

# Environmental Management Framework for the Olifants and Letaba Rivers Catchment Areas (OLEMF)

## Vegetation



**Environomics**  
Environmental Consultants

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## 1. INTRODUCTION

The EMF area is vast and includes many different vegetation types. A short description of each vegetation type was included in the status quo report. This appendix includes both a short description of each vegetation type and lists the species found in each type.

## 2. CATHEDRAL MOPANE BUSHVELD (SVMP3)

The vegetation type is a moderately closed savanna, which is dominated by *Colohospermum mopane* 10-15 tall, often with some shrubs 2-3 m tall in the understorey, and a sparse herbaceous layer. The upper canopy is seldom closed and the vegetation occurs on flats or gentle slopes. Entirely statutorily conserved in the Kruger National Park.

Important Taxa include:

- Tall trees: *Colohospermum mopane* (d<sup>1</sup>), *Acacia nigrescens*;
- small trees: *Combretum imberbe*, *Spirostachys African*, *Ximenia Americana*;
- tall shrubs: *Euclea Divinorum* (d), *Combretum hereoense*, *Grewia bicolor*, *Hibiscus micranthus*, *Maerua parvifolia*;
- low shrubs: *Neuracanthus africana*;
- graminoids<sup>2</sup>: *Enneapogon cenchroides* (d), *Enteropogon macrostachyus* (d), *Aristida Congesta*, *Panicum maximum*, *Schmidtia pappophoroides*; and
- herbs: *Amaranthus thunbergii*, *Seddera capensis*.

## 3. CENTRAL SANDY BUSHVELD (SVCB 12)

This vegetation occurs in low undulating areas, sometimes between mountains and sandy plains and catena supporting tall, deciduous woodlands *Terminalia sercia* and *Bureka Africana* woodland on deep sandy soils, low broad leaf *Combretum* woodland on shallow rocky or gravelly soils. Species of *Acaia*, *Ziziphus* and *Euclea* are found on the flats and lower slopes on eutrophic sands and some less sandy soils. *A. Tortillis* may dominate some areas on the valley. Grass-dominated herbaceous layer with relatively low basal cover on dystrophic sands. Much of the unit in the broad arc south of the Springbokvlakte is heavily populated by rural communities. Several alien plants are widely scattered but

<sup>1</sup> (d) means dominant species

<sup>2</sup> *Graminoids* means grasses and grass like plants, such as sedges.

often at low densities; these include *Cereus jamacaru*, *Eucalyptus* species, *Lantana camara*, *Melia azedarach*, *Opuntia ficus-indica* and *Sesbania punicea*.

Important taxa includes:

- Tall trees: *Acacia Burkei* (d), *A. Robusta*, *Sclerocarya birreas* subsp. *Caffra*;
- small trees: *Burkea Africana* (d) *Combretum apiculatum* (d), *C zeyher*, *Terminalia serica* (d), *Ochna pulchra*, *Peltophorum africanum*, *Rhus leptodictya*;
- tall shrubs: *Combretum hereoense*, *Grewia bicolor*, *G. Monticola*, *Strychnos pungens*;
- low shrubs: *Agathisanthemum Bojeri* (d), *Indigofera filipes* (d), *E. Rigigidior* (d), *Hyperthelia dissolute* (d), *Panicum maximum* (d), *Perotis patens* (d), *Anthephora pubescens*, *Aristida acabrivals* subsp. *abrivalvis*, *Brachiaria sertae*, *Elionurus muticus*, *Eragrostis nindensis*, *Loudetia simplex*, *Schmidtia pappophoroides*, *Themeda triandra*, *Trachypogon spicatus*;
- herbs: *Dicerocaryum seneiodes* (d), *Baleria macrostegia*, *Blephars integrifolia*, *Crabbea angustifolia*, *Evolvulus alsinoides*, *Geigeria burkei*, *Hermannia lancifolia*, *Indigofera daleoides*, *Justicia anagalloides*, *Kyphocarpa angustifolia*, *Lophiocarpus tenuissimus*, *Waltheria indica*, *Xerophyta humilis*;
- geophytic<sup>3</sup> herb: *Hypoxis hemerocallidea*; and
- succulent<sup>4</sup> herb: *Aloe greatheadii* var. *davyana*;

Biogeographically Important Taxa (Central Bushveld endemics):

- Graminoid: *Mosdenia leptostachys*; and
- herb: *Oxygonum dregeanum* subsp. *canescens* var. *dissectum*.

## 4. EASTERN HIGHVELD GRASSLAND (GM12)

This vegetation type occurs on slightly to moderately undulating planes, including some low hills and pan depressions. The vegetation is a short dense grass land dominated by the usual highveld grass composition (*Arsitida*, *Digitaria*, *Erafrostsia*, *Themeda*, *Tristachya* etc.) with small scattered rocky outcrops with, wiry sour grasses and some woody species. Some 44% transformed primarily by cultivation, plantations, mines, urbanisation and by building of dams. No serious alien invasions are reported.

<sup>3</sup> *Geophytic plant* means a land plant that survives an unfavourable period by means of underground food-storage organs (e.g. rhizomes, tubers, and bulbs). Buds arise from these to produce new aerial shoots when favourable growth conditions return.

<sup>4</sup> *Succulent* means any plant that possesses a succulent tissue, and further specified a succulent tissue is a living tissue that serves and guarantees a temporary storage of utilizable water, which makes the plant temporarily independent from external water supply.

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Important taxa include:

- Graminoids: *Aristida aequiglumis* (d), *A. congesta* (d), *A. junciformis* subsp. *Galpini* (d), *Brachiaria serrata* (d), *Cynodon dactylon* (d), *Digitaria monodactyla* (d), *D. tricholaenoides* (d), *Elionurus muticus* (d), *Eragrostis chloromelas* (d), *E. curvula* (d), *E. plana* (d), *E. racemosa* (d), *E. sclerantha* (d), *Heteropogon contortus* (d), *Loudetia simplex* (d), *Microchloa caffra* (d), *Monocymbium cereiiforme* (d), *Setaria sphacelata* (d), *Sporobolus africanus* (d), *S. pectinatus* (d), *Themeda triandra* (d), *Trachypogon spicatus* (d), *Tristachya leucothrix* (d), *T. rhmanni* (d), *Alloteropsis semialata* subsp. *eckloniana*, *Andropogon appendiculatus*, *A. schirensi*, *Bewisia biflora*, *Ctenium concinnum*, *Diheteropogon amplectens*, *Eragrostis capensis*, *E. dummiiflua*, *E. patentissima*, *Harpochloa falx*, *Panicum natalense*, *Rendlia altera*, *Schizachyrium sanguineum*, *Setaria nigrirostris*, *Urelytrum agropyroides*;
- herbs: *Berkheya setifera* (d), *Haplocarpha scaposa* (d), *Justicia anagalloides* (d), *Acalyha angusta*, *Cahmaecrista mimosoides*, *Dicoma anomala*, *Euryops gifillani*, *E. transvalensis* subsp. *setilobus*, *Helichrysum aureonitens*, *H. caespitium*, *H. callicomum*, *H. oreophilum*, *H. caespitium*, *H. oerophilum*, *H. rugulosum*, *Ipomoea crassipes*, *Pentanisia prunelloides* subsp. *latifolia*, *Selago densiflora*, *Senecio coronatus*, *Vernonia oligocephala*, *Wahlenbergia undulata*;
- geophytic herbs: *Gladiolus crassifolius*, *Haemanthus humilis* subsp. *hirsutus*, *Hypoxis rigidulua* var. *pilosissima*, *Ledebouria ovatifolia*;
- succulent herb: *Aloe ecklonis*; and
- low shrubs: *Anthospermum rigidum* subsp. *pumilum*, *Atoebe plumose*.

### 5. EASTERN TEMPERATE FRESH WATER WETLANDS (AZF 3)

This vegetation type occurs on flat landscapes or shallow depressions filled with water bodies supporting zoned system of aquatic and hygrophilous vegetation of temporary flooded grasslands.

Important taxa includes:

#### (a) Marshes

- Megagraminoid: *Cyperus congestus* (d);
- graminoids: *Agrostis lachnantha* (d), *Carex acutiformis*, *Elocharis palustris* (d), *Eragrostis plana* (d), *E. Planiculmis* (d), *Fuirena pubescens* (d), *Helictotrihon turgidulum* (d), *Hemathria altissima* (d), *Imperata cylindrical* (d), *Leersia heandra* (d), *Paspalum dilatatum* (d), *P. Urvillei* (d), *Pennisetum thunbergii* (d), *Schoenoplectus decipiens* (d), *Scleria dieterlenii* (d), *Setaria aphacelata* (d), *Andropogon appendiculatus*, *A. eucomuas*, *Aristida aequiglumis*, *Ascolepis capensis*, *Carex africana*, *C. schlechteri*, *Cyperus cyperoides*, *C. distans*, *C. longus*, *C. marginatus*, *Echinochloa holubii*, *Eragrostis micranth*, *Fininia acuminata*, *Fimbristylis complanata*,

*F. ferruginea*, *Hyparrhenia dregean*, *H. quarrei*, *Ischaemum fasciculatum*, *Kyllinga erecta*, *Panicu schinzii*, *Pennisetum aphacelatum*, *Pycreus macranthus*, *P. nitidus*, *Seraria pallide-fusca*, *Xyris gerradii*;

- herbs: *Centella asiatica* (d), *Ranunculus multifidus* (d), *Berkheya radual*, *B. speciosa*, *Berula erecta* subsp. *thunbergii*, *Centella coriacea*, *Chironia palustris*, *Equisetum ramososomum*, *Falckia oblonga*, *Harplocarpha lyrata*, *Helichrysum difficile*, *H. dregeanum*, *H. mundtii*, *Hydrocotyle sibthorpioides*, *H. verticillata*, *Lindernia conferta*, *Lobelia angolensis*, *I. flaccida*, *Mentha aquatica*, *Monopsis decipiens*, *Pulicaria scabra*, *Pycnostachys reticulata*, *Rorippa fluviatillis*, var. *fluviatillis*, *Rumex lanceolatus*, *Scenecioinornatus*, *S. microglossus*, *Sium repandum*, *Thelypteris confluens*, *Wahlenbergia banksiana*; and
- geophytic herbs: *Cordylogyne globosa*, *Crinum bulbispermum*, *Gladiolus papilio*, *Kniphofia ensifolia*, *K. fluviatillis*, *K. Linearifolia*, *Neobolusia tysonii*, *Nerine gibsoni*. *Sattyrrium hallackii* subsp. *hallackii*.

#### (b) Reed and Sedge Beds

- Megagraminoids: *Phragmites austrails* (d), *Schoenoplectus corynbosus* (d), *Typha capensis* (d), *Cyperus immensus*; and
- graminoid: *Carex cernua*.

#### (c) Water bodies

- Aquatic herbs: *Aponogeton junceus*, *Ceratophyllum demersum*, *Lagarosiphon major*, *L. muscoides*, *Marselea capensis*, *Myriophyllum spicatum*, *Nymphae lotus*, *N. nouchali* var. *caereulea*, *Nymphoides thunbergiana*, *Potamogeton thunbergi*;
- carnivorous herb: *Utricularia inflexa*; and
- herb: *Marsilea farinose* subsp. *farinosa*.

Biogeographically Important Taxa (Highveld endemic)

- Herb: *Rorippa fluviatillis* var. *caledonica*.

Endemic<sup>5</sup> Taxa

- Geophytic herbs: *Disa zuluensis*, *Kniphofia flammula* (northern KZN) *Nerine platypetala*; and
- succulent herb: *Crassula tuberella*.

<sup>5</sup> *Endemic* means a species that is prevalent in or peculiar to a particular locality

## 6. GABBRO GRASSY BUSHVELD (SVI 6)

This vegetation type is an open savanna with a dense grass cover (with dominants including *Themeda triandra*) with a few scattered trees and shrubs. Sparser grass cover is encountered on shallow soils. Very little is transformed and erosion is low.

Important taxa includes:

- Tall trees: *Acacia nigrescens* (d), *Sclerocarya birrea* subsp. *caffra*;
- small trees: *Acacia tortilis* subsp. *heteracantha*, *Bolusanthus speciosus*, *Dalbergia melanoxylon*, *Lannea schweinfurthii* var. *stuhlmannii*, *Ziziphus mucronata*;
- tall shrubs: *Fluggea virosa*, *Grewia bicolor*, *Ormocarpum trichocarpum*, *Trephrosia polystachya*;
- low shrubs: *Abutilon austro-africanum*, *Seddera suffruticosa*, *Sida rhombifolia*;
- graminoids: *Chloris virgata* (d), *Ischaemum afrum* (d), *Seteria incarssata* (d), *Themeda triandra* (d), *Bothriochloa radicans*, *Cenchrus ciliaris*, *Cymbopogon pospischilii*, *Digitaria eriantha* subsp. *eriantha*, *Enneapogon cenchroides*, *Eragrostis superba*, *Panicum maximum*, *Schmidtia pappophoroides*, *Sorghum versicolor*, *Sporobolus nitens*, *Urochloa mosambicensis*;
- herbs: *Heliotropium steudneri*, *Ipomoea crassipes*, *Kyphocarpa angustifolia*; and
- succulent herb: *Aloe zebrine*.

## 7. GOLD REEF MOUNTAIN BUSHVELD (SVCB 9)

The vegetation occurs on rocky hills and ridges often west-east trending with more dense woody vegetation often on the south-facing slopes associated with distinct floristic differences (e.g. preponderance of *Acacia caffra* on the southern slopes). Tree cover elsewhere is variable. Tree and shrub layers are often continuous. Herbaceous layer is dominated by grasses.

Some areas with dense stands of the alien *Melia azedarach* but which is often associated with drainage lines or alluvia embedded within this unit. Erosion is very low to low.

Important taxa includes:

- Small trees: *Acacia caffra* (d), *Combretum molle* (d), *Protea caffra* (d), *Celtis africana*, *Dombeya rotundifolia*, *Englerophytum magalismontanum*, *Orchna pretorieriensis*, *Rhus leptodictya*, *Vangueria infausta*, *V. parvifolia*, *Ziziphus mucronata*;
- tall shrubs: *Canthium gilfillanii*, *Ehretia rigida* subsp. *rigida*, *Grewia occidentalis*, *Gymnosporia buxifolia*, *Mystroxydon aethiopicum* subsp. *Burkeanum*;
- low shrubs: *Athrixia elata*, *Pearsonia cajanifolia*, *Rhus magalismontana* subsp. *magalismontana*, *R. rigida* var. *rigida*;

- woody climber: *Ancylobotrys capensis*;
- graminoids: *Loudetia simplex* (d), *Panicum natalense* (d), *Schizachyrium sanguineum* (d), *Trachypogon spicatus* (d), *Alloteropsis semialata* subsp. *eckloniana*, *Bewsia biflora*, *Digitaria tricholaenoides*, *Diheteropogon amplexans*, *Sporobolus pectinatus*, *Tristachya biseriata*, *T. leucothrix*;
- herbs: *Helichrysum nudifolium*, *H. rugulosum*, *Pentanisia angustifolia*, *Senecio venosus*, *Xerophyta retinervis*; and
- geophytic herbs: *Cheilanthes hirta*, *Hypoxis hemercocallidea*, *Pellaea calomelanos*.

Endemic taxa includes:

- Succulent shrub: *Aloe peglerae*; and
- succulent herb: *Frithia pulchra*.

## 8. GRANITE LOWVELD (SVI 3)

The vegetation type represents tall shrubland with few trees to moderately dense low woodland on the deep sandy uplands. Dense thicket to open savanna occur in the bottomlands. The dense herbaceous layer contains the dominant *Digitaria eriantha*, *Panicum maximum* and *Aristida congesta* on fine-textured soils, while brackish bottomlands support *Sporobolus nitens*, *Urochloa mosambicensis* and *Chloris virgata*. At seep lines where convex topography changes to concave, a dense fringe of *Terminalia sericea* occurs, with *Eragrostis gummiflua* in the undergrowth. More than 20% is already transformed, mainly by cultivation and by settlement development. Erosion is very low to moderate.

Important taxa includes:

- Tall trees: *Acacia nigrescens* (d), *Sclerocarya birrea* subsp. *caffra* (d);
- small trees: *Acacia nilotica* (d), *Albizia harveyi* (d), *Combretum apiculatum* (d), *C. imberbe* (d), *C. zeyheri* (d), *Ficus stuhlmannii* (d), *Peltoporum africanum* (d), *Pterocarpus rotundifolius* (d), *Terminalia sericea*, (d), *Acacia exuvialis*, *A. gerrandi*, *Bolusanthus speciosus*, *Cassia abbreviata* subsp. *beareana*, *Combretum collinum* subsp. *sulunse*, *Dalbergia melanoxylon*, *Gymnosporia glaucophylla*, *Lannea schweinfurthii* var. *stuhlmannii*, *Pavetta schumanniana*, *Plectroniella armata*, *Terminalia prunioides*;
- tall shrubs: *Combretum hereoense* (d), *Dichrostachys cinerea* (d), *Euclea divinorum* (d), *Strychnos madagascariensis* (d), *Gardenia volkensii*, *Hibiscus micranthus*, *Tephrosia polystachya*;



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- low shrubs: *Abutilon austro-africanum*, *Agathisanthemum bojeri*, *Aptosimum lineare*, *Barleria elegans*, *Clerodendrum ternatum*, *Commiphora africana*, *Grossypium herbaceum* subsp. *africanum*, *Panvonia burchellii*;
- woody climber: *Sphedamnocarpus pruriens* subsp. *pruriens*;
- herbaceous climber: *Rhynchosia totta*;
- graminoids: *Brachiaria nigropedatta* (d), *Digitaria eriantha* subsp. *eriantha* (d), *Eragrostis rigidior* (d), *Melinis repens* (d), *Panicum maximum* (d), *Pogonarthria squarrosa* (d), *Aristida congesta*, *Bulbostylis hispidula*, *Chloris mossambicensis*, *Enneapogon cenchroides*, *Heteropogon contortus*, *Leptochloa eleusine*, *Perotis patens*, *Schmidtia pappophoroides*, *Sehima galpinii*, *Tricholaena monachne*, *Urochloa mosambicensis*;
- herbs: *Achyranthes aspera*, *Aspilia mossambicensis*, *Becium filamentosum*, *Chamaecrista absus*, *Commelina benghalensis*, *C. erecta*, *Cucumis africanus*, *Evolvulus alsinoides*, *Heliotropium strigosum*, *Hermbsstaedtia ororata*, *Hibiscus praeteritus*, *Indigofera filipes*, *I. Sanguinea*, *Kohautia virgata*, *Kyphocarpa angustifolia*, *Leucas glabrata*, *Ocimum gratissimum*, *Phyllanthus maderaspatensis*, *Pupalia lappacea*, *Vahlia capensis* subsp. *vulgaris*, *Waltheria indica*; and
- succulent herbs: *Orbea rogersii*, *Stapelia leendertziae*.

### 9. GRAVELOTTE ROCKY BUSHVELD (SVI 7)

The vegetation consists of open deciduous to semi-deciduous woodland on rocky slopes and inselbergs, contrasting strongly with the surrounding plains. This vegetation type is not conserved in statutory conservation areas. Conservation of this unit is promoted due to the land use of game and cattle ranching and due to its low agronomic potential. Erosion is very low to moderate.

Important taxa includes:

- Tall tree: *Pterocarpus angolensis*;
- small trees: *Acacia caffra* (d), *Croton gratissimus* (d), *Cussonia natalensis* (d), *Ficus tettensis* (d), *Kirkia acuminata* (d), *Berchemia zeyheri*, *Birdelia mollis*, *Combretum apiculatum*, *C. molle*, *Dombeya rotundifolia*, *Englerophytum magalismsontanum*, *Faurea saligna*, *Ficus abutilifolia*, *F. bukei*, *Heteropyxis natalensis*, *Ochna natalitia*, *Pavetta schumanniana*, *Rhus leptodictya*, *Schrebera alata* (woodland form), *Sterculia rogersii*, *Vangueria infausta*;
- succulent tree: *Euphorbia cooperi*;
- tall shrubs: *Steganotaenia araliacea* (d), *Coptosperma supra-axillare*, *Hexalobus monopetalus*, *Mundulea sericea*, *Pouzolzia mixta*, *Psydrax livida*;

- low shrubs: *Barleria affinis*, *B. lancifolia*, *B. saxatilis*, *Psiadia punctulata*;
- woody climbers: *Cocculus hirsutus*, *Sphedamnocarpus pruriens* subsp. *pruriens*;
- graminoids: *Brachiaria serrata* (d), *Panicum maximum* (d), *Andropogon schirensis*, *Brachiaria nigropedata*, *Cymbopogon caesius*, *Eustachys paspaloides*, *Heteropogon contortus*, *Loudetia simplex*, *Setaria sphaceata*;
- herb: *Vernonia natalensis*; and
- succulent herb: *Stapelia gigantean*.

Endemic taxon:

- small tree: *Encephalartos dyeruanus*.

### 10. IRONWOOD DRY FOREST (FOZ 9)

This vegetation type occurs on moderate to steep mountain slopes (up to 22°), forming dense forests (sometimes called 'thicket') dominated by Lebombo Ironwood (*Androstachys johnsonii*), which may build a closed canopy reaching up to 10 m. *Croton pseudopulchellus* attains high densities in the understorey. The adjacent bushveld communities are often sharply demarcated from the forest.

Important taxa includes:

- Tall trees: *Androstachys johnsonii* (d), *Entandrophragma caudatum*;
- small trees: *Alchornea laxiflora*, *Boscia albitrunca*, *Cassia abbreviata* subsp. *beareana*, *Commiphora tenuipetiolata*, *Croton gratissimus*, *Euphorbia espinosa*, *Hymenodictyon parvifolium*, *Monodora junodii* var. *junodii*, *Pouzolzia mixta*, *Vitex ferrunginea*;
- succulent tree: *Euphorbia confinalis*;
- woody climbers: *Combretum paniculatum*, *Strophanthus kombe*;
- herbaceous climber: *Ipomoea magnusiana*;
- tall shrubs: *Croton pseudopulchellus* (d), *C. madandesis*, *Dombeya kirkii*, *Phyllanthus reticulatus*;
- low shrubs: *Asparagus setaceus*, *Hibiscus micranthus*, *Phyllanthus pinnatus*;
- herbs: *Achyranthes aspera* (d), *Commelina benghalensis* (d), *Selaginella dregei* (d), *Blainvillea gayana*, *blepharis maderaspatensis*, *Celosia trigyna*, *Cleome monophylla*, *Corchorus longipedunculatus*, *Monechma debile*, *Pupalia lappacea*, *Spermacoce senensis*, *Triumfetta pentandra*, *Xerophyta equisetoides*, *X. humilis*;
- geophytic herbs: *Cheilanthes viridis*, *Pellaea calomelanos*; and

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- graminoids: *Aristida congesta* (d), *Panicum maximum* (d), *Brachiaria deflexa*, *Danthoniopsis pruinosa*, *Digitaria eriantha*, *Eneropogon macrostachyus*, *Leptoarydion vulpiastrum*, *Setaria pumila*, *S. sagittifolia*, *Sporobolus panicoides*.

Endemic taxon:

- Tall shrub: *Pavetta tshikondeni*

### 11. LEGOGOTE SOUR BUSHVELD (SVI 9)

The vegetation type occurs on gently to moderately sloping upper pediment slopes with dense woodland including many medium to large shrubs often dominated *Parinari curatellifolia* and *Bauhinia galpinii* with *Hyperthelia dissolute* and *Panicum maximum* in the undergrowth. Short thicket dominated by *Acacia ataxacantha* occurs on less rocky sites. Exposed granite outcrops have low vegetation cover, typically with *Englerophytum magalismontanum*, *Aloe petricola* and *Myrothamnus flabellifolia*. It has been greatly transformed, mainly by plantations and also cultivated areas and urban development. Scattered alien plants include *Lantana camara*, *Psidium guajava* and *Solanum mauritianum*.

Important taxa includes:

- Tall trees: *Pterocarpus angolensis* (d), *Sclerocarya birrea* subsp. *caffra* (d);
- small trees: *Acacia davyi* (d), *A. sieberiana* var. *woodii* (d), *Combretum zeyheri* (d), *Erythrina latissima* (d), *Parinari curatellifolia* (d), *Terminalia sericea* (d), *Trichilia emetica* (d), *Veronia amygdalina* (d), *Acacia caffra*, *Antidesma venosum*, *Erythroxylum emarginatum*, *Faurea rochetiana*, *F. saligna*, *Ficus burikei*, *F. glumosa*, *F. ingens*, *F. petersii*, *Heteropyxis natalensis*, *Peltophorum africanum*, *Piliostigma thonningii*, *Pterocarpus rotundifolius*, *Schotia brachypetala*;
- succulent tree: *Euphorbia ingens*;
- tall shrubs: *Diospyros lycioides* subsp. *sericea*, *Erythroxylum delagoense*, *Olea europaea* subsp. *africana*, *Pachystigma macrocalyx*, *Pseudarthria hookeri* var. *hookeri*, *Rhus pentheri*;
- low shrubs: *Diospyros galpinii* (d), *Flemingia grahamiana* (d), *Agathisanthemum bojeri*, *Eriosema psoraleoides*, *Gymnosporia heterophylla*, *Hemizygia punctata*, *Indigofera filipes*, *Myrothamnus flabellifolius*, *Rhus rogersii*;
- succulent shrubs: *Aloe petricola*, *Euphorbia vandermerwei*, *Huernia kirkii*;
- woody climbers: *Acacia ataxacantha* (d), *Bauhinia galpinii* (d), *Helinus intergrifolius*, *Sphedamnocarpus pruriens* subsp. *Pruriens*;

- graminoids: *Bothriochloa bladhii* (d), *Cymbopogon caesius* (d), *C. nardus* (d), *Hyparrhenia cymbaria* (d), *H. poecilotracha* (d), *Hyperthelia dissolute* (d), *Panicum maximum* (d), *Andropogon schirensis*, *Paspalum scrobiculatum*, *Schizachyrium sanguineum*;

- herbs: *Gerbera ambigua*, *G. viridifolia*, *Hemizygia persimilis*, *Hibiscus sidiformis*, *Ocimum gratissimum*, *Waltheria indica*;

- succulent herbs: *Orbea carnos* subsp. *carnos*, *Stapelia gigantean*; and

- geophytic herbs: *Gladiolus hollandii*, *Hypoxis rigidula*.

Endemic Taxon:

- Succulent herb: *Aloe simii*.

### 12. LEOLO SUMMIT SOURVELD (GM 20)

The vegetation occurs on summit plateaus on major mountain ranges with steep slopes. Large boulders and stones cover the shallow soils on the hillsides and plateau. Dense, sour grassland occurs on the high-altitude upper slopes and summit of the mountain; scattered clumps of trees and shrubs occur in sheltered, rocky habitats on the plateau.

Although sparsely populated, very little of the Grassland Biome on the Leolo Mountains has remained undisturbed due to the extensive subsistence agriculture. Threatened by the mining of granite for dimension stone. Although the moist summit of the Leolo Mountains has important value as a water source to the surrounding arid valleys, it has never been regarded as a conservation priority. Erosion is very high.

Important taxa includes:

- Small trees: *Cussonia transvaalensis*, *Greyia radlkoferi*, *Maytenus albata*, *Protea caffra* subsp. *caffra*, *P. roupelliae* subsp. *Roupellia*;
- tall shrubs: *Euryops brecipapposus* (d), *Veronia myriantha* (d), *Buddleja auriculata*, *B. saligna*, *Euclea crispa* subsp. *crispa*, *Leucosidea sericea*, *Pavetta zeyheri*;
- low shrubs: *Helichrysum splendidum* (d), *Clutia pulchella*, *Gnidia caffra*, *Polygala uncinata*, *P. virgata*, *Rhus discolor*, *Senecio mircoglossus*;
- succulent shrub: *Aloe arborescens*;
- geoxylic suffrutex: *Elephantorrhiza elephantine*;
- graminoids: *Diheteropogon amplexens* (d), *Elionurus muticus* (d), *Eragrostis capensis* (d), *E. curvula* (d), *Setaria sphacelata* (d), *Themeda triandra* (d), *Tristachya leucothrix* (d), *Brachiaria serrata*, *Hyparrhenia hirta*, *Sporobolus centrifuges*;

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- herbs: *Hirpicium bechuanense* (d), *Pentanisia prunelloides* subsp. *prunelloides* (d), *Acalypha punctata*, *Angallis huttonii*, *Berkheya insignis*, *Jamesbrittenia silenoides*, *Lotononis foliosa*, *Manulea parviflora*, *Pegolettia lanceolata*, *Rothea hirsuta*, *Senecio latifolius*, *Xerophyta viscosa*; and
- geophytic herb: *Hypoxis rigidula* var. *pilosissima*.

Biogeographically important taxa includes:

(<sup>N</sup>Northern sourveld endemic, <sup>SK</sup>Sekhukhune endemic, <sup>Z</sup>Link to Zimbabwe)

- Tall shrub: *Vitex obvata* subsp. *wilmsii*<sup>N</sup>;
- woody climber: *Rhoicissus sekhukhuniensis*<sup>SK</sup>;
- low shrubs: *Asparagus sekukuniensis*<sup>SK</sup>, *Grewia vernicosa*<sup>N</sup>, *Helichrysum rudolffii*<sup>N</sup>, *H. uninervium*<sup>N</sup>, *Hibiscus barnardii*<sup>SK</sup>, *Jamesbrittenia macrantha*<sup>SK</sup>, *Melhania randii*<sup>N</sup>, *Plectranthus venter*<sup>Z</sup>;
- herbs: *Berkheya densifolia*<sup>N</sup>, *Cyantotis pachyrrhiza*<sup>N</sup>, *Nemsia zimbabwensis*<sup>Z</sup>;
- herbaceous climber: *Cyphia transvaalensis*<sup>N</sup>;
- geophytic herbs: *Gladiolus sekukuniensis*<sup>SK</sup>, *Zantedeschia jucunda*<sup>SK</sup>; and
- succulent herb: *Aloe affinis*<sup>N</sup>.

### 13. LIMPOPO RIDGE BUSHVELD (SVMP 2)

The vegetation occurs on extremely irregular plains with ridges and hills. Moderately open savanna with poorly developed ground layer. Umbrella-shaped canopied *Kirkia acuminata* is prominent on some ridge skylines with the often enormous *Adansonia digitata* on shallow calcareous gravel; the shrub *Catophractes alexandri* is dominant on cal-silicate soils. These are particularly striking landscapes with rock walls and passages within areas of sandstone of the Clarens Formation (e.g. within the Mapungubwe National Park). Very little is transformed, mainly for cultivation and mining.

Important taxa includes:

- Tall trees: *Adansonia digitata* (d), *Acacia nigrescens* (d), *Sclerocarya birrea* subsp. *Caffra*;
- small trees: *Colophospermum mopane* (d), *Commiphora glandulosa* (d), *C. tenuipetiolata* (d), *Terminalia puriodes* (d), *Acacia Senegal* var. *leiorhachis*, *A. tortilis* subsp. *heteracantha*, *Boscia albitrunca*, *Combretum apiculatum*, *C. imberbe*, *Commiphora mollis*, *Ficus abutilifolia*, *F. tettensis*, *Kirkia acuminata*, *Sterculia rogersii*, *Ximenia Americana*;
- tall shrubs: *Catophractes alexandri*, *Commiphora pyracanthoides*, *Gardenia resiniflua*, *Grewia bicolor*, *G. villosa*, *Hibiscus calyphyllus*, *H. micranthus*;

- low shrubs: *Barleria affinis*, *Blepharis diversispina*, *Neuracanthus africanus*, *Plinthus rehmannii*, *Ptychlobium contortum*;
- woody climber: *Cissus cornifolia*;
- graminoids: *Aristida adscensionis*, *A. stipitata* subsp. *graciliflora*, *Digitaria eriantha* subsp. *eriantha*, *Enneapogon cenchroides*, *Panicum maximum*, *Schmidtia pappophoroides*, *Stipagrostis uniplumis*; and
- succulent herb: *Tavaresia barklyi*.

### 14. LOSKOP MOUNTAIN BUSHVELD (SVCB 13)

The vegetation occurs on low mountains and ridges with open tree savanna on lower-lying areas dominated by *Burkea africana* and a denser broad-leaved tree savanna on lower slopes and midslopes with prominent *Diplorhynchus condylocarpon*, *Combretum apiculatum* and *Acacia caffra*. The herbaceous layer is dominated by grasses. A small percentage is transformed by cultivation and urban and built-up areas. Erosion is mostly very low to low.

Important taxa includes:

- Tall tree: *Acacia burke*;
- small trees: *Acacia caffra* (d), *Burkea africana* (d), *Combretum apiculatum* (d), *C. zeyheri* (d), *Croton gratissimus* (d), *Faurea saligna* (d), *Heteropyxis natalensis* (d), *Ochna pulchra* (d), *Protea caffra* (d), *Pseudolachnostylis maprouifolia* (d), *Terminalia sericea* (d), *Brachylaena rotundata*, *Combretum molle*, *Englerophytum magalismontanum*, *Ozoroa sphaerocarpa*, *Pappea capensis*, *Rhus leptodictya*, *Strychnos cocculoides*, *Vangueria parvifolia*;
- tall shrubs: *Diplorhynchus condylocarpon* (d), *Elephantorrhiza burkei* (d), *Combretum moggii*, *Grewia flava*, *Mundulea sericea*, *Pavetta zeyheri*, *Psydrax livida*, *Vitex rehmannii*;
- low shrub: *Rhus zeyheri* (d);
- succulent shrub: *Aloe castanea*;
- graminoids: *Aristida transvaalensis* (d), *Loudetia simplex* (d), *Trachypogon spicatus* (d), *Digitaria eriantha* subsp. *eriantha*, *Enneapogon pretoriensis*, *Heteropogon contortus*, *Setaria sphacelata*, *Themeda triandra*, *Tristachya biseriata*; and
- herb: *Xerophyta retinervis*.

Endemic taxa includes:

- Geophytic herb: *Gladiolus pole-evansii*; and
- succulent herb: *Haworthia koelmaniorum*.



## 15. LOSKOP THORNVELD (SVCB 14)

The vegetation type occurs in valleys and plains of parts of the upper Olifants River catchment. Open, deciduous to semi-deciduous, tall, thorny woodland, usually dominated by *Acacia* species. About a quarter of the area is already transformed, mainly for agricultural crops requiring irrigation. Winter crops are the most common. Alien plants, for example *Cereus jamacaru*, *Opuntia ficus-indica*, *Melia azedarach*, *Lantana camara* and *Solanum seaforthianum*, have invaded various parts of this unit.

Important taxa includes:

- Tall trees: *Acacia burkei*, *Sclerocarya birrea* subsp. *caffra*, *Acacia gerrardii* (d), *A. sieberiana* var. *woodii* (d), *A. nilotica*, *A. tortilis* subsp. *heteracantha*, *Berchemia zeyheri*, *Combretum zeyheri*, *Pappea capensis*, *Peltophorum africanum*, *Rhus leptodictya*;
- tall shrubs: *Euclea crispa* subsp. *crispa* (d), *Rhus pyroides* var. *pyroides* (d), *Dichrostachys cinerea*, *Euclea undulata*, *Grewia flava*, *Olea europaea* subsp. *Africana*;
- low shrubs: *Asparagus suaveolens*, *Leonotis ocymifolia*, *Orthosiphon fruticosus*, *Veronia poskeana* subsp. *Botswanaica*;
- succulent shrub: *Kalanchoe paniculata*;
- woody climber: *Clematis brachiata* (d);
- woody succulent climber: *Senecio pleistocephalus*;
- herbaceous climber: *Rhynchosia minima* (d);
- graminoids: *Bothriochloa insculpta* (d), *Digitaria argyrograpta* (d), *Themeda triandra* (d), *Aristida congesta*, *Bulbostylis humilis*, *Cenchrus ciliaris*, *Cymbopogon nardus*, *Enneapogon scoparius*, *Eragrostis trichophora*, *Eustachys paspaloides*, *Setaria verticillata*; and
- herb: *Kyphocarpa angustifolia*.

## 16. LOWVELD RIVERINE FOREST (FOA 1)

It is tall forests fringing larger rivers (gallery forests) and water pans. When dominated by *Ficus sycomorus* or *Diospyros mespiliformis* (alluvial sediments along major rivers) these forests are dense and tall, structured into several tree layers and with a well-developed dense shrub layer. Unknown portion has been irreversibly transformed by clearing for cultivation. Aliens such as *Melia azedarach*, *Lantana camara*, *Psidium guajava*, *Chromolaena odorata*, *Caesalpinia decapetala* are serious invaders in places. Agricultural malpractices upstream, building of dams and excessive water extraction for agriculture and mining as well as local exploitation for timber and non-timber forest products are serious threats to this vegetation.

Important taxa includes:

- Tall trees: *Acacia robusta* subsp. *calvigera* (d), *Breonadia salicina* (d), *Diospyros mespiliformis* (d), *Faidherbia albida* (d), *Ficus sycomorus* (d), *Kigelia africana* (d), *Berchemia discolor*, *Combretum erythrophyllum*, *C. imberbe*, *Ekebergia capensis*, *Philenoptera violacea*, *Rauvolfia caffra*, *Spirostachys africana*, *Syzygium guineense*, *Trichilia emetica*, *Xanthocercis zambesiaca*;
- small trees: *Combretum hereroense*, *Corton megalobotrys*, *Hyphaene coriacea*, *Nuxia oppositifolia*, *Phoenix reclinata*, *Vernonia colorata*;
- tall shrubs: *Abutilon angulatum*, *Acacias schweinfurthii*, *Ficus carprefolia*;
- soft shrub: *Hypoestes aristata*;
- herb: *Achyranthes aspera* (d); and
- graminoids: *Digitaria eriantha* (d), *Panicum maximum* (d), *Echinochloa pyramidalis*, *Eriochloa meyeriana*, *Panicum coloratum*, *Phragmites mauritianus*, *Seraria incrassata*, *S. sphacelata*, *Sporobolus consimilis*.

## 17. LOWVELD RUGGED MOPANEVELD (SVMP 6)

It occurs on irregular plains sometimes steep with slopes and prominent hills. It is usually composed of dense shrubs with occasional trees and a sparse ground layer. About 20% already transformed mainly by cultivation and some built up areas. This vegetation occurring outside the conserved areas is under pressure from high-density rural human populations and associated urban sprawl and agricultural activities.

Important taxa includes:

- Tall trees: *Acacia nigrescens*, *Sclerocarya birrea* subsp. *caffra*;
- small trees: *Colophospermum mopane* (d), *Combretum apiculatum* (d), *Terminalia prunioides* (d), *Acacia exuvialis*, *A. nilotica*, *Boscia albitrunca*, *Commiphora mollis*, *Dalbergia melanoxylon*;
- tall shrubs: *Combretum hereoense*, *Dichrostachys cinerea*, *Grewia bicolor*, *G. villosa*, *Rhigozum zambesiicum*;
- low shrubs: *Commiphora africana*, *Melhaniania forbesii*, *M rehmanni*, *Solanum panduriforme*;
- graminoids: *Aristida congesta* (d), *Enneapogon cenchooides* (d), *Melinis repens* (d), *Sporobolus panicoides* (d), *Bothriochloa radicans*, *Digitaria eriantha* subsp. *pentzii*, *Fingerhuthia africana*, *Panicum maximum*; and
- herbs: *Hibiscus sidiformis*, *Phyllanthus asperulatus*, *Xerophyta retinervis*.

## 18. LYDENBURG MONTANE GRASSLANDS (GM 18)

The vegetation occurs on high-altitude plateaus, undulating plains, mountain peaks and slopes, hills and deep valleys, supporting predominantly very low grasslands on the high-lying areas. Height of the grass sward increases on the lower slopes. The grassland is very rich in forb<sup>6</sup> species. Level of transformation is relatively high with mostly alien plantations and cultivated lands.

Important taxa includes:

- Small trees: *Protea roupelliae* subsp. *roupelliae* (d), *Faurea galpinii*;
- low shrubs: *Phymaspermum acaesum* (d), *Anthospermum rigidum* subsp. *rigidum*, *Cliffortia repens*, *Erica cerinthodes*, *E. woodii*, *Felicia filifolia* subsp. *filifolia*, *Gnidia caffra*, *Helichrysum odoratissimum*, *H. swynnertonii*, *Heteromorpha involucrata*, *Polygala uncinata*, *Tenrynea phyllicifolia*;
- succulent shrubs: *Lopholaena disticha* (d), *Delosperma lydenburgense*;
- graminoids: *Andropogon schirensis* (d), *Aristida junciformis* subsp. *galpinii* (d), *Brachiaria serrata* (d), *Digitaria monodactyla* (d), *D. tricholaenoides* (d), *Diheteropogon filifolius* (d), *Harpochoa falx* (d), *Heteropogon contortus* (d), *Hyparrhenia hirtia* (d), *Loudetia simplex* (d), *Monocymbium ceresiiforme* (d), *Setaria nigrirostris* (d), *Sporobolus centrifuges* (d), *Themeda triandra* (d), *Trachypogon spicatus* (d), *Tristachya leucothrix* (d), *Alloteropsis semialata* subsp. *eckloniana*, *Aristida sciurus*, *Bulbostylis oritrephes*, *Ctenium concinnum*, *Cymbopogon caesius*, *Diheteropogon amplexans*, *Elionurus muticus*, *Eragrostis capensis*, *E. chloromelas*, *E. curvula*, *E. gummiflua*, *E. plana*, *E. racemosa*, *E. sclerantha*, *Eulalia villosa*, *Ischyrolepis schoenoides*, *Koeleria capensis*, *Microchloa caffra*, *Panicum ecklonii*, *P. natalense*, *Pentachistis natalensis*, *Rendlia altera*, *Schizachyrium sanguineum*, *Sporobolus pectinatus*, *Tristachya rehmannii*;
- herbs: *Senecio gerrardii* (d), *Acalpha angustata*, *A. depressinerva*, *Alepidea longifolia*, *Dicoma anomala*, *Dimorphotheca jucunda*, *D. spectabilis*, *Eriosema kraussianum*, *Gerbera ambigua*, *Haplocarpha scaposa*, *Helichrysum caespitium*, *H. chionospaerum*, *H. nudifolium*, *H. rugulosum*, *H. spiralepis*, *H. subglomeratum*, *H. umbraculigerum*, *Monopsis decipiens*, *Myosotis afropalustris*, *Pelargonium luridum*, *Pentanisia prunelloides* subsp. *latifolia*, *Polygala amatymbica*, *Psammotropha myriantha*, *Rhynchosia monophylla*, *Schistostephium crataegifolium*, *Sebaea erosa*, *S. sedoides* var. *confertiflora*, *Selago procera*, *Senecio laevigatus*, *Vernonia hirsute*, *V. natalensis*, *V. oligocephala*, *Wahlenbergia undulata*, *Zornia capensis*;
- herbaceous climber: *Rhynchosia totta*;

- geophytic herbs: *Gladiolus longicollis* subsp. *platypetalus* (d), *Agapanthus inapertus* subsp. *inapertus*, *A. inapertus* subsp. *intermedius*, *Chlorophytum haygarthii*, *Corycium dracomontanum*, *C. nigrescens*, *Disa fragrans* subsp. *fragrans*, *D. versicolor*, *Disperis renibractea*, *Gladiolus ecklonii*, *Habenaria dives*, *H. dregeana*, *H. lithophila*, *Haemanthus humilis* subsp. *hirsutus*, *Holothrix scopularia*, *Hypoxis costata*, *H. galpinii*, *H. rigidula* var. *pilosissima*, *Merwillia natalensis*, *Pachycarpus transvaalensis*, *Raphionacme galpinii*, *Satyrion longicauda*, *Zantendeschia albomaculata* subsp. *Macrocarpa*; and
- succulent herbs: *Aloe dyeri*, *A. gracilifolia*, *A. longibracteata*, *Crassula vaginata*.

## 19. LYDENBURG THORNVELD (GM 21)

The vegetation occurs at lower levels at the foot of the mountains and on undulating plains. This is open, frost-hardy woodland. Structurally it comprises closed grasslands which is almost always wooded, sometimes densely so in rocky areas and less so in frost-ridden valleys. Part of it has been transformed, mainly by dryland and irrigated cultivation. Rainfall is generally too low for plantations.

Important taxa includes:

- Small trees: *Acacia robusta* subsp. *robsuta* (d), *Cussonia transvaalensis* (d), *Acacia caffra*, *A. karroo*, *Combretum erythrophyllum*, *Cussonia paniculata*, *Dombeya rotundifolia*;
- tall shrubs: *Diospyros lycioides* subsp. *guerkei*, *Euclea crispa* subsp. *crispa*, *Ormocarpum kirkii*, *Rhamnus prinoides*, *Veronia crataegifolia*;
- woody climbers: *Jasminum quinatum* (d), *Acacia ataxacantha*;
- low shrubs: *Rubus transvaaliensis* (d), *Senecio microglossus* (d), *Anthospermum rigidum* subsp. *pumilum*, *Lippia javanica*, *Nemesia fruticans*, *Polygala nodiflora*, *Rhus gerrardii*;
- succulent shrubs: *Euphorbia clavarioides* var. *truncata*, *Lopholaena coriifolia*;
- geoxylic suffrutex: *Elephantorrhiza elephantine*;
- graminoids: *Aristida canescens* (d), *A. congesta* (d), *A. diffusa* (d), *Brachiaria serrata* (d), *Bulbostylis buchellii* (d), *Digitaria tricholaenoides* (d), *Eragrostis racemosa* (d), *Heteropogon contortus* (d), *Microchloa caffra* (d), *Schizachyrium sanguineum* (d), *Trachypogon spicatus* (d), *Tristachya leucothrix* (d), *Andropogon schirensis*, *Bewsia biflora*, *Cymbopogon caesius*, *Diheteropogon amplexans*, *Elionurus muticus*, *Eragrostis chloromelas*, *E. gummiflua*, *E. patentissima*, *E. plana*, *Eulalia villosa*, *Hyparrhenia hirta*, *Melinis repens* subsp. *repens*, *Monocymbium ceresiiforme*, *Panicum natalense*, *Schizachyrium ursulus*, *Setaria nigrirostris*, *S.*

<sup>6</sup> *Forb species* means a broad-leaved herb other than a grass.

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*sphacelata*, *Sporobolus centrifuges*, *S. pyramidalis*, *Themeda triandra*, *Tristachya biseriata*, *T. rehmannii*;

- herbs: *Acalypha glandulifolia*, *Dicoma anomala*, *Eriosema kraussianum*, *Geigeria burkei* subsp. *burkei*, *Helichrysum cephaloideum*, *H. rugulosum*, *Kohautia amatymbica*, *Macledium zyheri* subsp. *argyrophylum*, *Rotheca hirsuta*, *Schistostephium crataegifolium*, *Senecio bupleuroides*, *S. coronatus*, *Vernonia oligocephala*;
- geophytic herbs: *Hypoxis multiceps*, *H. rigidula* var. *pilosisima*; and
- succulent herbs: *Aloe fosteri*, *A. greatheadii* var. *davyana*, *Kleinia stapeliiformis*.

Endemic taxa:

- Low shrubs: *Argyrolobium wilmsii* (d), *Adenia wilmsii*; and
- geophytic herb: *Gladiolus rufomarginatus*.

### 20. MAKHADO SWEET BUSHVELD (SVCB 20)

The vegetation type occurs on slightly to moderately undulating plains sloping generally down to the north with some hills in the southwest. It is a short and shrubby bushveld with a poorly developed grass layer. Part of the area has densely populated rural communities. Erosion is low to high.

Important taxa includes:

- Small trees: *Acacia erubescense* (d), *A. gerrardii* (d), *A. mellifera* subsp. *detinens* (d), *A. rehmanniana* (d), *Boscia albitrunca* (d), *Combretum apiculatum* (d), *Acacia tortillis* subsp. *heteracantha*, *Terminalia sericea*;
- tall shrubs: *Commiphora pyracanthoides*, *Dichrostachys cinerea*, *Grewia flava*, *Hibiscus calyphyllus*, *Lycium shawii*, *Rhigozum obovatum*;
- low shrubs: *Baleria lancifolia*, *Hirpicium bechuanense*, *Indigofera polioles*, *Melhania rehmannii*, *Pechuel-Loeschea leubnitziae*;
- graminoids: *Antheophora pubescens* (d), *Aristida stipitata* subsp. *graciliflora* (d), *Cenchrus ciliaris* (d), *Enneapogon scoparius* (d), *Brachiaria nigropedata*, *Eragrostis trichophora*, *Panicum coloratum*, *P. maximum*, *Schmidtia pappophoroides*, *Urochloa mosambicensis*; and
- herbs: *Chamaecrista absus*, *Corbichonia decumbens*, *Geigeria acaulis*, *Harpagophytum procumbens* subsp. *transcaalense*, *Heliotropium steudneri*, *Hemizygia elliotii*, *Hermibstaedtia odorata*, *Lecas sexdentata*, *Osteospermum muricatum*, *Tephrosia purpurea* subsp. *leptostachya*.
- Endemic taxon;
- Herb: *Dicliptera minor* subsp. *pratis-manna*.

### 21. MAKULEKE SANDY BUSHVELD (SVI 1)

It occurs on variable landscapes from low mountains, slightly to extremely irregular plains to hills. Tree savanna (or tall shrubs in places) occurs on the deep sands, and a moderate to dense ground layer. On stony soils the tree savanna and ground layer and dominated by different species than on the deep sands. Partly transformed, mostly through cultivation. Erosion is moderate to high in places.

Important taxa includes:

- Small trees: *Burkea africana* (d), *Kirkia acuminata* (d), *Pseudolachnostylis marprouneifolia* (d), *Terminalia sericea* (d), *Azelia quanzensis*, *Bridelia mollis*, *Combretum apiculatum*, *C. collinum* subsp. *gazense*, *C. zeyheri*, *Croton gratissimus*, *Ficus abutilifolia*, *F. ingens*, *Guibourtia conjugata*, *Hymenocardia ulmoides*, *Lanea schweinfurthii* var. *stuhlmannii*, *Orchna pulchra*, *Ozoroa obovata* var. *elliptica*, *Peltroforum africanum*, *Phyllanthus reticulatus*, *Pterocarpus rotundifolius*, *Stadmannia oppositifolia* subsp. *rhodesica*;
- tall shrubs: *Pteleopsis myritifolia* (d), *Alchornea laxiflora*, *Boscia angustifolia* var. *corymbosa*, *Dichrostachys cinerea*, *Diospyros lycioides* subsp. *sericea*, *Diplorhynchus condylocarpon*, *Grewia hexamita*, *Gymnosporia mossambicensis*, *Hexalobus monopetalus*, *Monodora junodii* var. *junodii*, *Senna petersiana*, *Steganotaenia araliacea*, *Strychnos madagascariensis*, *Tricalysia junodii*;
- low shrubs: *Agathisanthemum bojeri*, *Hermannia glanduligera*, *Pavetta harborii*;
- woody climbers: *Artabotrys brachypetalus*, *Bauhinia galpinii*, *Cissus cornifolia*, *Rhoicissus revoillii*;
- herbaceous climbers: *Merremia tridentata*, *Rhynchosia totta*;
- graminoids: *Andropogon gayanus* (d), *Digitaria eriantha* subsp. *pentzii* (d), *Panicum maximum* (d), *Aristida mollissima* subsp. *argentea*, *A. stipitata* subsp. *graciliflora*, *Brachiaria serrata*, *Bulbostylis hispidula*, *Coleochloa setifera*, *Perotis patens*, *Pogonarthria squarrosa*, *Setaria incrassata*, *Terapogon tenellus*, *Tricholaena monachne*;
- herbs: *Vahlia capensis* subsp. *vulgaris*, *Vernonia fastigiata*; and
- geophytic herb: *Drimia altissima*.

Biogeographically Important taxon (Southern distribution limit):

- Small tree: *Holarrhena pubescens*.

Endemic taxa:

- Succulent shrub: *Euphorbia rowlandii*; and
- herb: *Ceratotheca saxicola*.

## 22. MAMABOLO MOUNTAIN BUSHVELD (SVCB 24)

It occurs on low mountains, lower slopes of Strydpoort and Makapan ranges, and on rocky hills. Slopes are moderate to steep, and very rocky, covered by small trees and shrubs. Rock slabs or domes are sparsely vegetated, and then mostly with a mixture of xerophytic<sup>7</sup> or resurrection plants, with several succulents. Land uses include grazing wood harvesting and medicinal plant collecting. Alien plants include *Nicotiana glauca*, *Opuntia* species and *Zinnia peruviana*.

Important taxa includes:

- Tall tree: *Sclerocarya birrea* subsp. *caffra*;
- small trees: *Combretum molle* (d), *Croton gratissimus* (d), *Heteropyxis natalensis* (d), *Acacia caffra*, *A. davyi*, *A. gerrardii*, *A. nilotica*, *Berchemia zeyheri*, *Cussonia natalensis*, *C. transvaalensis*, *Dombeya rotundifolia*, *Erythrina lysistemon*, *Lannea discolor*, *May tenus undata*, *Pappea capensis*, *Rhus leptodictya*, *Schotia brachypetala*;
- succulent trees: *Euphorbia cooperi* (d), *Aloe marlothii* subsp. *marlothii*, *Euphorbia ingens*;
- tall shrubs: *Clerodendrum glabrum* (d), *Elephantorrhiza burkei* (d), *Acokanthera oppositifolia*, *A. rotundata*, *Buddleja saligna*, *Canthium mundianum*, *Carissa edulis*, *Ehretia obtusifolia*, *Euclea crispa* subsp. *crispa* (short, small-leaved form), *Grewia occidentalis*, *Hibiscus calyphyllus*, *Olea europaea* subsp. *africana*, *Pouzolzia mixta*, *Rhus pentheri*, *R. rehmanniana*, *Scutia myrtina*, *Tarchonanthus parvicapitulatus*;
- low shrubs: *Diospyros lycioides* subsp. *nitens* (d), *Grewia vernicosa* (d), *Barleria rotundifolia*, *Gossypium herbaceum* subsp. *africanum*, *Gymnosporia glaucophylla*, *Hermannia floribunda*, *Heteromorpha stenophylla* var. *transvaalensis*, *Lantana rugosa*, *Myrothamnus flabellifolius*, *Plinthus rehmannii*;
- succulent shrubs: *Kalanchoe sexangularis* (d), *Kleinia longiflora* (d), *Aloe arborescens*, *Cotyledon barbeyi*, *C. orbiculata* var. *orbiculata*, *Kalanchoe paniculata*, *K. rotundifolia*, *Senecio berbertonkus*, *Tetradenia riparia*;
- woody climbers: *Asparagus buchananii* (d), *Jasminum multipartitum* (d), *Acacia ataxacantha*, *Cryptolepis cryptolepidioides*;
- herbaceous climber: *Pentarrhinum insipidum*;
- graminoids: *Cymbopogon caesius* (d), *Digitaria eriantha* subsp. *eriantha* (d), *Heteropogon contortus* (d), *Aristida congesta*, *A. diffusa*, *Enneapogon scoparius*, *Eragrostis rigidior*, *Tricholaena monachne*, *Triraphis andropogonoides*;

- herb: *Vahlia capensis* subsp. *vulgaris*;
- geophytic herbs: *Boophone disticha*, *Drimia altissima*, *D. robusta*, *Eulophia petersii*; and
- succulent herbs: *Aloe greatheadii* var. *greatheadii* (d), *Aeollanthus rehmannii*, *Avonia rhodesica*, *Crassula swaziensis*, *Plectranthus grandidentatus*, *P. hadiensis*.

Endemic taxon:

- Succulent shrubs: *Euphorbia clivicola*, *Khadia media*.

## 23. MARIKANA THORNVELD (SVCB 6)

An open *Acacia karroo* woodland, occurring in valleys and slightly undulating plains, and some lowland hills. Shrubs are more dense along drainage lines, on termitaria and rocky outcrops or in other places protected from fire. Considerably impacted, with 48% transformed, mainly cultivated and urban or built up areas. Near Pretoria, industrial development is a greater threat of land transformation. Alien invasive plants occur localised in high densities, especially along the drainage lines.

Important taxa includes:

- Tall tree: *Acacia burkei*;
- small trees: *Acacia caffra* (d), *A. gerrardii* (d), *A. karroo* (d), *Combretum molle* (d), *Rhus lancea* (d), *Ziziphus mucronata* (d), *Acacia nilotica*, *A. tortilis* subsp. *heteracantha*, *Celtis africana*, *Dombeya rotundifolia*, *Pappea capensis*, *Peltophorum africanum*, *Terminalia sericea*;
- tall shrubs: *Euclea crispa* subsp. *crispa* (d), *Olea europaea* subsp. *africana* (d), *Rhus pyroides* var. *pyroides* (d), *Diospyros lyeioides* subsp. *guerkei*, *Ehretia rigida* subsp. *rigida*, *Euclea undulata*, *Grewia flava*, *Pavetta gardeniifolia*;
- low shrubs: *Asparagus cooperi* (d), *Rhynchosia nitens* (d), *Indigofera zeyheri*, *Justicia flava*;
- woody climbers: *Clematis brachiata* (d), *Helinus integrifolius*;
- herbaceous climbers: *Pentarrhinum insipidum* (d), *Cyphostemma cirrhosum*; graminoids: *Elionurus muticus* (d), *Eragrostis lehmanniana* (d), *Setaria sphacelata* (d), *Themeda triandra* (d), *Aristida scabrivalvis* subsp. *scabrivalvis*, *Fingerhuthia africana*, *Heteropogon contortus*, *Hyperthelia dissoluta*, *Melinis nerviglumis*, *Pogonarthria squarrosa*;
- herbs: *Hermannia depressa* (d), *Ipomoea obscura* (d), *Barleria macrostegia*, *Dianthus mooiensis* subsp. *mooiensis*, *Ipomoea oblongata*, *Vernonia oligocephala*; and
- geophytic herbs: *Ledebouria revoluta*, *Ornithogalum tenuifolium*, *Sansevieria aethiopica*.

<sup>7</sup> *Xerophytic* means a plant adapted to living in a dry arid habitat.

## 24. MOPANE BASALT SHRUBLAND (SVMP 4)

It occurs mainly plains and slightly undulating plains with medium-low (1-2 m) shrubs dominated overwhelmingly by mulistemed *Colophospermum mopane*. Tree forms of mopane are rare. The grass layer is well developed. Vegetation consists of three main variations depending on topographical position: (1) lower, middle footslopes, (2) middle slopes and convex uplands on usually deeper soils, and (3) concave terrain with soils with very high clay content. Conserved in the Kruger National Park.

Important taxa includes:

- Tall trees: *Acacia nigrescens*, *Philenoptera violacea*, *Sclerocarya birrea* subsp. *caffra*;
- small trees: *Acacia exuvialis*, *A. tortilis* subsp. *heteracantha*, *Combretum apiculatum*, *C. imberbe*, *Commiphora glandulosa*, *C. mollis*, *Dalbergia melanoxylon*, *Kirkia acuminata*, *Terminalia phanerophlebia*, *T. prunioides*;
- tall shrubs: *Colophospermum mopane* (d), *Combretum hereroense*, *Flueggea virosa*, *Grewia bicolor*. *Hibiscus calyphyllus*, *H. micranthus*, *Maerua parvifolia*, *Tephrosia polystachya*;
- low shrubs: *Clerodendrum ternatum*, *Dicoma tomentosa*, *Neuracanthus africanus*;
- woody climber: *Combretum mossambicense*;
- herbaceous climber: *Rhynchosia totta*;
- graminoids: *Aristida congesta*, *Bothriochloa radicans*, *Cenchrus ciliaris*, *Enneapogon cenchroides*, *Fingerhuthia africana*, *Heteropogon contortus*, *Panicum maximum*, *Schmidtia pappophoroides*, *Setaria incrassata*, *Themeda triandra*, *Urochloa mosambicensis*; and
- herbs: *Heliotropium steudneri*, *Leucas glabrata*, *Phyllanthus asperulatus*; geophytic herb: *Sansevieria hyacinthoides*.

## 25. MOPANE GABBRO SHRUBLAND (SVMP 8)

The vegetation occurs on slightly irregular to slightly undulating landscape with numerous outcrops of gabbro. Mainly a low shrub layer with two main structural variations both dominated by *Colophospermum mopane*: a shrubveld with practically no trees and a shrubveld with a few larger shrubs and trees including *C. mopane* and *Acacia nigrescens*. Species diversity is the highest in the latter variation. The ground layer of both variations is dense.

Important taxa includes:

- Tall tree: *Sclerocarya birrea* subsp. *caffra*;
- small trees: *Acacia exuvialis*, *A. tortilis* subsp. *heteracantha*, *Albizia harveyi*, *Combretum imberbe*, *Dalbergia melanoxylon*;

- tall shrubs: *Colophospermum mopane* (d), *Dichrostachys cinerea*, *Grewia bicolor*, *Tephrosia polystachya*;
- low shrubs: *Commiphora africana*, *Phyllanthus pentandrus*;
- woody climber: *Cissus cornifolia*;
- graminoids: *Fingerhuthia africana* (d), *Heteropogon contortus* (d), *Panicum coloratum* (d), *Schmidtia pappophoroides* (d), *Bothriochloa radicans*, *Themeda triandra*, *Urochloa mosambicensis*; and
- herbs: *Chamaesyce neopolycnemoides*, *Corbichonia decumbens*, *Heliotropium steudneri*.

## 26. NORTHERN AFROTEMPERATE FOREST (FOZ 2)

It is low, relatively species-poor forests of afrotemperate origin and some of them still showing clear afrotemperate character. Occasional hot fires encroaching from the surrounding savanna woodlands, uncontrolled timber extraction, medicinal-plant harvesting, and grazing in forest can be viewed as the current major threats.

Important taxa includes:

- Tall trees: *Celtis africana* (d), *Halleria lucida* (d), *Olinia emarginata* (d), *Pittosporum viridiflorum* (d), *Podocarpus latifolius* (d), *Rothmannia capensis* (d), *Scolopia mundii* (d), *Afrocarpus falcatus*, *Buddleja saligna*, *Dais cotinifolia*, *Ilex mitis*;
- small trees: *Acalypha glabrata* (d), *Buddleja salvidolia* (d), *Calpurnia aurea* (d), *Combretum erythrophyllum* (d), *Diospyros lycioides* subsp. *guerkei* (d), *D. whyteana* (d), *Euclea crispa* subsp. *crispa* (d), *Widdringtonia nodiflora* (d), *Bowkeria verticillata*, *Canthium ciliatum*, *Leucosidea sericea*, *Scolopia flanaganii*. woody climber: *Cassinopsis ilicdolia* (d);
- tall shrubs: *Myrsine africana* (d), *Cliffortia nitidula*;
- soft shrubs: *Isoglossa grantii* (d), *Hypoestes aristata*, *Plectranthus fruticosus*. herbs: *Plectranthus grillatus* (d), *P. hereroensis* (d), *Peperomia retusa*, *Streptocarpus haygarthii*, *S. pusillus*;
- geophytic herbs: *Blechnum attenuatum* (d), *Asplenium aethiopicum*, *Polystichum luctuosum*; and
- graminoids: *Carex spicato-paniculata* (d), *Oplismenus hirtellus* (d), *Cyperus albostrigatus*, *Schoenoxiphium lehmannii*, *Thamnocalamus tessellatus*.

Endemic Taxa:

- Tall tree: *Scolopia oreophila*;
- small tree: *Maytenus albata*;

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- tall shrub: *Sparrmannia ricinocarpa*; and
- herb: *Streptocarpus polyanthus* subsp. *dracomontanus*.

### 27. NORTHERN ESCARPMENT AFROMONTANE FYNBOS (GM 24)

The dominant structural form of the vegetation type is shrubland comprised of sclerophyllous shrubs and herbs, many with ericoid growth forms. It occurs in fragmented patches of high-lying quartzite ridges that experience frequent mist. Terrain is very rocky and fires are very rare. The landscape is rugged and soils shallow, therefore very little transformation has occurred.

Important taxa includes:

- Small trees: *Protea caffra* subsp. *caffra*, *P. roupelliae* subsp. *roupelliae*;
- tall shrub: *Psoralea latifolia*;
- succulent shrub: *Aloe arborescens* (d);
- low shrubs: *Anthospermum hispidulum* (d), *Cliffortia nitidula* (d), *C. serpyllifolia* (d), *Erica natalitia* var. *natalitia* (d), *Hypericum revolutum* (d), *Passerina montana* (d), *Cliffortia linearifolia*, *Erica revolute*, *E. simii*, *Euryops pendunculatus*, *Helichrysum obductum*, *H. splendidum*, *H. wilmsii*, *Macowania tenuifolia*, *Morella pilulifera*, *Myrsine africana*, *Otiophora cupheoides*, *Phyllica paniculata*, *Phymaspermum acerosum*, *Schistostephium rotundifolium*;
- graminoids: *Ischyrolepis schoenoides* (d), *Scleria transvaalensis* (d), *Cyperus psuedoleptocladus*;
- herbs: *Plectranthus rubropunctatus* (d), *Blechnum punctulatum*; and
- geophytic herb: *Drimia elata*.

### 28. NORTHERN ESCARPMENT DOLOMITE GRASSLAND (GM 22)

It is a very species-rich grasslands that occur along the Escarpment dolomite belt. The grasslands are characterized by a very diverse shrub layer, which varies in height and density. The herbaceous component becomes more dense northwards as the climate becomes drier. More than half has been transformed mainly by plantations and cultivated lands. Very little is currently protected.

Important taxa includes:

- Tall tree: *Sclerocarya birrea* subsp. *caffra*;
- small trees: *Combretum apiculatum* (d), *Acacia erubescens*, *A. exuvialis*, *Albizia harveyi*, *Boscia albitrunca*, *Combretum molle*, *Commiphora mallis*, *Croton gratissimus*, *Kirkia acuminata*, *Lannea*

*schweinfurthii* var. *stuhlmannii*, *Manilkara mochisia*, *Newtonia hildebrandtii* var. *hildebrandtii*, *Ozoroa engleri*, *Pappea capensis*, *Sterculia rogersii*, *Strychnos decussata*, *Terminalia sericea*, *Ximenia caffra*;

- succulent trees: *Euphorbia confinalis* (d), *E. cooperi*;
- tall shrubs: *Dichrostachys cinerea* (d), *Croton madandensis*, *Flueggea virosa*, *Grewia bicolor*, *Karomia speciosa*;
- low shrubs: *Barleria affinis*, *Commiphora africana*, *Pavetta catophylla*, *Tragia dioica*, *Tricalysia junodii*;
- Succulent Shrubs: *Aloe chabaudii*, *A. sipicata*, *Kalanchoe rotundifolia*;
- woody climbers: *Adenia digitata*, *A. spinosa*, *Capparis sepiaria*, *Cardiospermum halicacabum*, *Cissus rotundifolia*, *Helinus integrifolius*;
- herbaceous climber: *Cyphostemma subciliatum*;
- graminoids: *Aristida congesta* (d), *Digitaria eriantha* subsp. *eriantha* (d), *Enneapogon cenchroides* (d), *Heteropogon contortus* (d), *Panicum maximum* (d), *Andropogon gayanus*, *Bothriochloa radicans*, *Brachiaria nigropedata*, *B. xantholeuca*, *Cymbosetaria sagittifolia*, *Panicum deustum*, *Pogonarthria squarrosa*, *Schmidtia pappophoroides*, *Themeda triandra*;
- herbs: *Achyranthes aspera*, *Cleome maculata*, *Crabbea velutina*, *Heliotropium steudneri*; and
- geophytic herbs: *Actinopteris radiata*, *Pellaea calomelanos*, *P. viridis*, *Sansevieria pearsonii*.

### 29. NORTHERN ESCARPMENT QUARTZITE SOURVELD (GM 23)

The landscape where the vegetation occurs is characteristically very rugged, with steep east-facing cliffs. This escarpment is intersected in some areas with large east-flowing rivers. Short, closed grassland rich in forb species with scattered trees and shrubs. This area is very rocky and occurs on weather-resistant quartzite. The nutrient-poor soils lead to lower biomass, which, together with the rocky landscape, results in a reduced frequency and intensity of fires. A large portion of this area has been transformed mainly by plantations.

Important taxa includes:

- Small trees: *Protea roupelliae* subsp. *toupelliae* (d), *Faurea galpinii*, *F. rochetiana*, *Syzygium cordatum* var. *cordatum*;
- tree fern: *Cyathea dregei*;
- tall shrub: *Vernonia myriantha*;



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- low shrubs: *Athrixia phyllicoides*, *Clusia monticola*, *Crotalaria doidgeae*, *Erica woodii*, *Euryops pedunculatus*, *Helichrysum kraussii*, *H. obductum*, *H. wilmsii*, *Phymaspermum acerosum*, *P. bolusii*, *Rhus tumulicola* var. *meeuseana*. succulent shrubs: *Lopholaena coriifolia* (d), *Aloe arborescens*, *Crassula sarcocaulis*;
- graminoids: *Aristida junciformis* subsp. *galpinii* (d), *Loudetia simplex* (d), *Melinis nerviglumis* (d), *Monocymbiutn ceresiiforme* (d), *Panicum ecklonii* (d), *Trachypogon spicatus* (d), *Tristachya leucothrix* (d), *Alloteropsis semialata* subsp. *eckloniana*, *Andropogon appendiculatus*, *Cymbopogon nardus*, *Digitaria maitlandii*, *Diheteropogon filifolius*, *Elionurus muticus*, *Festuca costata*, *Hyparrhenia poecilotracha*, *Ischyrolepis schoenoides*, *Juncus lomatoophyllus*, *Koeleria capensis*, *Merxmuellera drakensbergensis*, *Microchloa caffra*, *Pentaschistis natalensis*, *Rendlia altera*, *Schizachyrium sanguineum*, *Sporobolus pectinatus*, *Stiburus alopecuroides*, *Themeda triandra*, *Trichopteryx dregeana*;
- herbs: *Rhynchosia woodii* (d), *Acalypha glandulifolia*, *Anisopappus smutsii*, *Aster harveyanus*, *Berkheya echinacea*, *Craterocapsa tarsodes*, *Dicoma anomala*, *Eriosema angustifolium*, *Geigeria burkei* subsp. *burkei*, *Gerbera ambigua*, *Helichrysum acutatum*, *H. appendiculatum*, *H. cephaloideum*, *H. nudifolium* var. *pilosellum*, *H. oreophilum*, *H. umbraculigerum*, *Indigofera sanguinea*, *Kohautia amatymbica*, *Lobelia flaccida*, *Monsonia attenuata*, *Pearsonia sessilifolia* subsp. *marginata*, *Rabdosiella calyeina*, *Selago hyssopifolia*, *Senecio panduriformis*, *S. scitus*, *Vernonia centaureoides*, *V. natalensis*, *V. poskeana*, *Wahlenbergia squamifolia*;
- herbaceous climber: *Rhynchosia caribaea*;
- geophytic herbs: *Asplenium aethiopicum*, *Cheilanthes hirta*, *Pteridium aquilinum*, *Schizocarphus nervesus*; and
- succulent herbs: *Crassula alba*, *C. vaginata*, *Craterostigma wilmsii*.

Biogeographically important taxa:

(<sup>N</sup>Northern sourveld endemic, <sup>W</sup>Wolkberg endemic)

- Small trees: *Protea rubropilosa*<sup>N</sup> (d), *Encephalartos paucidentalis*<sup>N</sup>;
- tall shrub: *Tricalysia capensis* var. *galpinii*<sup>N</sup>;
- low shrubs: *Asparagus rigidus*<sup>W</sup>, *Berkheya carlinopsis* subsp. *magalismsontana*<sup>N</sup>, *Helichrysum mimetes*<sup>N</sup>, *H. reflexum*<sup>N</sup>, *H. rudolfii*<sup>N</sup>, *H. uninervium*<sup>N</sup>, *Hemizygia parvifolia*<sup>N</sup>, *H. rehmannii*<sup>N</sup>, *H. subvelutina*<sup>N</sup>, *Kotschyia parvifolia*<sup>N</sup>, *Protea parvula*<sup>N</sup>, *Sutera polelensis* subsp. *fraterna*<sup>N</sup>, *Syncolostemon eriocephalus*<sup>N</sup>;
- succulent shrub: *Aloe chortoliriodes* var. *woolliana*<sup>N</sup>;

- semiparasitic shrubs: *Thesium gracilentum*<sup>W</sup>, *T. multiramulosum*<sup>N</sup>;
- herbs: *Anisopappus junodii*, *Cyanotis pachyrrhiza*<sup>N</sup>, *Hemizygia transvaalensis*<sup>N</sup>; *Monsonia transvaalensis*<sup>N</sup>, *Pearsonia aristata*<sup>N</sup>, *Scabiosa transvaalensis*<sup>W</sup>;
- geophytic herbs: *Agapanthus inapertus* subsp. *hollandii*<sup>N</sup>, *A. inapertus* subsp. *parviflorus*<sup>N</sup>, *Aspisonopsis shebae*<sup>N</sup>, *Brachystelma stellatum*<sup>N</sup>, *Cyrtanthus thorncraftii*<sup>N</sup>, *Disa extinctoria*<sup>N</sup>, *Gladiolus calcartus*<sup>N</sup>, *G. exiguus*<sup>N</sup>, *G. varius*<sup>N</sup>, *G. vernus*<sup>N</sup>, *Ledebouria minima*<sup>N</sup>, *Tulbaghia transvaalensis*<sup>N</sup>; and
- succulent herbs: *Aloe affinis*<sup>N</sup>, *A. thompsoniae*<sup>W</sup>.

Endemic Taxa:

- Small trees: *Encephalartos brevifoliolatus*, *E. cupidus*, *E. nubimontanus*, *Protea laetans*;
- low shrubs: *Erica tivulstris*, *Euclea dewinteri*, *Hemizygia tuoositolie*, *Lopholaena festiva*;
- graminoid: *Schoenoxiphium schweickerdtii*;
- herbs: *Cineraria hederifolia*, *Inezia speciosa*, *Monopsis kowynensis*, *Monsonia lanuginosa*, *Schistostephium artemisiifolium*, *Streptocarpus decipiens*; and
- geophytic herbs: *Brachystelma pachypodium*, *Crocasmia mathewsiana*, *Cyrtanthus huttonii*, *C. junodii*, *Dieramaadelphicum*, *Disa aristata*, *Drimiopsis davidsonae*, *Ledebouria* sp. nov. (*'rupestris'*), *L. galpinii*, *L. petiolata*, *Schizochilus crenulatus*, *Tulbaghia coddii*, *T. simmleri*, *Watsonia strubeniae*; and
- succulent herb: *Aloe nubigena*.

### 30. NORTHERN LEBOMBO BUSHVELD (SVI 16)

It is open bushveld dominated by *Combretaceae* on rocky slopes and ridges of a linear range of hills reaching about 100 m (and higher in places) above its surrounding basalt plains towards the west. Tree succulents such as *Euphorbia confinalis* and *E. cooperi* are typical on steep, stony slopes. There has been virtually no transformation.

Important taxa includes:

- Tall tree: *Sclerocarya birrea* subsp. *caffra*;
- small trees: *Combretum apiculatum* (d), *Acacia erubescens*, *A. exuvialis*, *Albizia harveyi*, *Boscia albitrunca*, *Combretum molle*, *Commiphora mallis*, *Croton gratissimus*, *Kirkia acuminata*, *Lannea schweinfurthii* var. *stuhlmannii*, *Manilkara mochisia*, *Newtonia hildebrandti* var. *hildebrandtii*, *Ozoroa engleri*, *Pappea capensis*, *Sterculia rogersii*, *Strychnos decussata*, *Terminalia sericea*, *Ximenia caffra*;

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- succulent trees: *Euphorbia confinalis* (d), *E. cooperi*;
- tall shrubs: *Dichrostachys cinerea* (d), *Croton madan densis*, *Flueggea virosa*, *Grewia bicolor*, *Karomia speciosa*;
- low shrubs: *Barleria affinis*, *Commiphora africana*, *Pavetta catophylla*, *Tragia dioica*, *Tricalysia junodii*;
- succulent shrubs: *Aloe chabaudii*, *A. spicata*, *Kalanchoe rotundifolia*;
- woody climbers: *Adenia digitata*, *A. spinosa*, *Capparis sepriaria*, *Cardiospermum halicacabum*, *Cissus rotundifolia*, *Helinus integrifolius*;
- herbaceous climber: *Cyphostemma subciliatum*;
- graminoids: *Aristida congesta* (d), *Digitaria eriantha* subsp. *eriantha* (d), *Enneapogon cenchroides* (d), *Heteropogon contortus* (d), *Panicum maximum* (d), *Andropogon gayanus*, *Bothriochloa radicans*, *Brachiaria nigropedata*, *B. xantholeuca*, *Cymbosetaria sagittifolia*, *Panicum deustum*, *Pogonarthria squarrosa*, *Schmidtia pappophoroides*, *Themeda trilandra*;
- herbs: *Achyranthes aspera*, *Cleome maculata*, *Crabbea velutina*, *Heliotropium steudneri*; and
- geophytic herbs: *Actinopterys radiata*, *Pellaea calomelanos*, *P. viridis*, *Sansevieria pearsonii*.

### 31. NOTHERN MISTBELT FOREST (FOZ 4)

It consists of tall, evergreen afrotemperate mistbelt forests occurring primarily in east-facing fire refugia such as subridge scarps and moist sheltered kloofs where they form small fragmented patches. The herb layer supports a number of dominating herbs and so called 'soft shrubs', geophytic herbs and ferns. Encroaching subsistence agriculture, firewood collection in communal areas, and selective harvesting of bark are viewed as serious threats.

Important taxa includes:

- Tall trees: *Brachylaena transvaalensis* (d), *Combretum kraussii* (d), *Curtisia dentata* (d), *Drypetes gerrardii* (d), *Kiggelaria africana* (d), *Ocotea kenyensis* (d), *Olea capensis* subsp. *macrocarpa* (d), *Podocarpus latifolius* (d), *Psydrax obovata* subsp. *elliptica* (d), *Rhus chirindensis* (d), *Schefflera umbellifera* (d), *Syzygium gerrardii* (d), *Xymalos monospora* (d), *Aphloia theiformis*, *Chionanthus battiscombei*, *C. foveolatus* subsp. *major*, *Maytenus acuminata*, *Pterocelastrus galpinii*, *Rapanea melanophloeos*, *Rothmannia capensis*, *Trichilia dregeana*;
- small trees: *Cassipourea malosana* (d), *Oxyanthus speciosus* subsp. *Gerrardii* (d), *Englerophytum magalismsontanum*, *Gymnospori harveyana*, *Mackaya bella*, *Ochna arborea* var. *oconnorii*, *Peddiea africana*, *Rinorea angustifolia*;

- woody climbers: *Acacia ataxacantha* (d), *Keetia gueinzii* (d), *Rhoicissus rhomboidea* (d), *Bauhinia galpinii*, *Dalbergia armata*;
- climbing graminoid: *Prosphytochloa prehensilis* (d);
- tall shrubs: *Psychotria capensis* (d), *Canthium kuntzeanum*, *Carissa bispinosa* subsp. *zambesiensis*, *Pavetta kotzei*, *Sclerochiton harveyanus*;
- soft shrubs: *Galopina circaeoides*, *Hypoestes triflora*;
- herbs: *Begonia sonderiana*, *Plectranthus rubropunctatus*, *P. tetragonus*, *Streptocarpus meyeri*, *S. pentherianus*;
- geophytic herbs: *Dietes iridioides* (d), *Asplenium aethiopicum*, *A. boltonii*, *A. splendens*, *Crocasmia aurea*, *Dryopteris inaequalis*, *Elaphoglossum acrostichoides*, *Polypodium polypodioides* subsp. *ecklonii*, *Polystichum macleanae*, *Pteris catoptera*; and
- graminoids: *Carex spicato-paniculata* (d), *Cyperus albostriatus* (d), *Oplismenus hirtellus* (d).

### 32. NWAMBYIA-PUMBE SANDY BUSHVELD (SVI 2)

It occurs on flats with several small pans embedded. The absence of well-defined drainage channels is conspicuous. Moderately open tall shrubland with few trees.

Important taxa include:

- Tall trees: *Sclerocarya birrea* subsp. *caffra* (d), *Acacia nigrescens*, *Adansonia digitata*, *Philenoptera violacea*;
- small trees: *Baphia massaiensis* (d), *Combretum apiculatum* (d), *C. zeyheri* (d), *Terminalia sericea* (d), *Azelia quanzensis*, *Balanites maughamii*, *Boscia albitrunca*, *Cassia abbreviata* subsp. *beareana*, *Combretum collinum* subsp. *toborensis*, *C. melle*, *Crossopteryx febrifuga*, *Dalbergia melanoxylon*, *Lannea schweinfurthii* var. *stuhlmannii*, *Ozoroa engleri*, *Ptaeroxylon obliquum*, *Spirostachys africana*, *Vangueria infausta*;
- tall shrubs: *Grewia microthyrsa* (d), *Pteleopsis myrtifolia* (d), *Tephrosia polystachya* (d), *Vitex ferruginea* (d), *Alchornea laxiflora*, *Dichrostachys cinerea*, *Grewia bicolor*, *G. monticola*, *Phyllanthus parvulus*, *Strychnos madagascariensis*;
- low shrubs: *Agathisanthemum bojeri*, *Aptosimum lineare*, *Melhania forbesii*, *Monechma debile*, *Pavetta catophylla*;
- woody climbers: *Cissus cornifolia*, *Combretum mossambicense*, *Rhynchosia resinosa*;
- herbaceous climber: *Merremia tridentata* (d);

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- graminoids: *Aristida stipitata* subsp. *graciliflora* (d), *Brachiaria nigropedata* (d), *Oigitaria eriantha* subsp. *eriantha* (d), *Eragrostis pallens* (d), *Panicum maximum* (d), *Schmidtia pappophoroides* (d), *Aristida congesta*, *Cymbopogon pospischilii*, *Enneapogon cenchroides*, *Eragrostis superba*, *Heteropogon contortus*, *Perotis patens*, *Pogonarthria squarrosa*, *Tricholaena monachne*, *Urochloa mosambicensis*; and
- herbs: *Vigna unguiculata* (d), *Coptosperma zygoon*, *Euphorbia tettensis*, *Commelina africana*, *C. erecta*, *Heliotropium steudneri*, *Indigofera titipes*, *I. vicioides*, *Kohautia virgata*.

Biogeographically Important Taxa (Southern distribution limit):

- Small trees: *Xeroderris stuhlmannii* (d), *Xylia torreana* (d); and
- woody climber: *Hugonia orientalis* (d).

### 33. OHRIGSTAD MOUNTAIN BUSHVELD (SVCB 26)

It is an open to dense woody layer, with associated woody and herbaceous shrubs and closed to open grass layer. Moderate to steep slopes on mountainsides and sometimes deeply incised valleys; also fairly flat terrain in a few places. Aliens include scattered *Melia azedarach*, *Caesalpinia decapetala* and *Nicotiana glauca*. Erosion is variable.

Important taxa include:

- Tall tree: *Sclerocarya birrea* subsp. *caffra* (d);
- small trees: *Acacia exuvialis* (d), *A. karroo* (d), *A. tortilis* subsp. *heteracantha* (d), *Combretum apiculatum* (d), *C. molle* (d), *Kirkia wilmsii* (d), *Acacia caffra*, *Berchemia zeyheri*, *Boscia foetida* subsp. *rehmanniana*, *Commiphora mollis*, *Croton gratissimus*, *Englerophytum magalimontanum*, *Hippobromus pauciflorus*, *Pappea capensis*, *Terminalia prunioides*, *Vitex obovata* subsp. *wilmsii*, *Ziziphus mucronata*;
- succulent trees: *Euphorbia tirucalli* (d), *E. cooperi*;
- tall shrubs: *Dichrostachys cinerea* (d), *Combretum petrophilum*, *Crotalaria monteiroi*, *Grewia bicolor*, *G. manticola*, *Hexalobus monopetalus*, *Karomia speciosa*, *Olea europaea* subsp. *africana*, *Tarchonanthus camphoratus*;
- low shrubs: *Grewia vernicosa* (d), *Psiadia punctulata* (d), *Euclea crispa*;
- succulent Shrubs: *Aloe castanea* (d), *A. cryptopoda*, *A. globuligemma*;
- woody climber: *Pterolobium stellatum* (d).
- graminoids: *Loudetia simplex* (d), *Andropogon chinensis*, *Aristida congesta*, *Brachiaria nigropedata*, *Eragrostis rigidior*, *Melinis repens*, *Panicum maximum*; and

- succulent herb: *Aloe fosteri* (d).

Biogeographically Important Taxon (Central Bushveld endemic):

- Low shrub: *Petalidium oblongifolium*.
- Endemic Taxa:
- Small tree: *Encephalartos cupidus*;
- woody climbers: *Asparagus lynnnetteeae*, *Rhoicissus laetans*; and
- succulent herbaceous climber: *Ceropegia distincta* subsp. *verruculosa*.

### 34. PHALABORWA-TIMBAVATI MOPANEVELD (SVMP 7)

It is an open tree savanna on undulating plains with the sandy uplands dominated by *Combretum apiculatum*, *Terminalia sericea* and *Colophospermum mopane* trees, with *T. sericea* disappearing and *Combretum apiculatum* becoming less common in the clayey bottomlands, and being replaced by trees such as *Acacia nigrescens* and increased dominance of *Colophospermum mopane*. The field layer is usually well developed. A feature is the large number of termite mounds on the uplands.

Important taxa include:

- Tall trees: *Acacia nigrescens*, *Sclerocarya bitrea* subsp. *caffra*;
- small trees: *Colophospermum mopane* (d), *Combretum apiculatum* (d), *Terminalia sericea* (d), *Acacia exuvialis*, *A. tortilis* subsp. *heteracantha*, *Albizia harveyi*, *Cassia abbreviata* subsp. *beareana*, *Combretum zeyheri*, *Dalbergia melanoxylon*, *Ozoroa engleri*, *Peltoporum africanum*, *Pseudolachnostylis maprouneifolia*;
- tall shrubs: *Combretum hereroense*, *Euclea divinorum*, *Grewia bicolor*, *Maerua parvifolia*, *Strychnos madagascariensis*, *Tephrosia polystachya*;
- low shrubs: *Cierodendrum ternatum*, *Commiphora africana*, *Hermannia glanduligera*, *Melhanian forbesii*;
- woody climber: *Cissus cornifolia*;
- graminoids: *Digitaria eriantha* subsp. *pentzii* (d), *Eragrostis rigidior* (d), *Pogonarthria squarrosa* (d), *Andropogon gayanus*, *Aristida congesta*, *Brachiaria nigropedata*, *Melinis repens*, *Panicum maximum*, *Perotis patens*, *Schmidtia pappophoroides*, *Themeda triandra*; and
- herbs: *Evolvulus alsinoides*, *Heliotropium steudneri*, *Hemizygia elliotii*, *Ipomoea magnusiana*, *Kohautia virgata*.

### 35. POLOKWANE PLATEAU BUSHVELD (SVCB 23)

It occurs on moderately undulating plains with a short open tree layer and with a well-developed grass layer to grass plains with occasional trees at higher altitudes. Hills and low mountains of Mamabolo Mountain Bushveld are embedded within this unit. Dense concentration of rural human settlements is found. In some regions populations of alien *Agave*, *Jacaranda mimosfolia*, *Melia azedarach*, *Opuntia ficus-indica* and *Ricinus communis* are of concern.

Important taxa include:

- Small trees: *Acacia caffra* (d), *A. permixta* (d), *A. rehmanniana* (d), *A. karroo*, *A. tortilis* subsp. *heteracantha*, *Combretum molle*, *Ormocarpum kirkii*, *Ziziphus mucronata*;
- succulent tree: *Aloe marlothii* subsp. *marlothii*;
- tall shrubs: *Acacia hebeclada* subsp. *hebeclada* (d), *Gymnosporia senegalensis* (d), *Combretum hereroense*, *Diospyros lycioides* subsp. *sericea*, *Euclea crispa* subsp. *crispa*, *Heteromorpha arborescens* var. *abyssinica*, *Lippia javanica*, *Rhus pyroides* var. *pyroides*, *Tephrosia rhodesica*, *Triumfetta pilosa* var. *tomentosa*;
- low shrubs: *Anthospermum rigidum* subsp. *rigidum*, *Gymnosporia glaucophylla*, *Hirpicium bechuanense*, *Lantana rugosa*, *Senecio burchellii*, *Sida rhombifolia*, *Solanum panduriforme*;
- succulent shrub: *Aloe cryptopoda*;
- woody climber: *Asparagus africanus*;
- herbaceous climbers: *Momordica balsamina*, *Rubia petiolaris*;
- graminoids: *Aristida diffusa* (d), *Brachiaria nigropedata* (d), *Digitaria eriantha* subsp. *eriantha* (d), *Eragrostis curvula* (d), *Themeda triandra* (d), *Aristida congesta*, *Cymbopogon caesius*, *Cynodon dactylon*, *Digitaria diagonalis*, *Diheteropogon amplexans*, *Elionurus muticus*, *Eragrostis gummiflua*, *E. racemosa*, *E. superba*, *Eustachys paspaloides*, *Panicum maximum*, *Pogonarthria squarrosa*, *Sporobolus africanus*;
- herbs: *Felicia mossamedensis*, *Hermestaedia odorata*, *Pollichia campestris*;
- geophytic herbs: *Eulophia petersii*, *Hypoxis hemerocallidea*; and
- succulent herb: *Aloe greatheadii* var. *greatheadii*.

Biogeographically important taxa (Central Bushveld endemics):

- Graminoid: *Mosdenia leptostachys*;
- herb: *Oxygonum dregeanum* subsp. *canescens* var. *dissectum*; and
- geophytic herb: *Ledebouria crispa*.

### 36. POUNG DOLOMITE MOUNTAIN BUSHVELD (SVCB 25)

It is open to closed woodland with well-developed shrub layers and occur on low to high mountain slopes on various slope angles, aspects and altitude, especially along the western extension.

Important taxa include:

- Small trees: *Hippobromus pauciflorus* (d), *Kirkia wilmsii* (d), *Seemannaralia gerrardii* (d), *Boscia albitrunca*, *Combretum hereroense*, *Croton gratissimus*, *Dombeya autumnalis*, *Vitex obovata* subsp. *wilmsii*;
- succulent tree: *Euphorbia tirucalli* (d);
- tall shrubs: *Pouzolzia mixta*, *Senna petersiana*;
- low shrubs: *Asparagus intricatus* (d), *Barleria rotundifolia*, *Euchaetis schlechteri*, *Rhynchosia nitens*;
- geoxylic suffrutex: *Ozoroa albicans*;
- succulent shrub: *Plectranthus xerophilus* (d);
- woody climbers: *Pristimera longipetiolata*, *Tecoma capensis*;
- graminoids: *Bewsia biflora* (d), *Brachiaria serrata* (d), *Eragrostis lehmanniana* (d), *Loudetia simplex* (d), *Melinis repens* (d), *Panicum maximum* (d), *Themeda triandra* (d), *Enneapogon scoparius*, *Heteropogon contortus*, *Melinis nerviglumis*, *Panicum deustum*, *Tragus berteronianus*;
- herb: *Stylochaeton natalensis*;
- geophytic herbs: *Cheilanthes dolomiticola* (d), *Sansevieria hyacinthoides*; and
- succulent Herb: *Plectranthus neochilus*.

Biogeographically important taxa:

(<sup>N</sup>Northern Sourveld endemic, <sup>SK</sup>Sekhukhune endemic)

- Small shrub: *Lynburgia cassinoides*<sup>SK</sup> (d);
- low shrub: *Asparagus fourei*<sup>N</sup>;
- soft shrub: *Chorisochora transvaalensis*<sup>N</sup>;
- megaherb: *Dracaena transvaalensis*<sup>N</sup> (d); and
- geophytic herb: *Haemanthus paucifolius*<sup>N</sup>.

Endemic taxa:

- Small trees: *Encephalartos dolomiticus*, *E. inopinus*;

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- low shrub: *Melhanian integrata*;
- succulent shrubs: *Delosperma vandermerwei*, *Euphorbia grandialata*;
- herbs: *Barleria dolomiticola*, *Lotononis pariflora*;
- geophytic herbs: *Brachystelma minor*, *B. parvulum*, *Gladiolus dolomiticus*, *G. pavonia*, *Ledebouria dolomiticola*; and
- succulent herbs: *Aloe branddraaiensis*, *A. monotropa*, *Gasteria batesiana* var. *dolomitica*, *Huernia blyderiverensis*, *Plectranthus dolomiticus*.

### 37. RAND HIGHVELD GRASSLAND (GM 11)

The vegetation type occurs on a highly variable landscape with extensive sloping plains and a series of ridges slightly elevated over undulating surrounding plains. The vegetation is species-rich, wiry, sour grassland alternating with low, sour shrubland on rocky outcrops and steeper slopes. There is a high diversity of herbs. Rocky hills and ridges carry sparse (savannoid) woodlands accompanied by a rich suite of shrubs. Poorly conserved, only small patches protected. Almost half has been transformed mostly by cultivation, plantations, urbanisation or dam-building.

Important taxa includes:

- Graminoids: *Ctenium concinnum* (d), *Cynodon dactylon* (d), *Digitaria monodactyla* (d), *Diheteropogon amplexans* (d), *Eragrostis chloromelas* (d), *Heteropogon contortus* (d), *Loudetia simplex* (d), *Monocymbium cerasiiforme* (d), *Panicum natalense* (d), *Schizachyrium sanguineum* (d), *Setaria sphacelata* (d), *Themeda triandra* (d), *Trachypogon spicatus* (d), *Tristachya biseriata* (d), *T. rehmannii* (d), *Andropogon schirensis*, *Aristida aequiglumis*, *A. congesta*, *A. junciformis* subsp. *galpinii*, *Bewsia biflora*, *Brachiaria nigropedata*, *B. serrata*, *Bufbostylis burchellii*, *Cymbopogon caesius*, *Digitaria tricholaenoides*, *Elionurus muticus*, *Eragrostis capensis*, *E. curvula*, *E. gummiflua*, *E. plana*, *E. racemosa*, *Hyparrhenia hirta*, *Melinis nerviglumis*, *M. repens* subsp. *repens*, *Microchloa caffra*, *Setaria nigrirostris*, *Sporobolus pectinatus*, *Trichoneura grandiglumis*, *Urelytrum agropyroides*;
- herbs: *Acanthospermum australe* (d), *Justicia anagalloides* (d), *Pollichia campestris* (d), *Acalypha angustata*, *Chamaecrista mimosoides*, *Dicoma anomala*, *Helichrysum caespitium*, *H. nudifolium* var. *nudifolium*, *H. rugulosum*, *Ipomoea crassipes*, *Kohautia amatymbica*, *Lactuca inermis*, *Macleodium zeyheri* subsp. *argyrophyllum*, *Nidorella hottentotica*, *Oldenlandia herbacea*, *Rothea hirsuta*, *Selago densiflora*, *Senecio coronatus*, *Sonchus dregeanus*, *Vernonia oligocephala*, *Xerophyta retinervis*;
- geophytic herbs: *Boophone disticha*, *Cheilanthes hirta*, *Haemanthus humilis* subsp. *humilis*, *Hypoxis rigidula* var. *pilosissima*, *Ledebouria ovatifolia*, *Oxalis corniculata*;

- succulent herb: *Aloe greatheadii* var. *davyana*;
- low shrubs: *Anthospermum rigidum* subsp. *pumilum*, *Indigofera comasa*, *Rhus magalismsontana*, *Stoebe plumose*;
- succulent shrub: *Lopholaena coriifolia* (d); and
- geoxylic suffrutex: *Elephantorrhiza elephantina*.

Biogeographically Important Taxa (all Northern sourveld endemics):

- Geophytic herbs: *Agapanthus inapertus* subsp. *pendulus*, *Eucomis vandermerwei*;
- succulent herb: *Huernia insigniflora*; and
- low shrub: *Melhanian randii*.
- Endemic taxa:
- Herbs: *Melanospermum rudolfii*, *Polygala spicata*;
- succulent herbs: *Anacampseros subnuda* subsp. *lubbersii*, *Frithia humilis*;
- succulent shrubs: *Crassula arborescens* subsp. *undulatifolia*, *Delosperma purpureum*; and
- small trees: *Encephalartos lanatus*, *E. middelburgensis*.

### 38. SAND FOREST (FOZ 8)

Dense thickets of 5-6 m up to forests with the canopy reaching 15 m with a well developed shrub layer and a very poorly developed ground layer. Epiphytic orchids and lichens festoon all the tall trees. It is critically endangered due to its vulnerability and economic pressure. An unknown portion was lost through clearing for subsistence agriculture and grazing. Uncontrolled extraction of wood for fuel and woodcraft is a problem.

Important taxa include:

(<sup>M</sup>In South Africa only in Maputaland, <sup>K</sup>Only in northern Kruger National Park)

- Tall trees: *Balanites maughamii* (d), *Cleistanthus schlechteri* (d), *Cola greenwayi*<sup>M</sup> (d), *Dialium schlechteri*<sup>M</sup> (d), *Drypetes arguta*<sup>M</sup> (d), *Guibourtia conjugata*<sup>K</sup> (d), *Newtonia hildebrandtii* (d), *Pteleopsis myrtifolia* (d), *Drypetes mosseimbicensis*<sup>K</sup>, *D. natalensis*<sup>M</sup>, *Lagynias lasiantha*, *Lansea antiscorbutice*<sup>M</sup>, *Pterocarpus lucens* subsp. *antunesii*<sup>K</sup>, *Suregada zenziberiensis*<sup>M</sup>, *Xeroderris stuhlmannii*<sup>K</sup>;
- small trees: *Baphia massaiensis* subsp. *Obovata*<sup>K</sup> (d), *Hymenocardia ulmoides* (d), *Wrightia natalensis* (d), *Alchornea laxiflora*<sup>K</sup>, *Brachylaena huillensis*, *Callichilia orientalis*<sup>M</sup>, *Cassipourea mossambicensis*<sup>M</sup>, *Cavacoa aurea*<sup>M</sup>, *Coffea racemosa*<sup>M</sup>, *Dalbergia nitidula*<sup>K</sup>, *Heinsia crinita*<sup>K</sup>,

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*Hexalobus monopetalus*<sup>K</sup>, *Hugonia orientalis*<sup>K</sup>, *Markhamia zanzibarica*<sup>K</sup>, *Monodora junodii* var. *junodii*, *Strychnos madagascariensis*, *Toddaliopsis bremekampii*, *Xylothea kraussiana*;

- woody climbers: *Uvaria lucida* (d), *Prionostemma delagoensis* var. *delagoensis*<sup>M</sup>, *Sclerochiton apiculatus*<sup>M</sup>, *Uvaria qrecilipes*<sup>K</sup>;
- tall shrubs: *Croton pseudopulchellus* (d), *C. steenkampianus* (d), *Canthium setiflorum* subsp. *setiflorum*, *Coptosperma zygoon*<sup>K</sup>, *Erythrococca menyharthii*<sup>K</sup>, *Haplocoelum foliolosum* subsp. *Mombasense*<sup>M</sup>, *Pavetta catophyla*;
- low shrubs: *Tricalysia junodii* var. *junodii*, *Warneckea sousae*;
- herb: *Aneilema arenicola*<sup>M</sup>;
- succulent herb: *Crassula maputensis*<sup>M</sup>; and
- graminoids: *Eragrostis moggi*<sup>M</sup> (d), *Panicum laticomum*.

### 39. SEKHUKHUNE MONTANE GRASSLAND (GM 19)

It occurs on major chains of hills that transect the area and have a north-south orientation, creating moderately steep slopes with predominantly eastern and western aspects. Large norite boulders and stones cover the shallow soils on the hillsides. Dense, sour grassland occur on slopes of mountains and undulating hills, with scattered clumps of trees and shrubs in sheltered habitats. Dense, tall grassland is found on the plains and encroachment by indigenous or invasion by alien microphyllous tree species is common in places.

Approximately 30% of this area is under commercial or subsistence cultivation. Vast areas are mined for vanadium using strip mining. There is no formal conservation in the area.

Important taxa include:

- Small trees: *Protea caffra* subsp. *caffra* (d), *Acacia caffra*, *Apodytes dimidiata* subsp. *dimidiata*, *Canthium suberosum*, *Cussonia transvaalensis*, *Seemannaralia gerrardii*;
- woody climbers: *Rhoicissus tridentata* (d), *Lasminum quinatum*, *Triaspis glaucophylla*. *Austro-africana*;
- tall shrubs: *Euclea crispa* subsp. *crispa* (d), *Brachylaena ilicifolia*, *Diospyros austro-africana*, *Euclea linearis*, *Pavetta zeyheri*;
- low shrubs: *Gnidia caffra* (d), *Senecio microglossus* (d), *Dyschotiste rogersii*, *Elephantorrhiza praetermissa*, *Leonotis leonurus*, *Polygala uncinata*, *Rhus discolor*, *R. tumulicola* var. *meeuseana*, *R. wilmsii*;
- geoxylic suffrutex: *Elephantorrhiza elephantina*;

- graminoids: *Aristida junciformis* subsp. *galpinii* (d), *Oiheteropogon amplectens* (d), *Elionurus muticus* (d), *Eragrostis chloromelas* (d), *E. racemosa* (d), *Heteropogon contortus* (d), *Microchloa caffra* (d), *Monocymbium cerasiiforme* (d), *Setaria sphacelata* (d), *Themeda triandra* (d), *Tristachya leucothrix* (d), *Andropogon schirensis*, *Aristida aequiglumis*, *Brachiaria serrata*, *Cymbopogon caesius*, *Oigitaria diagonalis*, *O. monodactyla*, *Ehrharta capensis*, *Eragrostis capensis*, *E. nindensis*, *E. plana*, *Hyparrhenia hirta*, *Loudetia simplex*, *Panicum natalense*, *Setaria nigrirostris*, *Trachypogon spicatus*, *Triraphis andropogonoides*;
- herbs: *Acalypha punctata* (d), *Berkheya setifera* (d), *Rothea hirsuta* (d), *Senecio latifolius* (d), *Tephrosia purpurea* subsp. *leptostachya* (d), *Berkheya insignis*, *Gerbera jamesonii*, *Helichrysum nudifolium* var. *nudifolium*, *Ipomoea crassipes*, *Jamesbrittenia silenoides*, *Maclidium zeyheri* subsp. *argyrophyllum*, *Pegolettia lanceolata*, *Pentanisia prunelloides* subsp. *prunelloides*, *Senecio coronatus*, *Vernonia galpinii*, *V. natalensis*, *V. oligocephala*, *Xerophyta retinervis*;
- geophytic herbs: *Hypoxis rigidula* var. *pilosissima* (d), *Cheilanthes hirta*, *Eucomis montana*, *Hypoxis hemerocallidea*, *Pachycarpus transvaalensis*; and
- succulent herb: *Kleinia stapeliiformis*.

Biogeographically important taxa:

(<sup>N</sup>Northern sourveld endemic, <sup>SK</sup>Sekhukhune endemic)

- Small trees: *Euclea sekhukhurnensis*<sup>SK</sup>, *Lydenburgia cassinoides*<sup>SK</sup>, *Rhus sekhukhuniensis*<sup>S</sup>;
- woody climber: *Rhoicissus sekhukhuniensis*<sup>SK</sup>;
- tall shrub: *Vitex obovata* subsp. *Wilmsii*<sup>N</sup>;
- low shrubs: *Dyschoriste perrottetii*<sup>SK</sup>, *Grewia verrucosa*<sup>N</sup>, *Helichrysum uninervium*<sup>N</sup>, *Jamesbrittenia rnecrentha*<sup>SK</sup>, *Melhania reridii*<sup>N</sup>;
- succulent shrub: *Aloe castenea*<sup>N</sup>;
- herbs: *Berkheya densioliola*<sup>N</sup>, *Cyanotis pechyrrhiza*<sup>N</sup>, *Graderia liinearifolia*<sup>N</sup>, *Ipomoea bathycolpos* var. *sinuatodentata*<sup>SK</sup>, *Rhynchosia rudolfii*<sup>N</sup>, *Tetraselago wilmsii*<sup>N</sup>;
- geophytic herbs: *Gladiolus sekukuniensis*<sup>SK</sup>, *Zantedeschia pentlandii*<sup>SK</sup>; and
- succulent herb: *Huernia insigniflora*<sup>N</sup>.

Endemic taxa:

- Succulent shrubs: *Aloe reitzii* var. *reitzii*, *Oelosperma deilanthoides*; and
- geophytic herbs: *Resnova* sp. nov. (‘megaphylla’), *Zantedeschia pentlandii*.



#### 40. SEKHUKHUNE MOUNTAIN BUSHVELD (SVCB 28)

It is dry, open to closed microphyllous and broad-leaved savanna on hills and mountain slopes that form concentric belts parallel to the northeastern escarpment. Open bushveld often associated with ultramafic soils on southern aspects. Bushveld on ultramafic soils contain a high diversity of edaphic specialists. Bushveld of mountain slopes generally taller than in the valleys, with a well-developed herb layer. Bushveld of valleys and dry northern aspects usually dense, like thicket, with a herb layer comprising many shortlived perennials. Dry habitats contain a number of species with xerophytic adaptations, such as succulence and underground storage organs. Both man-made and natural erosion dongas occur on footslopes of clays rich in heavy metals. An increasing area along the Dwars River Subsuite is under pressure from mining activities and its associated urbanisation.

Important taxa include:

- Tall tree: *Acacia nigrescens*;
- small trees: *Acacia senegal* var. *leiorhachis* (d), *Combretum apiculatum* (d), *Kirkia wilmsii* (d), *Terminalia prunioides* (d), *Vitex obovata* subsp. *wilmsii* (d), *Ziziphus mucronata* (d), *Bolusanthus speciosus*, *Boscia albitrunca*, *Brachylaena ilicifolia*, *Combretum molle*, *Commiphora mollis*, *Croton gratissimus*, *Cussonia transvaalensis*, *Hippobromus pauciflorus*, *Ozaroa sphaerocarpa*, *Pappea capensis*, *Schotia latifolia*, *Sterculia rogersii*;
- succulent tree: *Aloe marlothii* subsp. *Marlothii*;
- tall shrubs: *Dichrostachys cinerea* (d), *Euclea crispa* subsp. *crispa* (d), *Combretum hereroense*, *Euclea linearis*, *Pavetta zeyheri*, *Tinnea rhodesiana*, *Triaspis glaucophylla*;
- low shrubs: *Elephantorrhiza praetermissa* (d), *Grewia vernicosa* (d), *Asparagus intricatus*, *Barleria saxatilis*, *B. senensis*, *Clerodendrum ternatum*, *Commiphora africana*, *Hermannia glanduligera*, *Indigofera lydenburgensis*, *Jatropha latifolia* var. *angustata*, *Melhania prostrata*, *Phyllanthus glaucophyllus*, *Psiadia punctulata*, *Rhus keetii*. *Rhynchosia komatiensis*;
- succulent shrubs: *Aloe castanea* (d), *A. cryptopoda* (d);
- woody climbers: *Clematis brachiata* (d), *Rhoicissus tridentata* (d), *Acacia ataxacantha*;
- woody succulent climber: *Sarcostemma viminale*;
- graminoids: *Aristida canescens* (d), *Heteropogon contortus* (d), *Panicum maximum* (d), *Setaria lindenbergiana* (d), *Themeda triandra* (d), *Aristida transvaalensis*, *Cymbopogon pospischilii*, *Diheteropogon amplexans*, *Enneapogon scoparius*, *Loudetia simplex*, *Panicum deustum*, *Setaria sphacelata*;

- herbs: *Berkheya insignis* (d), *Commelina africana* (d), *Cyphostemma woodii*, *Kyphocarpa angustifolia*, *Senecio latifolius*;
- geophytic herbs: *Hypoxis rigidula*, *Sansevieria hyacinthoides*; and
- succulent herb: *Huernia stapelioides*.

Biogeographically important taxa:

(<sup>N</sup>Northern Sourveld endemic, <sup>CB</sup>Central Bushveld endemic, <sup>SK</sup>Sekhukhune endemic, <sup>Z</sup>Link to Zimbabwe)

- Small tree: *Lydenburgia cassinoides*<sup>SK</sup>;
- tall shrub: *Rhus sekhukhuniensis*<sup>SK</sup>;
- low shrubs: *Euclea sekhukhuniensis*<sup>SK</sup>, *Petalidium oblongifolium*<sup>CB</sup>, *Plectranthus venteri*<sup>Z</sup>, *Rhus batophylla*<sup>SK</sup>;
- woody climbers: *Asparagus sekukuniensis*<sup>SK</sup>, *Rhoicissus sekhukhuniensis*<sup>SK</sup>; and
- geophytic herbs: *Chlorophytum cyperaceum*<sup>SK</sup>, *Raphionacme chimanimaniana*<sup>Z</sup>.

Endemic taxa:

- Small tree: *Acacia ormocarpoides*;
- succulent tree: *Euphorbia sekukuniensis*; and
- soft shrub: *Plectranthus porcatus*.

#### 41. SEKHUKHUNE PLAINS BUSHVELD (SVCB 27)

It occurs mainly on semi-arid plains and open valleys between chains of hills and small mountains running parallel to the escarpment. Predominantly short, open to close thornveld with an abundance of *Aloe* species and other succulents. Heavily degraded in places and overexploited by man for cultivation, mining and urbanisation. Both man-made and natural erosion dongas occur in areas containing clays rich in heavy metals. Encroachment by indigenous microphyllous trees and invasion by alien species is common throughout the area. There is a high level of degradation of much of the remaining vegetation by unsustainable harvesting and utilisation.

Important taxa include

- Tall trees: *Acacia erioloba*, *Philenoptera violacea*;
- small trees: *Acacia melleoidea* subsp. *detinens* (d), *A. nilotica* (d), *A. tortilis* subsp. *heteracantha* (d), *Boscia foetida* subsp. *rehmanniana* (d), *Acacia grandicornuta*, *Albizia anthelmintica*, *Balanites maughamii*, *Combretum imberbe*, *Commiphora glandulosa*, *Maerua angolensis*,

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*Markhamia zanzibarica*, *Mystroxydon aethiopicum* subsp. *schlechteri*, *Ptaeroxylon obliquum*, *Schotia brachypetala*, *Ziziphus mucronata*;

- succulent tree: *Euphorbia tirucalli* (d);
- tall shrubs: *Rhus engleri* (d), *Cadaba termitaria*, *Dichrostachys cinerea*, *Ehretia rigida* subsp. *rigida*, *Grewia bicolor*, *Karomia speciosa*, *Maerua decumbens*, *Rhigozum brevispinosum*, *R. obovatum*, *Tinnea rhodesiana*, *Triaspis glaucophylla*;
- low shrubs: *Felicia clavipilosa* subsp. *transvaalensis* (d), *Seddera suffruticosa* (d), *Gnidia polycephala*, *Gossypium herbaceum* subsp. *africanum*, *Jamesbrittenia atropurpurea*, *Jatropha latifolia* var. *latifolia*, *Lantana rugosa*, *Melhanie rehmannii*, *Monechma divaricatum*, *Myrothamnus flabelldolius*, *Pechuel-Loeschea leubnitziae*, *Plinthus rehmannii*;
- succulent shrubs: *Aloe cryptopoda* (d), *Euphorbia enormis* (d), *Kleinia longiflora* (d), *Aloe castanea*, *A. globuligemma*;
- woody succulent climber: *Sarcostemma viminale*;
- herbaceous climbers: *Coccinia rehmannii*, *Decorsea schlechteri*;
- graminoids: *Cenchrus ciliaris* (d), *Enneapogon cenchroides* (d), *Panicum maximum* (d), *Urochloa mosambicensis* (d), *Aristida adscensionis*, *A. congesta*, *Eragrostis barbinodis*, *Paspalum distichum*, *Schmidtia pappophoroides*, *Stipagrostis hirtigluma* subsp. *patula*, *Tragus berteronianus*.
- herbs: *Becium filamentosum* (d), *Phyllanthus maderaspatensis* (d), *Blepharis integrifolia*, *Corchorus asplenifolius*, *Hibiscus praeteritus*, *Ipomoea magnusiana*; and
- geophytic herbs: *Drimia altissima*, *Sansevieria pearsonii*.

Biogeographically important taxa:

(<sup>N</sup>Northern Sourveld endemic, <sup>CB</sup>Central Bushveld endemic, <sup>SK</sup>Sekukhune endemic, <sup>D</sup>Broadly disjunct distribution)

- Small tree: *Lydenburgia cassinoides*<sup>SK</sup>;
- tall shrub: *Nuxia gracilis*<sup>D</sup>;
- low shrubs: *Amphiglossa triflora*<sup>D</sup>, *Asparagus tourei*<sup>N</sup>, *Hibiscus bernerdi*<sup>SK</sup>, *Orthosiphon fruticosus*<sup>CB</sup>, *Petalidium oblongifolium*<sup>CB</sup>, *Rhus batophylla*<sup>SK</sup>;
- woody climber: *Asparagus sekukuniensis*<sup>SK</sup>;
- herb: *Aneilema longirrhizum*<sup>SK</sup>;
- geophytic herb: *Chlorophytum cyperaceum*<sup>SK</sup>; and

- succulent herb: *Piaranthus etrcssrquineus*<sup>CB</sup>.

### 42. SOWETO HIGHVELD GRASSLAND (GM 8)

It occurs on gently to moderately undulating landscape on the Highveld plateau, supporting short to medium-high, dense, tufted grassland dominated almost entirely by *Themeda triandra*. In places not disturbed, only scattered small wetlands, narrow stream alluvia, pans and occasional ridges or rocky outcrops interrupt the continuous grassland cover. Only a handful of patches statutorily conserved or privately conserved. Almost half of the area already transformed by cultivation, urban sprawl, mining and building of road infrastructure. Dams have flooded some areas.

Important taxa:

- Graminoids: *Andropogon appendiculatus* (d), *Brachiaria serrata* (d), *Cymbopogon pospischillii* (d), *Cynodon dactylon* (d), *Elionurus muticus* (d), *Eragrostis capensis* (d), *E. chloromelas* (d), *E. curvula* (d), *E. plana* (d), *E. planiculmis* (d), *E. racemosa* (d), *Heteropogon contortus* (d), *Hyparrhenia hirta* (d), *Setaria nigrirostris* (d), *S. sphacelata* (d), *Themeda triandra* (d), *Tristachya leucothrix* (d), *Andropogon schirensis*, *Aristida adscensionis*, *A. bipartita*, *A. congesta*, *A. junciformis* subsp. *galpinii*, *Cymbopogon caesius*, *Digitaria diagonalis*, *Diheteropogon amplexans*, *Eragrostis micrantha*, *E. superba*, *Harpochoa falx*, *Microchloa caffra*, *Paspalum dilatatum*;
- herbs: *Hermannia depressa* (d), *Acalypha angustata*, *Berkheya setifera*, *Dicoma anomala*, *Euryops gilfillanii*, *Geigeria aspera* var. *aspera*, *Graderia subintergra*, *Haplocarpha scaposa*, *Helichrysum miconiifolium*, *H. nudifolium* var. *nudifolium*, *H. rugulosum*, *Hibiscus pusillus*, *Justicia anagalloides*, *Lippia scaberrima*, *Rhynchosia effusa*, *Schistostephium crataegifolium*, *Selago densiflora*, *Senecio coronatus*, *Vernonia oligocephala*, *Wahlenbergia undulata*;
- geophytic herbs: *Haemanthus humillis* subsp. *hirsutus*, *H. montanus*;
- herbaceous climber: *Rhynchosia totta*; and
- low shrubs: *Anthospermum hispidulum*, *A. rigidum* subsp. *pumilum*, *Berkheya annectens*, *Felicia muricata*, *Ziziphus zeyheriana*.

### 43. SPRINGBOKVLAKTE THORNVELD (SVCB 15)

An open to dense, low thorn savanna dominated by Acacia species or shrubby grassland with a very low shrub layer. Occurs on flat to slightly undulating plains. Very scattered alien plants over wide areas include *Cereus jamacaru*, *Eucalyptus species*, *Lantana camara*, *Melia azerdarach*, *Opuntia ficus-indica* and *Sesbania punicea*.

Important taxa include:

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- Small trees: *Acacia karroo* (d), *A. luederitzii*, *R. retinens* (d), *A. mellifera* subsp. *detinens* (d), *A. nilotica* (d), *Ziziphus mucronata* (d), *Acacia tortilis* subsp. *heteracantha*, *Boscia foetida* subsp. *rehmanniana*;
- tall shrubs: *Euclea undulata* (d), *Rhus engleri* (d), *Dichrostachys cinerea*, *Diospyros lycioides* subsp. *lycioides*, *Grewia flava*, *Tarchonanthus camphorates*;
- low shrubs: *Acacia tenuispina* (d), *Ptycholobium plicatum*;
- succulent shrub: *Kleinia longiflora*;
- herbaceous climbers: *Momordica balsamina*, *Rhynchosia minima*;
- graminoids: *Aristida bipartita* (d), *Dichanthium annulatum* var. *papillosum* (d), *Ischaemum afrum* (d), *Setaria incrassata* (d), *Aristida canescens*, *Brachiaria eruciformis*; and
- herbs: *Aspilia mossambicensis*, *Indigastrium parviflorum*, *Nidorella hottentotica*, *Orthosiphon suffrutescens*, *Senecio apiifolius*.

Biogeographically important taxon (Central Bushveld endemic):

- Graminoid: *Mosdenia leptostachys*.

### 44. STRYDPOORT SUMMIT SOURVELD (GM 27)

It consists of short to tall grasslands along rocky summits and mountain slopes. The landscape has a very broken topography with incised valleys. The slopes are steep and rocky, and sparsely wooded. Transformation levels are very low.

Important taxa include:

- Small trees: *Acacia caffra* (d), *Combretum molle* (d), *Cussonia paniculata* (d), *Englerophytum magalismontanum* (d), *Protea caffra* subsp. *caffra* (d), *Cussonia transvaalensis*, *Faurea saligna*, *Mundulea sericea*, *Protea roupelliae* subsp. *roupelliae*, *P. rubropilosa*, *Vangueria infausta*;
- tall shrub: *Rhus dentata*;
- woody climbers: *Ancylobotrys capensis*, *Rhoicissus tridentata*;
- low shrubs: *Rhus magalismontana* (d), *Aeschynomene rehmannii*, *Anthospermum hispidulum*, *Chrysanthemoides monilifera* subsp. *septentrionalis*, *Justicia betonica*, *Leonotis ocymifolia*, *Polygala hottentotta*;
- graminoids: *Aristida transvaalensis* (d), *Loudetia simplex* (d), *Monocymbium cerasiiforme* (d), *Schizachyrium sanguineum* (d), *Themeda triandra* (d), *Trachypogon spicatus* (d), *Tristachya leucothrix* (d), *Alloteropsis semialata* subsp. *eckloniana*, *Andrapogon chinensis*, *Bulbostylis*

*burchellii*, *Diheteropogon amplexens*, *D. filifolius*, *Elionurus muticus*, *Eragrostis racemosa*, *Sporobolus pectinatus*;

- herbs: *Acalypha angustata*, *Helichrysum nudifolium* var. *nudifolium*, *Monsonia attenuata*, *Pearsonia sessilifolia* subsp. *sessilifolia*, *Rhynchosia monophylla*, *Selaginella dregei*, *Vernonia galpinii*, *V. natalensis*, *Xeraphyta retinervis*;
- herbaceous climber: *Rhynchosia totta*; and
- succulent herbs: *Aloe fosteri*, *Crassula swaziensis*, *Kleinia stapeliiformis*.

Biogeographically important taxa:

(<sup>N</sup>Northern sourveld endemic, <sup>W</sup>Wolkberg endemic)

- Small trees: *Encephalartos euqene-mereisii*<sup>N</sup>, *Protea rubropilose*<sup>W</sup>.
- tall shrub: *Vitex obovata* subsp. *wilmsii*<sup>N</sup>;
- low shrubs: *Berkheya carlinopsis* subsp. *magalismontana*<sup>N</sup>, *Helichrysum uninetvium*<sup>N</sup>; and
- succulent herbs: *Aloe affinis*<sup>N</sup>, *A. thompsoniae*<sup>W</sup>.

Endemic taxa:

- Succulent shrub: *Thorncroftia media*;
- semiparasitic shrub: *Thesium gracilentum*; and
- herb: *Aster nubimontis*.

### 45. SUBTROPICAL ALLUVIAL VEGETATION (AZA 7)

It occurs on flat alluvial riverine terraces supporting and intricate complex of macrophytic vegetation (channel of flowing rivers and river-fed pans), marginal reed belts (in sheltered oxbows and along very slow-flowing water courses) as well as extensive flooded grasslands, ephemeral herblands and riverine thickets. Much of the area has been transformed for cultivation, urban development and road building. Alien woody species commonly occurring in this vegetation types include *Melia azedarach*, *Chromolaena discolor* and the like.

Important taxa includes:

a) Riparian<sup>8</sup> thickets

- Small trees: *Acacia natalitia* (d), *A. robusta* (d), *Boscia foetida* subsp. *rehmanniana* (d), *Combretum erythrophyllum* (d), *Phoenix reclinata* (d), *Salix mucronata* subsp. *woodii* (d),

<sup>8</sup> **Riparian vegetation** means plant communities along the river margins and are a buffer between terrestrial and aquatic ecosystems.

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*Ziziphus mucronata* (d), *Acacia luederitzii*, *A. nebrownii*, *A. nigrescens*, *A. tortilis*, *A. xanthophloea*, *Colophospermum mopane*, *Combretum hereroense*, *Philenoptera violacea*, *Pseudoscolopia polyantha* (Pondoland, sharing with Capensis).

- tall shrubs: *Salvadora angustifolia* (d), *Commiphora glandulosa*, *C. pyracanthoides*, *Euclea divinorum*, *Grewia bicolor*, *Gymnosporia senegalensis*;
  - low shrubs: *Justicia flava*, *Ocimum canum*;
  - graminoids: *Eragrostis trichophora* (d), *Panicum maximum* (d), *Setaria incrassata* (d), *Sporobolus ioclados* (d), *Chloris virgata*, *Dactyloctenium aegyptium*, *Enneapogon cenchroides*, *Urochloa mosambicensis*;
  - herbs: *Commelina benghalensis* (d), *Abutilon austro-africanum*, *Acalypha indica*, *Achyranthes aspera*, *Boerhavia erecta*, *Commicarpus fallacissimus*, *Cucumis zeyheri*, *Heliotropium ovalifolium*, *Lobelia angolensis*, *Oxygonum sinuatum*, *Pupalia lappacea*, *Ruellia patula*;
  - geophytic herb: *Crinum moorei*; and
  - succulent herb: *Portulaca quadrifida*.
- b) Reed beds
- Megagraminoids: *Phragmites australis* (d), *P. mauritanus* (d), *Prionium serratum* (only along few rapids in Pondoland).
- c) Flooded grasslands & herb lands
- Megagraminoid: *Cyperus immensus*;
  - graminoids: *Cynodon dactylon* (d), *Cyperus articulatus* (d), *Echinochloa pyramidalis* (d), *Urochloa mosambicensis* (d), *Bolboschoenus glaucus*, *Chloris mossambicensis*, *C. virgata*, *Cyperus corymbosus*, *C. difformis*, *C. distans*, *C. fastigiatus*, *C. sexangularis*, *Dactyloctenium aegyptium*, *Hemarthria altissima*, *Ischaemum afrum*, *Paspalidium obtusifolium*, *Setaria sphacelata*, *Sporobolus consimilis*, *S. fimbriatus*;
  - herbs: *Alternanthera sessilis*, *Amaranthus praetermissus*, *Grammatotheca bergiana* (Pondoland), *Marsilea ephippiocarpa*, *Scutellaria racemosa*;
  - geophytic herb: *Trachyandra selti*; and
  - aquatic herbs: *Ceratophyllum muricatum*, *Ottelia exserta*.

Endemic Taxon:

- a) Flooded grasslands & herblands
- Herb: *Crotalaria mollii*.

### 46. SUBTROPICAL FRESHWATER WETLANDS (AZF 6)

It occurs on flat topography supporting low beds dominated by reeds, sedges and rushes, waterlogged meadows dominated by grasses. Found typically along edges of often seasonal pools in Aeolian depressions as well as fringing alluvial backwater pans or artificial dams. So far only about 4% has been transform (largely for cultivation), but the pressure of local grazing a urban sprawl will result in the demise of many subtropical fresh water habitats. Disturbance leads to invasion by alien plants such as *Lantana camara*, *Chromolaena discolor* and *Melia darach* (on the edges of wetlands) and aquatic weeds such *Eichhornia crassipes*, *Pistia stratiotes* and *Salvinia molesta* (in water bodies).

Important taxa include:

- a) Marshes
- Small trees: *Hyphaene coriacea* (d), *Phoenix reclinata* (d);
  - graminoids: *Chloris virgata* (d), *Cynodon dactylon* (d), *Cyperus articulatus* (d), *Dactyloctenium aegyptium* (d), *Diplachne fusca* (d), *Echinochloa pyramidalis* (d), *Fimbristylis obtusifolia* (d), *Hemarthria altissima* (d), *Imperata cylindrica* (d), *Ischaemum arcuatum* (d), *Leersia hexandra* (d), *Pycreus mundii* (d), *Sporobolus nitens* (d), *S. smutsii* (d), *Urochloa stolonifera* (d), *Bolboschoenus glaucus*, *Courtoisia cyperoides*, *Cyperus alopecuroides*, *C. pectinatus*, *Oigitaria natalensis*, *Echinochloa stagnina*, *Eragrostis chapelieri*, *E. lappula*, *Eriochloa meyeriana*, *Fimbristylis bisumbellata*, *Fuirena ecklonii*, *Oxycaryum cubense*, *Paspalidium obtusifolium*, *Paspalum commersonii*, *Pycteus pelophilus*, *P. polystachyos*, *Selena poiformis*, *Sporobolus consimiles*;
  - herbs: *Pentodon pentandrus* (d), *Persicaria senegalensis* (d), *Burmannia madagascariensis*, *Centella coriacea*, *Commelina dituse*, *Convolvulus mauritanicus*, *Desmodium dregeanum*, *Eelipta prostrata*, *Epaltes gariepina*, *Eriocaulon abyssinicum*, *Ethulia conyzoides*, *Glinus lotoides*, *Hydrocotyle ranunculoides*, *Ludwigia adscendens* subsp. *diffusa*, *L. leptocarpa*, *L. octovalvis*, *L. palustris*, *Neptunia oleracea*, *Persicaria attenuata* subsp. *africana*, *P. hystricula*, *Rorippa madagascariensis*, *Sium repandum*, *Vahlia capensi*;
  - geophytic herbs: *Eulophia angolensis*, *Zeuxine africana*;
  - succulent herb: *Salicornia pachystachya*;
  - semiparasitic herb: *Buchnera longespicata*; and
  - aquatic herbs: *Bergia salaria*, *Lagarosiphon crispus*.
- b) Lakes & ponds
- Graminoid: *Eleocharis dulcis* (forming rafts);

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- aquatic herbs: *Azolla pinnata* var. *africana* (d), *Ceratophyllum demersum* (d), *Lemna minor* (d), *Nymphaea nouchali* var. *caerulea* (d), *Pistia stratiotes* (d), *Wolffia arrhiza* (d), *Aponogeton desertorum*, *A. natalensis*, *A. rehmanii*, *Ceratophyllum muricatum*, *Marsilea macrocarpa*, *Najas maritima* subsp. *delilei*, *N. pectinata*, *Nymphoides indica* subsp. *occidentalis*, *N. rautanenii*, *Ottelia exserta*, *Potamogeton crispus*, *P. tinatus*, *P. schweinfurthii*, *Spirodela polyrhiza*, *S. punctata*, *Trapanatans* var. *bispinosa*.
  - carnivorous herbs: *Utricularia* subsp. *exoleta*, *U. inflexa*, *U. subulata*; and
  - geophytic herb: *Crinum paludosum*.
- c) Reed & sedge beds
- Megagraminoids: *Cladium mariscus* subsp. *jamaicense* (d), *Cyperus papyrus* (d), *Phragmites australis* (d), *P. mauritanus* (d), *Schoenoplectus corymbosus*, *S. scirpoideus* (d), *Typha capensis* (d); and
  - graminoids: *Cyperus tigiatus* (d), *C. difformis*, *C. digitatus*, *C. latifolius*, *C. sexangularis*, *Fuirena ciliaris*.

Biogeographically important taxa (all southernmost distribution limit):

- a) Stream banks
- Herb: *Floscopa glomerata*, *Ipomoea aquatica*; and
  - geophytic herb: *Bolbitis heudelotii*.
- b) Lakes & ponds
- Aquatic herbs: *Brasenia schreberi*, *Ceratopteris comuta*, *Wolffia globosa*, *Wolffiella welwitschii*; and
  - herbs: *Hygrophila schullii*, *Limnophyton obtusifolius*, *Marsilea apposita*, *M. coromandelina*, *M. minuta*, *M. villifolia*.
- c) Reed & sedge beds
- Graminoids: *Cyperus dives*, *C. procerus*, *C. proliter*.

### 47. SUBTROPICAL SALT PANS (AZI 11)

It occurs in shallow depressions, often found on old alluvial terraces of rivers, surrounded by zones of bank reeds or low herblands and in more perennial pans also filled with a dense carpet of macrophytic floating vegetation. Aliens *Cardiospermum halicacabum* and *Argemone ochroleuca* invade edges of some pans. Alien floating *Pistia stratiotes* and *Nymphaea lotus* are dominant in some Lowveld pans when filled with water.

Important taxa include:

- a) Drained pan bottoms
- Graminoids: *Cynodon dactylon* (d), *Diplachne eleusine* (d), *Eragrostis rotifer* (d), *Cloris virgata*, *Cyperus indecorus*; and
  - Herbs: *Isoetes schweinfurthii*, *Persicaria senegalensis*.
- b) Pan edges
- Megagraminoid: *Phragmites mauritanus* (d);
  - graminoids: *Digitaria didactyla*, *Echinochloa pyramidalis*, *Paspalum vaginatum*, *Sporobolus smutsii*; and
  - herbs: *Eclipta prostrata*, *Marsilea ephippiocarpa*, *Persicaria hystricula*, *Syngonanthus wahlbergii*.
- c) Pan lakes
- Herb: *Ludwigia stolonifera* (d);
  - aquatic herbs: *Azolla pinnata* var. *caerulea* (d), *Potamogeton crispus* (d), *Trapa natans* var. *bispinosa* (d), *Wolffia arrhiza* (d), *Monochoria africana*, *Najas pectinata*, *Nymphaea lotus*; and
  - carnivorous herb: *Utricularia inflexa* (d).

### 48. TSENDE MOPANEVELD (SVMP 5)

It occurs on slightly undulating plains with medium-high shrubby savanna, with some trees and dense ground layer dominated by *Colophospermum mopane*, but with the ratio of *C. mopane* to *Combretum apiculatum* decreasing somewhat on the less clayey soils of the uplands. In the northwest parts the tree cover is greater and, together with the southern and northeastern outliers of the unit, these flatter landscapes include several trees. Some 63% statutorily conserved, almost all in the Kruger National Park.

Important taxa includes:

- Tall trees: *Acacia nigrescens*, *Sclerocarya birrea* subsp. *caffra*;
- small trees: *Colophospermum mopane* (d), *Combretum apiculatum* (d), *Acacia gerrardii*, *A. tortilis* subsp. *heteracantha*, *Albizia harveyi*, *Bridelia mollis*, *Cassia abbreviata* subsp. *beareana*, *Combretum imberbe*, *C. zeyheri*, *Dalbergia melanoxylon*, *Peltoporum africanum*, *Philenoptera violacea*, *Terminalia sericea*;
- tall shrubs: *Combretum hereioense*, *Dichrostachys cinerea*, *Euclea divinorum*, *Grewia bicolor* G. *monticola*, *Strychnos madagascariensis*, *Tephrosia polystachya*.

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- low shrubs: *Clerodendrum ternatum*, *Indigofera schimperi*, *Melhania forbesii*; woody climbers: *Cissus cornifolia*, *Combretum mossambicense*;
- graminoids: *Bothriochloa radicans* (d), *Digitaria eriantha* subsp. *pentzii* (d), *Heteropogon contortus* (d), *Panicum maximum* (d), *Themeda triandra* (d), *Cymbopogon pospischilii*, *Enneapogon cenchroides*, *Eragrostis rigidior*, *E. superba*, *Panicum coloratum*, *Perotis patens*, *Pogonarthria squarrosa*, *Schmidtia pappophoroides*, *Urochloa mosambicensis*; and
- herbs: *Blepharis integrifolia*, *Ceratotheca triloba*, *Chamaecrista absus*, *Corchorus asplenifolius*, *Evolvulus alsinoides*, *Heliotropium steudneri*.

### 49. TSHOKWANE-HLANE BASALT LOWVELD (SVI 5)

It usually occurs on fairly flat plains with open tree savanna, often dominated by tall *Sclerocarya birrea* and *Acacia nigrescens* with a moderately developed shrub layer and a dense herbaceous layer. On some sloping areas with shallower soils, trees are stunted. About 64% statutorily conserved, mainly in the Kruger National Park.

Important taxa include:

- Tall trees: *Acacia nigrescens* (d), *Sclerocarya birrea* subsp. *caffra* (d), *Philenoptera violacea*;
- small trees: *Acacia borleae*, *A. gerrardii*, *A. nilotica*, *A. tortilis* subsp. *heteracantha*, *Albizia harveyi*, *Combretum hereroense*, *C. imberbe*, *Lannea schweinfurthii* var. *stuhlmannii*, *Peltophorum africanum*, *Pterocarpus rotundifolius*;
- tall shrubs: *Dichrostachys cinerea*, *Grewia bicolor*, *Gymnosporia maranguensis*, *Rhus gueinzii*;
- low shrubs: *Acalypha segetalis*, *Dicoma tomentosa*, *Hermannia glanduligera*, *Justicia flava*, *J. protracta* subsp. *protracta*, *Seddera suffruticosa*, *Tragia dioica*;
- herbaceous climber: *Commicarpus plumbagineus*;
- graminoids: *Bothriochloa radicans* (d), *Digitaria eriantha* subsp. *eriantha* (d), *Panicum coloratum* (d), *P. maximum* (d), *Themeda triandra* (d), *Urochloa mosambicensis* (d), *Aristida congesta*, *Cenchrus ciliaris*, *Eragrostis superba*, *Heteropogon contortus*;
- herbs: *Chamaecrista mimosoides*, *Gisekia africana*, *Thunbergia dregeana*; and
- succulent herbs: *Aloe zebrina*, *Orbea paradoxa*, *O. rogersii*.
- Endemic taxon
- Low shrub: *Boscia foetida* subsp. *minima*.

### 50. TZANEEN SOUR BUSHVELD (SVI 8)

Deciduous, tall open bushveld (parkland) with a well-developed, tall grass layer, occurring on low to high mountains with undulating plains mainly at the base of, and on the lower to middle slopes of the northeastern escarpment. Very little currently conserved. About 41% is transformed, mainly by cultivation and plantations. Scattered alien plants include *Solanum mauritanum*, *Melia azedarach* and *Caesalpinia decapetala*. The subtropical climate is conducive to the spread of *Chromolaena odorata*, *Lantana camara* and *Psidium guajava*. Erosion is variable.

Important taxa include:

- Tall trees: *Pterocarpus angolensis*, *Sclerocarya birrea* subsp. *caffra*;
- small trees: *Acacia polyacantha* (d), *Albizia versicolor* (d), *Ficus sansibarica* (d), *Parinari curatellifolia* (d), *Piiiostigma thonningii* (d), *Pterocarpus rotundifolius* (d), *Trichilia emetica* (d), *Acacia davyi*, *A. sieberiana* var. *woodii*, *Antidesma venosum*, *Catha edulis*, *Faurea rochetiana*, *F. saligna*, *Ficus burkei*, *F. petersii*, *Heteropyxis natalensis*, *Peltophorum africanum*, *Terminalia sericea*, *Vernonia colorata*;
- tall shrubs: *Olea europaea* subsp. *africana*, *Pseudarthria hookeri* var. *hookeri*, *Rhus pentheri*, *Triumfetta pilosa* var. *tomentosa*;
- low shrubs: *Agathisanthemum bojeri*, *Barleria elegans*, *Dicliptera clinopodia*, *Flemingia grahamiana*, *Indigofera filipes*, *Polygala producta*;
- woody climbers: *Bauhinia galpinii*, *Pterolobium stellatum*;
- graminoids: *Cymbopogon caesius* (d), *C. nardus* (d), *Hyparrhenia cymbaria* (d), *H. poecilotracha* (d), *Hyperthelia dissoluta* (d), *Alloteropsis semialata* subsp. *semialata*, *Andropogon schirensis*, *Bothriochloa bladhii*, *Monocymbium ceresiiforme*, *Paspalum scrobiculatum*, *Schizachyrium sanguineum*, *Themeda triandra*; and
- herb: *Waltheria indica*.

### 51. WOLKBERG DOLOMITE GRASSLAND (GM 26)

It occurs on a series of broad mountain ridges, broad elevated plateaus and adjacent slopes covered with species-rich short closed grasslands rich in forbs, often dominated by *Loudetia simplex* and *Diheteropogon amplexans*. About half of this unit is formally protected within the Bewaarkloof and Lekgalameetse Nature Reserves and well as the Wolkberg Wilderness Area.

Important taxa includes:



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- Small trees: *Acacia davyi* (d), *Vitex rehmannii* (d), *Acacia caffra*, *Combretum molle*, *Cussonia paniculata*, *C. transvaalensis*, *Dombeya rotundifolia*, *Faurea rochetiana*, *F. saligna*, *Greyia radlkoferi*, *Lippia javanica*, *Protea caffra* subsp. *caffra*, *P. roupelliae* subsp. *roupelliae*;
- Tall shrub: *Protea gaguedi*;
- low shrubs: *Asparagus schroederi*, *Chrysanthemoides monilifera*;
- succulent shrub: *Aloe vryheidensis*;
- graminoids: *Andropogon schirensis* (d), *Brachiaria serrata* (d), *Diheteropogon amplexans* (d), *Heteropogon contortus* (d), *Loudetia simplex* (d), *Monocymbium cerasiiforme* (d), *Rendlia altera* (d), *Setaria sphacelata* (d), *Themeda triandra* (d), *Bewsia biflora*, *Elionurus muticus*, *Eragrostis capensis*, *E. chloromelas*, *E. racemosa*, *Panicum natalense*, *Sporobolus pectinatus*, *Trachypogon spicatus*;
- herbs: *Dicoma anomala*, *Gerbera ambigua*, *Ipomoea atherstonei*, *Oxygonum dregeanum*, *Xeraphyta retinervis*, *X. schlechteri*;
- succulent herb: *Aloe fosteri*; and
- semiparasitic herb: *Buchnera longespicata*.

Biogeographically important taxa (all Northern sourveld endemics):

- Low shrubs: *Berkheya pauciflora*, *Heteromorpha pubescens*; and
- herbaceous climber: *Cyphia transvaalensis*.

Endemic Taxa:

- Succulent shrubs: *Aloe dolomitica*, *Euphorbia restricta*; and
- herbs: *Barleria dolomitica*, *Becium citriodorum*, *B. coddii*, *Dicliptera fionae*, *Lotononis pariflora*.

### 52. WOODBUSH GRANITE GRASSLAND (GM 25)

It consists of mountainous plateaus covered by grassland, showing increased low-shrub density on steep south- and east-facing slopes. Only about 10% of this area is still in its natural state. There are no conservation areas protecting patches of this unit. Major land transformation is mainly due to silviculture. Frequent alien plants include *Acacia mearnsii*, *A. dealbata*, *Prunus serotina*, *Lilium formisanum*, *Agrimonia procera*, *Solanum mauritianum* and *Acanthospermum australe*. The vegetation is subject to bush encroachment (from both scrub forest and sour bushveld) exacerbated by exclusion of fire.

Important taxa include:

- Graminoids: *Eragrostis plana* (d), *E. racemosa* (d), *Hyparrhenia hirta* (d), *Microchloa caffra* (d), *Monocymbium cerasiiforme* (d), *Paspalum scrobiculatum* (d), *Stipa dregeana* var. *dregeana* (d), *Themeda triandra* (d), *Alloteropsis semialata* subsp. *eckloniana*, *Andrapogon schirensis*, *Cymbopogon nardus*, *Festuca costata*, *Panicum natalense*, *Rendlia altera*;
- herbs: *Berkheya echinacea*, *Chamaecrista mimosoides*, *Helichrysum cephaloideum*, *H. nudifolium* var. *pilosellum*, *Hypolepis sparsisora*, *Selago procera*, *Vernonia oligocephala*;
- geophytic herbs: *Asplenium sandersonii* (d), *Agapanthus inapertus* subsp. *Inapertu*, *Asplenium lobatum*, *Merwillia natalensis*, *Pteridium aquilinum*;
- succulent herb: *Aloe lettyae*;
- tall shrub: *Tricalysia lanceolata*; and
- low shrubs: *Asparagus virgatus*, *Dicliptera clinopodia*, *Eriosema nutans*, *Euryops pedunculatus*, *Hypericum revolutum*, *Protea simplex*.

Biogeographically important taxa:

(<sup>N</sup>Northern sourveld endemic, <sup>Z</sup>Link to Zimbabwe)

- Succulent herb: *Huernia insigniflora*<sup>N</sup>; and
- low shrub: *Eriosema buchmanii*<sup>Z</sup>.

Endemic taxa:

- Herb: *Wahlenbergia brachiata*;
- geophytic herbs: *Chlorophytum radula*, *Kniphofia crassifolia* (*extinct*); and
- low shrub: *Indigofera rehmenmi*.

### 53. CONCLUSION

The lists of species included in this appendix are likely not to be the complete lists as available botanical information is updated. It should however serve as a good point of reference for any person wishing to further investigate the vegetation and specific species occurring within the EMF area.

### 54. REFERENCE

Lists and descriptions compiled from the following source:

Mucina, L. & Rutherford, M.C. (eds) 2006. *The Vegetation of South Africa, Lesotho and Swaziland*. Strelizia 19. South African National Biodiversity Institute, Pretoria.



**Tree trunk**



Photo: S. Johnston

**Boobab branches**



Photo: S. Johnston

**Flower**



Photo: P. Claassen