Chapter 8: The Wetland and Thicket Vegetation Types

Thickets are present as patches in the grassland in deep rocky valleys. The Wetland Vegetation Type is found in close vicinity of standing and slow flowing water.

Classification of the relevès by means of Two Way Indicator Species Analysis (TWINSPAN) and subsequent refinement by Braun-Blanquet procedures resulted in the recognition of the following communities (Table 8.1):

8.1 The *Rhoicissus tridentata - Achyranthes aspera* thicket community
8.1.1 The *Leucosidea sericea - Podocarpus henkelii* sub-community
8.1.2 The *Cussonia natalensis - Acacia caffra* sub-community
8.2 The *Mariscus congestus - Arundinella nepalensis* wetland community
8.2.1 The *Sporobolus africanus - Paspalum dilatatum* sub-community
8.2.2 The *Schoenoplectus corymbosus - Fimbristylis ferruginea* sub-community

8.1 The *Rhoicissus tridentata - Achyranthes aspera* thicket community

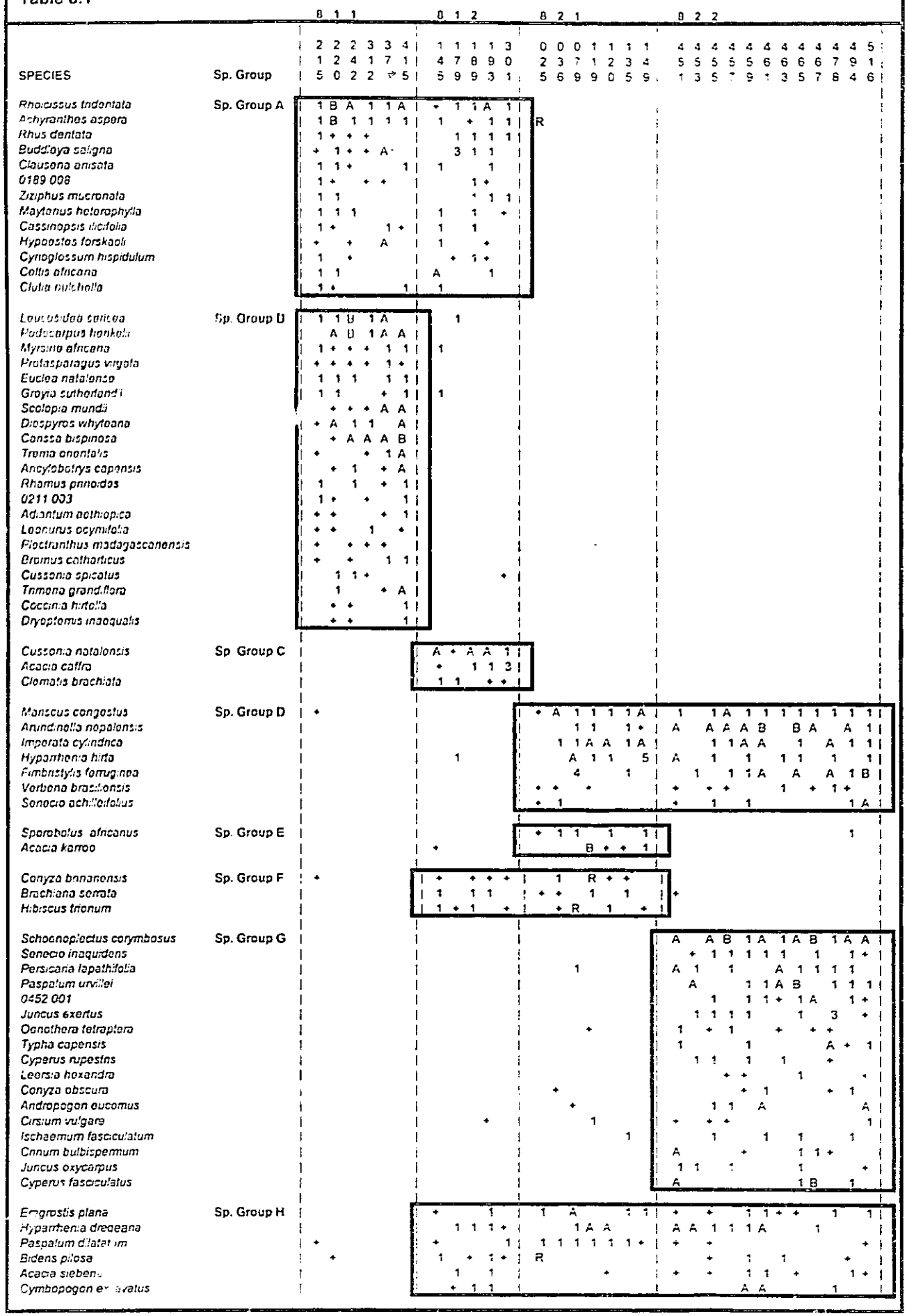
The vegetation of this community represents thickets distributed in the northern and western parts of the study area. Rockiness is characteristic (45-60%) and slopes are steep (30°). The woody component is dominant and the herbaceous layer consists mainly of forbs and climbers. Various geological formations and climate zones are represented and sub-communities are interpreted on geographical, altitudinal and floristic differences (Figure 8.1).

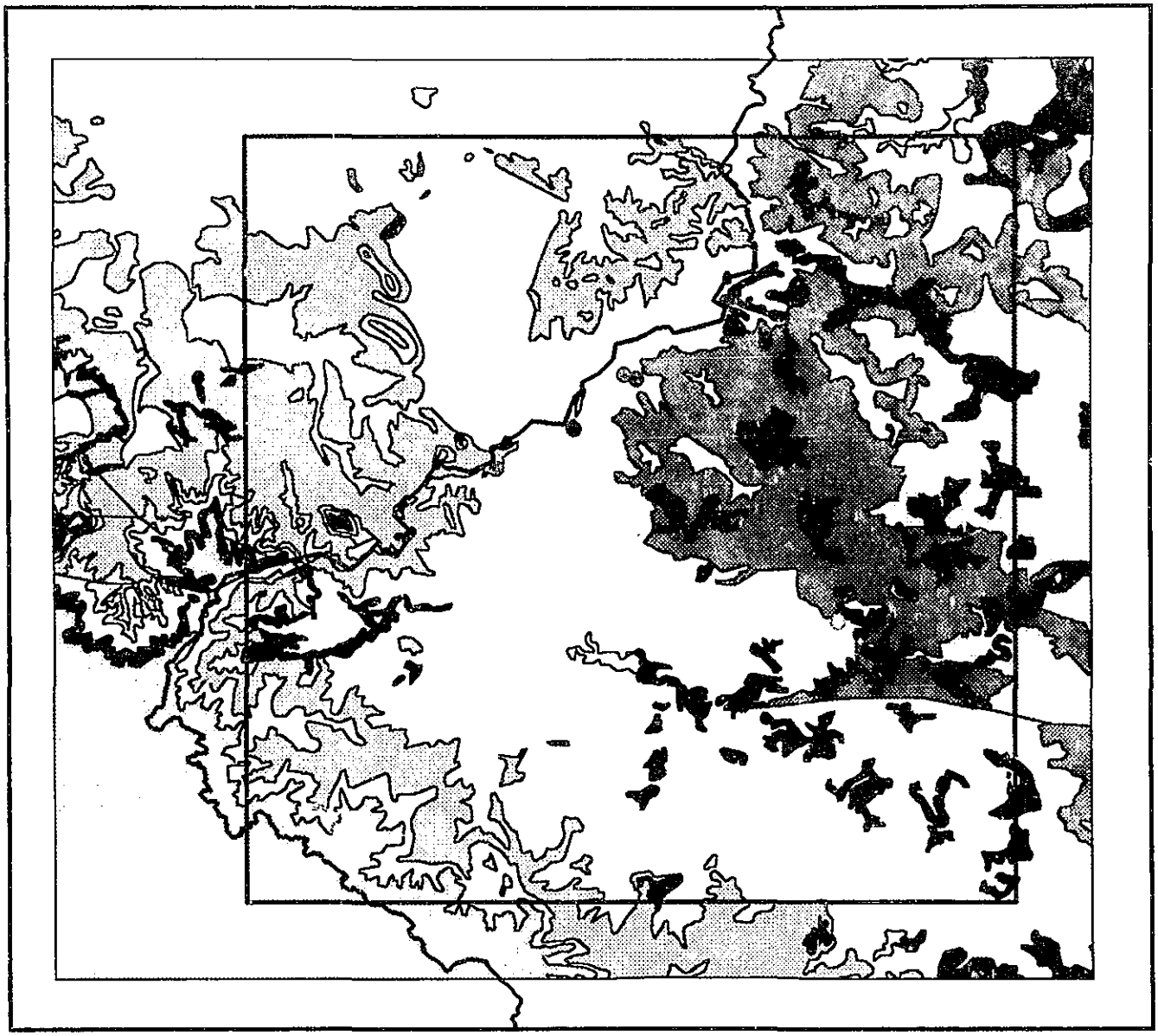
The *Rhoicissus tridentata - Achyranthes aspera* thicket community is characterised by species group A and is distinguished from the *Mariscus congestus - Arundinella nepalensis* wetland community by the absence of species groups D, E and G.

Diagnostic species include *Achyranthes aspera* and *Buddleya saligna* (Table 8.1). Two sub-communities were recognised in this community.

Plant communities of the Thickets and Wetland Vegetation Types

Table 8.1





Ladysmith
Gridlines 28° - 29°S and 29° - 30°E
KwaZulu-Natal Boundary
Sample plots of the Rhoicissus tridentata - Achyranthes aspera community

Geological Formations

Beaufort
Clarens
Drakensberg
Karoo
Karoo Dolerite
Molteno
Tarkastad
Volksrust
Vryheid

Figure 8.1: Distribution of the Thicket Vegetation Type sample plots in geological formations of the study area.

8.1.1 The *Leucosidea sericea - Podocarpus henkelii* sub-community

Patches of dense thickets in narrow, steep valleys in the grassland represent this sub-community. It is present at altitudes, exceeding 1 400 m and varies from small to intensive patches. The vegetation is similar to the Highland Sourveld and Dohne Sourveld forests (Acocks 1988) (#44) (Figure 8.2). Elements of both the Afromontane Forest (#2) and the Wet Cold Highveld Grassland (#41) described by Bredenkamp **et. al.** (1996a) are found (Figure 8.3). The vegetation of this sub-community is associated with rocky slopes and ravines with shallow soils.

The *Leucosidea sericea - Podocarpus henkelii* sub-community is characterised by species group B and is distinguished from the other communities by the absence of species groups C to H (Table 8.1). The woody layer of this sub-community is well developed and prominent species include *Leucosidea sericea, Podocarpus henkelii, Euclea natalensis, Diospyros whyteana, Carissa bispinosa* and *Trema orientalis.* The well developed woody component is responsible for a closed canopy and trees reach a height of twenty metres.

8.1.2 The *Cussonia natalense - Acacia caffra* sub-community

Sample plots representing this sub-community are found in the northern part of the study area at altitudes lower than 1 500 m a.m.s.l. Various climate zones are included in this sub-community. Rockiness is not as high and slopes are not as steep and subsequently soils are deeper than in the *Leucosidea sericea - Podocarpus henkelii* sub-community. The Scrub forest, described by Acocks (1988) as part of the Southern Tall grassveld (#65) is represented and is described by Granger (1996) as Natal Central Bushveld (#25), which are present at altitudes ranging from 600 to 1 350 m a.m.s.l.

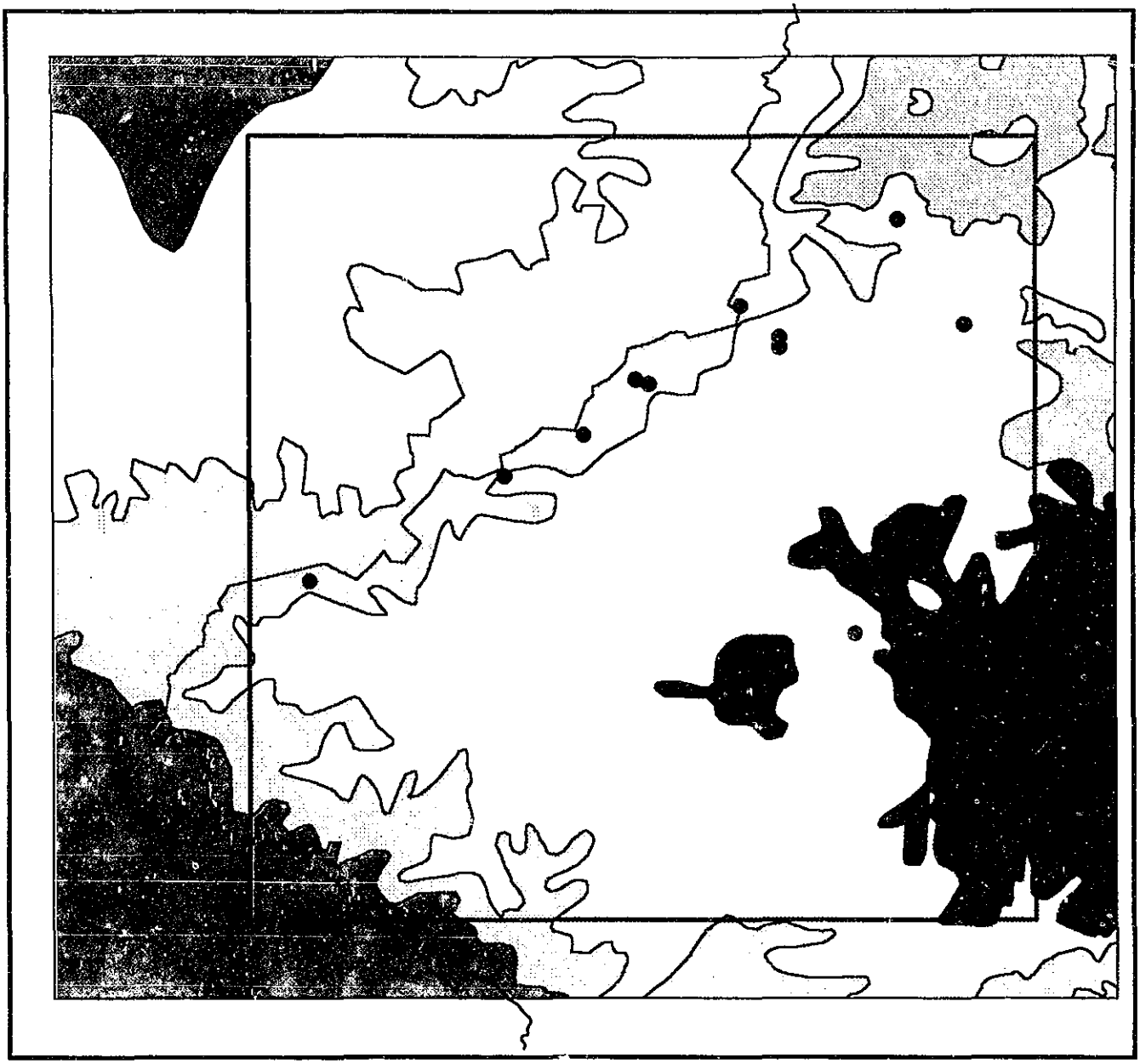


Figure 8.2: Distribution of the Thicket Vegetation Type sample plots in Acocks Veld Types of the study area.

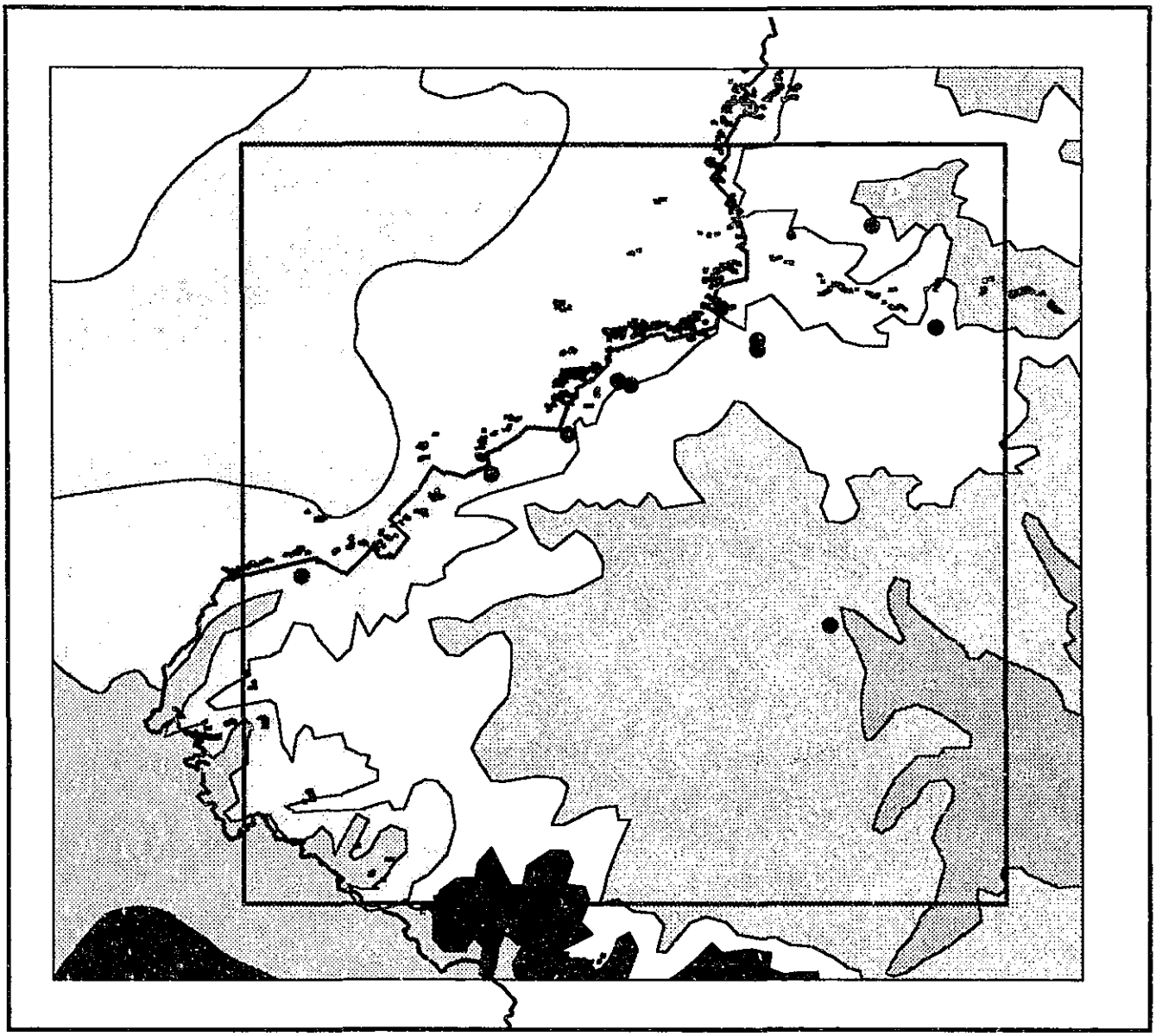


Figure 8.3: Distribution of the Thicket Vegetation Type sample plots in Low and Rebelo Vegetation Types of the study area.

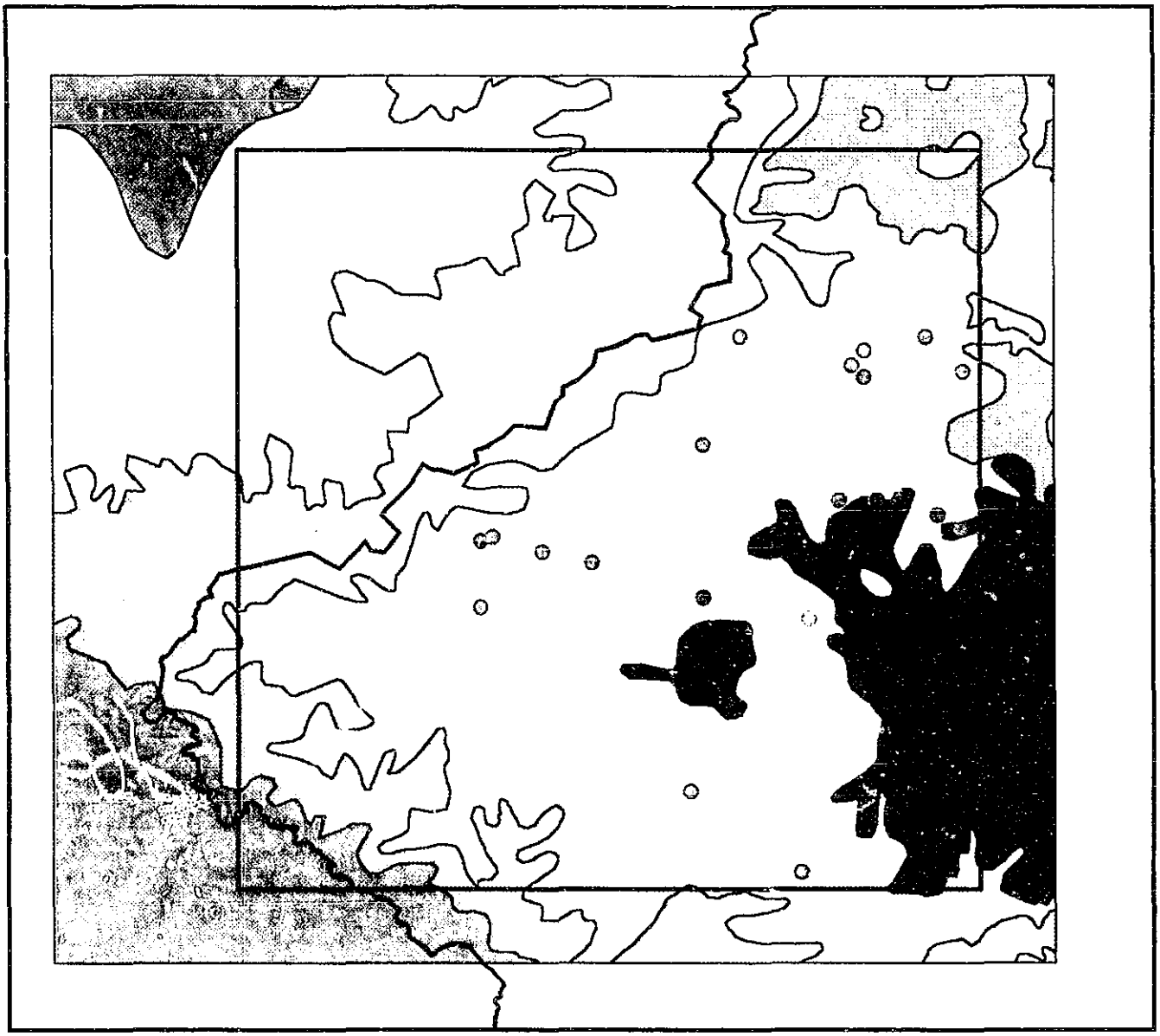
Prominent species include the woody species *Rhus dentata, Buddleya saligna, Ziziphus mucronata* (Species group A), *Cussonia natalensis, Acacia caffra* (Species group C), the climbers *Rhoicissus tridentata* (Species group A), *Clematis brachiata* (Species group C), the forbs *Achyranthes aspera* (Species group A), *Bidens pilosa* (Species group H) and the grass *Hyparrhenia dregeana* (Species group H) (Table 8.1). The woody component is dominant and is responsible for a closed canopy, with trees reaching a height of ten metres, not as high as in the *Leucosidea sericea - Podocarpus henkelii* sub-community.

The *Cussonia natalensis - Acacia caffra* sub-community is characterised by diagnostic species group C and is distinguished from other sub-communities by the absence of species groups B, D, E, G as well as the presence of species groups A, C, F and H. Species that are present in this and the *Mariscus congestus - Arundinella nepalensis* sub-community include woody and herbaceous species that are usually associated with disturbed areas.

8.2 The *Mariscus congestus - Arundinella nepalensis* wetland community

Prominent species usually associated with wet conditions represent the vegetation found in the *Mariscus congestus - Arundinella nepalensis* community. The differences between the sub-communities are a result of a moisture gradient, confirmed by the species composition. Various climate zones and geological formations are present and sample plots are distributed in the Southern Tall Grassveld (#65) (Acocks 1988) (Figure 8.4). Species group D is characteristic of this community and the absence of species groups A, B and C distinguishes it from the *Rhoiscissus tridentata - Achyranthes aspera* thicket community (Table 8.1).

Prominent species include the diagnostic sedge *Mariscus congestus* and forb *Verbena brasiliensis* and the characteristic species *Arundinella nepalensis, Imperata cylindrica* and *Fimbristylis ferruginea* (Species group D). Two sub-communities were recognised in this community.



Ladysmith
Gridlines 28° - 29°S and 29° - 30°E
KwaZulu-Natal Boundary
Sample plots of the Mariscus congestus - Arundinella nepalensis community

Acocks Veld Types

Cymbopogon - Themeda Veld (Sandy) (#48)
Highland Sourveld and Dohne Sourveld (#44)
Highland Sourveld to Cymbopogon - Themeda Transition (Eastern Free State Highveld) (#49)
Natal Sour Sandveld (#66)
Southern Tall Grassveld (#65)
Themeda Veld to Cymbopopogon - Themeda Veld Transition (Patchy) (#53)
Themeda - Festuca Alpine Veld (#58)
Valley Bushveld (#23)

Figure 8.4: Distribution of the Wetland VegetationType sample plots in Acocks Veld Types of the study area.

8.2.1 The *Sporobolus africanus - Paspalum dilatatum* sub-community

The vegetation of this sub-community occurs in the riverbeds in the central-eastern part of the study area. The *Sporobolus africanus - Paspalum dilatatum* sub-community is characterised by species group E and is distinguished from the *Schoenoplectus corymbosus - Fimbristylis ferruginea* sub-community by the presence of species group F and the absence of species group G (Table 8.1). Rocks are generally absent and soils are deep. The geology is representative of the Vryheid Formation, which weathers to a sandy-loam to clayey soil (Figure 8.5).

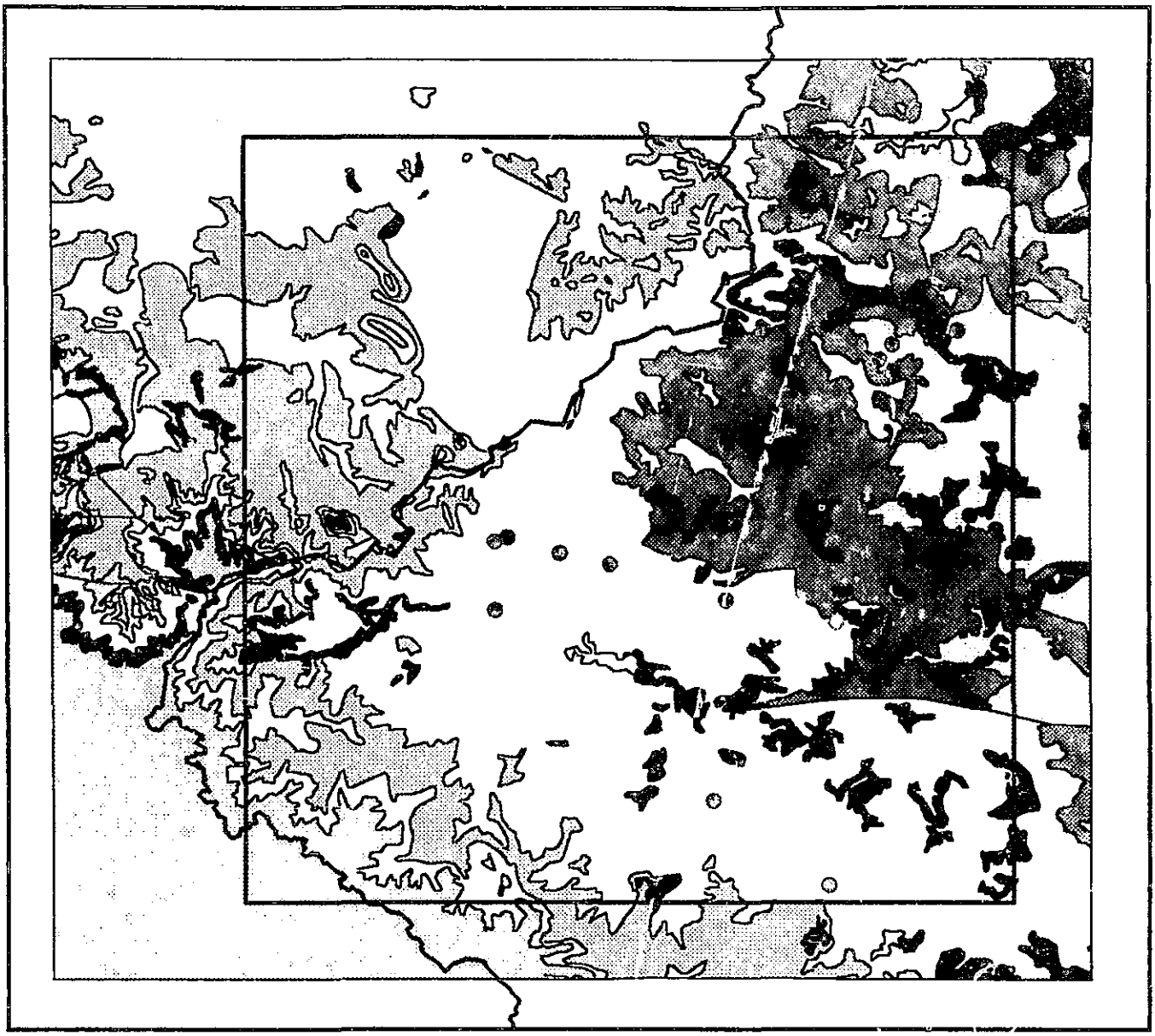
The presence of the woody species *Acacia karroo* (Species group F) and the grass *Paspalum dilatatum* (Species group H) is an indication that the clay content of the soil is higher than the soil present in the *Schoenoplectus corymbosus - Fimbristylis ferruginea* sub-community.

Species that are prominent in this sub-community include the grasses *Arundinella nepalensis, Imperata cylindrica, Hyparrhenia hirta* (Species group D), *Sporobolus africanus* (Species group E), *Paspalum dilatatum* (Species group H) and the forb *Mariscus congestus* (Species group D). The species composition of the *Sporobolus africanus - Paspalum dilatatum* sub-community indicates a wet habitat, but is not as waterlogged as the *Schoenoplectus corymbosus - Fimbristylis ferruginea* sub-community.

8.2.2 The *Schoenoplectus corymbosus - Fimbristylis ferruginea* sub-community

This sub-community is characterised by species group G, containing the diagnostic species *Schoenoplectus corymbosus, Persicaria lapathifolia, Paspalum urvillei* and *Juncus exertus* (Table 8.1). The presence of sedges like *Mariscus congestus, Fimbristylis ferruginea* (Species group D), *Schoenoplectus corymbosus* and the forb *Persicaria lapathifolia* (Species group G) indicate waterlogged conditions, permanently inundated with water. Sample plots representing this sub-community are located in riverbeds in the central and southern part of the study area. The geology conforms to the Beaufort Group. Rocks are absent and the soils are deep and sandy. The presence of the tree *Acacia*

sieberiana (Species group H), that is absent from the *Sporobolus africanus* - *Paspalum dilatatum* sub-community, gives an indication of the sandy character of the soil.



Ladysmith
Gridlines 28° - 29°S and 29° - 30°E
KwaZulu-Natal Boundary
Sample plots of the Mariscus congestus - Arundinella nepalensis community

Geological Formations

Beaufort
Clarens
Drakensberg
Karoo
Karoo Dolerite
Molteno
Tarkastad
Volksrust
Vryheid

N

Figure 8.5: Distribution of the Wetland Vegetation Type sample plots in geological formations of the study area.

Chapter 9: Conclusions

The application of the Braun-Blanquet technique, as applied by Behr & Bredenkamp (1988), Du Preez & Bredenkamp (1991) and Eckhardt (1993) in the present study area was proven to be successful. Results obtained with the subjective placement of sample plots proved to be successful in distinguishing between vegetation types and communities. Broad-scale stratification was based on Acocks (1988) and Low and Rebelo (1996). The lack of land type and geological data was limiting, but a comparison of results with previous studies proved favourable with other methods.

The validity of vegetation types, described by Low and Rebelo (1996) is confirmed, although some of the borders should be moved in order to accommodate variations in the vegetation. These differences were noted as the relevè data used in the present study provides more detailed information than the reconnaissance work of previous researchers.

The application of TWINSPAN proved to be successful in order to derive a first approximation of the data and environmental factors such as geology, rainfall and altitude verified the approximation. The use of Braun-Blanquet procedures to determine smaller variations in the broad communities is useful in spite of the lack of diagnostic species groups in some cases. In these cases a combination of species groups are used to describe a certain community. It can be concluded that successful results can be obtained with the proper application of the Braun-Blanquet and TWINSPAN techniques in combination with environmental factors such as rainfall, altitude, geology and topography.

Mapping of these vegetation types and communities will be possible as vegetation types correspond to Low and Rebelo vegetation types, although minor corrections must be made in some instances. In the case of the Woodland Vegetation Type, the distribution corresponds with Dolerite formations in the study area.

Various human influences affect the natural state of the vegetation of the study area, the main being utilisation by cattle, afforestation and other agricultural practises. While afforestation causes immediate and irreversible damage to the natural vegetation of an area, poorly practised agricultural practises and over-utilisation by cattle also have a long-term effect on the vegetation of an area. Natural factors influencing the vegetation include topography, rainfall, altitude and geology.

In the study area the main influence on the vegetation is utilisation by cattle. Prolonged periods of over-utilisation have caused severe damage to vegetation, in some cases to such an extent that secondary problems such as sheet and gully erosion is taking place. The midlands and footslopes of the Drakensberg mountains are areas where these effects are noted.

In the southwestern parts of the study area, where little or no relevès were compiled due to inaccessibility and time limitations an additional survey is proposed. In these areas the vegetation was noted to be different from the High Altitude Mountain Vegetation Type. A fynbos element seems to dominate in this vegetation and this difference can be ascribed to differences in climate and soil properties. In order to complete the knowledge of the high altitude grasslands it is imperative that these areas be sampled and classified.

Results pertinent to the vegetation of the present study area are discussed below under separate headings.

The High Altitude Mountain Vegetation Type

This vegetation type is predominantly a grassland area along the escarpment, but patches of natural forests occur in the sheltered gorges, ravines and valleys. The spreading of woody vegetation from the gorges and ravines into the open grassland appears to be restricted by fire (Tainton 1981). The grasslands are therefore considered fire-climax grasslands (Du Preez & Bredenkamp 1991). In the KwaZulu-Natal Drakensberg a relative high percentage of the grassland is conserved, but forest patches as opposed to

the grasslands are still regarded as relicts. This perception might change as evidence of the long history of grasslands becomes increasingly recognised. These evidence include fossil pollen evidence reported by Meadows and Linder (1993), which indicated that South African grasslands are at least 12 000 years old, with a high level of endemism which suggests a long evolutionary history.

The status of South African grasslands is often discussed and many grassland types are often considered as primary (O'Connor & Bredenkamp 1997) although the species composition and degraded state of the Open Thornveld Vegetation Type suggest that this is secondary. The secondary status could have been caused by the continued utilisation of the veld by previous local inhabitants who lived in this area and moved through the area many years ago.

In the *Monocymbium ceresiiforme - Alloteropsis semialata* community an average of 37 species were sampled in the sample plots. The *Cephalanthus natalensis - Trachypogon spicatus* variation has an average number of 48 species per sample plot of 100m². This is the highest average number of species per sample plot in the study area. This indicates a high alpha phytodiversity. Bredenkamp **et. al.** (1996) concluded that this is an area with many rare and endemic plant species, which are often threatened by the expanding forestry industry.

It seems that the *Monocymbium ceresiiforme - Andropogon schirensis* sub-community represents the Highland Sourveld (Acocks #44) and Wet Cold Highveld Grassland (Low & Rebelo #41) at high altitudes and rainfall. However, the *Monocymbium ceresiiforme - Cymbopogon excavatus* sub-community is situated at lower altitudes (though above 1 300 m a.m.s.l.) representing a transitional zone between the Highland Sourveld (Acocks #44) and Southern Tall Grassveld (#65) or Wet Cold Highveld Grassland (Low & Rebelo #41) and Natal Central Bushveld (25). This vegetation is not typical of the North-eastern Mountain Grassland (#43) indicated on the map of Low and Rebelo (1996).

Although moderate utilisation by cattle has caused some damage to the natural vegetation of this vegetation type, there are still some areas where the vegetation is representative of a natural state. As a result of the high species number per sample plot as well as the scenic beauty, these areas can be considered to have a high conservation status.

The Open Thornveld Vegetation Type

Located on the footslopes of the Drakensberg mountains at altitudes lower than 1 300 m a.m.s.l., the Open Thornveld Vegetation Type is present. This vegetation has been subjected to severe utilisation by cattle and, in some places, poor agricultural practises. This has caused the alteration of the natural vegetation in this area to the extent that several variations are recognised, as discussed in Chapter 6. This vegetation type covers the largest part of the study area. In this vegetation type the *Hyparrhenia anamesa - Hyparrhenia dregeana* and *Hyparrhenia hirta - Themeda triandra* communities have low average number of species per relevè, namely 25 and 26 respectively. These two communities have little woody species present and is representative of grasslands with evidence of moderate to severe utilisation.

The *Trachypogon spicatus - Diheteropogon amplectens* and *Diospyros lycioides - Eragrostis chloromelas* communities have respectively an average of 36 and 34 species per relevè. Utilisation is severe in these communities and this is evident in the high number of forb species present. This intensive utilisation created a limitation in the present study as sampling had to be carried out on smaller areas of apparently natural vegetation which might not be representative of the natural state of the grassland.

This vegetation is described by Granger (1996) as Natal Central Bushveld (#25), an open savanna with scattered tree species. Grasses such as *Hyparrhenia hirta, Themeda triandra* and *Cymbopogon excavatus* dominate this vegetation. As with the higher altitude grasslands of the Drakensberg, fires prevent the rapid spread of woody vegetation into the grasslands.

The Woodland Vegetation Type

Distributed in the central and eastern part of the study area are localised areas of Karoo Dolerite origin, forming dykes and sills. In these areas the vegetation has a characteristic physiognomy and is described as the Woodland Vegetation Type. The distribution of plant communities in this vegetation type is a reflection of the mosaic pattern of the dominant geological formation present in the Woodland Vegetation Type. This vegetation type is dominated by woody species such as *Maytenus heterophylla, Acacia sieberiana, Acacia karroo, Rhus pentheri, Diospyros lycioides* and *Euclea crispa.* However, in the case of the *Maytenus heterophylla - Acalypha angustata* community that is situated in the northern parts of the study area, the vegetation is transitional to grassland, the occurrence of woody species is limited to only a few species. This vegetation corresponds to the Southern Tall Grassveld (Acocks #65).

On the map of Low and Rebelo (1996) sample plots of the *Maytenus heterophylla - Acalypha angustata* community are located in North-eastern Mountain Grassland (#43) and Natal Central Bushveld (#25). This pattern is also reflected in the distribution area of the *Maytenus heterophylla - Rhus pentheri* community. Sample plots are located in Valley Bushveld (Acocks #25) and Southern Tall Grassveld (#65) or in the Natal Central Bushveld (Low & Rebelo #26) and Valley Thickets (#5). An average number of 43 species per relevè is noted in this community. The greater number of woody species in the Woodland Vegetation type is ascribed to the drier, warmer climate and the lower occurrence of frost.

In the *Maytenus heterophylla - Rhus pentheri* community, an average number of 40 species per relevè is noted. As this vegetation type is restricted to rocky hills in the central parts of the study area and in most cases not covering extensive areas, it can be assumed that transformation of this vegetation type is extreme.

The Thicket Vegetation Type

The Thicket Vegetation Type has an average number of 38 species per relevè. As it is situated at high altitudes in the Drakensberg mountains, associated with rocky slopes and ravines, it does not cover extensive areas. The possibility of severe damage to this vegetation type by means of careless fires and exploitation means that care must be taken to conserve as much of this vegetation type as possible. The spreading of this vegetation into the surrounding grasslands appears to be restricted by fire (Tainton 1981).

The Wetland Vegetation Type

An average number of 21 species per relevè is noted in this vegetation type. Severe damage is caused to these riparian communities as a result of utilisation and trampling by cattle. Regular flooding contributes to the disturbance of the vegetation and exotic species are often associated with this vegetation type.

The importance of wetland conservation is underlined by the phenomenon of different species composition of neighbouring marsh areas. This phenomenon is mentioned by Smit (1992) and Fuls (1993). Species diversity might thus be easily overlooked if one marsh is to be taken as representative of wetland species diversity. Other reasons for wetland conservation include their functions as water storage systems, stream flow regulators, flood attenuators, water purifiers, erosion control agents and specialised habitats for various animals (Begg 1986, Walmsley 1988).