

## Chapter 2

### Study Area

#### Introduction

Maputaland is located at the southernmost end of the Mozambique Coastal Plain. This plain extends from Somalia in the north to northern KwaZulu-Natal, South Africa, in the south (Watkeys, Mason & Goodman 1993). It encapsulates an area of about 26,734 km<sup>2</sup> defined as the Maputaland Centre of Endemism (see van Wyk 1994). This centre is bordered by the Inkomati-Limpopo River in the north, the Indian Ocean in the east, the Lebombo Mountains in the west and the St. Lucia estuary to the south. Biogeographically the northern boundary of the centre is not as clearly defined as the other borders (van Wyk 1994). Earlier authors (*e.g.* Moll 1978; Bruton & Cooper 1980) considered Maputaland as an area of 5,700 km<sup>2</sup> in north-eastern KwaZulu-Natal. These authors clearly did not always consider areas beyond South Africa in their descriptions.

There has been some contention over the name Maputaland, formerly known as Tongaland in South Africa (Bruton 1980). Nevertheless this now seems largely settled and the name Maputaland is taken to be politically acceptable (van Wyk 1994) and is generally accepted on both sides of the South Africa/Mozambique border. Maputaland is the northern part of the Maputaland-Pondoland Region, a more arbitrarily defined area of about 200 000 km<sup>2</sup> of coastal belt between the Olifants-Limpopo River in the north (24°S), to the Great Kei River (33°S) in the south, bounded to the west by the Great Escarpment and to the east by the Indian Ocean (van Wyk 1994). For the present study fieldwork focused in the Tembe Elephant Park in

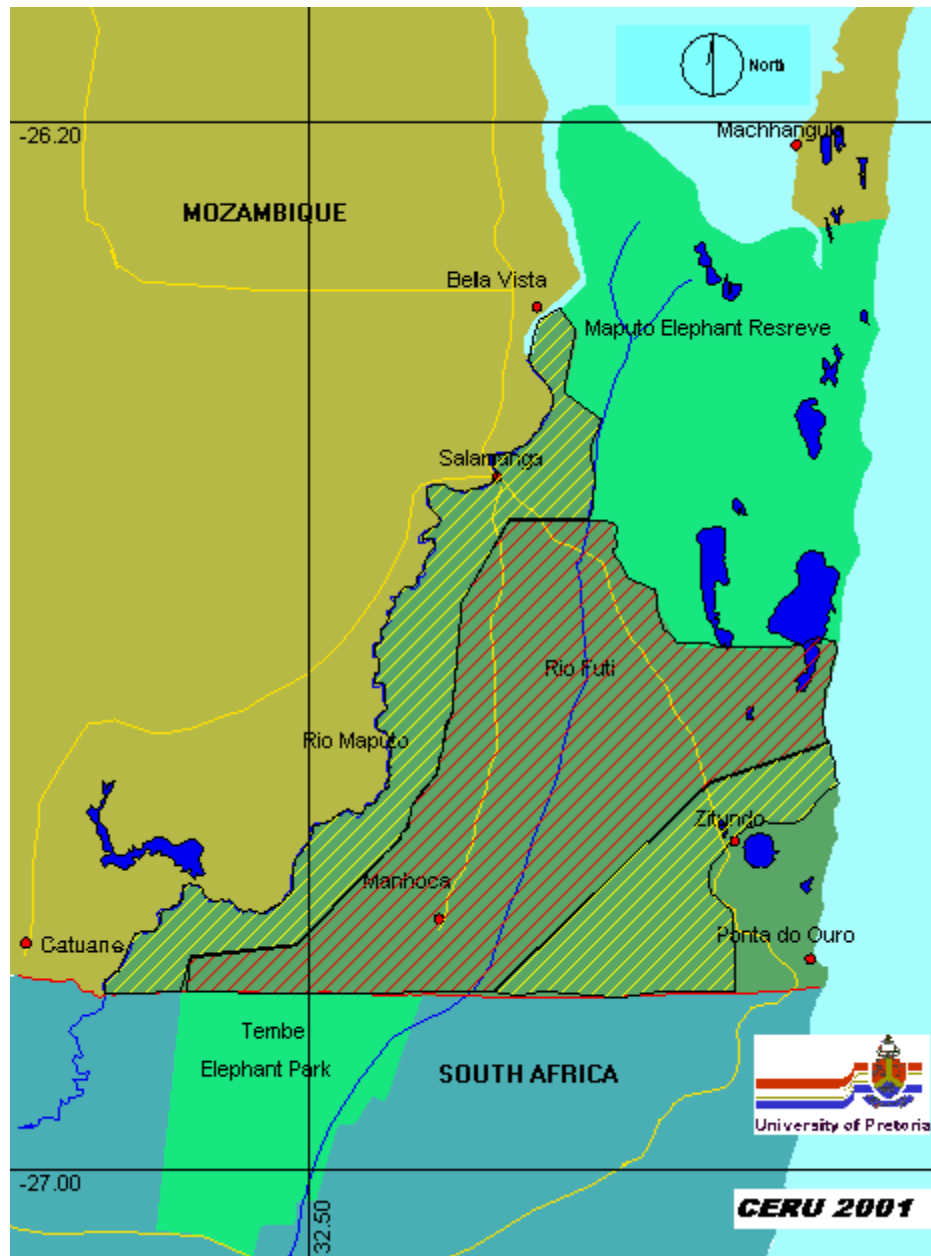
South Africa, with some surveys also being undertaken in the Maputo Elephant Reserve in Mozambique (Fig. 2.1).

#### *Tembe Elephant Park*

The northern boundary of the Tembe Elephant Park (TEP) forms the international border between South Africa and Mozambique. It is part of the Maputaland Centre of Endemism and extends over an area of about 300 km<sup>2</sup> (Matthews *et al.* 2001). It was proclaimed in 1983 (Gazette Notice N<sup>o</sup> 73 of 1983) and re-proclaimed in 1993 (Gazette Notice N<sup>o</sup> 11 of 1993), largely under the direction of the local people, with land for the Park allocated by Chief Mazimba Tembe (Sandwith 1997). The Park belongs to the Tembe Tribal Ward but is administrated on their behalf by Ezemvelo KwaZulu-Natal Wildlife. The people that lived in the area before the proclamation of the Park moved out, but retain the right to use some of its natural resources (Sandwith 1997). The Park was game fenced along its western, southern and eastern borders in 1983 and the northern border was fenced during 1989 in response to a perceived elephant poaching problem in adjacent Mozambique (Hall-Martin 1988; Ostrosky 1988). This fence stopped elephants from either moving in or out of the Park thereby fragmenting the elephant population of Maputaland.

#### *Maputo Elephant Reserve (Reserva dos elefantes do Maputo)*

The Maputo Elephant Reserve (MER) is located in the south east of Mozambique, below the Maputo Bay. The Reserve of 794km<sup>2</sup> was gazetted in 1932 and its current boundaries were finalised under the Diploma Legislativo N<sup>o</sup> 22314 of 1969 (DNAC 2001).



**Figure 2.1.** The elephant study centred on the Maputo Elephant Reserve and the Futi River Corridor, cross hatched in red, and Tembe Elephant Park in South Africa. The areas cross hatched in yellow are the proposed Community Conservation Development Areas (see DNAC 2001).

The Maputo Bay forms its northern boundary and the high water mark of the Indian Ocean delineates the eastern border. The western boundary largely follows the Maputo River as far as the town of Bela Vista, then heads eastwards in the direction of the Futi River (Rio Futi), before heading southwards along the road between Salamanga and Ponta do Ouro (DNAC 2001). The southern boundary goes east from the main road, and cuts through Lake Piti at 26°36'S. The Reserve is unfenced except for a 26 km distance along the western boundary close to Bela Vista (de Boer & Ntumi 2001). People continued to live in the Reserve after it was gazetted. Currently some 75 households exist within in the MER and the Futi Corridor totaling approximately 450 people (Els, Kloppers & van Aarde 2004; Fairall & van Aarde 2004a). This figure is far lower than the estimated 5 000 – 10 000 people reported to have lived there during the 1970s (DNFFB 1997). While law forbids the extraction of natural resources, collection of plant material has always been permitted (de Boer & Baquete 1998; Soto, Munthali & Breen 2001).

#### *The Futi River Corridor*

The Futi River in southern Mozambique runs from the north-east of TEP into the Maputo Elephant Reserve. The proposed Futi Corridor (DNAC 2001; van Aarde & Fairall 2001) is an area of 688 km<sup>2</sup> centred on the Futi River. In 1969, the time of the most recent delineation of the MER, the area south of the Reserve, east from the Rio Maputo to the ocean, and south to the border with South Africa was given a measure of protection as a Zona Vigilancia. The status of such a protected area in Mozambican legislation is unclear (DNAC 2001; van Aarde & Fairall 2001). The Futi area provides a natural linkage between the TEP and the MER and contains permanent fresh water and seasonal pans. The alignment of the proposed corridor has been identified to

protect elephant range and habitat and to minimise elephant/human conflict (DNAC 2001; van Aarde & Fairall 2001), which has occurred in the area (de Boer & Baquete 1998; Soto *et al.* 2001).

The south-western areas of the proposed Futi Corridor contain different vegetation than other areas in the TEP/MER complex and so are included to attain the exceptionally high biodiversity value of the proposed TFCA (DNAC 2001).

DNAC propose a ‘Core Conservation Area (CCA)’ which would extend the area of formal conservation provided by MER from 790 km<sup>2</sup> to 1,520 km<sup>2</sup> flanked by two ‘Community Conservation Development Areas (CCDAs)’ covering an additional 693 km<sup>2</sup> which would act as buffer zones (DNAC 2001).

## The Physical Environment

### *Geography*

Maud (1980) and Watkeys, Mason & Goodman (1993) described Maputaland as almost flat and as a coastal plain that rises no higher than 150m. High rising dunes fringe the coastline. Palaeo-dunes in the hinterland form north-south ridges that were formed by a retreating coastline (Watkeys *et al.* 1993).

The Tembe Elephant Park is generally flat with two main dune ridges that run through it in a north to south direction. At 129m above sea level, the peaks on these ridges are among the highest on the coastal plain of Maputaland (Matthews *et al.* 2001). The Maputo Elephant Reserve is also generally flat with undulating dunes, the tallest of which reaches 104 metres (de Boer & Baquete 1998).

The coastal plain formed during the break-up of the Gondwana super-continent. Since then the plain has been exposed to rising and falling sea levels and the deposition, erosion and reworking of marine sands and silts. The oldest rocks

occur in the Lebombo Mountains. These rocks date from the Jurassic Period and the geology gets progressively younger towards the coast. The Maputaland coastal plain consists of Quaternary sands. Most of these are redistributed sands and alluvium from river systems. These more recent geological features cover the Quaternary (youngest), Tertiary, Cretaceous and Karoo (oldest) sequences.

Watkeys *et al.* (1993) distinguish the Lebombo Mountains and the coastal plain landscapes and divide the coastal plain into undulating terrain, sandy ridges, coastal lake systems, coastal dunes and river-related systems. The Lebombo Mountains follow a north-south line, are up to 13 km wide and reach a maximum height of over 700m. Their western scarp is steep and to the east they slope gently. Both coastal and inland dunes are vegetated and the coastal dunes are among the largest vegetated coastal dunes in the world.

The rivers of Maputaland are of a simple drainage model (Cooke & Doornkamp 1990 cited in Watkeys *et al.* 1993), in that they have eroding headwaters, a water-sediment transport zone, and depositional lowlands. The three types of river identified for Maputaland are; large rivers with eroding headwaters lying to the west of the Lebombo Mountains, smaller streams with sources starting in the mountains, and streams with sources on the coastal plain. Rivers mainly run in a north-south direction determined by the presence of sandy ridges. The Pongolo River starts in South Africa and joins the Usutu River from Swaziland in Ndumo Game Reserve. It flows into Mozambique as the Maputo River and enters the Indian Ocean in Maputo Bay where it forms a large estuary. The Pongolapoort Dam restricts the flow of the Pongolo River and has a significant impact on the river and the associated floodplain and pans (Begg 1989). The Muzi swamps and adjacent wetlands are other important hydrological features and their surface area fluctuates with rainfall and other

hydrological events. The swamps have some permanently waterlogged areas and other seasonally waterlogged areas occur (Begg 1989). The Muzi drainage becomes the Futi River in Mozambique and flows into the MER where it ends in a swampy delta that does not reach the Indian Ocean.

Maputaland is covered in yellow and grey soils. The soils are hydromorphic, mainly mesotrophic mixtures of sands and loams and are relatively infertile and leached. The alluvial systems of rivers, pans and floodplains are associated with more fertile red clay and duplex soils (Schulze 1982; Watkeys *et al.* 1993; Pollet *et al.* 1995). The higher lying and older south western dunes have higher clay content than the lower gradient dunes in the north and east and are consequently more fertile (Matthews *et al.* 2001). Along the Muzi Swamp, clay rich duplex soils have formed (Matthews *et al.* 2001) and these may continue along the Futi River as it drains the Muzi Swamps in a northerly direction into Mozambique.

During the dry winter period natural water in the TEP is limited to the Muzi swamp system. Seasonal pans occur, mainly close to the swamp, but also at Ezinaleni, Mahlasela, Vukazini and Sinzangwane. The Park's Management artificially replenishes the last three pans. The chemical composition of the lakes and pans in the MER varies and changes seasonally in response to rainfall (de Boer *et al.* 2000; Pollet *et al.* 1995). Some of these pans and lakes are brackish and saline.

### *Climate*

Maputaland is a transitional sub-tropical area with warm temperatures and no winter frost. Climate varies from moist sub-tropical coastal eastern area to a moderately dry sub-tropical inland western area (Maud 1980). Schulze (1982) describes the region as warm to hot, humid and sub-tropical. Summers are hot and wet, winters warm and dry

(van Wyk & Smith 2000). Temperatures range between 4°C and 45°C (Schulze 1982), with a daily maximum of 20°C to 24°C, depending on location (Schulze 1997). Mean monthly temperature at Lake Sibaya, in the south of Maputaland, varies between 11.5°C in July to 28.7°C in January (Maud 1980). The mean annual temperatures in the Tembe area range between 20°C and 22°C, with mean daily maximum temperatures for the summer months (December-February) varying from 28°C to 30°C. The mean daily minimum temperature for winter months (June-August) is less than 10°C (Schulze 1997).

Humidity and evaporation are high. In summer humidity often exceeds 80%, and during winter it usually ranges between 50% and 60%. Evaporation exceeds precipitation for all months except December, January and February (Schulze 1997). Rain falls throughout the year but is highly variable. In the Tembe Elephant Park rainfall peaks from September to March and troughs from May to August (Fig. 2.2) (Official records, Tembe Elephant Park<sup>1</sup>) and between 25% and 35% of rainfall can occur during the ‘dry’ winter months (Schulz 1982). Mean annual rainfall ranges from 900mm in the southeast to 500mm in the northwest, (Schulze 1982; Pollet *et al.* 1995), with a consistent decrease from east to west, in an inland direction.

The western plains receive 500 to 600 mm rain per annum and rainfall increases in the mountains, with the Lebombo ridge receiving 800 to 1 000 mm per year (Schulze 1982, 1997). The Tembe Elephant Park is located in the 700-800 mm rainfall area (Schulze 1982, 1997). Average rainfall is highly variable, both within the summer rainfall season and from year to year.

Tropical cyclones that move down the Mozambique Channel sometimes reach the area and are often associated with exceptionally high rainfall. Values then can be

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<sup>1</sup> EKZN, Tembe Elephant Park, P.B. 356, Kwangwanase, KwaZulu-Natal.



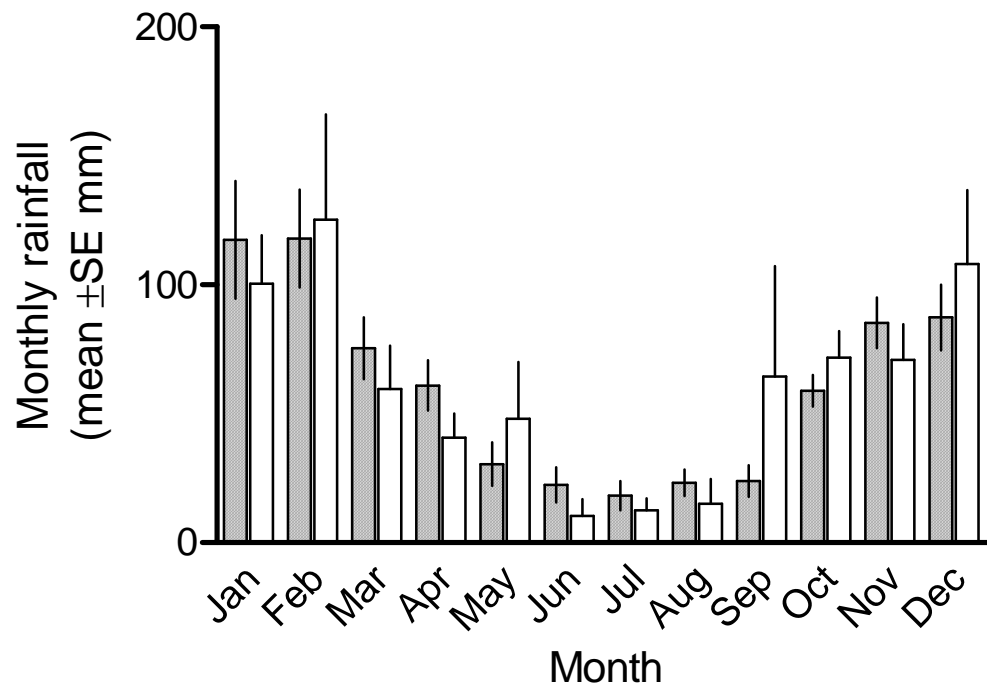
twice as high as the annual mean rainfall (Pollet *et al.* 1995). Dry years get less than half the mean annual rainfall. Thus rainfall is seasonally predictable but variable with the coefficient of variation increasing from 20% in the east to more than 30% in the west (Schulze 1997). The climate of the MER is comparable to that of the TEP, although along the coast rainfall and humidity are higher than inland (Maud 1980). There is little data available for the MER but in general, there is a hot wet season between October and March, and a cooler and relatively dry season from April to September. Rainfall is between 690-1 000mm (DNFFB 1994 cited in de Boer *et al.* 2000).

### *Biodiversity*

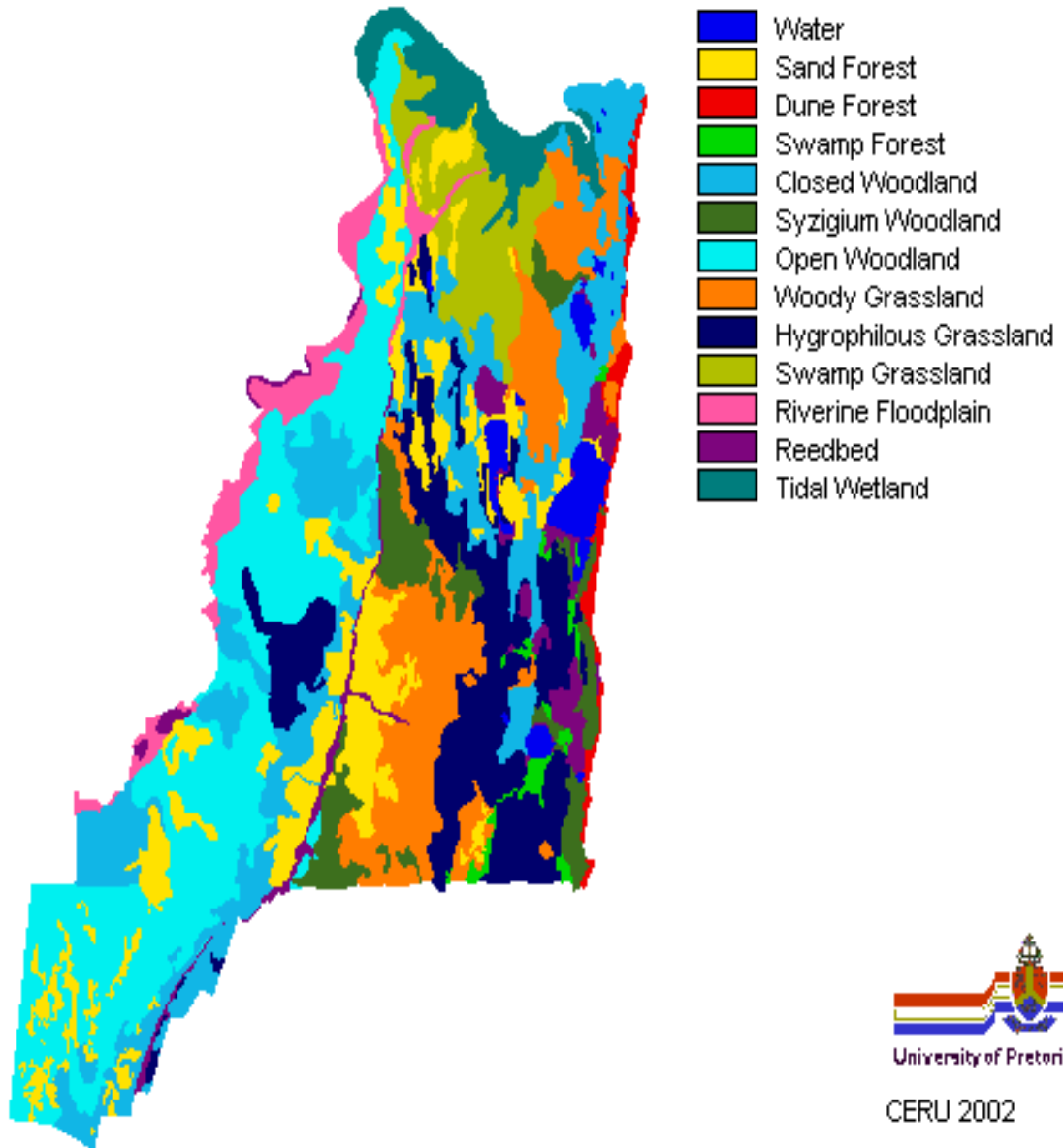
Cowling & Hilton-Taylor (1994) identified Maputaland as a biodiversity ‘hot-spot’. They based this on the high species richness, high occurrence of endemics and threats to the habitats of the region. About 9% of the 2,500 species of vascular plants identified for the region are endemic to the Maputaland centre of plant diversity (van Wyk & Smith 2000). It is highly likely that more endemic species will be identified as research intensifies in the region (van Wyk & Smith 2000). Matthews *et al.* (2001) identified eight major plant communities in the TEP. These include sand forest, closed woodland on clay based soils, woodland of deep sandy areas, clay based soils, woodland of deep sandy areas, grassland associated with sand forest, grassland on clay-rich soils, grassland associated with swamp/marsh/pan areas, aquatic vegetation of marshes/pans, and reed-beds of the Muzi Swamp.

De Boer *et al.* (2000) recognised six vegetation communities in the MER; mangroves in the Maputo Bay and river deltas; dune vegetation of pioneers, thicket and forest; grass plains, parts of which are seasonally inundated; forest on old dunes

similar to the sand forest of the TEP; open woodland and riverine vegetation of reedbeds and riverine forest. A recently constructed landscape map for the Futi Corridor region recognises 13 landscape units (Fairall & van Aarde 2004b) (Fig. 2.3). Two of these are endemic to Maputaland. These 13 landscape units are based on species composition (Table 2.1). The primary vegetation communities in the Futi Corridor are open woodlands, closed woodlands, woody grasslands, sand forest, swamp forest, hygrophilous grassland and reedbeds (Fairall & van Aarde 2004b). Fairall & van Aarde (2004b) used a supervised classification of a LANDSAT image to develop a landscape map for the area. They used the vegetation classes described by Pollet *et al.* (1995), and Matthews *et al.* (2001). They also included information from a map of the MER prepared by the Department of Biological Sciences of the University of Eduardo Mondlane (Fig. 2.3).



**Figure 2.2.** Mean monthly rainfall for the Tembe Elephant Park (clear bars, n=39 years, Official records, Tembe Elephant Park) and for Bela Vista (striped bars, n=7 years, Mozambican National Meteorological Institute Maputo 1999) at the southern and northern sectors of the study area. The seasonal pattern holds for the rainfall stations surrounding the study area, although the amount varies.



**Figure 2.3.** Landscape map of the study area constructed by Fairall & van Aarde (2004b) and derived from supervised classification of a LANDSAT image using all spectral bands. The map is based on information provided by Pollet *et al.* (1995), the University of Eduardo Mondlane (2000) and Matthews *et al.* (2001).

**Table 2.1.** The landscape units occurring in the Maputaland study area as determined by Fairall & van Aarde (2004b). The total area covered by each landscape type, its percentage of the total study area of 2100 km<sup>2</sup>, and the number of patches it occupies are indicated, with a range of patch sizes and the dominant plant species occurring.

Landscape unit	Area (km <sup>2</sup> )	% of study area	Number of patches	Patch size & Location	Dominant plant species
Water	NA	NA	NA	Ephemeral pans to 3,000 ha Lake Piti  Inter-dune depressions	Reedbeds <i>Phragmites australis</i> , Bulrushes <i>Typha latifolius</i> , sedges <i>Cyperus</i> species and water lilies <i>Nymphaea</i> spp.
Sand Forest	301	14.3	55	0.6 – 33.1 km <sup>2</sup> Dune crests and higher lying sandy soils  Occurs as forms of forest & thicket	Tree species include <i>Dialium schlechteri</i> , <i>Cleistanthus schlechteri</i> , <i>Hymenocardia ulmoides</i> , <i>Newtonia hildebrandtii</i> , <i>Balanites maughamii</i> , <i>Pteleopsis myrtifolia</i> , <i>Ptaeroxylon obliquum</i> , shrubs include <i>Drypetes arguta</i> , <i>Croton pseudopulchellus</i> , <i>Cola greenwayi</i> and <i>Psydrax fragrantissima</i>  Vegetation type is endemic to Maputaland
Dune Forest	34	0.8	NA	Coastal band on coastal dunes	Seaward side: <i>Mimusops caffra</i> , <i>Diospyros rotundifolia</i> and <i>Euclea natalensis</i> . Landward side: <i>Apodytes dimidiata</i> , <i>Celtis africana</i> , <i>Acacia kosiensis</i> (formerly <i>karroo</i> ) and <i>Strychnos</i> spp.
Swamp Forest	23	1.1	12	Inundated marshy conditions around Lake Piti & south of Lake Satine au Sotiba	<i>Voacanga thoarsii</i> , <i>Ficus tricopoda</i> , <i>Rauvolfia caffra</i> , <i>Macaranga capensis</i> , and <i>Syzgium cordatum</i>
Closed Woodland	444	21.1	13	0.7 – 53.2 km <sup>2</sup> Includes closed woodlands of TEP and woodlands of MER and comprises a range of different plant communities	Species occurring throughout the landscape include <i>Strychnos madagascariensis</i> , <i>Dichrostachys cinerea</i> , <i>Acacia burkei</i> , <i>Spirostachys africanus</i> , <i>Azelia quanzensis</i> , <i>Albizia adiantifolia</i> , <i>Sclerocarya birrea</i> and <i>Combretum molle</i> . Grasslands supporting <i>Panicum maximum</i> , <i>Digitaria eriantha</i> , <i>Brachycloa</i> and <i>Eragrostis</i> spp. cover the areas between trees
<i>Syzgium</i> Forest	126	5.9	11	1.8 – 33.2 km <sup>2</sup> Mainly south east Mozambique	Dominated by <i>Syzgium cordatum</i> , tree species such as <i>Trichilia emetica</i> , <i>Albizia adiantifolia</i> , <i>Sclerocarya birrea</i> and <i>Bridelia micrantha</i> occur. May form a mosaic with <i>Hyparrhenia dissolute</i> and <i>Themeda triandra</i> grasslands in dry areas and with <i>Imperata cylindrica</i> in wet areas

Table 2.1 (continued).

Open Woodland	523	24.8	NA	Western side of study site  Occurs as dry bushveld between Maputo & Futi Rivers	Trees & shrubs: <i>Strychnos madagascariensis</i> , <i>Strychnos spinosa</i> , <i>Acacia burkei</i> , <i>Sclerocarya birrea</i> , <i>Combretum molle</i> , <i>Terminalia sericia</i> , <i>Garcinia livingstonei</i> , <i>Vangueria infausta</i> and <i>Albizia versicolor</i>  Denser grass cover than closed woodland including <i>Andropogon gayanus</i> , <i>Themeda triandra</i> , <i>Diheteropogon amplexans</i> , <i>Digitaria eriantha</i> and <i>Aristida</i> spp.
Woody Grassland	283	13.4	9	1.2 – 145.5 km <sup>2</sup> Woody component grows underground	Geoxylic suffrutex species such as <i>Salacia kraussii</i> , <i>Eugenia mossambicensis</i> , <i>Dichapetalum cymosum</i> and <i>Parinari capensis</i> . Grass cover very dense and dominated by <i>Themeda triandra</i> . In some areas palms <i>Hyphaene coriacea</i> and <i>Phoenix reclinata</i> dominate to form "Palm Veld". <i>Syzgium cordatum</i> occurs as isolated trees or bush clumps and is sometimes associated with <i>Terminalia sericia</i>  This vegetation type is endemic to Maputaland
Hydrophilous Grassland	323	15.4	12	1.4 – 207 km <sup>2</sup> Low-lying seasonally inundated area in the southeast and central parts of the study area	True grassland with species such as <i>Ischaemum fasciculatum</i> , <i>Eragrostis lappula</i> , <i>Imperata cylindrica</i> and <i>Dactyloctenium germinatum</i> and in the wetter areas <i>Hemarthria altissima</i> and <i>Acroceras macrum</i>
Swamp Grassland	130	6.1	NA	Situated within boundaries of MER in the north	<i>Typha latifolius</i> , <i>Phragmites australis</i> and <i>Juncus</i> species. <i>Hemarthria altissima</i> recorded but area is not typical grassland
Riverine Floodplains	96	4.3	NA	Narrow strips of vegetation next to the Maputo and Futi Rivers	Floodplains covered in <i>Phragmites australis</i> , <i>Typha latifolius</i> , <i>Juncus</i> species and <i>Cyperus papyrus</i> . Riparian forests on riverine floodplains consist of trees such as <i>Ficus sycomorus</i> , <i>Kigelia africana</i> , <i>Syzgium cordatum</i> and <i>Trichilia emetica</i>
Reedbeds	84	3.8	NA	Along the Maputo and Futi Rivers. Extensive beds associated with some lakes	<i>Phragmites australis</i> , with some <i>Typha latifolius</i> and <i>Cyperus papyrus</i> in and along the slow flowing Futi River. Reedbeds associated with lakes are almost pure stands of <i>Phragmites australis</i>
Tidal Wetlands	95	4.3	NA	Shore of Maputo Bay	<i>Avicenna marina</i> and <i>Rhizophora mucronata</i> mangroves. Tidal area behind mangroves covered predominantly in <i>Phragmites australis</i> reeds and some salt marsh species

The sand forest is a major community containing many species endemic to Maputaland. It is associated with dunes and includes 42 endemic/near-endemic species in the Tembe Elephant Park of which 27 have been identified only in sand forest (Matthews *et al.* 2001). The closed woodlands mainly occur on the clay-rich soils of the ‘bottomlands’ of dunes and bordering the Muzi Swamp. In this community 20 endemic/near-endemic species were found in the Tembe Elephant Park, ten of which occur only in this vegetation type (Matthews *et al.* 2001). Woodlands of deep sandy areas dominate the Tembe Elephant Park and contain 37 endemic/near-endemic species (Matthews *et al.* 2001). Woodlands occur as closed woodland and thicket, ecotonal closed woodland, open woodland and sparse woodland (Matthews *et al.* 2001).

Maputaland has an exceptionally rich herpeto-fauna with 112 species/subspecies of reptiles, 23 of which are endemic (Bruton & Haacke 1980) and 45 frog species, three of which are endemic (Poynton 1980). Maputaland is also considered a biodiversity hotspot for freshwater fish (Skelton 2001). Bruton and Kok (1980) reported that 67 species of fresh water fish are found here, 12 of which are endemic to Maputaland (Davis, Heywood & Hamilton 1994). In a recent survey of the MER and the Futi Corridor 43 species were reported (Bills 2001). As with the flora, more intensive surveying may result in an increase in the recorded numbers of these mostly cryptic species. The invertebrate fauna of Maputaland is poorly understood; at least 257 species of butterflies are known to occur here (Davis *et al.* 1994).

Bird diversity follows the same trend as other vertebrates though in more spectacular numbers. At least 472 species have been recorded for the Maputaland region of which 4 species are endemic and 43 subspecies are either endemic or near-

endemic (Davis *et al.* 1994). In the Maputo Elephant Reserve alone at least 340 bird species have been recorded (Parker & de Boer 2000).

Of the 102 mammal species/sub-species recorded in the region 14 are endemic. Game eradication programmes before the 1920s apparently depleted the large mammal fauna on the South African part of Maputaland, as did hunting with black powder guns and snares by local people (Lugg 1970). Military activities depleted game in southern Mozambique from the 1940s onwards and may have been responsible for the extermination of wildebeest in southern Maputo province (Smithers & Tello 1976). Populations of large mammals survived in the Ndumo Game Reserve and the Tembe Elephant Park was extensively restocked with such species between 1985 and 1996 (Sandwith 1997).

In southern Mozambique 11 species of large mammals (cheetah *Acinonyx jubatus*, lion *Panthera leo*, wild dog *Lycaon pictus*, white rhinoceros *Ceratotherium simum*, black rhinoceros *Diceros bicornis*, zebra *Equus burchelli*, blue wildebeest *Connochaetes taurinus*, impala *Aepyceros melampus*, African buffalo *Syncerus caffer*, kudu *Tragelaphus strepsiceros*, and waterbuck *Kobus ellipsiprymnus*) were reported as extinct in the living memory of local people (Tello 1973). All of these have been reintroduced to the Tembe Elephant Park, with the exception of wild dog and cheetah. Of the other 14 large mammal species present in Tembe (spotted hyaena *Crocuta crocuta*, leopard *Panthera pardus*, side-striped jackal *Canis adustus*, African elephant *Loxodonta africana*, bush pig *Potamochoerus porcus*, hippopotamus *Hippopotamus amphibius*, red duiker *Cephalophus natalensis*, common duiker *Sylvicapra grimmia*, suni *Neotragus moschatus*, nyala *Tragelaphus angasii*, bushbuck *Tragelaphus scriptus* and reedbuck *Redunca arundinum*), 12 are known to occur in the Maputo Elephant Reserve, with the status of the leopard and spotted hyaena not known



(Oglethorpe 1997). Giraffe *Giraffa camelopardalis*, and eland *Taurotragus oryx* have been reintroduced to the Tembe Elephant Park (Sandwith 1997), while waterbuck and kudu were reintroduced into the MER (Ntumi 2002).

### *The People*

The people living in the study area belong to the Tsonga-speaking cultural group (Felgate 1982), and the people living in Matutuine Province of southern Mozambique speak the Ronga dialect of the Tsonga group (Junod 1962). Neighbouring cultural groups are Nguni-speaking Zulus and Swazis whose cultures and language differ markedly to those of the Tsongas (Felgate 1982).

The Tembe clan has been living in the study area since at least 1554 (Bryant 1965), and is still the dominant clan in the area. The Tembe clan used to live in the area bounded by Maputo Bay in the north, the Maputo River in the west and the present day Ubombo District in KwaZulu-Natal (Felgate 1982).

Over the last 200 years four major events shaped the socio-political and economic situation of the people living in Maputaland. The first of these events emanated from the Zulu people fleeing through the area during Shaka's wars. This disrupted cultural life, gave rise to Nguni people settling among the Tembes (Felgate 1982), and saw the establishment of the kingdom known as Gaza.

European colonisation at the turn of the 18<sup>th</sup> Century further disrupted life for people living in Maputaland (Axelson 1967). The Portuguese in Mozambique and the British, who then controlled Natal, tried to gain control of Maputaland over a long period. The colonial border between South Africa and Mozambique was finalised in 1875, when the French president (MacMahon) awarded all land between Delagoa Bay and the current border to Portugal.

The colonial boundary split the Tembe clan between two colonial authorities despite appeals for redress in 1889 (Bulpin 1966; Axelson 1967). Initially the Tembe *nkosi* retained his rule over the entire clan, but after trouble with the Portuguese, the then *nkosi* Ngwanase fled to Natal. Initially he and his descendants maintained their rule over the Tembe clan. The Portuguese colonial administration, however, strengthened its authority over southern Mozambique in 1940. Thereafter it became more difficult for the *nkosi* to exert influence from his base in South Africa. The Portuguese colonial administration then largely replaced the traditional systems of governance (Felgate 1982). Portuguese became the *lingua franca* for most Mozambicans, though certain socio-cultural elements of the traditional system, such as the *izinduna* (local headmen), continued to function across the region (Felgate 1982).

The third major disruption experienced by the Tembe people came in the form of the Mozambican War of Independence from 1964 to 1974. Although mainly fought in the northern provinces of the country the war had a devastating effect on the Mozambican economy. After Portugal surrendered Mozambique to FRELIMO in 1975, FRELIMO implemented socialist policies that further eroded the powers of traditional leaders (Newitt 1995).

Civil war broke out in 1980 between the ruling FRELIMO party and RENAMO. This was the fourth major disruption to the regions' inhabitants. Civil war lasted 12 years and disrupted all aspects of life for people living in Mozambique. Country-wide, about 50% of the rural people were displaced, many emigrating from southern Mozambique to Swaziland and South Africa (McGregor 1998; Hatton, Couto & Oglethorpe 2001). A large part of Mozambican Maputaland became

depopulated (de Boer & Baquete 1998; Fairall & van Aarde 2004a) as about 60% of the residents moved out of the Matutuine district (Els *et al.* 2004).

The civil war resulted in the destruction of most of the infrastructure across southern Mozambique. This severely negatively influenced the local economy (Hatton *et al.* 2001). People have recently started to return to the area (Soto *et al.* 2001; Fairall & van Aarde 2004a), but the Tembe people in both South Africa and Mozambique live in a region that has little infrastructure. Most households depend on subsistence farming and the collection and sale of natural resources (de Boer & Baquete 1998; Tyburski 2003; Els *et al.* 2004).

Efforts to improve living conditions amongst the people are generally small scaled and supported by non-government agencies. The development of a Transfrontier Conservation Area in the region could catalyse economic development and improve existing conservation programs (van Aarde 2004).