

The vegetation of the Boskop Dam Nature Reserve, Potchefstroom

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The Braun-Blanquet technique, complimented by TWINSPAN, was used for a phytosociological classification of the study area. Thirteen plant communities were recognised and described. A hierarchical classification is suggested and each community is related to its particular environmental characteristics.

Keywords: Conservation area, dolomite, plant communities, vegetation classification, western Transvaal grassland.

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Introduction

Vegetation and general ecological surveys of conservation areas are considered to have high priority (Nakor 1979), as a sound knowledge of the ecology of these areas is an essential prerequisite for the establishment of sound wildlife management programmes (Bredenkamp & Theron 1978, 1990 & 1991).

Other studies in conservation areas of the western Transvaal grasslands include the Abe Bailey Reserve near Carletonville (Van Wyk & Bredenkamp 1986) and the Faan Meintjes Nature Reserve near Klerksdorp (Bredenkamp & Bezuidenhout 1990).

For this reason, and also as part of a survey programme for conservation areas in South Africa, a study of the vegetation of the Boskop Dam Nature Reserve was undertaken. This study also fits in with a comprehensive phytosociological research programme under the Grassland Biome Project (Mentis & Huntley 1982; Scheepers 1987), with the ultimate aim of a phytosociological and syntaxonomical synthesis of the vegetation of the western Transvaal grasslands (Bezuidenhout *et al. in press.*) as well as the Grassland Biome in South Africa (Bredenkamp *et al.*

1989; Bezuidenhout *et al.* 1993; Fuls *et al.* 1993). In this regard a study of the Boskop Dam Nature Reserve may specifically complement a regional study of the dolomitic region in the Potchefstroom-Ventersdorp-Randfontein area (Bezuidenhout & Bredenkamp 1990).

The aim of this study was therefore to classify, describe, interpret and map the vegetation units of the Boskop Dam Nature Reserve.

The study area

The Boskop Dam Nature Reserve is situated approximately 20 km north of Potchefstroom (Fig. 1). The reserve covers 3 160 hectares, of which the dam extends over 374 hectares. The dam was constructed in the Mooi River, which originates from two perennial springs from the dolomite water reservoir towards the north (Du Toit 1954). The entire area is situated on dolomite of the Malmani Subgroup (Chuniespoort Group, Transvaal Sequence) (SACS 1980), representing the Klipveld (Louw 1951) of the western variation of the Bankenveld (Acocks 1988). Natural vegetation is mostly confined to very shallow, rocky and non-arable soils. The grazing is consid-

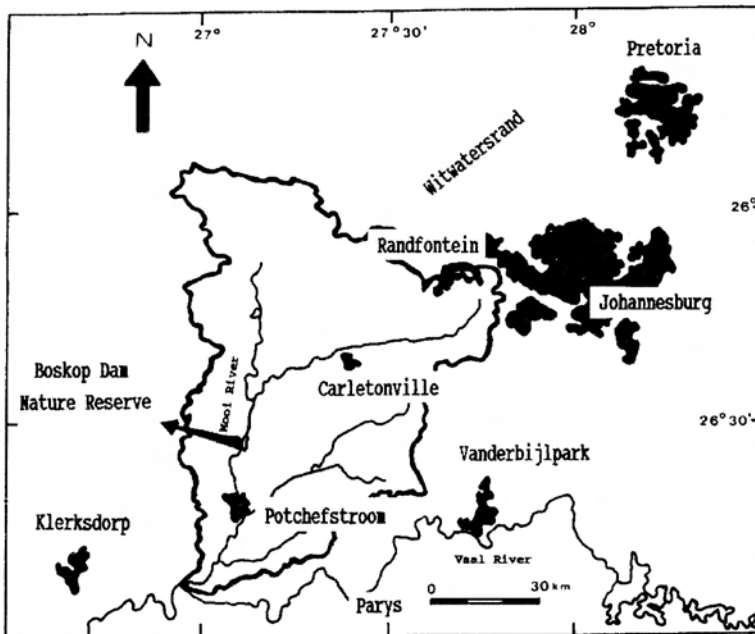


Fig. 1. The location of the Boskop Dam Nature Reserve in the Mooi River Catchment Area (64).

ered a sour, wiry grassland, virtually ungrazable in winter (Acocks 1988), and is not dominated by a single or few species, but represents a mosaic of many co-dominants (Louw 1951).

According to the Köppen classification the area has a Bs- climate, that is a cool dry steppe with summer rains. The rainfall is erratic but the average annual rainfall measured on the Reserve for the period 1980-1986 is 621 mm. The long term average rainfall for Potchefstroom over 81 years is 625 mm (Bezuidenhout & Bredenkamp 1990). The mean monthly maximum temperatures are high exceeding 32°C during October to January while mean monthly minimum temperatures are below -1°C during May to September. The winters are severely frosty (Weather Bureau 1986).

Methods

Relevés were compiled in 80 stratified random, 25m² sample plots. Stratification was done on 1 : 10 000 scale aerial orthophotographs, on basis of relatively homogeneous physiographic and physiognomic units. The number of sample plots were divided among these units *pro-rata* on an area size basis. In each sample plot a list of all species identifiable at the time of the survey (January/February) were made, and the cover-abundance of each species noted using the Braun-Blanquet scale (Mueller-Dombois & Ellenberg 1974). Taxa names conform to those of Arnold & De Wet (1993). Additionally the height (m) and canopy cover (%) of each stratum was noted. Habitat data recorded include topographical position and rockiness of the soil surface.

Two way species indicator analysis (TWINSPAN, Hill 1979) was used to classify the relevés, and the result was refined by application of Braun-Blanquet procedures. This approach proved to produce ecologically reliable results in many phytosociological studies in the Grassland Biome (Bredenkamp *et al.* 1989; Eckhardt *et al.* 1993; Fuls *et al.* 1993).

The results of the final classification are presented in a phytosociological table (Table 1). No attempt was made to formally fix syntaxa names as this is normally avoided in detailed local studies (Coetzee 1983).

Results and Discussion

The analyses resulted in the recognition of 12 individual plant communities. The hierarchical classification is as follows:

1. *Triraphis andropogonoides* Grassland Community

> *Triraphis andropogonoides-Trachypogon spicatus* Subcommunity

» *Eustachys paspaloides* Variant

» *Schizachyrium sanguineum* Variant

> *Triraphis andropogonoides-Eragrostis superba* Sub-community

» *Salvia radula* Variant

» *Antheophora pubescens* Variant

> *Triraphis andropogonoides-Themeda triandra* Subcommunity

2. *Rhus pyroides* Woodland Community

> *Rhus pyroides-Celtis africana* Bush Community

> *Rhus pyroides-Acacia karroo* Bush Community

> *Rhus pyroides-Cynodon dactylon* Subcommunity

3. *Hyparrhenia hirta* Wetland Community

> *Hyparrhenia hirta-Verbena bonariensis* Variant

> *Hyparrhenia hirta-Eragrostis plana* Variant

4. *Haemanthus humilis-Zinnia peruviana* Grassland Community

5. *Senecio isatideus-Artemisia afra* Wetland Community

6. *Setaria lindenbergiana-Combretum molle* Woodland Community

1. *Triraphis andropogonoides* Grassland Community

This community represents the general mesic grassland occurring on the dolomite in the region. This grassland also covers the largest part of the reserve. It occurs on shallow soils on the upland plains, with numerous dolomite rocky outcrops and rock sheets, typical of the dolomitic area. This grassland is characterised by species group G (Table 1).

The diagnostic species are the grasses *Triraphis andropogonoides* and *Eustachys paspaloides*, while non-grassy herbaceous species, such as *Plexipus hederaceus*, *Tylosema esculentum*, *Barleria macrostegia* and *Vernonia oligocephala* are also diagnostic. Although the species of species group F (*Brachiaria serrata*, *Justicia anagalloides*, *Chamaecrista biensis*, *Acalypha angustata* and *Elephantorrhiza elephantina*) occur only sporadically in one of the communities classified under Community 1 (the *Triraphis andropogonoides-Themeda triandra* Subcommunity), these species may also be considered as diagnostic for Community 1. All these species were also identified as diagnostic of the widespread *Justicia anagalloides-Elionurus muticus* grassveld described from the Abe Bailey Nature Reserve (Van Wyk & Bredenkamp 1986), indicating that they could be considered as diagnostic for the general grassland type of the dolomite region in the western Transvaal.

Typical of the grasslands of the dolomite, no single grass species attains dominance (Louw 1951). However, *Triraphis andropogonoides*, *Themeda triandra*, *Setaria spachelata*,

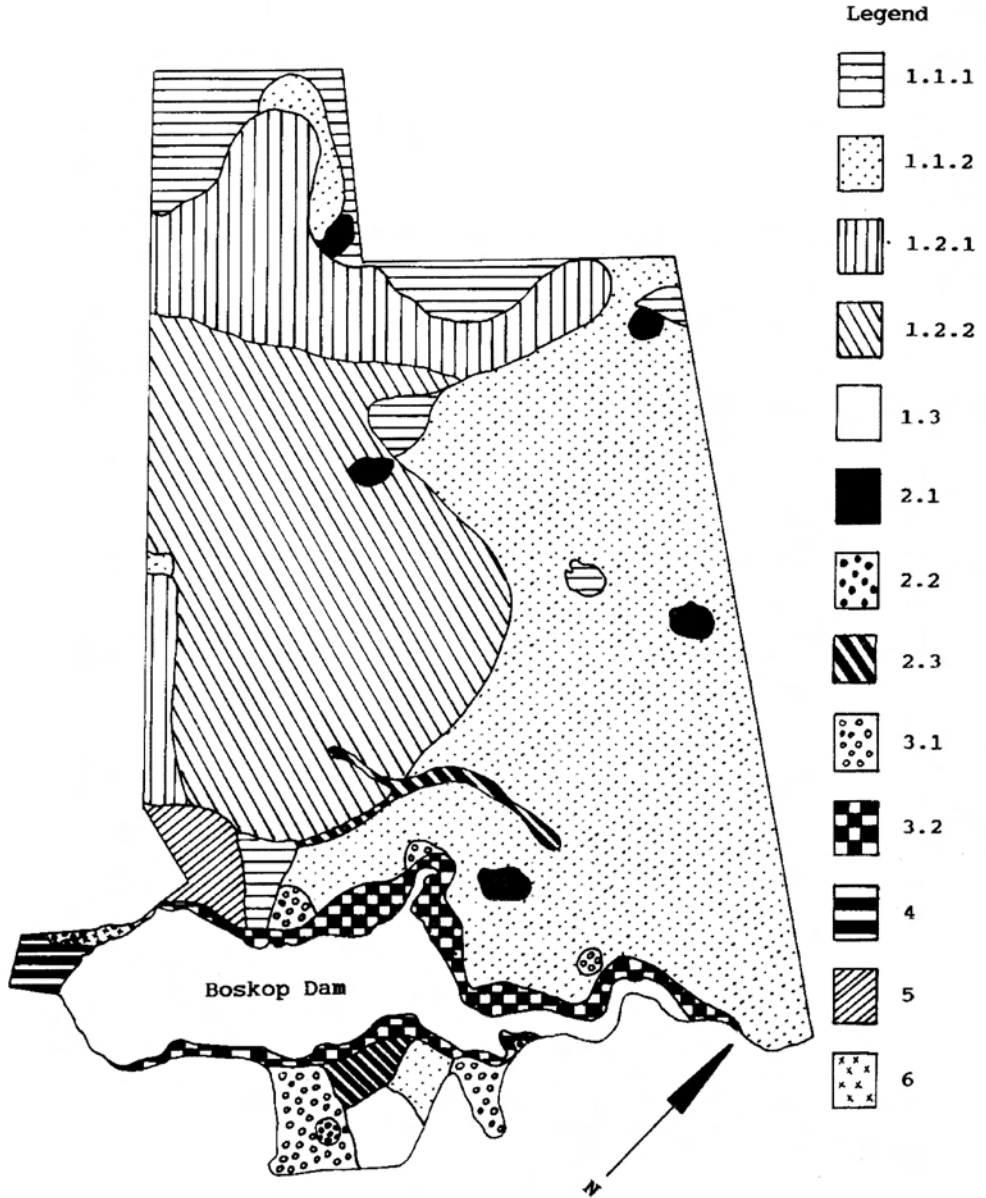


Fig. 2. A vegetation map of the Boskop Dam Nature Reserve (1.1.1 - *Eustachys paspaloides* Variant, 1.1.2 - *Schizachyrium sanguineum* Variant, 1.2.1 - *Salvia radula* Variant, 1.2.2 - *Anthehora pubescens* Variant, 1.3 - *Triraphis andropogonoides*-*Themeda triandra* Sub-community, 2.1 - *Rhus pyroides*-*Celtis africana* Bush Community, 2.2 - *Rhus pyroides*-*Acacia karroo* Bush Community, 2.3 - *Rhus pyroides*-*Cynodon dactylon* Sub-community, 3.1 - *Hyparrhenia hirta*-*Verbena bonariensis* Variant, 3.2 - *Hyparrhenia hirta*-*Eragrostis plana* Variant, 4 - *Haemanthus humilis*-*Zinnia peruviana* Grassland Community, 5 - *Senecio isatideus*-*Artemisia afra* Wetland Community, 6 - *Setaria lindenbergia*-*Combretum molle* Woodland Community).

Aristida congesta and *Eragrostis curvula* may be locally prominent.

A variety of forb species indicative of degradation occur in places throughout this grassland. Some of the most constantly present include *Cucumis hirsutus*, *Pollichia campestris*, *Lightfootia denticulata*, *Lippia scaberima* and *Anthospermum rigidum*.

Due to floristic variation, and also heterogeneity in habitat, Community 1 is divided into various communities and subcommunities. This was also found in the case of the *Justicia anagalloides-Elionurus muticus* grassveld described from the Abe Bailey Nature Reserve (Van Wyk & Bredenkamp 1986) as well as in the *Justicia anagalloides - Elionurus muticus* Grassland Community from the Potchefstroom-Ventersdorp-Randfontein area (Bezuidenhout & Bredenkamp 1990). This Community relates well with the *Trachypogon spicati - Diheteropogon amplexentis* which was described by Bezuidenhout *et al.* (*in prep*) in the dolomitic and chert grassland in the western Transvaal.

> *Triraphis andropogonoides-
Trachypogon spicatus*
Subcommunity

This subcommunity is restricted to the relatively dry, well drained upland crests or high altitude plains in the undulating landscape. Dolomite rock sheets and gravel cover 10 - 30 % of the soil surface.

The subcommunity is characterised by species group A (Table 1), and the diagnostic species are the prominent grass species *Trachypogon spicatus* and *Diheteropogon amplexentis*, as well as *Eragrostis racemosa* and the dwarf shrub *Triumfetta sonderi*. This subcommunity also contains a number of the diagnostic species of the *Justicia anagalloides-Elionurus muticus* grassveld from the Abe Bailey Nature Reserve (Van Wyk & Bredenkamp 1986), and from comparing the floristic data it seems as if the *Triraphis an-*

dropogonoides-Trachypogon spicatus Subcommunity represents the typical form of the *Justicia anagalloides-Elionurus muticus* grassveld.

A similar community, the *Schizachyrium sanguineum - Andropogon schirensis* Grassland is described by Bezuidenhout & Bredenkamp (1990) in the Potchefstroom-Ventersdorp-Randfontein area. This Subcommunity also relates to the *Loudetia simplicis - Diheteropogon amplexentis* from the dolomitic and chert grasslands in the western Transvaal (Bezuidenhout *et al.* *in prep.*).

» *Eustachys paspaloides*
Variant

The *Eustachys paspaloides* Variant is characterised by the absence of species group B (Table 1), and mostly occurs along the north-western boundary (Fig. 2), or on local patches where large dolomite rocks cover up to 20 - 30 % of the soil surface.

» *Schizachyrium sanguineum*
Variant

This variant is situated in the eastern part of the reserve (Fig. 2), on very shallow (0-300 mm) gravelly soil, but with only about 10 % rock cover of the soil surface.

The *Schizachyrium sanguineum* Variant is characterised by species group B (Table 1), which includes the prominent diagnostic grass species *Andropogon schirensis*, *Schizachyrium sanguineum*, *Melinis nerviglume*, *Trichoneura grandiglumis* and *Tristachya rehmannii* and also the forbs *Sphenostylis angustifolia*, *Senecio venosus*, *Bulbostylis burchellii*, *Ursinia nana*, *Kohautia amatymbica*, *Lotononis calycina*, *Tephrosia elongata* and *Dicoma anomala*.

The presence of these diagnostic species and the similarities in habitat (shallow soil and low rock cover) suggests that this variant is related to the *Setaria sphacelata* Variant of

the *Justicia anagaloides-Elionurus muticus-Panicum natalense* grassveld described from the Abe Bailey Nature Reserve (Van Wyk & Bredenkamp 1986).

- > *Triraphis andropogonoides-Eragrostis superba*
Subcommunity

In general this community is situated on less drained areas in relatively low-lying bottom-land situations in the undulating landscape. Wet rock sheets cover large areas (25–50 %) and the soil is restricted and extremely shallow (0–50 mm).

The community is characterised by species group C (Table 1), and the diagnostic species include the grasses *Eragrostis superba* and *Eragrostis gummiflua*, the latter being indicative of the waterlogged conditions that may occur from time to time. The diagnostic small grass species *Microchloa caffra* and *Sporobolus discosporus* indicate the extremely shallow soils covering the extensive rock sheets.

In the Potchefstroom-Ventersdorp-Randfontein area a similar community (*Eustachys paspaloides-Setaria flabellata* Grassland) was mentioned by Bezuidenhout & Bredenkamp (1990). The *Triraphis andropogonoides-Eragrostis superba* Community relates to the sub-association of the *Cymbopogon plurinodis-Eragrostidetum gummifluae* as was described by Bezuidenhout *et al.* (*in prep.*).

- » *Salvia radula* Variant

This variant is typically found locally on flat plains with disturbed soils. Rock sheets are not so prominent here.

The shrubby and prominent *Salvia radula* and the conspicuous geophytes *Boophane disticha* and *Hypoxis hemerocalidea* are diagnostic species.

The high cover-abundance of *Setaria sphacelata* is a further conspicuous feature of this variant.

- » *Anthephora pubescens*
Variant

The *Anthephora pubescens* Variant occurs locally where a sandy deposit overlies the rock sheets. These sandy areas are mostly situated on the south-western boundary of the reserve (Fig. 2).

The only diagnostic species is the grass *Anthephora pubescens* (species group E, Table 1), which is often associated with sandy areas in the western Transvaal (Bezuidenhout *et al. in press*). *Heteropogon contortus*, *Pogonarthria squarrosa* and *Aristida canescens* are prominent species in this vegetation unit.

- > *Triraphis andropogonoides-Themeda triandra*
Subcommunity

This community is situated at the relatively lower areas, especially on the lower slopes in the undulating landscape, in the southern parts of the reserve (Fig. 2).

No diagnostic species were identified, and the community is differentiated from the other subcommunities or variants of the *Triraphis andropogonoides* Grassland Community by the absence of species group F (Table 1).

This community shows some similarities to the *Cymbopogon plurinodis* Variant of low lying areas on the Abe Bailey Nature Reserve (Van Wyk & Bredenkamp 1986), which also lacks diagnostic species and shows a fairly similar species composition.

2. *Rhus pyroides*
Woodland Community

This woodland is restricted to sink holes, rocky hills or drainage lines, all scattered over the area of the reserve (Fig. 2). These areas are mostly disturbed as was also mentioned by Bezuidenhout & Bredenkamp (1990).

This woodland community is characterised by species group H (Table 1), and the diagnostic and dominant species are the shrubby small tree *Rhus pyroides*, as well as the shrubs *Grewia flava* and *Protasparagus suaveolens*, and the pioneer species *Bidens bipinnata*, *Felicia muricata* and the exotic *Opuntia ficus-indica*.

Further characteristics of this community are the decrease in constancy and abundance of the general and widespread species of species groups R and S (Table 1), and the presence of many other pioneer species, indicating the advanced state of disturbance or degradation. The most prominent of these species are *Protasparagus laricinus*, *Cynodon dactylon*, and *Schkuhria pinnata* (species group M, Table 1), *Aristida congesta*, *Melinis repens*, *Ziziphus zeyheriana* and *Lightfootia denticulata* (species group R, Table 1).

Van Wyk & Bredenkamp (1986) also recognised woodland communities on the Abe Bailey Nature Reserve, which are obviously related to this woodland. A similar *Rhus pyroides* Shrub and Woodland also with three communities, were described by Bezuidenhout & Bredenkamp (1990). This community is related to *Grewia flavae-Rhion pyroidis* of the dolomitic and chert grassland in the western Transvaal as well (Bezuidenhout *et al.* in prep.).

Three different communities were recognised in this woodland.

> *Rhus pyroides-Celtis africana*
Bush Community

This bush community is strongly associated with rocky dolomite areas in and around sink holes and also occurs on the limited rocky dolomite ridges on the reserve. Woody communities are generally rare on the reserve, and consequently the game often utilise the shade of the trees, with the result that the herbaceous layer is heavily trampled and disturbed.

This community is characterised by species group I (Table 1). The diagnostic species include the small trees or shrubs *Celtis africana*, *Diospyros lycioides* and *Maytenus heterophylla*, the grass species *Sporobolus fimbriatus* and *Tragus berteronianus* and also the forbs *Pavonia burchellii*, *Tribulus terrestris* and the strangling *Protasparagus africanus*.

Other woody species are those of the *Rhus pyroides* Woodland. Most woody species occur in the very limited soil in the narrow fissures between the dolomite rocks.

As is the case with the *Rhus pyroides* Woodland Communities in general, the *Rhus pyroides-Celtis africana* Bush also appears to be disturbed, with the herbaceous layer dominated by pioneer weedy species. These include *Tragus berteronianus*, *Aristida congesta*, *Aristida canescens*, *Cynodon dactylon* and *Tribulus terrestris*. An increase in the shrubby species *Protasparagus suaveolens*, *Protasparagus laricinus*, *Pollichia campestris*, *Ziziphus zeyheriana*, *Lippia scaberrima* and *Stoebe vulgaris* is evident of the degradation of these areas. A similar situation was found on the Abe Bailey Nature Reserve (Van Wyk & Bredenkamp 1986). Bezuidenhout & Bredenkamp (1990) mentioned a similar community, the *Protasparagus suaveolens-Rhus pyroides* Woodland, in the Potchefstroom-Ventersdorp-Randfontein area.

> *Rhus pyroides*-*Acacia karroo*
Bush Community

This community is very limited and restricted to small local calcareous bottomlands where dolomite or chert rocks and gravel cover up to 70 % of the soil surface.

The *Rhus pyroides*-*Acacia karroo* Bush Community is characterised by species group J (Table 1). Diagnostic species are the trees *Acacia karroo* and *Acacia caffra* and the weedy succulent forb *Talinum caffrum*.

Other woody species of the *Rhus pyroides* Woodland Communities, such as *Rhus pyroides* and *Grewia flava* do occur locally.

This community has a conspicuous low species richness, and especially the herbaceous layer is poorly developed, but the grasses *Eragrostis chloromelas*, *Digitaria eriantha*, *Themeda triandra* and *Setaria sphacelata* are constantly present, though with low cover-abundance values. The increase of species such as *Protasparagus suaveolens*, *P. laricinus* and *Aloe davyana* is often associated with *Acacia karroo* Communities in the western Transvaal (Friedel 1987; Bredenkamp *et al.* 1989; Bredenkamp & Bezuidenhout 1990). The *Rhus pyroides*-*Acacia karroo* Woodland of the Potchefstroom-Ventersdorp-Randfontein area is similar to this community (Bezuidenhout & Bredenkamp 1990).

> *Rhus pyroides*-*Cynodon dactylon*
Subcommunity

This is a very small woody community, occurring only locally at very disturbed spots.

The community is very poor in species composition, and is not characterised by any diagnostic species group, but the presence of species group H, and the absence of species groups I and J (Table 1) could be considered as characteristic features.

Woody species such as *Rhus pyroides*, *Grewia flava* and *Acacia karroo* are found scattered in these areas, and the encroacher species *Protasparagus suaveolens* and *Protasparagus laricinus* are conspicuously present.

The herbaceous layer is dominated by the pioneer grass species *Cynodon dactylon*, while other species include weedy pioneers such as *Aristida congesta*, *Schkuhria pinnata* and *Cynodon hirsutus*.

Similar plant communities, the *Eustachys paspaloides*-*Rhus pyroides* Secondary Savanna as well as the *Digitaria eriantha*-*Rhus pyroides* Shrubveld are respectively mentioned by Bezuidenhout & Bredenkamp (1990) and Bezuidenhout *et al.* (*in prep.*).

3. *Hyparrhenia hirta*
Wetland Community

This wetland community occurs in bottomland situations, especially along the disturbed, and often flooded, banks of the Boskop Dam.

This community is characterised by species group K (Table 1), and the diagnostic species include the tall growing and dominant grass *Hyparrhenia hirta*, as well as weedy and pioneer species such as *Helichrysum rugulosum*, *Conyza podocephala*, *Hermannia depressa* and *Tephrosia semi-glabra*.

Bezuidenhout & Bredenkamp (1990) described a similar community, *Themeda triandra*-*Hyparrhenia hirta* Grassland Major Community with similar variants in the Potchefstroom-Ventersdorp-Randfontein area. This wetland relates strongly to the *Paspalo dilatati*-*Hyparrhenietum hirtae* (Bezuidenhout *et al.* *in prep.*)

Two variants were recognised.

> *Hyparrhenia hirta-Verbena bonariensis* Variant

This wetland has a restricted distribution and is present at local depressions, especially where man-made ditches have been constructed, or at other severely disturbed wet bottomland localities.

This variant is characterised by species group L (Table 1), which includes the pioneer species *Monsonia angustifolia*, *Verbena bonariensis*, *Corchorus asplenifolius* and *Walafriida densiflora*.

These areas tend to be related to the other communities on the reserve, as indicated by the presence of species group R (Table 1), and especially to the *Rhus pyroides* Woodland Communities though the presence of the species of species group M (Table 1).

The vegetation is mostly dominated by dense stands of the 2 m tall *Protaspargus laricinus* and also the tall-growing grass *Hyparrhenia hirta*.

Other species prominently present include the grasses *Eragrostis chloromelas*, *Cynodon dactylon*, *Cymbopogon excavatus* and *Heteropogon contortus*.

> *Hyparrhenia hirta-Eragrostis plana* Variant

This variant represents the typical wetlands which occur on the moist banks of the dam.

The variant is characterised by species group N (Table 1), which includes the following hygrophilous species: the grasses *Eragrostis plana*, *Paspalum dilatatum*, *Setaria incrassata* and *Andropogon eucomus*, the weedy forbs *Oenothera rosea*, *Cirsium vulgare* and *Lactuca serriola*, and also the planted exotic tree *Eucalyptus grandis*.

This vegetation is entirely dominated by *Hyparrhenia hirta*.

The general absence of the widespread species of species group R (Table 1) is a further conspicuous feature of this wetland community.

4. *Haemanthus humilis-Zinnia peruviana* Grassland Community

This is a very local and small, restricted community occurring on a small rocky chert outcrop in the southern part of the reserve (Fig. 2).

The diagnostic species are the relatively rare geophyte *Haemanthus humilis* and the weedy *Eleusine coracana* and *Zinnia peruviana* (species group O, Table 1).

Other prominent species are the grasses *Eragrostis chloromelas*, *Setaria sphacelata*, *Melinis repens* and *Cymbopogon excavatus*.

5. *Senecio isatideus-Artemisia afra* Wetland Community

This wetland is restricted to a fairly dry vlei in the southern part of the reserve (Fig. 2).

The vegetation is characterised by species group P (Table 1), with the hygrophilous *Senecio isatideus*, *Cyperus longus* and *Artemisia afra*.

Other conspicuous species are the grasses *Cymbopogon plurinodis*, *Themeda triandra* and *Aristida congesta*.

6. *Setaria lindenbergiana-Combretum molle* Woodland Community

This is a very local and small community occurring on a small rocky outcrop in the southern part of the reserve. This community is so limited that it could only be surveyed by

Table 1
 A phytosociological table of the vegetation of the Boskop Dam Nature Reserve

Sample plots	0000000	000000000000000000000000	000000000	00000000	00000000	000000	00	000	000000	60000	00	000	0
	0372131	15014114620706487770	111223222	22444473	30537072	674001	56	455	566367	55455	66	333	6
	8680954	09610786762450202371	235890123	45835758	14899717	964396	72	125	668750	03914	41	243	3
Plant communities (in text)		1		.2	.3	2		.3	3		4	5	6
	.1	.1	.2	.1	.2	.3	.1	.2	.3	.1	.2		
Species group A													
<i>Trachypogon spicatus</i>	+A+A31	+++A1B+++B A +BA +	1 + +	+	+								
<i>Diheteropogon amplexens</i>	++ +1+	A+1+++1+++A1+++1+++		+	1	+	+						
<i>Eragrostis racemosa</i>	++ + ++	1 ++1++++1+1+++++	+										
<i>Triumfetta sonderi</i>	++1+++	+ +1A+++A+ +1+A+	++ +	+	+	+							
Species group B													
<i>Andropogon schirensis</i>	+	B ++++B+++BB+1++BA+			1	A +							
<i>Schizachyrium sanguineum</i>	+ +	+++++1+++ +A+++ ++	+			+	+						
<i>Melinis nervigluame</i>		1+++ ++ + + + + + + + +											
<i>Sphenostylis angustifolia</i>	+	+1 +++ + + + + 1+											
<i>Bulbostylis burchellii</i>		++ +++ + + + + + +											
<i>Trichoneura grandiglumis</i>		+ + + + + + + + + + + + + +											
<i>Senecio venosus</i>	+ +	+ + + + + + + + + + + + + +	+	+									
<i>Ursinia nana</i>	+ +	R + + + + + + + + + + + + + +											
<i>Lotononis calycina</i>		+ + + + + + + + + + + + + +											
<i>Kobautia amatymbica</i>		+ + + + + + + + + + + + + +											
<i>Tristachya rehmannii</i>		++ + +A1 +											
<i>Tephrosia elongata</i>		+ + + + + + + + + + + + + +											
<i>Dicoma anomala</i>	+	+ + + + + + + + + + + + + +											
Species group C													
<i>Eragrostis superba</i>	+	+ + + + + + + + + + + + + +											
<i>Eragrostis gumiflua</i>		+ + + + + + + + + + + + + +											
<i>Turbina oblongata</i>	+ ++	+ + + + + + + + + + + + + +											
<i>Microchloa caffra</i>		+ + + + + + + + + + + + + +											
<i>Sporobolus discosporus</i>		+ + + + + + + + + + + + + +											
Species group D													
<i>Salvia radula</i>		+ + + + + + + + + + + + + +											
<i>Hypoxis hemicaralidea</i>	+ +	+ + + + + + + + + + + + + +											
<i>Boopane disticha</i>	+ + +	+ + + + + + + + + + + + + +											
Species group E													
<i>Antheophora pubescens</i>		+ + + + + + + + + + + + + +											

Table 1
(continued)

Species group F

<i>Brachiaria serrata</i>	+++	+ + + + + + + + + + + + + + +	+++	++ +	+						+		
<i>Justicia anagalloides</i>	+++ +	++++ + + + + + + + + + + +	+ + ++	++ +	+						+		
<i>Chamaecrista biensis</i>	+ + +	++++ + + + + + + + + + + +	+ + +	++ +	+						+		
<i>Acalypha angustata</i>	+ + + + +	++ + + + + + + + + + + + + + + +	+ + + + +	++ +	+ +						+		
<i>Elephantorrhiza elephantina</i>	++	+ + + + + + + + + + + + + + +	++ + + + + +	++ + +	+						+		

Species group G

<i>Triraphis andropogonoides</i>	+ + 1 B + 1	+ + + + + + + + A + + + + + + 1	+ + + + + + + + +	+ + + + + + A	+ + + + + 1	++ +	++	+					
<i>Eustachys paspaloides</i>	AA + + + +	+ A + + + + + + + + + + +	+ + + + + + A 1 A	+ 1 + + + + + + 1 + 1	++ +	+	++	+					
<i>Barleria macrostegia</i>	+++ + + + +	+ + 1 + + + + + + + + + + +	+++ + + + +	+++ + + + + + + + + + + +	++ +	+	+	++					
<i>Vernonia oligocephala</i>	++ + + +	+ + + + + + + + + + + + + + +	+++ + + + + + + + + + + +	+++ + + + + + + + + + + +	++ +	+	+	++					
<i>Tylosea esculentum</i>	++++ +	+ + + + + + + + + + + + + + +	+++ 1 + + + + +	1 + + + + + + + + + + +	++ + + +	+	+	+					
<i>Plexipus hederaceus</i>	++++ +	+ + + + + + + + + + + + + + +	+ + + +	++ +	++ +	++	++	+					

Species group H

<i>Rhus pyroides</i>	+ +					+					+		
<i>Protasparagus suaveolens</i>													
<i>Crewia flava</i>		+ +				++	+						
<i>Bidens bipinnata</i>													
<i>Felicia muricata</i>													
<i>Opuntia ficus-indica</i>													

+A+1++ B
+ ++ ++ ++ +
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+ + + + +

Species group I

<i>Celtis africana</i>													
<i>Diospyros lycioides</i>	4					3							
<i>Sporobolus fibriatus</i>		+											
<i>Tragus berteronianus</i>													
<i>Pavonia burchellii</i>													
<i>Protasparagus africanus</i>													
<i>Maytenus heterophylla</i>													
<i>Tribulus terrestris</i>													

++ 1 A A +
A B + A
+++
+ + + + +
+ + + + +
+ + + + +
+ + + + +
+ +

Species group J

<i>Acacia karroo</i>													
<i>Falium caffrum</i>		+											
<i>Acacia caffra</i>													

++ B 1
++
A

Species group K

<i>Hypparrhenia hirta</i>													
<i>Helichrysum rugulosum</i>													
<i>Conyza podocephala</i>													
<i>Bermannia depressa</i>													
<i>Pephrusia semiglabra</i>													

4 + + 1 + A 3 A A A A
+ + + + + + + + + + +
++ ++ ++
+ + ++ +

Table 1
(continued)

| | | | | | | | | | | | | | | | | |
|---------------------------------|--------|-----|---------|-----------|-----------|----------|---------|----------|--------|--------|------|--------|-------|-------|------|----|
| Species group L | | | | | | | | | | | | | | | | |
| <i>Monsonia angustifolia</i> | | | | + | | | | + | | +++ + | | | | | | |
| <i>Verbena bonariensis</i> | | | | | | | | | | +++ | | | | | | |
| <i>Corchorus asplenifolius</i> | | | | + | | | | + | | + ++ | | | | | | |
| <i>Walafrida densiflora</i> | | | | + | + | | | + | | ++ + | | | | | | |
| Species group M | | | | | | | | | | | | | | | | |
| <i>Protasparagu laricinus</i> | | + | + | | | | | ++ | +++1++ | A+ | +1 | 1++1++ | + | +B+ | | |
| <i>Cynodon dactylon</i> | | | + | | + | | + | | ++++ | + | 1+ | 1+B+++ | ++ | + | | |
| <i>Schkuhria pinnata</i> | | + | + | | + | + | | + | | + | + | 1+ | + | + | | |
| Species group N | | | | | | | | | | | | | | | | |
| <i>Eragrostis plana</i> | + | | | | | 1+ | + | | | | | | | ++ ++ | | |
| <i>Oenothera rosea</i> | | | | | | | | | | | | | | ++++ | | |
| <i>Setaria incrassata</i> | | | | | | | | | | | | | | + A | | |
| <i>Cirsium vulgare</i> | | | | | | | | | | | | | | + + | | |
| <i>Paspalum dilatatum</i> | | | | | | | | | + | | | | | ++ | | |
| <i>Eucalyptus grandis</i> | | | | | | | | | | | | | | ++ | | |
| <i>Lactuca serriola</i> | | | | | | | | + | | | | | | ++ + | | |
| <i>Chaetacanthus burchellii</i> | | | | | | | | | | | | | | ++ + | | |
| <i>Andropogon eucomus</i> | | | | | | | | | | | | | | ++ | | |
| Species group O | | | | | | | | | | | | | | | | |
| <i>Zinnia peruviana</i> | | | | | | | | | | + | | | | +A | | |
| <i>Haemanthus humilis</i> | | | | | | | | | | + | | | | ++ | | |
| <i>Eleusine coracana</i> | | | | | | | | | | | | | | + | | |
| Species group P | | | | | | | | | | | | | | | | |
| <i>Artemisia afra</i> | | | | | | | | + | | | | | | AA1 | | |
| <i>Senecio isatideus</i> | | | + | + | | | | | | | | | | +3 | | |
| <i>Cyperus longus</i> | | | + | | | | | | | | | | | A | | |
| Species group Q | | | | | | | | | | | | | | | | |
| <i>Combretum molle</i> | | | | | | | | | | | | | | + | | |
| <i>Pavetta zeyheri</i> | | | | | | | | | | | | | | + | | |
| <i>Setaria lindenbergiana</i> | | | | | | | | | | | | | | + | | |
| Species group R | | | | | | | | | | | | | | | | |
| <i>Themeda triandra</i> | +1 | +++ | +++1+ | ++A++ | +1+1++B | 3B3+1A1+ | ++A11++ | 1A+AB4B+ | + | + | ++ | + | ++++ | + | + | ++ |
| <i>Setaria sphacelata</i> | 1++1++ | + | 11+++1+ | 1++A++11+ | ++A1++ABB | B+12+ | +3++ | +1 | ++ | ++ | + | + | + | + | ++ | + |
| <i>Aristida congesta</i> | ++ | + | +++ | ++++ | +++ ++ | ++ ++1++ | +A | ++++ | + | ++ | 1++ | ++ | +11+1 | 1 | ++ | + |
| <i>Cymbopogon plurinodis</i> | ++ | + | + | 1 | 1 | 1 | ++ | 1+B++ | ++A | 11++++ | 1 | ++ | + | + | + | 31 |
| <i>Heteropogon contortus</i> | + | + | ++ | ++++ | ++ + | + | +++ | 1++1AA+ | + | +++ | + | + | + | + | + | B |
| <i>Cucumis hirsutus</i> | +++ | R | + | +++ | + | +++ | ++ | ++ | ++ | ++ | ++ | + | + | + | ++++ | + |
| <i>Melinis repens</i> | +++++ | + | +++ | +++ | ++ | +++ | ++ | + | + | ++A+ | + | + | + | + | + | A |
| <i>Pollichia campestris</i> | + | + | +++ | + | +++ | ++ | ++ | ++ | + | +++++ | + | + | + | + | +++ | + |
| <i>Aristida canescens</i> | + | ++ | + | ++ | + | +++ | 1 | + | ++ | + | +++A | + | + | + | +++ | + |
| <i>Pogonarthria squarrosa</i> | | | + | + | +++ | + | + | + | +++ | +++ | ++ | + | + | + | + | + |
| <i>Indigofera comosa</i> | +++ | + | + | +++ | + | ++ | ++ | + | ++ | ++ | + | + | + | + | ++ | + |

Table 1
(continued)

Species group R (continued)

| | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------|-----|----|----|---|----|----|-----|----|----|----|----|----|----|----|----|----|---|----|--|--|--|----|---|---|
| <i>Ziziphus zeyheriana</i> | + | ++ | | | ++ | A+ | | | ++ | A+ | ++ | ++ | | + | | | | | | | | | + | |
| <i>Lightfootia denticulata</i> | | | | | | | +++ | + | ++ | + | ++ | + | ++ | ++ | | | | | | | | | | + |
| <i>Lippia scaberrima</i> | + | + | | R | + | | | | | + | ++ | B | + | + | + | ++ | + | ++ | | | | | + | |
| <i>Solanum capensis</i> | +++ | | | | + | + | ++ | + | | ++ | ++ | | | + | ++ | ++ | | | | | | | + | |
| <i>Leucas capensis</i> | ++ | | ++ | + | ++ | | | + | | + | + | | | | ++ | ++ | | | | | | | + | |
| <i>Eragrostis lehmanniana</i> | | | + | | | | | + | | ++ | + | | ++ | | ++ | ++ | | | | | | | + | |
| <i>Crabbea angustifolia</i> | + | | ++ | + | ++ | | | | + | | ++ | + | | | | | | | | | | | + | |
| <i>Stoebe vulgaris</i> | + | | + | + | | | | ++ | 1+ | | 1 | | | | | | | | | | | ++ | + | |
| <i>Teucrium trifidum</i> | | + | | | + | | ++ | + | | ++ | | | | | | | | | | | | | + | |
| <i>Sida dregei</i> | | | + | | + | | + | ++ | + | | + | | + | | ++ | + | | | | | | | + | |

Species group S

| | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|------|-----|-----|------|------|----|------|----|------|----|------|-----|----|----|----|----|-----|-----|----|----|----|---|----|
| <i>Eragrostis curvula</i> | +++ | + | +++ | ++++ | ++++ | 1+ | ++++ | ++ | 1+ | + | ++ | ++ | ++ | ++ | 1+ | ++ | B+A | +++ | ++ | 1 | A+ | | + |
| <i>Ledebouria marginata</i> | ++++ | | +++ | ++++ | ++++ | | ++++ | + | ++++ | + | ++++ | + | ++ | + | ++ | | | | | | | | + |
| <i>Cymbopogon excavatus</i> | +++ | A | B+ | ++++ | ++++ | 1+ | + | ++ | + | ++ | + | 1 | ++ | | | | | ABA | | 1+ | 1 | | + |
| <i>Digitaria eriantha</i> | + | + | ++ | | + | | ++ | 1 | B+A | + | ++ | 1A | ++ | ++ | ++ | | | | | 1+ | | | + |
| <i>Anthospermum rigidum</i> | | | ++ | ++ | ++ | ++ | | + | | ++ | + | +++ | + | + | | | | | | + | ++ | | + |
| <i>Sporobolus africanus</i> | | | | | | | ++ | + | A | | + | | + | + | | | | | | + | ++ | 1 | + |
| <i>Aristida diffusa</i> | ++ | | ++ | | ++ | | ++ | | | | + | | + | | B | 1 | | | | | | | + |
| <i>Polygala hottentotta</i> | + | +++ | | ++ | + | | ++ | + | | | + | + | ++ | | | | | | | | | | |
| <i>Raphionacme hirsuta</i> | ++ | | + | | | | ++ | | | | + | | | | | | | | | | | | + |
| <i>Cyanotis speciosa</i> | | | | ++ | ++ | ++ | ++ | + | | | | + | ++ | | | | | | | | | | + |
| <i>Eragrostis chloromelas</i> | + | | + | | | | A | | | + | + | 1+ | | + | | | | | | ++ | | | + |
| <i>Crabbea hirsuta</i> | | | | ++ | ++ | | | + | | | | + | | | | | | | | | | | |
| <i>Rhynchosia nervosa</i> | | | | + | + | | | | | | | + | + | | | | | ++ | | | | | |
| <i>Ledebouria ovatifolia</i> | | | | | + | + | | | | ++ | | ++ | | | | | | | + | | | | |
| <i>Aristida stipitata</i> | | | | | + | + | | | | ++ | ++ | | | | | | | | | | | | + |
| <i>Thesium utile</i> | | | + | | + | + | | | | + | | + | | | | | | | | | | | |
| <i>Rhynchosia venulosa</i> | | | | | | | ++ | + | | | | + | | | | | | | | | | + | |
| <i>Crassula lanceolata</i> | | + | | + | | | ++ | | | | ++ | | | | | | | | | | | | |
| <i>Helichrysum nudifolium</i> | | + | | | | | | | | | + | + | | | | | | | | | + | | + |
| <i>Hypoxis rigidula</i> | | | | | | | + | | | ++ | + | + | | | | | | | | | | | |
| <i>Berkheya radula</i> | | | | | | | | + | | ++ | | | | | | | | | | | | | ++ |
| <i>Sporobolus stapfianus</i> | | | | | | | ++ | | | | ++ | | | | | | | | | | | | |
| <i>Pygmaeocthamus zeyheri</i> | | | ++ | | + | | | | | | | + | | | | | | | | | | | |
| <i>Ipomoea crassipes</i> | | | | | | ++ | + | | | | | | + | | | | | | | | | | |
| <i>Rhus magalisoontana</i> | | | | + | | + | | | | | | | + | | | | | | | | | | + |
| <i>Eragrostis obtusa</i> | | | | | | | | | | | | | + | + | | | | | | | | + | ++ |
| <i>Becium grandiflorum</i> | | | | + | + | | | | | | | | 1 | | A | | | | | | + | | + |
| <i>Cynodon hirsutus</i> | | | | | | | | | | | | | | | | | | | | | | | + |

a single sample plot. It is however included in the description, as it represents a very rare community in the area, which should be included in the management programme of the reserve.

The diagnostic species are the trees *Combretum molle* and *Pavetta zeyheri* and the

grass *Setaria lindenberiana* (species group Q, Table 1). No similar community was described by Bezuidenhout & Bredenkamp (1990) in the Potchefstroom-Ventersdorp-Randfontein area but in the Vredefort Dome northwest of Parys a similar community, *Nuxia congesta*-*Combretum molle*-savanne was described by Bezuidenhout *et al.* (1988).

Concluding remarks

This report could serve as a basis for the compilation of a management programme for the Boskop Dam Nature Reserve. Each of the communities described represents a separate ecosystem with its own unique potential in terms of carrying capacity for game, and the habitat and grazing potential of each community should be assessed.

From the floristic data and habitat interpretation it is evident that many of the communities of the Boskop Dam Nature Reserve are quite similar to those found on the Abe Bailey Nature Reserve (Van Wyk & Bredenkamp 1986) and Potchefstroom-Ventersdorp-Randfontein area (Bezuidenhout & Bredenkamp 1990). For the grassland syntaxa it seems as if the vegetation of the dolomite area in the western Transvaal is adequately conserved in these two reserves but the woodland syntaxa, especially the *Rhoos lanceae-Acacietaum eriolobae* need to be conserved as was also mentioned by Bezuidenhout *et al.* (*in prep.*).

From a syntaxonomical point of view, it is clear that the knowledge of some plant communities recognised in small local areas such as nature reserves is too scanty to fix formal syntaxonomic ranks (Coetzee 1983) and names according to the Code for Syntaxonomical Nomenclature (Barkman *et al.* 1986). However, some of the plant communities recognised do fit in with the syntaxa recognised from the regional classification. Most of the communities of the Boskop Dam Nature Reserve can be related to one or other syntaxa of the dolomitic and chert grassland in the western Transvaal (Bezuidenhout *et al.* *in prep.*). This study should contribute to the ultimate goal of a comprehensive syntaxonomical synthesis for the western Transvaal grasslands and the South African grasslands.

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