

A HABITAT MAP OF THE KALAHARI GEMSBOK NATIONAL PARK

by

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Abstract – The Kalahari Gemsbok National Park exhibits some six major habitats. Away from the river beds the tree savanna is limited to the northern corner of the park, consisting of *Acacia giraffae* woodland and scattered dunes. The Nossob and Auob riverbeds and adjacent areas also harbour *A. giraffae* except in the south where *A. haematoxylon* becomes dominant, and where the Karoo flora increases. The dunes covered with trees and shrubs usually support *Boscia albitrunca*, *A. mellifera* and an occasional *A. giraffae*. Where the dunes are superficially without shrub vegetation, *Stipagrostis amabilis* is dominant, although low, shrub-like *A. haematoxylon* also occurs. The plains also contain low *A. haematoxylon* shrub and several dominant grasses. Pans are abundant and their vegetation is usually characterized by stands of *Rhizoglyphum trichotomum* and *Monechma incanum*.

Introduction

In recent years, the Kalahari Gemsbok National Park (K.G.N.P.) has received increased research attention. As the different research projects in the park proliferated, however, the need also arose for a habitat map of the area. This paper is a brief description of such a map discussing the major habitats encountered within the park. On the accompanying map, a grid has been added to facilitate plotting events and observations. The successful use of the grid naturally also depends on the observer's knowledge of the area and his ability to pinpoint his whereabouts. Some of the features (roads, windmills, etc.) on the map will inevitably also change in future. Nevertheless, it is hoped that it will serve a useful purpose in research projects and for future management policies within the boundaries of the K.G.N.P.

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Material and Methods

The map was designed for use during fieldwork. It therefore accentuates prominent habitat features of the K.G.N.P., without going into finer detail. The first draft copy was compiled from information derived from aerial photographs of the park. This involved scrutinizing some 601 photographs (each about 23 cm square) purchased from the Trigonometrical Survey Office in Pretoria (Job 526, scale 1:36 000, photographed during 21 July–11 August 1964).

Details from these photographs were transferred onto tracing paper and reduced by a 4 x factor using a pantograph. This draft map was then refined and the additional information was transferred onto a second copy. Further details pertaining to roads, camps, windmills and boreholes were added after consultation with Messrs. C.F.S.A. and E.A.N. le Riche, both resident in the K.G.N.P. Figures for average dune heights were obtained from 1:250 000 topographic maps of the area (Trigonometrical Survey Office, Pretoria). The final version of the map was eventually copied again and reduced photographically to obtain copies of maps with variable scales, an example of which accompanies this paper.

A grid of three kilometre square blocks, selected as a meaningful reference for research studies, has been superimposed on the map and is shown by figures and the alphabet. Personal observations as well as data in Leistner (1959, 1967) were used to characterize vegetation areas in the descriptions below. The vegetation zones as suggested by Leistner (1959) are indicated by approximation.

For additional details on the geology, water resources and vegetation of the K.G.N.P. see Brynard (1958). Smit (1964) provides information on geology and hydrology, while Louw (1964) discusses the geology and soils (profiles, chemical analysis, mineral licks and water analysis) of the area.

The major habitats

Six major habitat categories are recognizable in the K.G.N.P. viz. (1) the riverbeds of the Auob and the Nossob, (2) pans, (3) tree savanna, (4) dunes with tree- or shrub-covered crests, (5) dunes superficially devoid of trees and shrubs and (6) flat, open grassy plains. Within these categories some smaller subdivisions exist in different localities. The major categories are discussed below.

(1) *The riverbeds*

Unless otherwise indicated, the major roads in the K.G.N.P. are situated within the riverbeds.

The Nossob River

The Nossob River bed varies considerably in width. It tends to form a narrow channel, 100–500 m across, flanked with steep limestone banks in the south, and it changes to a wide, shallow, sandy

bed up to one kilometre and more in width in the north. The latter is typical of the area between the northernmost tip at Unie-End and Kameelsleep, while the former is found from Kij-Kij to Twee Rivieren. A number of permanently dry tributaries, cut off by transverse dunes running in a north-east direction, enter the Nossob, the most prominent of which is the Polentswa in the vicinity of Grootbrak.

The riverbed of the Nossob from the Nossob Camp to Unie-End lies within the zone II vegetation (Leistner, 1959). It has a savanna-like appearance with large *Acacia giraffe* (kameeldoring) trees in a grassland dominated by *Panicum coloratum* var. *coloratum* (buffelgras) and *Eragrostis bicolor* (blouaadgras).

The banks have no calcrete outcrops and are dominated by *Stipagrostis obtusa* (kortbeenboesmangras), mixed in some areas with *Rhigozum trichotomum* (driedoring). The transition area between the riverbed and the sandveld interior is covered by the grasses *Schmidtia kalahariensis* (suurgras), *Stipagrostis ciliata* var. *capensis* (langbeenboesmangras), *Eragrostis lehmanniana* (soetgras), by the shrubs *Rhigozum trichotomum* and *Monechma australe* (perdebos) and *Acacia giraffae*.

The river dunes of the northern Nossob are characterized by denser stands of shrubs and trees. The occurrence of *Acacia luederitzii* var. *luederitzii* (haak-en-steek) and *Grewia retinervis* (bessiebos) is restricted to this area of the park. Other shrubs are *Grewia flava* (bessiebos), *Acacia mellifera* subsp. *detinens* (swarthaak) and *Acacia haematoxylon* (vaalkameel) while *Acacia giraffae* and *Boscia albitrunca* (witgat) are prominent trees. Between the dunes *Stipagrostis obtusa* grows prominently, probably on account of the fact that the soil in the *strate* is richer in lime than elsewhere in the sandveld.

The Nossob River from Nossob Camp southwards to Jan-se-Draai is placed in the zone III vegetation by Leistner (1959). *Stipagrostis obtusa* is less prominent while the incidence of an arid Karoo flora increases. Otherwise, the riverbed vegetation is similar to that found in the north. In this area the riverbanks show small calcrete outcrops absent further north. The transition between the riverbanks and the sandveld interior is narrower in the south, but with similar vegetation. The only exception is the occurrence of *Acacia hebeclada* subsp. *hebeclada* (trassiebos), which grows on the riverbanks from Jan-se-Draai to Nossob Camp, absent further north.

The area from the Auob-Nossob confluence to Jan-se-Draai portrays Leistner's (1959) zone IV vegetation with *Acacia haematoxylon* as the dominant tree in the riverbed, mixed with scattered *Acacia giraffae*, *Lycium hirsutum*, *L. austrinum* (brosdoring), *Grewia flava* and *Ehretia rigida* (kraalbessie). The southernmost half of this stretch of the Nossob River is almost treeless for a distance of one to two kilometres. This feature could be a legacy of human occupation, especially on the Botswana side of the river during the park's earlier history, although conditions there are considered less favourable for tree growth than

elsewhere in the Nossob. Where woody plants do occur, they are found mainly in areas of relatively higher soil moisture, especially in the riverbeds (Leistner, 1959).

The southernmost Nossob riverbed is relatively narrow, with steep calcrete banks, and while the overall aspect and vegetation here closely resembles that found in the Auob, the vegetation of the Nossob is more karroid in nature (Leistner, *op. cit.*).

The Auob River

From Twee Rivieren, some six kilometres northwards to the confluence of the rivers and thence onwards to approximately 10 kilometres up the Auob, the bloubos *Lebeckia linearifolia* is a prominent shrub, the only other locality where it is encountered in the park is on the high, lime-rich dune ("kop") at Klein Skrij Pan (Leistner, 1959).

The course of the Auob River cuts into limestone plains for much of its length, resulting in a channel as much as 40 m deep and 800 m wide (Leistner, 1967). The Auob riverbed includes vegetation of Leistner's zones III-V. From Mata-Mata south-eastwards to Kamkwa, *Rhigozum trichotomum* and *Stipagrostis obtusa* are relatively scarce on the riverbanks, while in the riverbed itself a number of small circular thickets are found, consisting of *Acacia hebeclada* subsp. *hebeclada*, *Lycium hirsutum*, *Acacia giraffae* and some *Asparagus* sp. (katbos) (Leistner, 1959). South of Kamkwa, the Auob cuts deeper into the plains and therefore has steeper banks. The vegetation on the banks remains similar to that in the north, while in the riverbed *Acacia haematoxylon* becomes more prominent.

The occurrence of *Acacia giraffae* and *Acacia haematoxylon* as trees in both riverbeds is apparently closely associated with rainfall. The former mainly occurs in areas with an annual precipitation of more than 200 mm, while the latter is prominent in areas with less than 200 mm of rain annually. However, in the area with less than 200 mm rain, *A. haematoxylon* shrubs are found on loose sand only, with *Rhigozum trichotomum* on compact sand (Leistner, 1967).

(2) *Pans*

Pans occur abundantly in the K.G.N.P. especially in the Sewe Panne area and along the southern boundary bordering the Mier Settlement. Leistner (1967) describes two main pan types, *viz.* calc pans and salt pans. The former are more frequent and consist of depressions in sandy limestone surfaces filled in with a clay-like soil on the floor. The salt pans have a high sodium chloride content on the pan floor and are less common.

Most large pans have an accumulation of sand on the lee-side, usually to the south-east of the pan itself. These high dunes also tend to be higher and paler in colour than the other dunes of the surround-

ing area. The vegetation of the pans usually forms concentric circles radiating from the pan centre (Leistner, 1967).

The importance of the pans and pan-like depressions to wildlife in the K.G.N.P. cannot be overestimated (Leistner, 1959). The vegetation in the pans and vicinity differs vastly from that of the sandveld and is probably rich in minerals which are lacking in the sandveld areas. The pan dunes mentioned above also support a greater variety of plant species than ordinary dunes, while the pans themselves are often used as natural mineral licks by game.

The most prominent plants on the smaller pans are *Rhigozum trichotomum*, *Monechma incanum* (bloubos), *Geigeria ornativa* (vermeerbos) and *Schmidtia kalahariensis*. The larger pans usually have a bare centre with the diversity of plants surrounding it similar to that of the small pans (Leistner, 1967). The pans along the southwestern boundary are usually without perennials. Around these pans, however, the same plant species as mentioned above occur, supplemented by *Monechma australe*.

(3) *Tree savanna*

A tree savanna is usually a typical feature in Kalahari areas with a rainfall exceeding 250 mm annually (Leistner, 1967). In the K.G.N.P. tree savanna is found in the area adjacent to the Nossob and Auob rivers and in the immediate proximity of Dankbaar in the far north.

The vicinity of Dankbaar consists of scattered, irregular dunes interspersed with long, wide valleys or flats. In the valleys the dominant tree is *Acacia giraffae*, often adorned by the nests of the sociable weaverbird (*Philetairus socius*). On the dune crests, specimens of *Boscia albitrunca* are encountered, with a fair scattering of trees and shrubs exclusive to Leistner's zone II vegetation, such as *Rhus tenuinervis*, *Terminalia sericea* (sandgeelhout), *Albizia anthelmintica* (bonthout) and *Grewia retinervis*. Also present are *Acacia mellifera*, *Grewia flava* and *Lycium austrinum*. The area between the dunes is grassland with interspersed *Eragrostis lehmanniana*, *Stipagrostis uniplumis* var. *uniplumis* (blinksaadgras), *Asthenatherum glaucum* (ghagras) and *Stipagrostis amabilis* (duinsteekriet).

(4) *Dunes with trees and shrubs*

To the south of a line just north of Mata-Mata to Sewe Panne and the Nossob Camp, many dunes are relatively large and have crests dotted with *Boscia albitrunca*, *Acacia mellifera* and a few *Acacia giraffae*. This veld type peters out north of this line in the direction of Dankbaar, and this imaginary line also corresponds roughly with the southern limit of *Terminalia sericea* and *Rhus tenuinervis* (Leistner, 1959).

To the south and west of the Auob this veld is also encountered.

It consists of red dunes with long and narrow valleys. The dune crests are sparsely covered by stunted *Boscia albitrunca* and some *Acacia haematoxylon*, while *Acacia giraffae* is rare. The valleys between the dunes are dominated by *Rhigozum trichotomum*, *Monechma incanum*, *Lycium hirsutum* and *Schmidtia kalahariensis*, while the occurrence of *Brachiaria glomerata* (soetgras) is common.

In the area adjoining the Mier settlement in the southwest, long parallel dunes occur. Trees are rare while the dune crests are covered sparsely by shrub-like *Boscia albitrunca* and *Acacia haematoxylon*, while *Acacia giraffae* is extremely rare and the dune crests are essentially bare of grass. Pure stands of *Rhigozum trichotomum* occur extensively between the dunes (Leistner, 1967). This area is often referred to as the "red dunes".

(5) *Dunes superficially devoid of trees and shrubs*

At a glance, these dunes appear devoid of shrub and tree growth. However, they are covered by grass *Stipagrostis amabilis* on their crests, and on closer inspection also harbour a fair scattering of *Acacia haematoxylon* in a low, shrub-like form. Other grasses common on and between these dunes are *Eragrostis lehmanniana*, *Stipagrostis uniplumis* and *Asthenatherum glaucum*. Occasional patches of *Rhigozum trichotomum* and *Monechma incanum* occur in localized depressions in the dune valleys.

(6) *Plains*

The area between the two rivers shows a number of extensive, flat plains without dunes. In many instances these flats are separated from each other by narrow belts of dunes. Although these areas are fairly level and treeless, occasional shallow, local depressions do occur. The vegetation is very homogeneous, and often contains *Acacia haematoxylon* in a low, shrubby form. The dominant grasses are *Eragrostis lehmanniana*, *Stipagrostis uniplumis*, *Stipagrostis amabilis*, *Asthenatherum glaucum* and *Brachiaria glomerata*. In the depressions, plants such as *Rhigozum trichotomum*, *Monechma incanum* and *Schmidtia kalahariensis* are common (Leistner, 1959). The plains are generally more extensive in the area north of the Auob and south of Bayip than in the south-eastern sections of the park.

(7) *Severely irregular dunes*

While perusing the aerial photographs, four relatively small and localized areas were noted which differ obviously from any other area found elsewhere in the K.G.N.P. Little is known about these irregular dunes and they are being investigated and no explanation about their origin can be given at this stage. In gross appearance they consist of closely-packed sand ridges or dunes which often have almost sheer vertical sides. The four examples are all situated in the

triangle formed by the Moravet-Kameelsleep road and the two rivers.

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