Range

From 98 sets of measured leopard tracks in the study area exclusively, four different leopards were identified as using the same general area but at different intensities of use: two adult females, one subadult animal and one adult male. Twenty-four sets of tracks could not be measured as the tracks were either in unsuitable measuring terrain e.g. indistinct tracks in soft river sand or they were reports of tracks.

During the first seven months of the leopards study period (February 1980 to August 1980), one adult female (female A) and an adult male were identified within the study area. The tracks of a second adult female (female B) with a single cub were encountered in the northeastern section of the study area, bordering the area where the tracks of female A were found.

Excluding times when no tracking was carried out (104 days), the tracks of female A were recorded once every 8,75 days ($n = 16$; SD = 7,62 days) from February 1980 to August 1980

or once every 7,85 days (n = 14; SD = 5,85 days) over a period of 110 days. There was no significant difference in the intensity of land use between the whole period February to August and a 110 days when her tracks were first and last recorded in the study area from February 1980 to August 1980 ($t = -0,944$; $df = 28$; $p > 0,05$). The tracks of the adult male were recorded once every 17,75 days (n = 8; SD = 30,25 days) from February 1980 to August 1980 or once every six days (n = 6; SD = 8,43 days) over a period of 36 days when his tracks were first and last recorded in the study area from February 1980 to August 1980. There is a significant difference between the mean daily locations of his tracks in the study area indicating that from February 1980 to August 1980, the study male used the area intensively over a relatively short period of time ($t = -4,737$; $df = 12$; $p \leq 0,05$).

During the following seven months (September 1980 to March 1981), the tracks of female A were found once every 20,37 days (n = 8; SD = 17,75 days) or once every 18,16 days over a period of 109 days (n = 6; SD = 19,95 days) when her tracks were first and last recorded in the area from September 1980 to March 1981. There is no significant difference in the intensity of use of the study area from September 1980 to March 1981 and the period of 109 days when her tracks were first and last recorded from September 1980 to March 1981 ($t = -0,945$; $df = 12$; $p > 0,05$). However,

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female A used the study area significantly less intensively during September 1980 to March 1981 than during February to August, based on both total days ($t = -8,154$; $df = 22$; $p \leq 0,05$) and when her tracks were first and last recorded i.e. 110 and 109 days ($t = -2,343$; $df = 18$; $p \leq 0,05$). From April 1981 to October 1981, only one set of her tracks were recorded in the study area.

From September 1980 to March 1981, the tracks of female B were encountered once every 10,06 days ($n = 16$; SD 9,70 days) or once every 10,5 days over a period of 147 days ($n = 14$; SD = 10,33 days) with no significant difference between the means ($t = 0,380$; $df = 28$; $p > 0,05$). The tracks of female B were now however, encounterd at a significantly higher intensity than those of female A, based on both total days ($t = 6,805$; $df = 22$; $p \leq 0.05$) and when the tracks were first and last recorded in the study area from September 1980 to March 1981 ($t = 4,363$; $df = 18$; $p \leq 0.05$). From April 1981 to October 1981, the tracks of female B were observed once every 10,05 days ($n = 17$; SD = 11,19 days) or once every 8,86 days ($n = 15$; SD = 11,01 days) over a period of 133 days. There is however, no significant difference between the last two mean values, indicating that there was no period of intense area use from April 1981 to October 1981 ($t = -1,008$; $df = 30$; $p > 0,05$).

The tracks of the subadult animal, probably the grown cub

of female B, were also encountered in the study area from September 1980 to October 1981. These tracks were located once every 14,81 days (n = 11; SD = 13,54 days) during September 1980 to March 1981 and once ever 24,28 days (n = 7; SD = 24,64 days) during April 1981 to October 1981, with a significant difference between the two means (t = -4,662; df = 16; $p \leq 0,05$). This indicates that during April 1981 to October 1981, the subadult animal used the study area less intensively than or was more active during September 1980 to March 1981.

When comparing the occurrence of tracks of the subadult animal and female B, there is a significant difference in the mean values for September 1980 to March 1981 (t = 3,620; df = 25; $p \leq 0,05$) and an even greater significant difference in the mean values for April 1981 to October 1981 (t = 8,255; df = 22; $p \leq 0,05$). These data suggest that during September 1980 to March 1981, the subadult animal used the study area less intensively or was less active than female B and that from April 1981 to October 1981, the subadult animal again used the study area less intensively or was less active than female B or was now concentrating its activities in an area other than the study area.

The tracks of the adult male were encountered once every 16,1 days (n= 10; SD = 17,41 days) from September 1980 to March 1981 and once every 18,89 days over a period of 148

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days (n = 8; SD = 18,89 days) with no significant difference between the two means (t = 1,192; df = 16; p > 0,05). When comparing the male's mean track observation between the periods February 1980 to August 1980 and September 1980 to March 1981, there is no significant difference between the two when total days are calculated (t = 0,725; df = 16; p > 0,05) but there is a significant difference between the means when the days calculated were when the tracks were first and last recorded in the study area i.e. 36 and 148 days respectively (t = -6,097; df = 12; $p \leq 0,05$). These data indicate that from September 1980 to March 1981, the adult male did not use the study area intensively over a short period, as it did during February 1980 to August 1980, and that from September 1980 to March 1981, the occurrence of his tracks were more evenly distributed over the time period. Only two sets of this male's tracks were found from April 1981 to October 1981. On a subsequent brief visit (three days) to the study area during February 1982, one set of tracks of this adult male was still found.

Tracks of evidently two other adult males were encountered seven times in the study area during the leopard study period, bordering the area used by the foremost adult male.

Outside the study area, only those tracks that entered or left the study area were used in range data to avoid confusion with other leopards with similar sized tracks.

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The tracks of the adult male in the study area were however, easily identified as the tracks of his right hind pad showed three toes and not the usual four.

The routes followed by female A, female B, the subadult animal, and the adult and other males in the study area appear in Figs. 5, 6, 7 and 8 respectively. Figure 9 shows the "observed range" overlap of the four study leopards in the study area. Observed range was determined by the minimum area method i.e. connecting the outermost points where tracks were located. The term "observed" range, as suggested by Hamilton (1981), represents the total area over which a leopard's tracks were found.

The observed ranges of 10 Tsavo leopards in Kenya varied from 22,6 - 120,6 km^2, while more realistic ranges in the same area (adjusted home range) were from 19,7 - 53,3 km^2 (average 30,5 km^2) for adult males and 13,9 km^2 and 10,2 km^2 for an adult female and a subadult male respectively (Hamilton 1981). In the Serengeti, Schaller (1972) estimated the minimum range of two female leopards to be 40 and 60 km^2 respectively and in the northern Serengeti, Bertram (1982) found that an adult female leopard and her cub moved in an area of 15,9 km^2. The range of an adult female in the Royal Chitawan National Park (Seidensticker 1976) varied from 2,8 - 6,3 km^2 and in the same park, two sibling male leopards 14 months old had a natal range of

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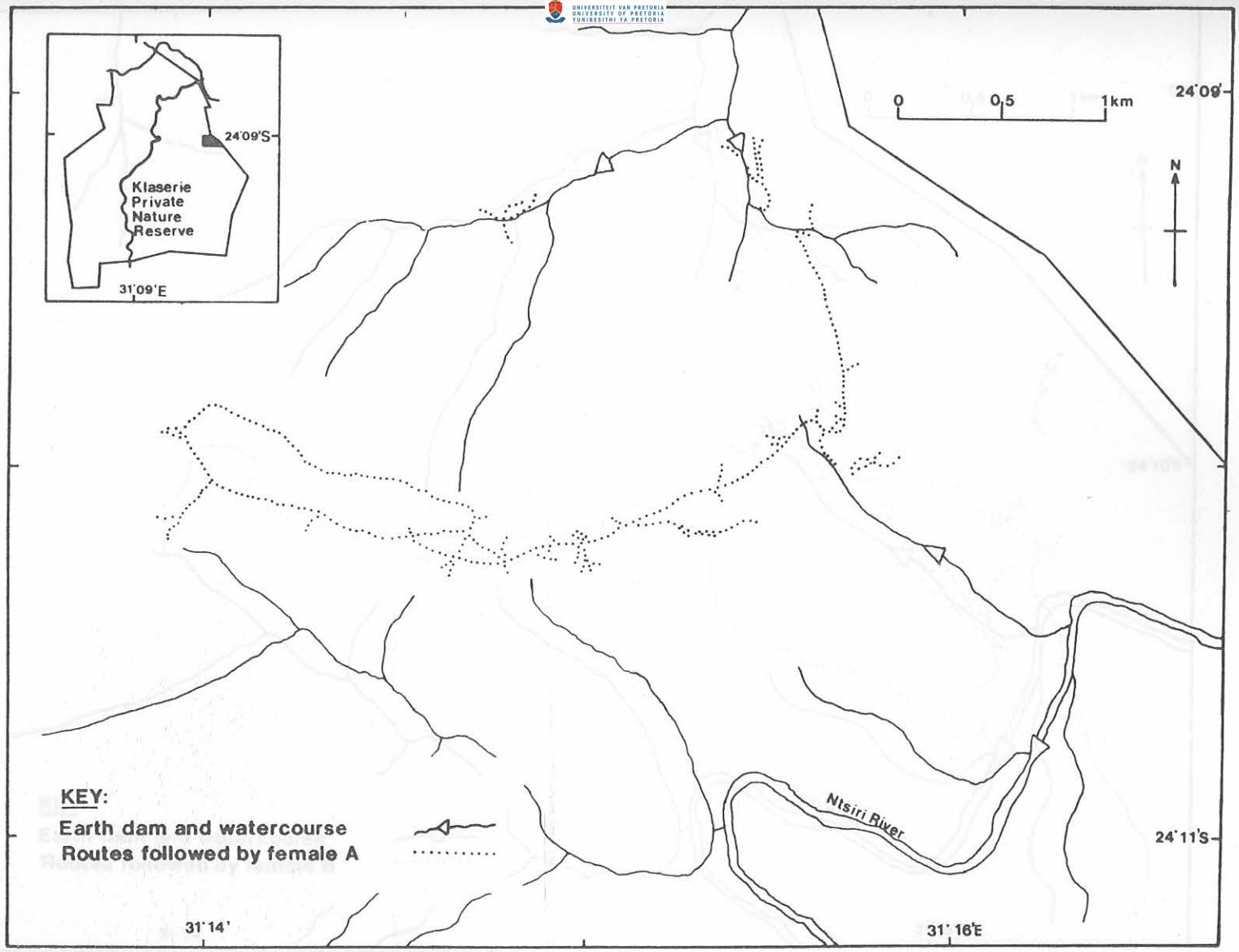

Figure 5: The location of the study area (insert) and the routes followed by the study leopard female A in the study area in the Klaserie Private Nature Reserve, Eastern Transvaal Lowveld, February 1980 to October 1981.

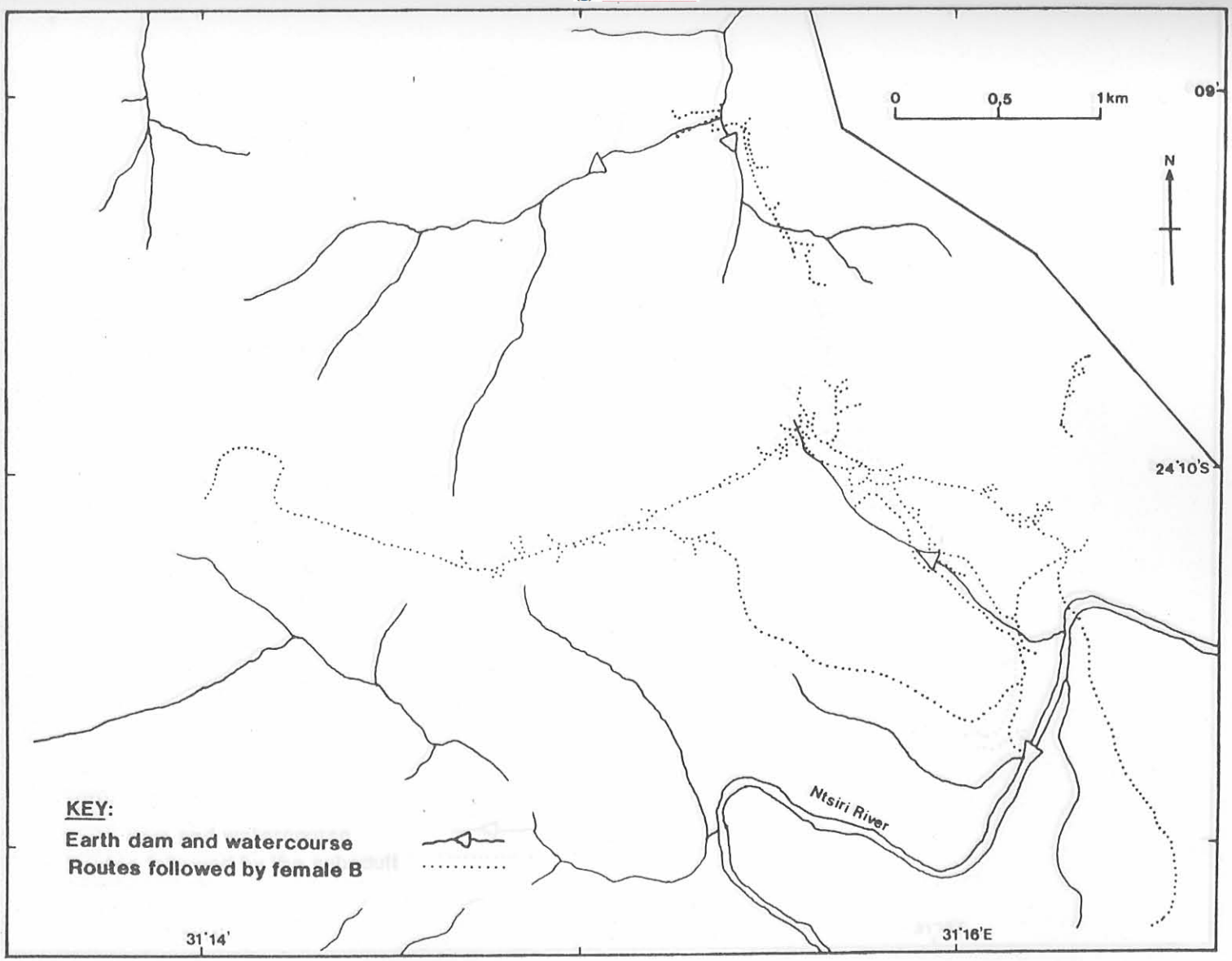

Figure 6: Routes followed by the study leopard female B in the study area in the Klaserie Private Nature Reserve, Eastern Transvaal Lowveld, February 1980 to October 1981.

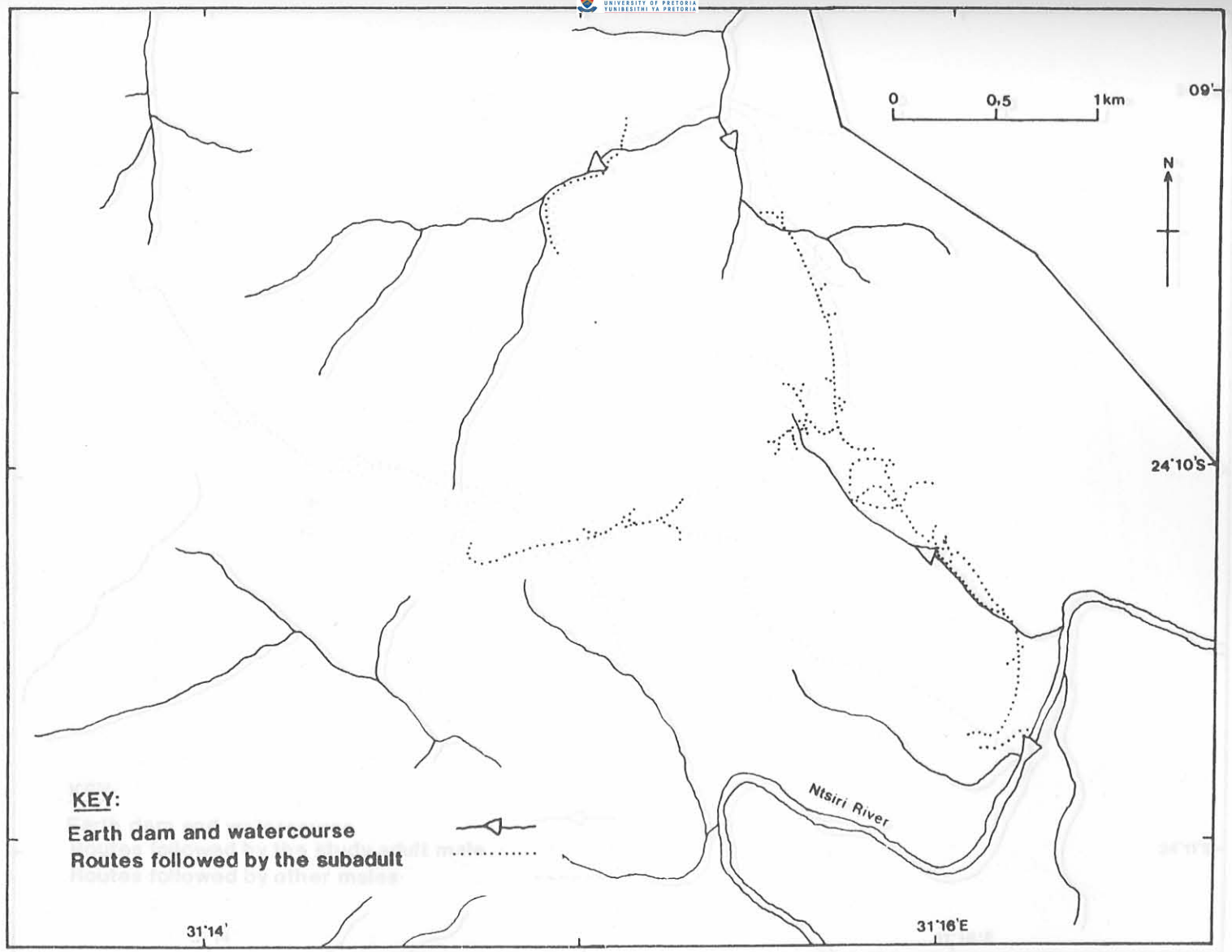

Figure 7: Routes followed by the subadult study leopard in the study area in the Klaserie Private Nature Reserve, Eastern Transvaal Lowveld, February 1980 to October 1981.

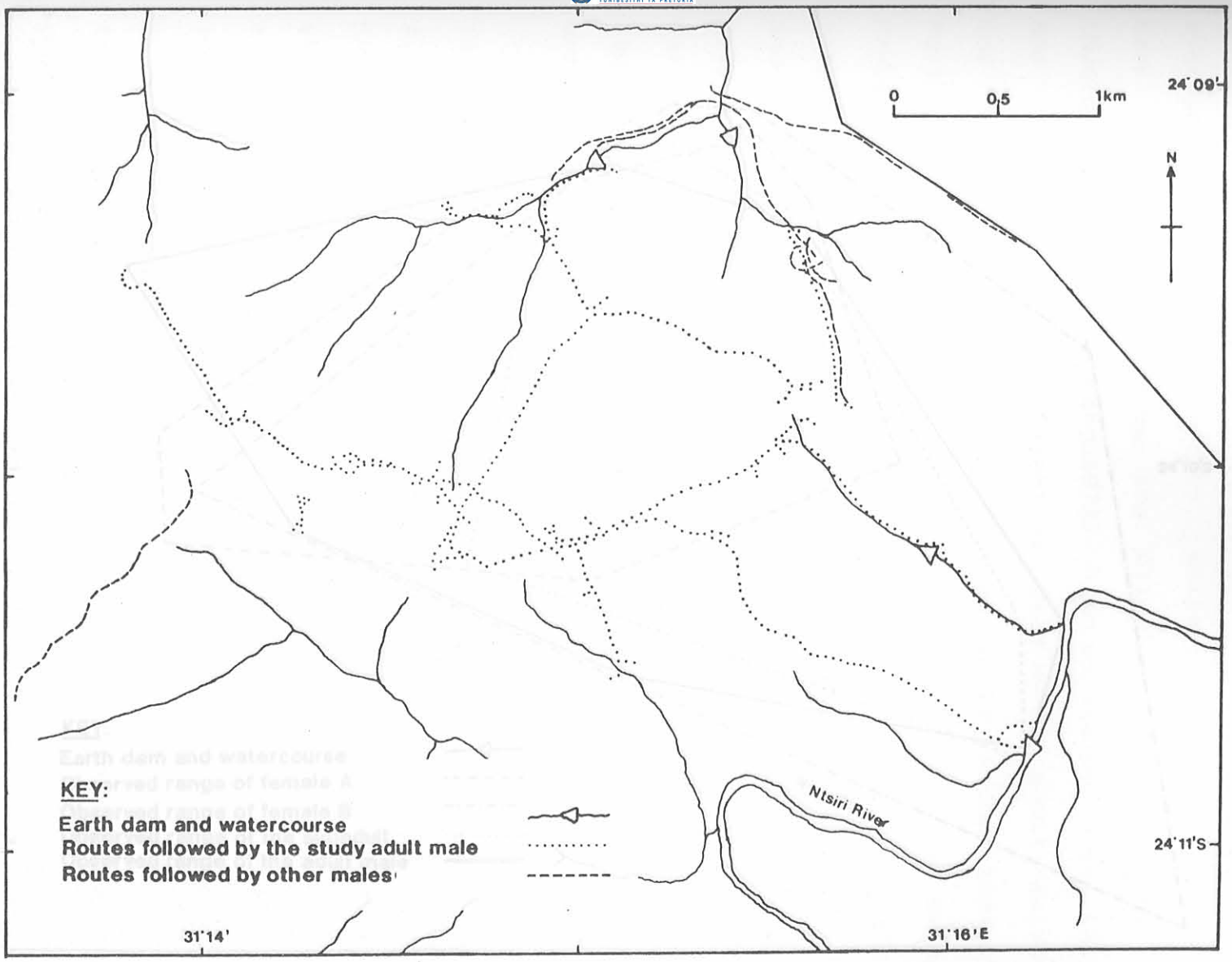

Figure 8: Routes followed by the study adult male leopard and other adult male leopards in the study area in the Klaserie Private Nature Reserve, Eastern Transvaal Lowveld, February 1980 to October 1981.

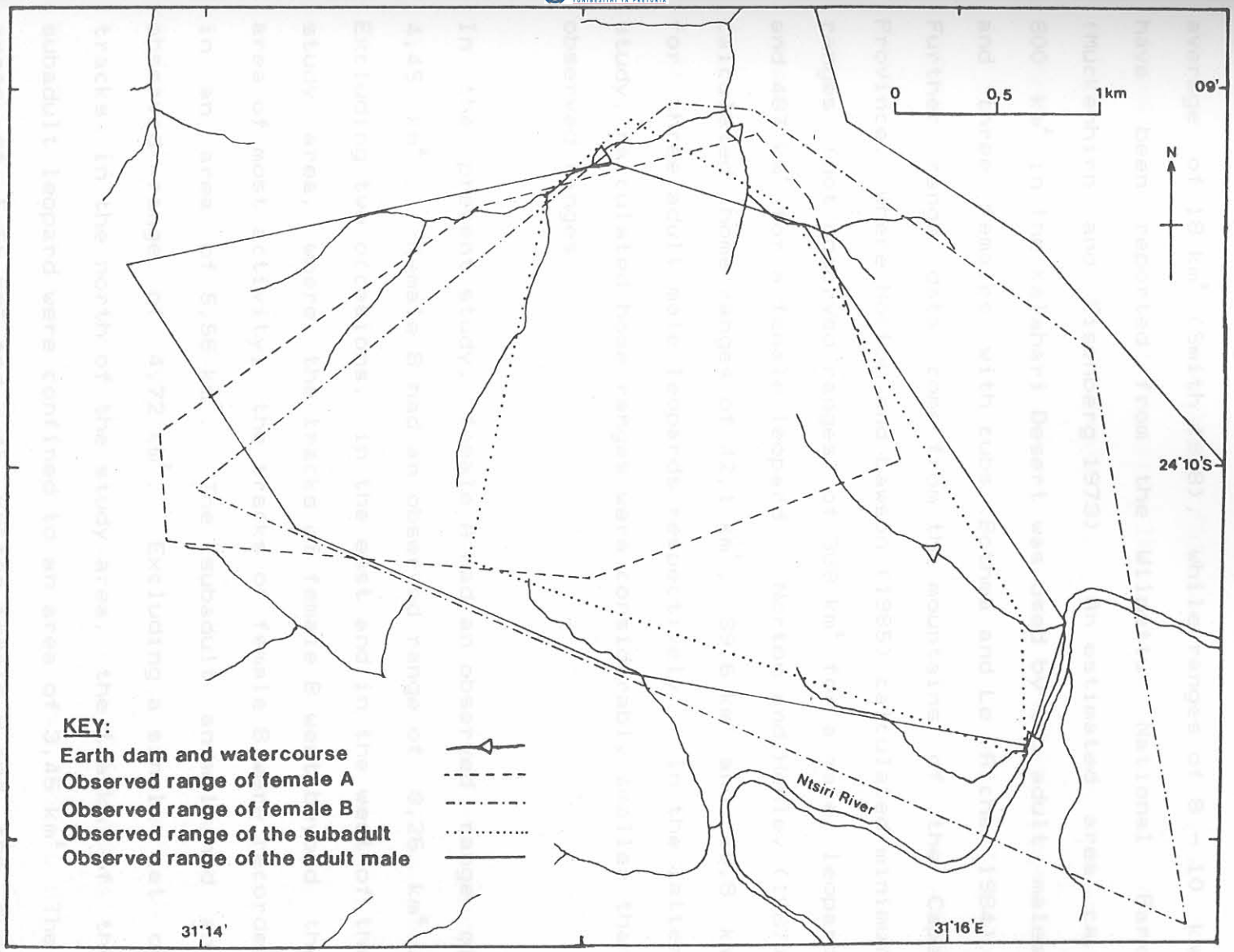

Figure 9: Observed overlapping ranges of the study leopards female A, female B, the subadult animal and the adult male in the study area in the Klaserie Private Nature Reserve, Eastern Transvaal Lowveld, February 1980 to October 1981.

8 km^2 and another male of 17 months old, a range of 6 - 7 km^2 (Sunquist 1983). In the Matobo National Park, tracks revealed leopard ranges to be between 10 and 19 km^2 with an average of 18 km^2 (Smith 1978), while ranges of 8 - 10 km^2 have been reported from the Wilpattu National Park (Muckenhirn and Eisenberg 1973). An estimated area ca. 800 km^2 in the Kalahari Desert was used by two adult males and three females with cubs (Bothma and Le Riche 1984). Further range data come from the mountains of the Cape Province, where Norton and Lawson (1985) calculated minimum ranges (not observed ranges) of 388 km^2 for a male leopard and 487 km^2 for a female leopard. Norton and Henley (1987) calculated home ranges of 42,1 km^2, 39,6 km^2 and 66,8 km^2 for three adult male leopards respectively. In the latter study, calculated home ranges were considerably smaller than observed ranges.

In the present study, female A had an observed range of 4,45 km^2. Female B had an observed range of 8,26 km^2. Excluding two occasions, in the east and in the west of the study area, where the tracks of female B went beyond the area of most activity, the tracks of female B were recorded in an area of 5,56 km^2. The subadult animal had an observed range of 4,72 km^2. Excluding a single set of tracks in the north of the study area, the tracks of the subadult leopard were confined to an area of 3,45 km^2. The areas of 5,56 km^2 and 3,45 km^2 for female B and the sub-

adult respectively are considered the more realistic sizes. The adult male had an observed range of 7,51 km^2.

As leopard tracks were never followed to the full, the ranges given here for Klaserie leopards are probably under-estimated and they can only be taken as minimum observed ranges. However, they do give an indication of range size for adult male and female leopards in the Klaserie Private Nature Reserve. Excluding the range size for an adult female in the Royal Chitawan National Park, the ranges of the leopards in the present study are smaller than those of leopards elsewhere. If the ranges of leopards depend on the type of terrain and the availability of food (Kruuk 1986 and Eisenberg 1986), then the ranges of Klaserie leopards would be expected to be comparatively small due to the prey availability and the woodland nature of the terrain.

The data presented here support the findings elsewhere, summarised by Smithers (1983), that the range of a male leopard may overlap the range of more than one female. In the Serengeti, Schaller (1972) also found that the ranges of resident leopards showed considerable overlap. No tracks of other adult males were found within the range used by the adult male in the present study, but such tracks were found along the observed borders of its range. This tends to support the findings of Hamilton (1981) that adult males have exclusive ranges. No conflict between adult males was

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noted in the present study. The data also support the conclusion of Hamilton (1981) that "home ranges of females do not appear to fit in with that of the male mosaic but are probably superimposed in a separate overlapping mosaic of female ranges."

Schaller (1972) further concluded that although the ranges of resident leopards overlapped, each leopard would concentrate its activity in an area that was, at that time, little used by other leopards. The study of Hamilton (1981) showed that adult male leopards, which had overlapping home ranges, concentrated their activities in different areas and appeared to be avoiding each other. Scott (1985) observed a female leopard with cubs to have a range size of 10 - 15 square miles. He further observed this female to vacate the area and then become occupied by a second neighbouring female with cubs. Later, the second female vacated the area and the area was again re-occupied by the original female and her cubs. Scott (1985) concluded that the two female ranges possibly overlapped and that the two females had been avoiding each other's presence.

This conclusion of Scott (1985) may explain the observation in the present study whereby female A used the study area less intensively towards the end of the study period while female B used the area more intensively. However, it is not known if avoidance can continue for a length of time in an

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area i.e. seven months, or if avoidance is over a shorter period of time, even daily. The latter is more likely as Hamilton (1981) observed leopards to generally cover the greater part of their home ranges frequently and thoroughly, although they did spend more time in certain areas. Scott (1985) then regarded the movements of an adult female leopard to be indicative of other adults, moving within her range, killing and feeding for a day or three.

On 3 December 1980, the tracks of female A revealed that she had two young cubs and this may have had an influence on her observed behaviour. On only two occasions were the tracks of the two adult females encountered in the same locality at one time but it could not be concluded if they had moved about there at different times of the same night. The tracks of the adult male were definitely found once with the tracks of female A and once with the tracks of female B. These data suggest that contacts between adult leopards are minimal. For the remainder, all tracks were located on separate days in different localities.

In the Tsavo West National Park, a subadult male leopard left his natal area at an estimated age of 30 months (Hamilton 1981). The observations of Sunquist (1983) in the Royal Chitawan National Park show that male leopards there left their natal areas at 15 to 18 months of age while Bertram (1982) found a 2,75 year-old male leopard to fairly

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often accompany its mother. The subadult leopard in the present study was taken to be the grown cub of female B. The sex of this animal was never determined and at an age of at least 18 months (until the end of the study period) it was still using a natal area of at least 4 km . This natal range is somewhat smaller than the ranges recorded by Sunquist (1983). Similar to the results of Sunquist (1983) and Bertram (1982), the range of this subadult was within the range of female B. That the subadult animal used the area significantly less intensively from April 1981 to October 1981 indicates its growing independence as it grew older. Scott (1985) observed a one yearold male leopard cub to behave in a much more independent manner than its sister of the same age. Tracks revealed that contact between the present study subadult and its mother occurred on at least four occasions. On all occasions, contact between mother and cub was without conflict, as was also found by Bertram (1982). Hamilton (1981) concluded that resident adult males were intolerant of each other and also possibly resident females of each other and that the only extended relationships are when females have dependent young.

Social Structure

Eltringham (1979) and Hamilton (1981) describe the leopard

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as being a strictly solitary animal in which associations only occur during mating or when a female has cubs.

From all sightings throughout the Klaserie Private Nature Reserve during the entire study period, 94 per cent (n = 50) were of solitary leopards, 4 per cent were of a female with her offspring and 2 per cent were of two animals together.

From tracks encountered throughout the Klaserie Private Nature Reserve during the study period, 83 per cent (n = 151) were of solitary animals, 4 per cent were of a female with cub/s and 13 per cent were of two animals in one form or other of association: either two cubs together or two adults together. The latter associations include instances where two leopards used the same section of track on the same night but possibly at different times. It was at times difficult to interpret whether two leopards had actually walked together or whether they had walked at different times on the same night, especially where the tracks were together for only a short distance. Where two adults had walked together, these associations would be either a female with her grown offspring (Bertram 1982) or a mating pair (Bothma **pers. comm.**). Combining all the data above 86 per cent (n = 201) were of solitary leopards, 4 per cent were of females with cub/s and 10 per cent were of a pair of leopards. Female leopards in the reserve were not known to raise more than two cubs, although more may have been born.

Summarising the literature on leopard reproduction, Hamilton (1981) concluded that cub mortality is high and that one or two grown young are usually seen with their mothers.

Activity Patterns

Klaserie leopards were regarded as being active when they were walking, feeding or vocalizing. The leopard's vocalization has been described by Schaller (1972) as a rasping, coughing call similar to the sound of the sawing of wood. Data on activity patterns were derived from sightings throughout the reserve and from the times that vocalizations were heard throughout the reserve. Supportive data came from occasions when leopard tracks covered or were covered by vehicle tracks laid at a certain time and where leopards left tracks before or after rain at a known time.

Klaserie leopards were mostly sighted or heard between sunset and sunrise, when they were most active (Fig. 10), and were mostly inactive during daylight hours. On two occasions a female leopard was observed resting, awake, on an earth dam wall as the sun was setting; at the onset of darkness she rose and began walking away.

These data support the findings of Hamilton (1981) and Bothma and Le Riche (1984) where the study animals concerned

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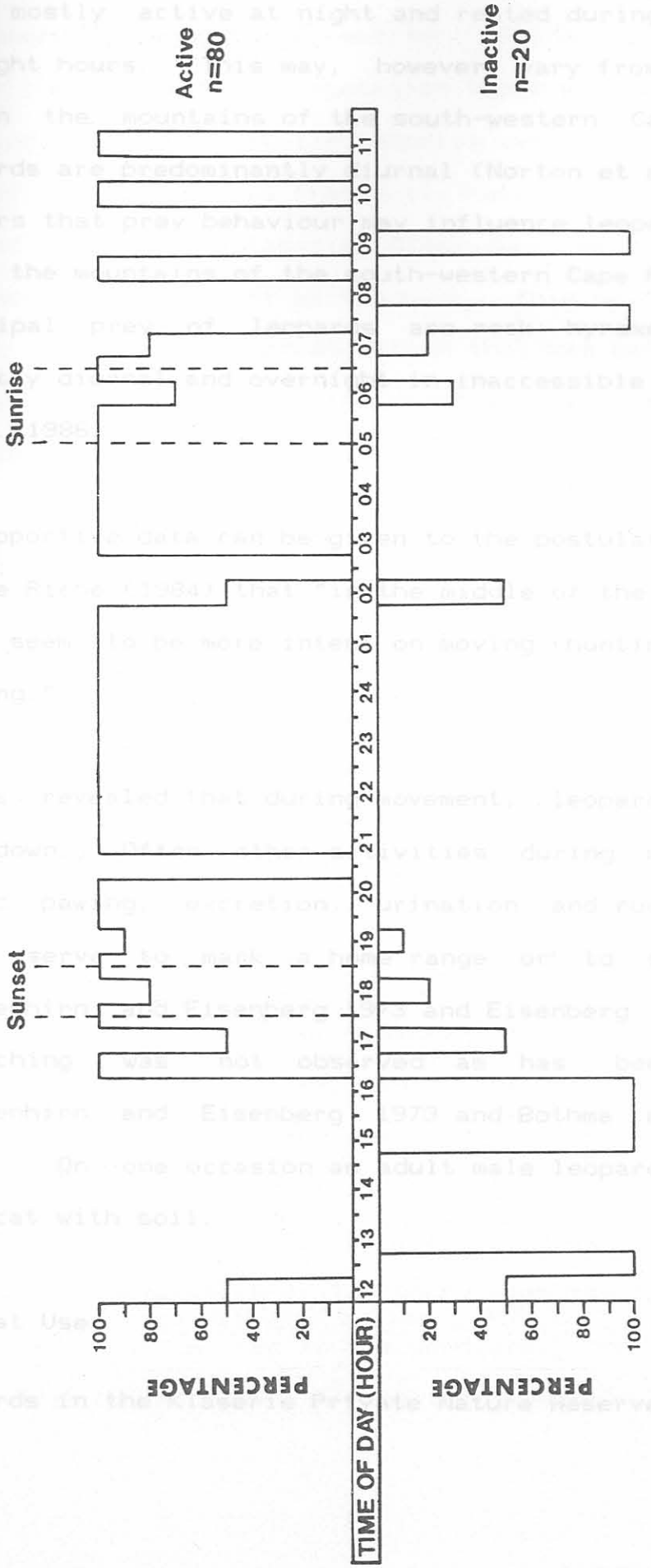

Figure 10: Periods of activity and periods of inactivity (percentage of each half-hour period) of leopards in the Klaserie Private Nature Reserve, Eastern Transvaal Lowveld, February 1979 to October 1981.

were mostly active at night and rested during the warmer daylight hours. This may, however, vary from area to area as in the mountains of the south-western Cape Province, leopards are predominantly diurnal (Norton **et al**. 1986). It appears that prey behaviour may influence leopard behaviour as in the mountains of the south-western Cape Province, the principal prey of leopards are rock hyraxes which are strictly diurnal and overnight in inaccessible holes (Norton **et al**. 1986).

No supportive data can be given to the postulation of Bothma and Le Riche (1984) that "in the middle of the active period they seem to be more intent on moving (hunting?) than on resting."

Tracks revealed that during movement, leopards lay down or sat down. Often other activities during movement were ground pawing, excretion, urination and rock scratching which serve to mark a home range or to space animals (Muckenhirn and Eisenberg 1973 and Eisenberg 1986). Tree scratching was not observed as has been elsewhere (Muckenhirn and Eisenberg 1973 and Bothma and Le Riche 1984). On one occasion an adult male leopard had covered his scat with soil.

Habitat Use

Leopards in the Klaserie Private Nature Reserve can be found

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and heard throughout the reserve. Although leopards may favour denser riverine vegetation there was an equal chance of finding active Klaserie leopards away from this type of habitat. Leopards were frequently heard (vocalizing) moving up and down the Klaserie River but were also heard elsewhere, although not as frequent. This may have been due to the nature of the accommodation that was personally used. The accommodation along the river was less sheltered and more ventilated than the accommodation away from the river.

In the Kalahari Desert, study leopards mainly used vegetation cover as resting sites but also often used aardvark burrows (Bothma and Le Riche 1984). In the Tsavo West and Meru National Parks, study leopards used rocks, bushes and trees as resting places. In Tsavo, study leopards showed a seasonal selection of resting sites: rocky places during the dry season and in trees during the wet season (Hamilton 1981).

Favoured resting sites of Klaserie leopards were the reed-bed of the Klaserie River, in dry watercourses and under bushes. Six of 19 day-time resting leopards were in the reeds of the Klaserie River, six were under trees or bushes in the woodland and four were in dry watercourses under overhanging vegetation. Two young leopards rested together on a rock under a tree in the woodland, one leopard rested on a dead fallen tree 2 m from the ground and one leopard

rested in a well foliated tree overhanging the Klaserie River, 6 m from the ground.

Porcupines and aardvarks do occur in the Klaserie Private Nature Reserve but leopards were not known to use any burrows as day-time resting sites. The habit of using burrows as resting sites is thus a reflection of the sparse vegetation cover of the Kalahari Desert, an area devoid of rocky crevices, outcrops or caves.

Population Size And Density

It was accepted that at one time, an adult female leopard and an adult male leopard occupied an area of at least 12,3 km^2 in the study area. This is assuming that female A later concentrated her activities elsewhere and that home range size was underestimated. The density of resident adult leopards in the study area was thus estimated at 1 per 6,15 km^2. The subadult animal and the two cubs of female A were not included in this estimation, as their future was not known. If both adult females are included in the estimation, then the density of resident adult leopards in the Klaserie Private Nature Reserve could be as high as 1 per 4,1 km^2. If the subadult animal is also included in the calculations, this would indicate a maximum density of 1 leopard per 3 km^2. This density is high compared to some

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other areas. Bothma and Le Riche (1984) recorded five resident leopards in an area of ca. 800 km^2 in the Kalahari Desert and in the Serengeti, Schaller (1972) estimated 1 leopard per 22 to 26,5 km^2. In the Wilpattu National Park, adult leopard densities were estimated at 1 per 30 km^2 (Muckenhirn and Eisenberg 1973) while Norton and Lawson (1985) reported low leopard densities from the mountains in the Cape Province. The densities here presented compare more favourably with those of Hamilton (1981) for Tsavo where a minimum of 1 resident adult per 13 km^2 or 1 resident leopard per 8,1 km^2 with density reaching a possible 1 resident adult per 9,3 km^2 or 1 resident leopard per 5 km^2 was found and with those of Smith (1978) for the Matobo National Park where 1 resident adult per 6 km^2 or 1 leopard per 4,5 - 5,0 km^2 was found. A high density of leopards would however, be expected in the Klaserie Private Nature Reserve as abundant prey results in high densities of cats (Eisenberg 1986).

The densities would mean that the Klaserie Private Nature Reserve would have an estimated adult resident population of between 100 and 146 leopards or an estimated 200 leopards. From the area-use observed in the study area and the high densities, it is accepted that all areas in the Klaserie Private Nature Reserve are fully occupied.

The data also suggest that leopards in the Klaserie Private

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Nature Reserve occur in a ratio of 1 adult male per 2 adult females. From a one month observation period in a 2,4 km^2 area in the northern part of the Klaserie Private Nature Reserve along the Klaserie river where a male leopard was known to live, tracks of two other smaller animals were also found. Similarly, Hamilton (1981) estimated a ratio of 1 adult male to 1,8 adult females for Tsavo.

Hornocker and Bailey (1986) reported on a study of leopards in the Kruger National Park, where sufficient food resources were available and where the stable leopard population consisted of resident adults established on home ranges. The Klaserie Private Nature Reserve also contained sufficient food for leopards and as the habitat is similar to that of the Kruger National Park, the results of the more detailed study of Hornocker and Bailey (1986) surely closely reflect the true picture of range-use and population regulation of Klaserie leopards. The results of Hornocker and Bailey (1986) showed that the population size remained constant as a result of the relative stability of the adult segment. Cub mortality was high and young animals that had become self-sufficient did not all disperse far from the natal area but remained within the population. These young independent "non-tenured floaters" were also subject to high mortalities. Those that did disperse far from natal areas were probably shot in intensively farmed areas while available leopard habitat adjacent to their study areas,

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which would include the Klaserie Private Nature Reserve, were probably fully occupied by resident adults. Eighteen per cent of adults, 32 per cent of sub-adults and 50 per cent of cubs-of-the-year died annually with 64 per cent of the mortalities attributed to starvation and 36 per cent attributed to predation or man. It is here accepted that all areas in the Klaserie Private Nature Reserve are fully occupied by resident adults and because of insufficient further data, the dispersal patterns and mortalities recorded by Hornocker and Bailey (1986) are accepted as being indicative of dispersal patterns and mortalities in the Klaserie Private Nature Reserve.

CONCLUSIONS

Following leopard tracks in a humid area gives insight into the ecology and behaviour of leopards but is not as effective and conclusive as that of experienced tracking in desert sand (Bothma and Le Riche 1984 and Bothma and Le Riche 1986) or radio-tracking (Hamilton 1981 and Bertram 1982). The advantage of following tracks is that leopards are not disturbed in any way. Disadvantages are that tracks, in a humid area, can not be followed to the full and as a result, leopards could not be continuously monitored for more than a part of one night's activity.

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The leopard in the Klaserie Private Nature Reserve is an important predator of the area. Impala is the favoured prey with most prey, as suggested by Schaller (1972), falling within the 20 kg to 70 kg size class. Adult impala males form an important part of the diet of the leopard in the Klaserie Private Nature Reserve. Klaserie leopards will scavenge when the opportunity arises, even eating putrid meat.

Kills are normally dragged to some form of cover. Large prey is, however, eaten where it is killed. The greatest drag distance was 400 m by an adult leopard with the carcass of a subadult impala male. Drag distances by Klaserie leopards are variable but are not as great as in other areas. Drag distance appears to be cover related and Klaserie leopards do not select specific types of bushes under which they drag their prey.

Relatively few (31,0 per cent) kills are taken up trees. Tree-hauling is due to a combination of factors: size of prey, disturbance by scavengers, avoidance of scavengers and the desire (degree of hunger) to feed again on the same carcass. Prey is most often disembowelled along a drag route or at the feed site and feeding normally begins on the hindquarters of the prey.

Klaserie leopards spend comparatively little time with a

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carcass. Carcasses the size of an adult impala will keep a leopard in the area for at most two days. Medium-sized prey will keep Klaserie leopards in one area for a maximum of one day.

Adult male leopards in the Klaserie Private Nature Reserve move a mean minimum distance of 1,5 km per day and adult females, 1,3 km per day. One adult female had a minimum range size of 4,45 km^2 and another adult female 5,56 km^2. A Klaserie adult male had a minimum range of 7,51 km^2 . The range of the male overlapped that of the two adult females. The two adult females also had overlapping ranges with activity being centred in different areas. The subadult animal shared the range of its mother. An animal of at least 18 months of age can still be found within the mother's range.

As elsewhere, Klaserie leopards are predominantly solitary animals and are most active during the hours of darkness. Favoured resting sites are the reed-bed of the Klaserie River, dry watercourses and under trees or bushes.

The Klaserie Private Nature Reserve has a dense leopard population. The calculated density of resident adult animals was 1 per 6,15 km^2 and 1 per 3 km^2 of leopards of all ages. This leads to an estimated resident adult population of between 100 and 146 leopards or 200 leopards

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of all ages.

The nature of the terrain and prey availability are two important factors influencing the ecology and behaviour of Klaserie leopards. A high potential prey population, ample cover and abundant water allow Klaserie leopards to occupy relatively small observed ranges.

The density of the Klaserie leopard population suggests that there would be no room for relocated leopards. All areas of the reserve are used by leopards and all available areas are probably fully occupied by a land tenure system. This, together with the size of the reserve, leads to the conclusion that a successful translocation is unlikely. The outcome of 10 translocated leopards to the Meru National Park, an area of 872 km^2 with a substantial leopard population, was regarded as a failure (Hamilton 1981). If a translocation is envisaged for the Klaserie Private Nature Reserve, then the animal to be released should be radio-collared to establish the outcome of the translocation. Test translocations of an adult male and an adult female would prove interesting. The release site should be in the centre of the reserve.

Leopards in the Klaserie Private Nature Reserve require no management. With their evident social organisation and land tenure system, they will themselves adapt to varying

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conditions within the reserve and there are no known unnatural factors operating against Klaserie leopards. If a high density of leopards were to be maintained, then it must be ensured that their principal prey, the impala, remains in satisfactory numbers. Should the numbers of the impala become significantly reduced, Klaserie leopards will self-adjust to the prevailing conditions and would require no management.