

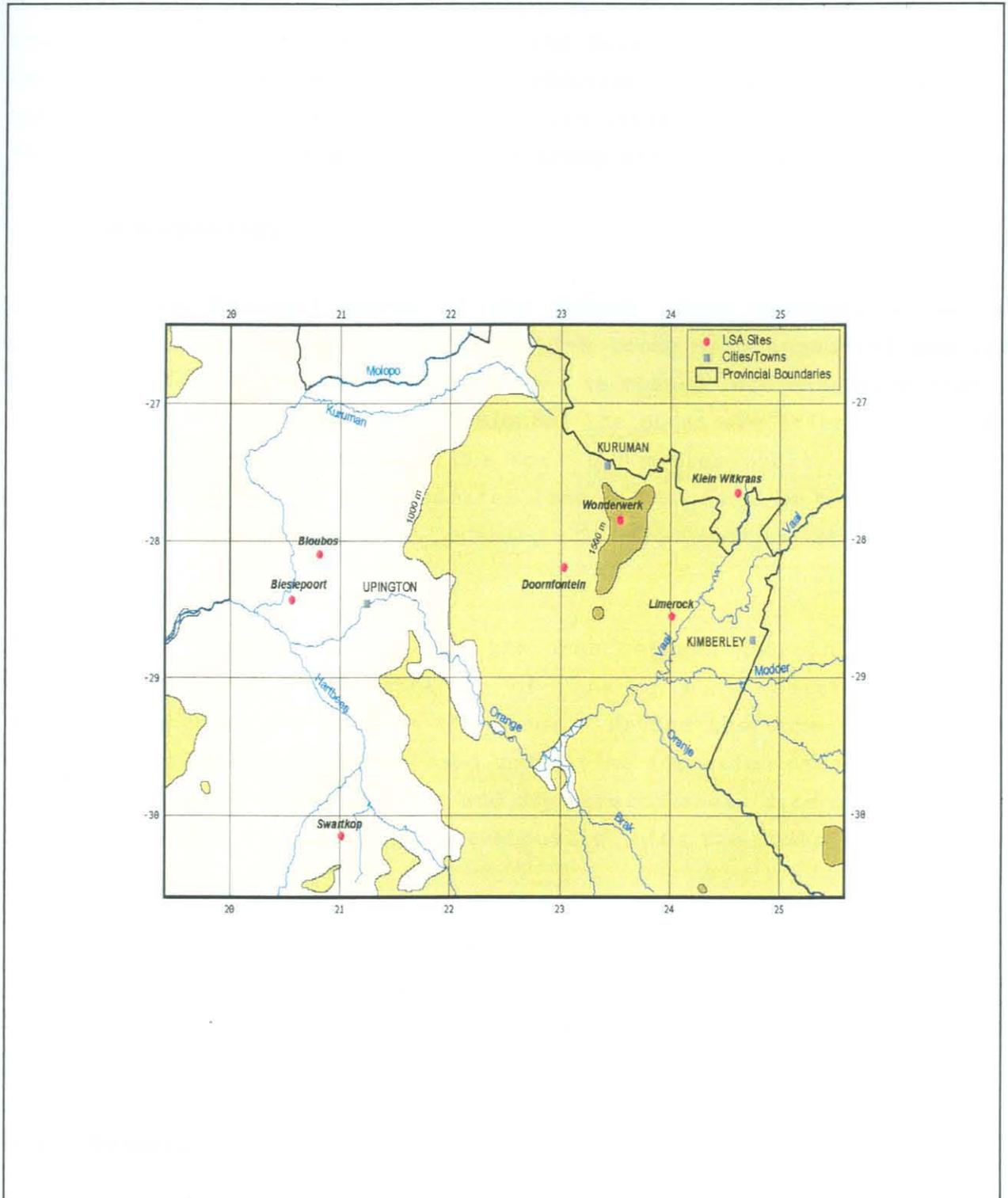
## **The study area**

### **2.1. Introduction**

The farm Bloubos is located at 28° 05' S and 20° 50' E, within the area between the Orange River and the Kuruman River. To the west the area is bound by the derelict southward stretch of the Molopo River, and to the east by the Langeberg and Korannaberg (Figure 2.1). The farm lies 55 kilometres north-north-west of Upington in the most southern part of the Kalahari desert which stretches between the Okavango swamp in the north and the Orange River in the south. Between the two permanent water sources there is virtually no surface water available. The Aub and Nossob Rivers in the south-west and the Molopo and Kuiseb Rivers in the south occasionally carry floods for some days, but they never reach the outflow into the Orange River. After local showers the numerous pans in the landscape sometimes also carry water for a while.

### **2.2. Geology**

The Kalahari "has acted as a major sedimentary basin" since the Cretaceous geological period (Deacon and Lancaster 1988:60). The result is that in some places, this basin can contain up to 500 metres of sediment consisting of sands and marls. Many of the sediments representing the Kalahari Group were calcified or silicified after deposition and have subsequently been covered by loose surface sand. These sediments extend far to the north and cover an area of approximately 2,5 million square kilometres (Deacon and Lancaster 1988:60). The sand cover in the study area between the Kuruman and Molopo Rivers in the north and the Orange River in the south is termed the Gordonia Sand Formation, a subdivision of the Kalahari geological sequence. On average its thickness is 10 to 20 metres. The colour of the aeolian sand is primarily red, although local variations in colour do occur. Next to a river course or a pan it is often white. A thin coating of haematite causes the red colouration (Thomas, Thomas & Malherbe 1988:14).



**Figure 2.1:** Topographical map of the study area. (Southern latitude, eastern longitude).

This map indicates the position of the farm Bloubos and other LSA sites as well as the location of towns, rivers and provincial borders within the study area.

Only the south-western part of Bloubos is covered by Kalahari sand. On the rest of the farm Dwyka tillite and Kuibis quartzites of the Nama Group form much of the surface. In addition there are several granite outcrops that form low mounds capped with large loose boulders (Du Toit 1954; SACS 1980). The geology of the study area is shown in Figure 2.2.

### **2.3. Geomorphology**

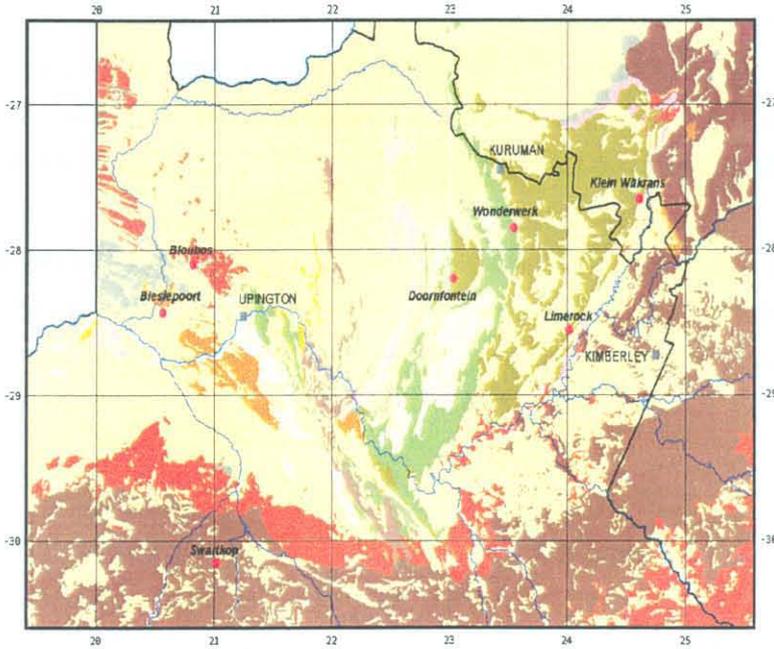
The southern Kalahari south of the Kuiseb River presents a gently undulating landscape largely covered with loose desert sand of aeolian origin (Du Toit 1954). Much of this sand is formed into extensive stable linear dunes. In the vicinity of Bloubos the dunes are oriented in a NW-SE direction. They typically lie some 150 metres apart, are 5 to 15 metres high and may be 40 kilometres long. Occasionally they join in a Y-shaped junction with the opening to the north-west (Lancaster 1987:103).

In addition to these dune fields the area between Koës in Namibia and Upington features a concentration of pans of which several occur on Bloubos alongside and between the dunes. Beyond the dune field in the south-west of the farm the exposed underlying formation presents a rocky flat surface with numerous faint and dry watercourses, some of which join to form a fossil tributary which eventually joins the lower Molopo River in the west.

In contrast to the monotonous sand-dunes and rocky surface on Bloubos, are the granite rock outcrops on the property which occur on the northern part of the farm. They consist of huge to medium sized boulders that stand out in the landscape.

### **2.4. Climate**

In the time span covered by this investigation, i.e. the late Holocene, some fluctuations in climate are known to have occurred, but these are of minor magnitude and probably did not have any effect on the semi-desert environment of the Northern Cape area (Tyson & Lindesay 1992).



**Figure 2.2:** Geological map of the study area. (Southern latitude, eastern longitude).

This map indicates the position of the farm Bloubaos and other LSA sites in terms of the geological formations in the study area.

Legend	
Yellow:	Kalahari Beds & Sands
Brown:	Ecca shales of the Karroo Sequence
Orange:	Dwyka tillite of the Karroo Sequence
Grey:	Kuibis quartzites of the Nama Group
Dark yellow:	Schists & gneisses of the Korannaland Sequence
Light brown & pink:	Schists & Quartzites of the Olifantshoek Sequence
Green:	Banded ironstone of the Griqualand West Sequence
Olive:	Dolomites of the Griqualand West Sequence
Dark brown:	Ventersdorp lavas etc.

The African continent is characterised by desert and semi-desert climates in mid-latitudes, both north and south of the equator where the subtropical high-pressure cells are situated. Southern Africa is characterised by the Namib desert on the Atlantic coast and the Kalahari desert in the centre of the sub-continent. These deserts are characterised by low and irregular rainfall, very high solar radiation which produces high rates of evaporation and high day-time temperatures contrasting with low night-time temperatures (Nyamweru 1997:34).

Using Thornthwaite's classification of climate, Poynton (1971) describes the southern Kalahari region as Arid Mesothermal with moderate frost (E5) in the west and Semi-arid Mesothermal with moderate frost (D5) in the east. Bloubaos itself lies in the western arid zone, close to the 200mm isohyet.

The nearest long-term climatic station of the Weather Bureau is that of Upington. Here the rainfall during the 20<sup>th</sup> century averages 180mm per annum, but it is highly variable. In 1903 and again in the 1932/33 season only 34mm fell, while in 1950, 500mm was recorded and on three occasions more than 300mm a year was experienced since 1960 (South African Weather Bureau data). The area is well within the summer rainfall region with most of the precipitation occurring between November and April. The rain is rapidly absorbed in the sandy soils and it is only after heavier showers that runoff accumulates in the pans for a while (Butzer 1984:117).

The desert climate of the region is characterised by large daily variations in temperature. At Upington the average maximum and minimum temperatures recorded during the hottest month, January, are 36°C and 20°C. In midwinter the average maximum reaches 21°C and the minimum temperature is 4°C on average (South African Weather Bureau data). During the dry season, frosts in the early morning are not uncommon (Grove 1969:191).

In winter the winds blow mainly from the north and occasionally reach velocities of over 14m/sec. Between October and January it is



predominantly from the south-west. However, significant sand movement is not induced by these winds (Lancaster 1987:104).

## 2.5. Flora

The study area is situated within the Kalaharian ecozone as identified by Devred (Klein 1984:117).

### 2.5.1. Vegetation

Desert vegetation is inherently drought-resistant. The flora is characterised by deep roots, thick bark, thorns and small waxy or hairy leaves and tend to show rapid growth after rains (Nyamweru 1997:34). The veld type in the study area falls within Acocks's (1988) western and north-western form of the Kalahari Thornveld Proper. The Western Form is typically an open savannah of *Acacia erioloba* and *A. haematoxylon* with desert grasses and is found mainly west of the Asbestos, Kuruman and other hills. The crests of linear dunes are mostly bare in this drier part of the Kalahari region (Lancaster 1987:103-104). On Bloubos, dunes as a whole carry rather sparse vegetation with plants mostly growing along their edges. Acocks mentions that in the Gordonia district calcareous tufa and silcrete outcrops are associated with Arid Karoo or Orange River Broken Veld vegetation (Acocks 1988:44-46).

The subdivision of the abovementioned Arid Karoo Veld type relevant to the research area is the Blomkoolganna Veld which is found on sandy calcareous tufa. This veld type is characterised by a uniform and dense growth of desert grasses *Salsola tuberculata*, *Stipagrostis obtusa* and *S. ciliata*. Short grasses which include *Oropetium capense* and *Stipagrostis brevifolia* often also cover the ground. The latter is an extremely hardy plant which, even in droughts, manages to survive by shedding its leaves, forming a "little woody yellow-brown bush" (Acocks 1988:74). Annuals and geophytes also occur in the Blomkoolganna Veld and are numerous after good rains. The relevant subdivision of the Orange River Broken Veld is mainly associated with calcareous tufa of great depth and stony terrain, and is called *Acacia mellifera* subsp. *detinens* Veld. The latter, as well

as a variety of Karoo bushes and grasses are in this veld type. Acocks specifically mentions that the grasses would have been more plentiful in the past (Acocks 1988:75, 83).

Grass types which occur specifically on the Bloubos dunes include tall bushman grass (*Stipagrostis ciliata* var. *Capensis*), small bushman grass (*Stipagrostis obtusa*) and sour grass (*Schmidtia kalahariensis*) (pers. comm. F. Liebenberg). These grass types all prefer sandy soil as habitat and consequently occur regularly on dune sand (Van Oudtshoorn 1992:200, 204-205). The annual sour grass flourishes after adequate precipitation and grows in large clusters next to watercourses as well as on dunes. The sour grass is a valuable food source for animals when young and tender (Mills & Haagner 1989:14). Duwweltjies (*Tribulus terrestris*) whose bright yellow flowers enliven the sand coloured landscape, occur in broad stands after rain on the farm (Leistner 1967:111).

#### 2.5.2. Trees and shrubs

The area also features shrubs and trees. Smaller shrubs occurring on Bloubos include the kapokbossie (*Eriocephalus ericoides*) which is found primarily on the 'hardeveld' (Milton & Dean 1996:88). Another shrub found on Bloubos, especially on the dunes, is the driedoringbossie (*Rhigozum trichotomum*) (Milton & Dean 1996:87). The driedoringbossie is an important source of food for sheep and other browsers since both the bushman grass types are annuals which only thrive after rain (Smith & Metelerkamp 1995:9). On the hardeveld one finds the swarthaak (*Acacia mellifera* subsp. *detinens*) (Palmer 1961:160).

Trees growing on dunes on Bloubos include the vaalkameeldoring (*Acacia haematoxylon*), the kameeldoring (*Acacia erioloba*) and the witgat (*Boscia albitrunca*) (Mills & Haagner 1989:96; Palmer 1977:109, 127). The *Acacia* species grow in dune sand but also in riverbeds since their extensive root systems are able to penetrate deep into the sand to reach the ground water below. Due to the shortage of water on the dunes though,

they tend to grow only into bushes. The witgat is a common sight on dunes (Mills & Haagner 1989:13).

### 2.5.3. Edible plants

On Bloubos, the rosyntjieboom or korentebessie (*Rhus* genus) is found on the hardeveld. The fruits of this *Rhus* species are small and fleshy and can differ in colour from brightly coloured to brown. These fruits are nowadays eaten by most indigenous people as well as by birds (Palmer 1977:185). The tsama melon (*Citrullus lanatus*) represents another edible wild fruit found on dunes and in riverbeds on the farm. The tsama melon grows along the ground and is a very valuable source of refreshment to humans, birds, mammals and insects with 90% to 95% of the fruit being water. While the tsama is an annual plant, the gemsbokkomkommer (*Acanthosicyos naudinianus*) is a perennial wild fruit. The cucumber has the same nutritional value as the tsama, both being rich in Vitamin C (Mills & Haagner 1989:16, 96).

Further edible plants occurring in the southern Kalahari include *Caralluma knobelli* and the bobbejaankomkommertjie (*C. lugardii*) of which the stems can be eaten, *Coccinia rehmannii* and *C. sessilifolia*, the wildekomkommer (*Cucumis africanus*) and *Ipomoea bolusiana* (Leistner 1967:106-108).

The exploitation of plant foods in historical times mentioned in connection with the immediate area along, and north and south of the Orange River, could also be applicable to Bloubos itself. Early travellers mention the collection of root plants, fruits and seeds by 'bushmen'. Tree gum, beans from pods and honey were also eaten. The eighteenth century traveller, Mossop, described how *Acacia* seeds were crushed and mixed with wild lily and wild raisins and then stored and used when needed (Smith 1995:7).

## 2.6. Fauna

### 2.6.1. Present-day fauna

At present, a variety of wild animals still occur on the farm. A comprehensive list compiled by the owner, Mr. F. Liebenberg, is presented in Appendix A. Scientific names were quoted from Skinner and Smithers (1990). Several other species were undoubtedly also present in prehistoric times. The Kalahari Gemsbok National Park belongs to the same Kalaharian ecozone and the animals there would also have occurred on Bloubos. A list of the mammals in that park is presented in Appendix B. In addition to those presently on Bloubos, this list includes game animals such as eland, red hartebeest, jackals and hyaenas.

### 2.6.2. Earlier records

In prehistoric and early historical times the faunal composition of the study area was more extensive. Eye-witness accounts of eighteenth century travellers are, since these explorers were mainly hunters, somewhat biased as to which species of animals they report, but they do give some indication of the wildlife in the area in those days (Smith & Metelerkamp 1995:5). During his voyage to the mouth of the Orange River and further along it in 1779 to 1780, Gordon witnessed the hunting of giraffes near the Augrabies Falls and several hippopotamus herds and rhinoceros along the river. On the islands between the Falls and the confluence with the Hartebeest River baboons, ducks and cormorants were seen (Raper & Boucher 1988:320-324). The amount of wildlife along the river in early historical times is clear from Gordon's mention of elephant and hippo hunting, his sighting of a herd of 8 kudu bulls and his comments on the mountain zebra. Other animals mentioned by Gordon in his recordings are hyenas, jackals, caracals and hartebeest (Raper & Boucher 1988:332-340).

The subsistence value of fish from the Orange River should not be overlooked. Smith & Metelerkamp identify the smallmouth yellowfish (*Barbus holubi*), the orange river mudfish (*Labeo capensis*), the



largemouth yellowfish (*Barbus kimberleyensis*), the moggel (*Labeo umbratus*) and the sharptooth catfish (*Clarias gariepinus*) as being of economic importance (1995:5, 7). Gordon mentions not only the fishing for moggels by means of traps, but also that dried fish were eaten by the inhabitants along the River (Raper & Boucher 1988:322-324).

## **2.7. Conclusions**

Despite the obvious drawbacks to living in a desert environment, the southern Kalahari should not be seen as entirely inhospitable. The geomorphological, floral, and faunal conditions on Bloubos provided good hunting ground, some shelter, and plant foods for nomadic hunter-gatherers. During the rainy season, normally dry riverbeds and pans could provide water. During this brief interval the possibility of nomadic pastoralism in the area can not be ignored. The environmental setting on Bloubos and the southern Kalahari as a whole, could clearly have sustained a variety of economic customs in prehistoric times.