

CHAPTER 4

IMPLICATIONS FOR MANAGEMENT

The MER and adjacent areas may have supported high densities of elephants in the past (Pardal 1996). Habitat changes and an increase in human densities may have resulted in the dispersion of elephants (Pardal 1996), compressing them into small areas, which have been declared Reserves (Cox 1997). Tello (1973) reported a large elephant home range in the MER but the pattern of elephant movements and their habitat use have changed (see Tello 1973, de Boer *et al.* 2000). We initiated this study to evaluate current home range size and habitat use by elephants in the MER and to discuss possible factors influencing home range size and habitat use. Some of these may be important for the management of the MER.

During my study the five elephants with satellite collars ranged over about one third of the area of the MER. They concentrated their activities in a core area which comprises about 6% of the MER and which was situated between the Futi and Maputo Rivers (see Fig. 7). The studied elephants may represent four to five of the breeding herds within the population and other herds may thus be using other parts of the MER. Counts during the helicopter survey conducted in October 1999 suggest that there may be as many as eight breeding herds in the population. Elephants thus in reality may be using a much larger proportion of the MER as is also supported by a more recent (September 2000 to September 2001) satellite tracking study of five elephants in southern Mozambique (N. Fairall pers. comm.).

Based on reports from the local people of the region the area between the MER and the Maputo River was used freely by elephants in the recent past. At that time, this area was covered by suitable habitats, including forests and thickets. Subsequently local communities settled and cleared the area for agricultural fields, thereby decreasing the availability of suitable elephant habitat. This may have given rise to increased conflict between the local human population and elephants.

Elephants still raid this area during the night and during the wet season (de Boer & Ntumi 2001). This could indicate that new ranges are required to allow the elephant population to expand. Ecological management, including the possibility of enlarging the MER to include the area between the Reserve and the Maputo River will

provide extra range and recover the traditional area for elephants. However, it will not reduce elephant-human conflict into the region. For this reason, the long-term viability for the elephant conservation with low human-elephant conflict and an extra elephant range may be achieved through the establishment of the Futi Corridor which could be electrically fenced on both sides of the Corridor.

Osborn (1996) and H. H. T. Prins (pers. comm⁶.) suggested that the vegetation of the MER maybe have a poor quality and can not support high animal densities. It is not possible in this discussion to argue the Osborn and Prins's perceptions about the Maputo Elephant vegetation quality. However, the MER belongs to the sour veld type (van Rooyen *et al.* 1996) where, most important types of grazing plants lose their palatability and nutritional value at maturity. As a consequence nutritional deficiencies can occur for at least three months of the year (van Rooyen *et al.* 1996). The sour veld vegetation type is found in the other Southern African conservation areas which supports too many elephants (see van Rooyen *et al.* 1996). The area in MER preferred by elephants (Fig. 10) is relatively more suitable (in terms of plant biomass and percent of cover) than the avoided one, east of the MER. The forested patches more common in this area (see Fig. 10) have a higher plant biomass and high percentage of plant cover (see DCB 2000) than the grasslands dominating the east of the MER.

During the present study habitat use by elephants was not random and they preferred forest and Futi floodplain vegetation. Many explanations have been considered as influencing habitat selection by elephants. Biomass and plant cover seem to offer the best answers to the elephant habitat use. Elephants require a large amount of food and a high percentage of cover for refuge seeking from human disturbance but, although the forest has a high biomass and a high percentage of cover, they are patchily distributed in the MER (see DCB 2000). Within the elephant's home range (see Fig. 10), 57 small forest patches were recorded. Elephants are area-sensitive and it is likely that large patches are preferable for them to smaller ones with the same total area (Cox 1997).

The impact of elephants on the MER may result in high pressure in certain localised parts of the MER with high conservation value. In fact the home range

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polygon measured covers the sand forest, sand thicket and woodland (Fig. 8). The sand forest and woody grassland are endemic to Maputaland (van Wyk & Smith 2000 cited by van Aarde & Fairall 2001). Floristically, the sand forest is unique and supports a large number of neo-endemics, indicating recent and ongoing evolutionary processes (van Aarde & Fairall 2001).

The protection of endangered species includes the designation of critical habitat, consisting of areas either within or outside the range of the species that are essential to its conservation (Cox 1997). Although the elephants of the MER mainly feed of trees and shrubs (de Boer *et al.* 2000) available in sand forests, sand thickets and woodlands, few signs of damage of the vegetation in these habitats by elephants were reported by Haandrikman (1998), Vriesendrop (1998).

The confinement of elephants within the MER could eventually increase their impact on the vegetation. To avoid an increased elephant pressure, the proposed extended Trans-frontier Conservation Area (TFCA) in which elephants can move freely will reduce the potential impact on the vegetation even further.

As has been recorded during this study the elephants occur mostly near the Futi River and in the sand forest. These areas have low human density and very little human conflict is experienced, making the use of the Futi as a Corridor between the MER and Tembe Elephant Park possible. People live along the Maputo River and on the Palm veld to the east of the lower Futi River, where they brew a palm wine. In the MER, the number of houses in the eastern area between Lake Munde and the sea is increasing (van Aarde & Fairall 2001). From a management point of view, it is recommended that the influx of people to the MER and to the Futi Corridor be controlled.

CHAPTER 5

SYNTHESIS

The conservation of the African elephant, *Loxodonta africana*, presents a challenge, not only due to the ethical issues that are involved, but also because of the dearth of information on which management decisions could be based.

Elephants have few natural predators (Laws *et al.* 1975, Hanks 1979), a long life expectancy (Hanks 1979) and destructive feeding behaviour (Laws *et al.* 1975, Malan 1992 and references therein). Because of that, at high population densities modify the diversity of a conservation area by turning areas of high diversity into wastelands with little or no conservation value (Bhima 1998).

This implies that well-defined elephant management practices might be also useful to conserve the biodiversity of the ecosystem, using elephants as a flagship species (van Aarde & Fairall 2001). Elephant management practices involve studies on elephant space and habitat relationship as have been done during the current study in one of the recognized centre of endemism, the Maputaland Centre of Endemism (van Wyk 1994).

This study has been based on the recognized dependence of elephant distribution and movement to the resources (Douglas-Hamilton 1972, Hanks 1979); human disturbance (Barnes *et al.* 1991, Hoare & du Toit 1999, de Boer *et al.* 2000) and environmental factors (Laws *et al.* 1975, Hanks 1979, Whyte 2001).

The distribution of the elephants, current elephant population size and the respective space and habitat use study was carried out following public perceptions that the high incidence elephant-human conflict, as reported by de Boer & Ntumi (2001), may be due to increased number of elephants in the MER. There have been many speculations about the movements and supposed existing migrations of elephants in the MER. The wildlife authorities in Mozambique, are interested on establishing the Futi Corridor, linking the MER and Tembe Elephant Park as a Conservation area.

205 elephants were counted during the survey, most of them (98%) in the MER and the remaining 2% in the Futi Corridor. Because of the very dense vegetation in the MER and in the Futi Corridor, counting elephants from the air was

found difficult and, for that, this estimate should be considered as the minimum. The elephants did not randomly use the total area of the MER and concentrated their activities to the north western parts of the MER. I did not find evidence supporting an increased incidence of raiding of agricultural crops in areas adjacent to the MER. Elephant movements are normally local and generally confined to home ranges within the MER. This study also does not support evidence of reported elephant migrations. However, elephants do move along the Futi Corridor, which may be part of a traditional route used by them in earlier days.

My analyses showed that the elephants did not use the available vegetation types at random and the forest and Futi floodplain vegetation types were selected, whilst grasslands and woodlands were avoided. Preference for a vegetation type was function of the time of day. The mean distance between successive locations was negatively correlated with biomass and plant cover of the vegetation type. With the limited information available I may deduce that space and habitat use by elephants of the MER as being affected by human disturbances (de Boer *et al.* 2000) induced by burning and poaching. Regular fires reduce plant cover and biomass and converts forested areas into open grasslands. These open areas are prone to fire and poaching which force elephants to move to the forested areas (west of MER) where fires are at low intensity and there is high biomass, water and better game scout control.

I found evidence that explain the lack of habitat quality in the east of MER, mainly due to the human disturbance. The confinement of elephants within the MER could eventually increase their impact on the vegetation (Laws *et al.* 1975, Hanks 1979 and references therein).

Since I recorded that the male comes regularly into conflict with humans during the rainy season, maintaining elephants and human together will raise the conflict between these two populations. I can state that because of human disturbance in the east of the MER and the consequence of that in the elephant population behaviour, elephants need more space and more resources south west of the MER. A long-term management measure, which minimizes conflicts between elephants and humans and maximizes elephant conservation in this area through the establishment of the Futi Corridor as a conservation area would provide for the foraging needs of an increasing elephant population. Therefore, this study supports the Trans-Frontier Conservation initiative aimed to link the MER (Mozambique) and Tembe Elephant Park (South Africa) through the Futi Corridor.