

ASPECTS OF THE BIOLOGY, POPULATION ECOLOGY AND
BEHAVIOUR OF THE SABLE ANTELOPE, HIPPOTRAGUS
NIGER NIGER, (HARRIS, 1838) IN THE RHODES
MATOPOS NATIONAL PARK, RHODESIA

by

JOHANNES HENDRIK GROBLER

DEPARTMENT OF NATIONAL PARKS AND WILDLIFE MANAGEMENT,
RHODESIA.

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INTRODUCTION

The present study set out to determine some bio-ecological relationships of the sable antelope, Hippotragus niger niger (Harris, 1838) in the Rhodes Matopos National Park, Rhodesia. The main objectives were to study selected aspects of the biology, population ecology and behaviour of the sable antelope. The duration of the study was from December, 1970 to March, 1973; a period of 27 months.

The sable belongs to the subfamily Hippotraginae, genus Hippotragus of which there are apparently three subspecies. The giant or royal sable H. niger variani (Thomas, 1916) occurs in Angola, between the Upper Cuanza River and its tributary the Luando (Dorst and Dandelot, 1970). Estes and Lstes (1970a) in their preliminary report on the giant sable refrain from commenting on their status, though the area in which the giant sable occur was gazetted as a reserve in 1922 (Varian, 1951). Da Silva (1962) states that a total of 159 animals were observed in part of the southern portion of the Luando Reserve. The present population totals possibly 2 000 to 3 000 animals (Huntley, 1973). Characteristics of this subspecies are the long horns and dark, almost black face.

The second subspecies, H. niger kirkii (Gray, 1822)

probably occurs north of the Zambesi River (Estes and Estes 1970b) although the integration, if any, with H. n. niger is unknown. Although not uncommon in Kenya, the only protected herd is in the Shimba Hills area (Estes and Estes 1969). Stewart and Stewart (1963) show a fairly wide distribution in Kenya, while Smithers (1966) shows a widespread distribution in Malawi and Zambia, southern Congo, north to Kenya and Tanzania. Ansell (1960a) states that in Zambia the subspecies is not clear, but H. n. kirkii is probably valid, and may occur throughout except in the Eastern Province where it is perhaps replaced by the nominate race. Grimwood, Benson and Ansell (1958) give the greatest concentration area for sable in Zambia as the Kafue National Park. The females in this subspecies, unlike the other two, are a distinct brown in colour, the males being characteristically black.

The southern subspecies H. niger niger (Harris, 1838) occurs south of the Zambesi River in Rhodesia, Northern Botswana, South West Africa, the Transvaal in the Republic of South Africa and in Mocambique; it is also recorded in Eastern Angola although it is separated from H. n. variani, (Hill and Carter, 1941). Selous (1899, In Bigalke 1955) gave the distribution of sable as follows: "Throughout the greater part of Matabeleland, Mashunaland, Manica, the low veldt of the Eastern Transvaal and in fact the

whole of South-east Africa north of Swaziland and Delgoa Bay, the sable antelope is, or was until recently, plentiful."

In Botswana the sable is confined to the northern parts of the territory, north and east of the Okavango River and south to Maun, the northern part of the Makari-kari, Nata and Tati Concession (Child, 1968; Smithers, 1968 and 1971).

Bigalke (1958) records sable in the eastern Caprivi, along the Kwando River, being less abundant in Ovamboland and the western Caprivi - South West Africa.

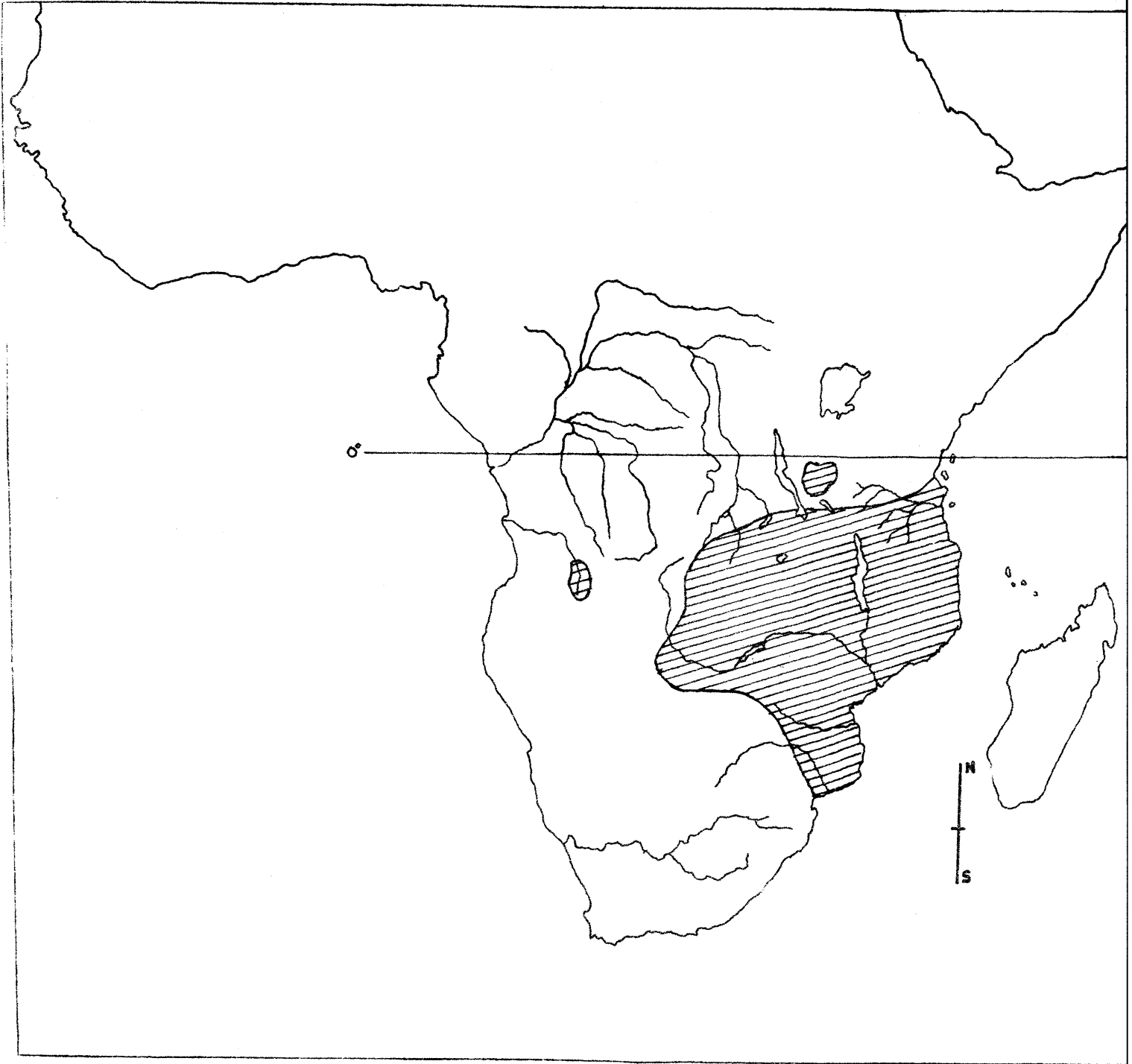
In Rhodesia the distribution of sable is greatly modified by human agency and sable are generally absent from the plateau except where protected. The stronghold of sable in Rhodesia is the north-west including Wankie National Park, the Matetsi area north to Victoria Falls National Park and east along the escarpment.

In the Republic of South Africa, Pienaar (1963) estimated 1 080 to 1 140 sable in the Kruger National Park, most of which occurred in the central and northern areas, though Stokes (1966) states that there were possibly over 2 000 sable in the Kruger National Park. Kettlitz (1962) estimated 800 sable in the Transvaal excluding the Kruger National Park and claims that natural areas where sable occurred were slowly giving way to agricultural pursuits,

consequently numbers were dwindling. The sable is now extinct in the type locality (Ellerman, Morrison-Scott and Hayman, 1953) which according to Shortridge (1934) was the Magaliesburg, west of Pretoria.

The sable is thus still widely distributed in Africa, (Fig. 1), south-east of the equator but apart from where they are in protected areas, their status is not healthy. The main threat to their survival in unprotected areas is their clash with agricultural activities (especially fence breaking) sport hunting to a lesser extent and deterioration of suitable habitat.

Figure 1. Sable distribution (gridded areas) in Africa,
based on the map by Dorst and Dandelot (1970).



THE STUDY AREA

The Rhodes Matopos National Park, some 43 200 ha in size, lies 48 km south-west of Bulawayo and consists of large broken granite hills with gorges, surrounded by woodland interspersed with grassland and savanna woodland of variable tree density. The northern section of the Park consists of what was once Hazelside and World's View farms, an area of about 6 800 ha (Fig. 2). It is in this area that the present study took place.

Information obtained from National Parks staff, the late Mabende in particular who worked in the area for over 50 years, indicated heavy African settlement in 1902, with little in the way of wildlife. From 1904 to 1908 a game enclosure was erected on the Maleme River in the north-western corner of Hazelside near the Arboretum into which a number of mammal species were introduced, including 12 sable. By 1918 the sable had increased to 30, most of the other species having died. The game fence washed away in the same year and all the remaining animals escaped. The present sable population in the area may well have arisen from the original group introduced, although cave paintings of sable on overhangs in the granite hills suggest that sable did in fact occur naturally.

The sable population now numbers over 200 in the

study area with other groups having dispersed onto neighbouring land and elsewhere in the National Park. The only restriction imposed on the movements of the population is a game fence erected in 1965/67 along the areas bordering European farm land (Fig. 2). The present distribution of sable in the study area from recorded localities is shown in Figure 3.

VEGETATION

As a result of human settlement in the past the vegetation in the Rhodes Matopos National Park has been modified, especially in all arable areas where the woodland has been replaced by grassland due to stumping. A species list of plants collected during the study is given in Appendix A, the major habitats being shown in Figure 4, while Figures 5 and 6 show sable in two habitat types. The vegetation in the study area consists of the following major habitat types:-

- Koppie vegetation
- Open woodland - sandveld
- Open woodland - mopane
- Grassland
- Marshland
- Aquatic environment
- Exotic trees

Figure 2. Rhodes Matopos National Park, Rhodesia, showing the study area (gridded) in relation to the entire National Park, (1973).

Reference	
Tarred Roads	—————
Gravel Roads	- - - - -
National Park Boundary	- · - · -
Rivers	~~~~~

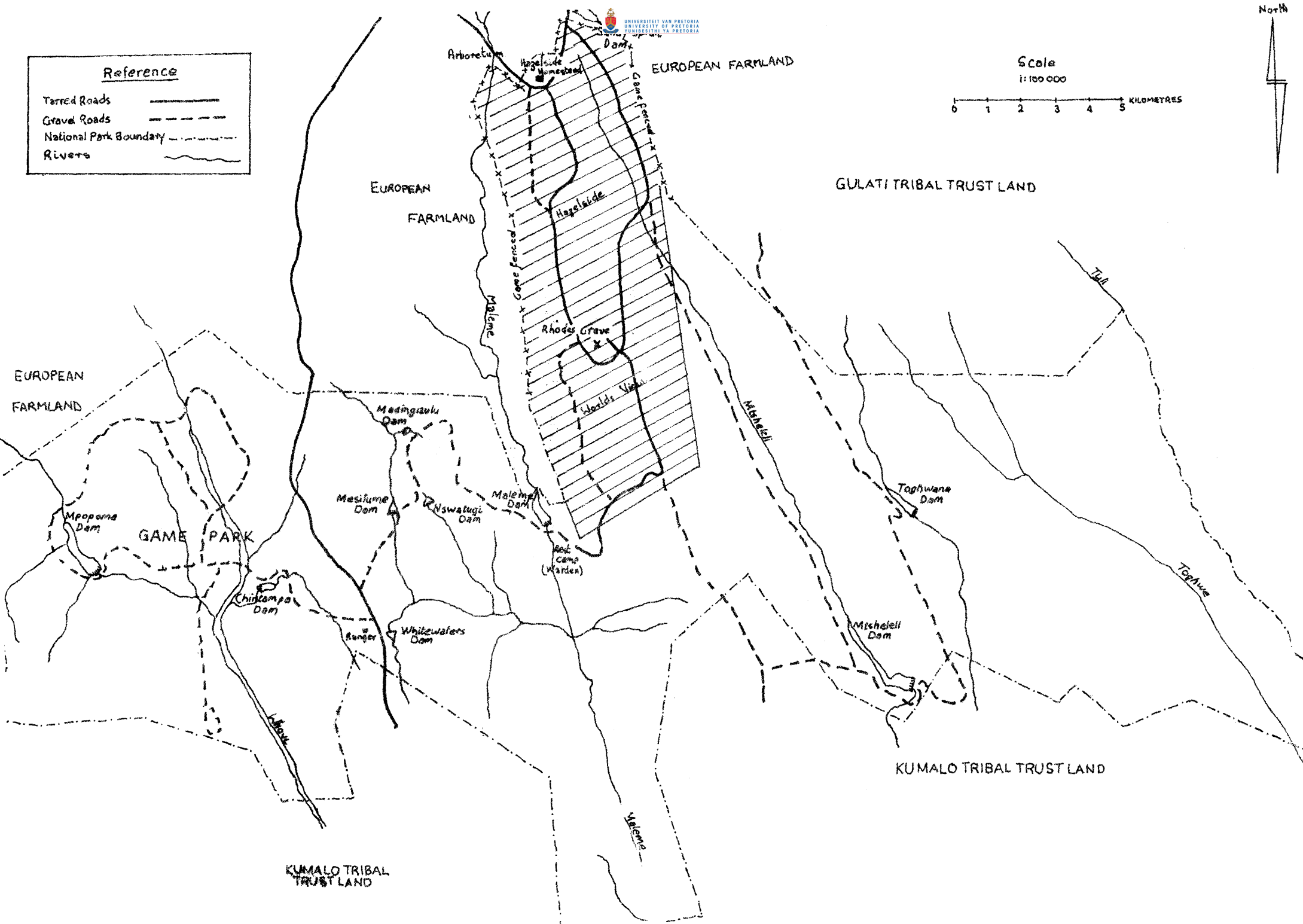
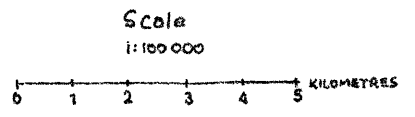
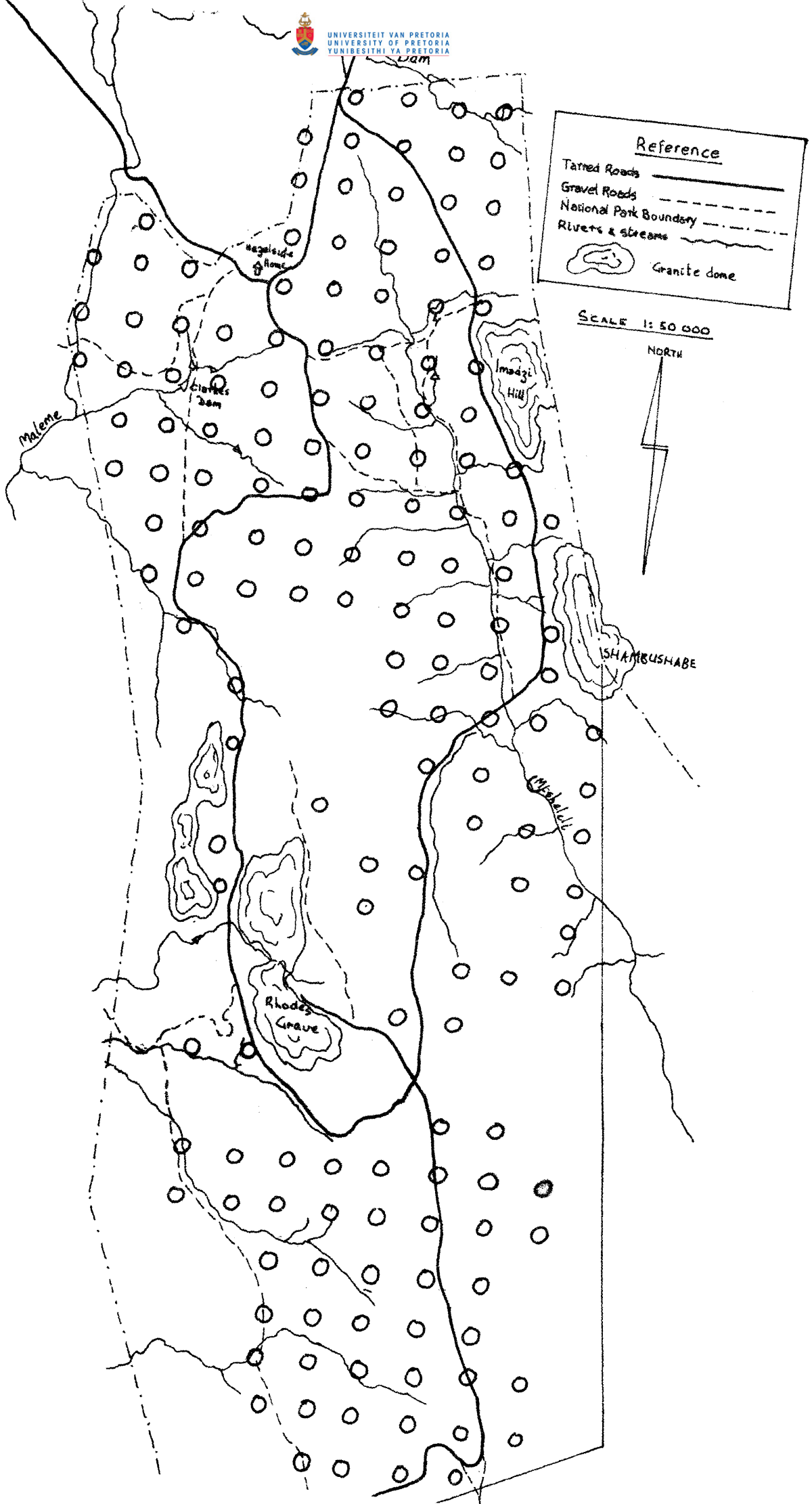



Figure 3. Sable distribution in the study area on the Rhodes Matopos National Park, Rhodesia, from recorded localities (December 1970 to March 1973). The circles represent sable having been recorded in that particular area of 0,06 sq. km or 10 x 10 mm square on the map.

Figure 4. Major habitat types in the study area of Rhodes Matopos National Park, Rhodesia, December 1970 to March 1973.



Reference

- Tamed Roads —————
- Gravel Roads - - - - -
- National Park Boundary - - - - -
- Rivers & streams ~~~~~
-  Granite dome







SCALE 1: 50 000



Figure 4. Major habitat types in the study area of Rhodes Matopos National Park, Rhodesia, December 1970 to March 1973.

Legend

Timed Roads ————
Gravel Roads - - - - -
National Park Boundary - - - - -
Rivers ~~~~~~

	KOFFIE VEGETATION
	OPEN WOODLAND - SANDVELD
	OPEN WOODLAND - MOPANE
	GRASSLAND
	MARSHLAND
	EXOTIC TREE PLANTATION

SCALE 1:50 000



Figure 5. Sable in grassland - open woodland ecotone with granite koppies in the background. Rhodes Matopos National Park, Rhodesia, May 1972.

Figure 6. Territorial sable male Y95 on bare granite in koppie vegetation on Rhodes Matopos National Park, Rhodesia, October 1972.



Koppie Vegetation

Koppie vegetation includes the granite hills and associated woodland comprising up to 50 per cent of the overall area. On the exposed granite a large variety of foliuous, cryptic and dendritic lichens grow while cryptograms are found in the more secluded, often moist, areas of the granite. In the crevices and depressions in the granite where organic matter has accumulated, plants such as Myrothamnus flabellifolia, Coleochloa setifera, Tripogon minimus and Danthoniopsis pruinosa may be found with trees such as Ficus spp., Commiphora marlothii and Euphorbia spp. growing in the larger crevices.

Interlaced with the exposed granite is a dense woodland including the following trees: Albizia rhodesiaca, Cassia abbreviata, Commiphora marlothii, C. mollis, Croton gratissimus, Combretum molle, Entandophragma caudatum, Euphorbia ingens, E. cooperi, Ficus spp., Kirkia acuminata, Pterocarpus rotundifolia, Ptaeroxylon obliquum, Securinega virosa and Ziziphus mucronata. The grass cover is generally poor in this woodland. A sparse cover of Oplismenus hirtellus occurs with Enteropogon macrostachys penetrating quite far into the granite hills. Fairly pure stands of Panicum maximum grow on the woodland fringes and a good grass cover is often found on the hills where the trees are sparse, a

common grass in the latter being Andropogon gayanus. Numerous Aloe excelsa also occur in more open areas of granite.

Open Woodland - Sandveld

This is the second most common vegetation type and can be divided into three major categories.

The first is dominated by Burkea africana and Pterocarpus rotundifolia with trees such as Piliostigma thonningi, Dombeya rotundifolia, Terminalia sericea, Ozoroa reticulata, Rhus lancea and Strychnos spp. also occurring. A shrub layer of Grewia bicolor, Maytenus senegalensis, Terminalia sericea and Lippia javanica often occurs.

The second category is a more open woodland with little or no shrub layer, the dominant trees being Burkea africana and Terminalia sericea with Pterocarpus angolensis and Dombeya rotundifolia also occurring.

The third and last category is dominated by Acacia rehmanniana.

The grass cover in this vegetation type as a whole is a mixed medium to tall one. The species composition varies throughout but generally includes the following: Heteropogon contortus, Hyperthelia dissoluta, Panicum maximum, Eragrostis spp., Andropogon gayanus, Aristida

spp., Pogonarthria squarrosa, Urochloa bolbodes and Schyzachirium spp. A mosaic of anthills occurs with vegetation often atypical of the surroundings.

Open Woodland - Mopane

Mopane woodland occurs in the northern part of the study area on sodic soils. The dominant trees are Colophospermum mopane with associated trees being Terminalia randii. Although there is no shrub layer, common shrubs include Euclea divinorum, E. undulata and Grewia bicolor. Also occurring, often in large communities, are stands of Aloe aculeata.

The grass cover is sparse consisting of weak perennials and annuals, common species being: Aristida spp., Eragrostis spp., Chloris virgata, Microchloa kunthii and Tragus berteronianus. Areas immediately peripheral to the mopane woodland have a dense grass cover.

Grassland

Grassland has resulted from cultivation by human settlers and now forms an important part of the environment.

The more recently cultivated areas have given rise to a mixed grassland of medium height with regenerating Acacia rehmanniana, Terminalia sericea and Burkea africana. The grasses include the following: Hyperthelia dissoluta,

Heteropogon contortus, Schyzachyrium spp., Aristida spp.,
Eragrostis spp., Cynodon dactylon, Rhynchelytrum repens,
Pogonarthria squarrosa, Chloridion cameronii, Cymbopogon
excavatus, Digitaria spp., Loudetia simplex, Perotis
patens, Setaria spp., Sporobolus spp., Themeda triandra,
Trichoneura grandiglumis.

The older cultivated areas consist of tall climax grassland dominated by Hyperthelia dissoluta. This tall grassland is usually quite barren of large mammals, only being utilised if burnt or cut.

Marshland

Many of the streams have permanently moist soil giving rise to a dense mass of grass forming a marsh. Much of the Mtsheleli River consists of marshland.

The dominant grass is Pennisetum glaucocladum, associated grasses being Miscanthidium teretifolium, Bothriochloa glabra, B. insculpta, Haemathria altissima, Rottboelia exalta, Sacciolepis typhura, Ischium afrum, and Phragmites mauritianus. Also occurring are various species of sedges.

Aquatic Environment

Apart from the various species of Cyperaceae, grasses associated with permanent water are Panicum repens, P. subalbidum, Pennisetum glaucocladum and Phragmites

mauritanus. The water also contains good growths of both submerged and floating plants, including communities of Nymphaea sp.

Exotic Trees

Exotic trees and shrubs have been planted in the northern section of the study area including various coniferous trees, Eucalyptus spp., sisal (Agave americana) and jacaranda (Jacaranda mimosifolia). A small plantation of coniferous trees is quite well utilised by sable as a resting place.

ASSOCIATED GAME SPECIES

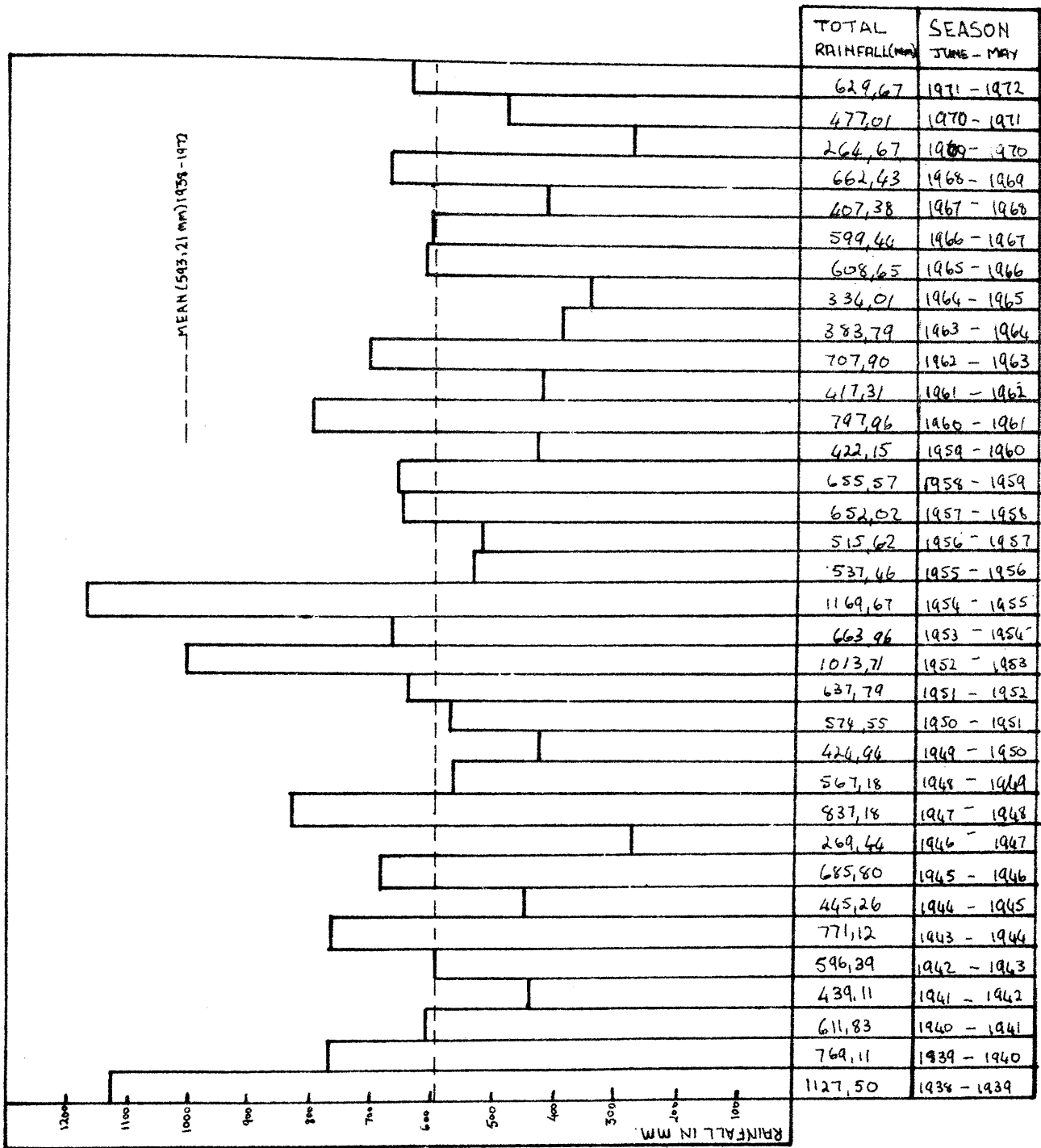
The remarkably diversified habitats in close proximity to each other has resulted in a rich fauna (Vernon 1967, Wilson 1969, Grobler and Wilson, 1972). Ungulates associated with the sable in the study area include the following: seven blue wildebeest, Connochaetes taurinus; reedbuck, Redunca arundinum; impala, Aepyceros melampus; bushbuck, Tragelaphus scriptus; duiker, Sylvicapra grimmia; steenbok, Raphicerus campestris; kudu, Tragelaphus strepsiceros and klipspringer, Oreotragus oreotragus. The only large predators occurring in the area are leopard, Panthera pardus and black-backed jackal, Canis mesomelas.

WATER AVAILABILITY

The annual rainfall was an average of 593,21 mm

(Fig. 7) from 1938 to 1972 falling seasonally mainly from November to February. Owing to the considerable drainage from the hills and from the underground geological formations, water is available in well dispersed dams, rivers and springs throughout the year.

Figure 7. Seasonal rainfall (in mm) recorded at the Hazelside homestead by the Department of National Parks and Wildlife Management, Rhodesia, from 1938 to 1972. The homestead is situated in the northern sector of the study area in the Rhodes Matopos National Park, Rhodesia.



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METHODS

FIELD OBSERVATION

Most field observations were recorded by using a portable cassette tape-recorder and 10 x 50 mm binoculars. Observations could be done equally well on foot, from a vantage point or from a vehicle, though most were done from a vehicle using the roads shown on Figure 3 and by driving across country. All observations were transferred to a recording book at the end of the day, every recording being given a reference number corresponding to one on a 1:50 000 locality map. Locality maps were kept on a bi-monthly basis; eg. showing all January and February localities on one map.

AGE CLASSIFICATION

The following age classes for sable were recognised in the field for the use in classification of groups:-

Young of the year: any sable born during the season, all being less than 12 months old.

Yearling: all sable in their second year, approximately 12 months to 24 months old.

Sub-adult: males only, from two to four years old and still with the breeding herd.

Adults: all females over two years old and all

bachelor and territorial males.

Males can be distinguished by the black penial button in the field from about three months of age. Another feature in identification of the sexes is the manner in which urination takes place, the female with tail straightened and back legs slightly splayed and the male in an upright or normal stance.

As sable are seasonal breeders, young of the year and yearlings can be distinguished by body size and horn length comparison. The females in their third year can be recognised in the same way early in the season, but can be confused with adults towards the end of the year; thus only three classes were used for the female sable (Fig. 8). The sub-adult males have horns similar to adult females but they are wide at the base with large broad primary annuli. The annuli being the "bumps" on the horns. A detailed study is in progress on ageing criteria and growth rates of sable in the Rhodes Matopos National Park based on captive sable and known-age sable in the field, therefore no detailed discussion is included here.

CAPTURE AND MARKING

Calves

New-born sable calves were captured by locating small

- Figure 8. Age classes for female sable based on horn length and body size comparison in the Rhodes Matopos National Park, Rhodesia.
- (a) Young of year: female sable number R11 at seven months old (note notches on the ears) August 1972.
 - (b) Yearling: female sable at approximately 17 months old, September 1972.
 - (c) Adult: fully adult female sable, September 1972.



a.



b.



c.

461 865

groups of adult females (two to five) during the peak calving period, then searching the immediate vicinity for hidden calves. This was done by 15 men walking about 10 m apart in a line. Once a hidden calf (Fig. 9) was seen, the observer signalled by raising his arms. The calf was then quietly surrounded and caught by hand. Most calves made no attempt to run, those that did were usually caught by the men surrounding it. Some very young calves in the presence of females were run down and caught on foot.

Once captured the calves were measured, their mass determined with a spring balance using a canvas sling, marked and released. The marking was done by using coloured plastic ear tags (Rhotag, by Millborrow, Salisbury) and a v-shaped ear clipper. Yellow tags were used for males and red for females, in the right ear for 1971 and 1973, the left ear for 1972. An ear number code was used with the v-shaped clipper, the number corresponding to that on the tag, (Figs. 10 and 11). Calves were caught at random; the capture localities are shown on Figure 12.

Adults

Six adult males were immobilized and marked, the details of which are in Appendix B. The method of marking was to use BAND-IT (manufactured by Band-it Co.

Figure 9. Hidden new-born male sable calf before capture, Rhodes Matopos National Park, Rhodesia, February 1972.

Figure 10. Marked sable calf female number R11 showing tag and ear code (arrows), Rhodes Matopos National Park, Rhodesia, February 1972.



Figure 11. Illustration showing ear code for v-shaped clipper and tag used for marking sable calves in the Rhodes Matopos National Park, Rhodesia. during January/February 1971 to 1973.

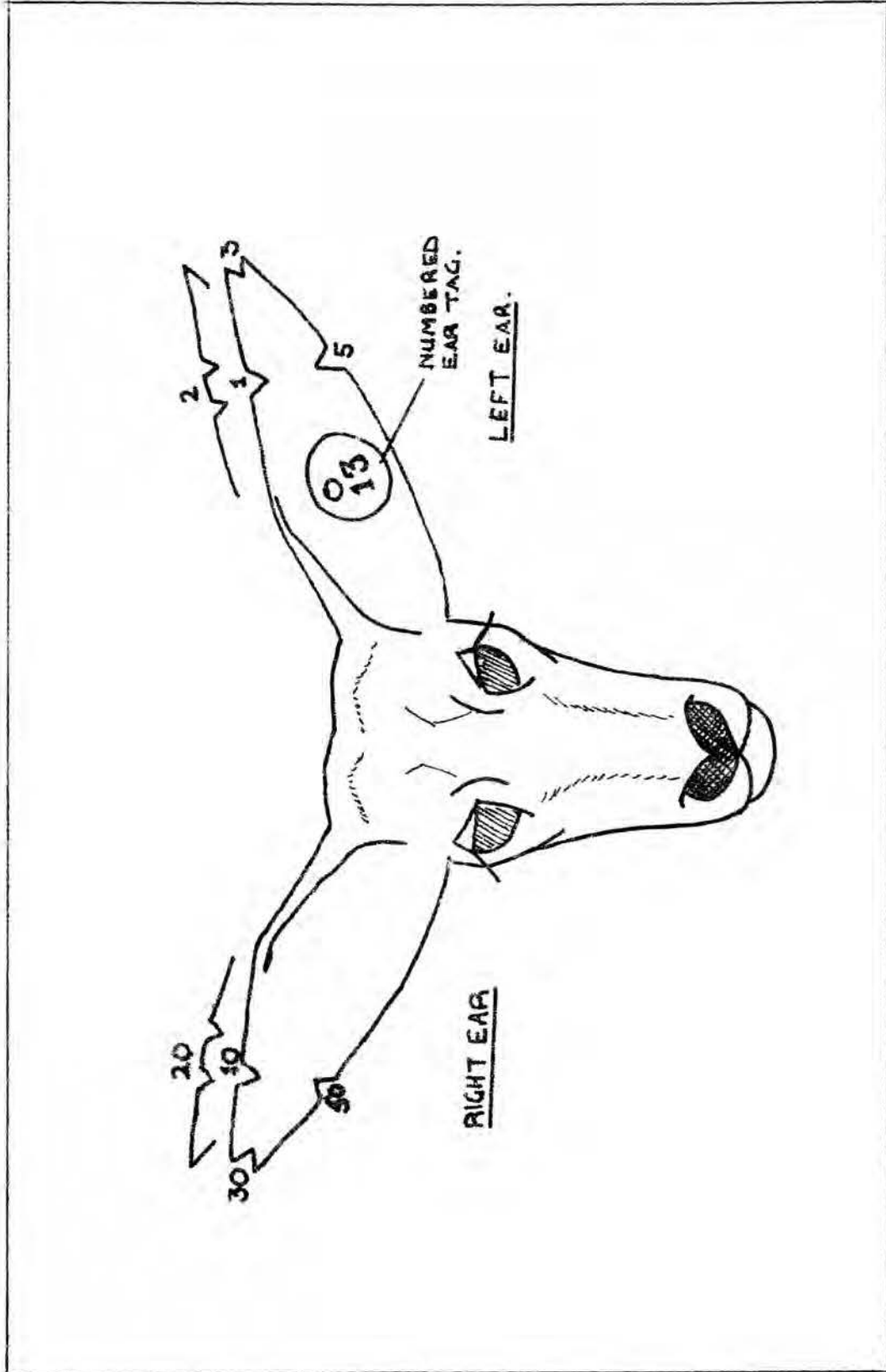
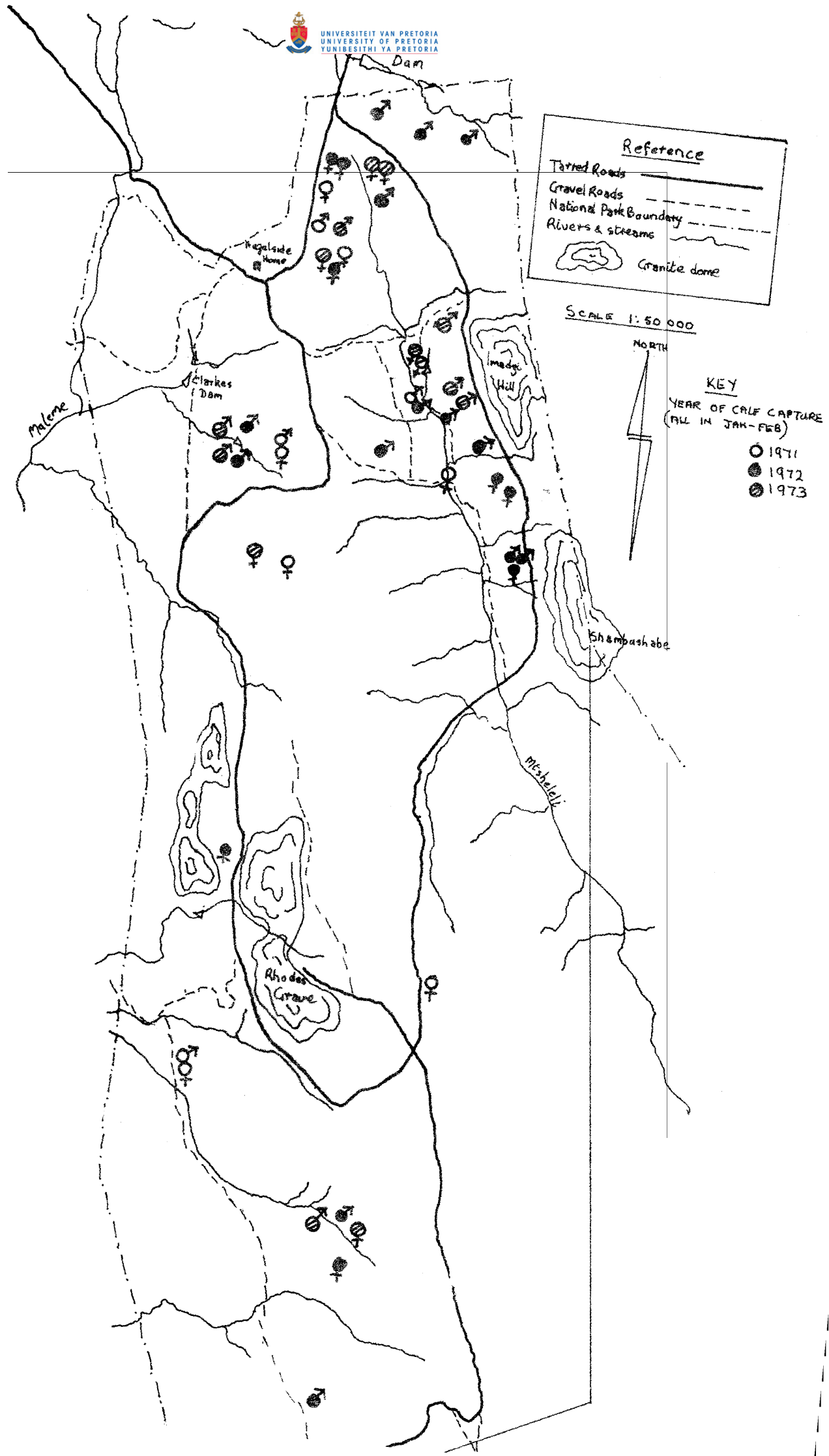


Figure 12. Sable calf capture localities in the study area of Rhodes Matopos National Park, Rhodesia, showing point of capture, year of capture and sex of the calf. All calves except eight caught in 1973 were released at the capture site after marking and measuring.



4799 Dahlia Street, Denver, Colorado 8046; distributed by J. Mann & Co. of Bulawayo) metal strips on the horns in addition to yellow ear tags as described above, (Fig. 13). The horn bands were placed in the annuli approximately one third of the way up from the base of the horn. The code used was one band on the left horn, one on the right, one on both, two on left, two on right and with the sub-adult male none was used.

Two of the adult males lost one horn band each after six months following the rut while the remainder have retained theirs. Careful consideration should be given to positioning the joints of the metal bands in the inside of the horns to avoid contact in sparring or fighting between males. Ear tags placed in adult sable and wildebeest have lasted permanently to date (April 1973) having been marked in October and March 1971 respectively. In the marked calves the tags dropped out within 12 months for unknown reasons. Fortunately the v-shaped code in the ears is permanent and can be seen without difficulty at a distance of 50 m using 10 x 50 mm binoculars.

Naturally Marked Animals

Fifteen sable, individually recognisable due to broken or twisted horns, torn ears and abnormal colouration were also used in studying movements and behaviour.

Figure 13. Method of marking adult male sable in the study area of the Rhodes Matopos National Park, Rhodesia.

(a) Frontal view of Band-it stainless steel strips (1) on the horns of male sable number Y95 also indicating the ear tag (2), October 1971.

(b) Close up view of male sable number Y100 showing ropes securing horns while under sedation, Band-it horn band (1) and ear tag (2), October 1971.



a.



b.

MEASUREMENTS

The following measurements were used on the calves captured in the study:

Ear length: taken on the right ear from the apex to the notch at the base of the ear.

Height at withers: taken with the animal standing, from the base of the front hoof in a straight line to the highest point on the shoulder.

Length of body curve*: from the nose tip, along the dorsal side of the body curve to the base of the tail, with the animal standing.

Tail length: from the base of the tail to the fleshy apex with the tail held at right angles to the body. Measured dorsally.

Hind foot length: measured with the back leg bent, from where the hair ends on the hoof in a straight line to the outermost point of the bend in the leg (SU.).

Hoof length: measured in a straight line from the tip to a point on the broad end vertical to the hairline.

*The body curve length, instead of body length, was used because the latter was too variable when measuring

live animals.

FEEDING RECORDS

As the sable were relatively tame, it was possible to observe them from close quarters using 10 x 50 mm binoculars and to collect specific plants being eaten. If a plant was purposefully eaten, this was regarded as a feeding record. The method became less effective in the dry season, but the selection sable show for green grass made it possible for plants being eaten to be located without difficulty. All plant material collected was identified by the National Herbarium in Salisbury.

RESULTS AND DISCUSSIONS

BIOLOGY

Feeding

Twenty-eight plant species were recorded as food plants during the study (Table 1). Of these, only four were dicotyledonous plants - Tarchonanthus camphoratus, Dombeya rotundifolia, Grewia flava and Lippia javanica. Although rarely seen being browsed, Tarchonanthus camphoratus is an important browse plant especially prior to the rains at which time most of these trees show signs of browsing by sable.

Although only one sedge (Scirpus inclinatus) was recorded, it is quite possible that other smaller species are utilised, especially in the vleis. Small sedges would be difficult to observe being grazed when sable are in rank grass associated with vleis.

Twenty-three species of grass were recorded as being utilised in the study area. These can be divided into categories as follows:-

- (a) Species recorded throughout the year: Panicum maximum, Heteropogon contortus, Eragrostis jeffreysii, Themeda triandra and Urochloa bolbodes.

Table 1. Sable feeding records from the study area of Rhodes Matopos National Park, Rhodesia, based on observations from December 1970 to December 1972 giving month of recorded feeding (X), Forage value (F.V.) from Rattray (1960) and number of times recorded.

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	F.V.*	NO. RECORDS
Grasses:														
<u>Andropogon gayanus</u>			X			X						X	3	3
<u>Aristida congesta</u>									X				1	1
<u>Brachiaria brizantha</u>	X		X			X						X	3	4
<u>B. xantholeuca</u>				X									-	1
<u>Chloris virgata</u>				X									1	1
<u>Cyndon dactylon</u>	X				X								3	3
<u>Dactyloctenium aegyptium</u>	X												3	1
<u>Digitaria pentzii</u>									X				3	1
<u>Eragrostis jeffreysii</u>	X		X	X	X	X		X			X	X	2	18
<u>Heteropogon contortus</u>	X	X	X	X	X	X	X		X	X	X	X	2	29

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	F.V.*	NO. RECORDS
Browse:														
<u>Tarchonanthus camphoratus</u>					X			X					-	6
<u>Dombeya rotundifolia</u>									X				-	1
<u>Grewia flava</u>										X	X		-	2
<u>Lippia javanica</u>							X						-	1

*NOTE: F.V. Symbols: 1 = poor

2 = average

3 = good

(b) Scattered records throughout the year : Brachiara
brizantha, Andropogon gayanus, Rhynchelytrum
repens, Hyparrhenia rufa, Cynodon dactylon,
Hyperthelia dissoluta, and Schizachyrium inclusum.

(c) Species recorded occasionally : Dactyloctenium
aegyptium, Setaria porphyrantha, S. verticillata,
Digitaria pentzii, Aristida congesta, Urochloa
mossambicensis, Chloris virgata, Brachiaria
xantholeuca and Phragmites mauritianus.

(d) Species only recorded after burn or cutting:

Pennisetum glaucocladum and Miscanthidium
teretifolium.

Estes and Estes (1970b), in addition to the species listed above, also recorded as food plants Bothriochloa insculpta, Hyparrhenia filipendula, Pogonarthria squarrosa and Sporobolus ioclatus, in the Rhodes Matopos National Park. They further recorded Heteropogon contortus, Panicum maximum and Themeda triandra as being heavily utilised by sable. Wilson (1969) recorded the following additional species utilised by sable in the Rhodes Matopos National Park - Cymbopogon plurinodis, Urochloa panicoides, Acacia karroo, Dichrostachys glomerata, Lippia catzii, Rhus lancea and Grewia monticola; also the fruit of Dichrostachys glomerata and Ziziphus mucronata. Most of the above records by Estes and Estes and Wilson were

from the game section of the Rhodes Matopos National Park which has similar vegetation, though it is some distance from the study area. The sable in the game section are under greater competition with other grazers which may explain the greater use of dicotyledonous plants as indicated by Wilson (op. cit). Rushworth (1972), in the Wankie National Park, recorded grass as 44 of 47 plant species being fed on. The remaining three consisted of one herb and two trees/shrubs.

Using Rattray's (1960) forage values for grasses as shown in Table 1, the majority of grasses utilised in the study area are of average or good forage value.

The actual method of feeding by sable is to select the green succulent parts of the grass and bite off lengths of up to 30 cm, then with head held up, to stand feeding with the grass protruding from the mouth. This is particularly prevalent during the rains when most grasses are green and succulent. At other times sable may feed with the head held down for up to 10 minutes without looking up.

Bone chewing as described by Estes and Estes (1969) due to a pronounced deficiency of calcium and phosphorus in the Shimba Hills was not noted in the study area, even though old bones were fairly abundant.

Drinking

Drinking patterns were difficult to observe as there were several drinking points in each home range. Observations in the study area augmented by those from other areas in Rhodesia obtained from wildlife report form punch cards (Department of National Parks and Wildlife Management, Rhodesia), indicated that sable are "day drinkers" drinking mostly from 10h00 to 16h00 with a peak between 13h00 and 14h00 (Fig. 14). In the study area drinking is usually associated with grazing on the green grass growing around a water point. The favoured drinking sites are shown in Figure 15, although these are by no means the only ones.

The frequency of drinking in the study area was never ascertained. One group was observed from 16h00 to 17h30 on the 19th May 1971, then again from 07h35 to 17h00 on the 20th May 1971. During this period the group never went near a water point. Sable in the study area drink frequently as proved by observations of tracks at drinking sites and groups seen drinking. The indications are that in the study area sable probably drink daily on most occasions. The method of drinking is to walk into the water to about knee level if the water is deep enough, then to drink from the surface. There was no apparent social order for drinking.

Figure 14. Sable daylight drinking patterns in Rhodesia giving time of drinking and number of observations based on records from the Department of National Parks and Wildlife Management, Rhodesia, and Rhodes Matopos National Park, Rhodesia.

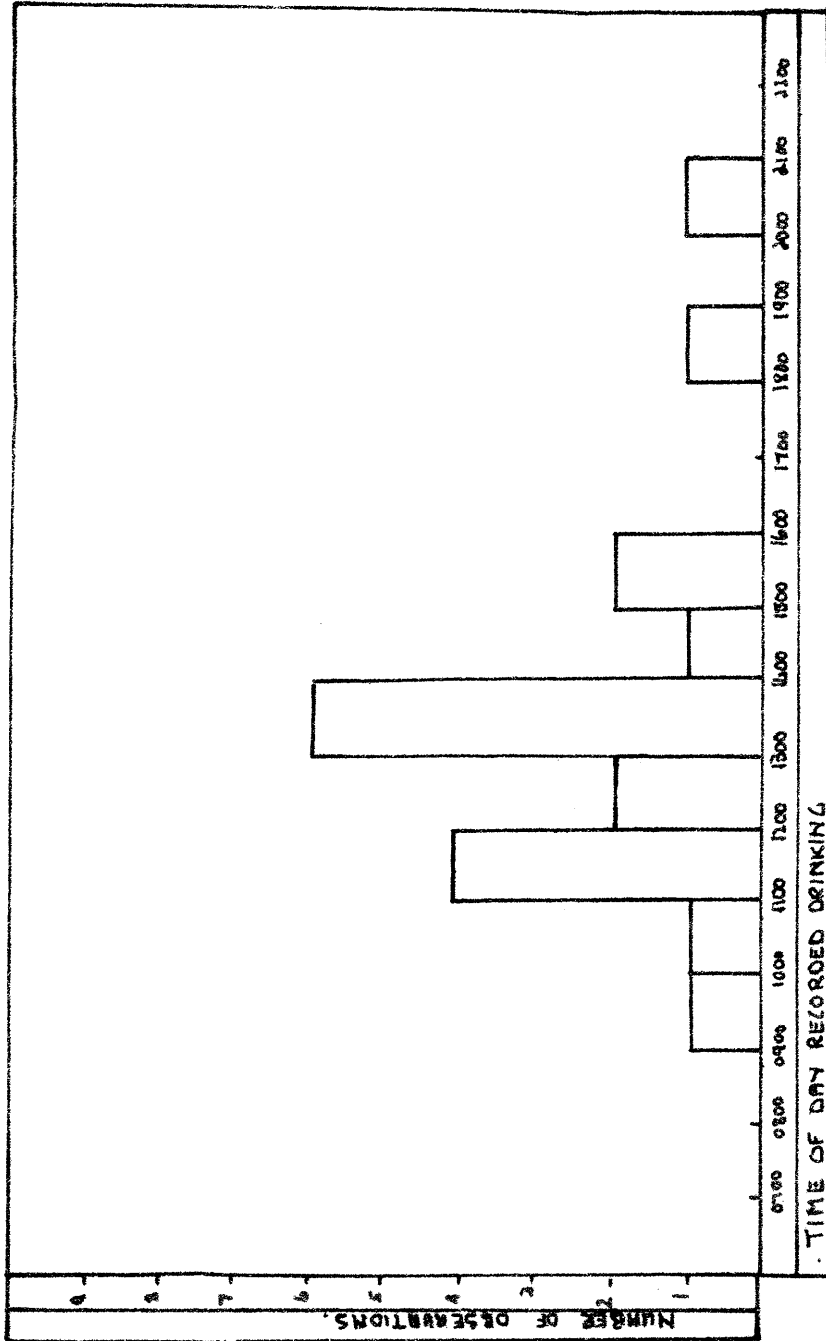
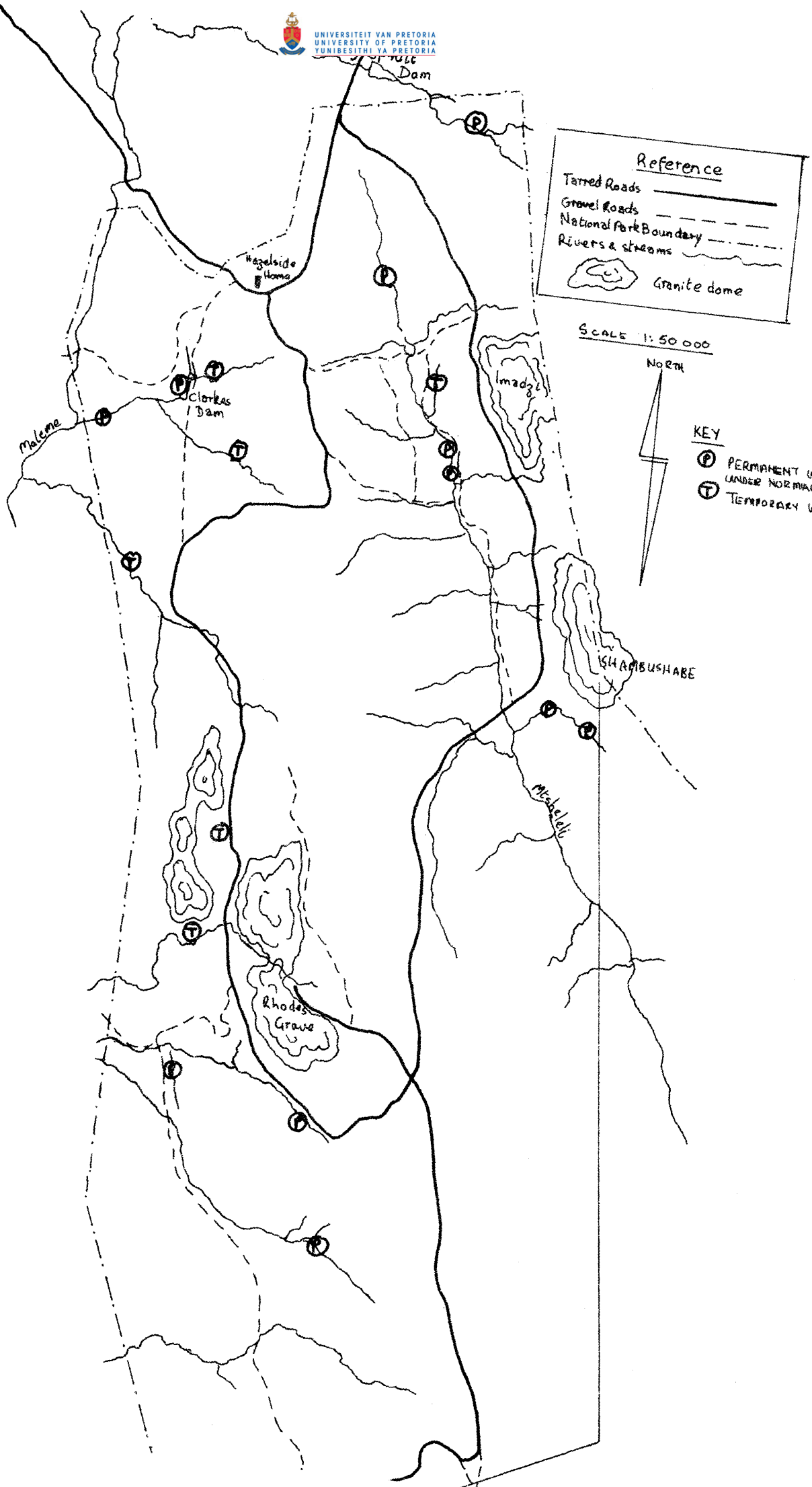


Figure 15. Map showing main drinking sites of sable at permanent and temporary water points in the study area of Rhodes Matopos National Park, Rhodesia.



Reference

- Tarmac Roads ———
- Gravel Roads - - - - -
- National Park Boundary - - - - -
- Rivers & streams ~~~~~
- Granite dome

SCALE 1:50 000

North



KEY

- PERMANENT WATER UNDER NORMAL SEASONS
- TEMPORARY WATER

Johnstone (1971) found most of the sable on Rosslyn Farm in the Matetsi district of Rhodesia to be within 2,5 km (1½ miles) of the nearest water.

Habitat

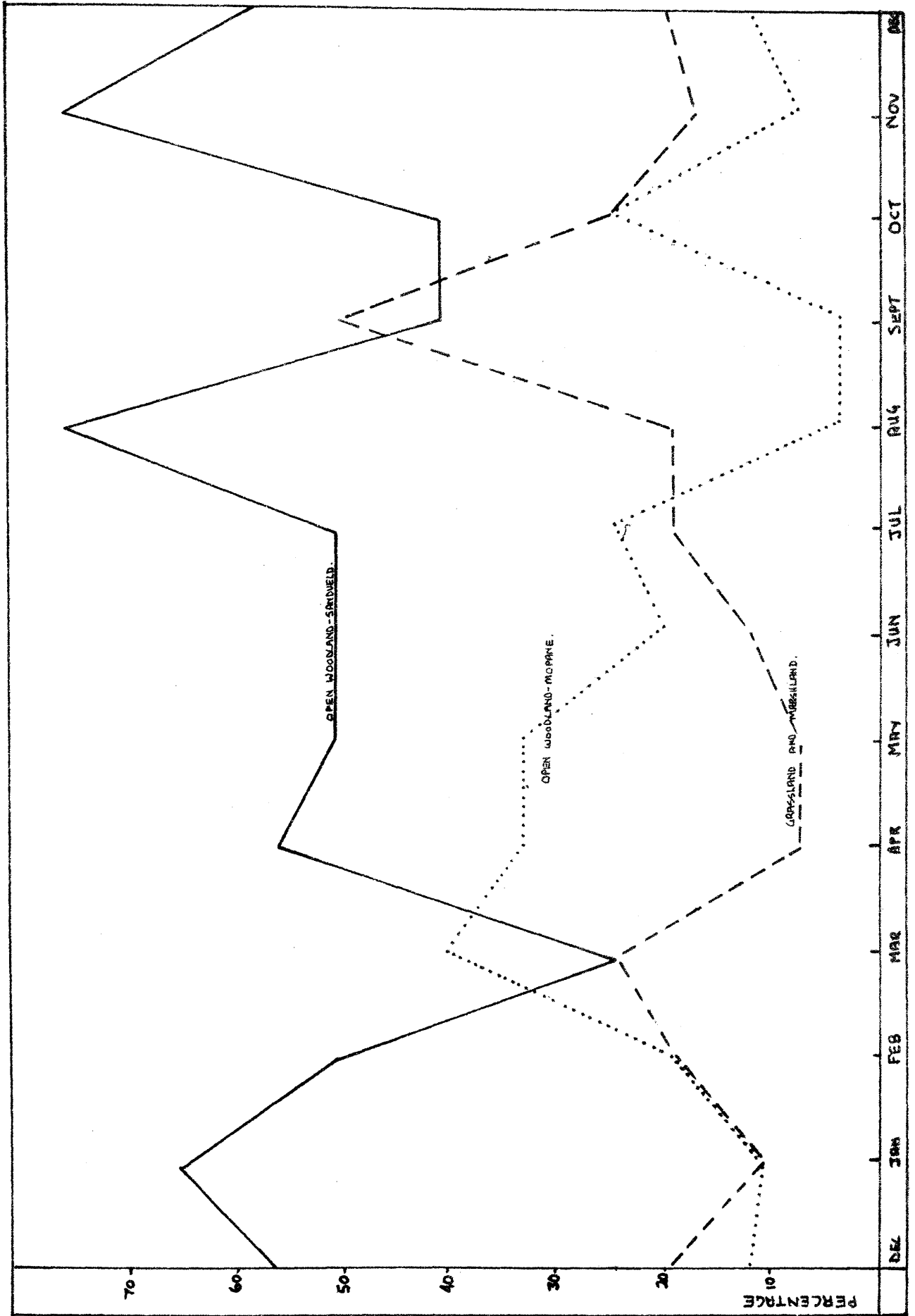
The habitat utilised by sable in the study area can best be explained graphically (Table 2, Fig. 16) by plotting the relative percentage of occurrence in the three major habitats utilised for each month. The three major habitats were open woodland - sandveld, grassland (including marshland) and open woodland - mopane. Of the total observations 13,5 per cent occurred in the ecotone between grassland and woodland while a small percentage involved koppie vegetation. The latter mainly concerned solitary males which have small select patches of grass in the more open areas of the koppie vegetation which they favour.

The graph can be interpreted by discussing the fluctuations of percentage occurrence in three major habitats. In January the percentage occurrence in the sandveld-woodland decreases rapidly with an increase in occurrence in mopane-woodland and grassland. This would be due to the dispersal factors in the peak calving period as discussed in a later section. Once the calves are strong enough to run with the herd there is a rapid return to the sandveld-woodland where the herds remain

Table 2. Relative percentage occurrence of sable in the major habitats of the study area in Rhodes Matopos National Park, Rhodesia, based on monthly observations from December 1970 to December 1972.

MONTH	OPEN WOODLAND-SANDVELD	OPEN WOODLAND-MOPANE	GRASSLAND AND MARSHLAND	KOPPIE VEGETATION	GRASSLAND/WOODLAND ECOTONE	TOTAL PERCENTAGE	TOTAL NUMBER OF MONTHLY OBSERVATIONS
JAN	65	10	10	5	10	100	63
FEB	50	20	20	0	10	100	57
MAR	25	40	25	0	10	100	25
APR	56	33	7	0	4	100	28
MAY	50	33	7	0	10	100	28
JUNE	54	24	12	5	5	100	33
JULY	50	25	20	0	5	100	12
AUG	70	4	16	0	10	100	26
SEP	40	5	50	0	5	100	24
OCT	40	25	25	5	5	100	38
NOV	70	10	17	0	3	100	43
DEC	57	12	20	3	8	100	34
TOTALS	627	241	229	18	85	-	411

Figure 16. Graph showing relative percentage occurrence of sable in the major habitats of the study area in Rhodes Matopos National Park, Rhodesia, based on monthly observations from December 1970 to December 1972.



until July to August. During this period there is a decrease of sable numbers in mopane-woodland and an increase in the grassland which appears to be correlated with decrease in grass cover within the mopane-woodland.

As stated previously the mopane-woodland has a poor grass cover in comparison with the other vegetation types in the study area. The poor grass cover is related to the sodic soils on which the mopane-woodland occurs. As a result there is a marked difference of grass cover between the wet season (November to March) and the dry season (July to October) due to abundance of annual grasses and game pressure on the mopane-woodland which is favoured by impala, kudu and wildebeest as well as the sable.

Disturbance by grass cutters during July and August in the grassland results in a large number of sable moving into the sandveld-woodland by August. This is followed by a rapid decrease of sable in the sandveld-woodland and increase of sable in the grassland as a result of the green grass now available from the grass cutting. Green grass in the moist vleis where the grass is cut becomes readily accessible and shows within a very short period of time.

The next major peak of sable numbers in the sandveld-woodland is in November. This is a result of accidental

and controlled burning during October which affects much of the sandveld-woodland by burning back scrub and making available new grass growth. Sable will appear on a burnt area within seven days of a burn. With the onset of the rains and the approach of the calving season dispersal once more occurs and the cycle repeats itself.

The October peak of sable numbers in the mopane-woodland could be as a result of early rains giving the first green flush of grass in the relatively bare mopane areas. As many of the grasses in the mopane area are annuals, these would be amongst the first to appear after the rain.

By summing the relative percentage occurrence based on monthly observations for sable in each of the major habitat types (Table 2) it was found that the majority of observations showed sable in sandveld-woodland followed by grassland and mopane-woodland. The relative area of sandveld-woodland is far greater than that of mopane or grassland when taking the overall study area into consideration. Most of the observations, however, came from the northern sector of the study area where there is a fairly equal distribution of the three habitat types and based on this the sable showed a preference for sandveld-woodland.

Mortality Factors

Predation

Leopard predation was evident from two carcasses, one of a new-born calf, the other of a calf five months old. A yearling, freshly killed by leopard was also found in the game section of the park and Grobler and Wilson (1972) indicate that sable form a significant part of the leopard's diet in the Matopos as judged from a leopard scat analysis. Smith (1969) recorded leopard predation on a "young bull" sable in the Victoria Falls National Park. As leopard are fairly common in the study area, they must account for a certain percentage of the annual mortality.

Predation on sable elsewhere in Rhodesia includes the crocodile, Crocodilus niloticus (in Rhodes Matopos and Wankie National Park); lion, Panthera leo (Hatton 1970, Stevens 1968, Johnstone 1971) and hyaena, Crocuta crocuta (Johnstone 1971). The sable is, however, known for its aggressiveness to the extent of defying a pride of lion (Blackmore, 1962). Stevenson-Hamilton (1947) recorded the sable as having the credit or otherwise of being the only wild animal in the Kruger National Park which had till then inflicted an injury upon a tourist when a sable, wounded by a rival, attacked a tourist who attempted to photograph it. Wolhuter (1948) records

a kudu bull which he assumed had been killed by a sable.

Parasites

Heavy tick infestation is prevalent in all sable age groups in the study area and many individuals bear scars, especially on the neck adjoining the mane, from such infestation. The areas most infected are the ears, mane and base of the forelimbs. Young calves have been seen with gaping wounds at the base of the forelimbs which appeared to be a direct cause of tick infestation. Heavy infestation was noted particularly with young of the year during capture, the inner part of the ear in many cases being a solid mass of ticks. The tick infestation and scars were also noted in the Matopos by Estes and Estes (1970b). The only internal parasites collected were from a specimen outside of the study area which contained a small number of Setaria (Artionema) hornbyi. Condy (1963) suggests heavy internal infestation of parasites in sable of Wankie National Park having found large numbers of Cooperia spp. and Haemonchus sp. (Nematodes) in an examined specimen. He also found 600 Nematode eggs per gramme of faecal samples. A series of ticks collected from sable in the study area are listed in table 3.

Table 3. Ticks collected from captured sable in the study area of Rhodes Matopos National Park,

Rhodesia, showing recorded percentage occurrence.

TICK SPECIES	RECORDED PERCENTAGE OCCURRENCE
<u>Boophilus decoloratus</u>	3,5
<u>Amblyomma hebraeum</u>	3,1
<u>Rhiphicephalus evertsi</u>	21,2
<u>Rhiphicephalus appendiculatus</u>	71,6
<u>Hyalomma rufipes</u>	0,3
<u>Hyalomma truncatum</u>	0,3
	100,0

Death by Fighting

Although this was not recorded in the study area certain males were seen limping badly during the rut thus indicating injury from fighting. Hatton (1969) recorded a dead adult female in the Victoria Falls National Park which had a puncture, which had penetrated the stomach, on the left side behind the rib-cage. Stevenson-Hamilton (1947) and Wolhuter (1948) also recorded death in sable from fighting.

Accidental Deaths

A single adult male sable was found dead having apparently attempted to jump a cattle fence enclosing a special conservation area, and breaking his neck in

the process.

Jacobson (1968) recorded a similar incident in the Sengwe area of Rhodesia after an adult female had "crashed" into a fence. An adult male was destroyed in January, 1971 having broken a leg in an attempt to cross a cattle grid on the main road and game fence intersection.

Illegal Hunting

Three known deaths from illegal hunting were recorded during the study period. Illegal hunting is, however, not a major problem in the area.

Physical Defects

Three sable, including a territorial male, had large umbilical hernias. The animals showed no physical discomfort and were all in excellent condition. According to a spokesman from the Veterinary Department in Bulawayo this could be hereditary and may lead to death.

The main mortality factors of sable in the study area thus appears to be predation by leopard, and possible death from tick infestation. No doubt a certain number must succumb of old age as adult carcasses found had heavy wear on the teeth.

Due to dispersal by sable from the study area down the Mtshelili Valley it was not possible to ascertain the annual mortality rate in the population.

Home Range and Territory

Detailed observations on marked sable, totalling more than 50 individuals and including naturally marked ones, gave a good indication of movements in the study population of sable.

For most part of the year the breeding herds lived in four major home ranges as shown in Figures 17 and 18. These were, however, not home ranges in the true sense of the word as individuals would move from one range to another (Figures 19 and 20) as would whole herds during the concentration phase in September and October. Home range is defined as the area over which an animal habitually travels while engaged in its usual activities. Among some species, home range and territory are the same. Among others only a part or none of the home range is defended. The two sexes may have the same or different home range. However, these overlap and the home range of the male may embrace those of several females. (Smith, 1966).

The boundaries of breeding herd home ranges were not marked in any way except by the movement of the

Figure 17. Localities recorded for four marked sable calves from February 1971 to February 1972 in the study area of Rhodes Matopos National Park, Rhodesia.

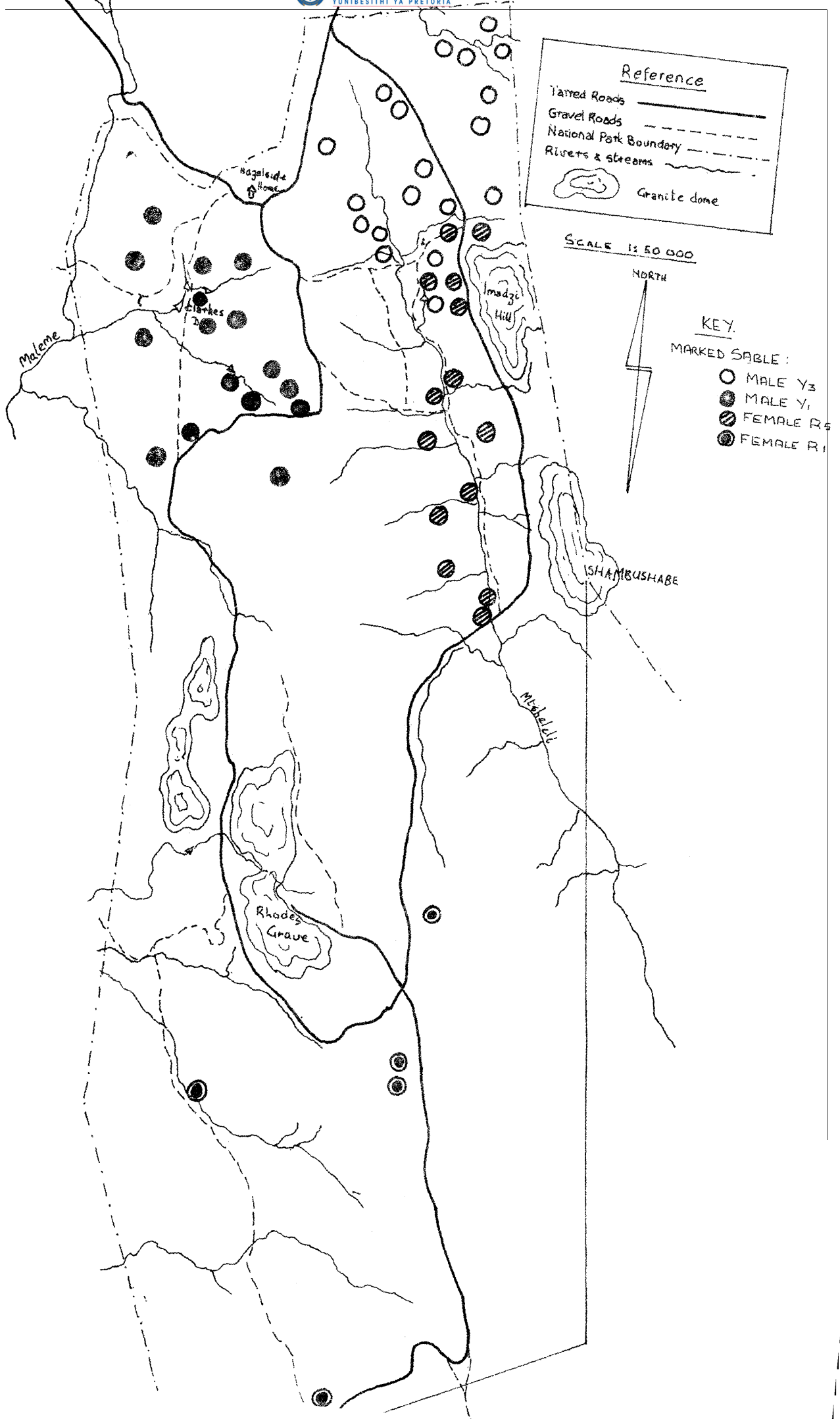


Figure 18. Map showing the four (1 - 4) major home ranges (gridded) of sable in the study area of Rhodes Matopos National Park, Rhodesia, based on known herd movements, December 1970 to December 1972.

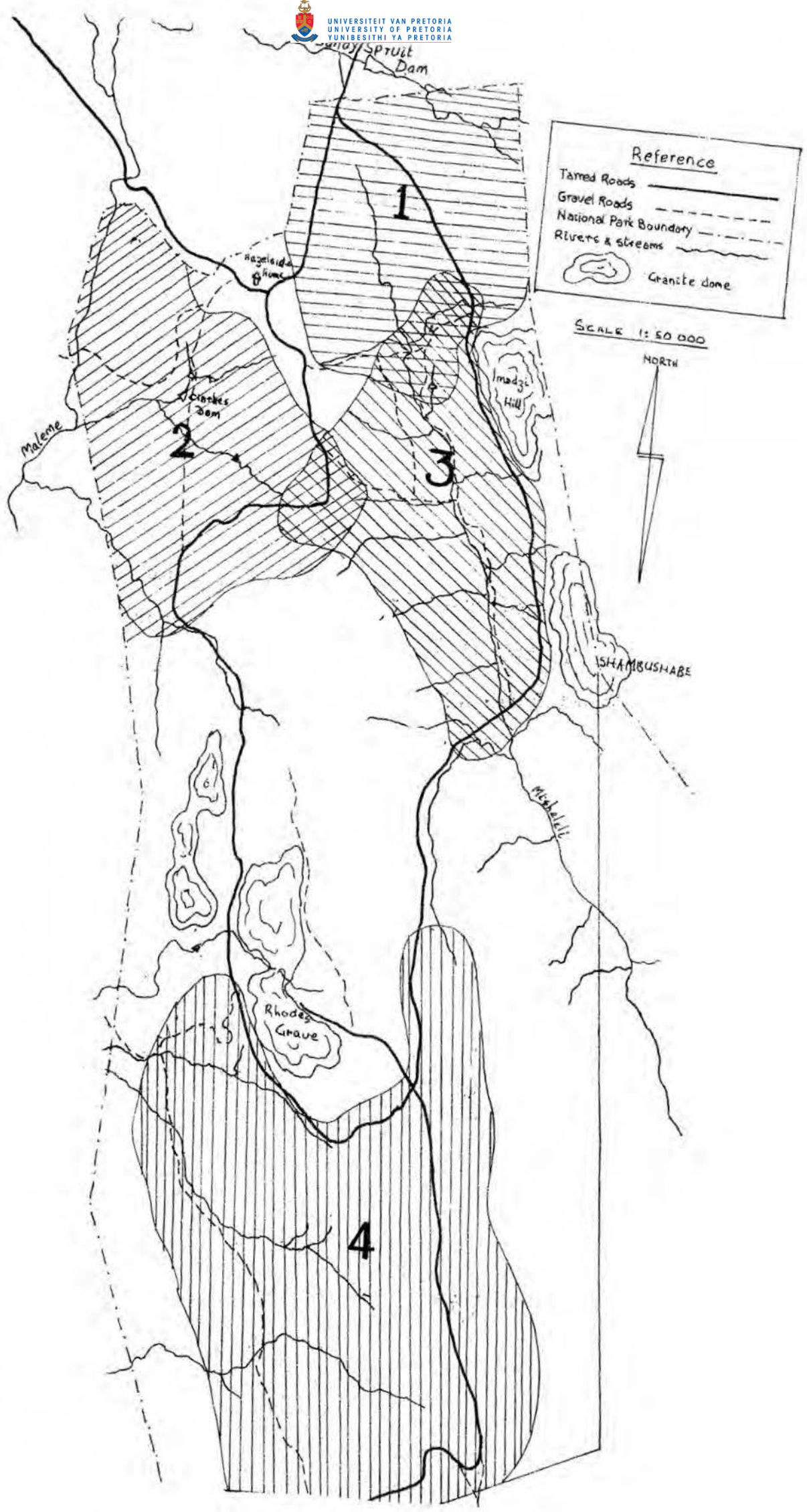


Figure 19. Localities recorded for three marked sable calves in the study area of Rhodes Matopos National Park, Rhodesia, from February 1971 to February 1972.

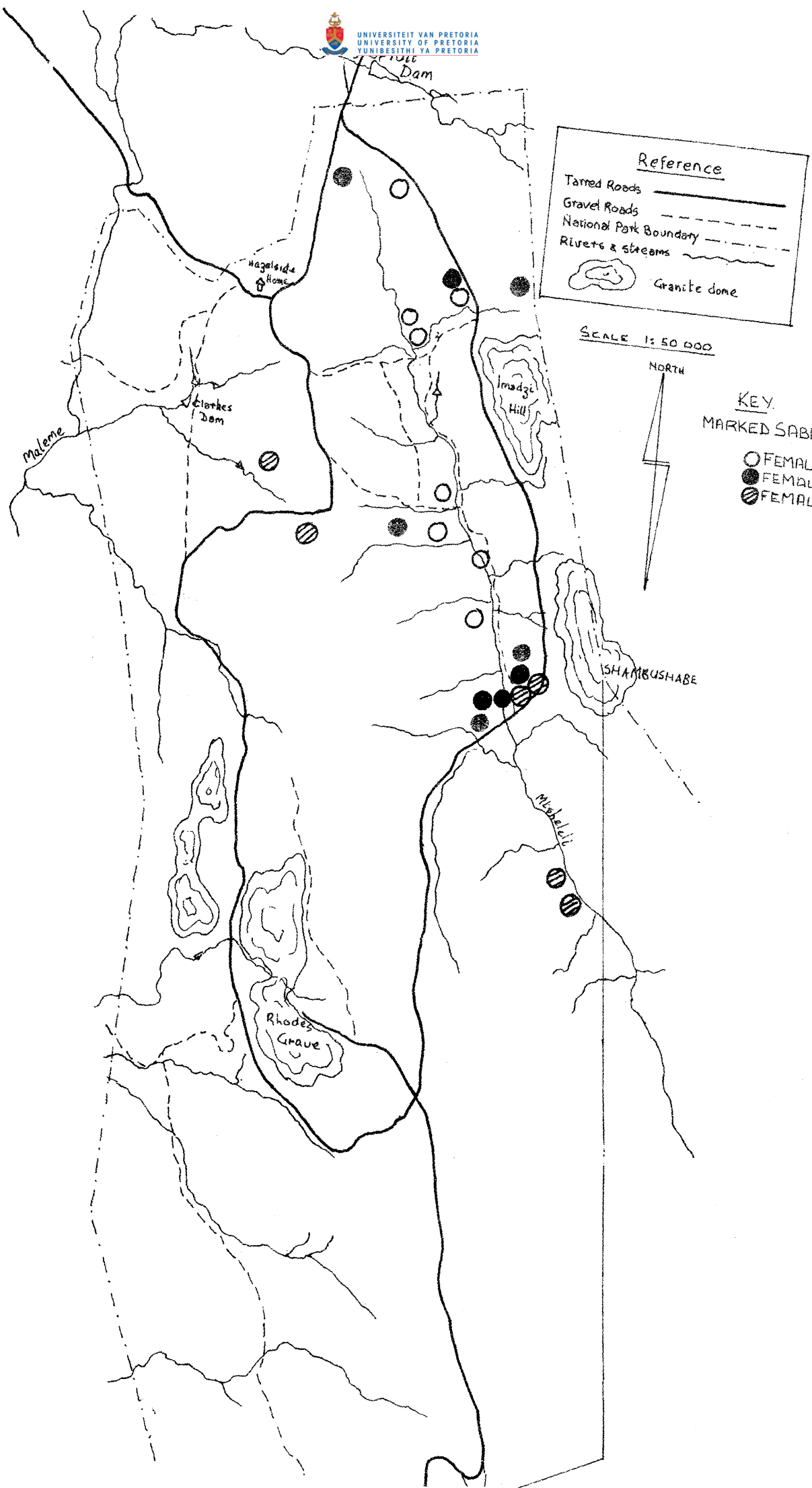
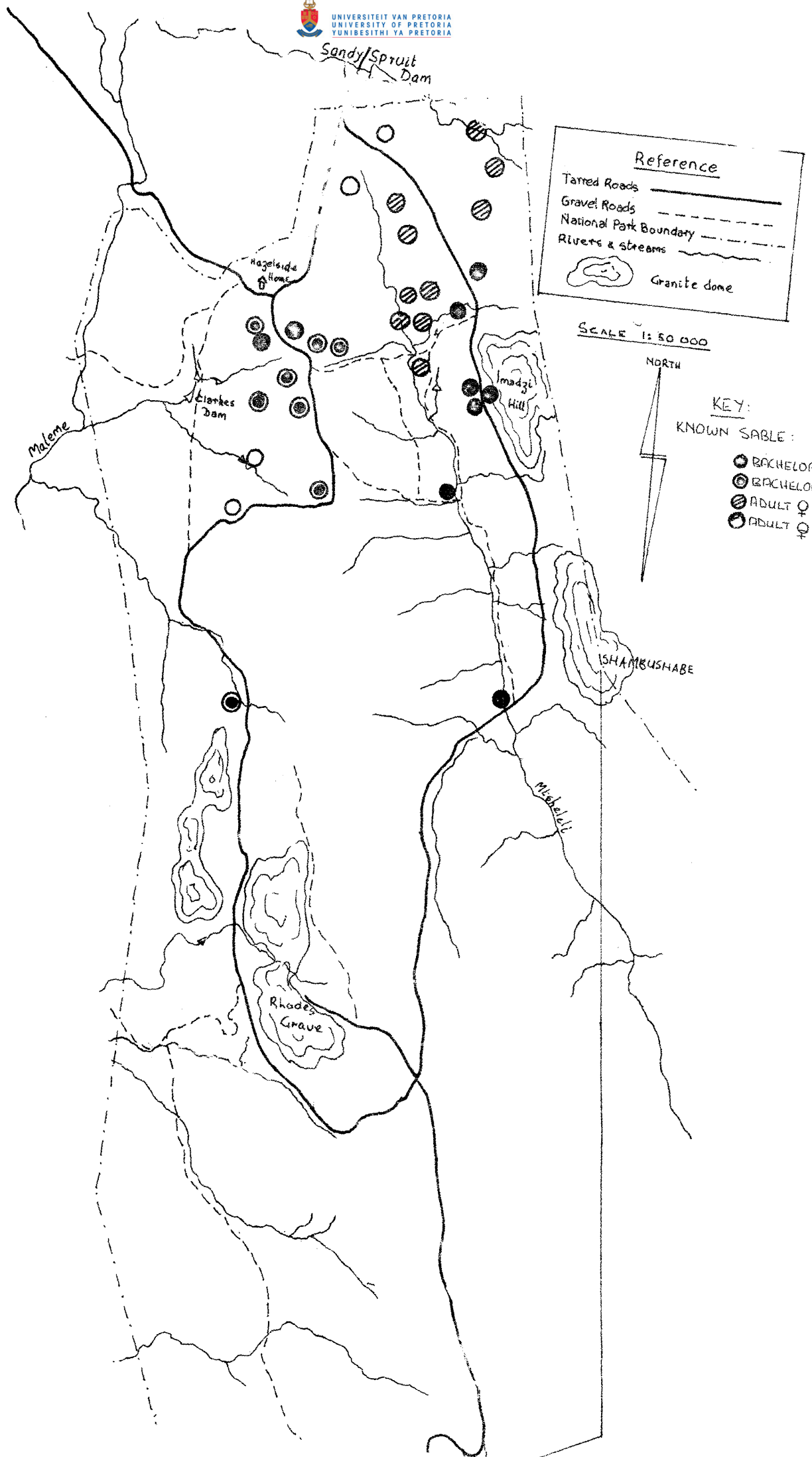


Figure 20. Localities recorded for four known sable
in the study area of the Rhodes Matopos
National Park, Rhodesia, December 1970
to December 1972.



groups themselves. Each home range had its own water points and some grazing areas were favoured more than others. Once a group moved into a favoured area it remained there for as much as ten to 14 days, within an area of 2 to 4 ha. The area of the home ranges varied from 240 to 280 ha excluding the areas of overlap. A large breeding group may divide into two, each occupying a different area of the same home range for as much as four to five weeks before coming together again.

A typical sable home range for breeding herds in the study area had at least one permanent water point in addition to areas of grassland and woodland with a varied amount of granite hills with associated koppie vegetation. Parts of a home range were rarely utilised by the breeding herd, these were areas where bush encroachment and moribund grass was evident. Breeding herds were never seen to utilise the koppie vegetation although they did graze on parts of the Mtshelili River on banks with a steep gradient. The overall vegetation of the home ranges can be seen by comparing Figures 4 and 18.

With the territorial males, the area covered by the home range and the territory is the same. These lie within the female home ranges, sometimes overlapping two breeding herd home ranges or, depending on the status

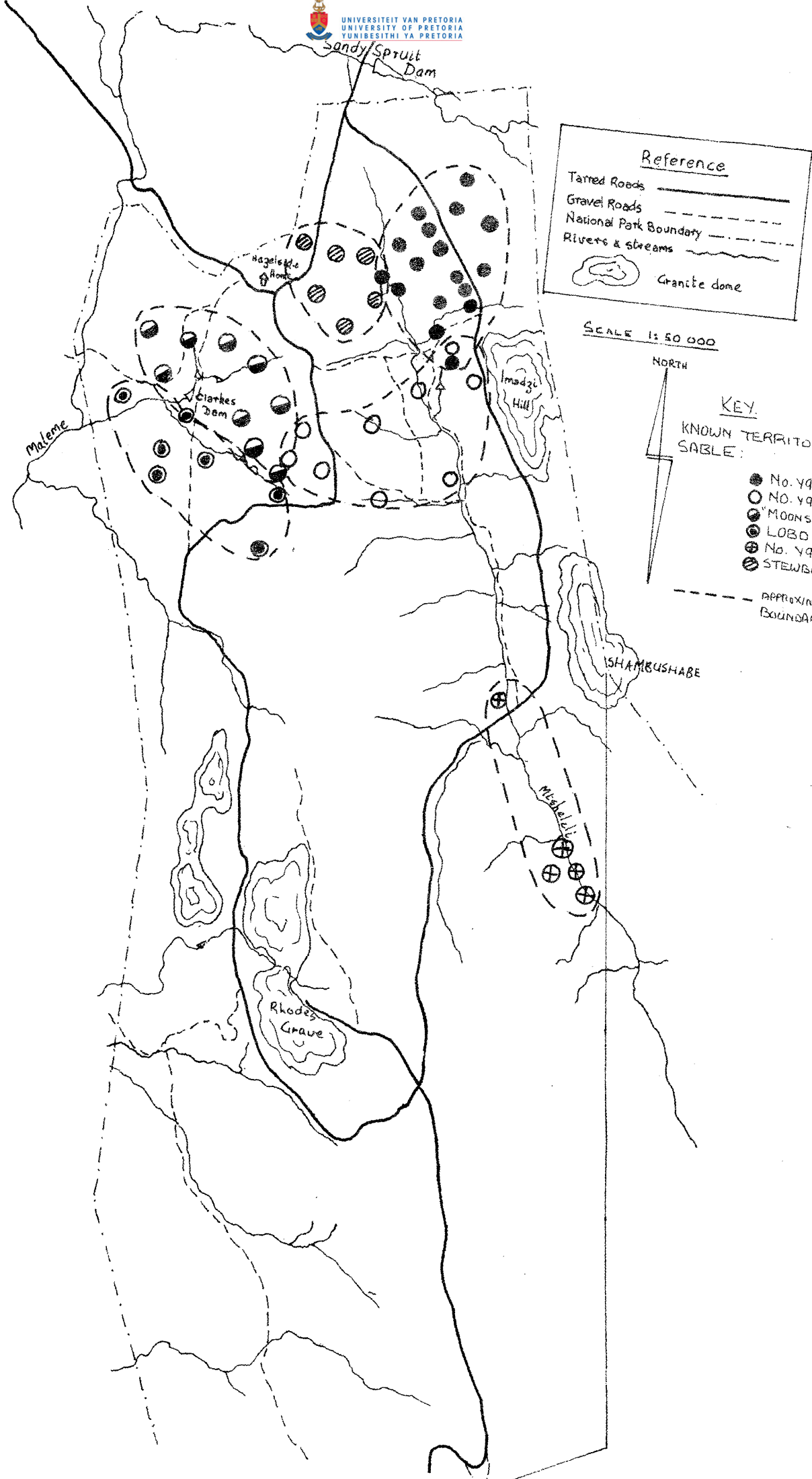
of the male, on areas bordering breeding group home ranges. Sable in the study area have territorial males in that such males occupy definite areas which are defended against other territorial males. Territoriality of sable in the study area may be defined as occupation of a specific area by a solitary adult male which is defended against other solitary adult males, within which a breeding herd is retained for as long as possible during the rut (April to June). Territories are most clearly defined during the critical breeding season when the territorial male, with loud snorts and horn sweeps, retains a breeding group in his territory to the best of his ability even when danger threatens. Each male territory has particular favoured grazing areas and a drinking site, thus acting as a home range in addition to a territory.

The actual marking of a territory is not clearly defined but the breaking of branches on shrubs, Terminalia sericea in particular, correlates well with the boundaries. These shrubs are broken from ground level to a height of approximately one metre, exposing the yellow wood where the bark has been stripped off. The breaking of the branches is done with the horns from an upright or kneeling position. This is also a form of dominance display. With many of the larger shrubs the bark is rubbed off horizontally with the horns without breaking the branches.

The period of time for which a territory is maintained by an individual sable is uncertain. Males Y95 and Y98 occupied a single territory each from October 1971 to December 1972, a period of 14 months. Other males occupied a territory for as little as four months before being replaced. The term of occupation could be linked with physical ability in defence of the territory.

Dung piles do exist in the territories but the significance of these is not clear. The territories vary in size, the well defined ones being 25 to 40 ha in area (Fig. 21). The territory of a particular male in Shimba Hills was about 40 ha (Estes and Estes, 1969).

Figure 21. Recorded localities of six known territorial male sable, showing approximate boundaries of the territories, in the Rhodes Matopos National Park, Rhodesia, from May 1971 to October 1972.




Reference

Tarm'd Roads —————

Gravel Roads - - - - -

National Park Boundary - - - - -

Rivers & streams ~~~~~







 Granite dome

SCALE 1:50 000

NORTH

KEY.

KNOWN TERRITORIAL MARKER SABLE:

-  No. 495
-  No. 498
-  "MOONSHINE"
-  LOBO
-  No. 496
-  STEWBALL

- - - - - APPROXIMATE TERRITORY BOUNDARY.

BEHAVIOUR

Social Hierarchy

The social organisation of sable in the study area is based on intraspecific aggressiveness and intolerance and the dominance of one individual over another.

The dominance displays, in order of aggressiveness, used by sable are as follows:-

- (a) "Stiff-neck" display: the head is held erect, the chin tucked in and neck muscles contracted.
- (b) "Lateral intimidation" display: this usually follows on from (a) above, the head and neck is held in the same position, but in addition the tail is held out stiffly and periodically twitched. In this display the two individuals stand laterally with heads at opposite ends.
- (e) "Bluff fighting": from the lateral position two individuals may suddenly swing around and drop to their knees to face each other. The display may end after sparring or continue into the final phase of physical contact.

(f) Physical contact: fighting is done with contestants on their knees accompanied by bellowing in the case of males, and slashing with the horns, resulting in loud clashes on contact.

Although dominant, adult, female sable are evident in breeding groups leading stampedes, investigating danger and generally concerned with the welfare of the group, very little was witnessed in the way of dominance displays by females apart from the occasional "stiff-neck" display or sideward sweep of the horns.

Dominance displays in both sexes were common in displacement activity and appeared to affect all age groups. "Play behaviour" by yearlings and young of the year of both sexes in the form of dominance displays, chasing and sparring often results as a form of displacement behaviour when disturbed by the presence of man. Bachelor male sable are on occasions stimulated into dominance displays by the presence of man which could again be displacement activity. Territorial males have at times been observed to pretend browsing on a shrub or bush of any kind while watching the approach of man.

A display observed throughout the year by males of all age groups and more rarely females, is the Flehmen

test. The significance of this is unknown but may give an indication of how strong the impulse is for flehmen, hence mating. Another common form of displacement behaviour is mounting, by individuals of any age group, regardless of sex.

Dominance displays were most pronounced with the territorial males. The "stiff-neck" and "lateral" display was exhibited by territorial males to both sexes and all age groups usually terminating with a backward sweep of the horns at the rear end of the contender, who runs away submissively.

With sub-adult males and bachelor males that have accidentally mixed with a breeding group in the presence of a territorial male, the territorial male may charge at a selected individual with sweeping horns and an occasional snort, rarely contacting the fleeing victim of the assault. On other occasions, out of rut, bachelors and sub-adults were quite often ignored.

In a territorial dispute, especially during the critical breeding season, the preliminary displays will lead into vicious fighting sometimes leading to death (Hatton, 1969; Stevenson-Hamilton, 1947; Wolhuter, 1948). Territorial disputes did, however, take place at times other than the rut, fighting having been

recorded even at night *(Van der Meulen, pers. comm.). Territorial males rarely pursued a potential contestant over their own boundary. In the study area no mortalities from fighting were recorded though physical injury was not uncommon. The fighting is usually accompanied by loud bellowing and the sound of clashing horns. Several contacts and chases occur before the dispute is settled which may last up to an hour. One dispute was timed at 55 minutes before the physically weaker individual turned and fled.

The game fence along part of the study area acts as a physical boundary to the territories of some males, inside and outside the Park. Violent fights often occur through the fence when two males meet. These disputes are usually unsettled until they meet again, resulting in a series of broken fence strands. One naturally marked male broke through the game fence from the study area and established a territory some 5 km away on privately owned land.

In the game section of the Rhodes Matopos National Park a newly erected game fence was continuously broken by solitary sable males. This could have been a barrier through their territories showing perhaps to what extent the territorial bond is maintained once established.

*Mr. J.H. van der Meulen, Matopos National Park,
P. Bag 5154K, Bulawayo, Rhodesia.

A general dominance display by males entering a breeding group is to hold the head and neck outstretched horizontally. This is quite often followed by urethral smelling and the Flehmen test.

The most active display by a territorial male is perhaps retaining a breeding herd within a territory during the critical breeding period. This varies with individuals, the most active going to the extent of actually keeping the herd in a reasonably compact group. This is achieved by literally rounding up, with loud snorts and vicious horn sweeps, any individual of any age group that may stray from the herd. Another example is when a herd stampedes with the dominant females in the lead, the male will force his way ahead and turn the herd back again with loud snorts and horn sweeps. This may continue until the territorial male does not have the physical energy to turn a stampede.

A dominance display by sable may be defined as an act by one individual influencing another individual which may be of the same or opposite sex to show signs of submission. In this manner the social hierarchy is determined and produces an "order of dominance" within a group. The order of dominance in a breeding group from observations appears to be as follows, starting with the highest ranking: territorial male, dominant adult females (usually about three), adult females,

sub-adult males, yearling males, yearling females, young of the year. Contrary to Lundholm (1949) and Roberts (1951) who give credit to the herd bull as being the protector of the breeding group, the dominant females are the ones concerned with the welfare of the group while the herd or territorial male is generally only concerned with those activities which lead to the increase of the population and maintaining a high ranking position in the social hierarchy. The territorial males are the most active displayers as they must ensure their dominance within a breeding group, initiate displays leading to mating, maintain a territory and vigorously defend it against challengers so as to establish a high social ranking as a territorial male.

Voice

The most common sound made by sable of all age groups is the warning snort which is made by forcing a short gush of air through the nose. This snort is used whenever danger is suspected or threatening. Another common sound made by all age groups, but more commonly the calves, is a soft high-pitched whine. This again is used when danger is suspect.

When sable calves are caught they utter the most alarming distress calls, unlike the sound associated with other antelope under the same condition. The

very young, almost new-born calves, never use this distress call. When a calf is in search of its mother, it utters another strange, almost bird-like call at short intervals. An adult female in search of her calf will give short grunts which cannot be heard at any great distance.

Apart from the warning snort and whine, the sounds of the adult male have already been described. These are the bellowing when fighting and the snorts when retaining a breeding group in the territory. The Senior Ranger in charge of the area, J.H. van der Meulen, reports loud snorts and grunts by territorial males at night and early hours of the morning. These sounds were heard out of the rutting season but may well be linked with territorial display or announcement.

The reaction to predators is unknown. On one occasion a black-backed jackal passed within 50 metres of a breeding group. One young of the year uttered a high-pitched whine while looking in the direction of the predator. The adult females reacted by staring at the passing jackal, but only one snorted. Most of the above observations in which the word "danger" is used are based on the presence of man.

Breeding Behaviour

The gestation period of the sable is about nine

months (270 days). Lundholm (1949) and Stevenson-Hamilton give it as about 270 days, and Shortridge (1934) as 272 to 281 days based on sable in the Cologne Zoo.

The females become receptive in their second year, calving for the first time in their third year. This was confirmed from two females in their third year collected in June 1971 from a herd on neighbouring farmland. One had a full-term foetus while the other had a calf at foot. Sexual receptiveness appears to continue through to old age as some old females (10 + years) in the study area were observed with new-born calves.

The critical breeding period, when most of the mating takes place, is May to June. The urine or Flehmen test is the first step in courtship behaviour and may be performed by males of all age groups. The nose is pushed into the urine of a urinating female then lifted into the air with the upper lip curled slightly and the mouth open, well described by Estes and Estes (1969). The head is lifted to varying degrees depending on the individual and held in this position for several seconds before either walking off or repeating the test (Figure 22). The significance of the vomeronasal organ in mammalian reproduction which is tied in with the Flehmen act is discussed by Estes (1972).

Perineum or urethral smelling may take place prior to and following the Flehmen test (Figure 22). If the female is receptive, "laufs Schlag" follows Flehmen and perineum smelling succeeded by mounting. Adult females refuse persistent approaches by territorial males at times running off for short distances; this may be controlled by the female until she is presumably fully receptive.

Although new-born calves were recorded from December to June, there is a distinct calving peak in early February (Figure 23). Wilson (1969) shows a calving peak for sable in March for Matopos National Park but this is based on calves counted after they had come out of hiding, which would be up to 14 days since birth. Other calving peaks are given as April to August in the South African Zoological Gardens (Brand, 1963), March in Wankie National Park (Child and Wilson, 1964), January or early February in north-eastern Botswana (Child, 1968), February to March (Fairall, 1968) and late January to mid-March (Pienaar, 1963) in the Kruger National Park. In the northern race the calving peak is given as June to September (Ansell, 1960b) and October to November in Eastern Zambia (Child and Wilson, 1964). In Angola the majority of calves are produced in May and June (Estes and Estes, 1970a). In Kenya two calving peaks are recorded by Estes and Estes (1969) as January to February and July to September.

Figure 22. Pre-mating behaviour by male sable in the study area of Rhodes Matopos National Park, Rhodesia.

- (a) Urethral smelling by territorial male sable on adult female, June 1972.
- (b) Flehmen test by the same male on the same female urinating.
- (c) Flehmen by a territorial male sable on a urinating adult female sable. Note the position of the head when compared with (b). September 1972.



a.

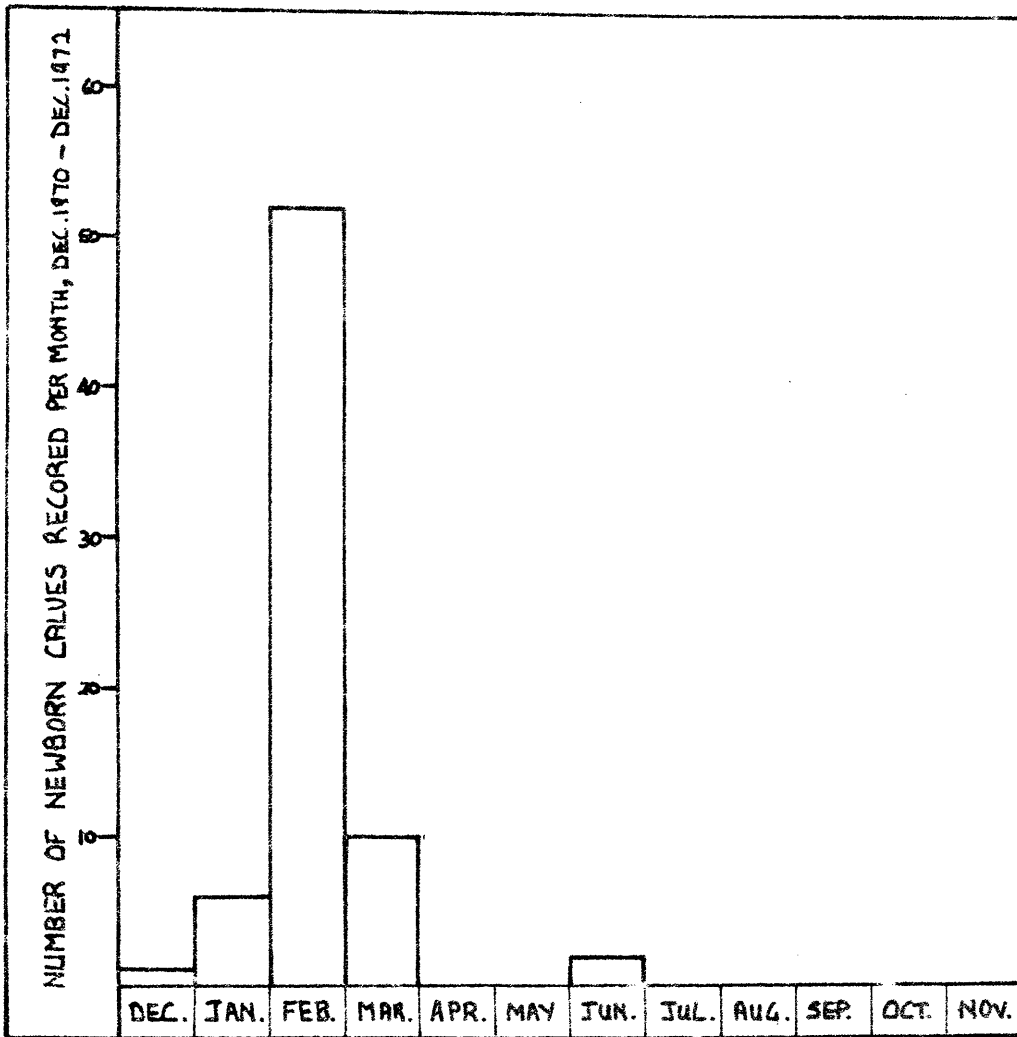


b.



c.

Figure 23. Sable calving period in the study area of Rhodes Matopos National Park, Rhodesia, based on recorded births during 1971 and 1972.



As the calving season approaches, the pregnant adult females tend to disperse into smaller groups. A new-born calf, less than a few hours old, is always found with a single adult female in the vicinity, indicating that the adult female leaves the group to give birth on her own. Within a few days of birth the female with a new-born calf associates once more with the small group or forms a loose association with a larger group. After two to three weeks the females with their calves unite with other females with calves, yearlings and sub-adults to form breeding herds.

On only one occasion was the afterbirth found (mass 1,2 kg) which indicates that, as with most of the Bovidae, this is consumed by the mother.

A full-term male foetus had a mass of 10,4 kg while the mass of a new-born male less than an hour old was 13,6 kg. The birth mass of sable in the study area is judged to be 13 to 14 kg. Captive sable calves were found to increase up to twofold in mass in seven days showing remarkably rapid growth. The umbilical cord when attached and fresh is a good indication of a new-born sable, but once dry may remain attached for as long as eight weeks. As the capture technique for calves became more refined the calves caught in successive years were younger overall which has made direct comparison of results (Table 4) impractical. Individual

Table 4. Range and mean of body measurements (in mm) and mass (in kg) of sable calves captured in the study area of the Rhodes Matopos National Park, Rhodesia, showing sex and year of capture.

YEAR	SEX	SAMPLE SIZE	BODY CURVE LENGTH	HIND FOOT LENGTH (SU)	HOOF LENGTH	EAR LENGTH	TAIL LENGTH	WITHER HEIGHT	MASS
1971	MALE	4	1060 - 1240 (1177,0)	374 - 390 (377,7)	54 - 57 (55,7)	131 - 153 (141,5)	180 - 260 (212,5)	720 - 800 (752,5)	18,45 - 27,90 (22,50)
	FEMALE	7	1080 - 1350 (1203,0)	345 - 365 (344,6)	52 - 57 (54,9)	131 - 158 (142,0)	190 - 260 (215,9)	630 - 790 (720,6)	13,50 - 30,20 (22,40)
1972	MALE	14	940 - 1200 (1107,7)	270 - 350 (313,8)	50 - 55 (53,0)	110 - 145 (129,0)	160 - 210 (186,6)	640 - 750 (698,7)	13,95 - 24,30 (19,60)
	FEMALE	8	900 - 1213 (1123,0)	303 - 325 (319,5)	52 - 57 (55,2)	130 - 142 (137,0)	182 - 220 (189,9)	670 - 720 (695,6)	18,00 - 24,30 (21,90)
1973	MALE	7	810 - 1002 (906,0)	260 - 310 (292,0)	50 - 57 (53,0)	110 - 154 (128,0)	160 - 204 (199,0)	620 - 700 (668,6)	13,50 - 19,80 (16,65)
	FEMALE	7	830 - 910 (1063,6)	270 - 320 (295,0)	50 - 55 (52,4)	120 - 134 (126,0)	160 - 230 (198,6)	650 - 690 (672,9)	13,05 - 22,50 (17,10)

comparisons from a particular capture would be invalid due to the rapid growth in the new-born sable and the difficulty in assessing the age in days from birth.

Ansell (1963) describes a new-born female calf giving dimensions of height 74 cm, point of elbow to ground 51 cm and ear 14 cm. He goes on to say that the calf differed from that of the roan antelope (Hippotragus equinus) in the facial markings and ear size.

The calves remain hidden in grass, usually lying with the head and neck bent back along the body, for at least the first seven days after birth, only leaving the hiding place to suckle and be groomed by the mother. The hiding place is usually in dense grass in a vlei or in woodland at the base of a tree. Several calves may hide in close proximity to each other. The calves hide themselves and remain hidden when approached, the flight distance of the older calves being about five metres. The very young calves make no escape attempt at all.

The mother to calf relationship in the sable is very loose even from birth. The only time the mother and calf were seen together was with the calf suckling and being groomed by the mother. Suckling has been observed at all hours of the day and usually lasts for more than 60 seconds. Although the calves start grazing at less than 30 days suckling by an eight-month old calf has been

observed. Female sable have four nipples on the udder, only two of which appear to be used for suckling.

Calves often form nursery groups some distance from the main group. On most occasions, however, there is an adult female or a few yearlings present. When a group of very young calves are being chased on foot they will drop into long grass as soon as they tire and hide.

On only two occasions did adult females show any sign of defending a calf which was caught during capture operations and uttering distress calls. No records of twins have been found.

Daily Activity Patterns

Although no 24 hour observations were attempted, daily activity was noted on all field observations. These can be divided into feeding and resting, drinking having been discussed elsewhere. Resting took the form of lying down in a sternal position or standing apparently motionless, often ruminating. Individuals always rested in close proximity to each other and on occasions in different age groups. In respect of the latter, the young of the year always lay down in close proximity to each other.

With larger groups, odd individuals would be resting while the others grazed, and vice versa. The observation

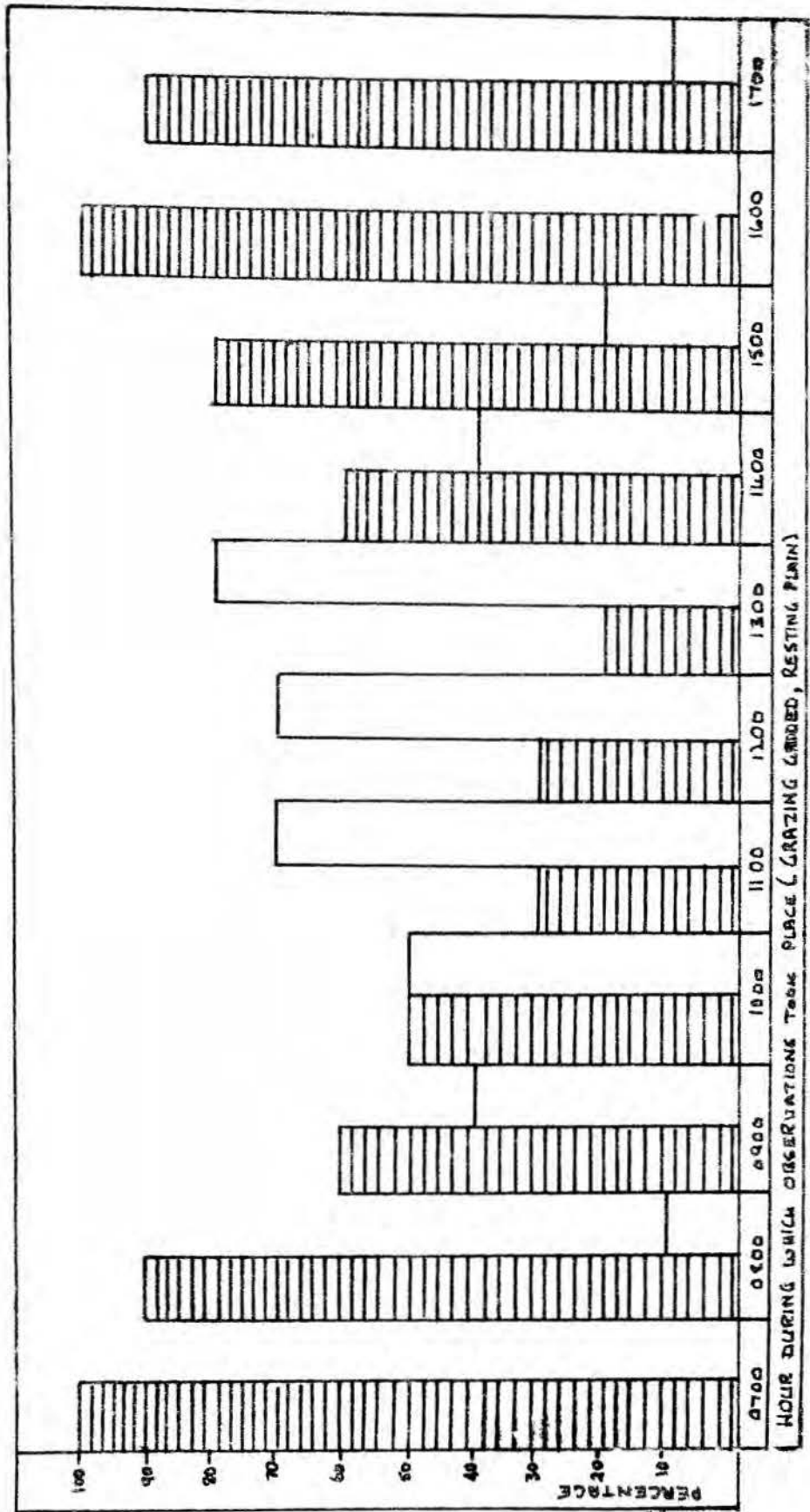
was thus directed at the activity of the majority. Invariably when a resting group was disturbed they would move off, certain individuals would defecate and the group would start grazing before coming to rest again. The initial observation was thus taken for the activity pattern.

By taking the first ten observations in each hour from 07h00 to 18h00 from field observations throughout the year, thus providing 110 random observations, it was found that grazing took place during all hours of the day but slackened from 10h00 to 14h00 (Figure 24). From 10h00 to 14h00 resting and ruminating was at its maximum. The peak grazing periods appeared to be from 07h00 to 09h00 and 16h00 to 18h00, that is during the cooler part of the day.

Due to the availability of food and water, there was no apparent seasonal change in activity patterns as was found for example for the blesbok (Damaliscus dorcas) by Du Plessis (1972).

Activity patterns of sable as shown by Johnstone (1971) were basically the same as in the study area.

Figure 24. Daily activity patterns (relative percentage grazing and resting) of sable in the study area of the Rhodes Matopos National Park, Rhodesia, based on 110 random observations between 07h00 and 18h00, 10 for each hour. December 1970 to December 1972.



POPULATION ECOLOGY

There are three basic components to the sable population group structure:-

Breeding groups: consisting of adult females, sub-adult males, yearlings, young of year and on occasions a single adult territorial male.

Bachelor males: groups of males varying from two to 12 in number and four year olds to adult in age.

Territorial males: adult males occurring solitarily or in the presence of breeding groups.

Breeding Groups

The structure of breeding groups passed through three phases during the year based on field observations from December 1970 to December 1972 (Table 5). In late December the adult females disperse with the approach of the calving season. This carries through to February when peak calving takes place and during this three-month period the groups' range and mean size were as follows:- December: 1 - 42 (13,77), January: 1 - 24 (6,33) and February: 1 - 24 (6,73). The larger groups during this phase were often comprised of young of the previous season, yearlings, a few sub-adult males and a small number of adult females.

Table 5. Overall population structure of sable in the study area of Rhodes Matopos National Park, Rhodesia, based on monthly observations from December 1970 to December 1972 giving range and mean group size.

MONTH (1971- 1972)	BREEDING GROUPS								BACHELOR MALES			SOLITARY MALES	TOTAL CLASSI- FIED
	ADULT MALE	ADULT FEMALE	SUB-ADULT MALE	YEARLING	YOUNG OF YEAR	MEAN GROUP SIZE	GROUP SIZE RANGE	SAMPLE SIZE	MEAN GROUP SIZE	GROUP SIZE RANGE	SAMPLE SIZE		
JANUARY	0,20	6,03	0,87	1,80	1,46	6,33	1-24	190	3,90	2-12	39	16	245
FEBRUARY	0,09	2,94	0,24	1,36	1,12	6,73	1-24	183	4,33	2-11	26	13	222
MARCH	0,16	10,33	0,33	2,33	5,00	18,16	1-31	109	6,66	2-12	40	4	153
APRIL	0,66	7,06	0,46	2,00	4,26	14,60	3-42	219	-	-	-	8	227
MAY	0,82	8,72	1,18	2,82	6,73	10,18	3-32	222	2,00	2	2	10	234
JUNE	0,69	8,30	1,30	3,46	5,07	19,00	5-44	247	2,86	2-5	17	8	272
JULY	0,00	7,25	0,75	2,75	6,75	17,50	8-32	70	7,00	7	7	4	81
AUGUST	0,25	13,75	1,50	4,25	7,00	26,50	6-64	212	4,75	3-8	39	9	260
SEPTEMBER	0,60	17,00	2,00	5,80	10,20	35,60	7-76	178	4,16	2-6	25	11	214
OCTOBER	0,37	11,23	1,69	3,69	6,90	23,92	2-53	308	4,60	2-11	32	10	350
NOVEMBER	0,15	9,05	0,90	2,52	5,29	18,00	8-45	377	2,60	2-6	25	22	424
DECEMBER	0,25	6,96	0,42	1,38	3,42	13,77	1-42	303	3,00	2	6	11	320

By March the young are old enough to accompany the adult females which now gather in larger herds dispersed in separate home ranges. This carries through the rut (April - June) to July. The range and mean group size from March to July respectively were: 1 - 31 (18,16), 3 - 42 (14,60), 3 - 32 (10,18), 5 - 44 (19,00) and 8 - 32 (17,50).

After July there is a tendency for sable to concentrate on selected grazing areas regardless of home range boundaries. The main concentration area is the Mtshelilei vleis which is cut for thatch at about this time with the result that the green shoots of Pennisetum glaucocladum, in addition to any other green grass or sedge growing in the moist soil, become accessible. Any burns in the area also become a great attraction. The largest group encountered was in September 1972 totalling 76 individuals consisting of one adult male, 35 adult females, four sub-adult males, 18 yearlings and 18 young of the year. The groups had the following range and mean from August to November respectively: 6 - 64 (26,50), 7 - 76 (35,60), 2 - 55 (23,92) and 8 - 45 (18,00).

Small breeding groups were encountered throughout the year which appeared to have no affinity to any herd except during the months of August to November. With the fall of the first rains in November, the large herds tend to disperse into the previously occupied home ranges.

This is the start of the first phase leading to the calving period.

Bachelor Males

Male sable leave, or are evicted from breeding herds early in their fourth year to become bachelor males. This was observed with known animals in particular male Y97/79 whose movements are shown on Figure 20. The group size of bachelor males varied from two to 12 in the study area, with the four year old males living together at first before joining the older males in bachelor herds. *P.A. Johnstone (pers. comm.) states that bachelor herds of up to 25 occur in the Matetsi area of Rhodesia.

At no stage was a male with pronounced secondary annuli (growth at base of horn below primary annuli) on the horns found with a bachelor group, thus indicating that these are all young males from about four to seven years old. The bachelor groups are tolerated in the territories of the territorial males and may at times mix with breeding herds without showing signs of being sexually interested in the females. The bachelors may thus be sexually inactive for most part of the year as with the Ugandan Kob (Adenota kob) (Ardrey, 1966). A sperm analysis using the method of Kerr (1965) on the

*Mr. P.A. Johnstone, P. Bag WK 5934, Wankie, Rhodesia.

testis and epididymis of a sable male of approximately 40 months old showed that the animal was sexually mature with a multitude of sperm present. This specimen was collected from a splinter group on a property near the study area. A male of approximately 16 months old collected on the same property had no sperm present in the testis or epididymis smear. During the rut there is a marked increase in individual distance especially in the larger bachelor groups which become scattered in smaller groups.

The bachelor groups occupy particular areas even though these are not marked out or defended in any way; the distribution of bachelor groups is shown on Figure 25. Typical bachelor males have the thick primary annuli at the base of the horn.

Territorial Males

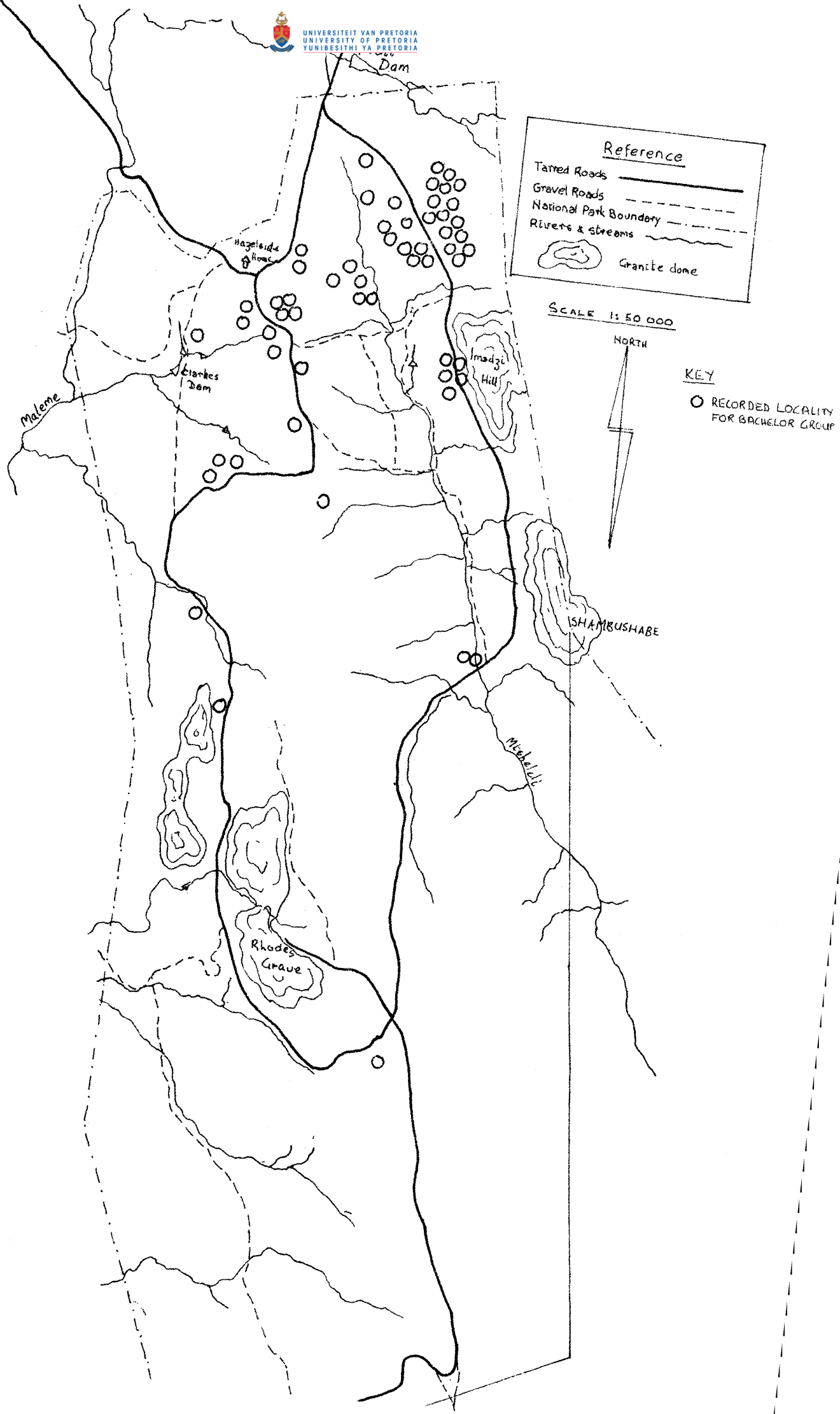
Once the bachelor male sable reaches full maturity, an estimated seven years and older, he establishes a territory. This is done by taking up a vacant territory or evicting an already established territorial male. A known territorial male, for example, was evicted from his territory by a superior male while another male took up a vacant territory shortly after being marked as a bachelor. Three classes of territories are recognised with the males:

(x)

PAGE

National Park, Rhodesia, based on three separate observations in which an estimated 75 per cent of the study population was classified in each, for comparative purposes the classification to the base of 100 adult females and the nearest whole number is given in brackets 83

Table 7. Management plan for sable based on studies in the Rhodes Matopos National Park, Rhodesia, from December 1970 to March 1973 97



Reference

Tarmacked Roads ————

Gravel Roads - - - - -

National Park Boundary - - - - -

Rivers & streams ~~~~~

Granite dome

SCALE 1:50 000



KEY

RECORDED LOCALITY FOR BACHELOR GROUP

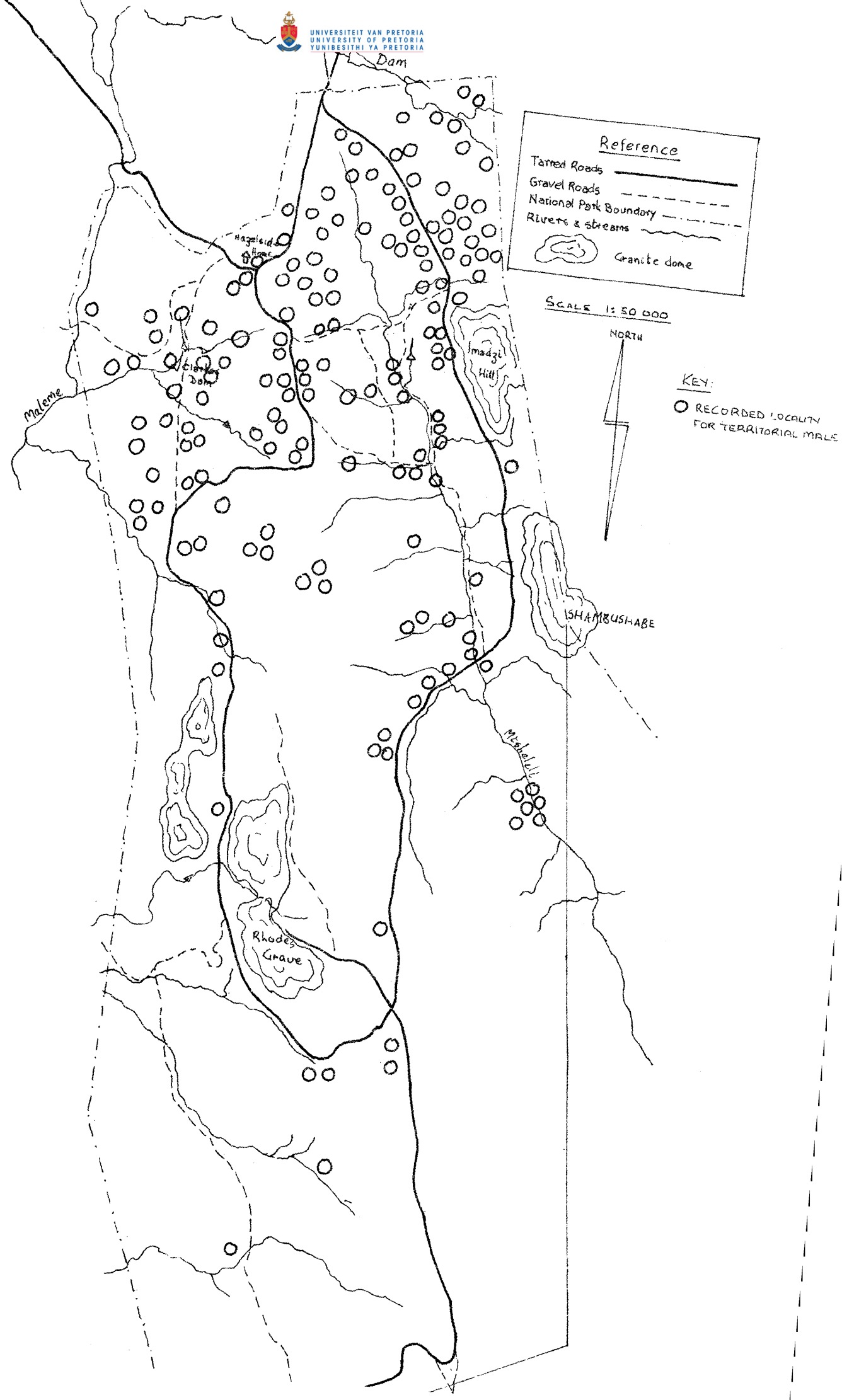
Class I: Territorial male with highest status, territory usually within breeding group home range, chance of continual contact with breeding group. (Termed central territorial male).

Class II: Territorial male of lesser status, territory in a position where contact is rarely made with breeding groups. (Termed peripheral territorial male).

Class III: Territorial male with lowest status, territory in an area where contact with breeding herd is remote. (Termed outer territorial male).

Much of the territorial male's life is spent away from a herd except during the mating season, though with some breeding herds the male is constantly seen in attendance. All territorial males were found to have signs of secondary annular growth on the horns. The distribution of territorial males in the study area is shown on Figure 26, though there is a bias on central territorial males. The apparently vacant areas on the map may have peripheral or outer territorial males as all these areas show signs of lone adult sable males.

Figure 26. Recorded localities of territorial male
sable in the study area of Rhodes Matopos
National Park, Rhodesia, from December
1970 to December 1972.



Overall Population Structure

On three occasions an estimated 75 per cent of the sable population in the study area was classified in one day. This took place in November and December 1971, when large burnt areas attracted the sable, and similarly in October 1972 when the sable were attracted to burnt areas and cut vleis. This gave an idea of the overall population structure within the main home ranges of the study population (Table 6). For the two 1971 observations the overall male to female sex ratios were 1:2,18 and 1:2,38; and for the 1972 observation 1:2,33 excluding the young of the year.

To test the significance of the figures given in Table 6 for the two 1971 counts which were thought to be an accurate analysis of the population structure, Chi-square tests were carried out for the male and female sex ratios to determine if this was 1:1 for the adults and yearlings. The sub-adult males were included with the adult males as the same age class for females was included with the adult females. The results were tested at $\alpha = 5$ per cent and one degree of freedom. With the adults $X^2 = 68$ which was far greater than $X^2_{(1-x)}(1) = 3,84$. With the yearlings $X^2 = 1,60$ which was less than $X^2_{(1-x)}(1) = 3,84$. The hypothesis was therefore accepted that the male to female ratio for yearling sable in the study population was 1:1, and

Table 6. Overall population structure of sable in the study area of the Rhodes Matopos National Park, Rhodesia, based on three separate observations in which an estimated 75 per cent of the study population was classified in each, for comparative purposes the classification to the base of 100 adult females and the nearest whole number is given in brackets.

DATE	ADULT		SUB-ADULT MALE	YEARLING		YOUNG OF YEAR		SAMPLE SIZE
	MALE	FEMALE		MALE	FEMALE	MALE	FEMALE	
8/11/71	17 (22)	78 (100)	7 (9)	8 (21)	12	23 (60)	23	162 -
16/12/71	10 (13)	79 (100)	7 (9)	8 (25)	12	23 (58)	23	164 -
27/10/72	4 (7)	59 (100)	9 (15)	18 (50)	11	39 (66)		150 -

rejected for 1:1 in the adults.

To compare this with age ratios at birth, the same hypothesis was tested using the sexes of all new-born calves captured during 1971, 1972 and 1973. The hypothesis of unity in sex ratios was again found to be acceptable and significant at $\alpha = 5$ per cent in which $X^2 = 0,18$ and $X^2_{(1-x)(1)} = 3,84$. The indication from this is that unity in sex ratio is maintained to the yearling age class, thereafter the density of females increase as the adult males establish territories, therefore dispersing.

Dispersion of sable from the study population to other areas is difficult to trace as far as numbers are concerned because of the difficult terrain into which dispersion takes place. For this reason it is impossible to determine the net increase or annual recruitment rate of the population. The annual recruitment would be the population (P) at time t + births from the past twelve months (x) - (mortality for past twelve months (m) + numbers that have left the population (d)). The formula would thus read: Population = $P_t + x - (m + d)$. Both 'm' and 'd' are unknown. Another way of assessing the population increase is the percentage young of year in the population sample which would give an estimate of the recruitment from the juveniles. This was found to be 28,29 and 26,00 per cent for the above observations

of November, December 1971 and October 1972. To assess potential increase from the number of adult females the calving percentage or young of the year as a percentage of adult females in the population sample can be considered. For the three observations under discussion this was found to be 56, 56 and 67 per cent respectively. The indications from this is that the study population is prolific in its breeding and with a low mortality rate would be increasing rapidly. Fortunately there is room for expansion and the excess can disperse.

Child (1968) classified 278 sable on the Chobe River and found 69 adult male, 114 adult female, 30 yearlings and 65 calves. Estes and Estes (1970b) list various overall population structures from Rhodesia and South Africa showing a tremendous variation. They list the following ranges in sex and age ratios as a percentage of numbers classified: Adult males: 3,4 - 30 per cent, adult females: 35,6 - 50 per cent, two-year olds: 1,4 - 15,7 per cent, yearlings: 8,7 - 27,1 per cent and calves: 13,2 - 27,3 per cent. The ranges in the study area from Table 6 are:- Adult males: 2,7 - 10,6 per cent, adult females: 36,3 - 49,4 per cent, yearlings: 10,0 - 19,3 per cent and calves: 26,0 - 28,8 per cent, all of which are comparable to the above ranges.

MANAGEMENT IMPLICATIONS

Although cave paintings suggest that sable did occur in the Matopos, it would appear that the present population in the Rhodes Matopos National Park and surroundings (excluding those introduced into the game section) have arisen from the group originally introduced in 1904 - 1908. The original group may have been supplemented by remnant groups from surrounding areas, the present distribution however, radiates from the release point at the Arboretum (Figure 27). The flow to the north of the Park would undoubtedly have continued had the game fence not been erected in 1965/67.

The forerunners of the dispersal appear to be the outer territorial males and peripheral territorial males as these occur peripheral to major populations. The males are followed in dispersal by breeding groups. It has thus taken over fifty years for the population, now estimated at nearly 400, to reach the present distribution. The population as a whole is by all indications a well dispersed one, the dispersal being associated with availability of water and suitable habitat as indicated by distribution patterns.

Recruitment rate and calving percentage has already been discussed. Relatively few carcasses (eight) were found in the study area indicating a low mortality.

Figure 27. Present distribution of sable in the Rhodes Matopos National Park, Rhodesia, and surrounding areas from known localities December 1970 to March 1973 showing original release point (R).

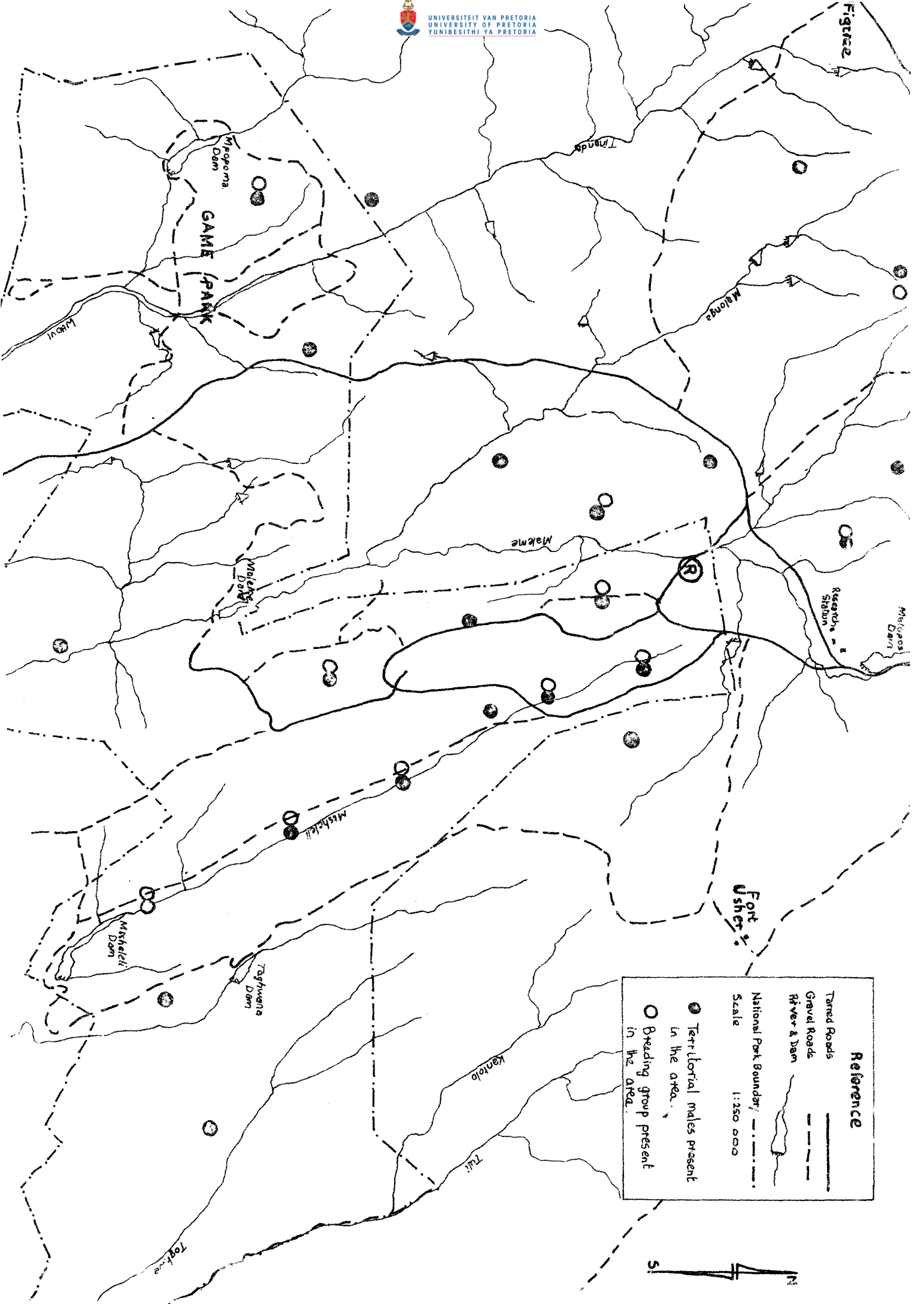


Figure 2

Reference

- Tarred Roads
- Gravel Roads
- River & Dam
- National Park Boundary
- Scale 1:250 000
- Territorial males present in the area
- Breeding group present in the area

The sable are by all means prolific breeders, calving for the first time in their third year continuing through to old age. Given suitable habitat and water, sable disperse naturally, only forming minor concentrations and living a generally gregarious existence.

The overall density in the study area is in the region of three per 100 ha, though much of the area is not used by the sable. This figure compares well with that in Johnstone (1971) for the Matetsi area where the overall density is approximately four per 100 ha in spite of competition from numerous other large herbivores. Dasman and Mossman (1962) give densities of sable from Robins Camp area (Wankie National Park) and Victoria Falls National Park respectively as 10,0 and 10,4 per square mile, both of which are approximately four per 100 ha. A conservative estimate of the habitat suitable for sable in the study area is 50 per cent which would give the more realistic figure of five per 100 ha. When taking into account the selection of particular areas by the sable the figure would in fact be even lower.

Considering the present dispersal of the sable from the study area mainly south along the Mtshelili Valley, the population would appear to be at optimum level, governed to a large extent by a social behaviour factor. The vegetation by all standards is in a better

than average condition and the available water well dispersed. In a particularly dry season with the drying of permanent water, this would undoubtedly cause concentrations which would be detrimental to the vegetation. Estes and Estes (1970b) attributes sable dispersal largely due to the availability of water and the effect it has on the vegetation such as the green grass growth of moist vleis. They also consider the sable to be one of the more water-dependent antelopes of Africa. Pienaar (1963) states that severe sable mortality had taken place in the past due to drought in the Kruger National Park, though Eloff (1950) states that during a great drought in Northern Transvaal sable suffered less than some other species of game, and that few succumbed to the drought because they simply trekked away.

Fortunately the bachelor male phase is short, unlike the tsessebe (Damaliscus lunatus) for example in which males are evicted from breeding groups in their second year, (Grobler, 1973). A prolonged bachelor phase could lead to excess pressure as bachelor herds are tolerated within the home range of the remainder of the population.

Sable would naturally compete for grazing with many other herbivores, especially as they tend to browse to a very limited extent and prefer grass of

average or better than average forage value. The selection for grass leading to concentrations in suitable areas would be a good indicator of the population status in sable, relating the relatively low density existence to numbers at concentration points and the physical condition of the sable. A breakdown of the barriers in the social structure may well result in times of stress when seeking suitable grazing areas. This could result in the maintenance of a population by longevity and not recruitment, and in a detrimental effect on the environment, which may be what Estes and Estes (1970b) imply about the Victoria Falls National Park sable population where the recruitment rate is relatively low and the herd size high. This could lead to natural stabilisation of a population having reached optimum growth and kept at that level by density dependent factors. This is perhaps not a sign of an unstable population but one which has reached optimum density which is desirable in a game reserve or national park providing that this density does not degrade the habitat in any way, in which case it could be considered as an overpopulation.

The prime requirement for management is suitable habitat and available water. Although sable occur in various habitats which differ floristically, the physiognomic characteristics are basically the same. These are

short to medium height grassland with fairly open woodland and flood plains or vleis. Vleis are only used peripherally when rank but are favoured when burnt, mown or trampled. The species composition of the grass may vary but should be better than average in forage quality.

Sable can be attracted by green grass and water. Water is essential in the life of a sable and the distribution of water can be used in dispersing a sable population. The more watering points, the greater the dispersal as sable will live for some time in a very confined area as long as the basic requirements are met. Sable drink readily from cattle troughs, dams and pools.

Attraction to green grass can also be useful in dispersing sable. Burning and mowing are the two methods of achieving this objective, especially on vleis. Rotational burning can be effective in rotating the movements of sable, though the actual burning policy needs extreme care and consideration before implementing. In the Rhodes Matopos National Park the most suitable burn based on burning trials in the past 25 years by the Matopos Research Station, is on a five year rotation, burning after the first rains but before the major rains set in (Kennan, 1971). The only vegetation types excluded are mopane and Brachystegia open-woodland where

it occurs. The koppie environment is naturally excluded, thus the burn affects the grassland, marshland and open sandveld-woodland. The effect of controlled burns in October 1971 was still evident in the January and February 1972 distribution of sable in the northern sector of the study area (Figure 28) when 68,75 per cent of the locality records were from burnt areas. The territorial males were not affected by burns unless these occurred in their territories.

Mowing or grass cutting can also be effective in attracting sable, especially in rank vleis. This enables the sable to utilise the entire vlei by stimulating new growth and increasing the accessibility of the grass.

Care should be taken, however, when managing an area for a variety of ungulates, one of which is sable. The basic requirements of other ungulates should also be taken into consideration. The vlei for example could be used by waterbuck (Kobus ellipsyprinnus) and reedbuck in the rank grass while sable used the periphery, thus eliminating competition to some extent.

Should there be an overpopulation of sable this can be reduced by a random kill and/or capture. A random take-off of all age groups regardless of sex and social rank prevents an imbalance in the population structure which could be caused by the selective reduction of a

Figure 28. Sable locality records for January and February 1972 in the study area of the Rhodes Matopos National Park, Rhodesia, showing distribution in relation to areas burnt in the northern sector during October 1971.


Reference

Tarred Roads —————

Gravel Roads - - - - -

National Park Boundary - - - - -





Rivers & streams ~~~~~

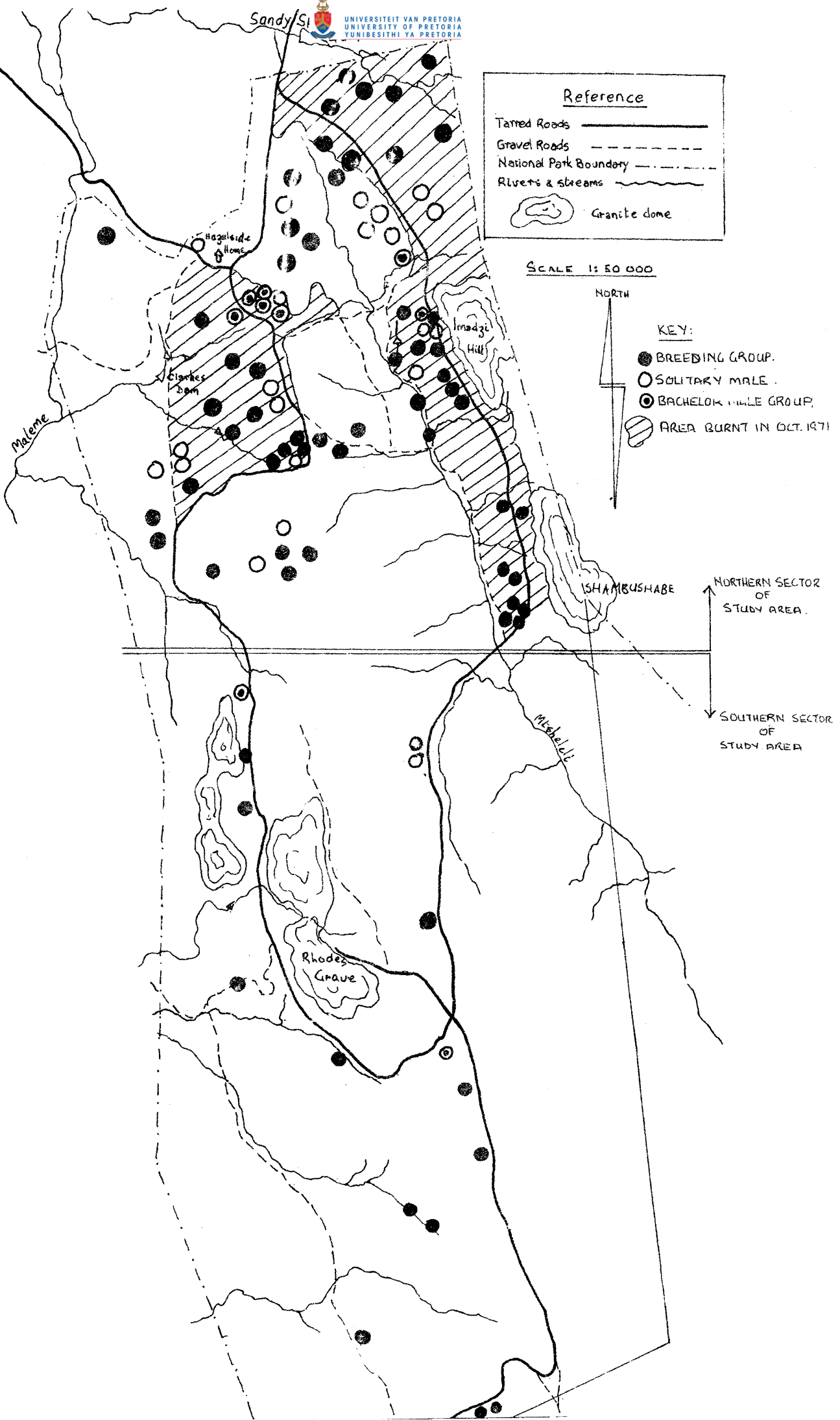
 Granite dome

SCALE 1:50 000

NORTH

KEY:

-  BREEDING GROUP.
-  SOLITARY MALE.
-  BACHELOR HILL GROUP.
-  AREA BURNT IN OCT. 1971



fairly large number. For translocation purposes breeding groups should be captured where possible and translocated as units so that individuals are familiar with each other and have an already established social structure. Capture can take the form of immobilising, using nets and using the plastic sheet method developed in Natal, South Africa. Suitable units for translocation other than family units would be one adult male, one sub-adult male, six adult female, one yearling male and one yearling female. Should more be required multiples of all excluding the adult male could be used to an overall total of 40 animals. The most suitable time for capture is July to August, that is after the mating season, before the females are too heavily pregnant and the calves have reached weaning age. If a population is to be reduced by death, hunting at night with dazzling lights would be the most suitable and least disturbing.

Selective hunting for trophies and meat could be used on a sustained yield basis with a stable population. Trophy hunting would in most cases be confined to males. Discretion should be used on deciding which animals are most suited for trophies taking into consideration the future of the population as a whole. In order of increased importance the males rank as follows: outer territorial, peripheral territorial, bachelor and lastly

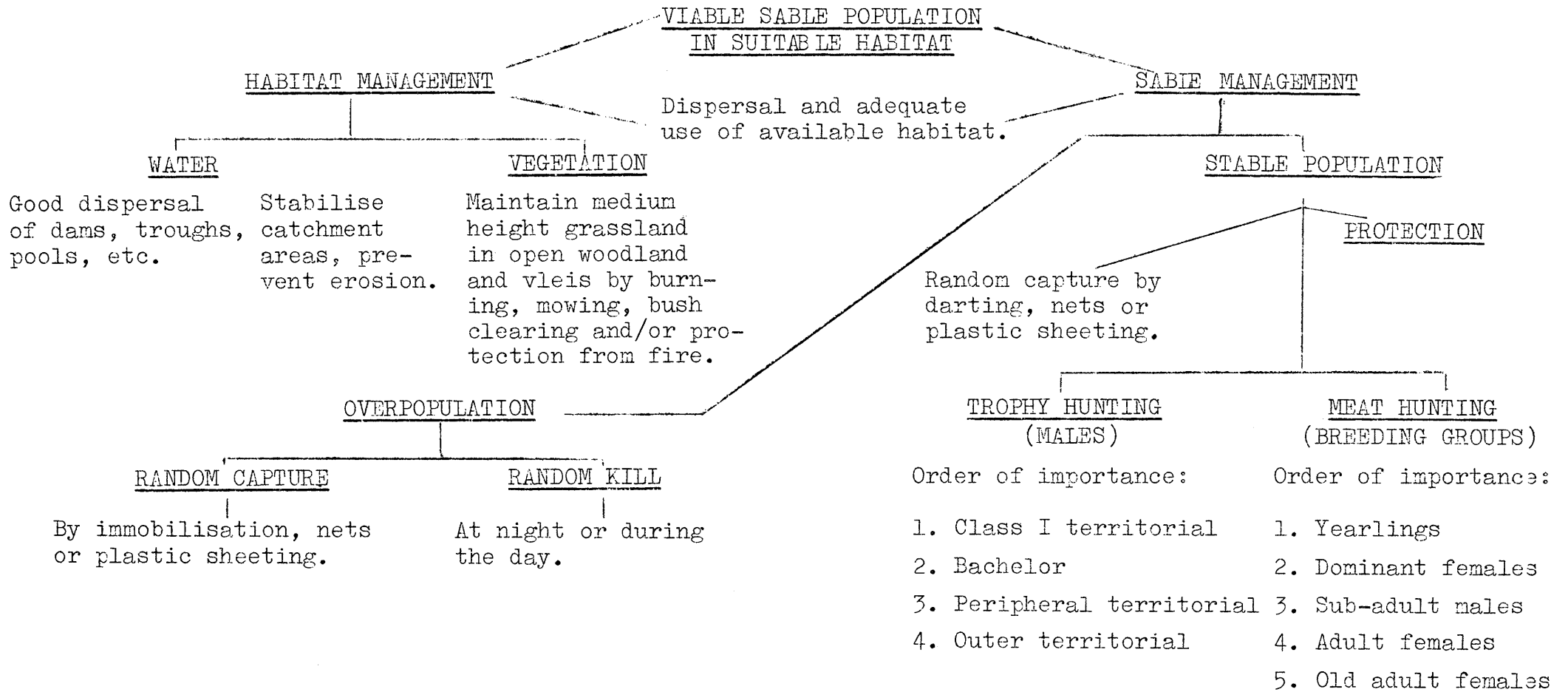
the central territorial males. The outer territorial males can be recognised by the distance from breeding herds, a solitary existence and most important the shortened or blunt horn tips and thick secondary annular growth at the base of the horn. Peripheral territorial and central territorial males do overlap in appearance though the latter are usually in prime condition with the best horns and closely associated with areas occupied by breeding groups. Bachelor males, from which the selection of future territorial males come, are recognised by their numbers and lack of secondary annuli.

To keep a stable population in hand it may also be necessary to take off a number of animals from the breeding groups. In order of increased importance the breeding group individuals rank as follows: old adult females, adult females, sub-adult males, dominant adult females and yearlings of both sexes. Old adult females are recognised by excessive secondary annular growth and usually a dark overall colour. Younger adult females are often paler in colour with little secondary annuli on the horns and shorter as well as more slender horns, though certain females remain pale-coloured with slender horns. Sub-adult males are recognised by the black penial button and thick horn bases with equally thick primary annuli. Dominant adult females do overlap with lower ranking adult females in appearance but are generally

those that challenge any sign of danger by coming forward and snorting.

There are thus two major facets of management, the sable population itself and the habitat in which they live. The management is summarised in Table 7. Dispersal of a sable population will depend on the management of the habitat. Management of the habitat includes good dispersal of water by troughs, dams, pools etc., stabilising of catchment areas and maintaining the vegetation by protection, burning, mowing and/or bush clearing. Management of the sable population includes random reduction when excess numbers occur, utilising a stable population on a sustained yield basis or protecting the population to build up numbers. All factors shown on the management plan are prone to variation depending on the area and should thus be adjusted accordingly using a flexible plan rather than hard and fast rules.

Table 7. Management plan for sable based on studies in the Rhodes Matopos National Park, Rhodesia, from December 1970 to March 1973.



SUMMARY

The study set out to determine some of the bio-ecological relationships of the sable antelope Hippotragus niger niger (Harris, 1838) in the Rhodes Matopos National Park, Rhodesia. The vegetation of the area is divided into seven categories each of which is discussed.

The population in the study area (approximately 200) had three major components as follows: the breeding groups, the bachelor male groups and territorial males. The structure of the breeding groups varied seasonally. Bachelor male groups of two to 12 consisted of younger males which had as yet not established territories. Territorial males fell into three classes depending on status:- class I: central territorial; class II: peripheral territorial and class III: outer territorial males, in relation to the breeding group home ranges. The population had a recruitment rate of 26 - 29 per cent from young of the year and a calving percentage of 56 - 67 per cent, calculated towards the end of the year for 1971 and 1972. The male to female sex ratio was not significantly different from a 1:1 ratio for calves and yearlings but in adults the females outnumbered the males significantly.

Breeding groups were found to have home ranges ranging in area from 240 ha to 280 ha though this did

not apply in the strictest sense. The territories of territorial males were marked by branch breaking on shrubs and were equivalent to home ranges. The territories ranging from 25 ha to 40 ha in size were defended against other territorial males though bachelor males were tolerated. Social organisation of the population was based on intraspecific aggressiveness and intolerance and the dominance of one individual over another. Various dominance displays are discussed.

Although difficult to determine exactly, the gestation period was about 270 days, the peak calving period being early February. The peak rut took place during May and June although females were mated at other times during the year. Measurements and mass are given for 47 young calves which were captured, marked and released for field studies.

The sable were found to be selective grazers of medium height grass showing preference for new growth. Sable appeared to be water dependent, drinking mostly from 13h00 to 14h00. Twenty-eight plant species were recorded as food plants, four of which were dicotyledonous. Seasonal use of different habitats was recorded.

Mortality factors in the study area included predation, accidental deaths and illegal hunting,

with possible mortality from parasite infestation and fighting. Management of the species involves management of the sable population itself and management of the habitat in which they live. Management implications are discussed.

"OPSOMMING"

Die doel van die huidige studie was om sekere bio-ekologiese verwantskappe van die Swartwitpens Hippotragus niger niger (Harris, 1838) te bestudeer in die Rhodes Matopos Nationale Park in Rhodesie". Die plantegroei van die area is in sewe subklasse verdeel en elk van die subklasse is bespreek.

Die bevolking van ongeveer 200 swartwitpense het uit drie hoof groepe bestaan, nl., die teelgroepe, vrygesel bulgroepe en territoriale bulle. Die samestelling van die teelgroepe het gewissel van seisoen tot seisoen. Die vrygesel bulgroepe het uit twee tot 12 jonger bulle bestaan wat nog nie 'n territoriale gebied afgebaken het nie. Die territoriale bulle kan volgens status in drie groepe verdeel word nl. klas I: sentraal territoriaal; klas II: aangrensend territoriaal en klas III: rand territoriaal ten opsigte van die weidingsgebied van die teelgroepe. Die Swartwitpens bevolking het 'n jaarlikse aanvas van tussen 26 - 29 persent gehad en die kalfpersentasie was tussen 56 - 67 persent. Die syfers is gebaseer op gegewens ingewin gedurende Oktober tot Desember vir die 1971 en 1972 seisoene. Die geslagsverhouding het nie betekenisvol afgewyk van 'n 1:1 verhouding vir kalwers en een tot twee jaar oud diere nie, maar by volwasse diere was daar betekenisvol meer koeie as bulle.

Alhoewel elke teelgroep sy eie weidingsgebied gehad het, het hulle nie-te-min ook van tyd tot tyd ander weidingsgebiede besoek. 'n Weidingsgebied het uit tussen 240 hektaar tot 280 hektaar bestaan. Die gebied wat deur 'n territoriale bul beset is, is afgebaken deur gebreekte struik op die grense van die gebied. So 'n gebied het uit ongeveer 25 tot 40 hektaar bestaan en is streng bewaak. Alhoewel vrygeselbulle in die gebied toegelaat is, is ander territoriale bulle verwilder.

Die sosiale samestelling van die bevolking was gegrond op die agresieweteit, onverdraagsaamheid en dominansie van een individue teenoor 'n ander. Sommige van die dominansie houdings teenoor ander individue word bespreek.

Die dragtigheidsduur was moeilik om te bepaal maar skyn ongeveer 270 dae te wees. Alhoewel die koeie deur die jaar gedek was, was daar wel 'n hoogtepunt in die teelseisoen van Mei tot Junie. Die meeste kalwers is vroeg in Februarie gebore. Liggaamsmates en massa van 47 lewende kalwers jonger as een week is bepaal.

Die swartwitpens wei op gras van gemiddelde hoogte maar verkies jong gras en alhoewel hulle nie altyd daaglik water drink nie verkies hulle nie-te-min om water tussen 13h00 en 14h00 te drink. Ten minste 28 verskillende plantsoorte was gevreet, hiervan was slegs

vier nie 'n gras soort nie. Daar skyn ook 'n seisoenale voorkeur vir verskillende veldtipes te wees.

Mortaliteit kan toegeskryf word aan roofdiere, ongelukke, onwettige jag, moontlike ongevallen as gevolg van gevegte asook ongevallen veroorsaak deur oorbesmetting met bosluise.

Die suksesvolle bestuur van die swartwitpens sluit die beheer van die bevolking en die toepassing van erkende weiveldbeheertegnieke in. Albei hierdie aspekte word bespreek.

ACKNOWLEDGEMENTS

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APPENDIX A - INDIGENOUS PLANT FAMILIES AND SPECIES
RECORDED IN THE STUDY AREA OF THE RHODES
MATOPOS NATIONAL PARK, RHODESIA. FAMILIES
AS FROM WILD (1973).

DICOTYLEDONAE

Acanthaceae

Barleria affinis

B. albostellata

Blepharis transvaalensis

Anacardiaceae

Lanea discolor

L. edulis

Ozoroa reticulata

Rhus lancea

R. leptodictya

R. pyroides var. gracilis

Sclerocarya caffra

Annonaceae

Artabotrys brachypetalus

Apocynaceae

Acokanthera schimperi

Carissa bispinosa

Asclepiadaceae

Ectadiopsis producta

Burseraceae

Commiphora marlothii

C. mollis

- 113 -

Capparaceae

Boscia angustifolia

B. corymbosa

Maerua juncea

Celastraceae

Cassine matabelica

Catha edulis

Maytenus senegalensis

M. undata

Chrysobalanaceae

Parinari curatellifolia

Combretaceae

Combretum apiculatum

C. erythrophyllum

C. hereroense

C. imberbe

C. molle

C. zeyheri

Terminalia brachystemma

T. randii

T. sericea

Compositae

Brachylaena discolor

B. rotundata

Helichrysum kraussi

Lopholaena coriifolia

Tarchonanthus camphoratus

- 114 -

Vernonia oligocephala

Convolvulaceae

Convolvulus sagittatus

Ebenaceae

Diospyros batocana

D. mespiliformis

D. lycioides

Euclea divinorum

E. natalensis

E. schimperi

E. undulata

Euphorbiaceae

Bridelia mollis

Croton gratissimus

Euphorbia ingens

E. cooperi

Pseudolachnostylis maprounefolia

Securinega virosa

Flacourtiaceae

Dorvalis zeyheri

Flacourtia indica

Heteropyxidaceae

Heteropyxis dehniae

Icacinaceae

Apodytes dimidiata

Labiatae

Iboza riparia

Leguminosae

Subfam. Caesalpinioideae

Afzelia cuanensis

Brachystegia specifformis

Burkea africana

Cassia abbreviata

Colophospermum mopane

Erythrophleum africanum

Peltophorum africanum

Piliostigma thonningii

Pterolobium stellatum

Subfam. Mimosoideae

Acacia erubescens

A. galpinii

A. karroo

A. nigrescens

A. nilotica

A. rehmanniana

Albizia amara

A. antunesiana

A. rhodesiaca

A. tanganyicensis

A. versicolor

Dichrostachys cinerea

Elephantorrhiza goetzei

Subfam. Papilionoideae

Aeschynomene nyassana

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Bolusanthus speciosus

Erythrina lysistemon

Indigofera heterotricha

Lonchocarpus capassa

Mundulea sericea

Pterocarpus angolensis

P. rotundifolia

Rhynchosia nyasica

Loranthaceae

Viscum combreticola

Malvaceae

Azanza garckeana

Hibiscus mutatus

Sida cordifolia

Meliaceae

Entandrophragma caudatum

Menispermaceae

Cissampelos mucronata

Moraceae

Ficus burkei

F. capensis

F. ingens

F. natalensis

F. pretoriae

F. smutsii

F. soldanella

F. sonderi

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Myrothamnaceae

Myrothamnus flabellifolia

Nymphaeaceae

Nymphaea caerulea

Ochnaceae

Ochna schweinfurthiana

Olacaceae

Olax dissitiflora

Ximenia americana

X. caffra

Oleaceae

Olea africana

Schrebera argyrotricha

Pittosporaceae

Pittosporum viridiflorum

Proteaceae

Faurea saligna

Protea sp.

Ptaeroxylaceae

Ptaeroxylon obliquum

Ranunculaceae

Clematis brachiata

Rhamnaceae

Berchemia zeyheri

Ziziphus mucronata

Rubiaceae

Agathisanthemum bojeri

- 118 -

Canthium huillense

Enterospermum rhodesianum

Gardenia spatulifolia

Pavetta eylesii

P. schumanniana

Tarenna neurophylla

Vangueria infausta

Rutaceae

Fagara capensis

Teclea rogersii

Salicaceae

Salix subserrata

Sapindaceae

Dodonaea viscosa

Pappea capensis

Sapotaceae

Mimusops zeyheri

Simaroubaceae

Kirkia acuminata

Solanaceae

Solanum panduriforme

Sterculiaceae

Dombeya rotundifolia

Strychnaceae

Strychnos cocculoides

S. innocua spp. dysophylla

S. matopoensis

- 119 -

S. spinosa

S. usambarensis

Tiliaceae

Corchus kirkii

Grewia flavescens var. olukondae

G. bicolor

G. cordata

G. monticola

Verbenaceae

Clerodendrum glabrum

Lippia javanica

MONOCOTYLEDONAE

Gramineae

Andropogon eucomis

A. gayanus

A. schinzii

Aristida adscensionis

A. barbicollis

A. congesta

A. junciformis ssp. macilentata

A. meridionalis

A. pilgeri

A. rhiniochloa

Arundinella nepalensis

Bothriochloa glabra

B. insculpta

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B. radicans

Brachiaria brizantha

B. deflexa

B. nigropedata

B. xantholeuca

Chloridion cameronii

Chloris gayana

C. pycnothrix

C. virgata

Chrysopogon montanus

Coleochloa setifera

Cymbopogon excavatus

Cynodon dactylon

Dactyloctenium aegyptium

D. giganteum

Danthoniopsis pruinosa

Digitaria milanjiana

D. pentzii var. rhodesiae

D. setivala

D. velutina

Diheteropogon amplectens

Dinebra retroflexa

Eleusine indica

Enteropogon macrostachys

Eragrostis aspera

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E. atrovirens

E. capensis

E. chapelieri

E. cilianensis

E. denudata

E. gummiflua

E. habrantha

E. jeffreysii

E. namaquensis

E. patens

E. paradoxa

E. pilosa

E. rigidior

E. rotifer

E. stapfii

E. superba

E. tricophora

E. viscosa

Hemarthria altissima

Heteropogon contortus

Hyparrhenia cymbaria

H. diclora

H. rufa

Hyperthelia dissoluta

Imperata cylindrica

Ischaemum afrum

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Loudetia simplex

Microchlea kunthi

Miscanthidium teretifolium

Oplismenus hirtellus

Panicum maximum

P. repens

P. subalbidum

Pennisetum glaucocladum

Perotis patens

Pogonarthria squarrosa

Rhynchelytrum repens

R. setifolium

R. villosum

Pottboellia exaltata

Sacciolepis typhura

Schizachyrium inclusum

S. jeffreysii

S. sanguineum

Schmidtia pappophoroides

Setaria eylesii

S. pallide-fusca

S. porphyrantha

S. verticillata

Sorghastrum friesii

Sorghum versicolor

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Sporobolus festivus

S. marginatus

S. panicoides

S. pyramidalis

Themeda triandra

Trachypogon spicatus

Tragus berteronianus

Tricholaena monachne

Trichoneura grandiglumis

Tripogon minimus

Urochloa bolbodes

U. mossambicensis

Cyperaceae

Coleochloa setifera

Cyperus spp.

Kyllinga spp.

Scirpus inclinatus

Liliaceae

Aloe aculeata

A. chaubaudii

A. excelsa

A. gerradi

Gloriosa superba

G. virescens

Orchidaceae

Ansellia gigantea

Velloziaceae

Vellozia equisetoides

APPENDIX B - SABLE IMMOBILISATION IN THE STUDY AREA OF
RHODES MATOPOS NATIONAL PARK, RHODESIA,
OCTOBER 1971

Six male sable were immobilised on the 23rd October in the Rhodes Matopos National Park (Hazelside and World's View) for the purpose of marking and collecting of scientific data. A Field capture gun (modified 450, smooth bore) was used with 3 cc darts, ultrashort needles (30 mm) with slight barb, 1,25 grain Cash blanks and 1 through 3 cc cap-chur charges.

The drug mixture consisted of 2 mg M99 (Etorphine) mixed at 2 mg/ml and 100 mg Largactil mixed at 50 mg/ml. The antidote was 5 mg M285. Also administered to each animal was 5 cc (1 500 mg) Procillin, wound and eye aerosol.

Marking was done by numbered yellow eartags (Rhotag) on the left ear and stainless steel bands (Band-it) on the horns. The sub-adult male had no horn bands; a yellow tag was placed in each ear. To have full control over the animals while taking measurements etc., the horns were secured to the front bumper of a Landrover with nylon ropes.

Darting was done from the back of a Landrover pickup.

The following observations on immobilisation were made:-

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<u>Ref. No. Y/100</u>	<u>Date: 23rd October, 1971</u>
Time darted	: 07h53
Time found	: 08h05
Time antidote administered	: 08h27
Time back on feet	: 08h30
Dart site	: Right side of neck
Range	: 36 metres
Estimated mass	: 250 kg
Drug dosage	: 2 mg M99 + 100 mg Largactil
Antidote	: 5 mg M285

Remarks:

The animal was found lying down in a sternal position after running about 400 metres and darted in the presence of another adult male.

<u>Ref. No. Y/99</u>	<u>Date: 23rd October, 1971</u>
Time darted	: 09h18
Time found	: 09h25
Time antidote administered	: 09h52
Time back on feet	: 09h56
Dart site	: Centre of back
Range	: 32 metres
Estimated mass	: 225 kg
Drug dosage	: 2 mg M99 + 100 mg Largactil
Antidote	: 5 mg M285

Remarks:

The animal was darted from behind at a slight decline. On impact, the needle was dislodged from the dart but the drug had already penetrated. This appeared to be a particularly thick-skinned individual as the skin on the dart site was about 2 cm thick, also, on administering the antidote, two needles were broken before it was decided to first make a small incision with a scalpel blade.

Darted from a bachelor bull group of 11.

<u>Ref. No. Y/98</u>	<u>Date: 23rd October, 1971</u>
Time darted	: 10h15
Time down	: 10h29
Time antidote administered	: 10h42
Time back on feet	: 10h45
Dart site	: Base of neck on right side
Range	: 41 metres
Drug dosage	: 2 mg M99 + 100 mg Largactil
Antidote	: 5 mg M285
Estimated mass	: 270 kg

Remarks:

Territorial male; made determined efforts to charge before going down.

Remarks:

Territorial male darted from herd. An extra 1 mg M99 was administered as the animal was too active, possibly due to the dart site not allowing for the full impact of the drug.

Ref. No. Y/95

Date: 23rd October, 1971

Time darted	: 17h04
Time found	: 17h20
Antidote administered	: 17h41
Back on feet	: 17h45
Dart site	: Left shoulder
Range	: 45 metres
Drug dosage	: 2 mg M99 + 100 mg Largactil
Estimated mass	: 270 kg

Remarks:

Lone territorial male.

All the animals darted except one were adult males. Two of the five adult males were not fully mature as indicated by a slight brownish colour on the hindquarters, a more slender build and lack of secondary annuli.

The following table gives a summary of times taken during immobilisation:-

	Reference Number						Total	Average
	Y 100	Y 99	Y 98	Y 97,79	Y 96	Y 95		
Time darted to time down/found	8	7	14	7	13	16	65	10,8 minutes
Time found to time antidote given	22	27	13	18	25	21	126	21,0 minutes
Time antidote given to time of recovery	3	4	3	2	10	4	26	4,3 minutes
	33	38	30	27	48	41	217	36,1 minutes

None of the animals showed any sign of stress while under sedation and breathing appeared to be normal in all cases.
