have been stronger attempts to control logging operations in Mozambique. In accordance with the new forestry and wildlife policy

6. According to forestry regulations, permission to harvest hardwoods may be acquired through acquiring (a) a "simple" license (*licença simples*) or (b) a forestry concession. A simple license permits the harvesting of a quota (m³) of specified tree specie(s) within a particular area over a limited period of time (usually six months). A concession license authorizes a concessionaire to acquire long-term, exclusive rights to harvest hardwoods within a particular area over a period of time (up to 50 years).

of 1997, the government is promoting longer-term forestry concessions based on forestry management plans as it is believed that this will lead to harvesting on a more sustainable basis.

There was a wide-held belief that there was a massive reduction in mangrove cover due to the relocation of the rural population to coastal areas (mainly coastal cities and towns). Several published reports provided data indicating mangrove forests had been reduced by 70 percent between 1975 and 1992 due to cutting for fuelwood and construction (see for example Mayo *et al.*, 1993). The reportedly massive mangrove destruction in Mozambique was described at various international environmental conferences and formed the basis for several project proposals for mangrove rehabilitation.

It was only in 1994, through an analysis of satellite imagery, that the changes in mangrove cover were quantitatively estimated along the entire 2770 km coastline of Mozambique. The overall reduction in mangrove cover was less than 3 percent; in some urban areas mangrove cover had declined whilst in areas mangrove cover had increased (Saket & Matuse, 1994). The perception of a major decline in mangrove cover stemmed from observations made in urban areas only as travel was restricted because of the war. However, this study gave no indication of the quality of the mangroves.

5.3. Lack of knowledge

Prior to Independence in 1975 several surveys and assessments of selected components of Mozambique's biological diversity were carried out by Portuguese scientists and other visiting researchers. These studies focused mainly on large mammals, birds and angiosperms. Due to the large size of the country, inaccessibility and relatively few biologists, large areas of the country were not covered. All other taxa were poorly documented or not covered at all.

Since 1975 no coordinated, comprehensive surveys of Mozambique's biological resources have been carried out. This is due to a long period of armed conflict that affected much of the country as well as the lack of trained Mozambican biologists. Between 1980 and 1992 travel outside the major cities was not possible and most of the country was a "no go" area. Biological research was restricted to offshore islands such as Inhaca Island (which has a well-established biological research station) and Bazaruto Island. Consequently, there is a profound lack of information regarding the conservation status of Mozambique's biological diversity, and there are no Red Data Books for Mozambique's fauna and flora.

The low level of biodiversity knowledge at the onset of peace in 1992 was very unfortunate. As a result, there were undoubtedly many missed

opportunities for new conservation initiatives in the post-war reallocation of land and land-uses. The priority of the national Wildlife Services immediately following the onset of peace in 1992 was to consolidate the wildlife estate and rehabilitate areas that were already gazetted, rather than investigate opportunities for conserving new areas which might protect a wider range of biodiversity. The existing wildlife protected areas were mostly established before independence to conserve large terrestrial mammals.

Since 1994, some biological surveys in other parts of Mozambique have been carried out by a variety of research institutes, NGOs and government services. However, these have been limited in extent (due to lack of logistical support and trained biologists) and have been carried out in an uncoordinated fashion. With increasing international awareness that peace and stability have finally returned to Mozambique together with the recognition that Mozambique offers unique opportunities for biological research, an increasing number of outside research institutes are carrying out biological surveys in Mozambique.

These surveys are mostly undertaken in collaboration with a Mozambican partner. For example, a British NGO (Frontier) together with the Ministry for the Coordination of Environmental Affairs (MICOA) carried out a two-year survey of the coral reefs and associated marine habitats of the Quirimbas Arquipelago in 1996-97. These studies highlighted the biological importance and conservation value of the area. The Provincial Wildlife Services have recently proposed the creation of a marine national park there.

A list of Mozambican and other agencies involved in biodiversity surveys in Mozambique is given below (Table 7 from Ministério de Coordenação de Acção Ambiental, 1997).

In addition, there has been no systematic attempt to identify and quantify all processes and activities that have an impact or potential impact on biodiversity in Mozambique, although it is known that activities such as over-harvesting of forests, slash-and-burn agriculture and non-sustainable use of wildlife are having negative impacts on the natural resource base.

The challenges facing Mozambique in order to identify and monitor the most important components of biodiversity are daunting, and the capacity to carry out the necessary research and assessment activities is limited (see below, Section 5.4). Several institutions are currently involved in identification and monitoring activities, but there is an urgent need to co-ordinate research activities.

Table 7. Institutes involved in biodiversity research in Mozambique

INSTITUTE	RESEARCH AREA
EDUARDO MONDLANE UNIVERSITY	
Department of Biological Sciences (DBS)	Mainly coastal and marine biodiversity Botanical collection (the DBS has a fully functional herbarium-LMU)
The Natural History Museum	Currently re-organizing collections Selected surveys (especially avifauna)
Department of Forest Engineering	Forest Inventories
Department of Geography	Land-use and habitat surveys
MINISTRY OF AGRICULTURE & RURAL DEVELOPMENT	
Forestry Research Center	Seed collection Forest ecology Resource use patterns
Forestry Inventory Unit	Forest inventories
The National Herbarium	Botanical Collection Wild crop genetic research
National Directorate of Forestry & Wildlife (Wildlife Services now in Ministry of Tourism)	Wildlife surveys and forest inventories, socio-economic and resource use surveys
Fisheries Research Institute	Fish stock estimates
National Institute for Veterinary Research	Veterinary research
Animal Production Institute	Livestock breeding Pasture and grazing research
MINISTRY FOR THE COORDINATION OF ENVIRONMENTAL AFFAIRS	
Coastal Zone Management Unit	Coastal & marine biodiversity surveys
NON-GOVERNMENTAL/OTHER ORGANIZATIONS	
The Endangered Wildlife Trust in collaboration with the Mozambican Ornithological Club	Currently producing a Bird Atlas for the whole of Mozambique; due to be completed by 2006
Frontier-Mozambique (in collaboration with MICOA)	Coral reef and marine surveys of the Quirimbas Archipelago, northern Mozambique
WWF in collaboration with DNFFB	Biodiversity conservation, Bazaruto Archipelago
WWF in collaboration with several Mozambican organizations	Development of the East African Marine Ecoregion program, Miombo Ecoregion program, and Lake Malawi/Niassa
IUCN in collaboration with several Mozambican organizations	Zambezi Delta biodiversity and socio-economic survey
International Crane Foundation in collaboration with the Natural History Museum	Survey of waterfowl of the Zambezi Delta and other wetlands
Percy Fitzpatrick Ornithological Institute (University of Cape Town) in collaboration with the Natural History Museum	Bird surveys of Mount Namuli, Zambezia Province

5.4. Low levels of trained and experienced personnel

The current level of training of Mozambicans within all sectors, including the wildlife and forestry sectors and university research, is a consequence of Mozambique's turbulent history: colonial rule, a long war of Independence, an abrupt transition to Independence in 1975, a short period of post-Independence stability (1975-1980) followed by a long and bloody armed conflict which finally came to a conclusion in 1992.

Prior to Independence Mozambique was considered a "Province" of Portugal and there was little attempt to train indigenous Mozambicans other than at the most rudimentary level. Academic and technical training (where available) was largely restricted to junior school level. Higher level training (high schools, technical colleges and the single university - then known as then Lourenço Marques University) provided training for mainly Portuguese nationals under instruction from teachers and lecturers from Portugal.

Following Independence in 1975 the majority of trained personnel, lecturers, teachers and higher-level students left the country. It is estimated that there were 19 Mozambicans with University degrees at the time of Independence. One of the main priorities of the newly-independent government was, therefore, to provide training for Mozambicans at all levels but initially focusing on basic technical, junior and high school levels. Most of the University departments (renamed the Eduardo Mondlane University after Independence) and several technical colleges were obliged to close down in the late 1970s and early 1980s due lack of staff as well as an insufficient number of qualified university-entry level students. For example, the Department of Biological Sciences was closed between 1981 and 1985. Prior to closure only a few Mozambicans graduated with a bachelors degree in biology.

On reopening in 1985 the university offered a five-year Licenciatura degree course (equivalent to a BSc honors degree). Consequently, most Mozambican university-trained biologists only graduated in the early 1990s. These recently qualified graduates were immediately recruited into the various government departments as senior technical staff or as junior lecturers in the Department of Biological Sciences. Although equipped with academic degrees the newly recruited staff often had little or no field experience in much of Mozambique, or experience in administration and project management. Since the early 1990s several of these graduates have embarked on MSc or PhD research programs. The first Mozambican with a PhD in biology graduated in 1998 whilst another two more Mozambican biologists graduated in 2000. Currently, therefore there are only three Mozambicans with PhDs in biology.

The wildlife sector (as for other sectors) was affected by the loss of senior staff following Independence in 1975 as several Portuguese staff left. During the war many of the remaining senior wildlife staff left the country when management of the protected area system became largely impossible. Many of them were expatriates (including Portuguese nationals), and they took their knowledge and expertise of Mozambique with them. In the 1980s the Wildlife Services recruited several senior level Mozambican staff (mainly veterinary scientists). However, due to the war situation it was not possible for the newly recruited senior staff to gain field experience in Mozambique's protected areas. Since the early 1990s the wildlife sector has recruited several Mozambican graduate biologists.

With respect to medium-level staff in the wildlife sector, the Wildlife Services lost many Portuguese medium-level staff at Independence, and was greatly understaffed. Only four Portuguese nationals (medium level) chose to remain in the wildlife services after Independence. Notwithstanding the pressing needs of the new Government in the fields of education, health and agriculture, high priority was given to maintaining the protected areas network at Independence. It should be noted that a number of protected areas had been gazetted shortly before Independence and these were not yet occupied by management staff.

Between 1977 and 1981 approximately 28 Mozambicans, with the equivalent of 6th grade level education, were recruited by the Department of Forestry and Wildlife and underwent an intensive one-year course in parks administration, wildlife management and selected academic courses at Gorongosa National Park. In-service training was also provided to existing medium-level Mozambican staff. This was the inception of the Gorongosa Wildlife Training School. After graduating these newly trained wildlife managers were posted to the various reserves and national parks as wardens or rangers. A parallel course was run for forestry staff.

However, with the onset of the armed conflict in the early 1980s the process of consolidating Mozambique's protected areas was brought to a premature end and most of the wardens and rangers were relocated to headquarters in Maputo or to the provincial capitals.

Remarkably some rangers continued to carry out field duties during the armed conflict, and sadly three ranger staff were killed. A further two died in service-related accidents and seven left the service in search of better conditions. Of the 28 rangers trained at the Gorongosa Training School at considerable cost and effort, only 16 remained in service at the end of the armed conflict (Costa *et al.*, 1993).

During the armed conflict wildlife staff (including some graduates from the Gorongosa Training School) completed certificate and diploma courses at Mweka Wildlife College in Tanzania. One of the Mweka College graduates went on to complete an undergraduate course in wildlife management in Australia in the early 1990s. Due to the war situation these newly trained staff members were unable to assume duties in the protected areas with the exception Bazaruto National Park. The medium-level staff are now playing key roles in protected area management in Mozambique.

When the FRELIMO and RENAMO armies were demobilized there was great concern that if future employment could not be found for the ex-soldiers they might pose a serious threat to peace and security. Since many of the bush soldiers' skills were valuable for control of illegal hunting (tracking, handling of firearms, self-sufficiency in the bush, etc.) some were recruited by DNFFB as game guards (for example, in Gorongosa National Park). Care was taken to ensure that each patrol team had ex-soldiers from both RENAMO and FRELIMO, led by a trained Wildlife Service ranger, to prevent possible conflict between teams. Although the numbers were small in terms of total number of demobilized soldiers, it did provide some employment and their skills make a useful contribution to conservation.

With hindsight, one of the best investments donors could have made during the war would have been to provide university training outside Mozambique for a future wildlife staff in skills which would be needed to rehabilitate, improve and run the wildlife sector. This cohort of people would then have been in a very strong position to develop a strong and viable sector. Currently the Wildlife Services continue to be short of trained personnel. This places heavy burden on those Mozambicans who are trying to build the sector and consequently the sector continues to rely on expatriate assistance. The latter has limitations and inefficiencies, especially because of the required ability to work in Portuguese.

5.5. Impacts on traditional management systems

Traditional natural resource management systems in Mozambique have been profoundly affected by forces external to these systems since early colonial times.

In the 16th century the Portuguese administration was weak and over-extended. In order to acquire and rule land in Mozambique, traders with private armies were granted large tracts of land especially in central and northern Mozambique. This was known as the *prazo* system (1700 - ca. 1900). The

prazo lands were acquired mainly through conquering and force by the private armies of rich traders in the name of Portugal. The colonial government's aim in establishing *prazos* was to accelerate colonization through white settlement.

During the first decade of the 20th century a more central (state) administration was established and traditional authority was integrated into the state structure. Concomitantly, the *prazos* started to give way to large companies with foreign capital. The largest was the Mozambique Company established in 1888 with English capital.

The decade of the 1950s was a period of massive colonization of Mozambique. The main *colonatos* were located in southern Mozambique, but the center and north received thousands of Portuguese settlers mainly in towns and peri-urban areas. Some were involved in agricultural activities and occupied concessions in the more fertile regions. During this period there was a progressive expulsion of local small-scale farmers from their land. The cultivation of cotton by indigenous Mozambicans was enforced, and forced labor on the *colonatos* was common practice. Local traditional leaders (*régulos*) were often coerced into providing forced labor. The increase in social conflict between local communities and the Portuguese settlers that occurred during this period eventually led to the liberation war (1964-1974).

Following Independence in 1975, the Mozambique government opted for state-controlled socialist policies. The power of traditional leaders (considered to have been puppets of the Portuguese colonial authorities) was removed and many rural communities were encouraged or coerced to move to communal villages. The latter policy was based on the Tanzanian model of Ujamaa and impacted directly on the rural economy and traditional systems. The traditional leaders were replaced with political cadres responsible for issues related to village administration and management. It is believed that these policies contributed to civil unrest and eventually to the armed conflict. (In rural areas under RENAMO control during the last war the role of traditional leaders was recognized and strengthened.)

The attempts to remove the power of traditional authorities and to establish communal villages met with varying levels of success. In some areas traditional systems were completely broken down whilst in others they proved remarkably resilient and are still in place today.

The war *per se* (1980-1992) resulted in the large-scale movements of entire rural communities. Most of these displaced communities returned to their places of origin after 1992 and embarked on the process of reconstructing

their lives based on traditional village systems. Nonetheless, indigenous knowledge and traditional natural resource management systems were generally much weaker after the war. A new generation had been brought up away from the land and local natural resource management systems.

In several cases demobilized soldiers remained in the vicinity of their dismantled military bases relying mainly on the local natural resources for their livelihoods: slash and burn agriculture, logging of hardwoods, manufacture of charcoal, and fishing. These situations invariably led to conflict between the returnees and the “outsiders”.

Traditional management and indigenous knowledge systems Mozambique have, therefore, been significantly weakened by the cumulative effects of colonial rule, post-independence policies and armed conflict. Since 1994, the Government of Mozambique, recognizing that earlier policies were out of step with social and economic trends, has adopted a number of policies that provides for a greater degree of involvement of communities and traditional leaders in land and natural resource management. These include:

Moribane Forest, Manica Province

Moribane Forest Reserve (53 km²) was gazetted by the Portuguese colonial government in 1950 to protect a watershed area from deforestation. During the armed conflict the Moribane area was an important RENAMO base, and there was considerable fighting and displacement.

The recognized chief (*régulo*) fled the area and RENAMO requested that the elders designate a substitute. The brother of the absent chief was nominated and he continues to hold the chieftaincy. Since the signing of the Peace Accord and the return of displaced people the current chief is facing challenges from members of the community. In addition, former RENAMO soldiers have remained inside the reserve. This complex situation has created difficulties in initiating CBNRM projects in the area.

The major issues inside the reserve are the uncontrolled burning of forest for hunting and collection of honey, and the opening up of forest for agriculture. State-sanctioned and traditional rules on management of the forest have been largely disregarded by forest dwellers. Another major issue for local residents is the destruction of fields and crops by elephants, which have also returned to the area. Currently the Provincial Forestry and Wildlife Services, working with the Forestry Research Center, are seeking to re-establish a management regime for Moribane Reserve in collaboration with local communities. Several projects are underway to develop CBNRM in the Moribane area (see Section 6.3).

Coastal resources of southern coastal Mozambique

The fishery resources of the coastal lakes of southern Mozambique have long been exploited by local inhabitants for subsistence and commercial purposes. During the protracted armed conflict, fishing activities throughout the region declined markedly. During the war 80 percent of the local population fled to neighbouring countries or to larger urban areas. Access to fish resources at this time was restricted to the military or individuals who negotiated agreements with the military. Since the signing of the Peace Accord in October 1992 the small-scale fisheries sector has once again been resumed operations. However, since the onset of peace the allocation and use of the fish resources has become a complex situation. Prior to Independence traditional leaders controlled the timing and location of fishing drives, known as *fonyo*. Since 1992, semi-commercial fishing has incorporated demobilized soldiers and other immigrants resulting in a breakdown of traditional management practices and conflict with local residents who have returned to their places of origin. Fish stocks are reported to have declined. Similar conflicts occur with wildlife and tree resources (charcoal and firewood).

Liquati Forest, Maputo Province

In Liquati Forest demobilized soldiers established a charcoal operation, taking advantage of the proximity of a main road to Maputo city, and hence access to a ready market. Conflict occurred with local communities who had traditional management systems for the forest and its resources, including protection of part of the forest that they held as sacred. A World Bank-funded project has assisted local communities to re-establish management over their forest resources. As a consequence the uncontrolled harvesting of trees for charcoal production has been somewhat curtailed.

- Land Policy (1995) and new Land Law.
- National Environmental Management Programme (1995) and Environmental Law (1997)
- The National Forestry and Wildlife Policy and Strategy (1995) and the new Forestry and Wildlife Law (2000).

These are discussed further in Section 6.

6. Post-war initiatives for biodiversity conservation in Mozambique

6.1. The post-war setting

The long and bloody war that affected the lives of all Mozambicans finally came to end in 1992 with the signing of the Peace Accord between FRELIMO and RENAMO. Contrary to the expectations of many, lasting peace and stability returned to Mozambique.

The moves towards peace and subsequent consolidation of peace and stability are attributed to the willingness on all sides to finally abandon attempts to solve ideological and political differences by war. All sectors of Mozambican society welcomed the peace initiatives and accepted the necessary compromises. The energy to wage war was lost – and a long war finally wound down.

The United Nations peace-keeping force in Mozambique (UNOMOZ) adopted a high profile strategy and insisted on demobilization of troops on both sides prior to democratic elections. The demobilization process proceeded according to plan with soldiers from both sides seeking to be demobilized. Demobilization was undoubtedly the key to the subsequent transition to peace and the holding of the first democratic elections. Unfortunately this did not happen in the case of Angola; it suffered a similar scenario to Mozambique following independence in 1975 but did not succeed in achieving lasting peace following the signing of the Bicesse Accords in 1989.

The successful first democratic election in October 1994 was another key event in the history Mozambique that contributed to the consolidation of peace and stability. Since 1994 Mozambique has benefited from a peace dividend with rural communities rebuilding their livelihoods and unprecedented economic growth after years of stalled development efforts.

In many respects Mozambique serves as model for the creation of durable peace and post-war reconstruction in Africa. The over-riding factor was the

genuine desire by all parties to end the conflict and the willingness to compromise in the interest of Mozambique and Mozambicans.

The coming of peace and democratic elections was accompanied by the urgent need to rebuild the national economy, which had been virtually destroyed by the war. All relevant sectors were expected to contribute to this, including the natural resource sector (through forestry, wildlife, fisheries and tourism activities). The government looked to the private sector to initiate developments, and to donors for support in creating enabling conditions and infrastructure.

Investor confidence grew and investment increased significantly during the post-war years, aided by Mozambique's proximity to South Africa. The opportunities for investment were high in light of the enormous void that had been created with the breakdown of most economic activity in the country during the armed conflict. New investment and privatization policies created a favorable environment. For example, colonial Portuguese-run farms that became state farms after Independence and were abandoned during the conflict, suddenly became available to private investors on a fifty-year lease basis. Safari-hunting concessions were granted for the abandoned coutadas. Tourism concessions were granted for extensive tracts of land particularly along the southern coast.

Concessions were granted at different levels of government depending on geographical size of the concessions (e.g. district, provincial, national and ministerial levels). There was a serious lack of co-ordination among the various sectors allocating concessions in government (such as wildlife, agriculture, tourism, forestry and mining). The process of granting concessions was not consultative, especially with regard to local communities living in the areas concerned. Consequently, the same area of land was sometimes granted to different concession seekers, and often there was conflict with local communities.

Due to the war very few traditional farmers formalized their rights to land under the prevailing legislation. In some cases, local communities returning to their places of origin discovered that tracts of land had been requested or given over to outsiders⁷. Closely linked to land rights is the issue of community rights to wildlife resources and to benefits derived from these resources. The economic potential of wildlife in Mozambique is clearly recognized by commercial investors who are making major investments in wildlife-based concessions for tourism development in the country.

Soon after the war concessions were sometimes even allocated in protected areas, at a time when management had not yet been re-established in most

7. The new Land Policy and Land Law (1997) addresses these issues and community rights over land are now recognized

protected areas. In addition, the precise boundaries of the protected areas were sometimes unclear. In 1996 DNFFB prepared maps showing the locations of all protected areas and sent them to all major national, provincial and district offices involved in planning and granting concessions, as well as DNFFB offices around the country, in an attempt to solve this problem.

With the transition to peace and associated shifts in power, corruption in some cases became a factor in the allocation, control and use of land and natural resources. Various attempts have been made at different levels to stem and eradicate it, and these attempts are to be applauded.

6.2. Improved policy and legal framework

In the early 1990s it was recognized that many of Mozambique's policies and laws relating to biodiversity and natural resources were outdated both nationally and globally. Even before the signing of the 1992 peace accord, issues related to the environment were given an increasingly higher profile. In 1990 the National Environmental Commission was established. Mozambique participated in the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil in 1992 when Mozambique signed the Convention on Biological Diversity (CBD). The Mozambican Parliament subsequently ratified the Convention in 1994. The announcement of the Ratification and the Convention, in its entirety in English and Portuguese, was published in the Government Bulletin (*Boletim de República*, N°34, I Serie) on 24 August 1994. Since UNCED, biological diversity has gained increasing attention in Mozambique.

Although economic activity has increased markedly since the return of peace and stability this has often been accompanied by the uncontrolled exploitation of the country's natural resources. Consequently, Mozambique's natural resource base is coming under increasing pressure from a variety of developments.

The Government of Mozambique is committed to pursuing sustainable development pathways. Shortly after the holding of elections in 1994, the National Environmental Commission gave rise to the Ministry for the Coordination of Environmental Affairs (MICOA). One of the first tasks of the newly created ministry was the formulation of the National Environmental Management Program (NEMP) to promote and implement sound environmental policy.

A watershed for environmental conservation and management in Mozambique was achieved in 1997 with the passing of the framework Environmental Law. For the first time in its history Mozambique possesses a

legal instrument to ensure that environmentally sound development pathways are adopted.

Chapter IV, Article 4 specifically refers to the protection of biodiversity:

1. All activities that threaten the conservation, reproduction, quality and quantity of biological resources, especially those that are threatened with extinction, are prohibited.
2. The Government will ensure that adequate measures are taken for:
 - a) The maintenance and regeneration of animal species, rehabilitation of degraded habitats and creation of new habitats, especially through the control of activities that may negatively impact upon faunal species and their habitats.
 - b) The special protection of plant species threatened with extinction, or due to their rarity and scientific or cultural value.

Article 13 of the Environmental Law provides a legal basis for the creation of protected areas. Importantly, the Law specifies the need to indicate the role of local communities in the management of protected areas:

1. In order to ensure the protection and preservation of the components of the environment as well as the maintenance and/or improvement of ecosystems recognized for their ecological and socio-economic value, the Government will establish environmental protection areas.
2. The environmental protection areas will be subject to classification, conservation and control measures, which will always take into consideration the need to preserve biodiversity as well as areas of social, economic, cultural, scientific and landscape value.

Article 30 of the Environmental Law recognizes the need to guarantee the participation of local communities and to use their knowledge and human resources in the protection of the environment.

Importantly, the framework Environmental Law obliges all sectoral legislation that deals in any way with the management of components of the environment to be reviewed and revised so that it is in conformity with the new Law (Article 32).

Chapter 4 of the framework Environmental Law refers to the Prevention of Environmental Damage. An environmental impact assessment (EIA) is

required for projects likely to cause significant environmental impacts. The issuing of an environmental licence is contingent upon the EIA and is a necessary prerequisite for the issuance of any other required licences.

In 1998 the Regulations for EIA for Mozambique were passed by the GOM. The regulations specify that all programs and projects that may directly or indirectly affect sensitive areas shall be subject to an EIA. These include:

- coral reefs
- mangroves
- natural forests
- small islands
- zones of potential erosion, including dunes along the coastline
- areas exposed to desertification
- conservation or protected zones or areas
- wetlands
- zones where the habitats and ecosystems are in danger of extinction
- zones of outstanding landscape beauty
- zones of archaeological, historical and cultural value that should be preserved
- zones where plant or animal species threatened with extinction are located
- ground waters used for public consumption
- areas for the protection of spring and water sources.

In 2000 a National Directorate for Environmental Impact Assessment was created within MICOA. The Directorate is currently being strengthened in order to carry out its mandate effectively.

In order to ensure effective coordination and integration of sectoral policies and plans related to environmental management at the highest level, a National Commission for Sustainable Development (NCSD), linked to the Council of Ministers, has been created by a provision in the Environmental Law (established in 2000).

MICOA is also responsible for the coordination of activities related to the implementation of the Convention on Biological Diversity in Mozambique. To this end a provisional unit has been established: the **National Biodiversity Unit**. The precise structure, role and function of the Unit is being currently being defined and formalized.

One of the principal outputs of MICOA in 1998 was the formulation of a draft National Strategy and Action Plan for the Conservation of Biological Diversity in Mozambique in accordance with Article 6 of the Convention.

Mozambique's National Strategy has identified a series of strategic objectives and associated areas for action to achieve these objectives. The draft National Strategy and Action Plan identifies as a highest priority the need to update and acquire information in order to identify and monitor the important components of biological diversity, recognizing that conservation and sustainable use depends upon such information. In addition, it is recognized that the integration of biodiversity considerations into sectoral plans, policies and programs is a priority and will be a prerequisite for implementing many of the actions outlined in the Strategy.

The **first** purpose of Mozambique's Strategy is to meet the requirement of the Convention which calls upon all parties to develop national strategies reflecting the measures set out in the Convention (Article 6).

The **second** purpose of the Strategy is to identify issues for which national action will be taken as a matter of priority and for which there is an immediate need for co-ordination of efforts. For some of the issues covered by the Strategy there will be a need to develop more detailed action plans.

The **third** purpose of the Strategy is to serve as an instrument that will help government agencies and society in general in ensuring that the overall government policy goals related to biodiversity are realised, principally through efforts to coordinate relevant sectoral policies, programs and strategies.

In addition to the framework Environmental Law, a new **Land Law** was also passed in 1997. The new Land Law recognizes the need to protect ecologically sensitive areas and the creation of protected areas. The new Law, therefore, provides an additional legal basis for demarcating areas for protection and conservation (Article 5) and the creation of total and partially protected zones (Article 6). The latter provision now permits the conservation and management of riparian and coastal habitat together with their associated species. Importantly, the new Land law also recognizes the rights of local communities over land and natural resources, and so providing for the first time the possibility of involving rural communities fully in the management and conservation of natural resources (Article 31).

According to the new Land Law (and Forestry and Wildlife Law) local communities, individuals or private sector companies may acquire rights over land and/or wildlife and forestry resources. Community associations or institutions can be legally created in Mozambique and may acquire rights over land. The associations may carry out activities independently or enter into joint ventures with the private sector. The latter could be achieved through the creation of a legally recognized commercial company to carry out economic activities in an area where local communities have rights to the land.

In 1997 the GOM adopted a new Forestry and Wildlife Policy and Strategy. The Policy and Strategy take their lead from the Agricultural Policy and has as their overall objective: “To conserve, utilize and develop forest and wildlife resources for the social, ecological and economic benefit of the present and future generations of the Mozambique people”.

In accordance with the objectives of the Forestry and Wildlife Policy and Strategy, a new Wildlife and Forestry Law was passed in 1999. The new Law replaces the out-dated laws promulgated in 1965 (the Forestry Laws) and 1978 (the Wildlife Laws).

The Law confirms the rights of the state over natural forest and wildlife resources in the country. A key principle of the new Forestry and Wildlife Law is that local communities must be more fully involved in the conservation and sustainable use of forestry and wildlife resources. Article 3 (b) states that policies for the conservation of biodiversity must involve local communities, the private sector and civil society. Article 3 (e) recognizes the need to act in harmony with local communities and to promote the conservation, management and use of forest and wildlife resources without prejudice to customary practices.

The National Forest Estate is classified as (Article 5):

- a. Forests requiring conservation – comprising vegetation formations located in protected zones and subject to a special management regime
- b. Productive forests – vegetation types comprising high production potential located outside protected zones
- c. Multiple-use forests – comprising vegetation types outside protected zones with low forestry potential.

The faunal heritage comprises all wildlife occurring in Mozambique and will be classified on the basis of its rarity and economic and socio-cultural value; these species will be officially listed and protected by law (Article 6).

Article 10 recognizes three types of protected zones for the conservation of biodiversity and fragile ecosystem:

- a. National Parks
- b. National Reserves
- c. Historical-Cultural Use Zones

National Parks are total protection zones for the protection, conservation and management of vegetation and wildlife as well as the protection of sites of special scientific, cultural or aesthetic interest and for recreation that are representative of the national heritage (Article 11).

National Reserves are for the protection of rare species of fauna and flora, endemics, species threatened with extinction or in decline, sensitive ecosystems such as wetlands, dunes, mangroves, and corals as well as the conservation of flora and fauna within these ecosystems (Article 12). Activities that are prohibited in national parks are also prohibited in national reserves although private sector co-management is contemplated (for example, for tourism).

The recognition of Historical-Cultural Use Zones (Article 13) is a completely new category for Mozambique reflecting the new policies to ensure that local communities are involved in natural resource management. These use zones are areas for protection of forests of religious importance or cultural use in accordance with the customary norms and practices of the local communities. The forestry and wildlife resources within the zones may be used in accordance with customary norms and practices.

The recently promulgated laws and development of national policies and strategies will hopefully lead to the sustainable use of these natural resources. However, a major constraint to achieve this laudable objective is the current weak human resource capacity. Mozambique needs to embark upon a human resources development strategy in parallel with institutional strengthening and the rehabilitation of infrastructure and services. The training of a cadre of Mozambican natural resource users and managers at all levels and within all sectors will be the key to ensure the sustainable use of its natural resources.

6.3. Biodiversity-related projects

6.3.1. Background

Immediately after the war ended, donors focused on demobilization of the armies, feeding and resettlement of displaced people, and rehabilitation of basic infrastructure. Initially there was little money available for biodiversity conservation.

By the mid-1990s a few donor agencies started to fund natural resource management projects. In 1994 the Ford Foundation funded the first community-based natural resource management work in Mozambique, the Tchumo Tchato Project on the south bank of Lake Cahora Bassa in Tete Province. In the same year the European Union funded a study and the preparation of an emergency management plan for the Gorongosa-Marromeu area (DNFFB 1994), which led to a larger wildlife and forestry emergency grant for northern Sofala (section 6.3.2). Preparation for the World Bank GEF transfrontier project (section 6.3.4) started in the early 1990s but full funding was only made available only in 1997.

The successive colonial, socialist and wartime environments did not encourage the development of Mozambican NGOs and there were very few NGOs operating in Mozambique in the early 1990s. The first Mozambican environmental NGO, the Grupo de Trabalho Ambiental (Environmental Working Group) was formed in 1990 and undertook several small projects. The Endangered Wildlife Trust (EWT), a South African NGO, supported DNFFB with the management of Bazaruto National Park from the early 1990s before the signing of the Peace Accord. EWT also provided support to the management of Maputo Special Reserve soon after the end of the armed conflict. The World Conservation Union (IUCN) provided support to DNFFB at headquarters level (staffing assessment, planning support, project development and capacity building), supported projects at several field sites, and helped to fundraise for various projects soon after the onset of peace.

With the consolidation of peace there has been an enormous interest in funding biodiversity related projects in Mozambique. Large areas of the country are poorly documented in terms of its biodiversity, especially in the north, presenting unique challenges and opportunities.

The past two decades of war and political instability severely restricted most economic activities. Many ecosystems consequently remain in relatively pristine condition (except for depleted wildlife populations in many areas, and habitat degradation in areas of high population density). However, establishment of what appears to be lasting peace and the accompanying rapid transition to a dynamic economy is leading to rapid development. Although development pressure in Mozambique is increasing rapidly, there is still a window of opportunity to build institutional structures, technical capability, and a philosophy of natural resource management that will eventually lead to environmentally and socially sustainable development. Several projects have been carried out or are underway to assist in this process.

6.3.2. Northern Sofala Integrated Management Area (NSIMA) Project

Following a number of surveys and preparation of an emergency plan for Gorongosa and Marromeu, the EU provided funding for an 18-month emergency rehabilitation program. This was executed in 1996-97 by DNFFB, with support from IUCN. An outline of experiences in rehabilitation of Gorongosa National Park is provided below as it may prove useful to other countries faced with similar challenges after conflict.

Gorongosa National Park was reoccupied by the Wildlife Services in April 1995, having been abandoned since 1981. An emergency team was gradually built up, under the leadership of a former graduate of the Gorongosa Wildlife School. The team comprised Wildlife Services staff with work experience from

before the war, demobilized soldiers, and recruits from local communities.⁸ The team started by establishing contacts with district and provincial administration including the police, and with both political parties, to obtain their support. They also contacted local chiefs and communities, explaining future plans for the park. In general the park and what it stood for was still recognized by the communities, though there was inconsistency in recollections of boundary locations. People who had not lived inside the park previously and who had moved in opportunistically with the coming of peace moved out voluntarily. People who had been living inside the park previously were invited to participate in park management operations.

The park had been land-mined during the war, so the team relied on local communities' knowledge for safe access when they first moved into the park. They established a base in the old headquarters at Chitengo, which had been severely damaged. Due to tight control on firearms at that time the team moved in unarmed (firearms were later obtained from the police, after staff training). Although this was a risk, given the uncertain times, the fact that the new management presented a more 'people-friendly' image than the previous management did facilitate development of good relations with local communities.

From Chitengo, small patrol teams gradually reoccupied the park by reopening old management roads, spreading further and further into the park and establishing temporary camps as they went. Eventually they opened permanent bases for patrols, often in the same strategic locations as they had been previously. From there they undertook regular patrols, controlling illegal activities, consulting with local communities and collecting information about the current status of the park.

De-mining of the main access roads and the airstrip was conducted by a professional de-mining team, who employed ex-soldiers from both sides with first-hand knowledge of where mines had been laid (and often moved around). With hindsight, the de-mining should probably have been conducted earlier, but de-mining companies were very busy at that time and this was difficult to arrange.

Radio communications were established for the team with communication between Chitengo and patrol posts, and also with the IUCN office in Beira and DNFFB national network. Again this took time, necessitating the installation of a radio aerial on Gorongosa Mountain. Ideally it should have been done much earlier, to facilitate the work and ensure greater safety of the emergency team.

8. A key to the success of the project was the role of a few Mozambican medium-level technical staff who had considerable field experience in wildlife management with the ability and willingness to work in the field under very difficult conditions.

Working relationships were developed with local communities living both inside and adjacent to the park. In exchange for not hunting in the park, and for assisting in controlling illegal resource extraction by outsiders, communities were allowed to extract certain products from the park on a sustainable basis: e.g. fish, honey, and plant materials for construction, fuel, food and medicinal purposes. The park provided some employment, and local communities also took part in a 'food for work' program reopening park infrastructure. They participated in discussions of proposed zoning for the park which would enable them to continue certain subsistence activities, and ensure access to and conservation of the communities' sacred sites. A traditional ceremony was held by the communities with park staff at the start of the emergency operation to inform the ancestors about the reoccupation of the park by the government, and to appease their spirits.

The team also collaborated with relief and development organizations working with local communities around the park to re-establish their livelihoods after the war. There were practical reasons for doing this: for example, the boundaries of the park were poorly understood due to an inaccurate map which had been printed before the war. Development agencies in principle respected the park, but had in some cases been supporting community activities inside the park because they did not know where the boundaries were. Another form of collaboration was information sharing and mutual support. Both the emergency team and the relief and development agencies were working under isolated and hard conditions, and this collaboration was important. It extended to sharing results of socio-economic surveys, and collaboration of development NGOs in the preparation of the Northern Sofala Integrated Management Plan for forestry and wildlife (NSIMA).

By the end of 18 months the park was under regular management. Illegal activity was greatly reduced and good relations and collaboration had been established with local communities and authorities. Plans had been made for more elaborate participation by communities in sustainable use of resources around the park. Wild animal populations while still very low were starting to recover. Initial plans had been made for re-opening tourism and developing a new park headquarters. The hard work, diplomacy, and perseverance of the team and particularly its leader under very difficult and sometimes dangerous circumstances were key factor in the success of the program.

Included in the emergency program was the preparation of the NSIMA Plan. It included not only Gorongosa National Park but also adjacent Gorongosa Mountain, the vigilance areas, coutadas, forestry reserves and Marromeu Buffalo Reserve, proposing the conservation and development of this whole series of linked systems (Rift valley – mountain – plateau – coastal zone) as

one landscape. The plan identified critical areas requiring special conservation measures. The conservation of biodiversity with community participation was a key feature of the plan.

The plan aimed to promote conservation and sustainable use of wildlife and forest resources in the Gorongosa/Marrromeu areas in support of the national and local economies while ensuring the long-term conservation of the area's biodiversity. The main objectives of the NSIMA Plan included:

To conserve the ecosystems, biodiversity (with special reference to large mammals), historical and cultural sites of Gorongosa National Park.

To promote the conservation of the Gorongosa Mountain and related ecological systems through appropriate land use and the designation of an appropriate conservation category.

6.3.3. The Forestry and Wildlife Resources Management (GERFFA) Project

Implementation of the NSIMA Plan and continued conservation measures are being undertaken by a follow-up, five-year project: the Forestry and Wildlife Resources Management (GERFFA) Project, funded by the African Development Bank (US\$13.2 million) from 1997 to 2002.

(GERFFA) is helping to develop and manage commercial wildlife and forestry concessions, restore Gorongosa National Park (GNP) and Marrromeu Game Reserve, and develop social forestry programs. GERFFA funds the warden of Gorongosa National Park, law enforcement operations, logistical support, rehabilitation of infrastructure and training of wildlife guards.

The main camp at GNP is now partially rehabilitated and enforcement measures have greatly improved. An increase in the number of some species of large mammals was recorded in 2000 indicating that these measures are finally having a positive impact in Mozambique's flagship conservation area.

6.3.4. The Transfrontier Conservation Areas Project

The Transfrontier Conservation Areas Project is a five-year, US\$8.1 million project, funded by the World Bank GEF that started in 1997. It is assisting the Government of Mozambique to create enabling policies, activities and institutional frameworks for rehabilitating, conserving and managing biodiversity and natural resources in three transfrontier conservation areas (see also Section 4). The new concept of conservation areas (rather than national parks) places greater emphasis on multiple resource use and management by local communities living in and adjacent to these areas.

The Gaza TFCA covers 20,700 km² in the Provinces of Gaza and Inhambane, and borders Zimbabwe in the north-west and South Africa in the south-west. This is an important TFCA as it includes three main conservation areas: Zinave and Banhine National Parks (3,700 km² and 7,000 km² respectively) and Coutada 16 (a 10,000 km² wildlife utilization area). The latter is contiguous with the Kruger National Park in South Africa. The Gaza TFCA also borders on the Gonarhezhou National Park in Zimbabwe. An agreement was recently signed by the three countries setting out their commitment to this initiative.

The Maputo TFCA includes the Maputo Special Reserve (700 km²) and the proposed Futi corridor which would link the Maputo Reserve with the Tembe Elephant Park and the Ndumo Game Reserve in Kwazulu, South Africa. The Futi River and associated vegetation provided a traditional corridor for a population of elephant that is currently divided by a fence along the international border. The project area forms part of the Maputaland Centre for Endemism and ranks as a first order site of global botanical significance.

The Chimanimami TFCA in Manica Province is contiguous with the Chimanimani National Park in Zimbabwe. This TFCA covers a relatively small area (1,740 km²), and includes the eastern escarpment and foothills of the Chimanimani massif.

The proposed project has four components: (i) institutional and policy development, with specific emphasis on training and capacity building; (ii) habitat and wildlife management (conservation activities); (iii) community mobilization and development activities, and (iv) monitoring and evaluation.

DNFFB⁹ has overall responsibility for project co-ordination and management, with a major part of the implementation being done by NGOs and local consultants. Project co-ordination and management staff are based in DNFFB headquarters. Regional coordinators are in place for each TFCA and activities are integrated with those of the Provincial Forestry and Wildlife Services. Community-based activities are undertaken by NGOs.

6.3.5. The Community Forestry and Wildlife Management Project

The Community Forestry and Wildlife Management Project (US\$9.6 million) funded by the Netherlands Government is implementing pilot community forestry projects in Nampula and Maputo Provinces and meeting the full costs of the Community-based Natural Resources Management Unit within DNFFB.

9. As of May 2001, the implementation of the TFCA Projects falls under the newly created National Directorate for Conservation under the Ministry of Tourism.

The project has succeeded in demarcating and registering community land in the Goba area in Maputo Province on the Swaziland border. Local communities now have title rights over their land; the license was awarded in March 2001. This is believed to be the first case in for communities in Mozambique (as opposed co-operatives which have gained rights over land). Local communities in the Goba area are now in a position to negotiate with the private sector for the implementation of natural resource projects such as tourism and forestry.

6.3.6. The Coastal and Marine Biodiversity Management Project

The Coastal and Marine Biodiversity Management Project (CMBMP) is a four-year project due to commence in March 2001. It is funded jointly by the GEF and the International Development Association. The total funding in US\$ 9.7 million.

CMBMP will pilot an integrated approach to coastal and marine biodiversity protection, and sustainable use of natural resources in two areas of northern Mozambique. One area is contiguous with the Tanzanian border. Both these pilot project areas include sites recognized as having globally significant biodiversity, including corals, mangroves, sea-grass beds, dugongs, and all five species of threatened and endangered turtles.

The overall objective of the CMBMP is to ensure the effective protection of globally significant coastal and marine habitats and species. It is envisaged that the achievement of this objective will to be accomplished through a strategic development planning process that balances ecological and social issues with the various development interests in the coastal zone. Its success will be measured by: establishment of effective protection of key marine and terrestrial conservation areas; and co-management in buffer zones of marine and terrestrial conservation areas consistent with conservation objectives.

The Project comprises a multi-pronged approach designed to support sustainable development including:

- strategic spatial planning that fully integrates conservation with regional development
- establishment and strengthened protection of key terrestrial and marine conservation areas and initiation of conservation-oriented community activities in and around these areas
- establishing best practice for environmentally and biodiversity-friendly economic development
- capacity building of key government and non-government stakeholders responsible for biodiversity protection
- public awareness raising.

The overall coordination and management of the CMBMP will be the responsibility of Ministry for the Coordination of Environmental Affairs (MICOA). Components of the project will be implemented by various government departments and NGOs.

6.3.7. Rehabilitation of Niassa Reserve

Niassa Reserve was managed at a low level during the war. The reserve presents major logistical challenges for management, due to its large size and location in a very remote area on the Tanzania border. DNFFB would have been unable to manage it effectively without outside assistance in 1996. DNFFB entered into an agreement with Madal, a Mozambican company, to provide management support together with IUCN. A major Madal shareholder provided funding privately for the first three years of the operation. A reserve management committee was established which included DNFFB, provincial government, district government and Madal. IUCN assisted with community-based initiatives in an attempt to ensure the full participation of local communities in the project.

In 1998 the agreement was transformed into a commercial arrangement, with the establishment of the Company for the Management and Development of Niassa Reserve (SRN). The company comprises the State (51 percent shareholding) and an investment consortium, Investimentos de Niassa (49 percent shareholding). The intention is to offer 15 percent of the shares to local communities, although this has yet to happen.

The company currently employs 70 game rangers and a warden. The game rangers have received various levels of training. Wildlife populations are reported to be stable or increasing since management of the reserve has improved (see Section 5.1). The Worldwide Fund for Nature's Southern Africa Regional Programme Office (WWF SARPO) in Zimbabwe is currently developing a management plan for SRN.

The development of government/private sector/community partnerships for protected area management is a new concept for Mozambique, and indeed for much of Africa. This willingness to try new approaches to protected area management is possible with the new policies and legislative framework. The new openness extends to natural resource management in general, and seems to be one consequence of the new start which was possible with an almost 'clean slate' at the end of the war. It is interesting to speculate whether land and natural resource policies would have changed to this degree, had the war not occurred.

6.3.8. Community-based Natural Resources Management Project, Chimanimani Area, Manica Province

The Ford Foundation is supporting a number of activities in the Chimanimani area (in addition to support provided by the Transfrontier Conservation Area Project).

These include:

- Construction roads and opening of some trails to potential tourist spots
- Identification of tourist attractions, including bird watching areas;
- Support for NGOs including: awareness on environmental issues; establishment of women's bee-keeping association; fish aquaculture; documentation of indigenous knowledge; and exchange visits for local community members to other CBNRM projects
- Support to the Forestry Research Centre (CEF) and Agrarian Institute of Chimoio for: research in Moribane Forest Reserve; CBNRM initiatives based on forest products; and slope cultivation control measures.

6.3.9. The Marena Research Project

This is one of the few research projects that specifically aims to critically evaluate CBNRM initiatives in post-conflict situations sub-Saharan Africa. Currently research is being carried out in Mozambique and Ethiopia.

In Mozambique the University of Sussex (UK) in collaboration with CEF is carrying out research related to reconstruction of natural resource management institutions in post-conflict situations. The project, known as the Marena Research Project, is funded by the Department for International Development (DFID), UK.

The Project distinguishes between discussion of 'institutions' and discussion of 'policy' of government and agencies, stressing the opportunities, but also the limitations provided by community-level institutions concerned with renewable natural resource management. The research also questions the notion of 'community', and the extent to which direct stakeholder participation is feasible and will contribute towards longer-term development goals especially when this is made more problematic by protracted violent conflicts and complex political emergencies. The project addresses the issue of how to construct or reconstruct and foster such institutions to manage the natural resource sector in situations where government structures have been under severe stress and large sections of the population have been displaced (Watson *et al.* 1999; Serra, 2001 and Ribeiro 2001).

The research aims to:

- identify the constraints and opportunities for reconstruction of sustainable and participatory renewable natural resource management institutions in post-conflict situations
- examine the role of these institutions in environmental rehabilitation
- identify an appropriate framework for analyzing renewable natural resource management institutions in post-conflict situations
- develop and promote more efficient and participatory policy and institutional models for local-level management and regulation of renewable natural resources
- identify regional constraints on renewable natural resource management in these countries, and promote appropriate policy responses.

In Mozambique the Marena Project is being implemented in Manica Province which borders Zimbabwe. There are two study sites: Moribane Forest Reserve and Pindanganga village.

MORIBANE

Following the armed conflict ex-RENAMO soldiers settled in Moribane Forest Reserve rather than return to their places of origin. This resulted in breakdown of traditional management systems *vis-à-vis* the “outsiders” and local communities. The Provincial Forestry and Wildlife Services together with the Forestry Research Center are attempting to develop CBNRM projects in the area.

The Marena research intends to critically evaluate the assumptions on which the community-based approach is founded as well as the extent to which traditional authorities have legitimacy over natural resources management.

PINDANGANGA

The village of Pindanganga lies along the ‘Beira Corridor’ - a ‘safe’ area protected by government and Zimbabwean troops during the armed conflict. During the war a 3 km wide strip of land along the corridor was clear-felled as a precaution against attack by RENAMO forces. In the post-war period, Pindanganga has witnessed the return of displaced populations and consequent pressure on the remaining forests from the production of charcoal.

Unlike Moribane, it has witnessed various outside interventions from agencies that have engaged with ‘community’ structures in different ways. The Marena research plans to examine the process of interaction between external agencies and different forms of community institutions, paying particular attention to the felling of trees for firewood and charcoal.

7. Conclusions

The long and bloody armed conflict that ravaged Mozambique between 1980 and 1992 came to a final conclusion in October 1992 through the signing of the Peace Accord in Rome between RENAMO and FRELIMO. The peace has held and stability has returned to Mozambique. This is attributed to:

- The willingness of all sides to make compromises and the genuine desire for peace and stability
- The demobilization of the opposing forces prior to the first democratic elections in October 1994.

The armed conflict had a devastating effect on components of the natural resource base in many parts of the country especially large mammal populations.

In the immediate post-war period uncontrolled harvesting of wildlife and forestry resources occurred as access improved. This was due to the lack of capacity of both government and traditional authorities to control both legal and illegal exploitation of the natural resource base, while entrepreneurs mobilized fast.

Donor funding initially focused on emergency rehabilitation and neglected the environmental sector. Since 1994 assistance to the environmental sector has improved with the increasing recognition that the natural resource base of the country has the potential to contribute significantly to the economy of the country and the livelihoods of local communities. In retrospect, aid for the environmental and natural resource sectors should have been forthcoming earlier. As a consequence much of the natural resource base was severely affected in the immediate post-war period and is still in the process of recovery.

The lack of knowledge related to the status of Mozambique's biodiversity also limited post-war conservation initiatives. Opportunities to promote biodiversity conservation were undoubtedly missed during the massive land allocations that occurred after the war, because priority biodiversity areas could not be adequately identified.

Adequate post-war management of Mozambique's biodiversity was hindered by low human and operational capacity, and inadequate funding. There were

too few trained natural resource managers in post immediately after the conclusion of the armed conflict. Again, in retrospect, a greater investment in training a cadre of natural resources managers during the war by the donor community would have made a big difference.

Extensive and enlightened policy reform occurred after the war, creating many new opportunities for sound natural resource management, community involvement and biodiversity conservation, within the overall framework of sustainable development. Time will tell whether these policies and their associated legislation can be successfully implemented. The management of Mozambique's biodiversity is gradually improving, in association with policy and legal changes, and institutional strengthening. The growth of a vibrant and vocal civil society is also contributing to the development process including greater awareness regarding the need for wise use of natural resources and biodiversity conservation.

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