

## CHAPTER 2

### STUDY AREA

#### Introduction

The study was undertaken in the Northern Tuli Game Reserve (NTGR), a private game reserve in eastern Botswana. A general description of the Reserve is given for reference purposes. Only a small portion of the Reserve was utilized as the jackal study area and, where appropriate, specific reference is made to the characteristics of this circumscribed area.

#### Location

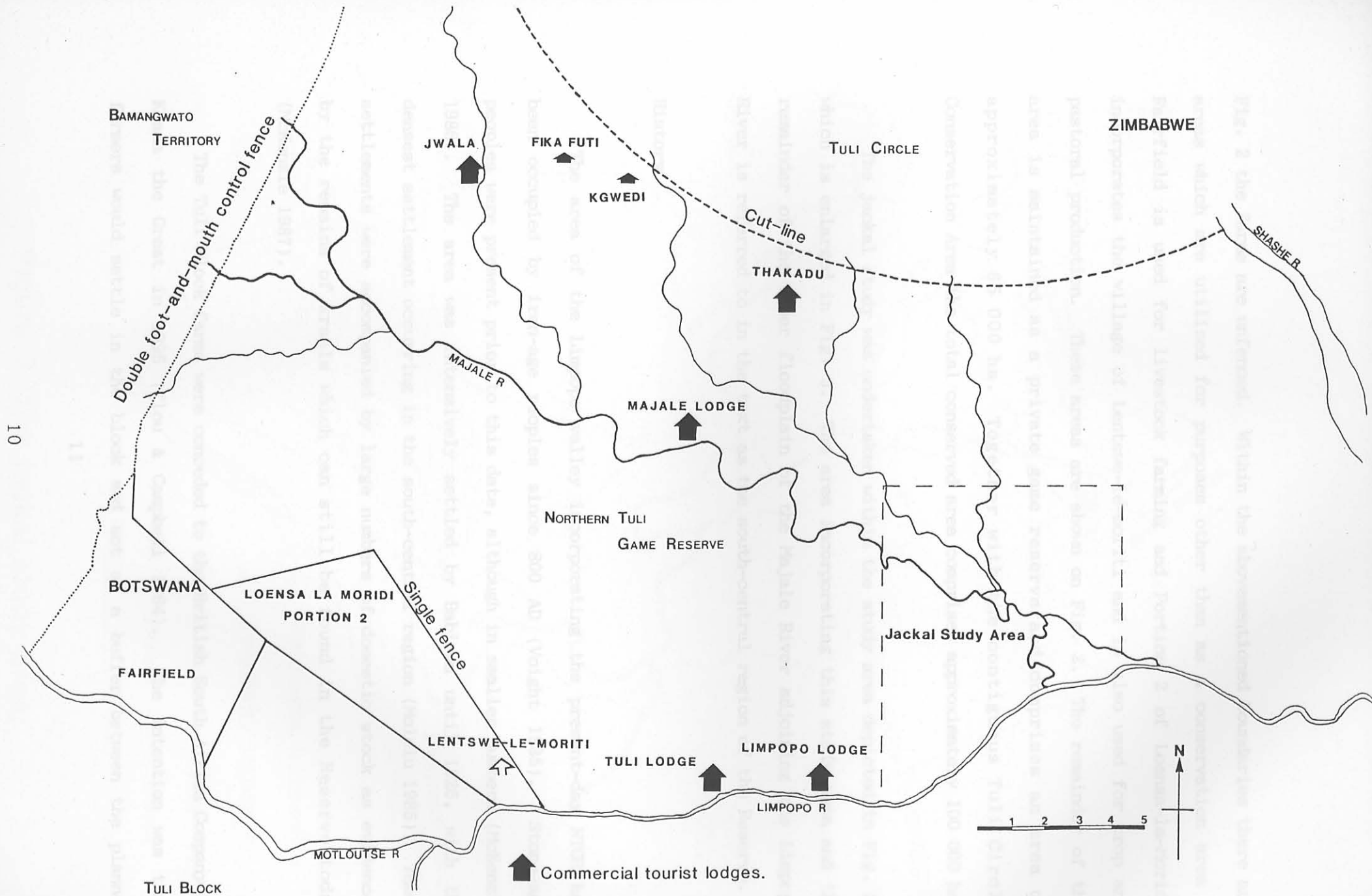
The NTGR is located in eastern Botswana between  $21^{\circ}55'S$  and  $22^{\circ}15'S$  and between  $28^{\circ}55'E$  and  $29^{\circ}15'E$ . The Reserve constitutes the north-eastern extremity of a 350 km strip of private agricultural land known as the Tuli Block (Fig. 1). The Reserve is bounded in the east by the Shashe River and in the south by the Limpopo River. The former constitutes the border between Botswana and Zimbabwe and the latter the border between Botswana and South Africa. The south-western boundary is bordered by the Motloutse River, while the remainder of the western boundary consists of a double foot-and-mouth disease control fence. The northern boundary is comprised of a semi-circular unfenced cut-line which demarcates the Tuli Safari Area in Zimbabwe (Fig. 2).

The Reserve consists of nine original farms, some of which have been subdivided into several portions. With the exception of the fences shown on

Figure 1. Location of the Northern Tuli Game Reserve.



Figure 1. Location of the Northern Tuli Game Reserve.



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Figure 2. The Northern Tuli Game Reserve.

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Fig. 2 the farms are unfenced. Within the abovementioned boundaries there are areas which are utilized for purposes other than as a conservation area - Fairfield is used for livestock farming and Portion 2 of Loensa-la-Moridi incorporates the village of Lentswe-le-moriti and is also used for crop and pastoral production. These areas are shown on Fig. 2. The remainder of the area is maintained as a private game reserve and comprises an area of approximately 65 000 ha. Together with the contiguous Tuli Circle Conservation Area the total conserved area comprises approximately 100 000 ha.

The jackal study was undertaken within the study area depicted in Fig. 2, which is enlarged in Fig. 3. The area incorporating this study area and the remainder of the lower floodplain of the Majale River adjoining the Limpopo River is referred to in the text as the south-central region of the Reserve.

### History

The area of the Limpopo valley incorporating the present-day NTGR has been occupied by iron-age peoples since 800 AD (Voight 1985). Stone-age peoples were present prior to this date, although in smaller numbers (McKenzie 1986). The area was intensively settled by Babirwa until 1926, with the densest settlement occurring in the south-central region (Molelu 1985). These settlements were accompanied by large numbers of domestic stock as evidenced by the remains of kraals which can still be found in the Reserve today (McKenzie 1987).

The Tuli Block farms were conceded to the British South Africa Company by Khama the Great in 1895 (Tlou & Campbell 1984). The intention was that farmers would settle in the block and act as a buffer between the planned

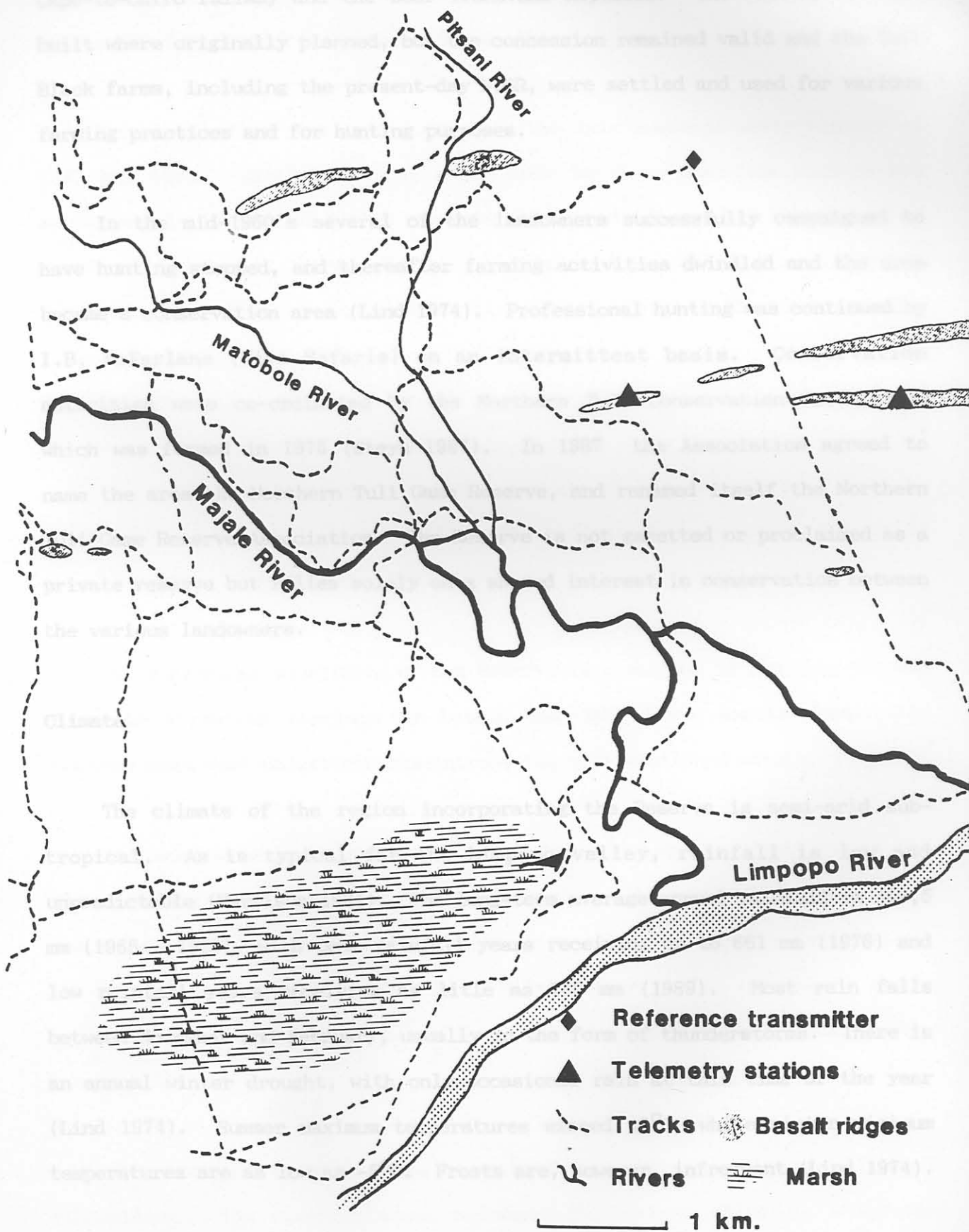


Figure 3. The jackal study area.

Cape-to-Cairo railway and the boer Transvaal Republic. The railway was not built where originally planned, but the concession remained valid and the Tuli Block farms, including the present-day NTGR, were settled and used for various farming practices and for hunting purposes.

In the mid-1960's several of the landowners successfully campaigned to have hunting stopped, and thereafter farming activities dwindled and the area became a conservation area (Lind 1974). Professional hunting was continued by I.B. McFarlane (Vira Safaris) on an intermittent basis. Conservation activities were co-ordinated by the Northern Tuli Conservation Association which was formed in 1975 (Steyn 1987). In 1987 the Association agreed to name the area the Northern Tuli Game Reserve, and renamed itself the Northern Tuli Game Reserve Association. The Reserve is not gazetted or proclaimed as a private reserve but relies solely on a shared interest in conservation between the various landowners.

#### Climate

The climate of the region incorporating the Reserve is semi-arid subtropical. As is typical for the Limpopo valley, rainfall is low and unpredictable (Harrison 1984). The long-term average annual rainfall is 369,5 mm (1965 - 1989), with peak rainfall years receiving up to 661 mm (1976) and low rainfall years receiving as little as 180 mm (1989). Most rain falls between November and February, usually in the form of thunderstorms. There is an annual winter drought, with only occasional rain at this time of the year (Lind 1974). Summer maximum temperatures exceed 42°C, while winter minimum temperatures are as low as -5°C. Frosts are, however, infrequent (Lind 1974).

The prevailing wind is south-easterly. Whirlwinds are common in the hot-dry season from August to December (Lind 1974).

The jackal study was concentrated in the late summers/ early winters of 1987 and 1988. Rainfall in the study area in the preceding summers was approximately 190 mm and 284 mm respectively (Pontdrift records, Department of Transport, Pretoria, South Africa. A single storm of 92 mm recorded at Pontdrift on 16-01-87 is excluded as this did not extend to the study area.)

## Geology and Soils

Two differing descriptions of the geology of the Reserve are given by Alexander (1984) and Joubert (1984). The geological description summarized here is derived from Joubert (1984).

The geological substratum of the Reserve is comprised of the deep Clarens Sandstone Formation overlain by Letaba and Sabi River Basalt Formations. Numerous east-west dolerite dykes intrude the abovementioned strata.

The sandstone is only exposed along the southern extremities of the Reserve along the Limpopo and Motloutse rivers. The rest of the Reserve is dominated by the basalt formations. Extensive alluvial plains occur along all the major rivers, including the lower Majale River. Old, undulating plains are flanked by the younger alluvial deposits along the rivers and by the basalt hills.

The jackal study area is comprised almost entirely of alluvial floodplains. The riverine areas represent the younger alluvium, while the

fringe areas are the older flood-plains. Weathered basalt ridges intrude the edges of the study area, and the telemetry stations indicated on Fig. 3 were situated on two of the highest of these ridges.

#### Vegetation

Extensive accelerated erosion has followed over-utilization of the herbaceous layer (Lind 1974, Joubert 1984). Both sheet and donga erosion were evident in the study area, giving rise to areas devoid of vegetation within the otherwise well vegetated river valley. Riverine soils are deep, while the basalt areas have a very thin layer of remaining top-soil.

The vegetation of the Reserve comprises three major landscapes - the Veld on Basalt, and the Karoo Sandstone landscape. The latter occurs only

#### Topography and Drainage

The Reserve is extensively dissected by incisive drainage lines. Most of the Reserve is drained via the Majale River which terminates in the south-central portion of the Reserve where it enters the Limpopo River (Fig. 2). Other minor rivers flow directly into the Motloutse, Limpopo and Shashe rivers. All of these rivers flow only sporadically in summer and are dry, with the exception of isolated pools, during winter.

The remainder of the riverine areas consist of a mosaic of

The incised topography of the basaltic regions is abruptly replaced by the undulating older flood-plains along all the major rivers. The floodplain is interrupted by the sandstone formations in the south and west and by the dolerite dykes in other parts.

The study area is bisected by the Majale River. Due to recent flooding and siltation the young floodplain is dissected by deep dongas and exhibits a case of river capture and a case of ox-bow formation (Fig. 3). The topography is gently undulating except for the flatter young floodplain, the recent



dongas (which are up to 3 m deep) and the incised basaltic terrain on the fringes.

## Vegetation

The vegetation of the Reserve falls within the broad classification of Mopani Veld (Acocks 1975). The following more detailed classification follows Joubert (1984).

The vegetation of the Reserve comprises three major landscapes - the Floodplains on Alluvium, the *Colophospermum mopane*/*Terminalia prunoides* Rugged Veld on Basalt, and the Karoo Sandstone landscape. The latter occurs only along the south-western fringes, the Floodplain landscape occurs along all the major rivers, and the rest of the Reserve is comprised of the various elements of the Rugged Veld on Basalt landscape.

The study area is dominated by the Alluvial landscape. The triangular portion between the three rivers (Fig. 3) consists largely of *Acacia tortilis* savanna. The remainder of the riverine areas consist of a mozaic of *Acacia albida* Gallery Forest and *Croton megalobotrys* Thicket. Fringing these communities is a thin, variable zone of *Salvadora angustifolia*/*Acacia tortilis* Brushveld which is replaced by the open *Boscia foetida* savanna on the old, undulating floodplain.

The Rugged Veld landscape is represented on the fringes of the study area by the *Colophospermum mopane*/*Terminalia prunoides* Middleslopes, and on the ridges by the Basalt Outcrop community.

The woody communities mentioned above form a complex mozaic in the study area. A consistent difference is however apparent between the herbaceous vegetation of the young floodplain on the one hand and the old floodplain and basalt elements on the other. The former is covered by a dense stand of tall, largely perennial grasses - mostly *Cenchrus ciliaris*, *Chloris gayana*, *Panicum maximum*, *P. meyerianum* and *Urochloa mossambicensis*. The latter is covered largely by short annual species. The most common forb, which forms a dense yellow and green carpet in summer, is the dubbeltjie *Tribulis terrestris*. The most common grasses on the old floodplain are the short *Enneapogon brachystachius* and *Oropetium capense*. These are replaced by the taller but sparse *Aristida spp.* and *Enneapogon cenchroides* in the basaltic areas.

An exception to the above is the large *Sporobolus consimilis* marsh which occurs in the south-western corner of the study area. This marsh, or vlei, consists of a homogeneous stand of the tall "elephant grass" *Sporobolus consimilis*, is an important component of the south-central region, but was not utilized by any of the study jackals.

## Fauna

A comprehensive faunal list for the Reserve is given by Lind (1974).

Large mammals which occur within the study area are listed below, with the most recent estimates of total abundance in the Reserve shown where available (le Roux 1989). Calculated densities within the NTGR are shown. A subjective indication is also given of the relative abundance of all the species within the jackal study area.

<i>Carnivora</i>					
<i>Acinonyx jubatus</i>	Cheetah	common			
<i>Canis mesomelas</i>	Black-backed jackal	very common	110	0,17	
<i>Civettictis civetta</i>	African civet	common			
<i>Crocuta crocuta</i>	Spotted hyaena	scarce	540	0,83	
<i>Felis caracal</i>	Caracal	scarce			
<i>Felis lybica</i>	African wild cat	common			
<i>Genetta genetta</i>	Small-spotted genet	common			
<i>Genetta tigrina</i>	Large-spotted genet	common	187	0,29	
<i>Ichneumia albicauda</i>	White-tailed mongoose	scarce			
<i>Mellivora capensis</i>	Honey badger	scarce			
<i>Mungos mungo</i>	Banded mongoose	common			
<i>Panthera leo</i>	Lion	common			
<i>Panthera pardus</i>	Leopard	common			
<i>Proteles cristatus</i>	Aardwolf	scarce			
<i>Loxodonta africana</i>	African elephant	common	451	0,69	
<i>Cyclopropon afor</i>	Aardvark	scarce			
<i>Artiodactyla</i>					
<i>Antelope cervina</i>	Springbuck	scarce			
			Total density		
					no/km <sup>2</sup>
<i>Aepyceros melampus</i>	Impala	very common	5800	8,9	
<i>Connochaetes taurinus</i>	Blue wildebeest	common	223	0,34	
<i>Giraffa camelopardalis</i>	Giraffe	scarce	26	0,04	
<i>Kobus ellipsiprymnus</i>	Waterbuck	scarce	15	0,02	
<i>Phacocoerus aethiopicus</i>	Warthog	scarce	90	0,14	
<i>Potomachoerus porcus</i>	Bushpig	scarce			

<i>Raphicerus campestris</i>	Steenbok	common		
<i>Sylvicapra grimmia</i>	Common duiker	common		
Artiodactyla (cont.)				
<i>Taurotragus oryx</i>	Eland	common	110	0,17
<i>Tragelaphus scriptus</i>	Bushbuck	scarce		
<i>Tragelaphus strepsiceros</i>	Greater kudu	common	540	0,83
<i>Hippotragus equinus</i> Eland				
Perissodactyla				
<i>Oryx capensis</i> Gemsbok				
<i>Equus burchelli</i>	Burchell's zebra	common	187	0,29
<i>Syncerus cafer</i> Buffalo				
Others				
<i>Cercopithecus pygerythrus</i> Vervet monkey				
<i>Hystrix africae-australis</i>	Porcupine	scarce		
<i>Lepus saxatilis</i>	Scrub hare	common		
<i>Loxodonta africana</i>	African elephant	common	451	0,69
<i>Orycteropus afer</i>	Aardvark	scarce		
<i>Papio ursinus</i>	Chacma baboon	common		
<i>Pedetes capensis</i>	Springhaas	scarce		

Gibson (1989) states that only *C. adustus* occurs in the Tuli Safari Area in Zimbabwe. As this area is directly contiguous with the NTGR, and as many *C. mesomelas* have been recorded in the Reserve without a single record of *C. adustus* (Lind 1974, present study), Gibsons' statement is regarded as questionable.

The following ungulates have become extinct in the Reserve within historical times:

<i>Alcelaphus buselaphus</i>	Red hartebeest
<i>Damaliscus lunatus</i>	Tsessebe
<i>Hippotragus equinus</i>	Roan
<i>Hippotragus niger</i>	Sable
<i>Oryx gazella</i>	Gemsbok
<i>Redunca arundinum</i>	Reedbuck
<i>Syncerus cafer</i>	Buffalo

#### Human Activities

The Reserve is utilized for photographic safaris - both private and commercial. The most intensively utilized area is the south-central region which is utilized by the commercial enterprise of Mashatu Game Reserve as well as by visitors to the Gilfillan properties in this area. This is reflected in the extensive road network in this area (Fig. 3). Utilization is almost exclusively in the form of game-drives in open four-wheel-drive vehicles. Extensive night-spotting is undertaken using spotlights. Up to seven vehicles may be active within the south-central area at times of peak utilization.

Hunting by Vira Safaris ceased in the Reserve in 1987. The only remaining consumptive activity is the utilization of impala and kudu by the commercial lodges and for staff rations. Very little of this shooting is undertaken in the south-central region to avoid increased wariness by the game animals. Such demonstrably opportunistic behaviour understandably is