File Name: 985.pdf **UNESCO Region:** Africa

SITE NAME: **uKhahlamba / Drakensberg Park**

DATE OF INSCRIPTION: 2nd December 2000

STATE PARTY: SOUTH AFRICA

CRITERIA: N (iii)(iv) C (i)(iii)

DECISION OF THE WORLD HERITAGE COMMITTEE:

Natural criteria (iii) and (iv): The site has exceptional natural beauty with soaring basaltic buttresses, incisive dramatic cutbacks and golden sandstone ramparts. Rolling high altitude grasslands, the pristine steep-sided river valleys and rocky gorges also contribute to the beauty of the site. The site's diversity of habitats protects a high level of endemic and globally threatened species, especially of birds and plants.

Cultural criteria (i) and (iii):

Criterion (i): The rock art of the uKhahlamba/Drakensberg is the largest and most concentrated group of rock paintings in Africa, south of the Sahara and is outstanding both in quality and diversity of subject.
Criterion (iii): The San people lived in the mountainous uKhahlamba/Drakensberg area for more than four millennia, leaving behind them a corpus of outstanding rock art which throws much light on their way of life and their beliefs.

A number of delegates supported the nomination, which enhances the diversity of African biogeographical provinces represented on the World Heritage List, with this site being an example of the Mediterranean biome. The Committee furthermore encouraged the State Party to work on an integrated management plan, including the management of fire and invasive species as well as visitor management.

The Delegate of South Africa informed the Committee of the importance of Izintaba zoKhahlamba in her country and that the authorities are addressing a number of issues raised by the Committee. She hoped that with bilateral and international assistance the integrated management plan could be accomplished.

BRIEF DESCRIPTIONS

The spectacular natural landscape of the Drakensberg Park contains many caves and rock-shelters with a wealth of paintings made by the San people over a period of 4000 years. They depict animals and human beings, and represent the spiritual life of this people, who now no longer live in their original homeland.

1.b State, Province or Region: KwaZulu-Natal

1.d Exact location: 28° 46' S, 29° 0' E

World Heritage Centre
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UNITED NATIONS EDUCATION SCIENTIFIC AND CULTURAL ORGANIZATION

CONVENTION CONCERNING THE PROTECTION OF THE WORLD CULTURAL AND NATURAL HERITAGE

NOMINATION PROPOSAL

for

THE DRAKENSBERG PARK ALTERNATIVELY KNOWN AS OKHAHLAMBA PARK

to be

LISTED AS A WORLD HERITAGE SITE

Submitted by:

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM
REPUBLIC OF SOUTH AFRICA

prepared by:

KWAZULU-NATAL NATURE CONSERVATION SERVICE
AMAFA aKWAZULU NATALI - HERITAGE KWAZULU NATAL
REPUBLIC OF SOUTH AFRICA
1999

Application for inclusion on

The World Heritage List

THE DRAKENSBERG PARK ALTERNATIVELY
KNOWN AS OKHAHLAMBA PARK

Signed [on behalf of State Party]

Full name MOHAMMED VALLI MOOSA

Title MINISTER OF ENVIRONMENTAL AFFAIRS & TOURISM

Date 23 JUNE 1999

ACKNOWLEDGEMENTS

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Location of the Drakensberg Park/Okahlamba Park

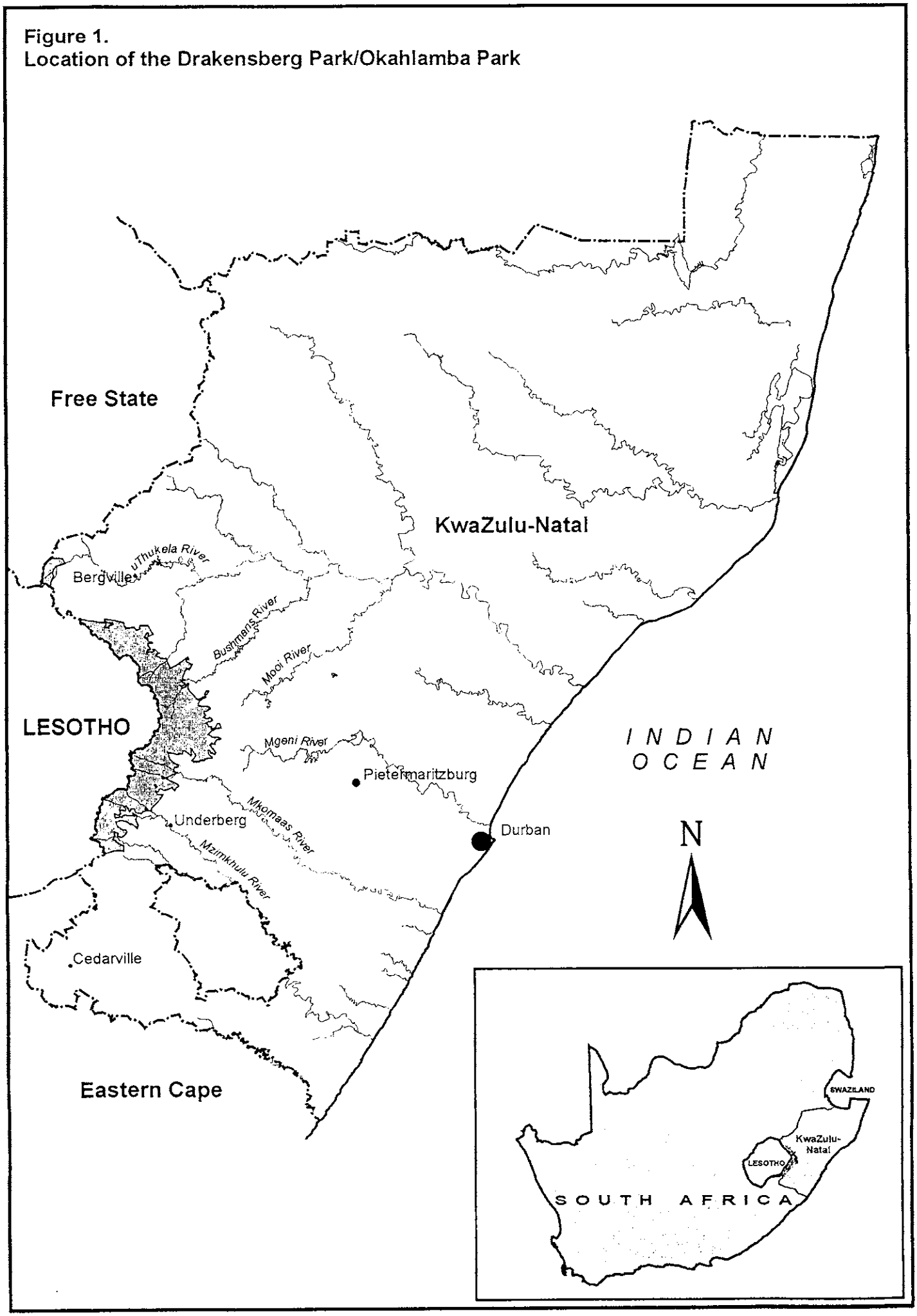

Figure 2.
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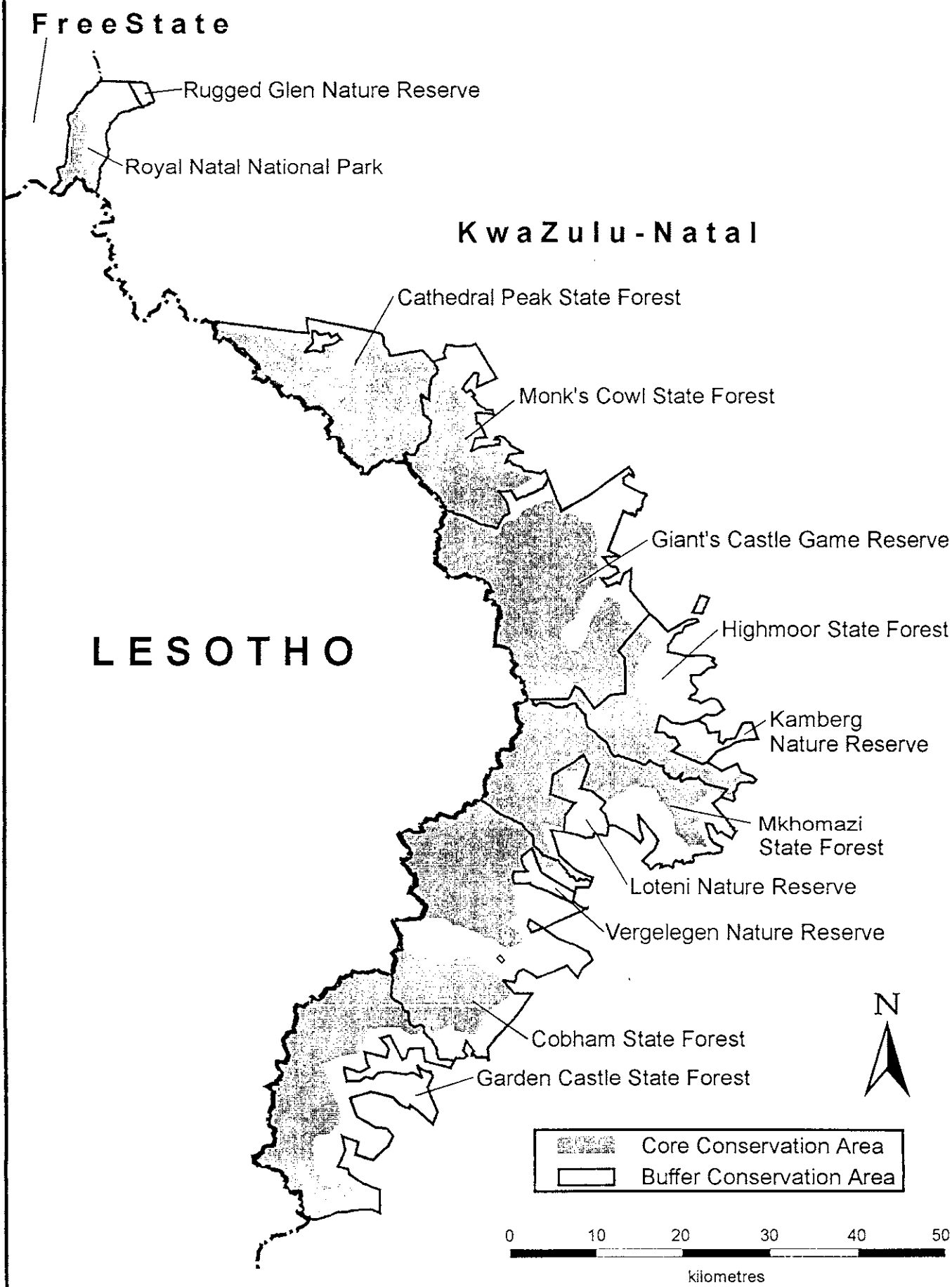


Figure 3.
Component protected areas, which comprise the Drakensberg Park/Okahlamba Park

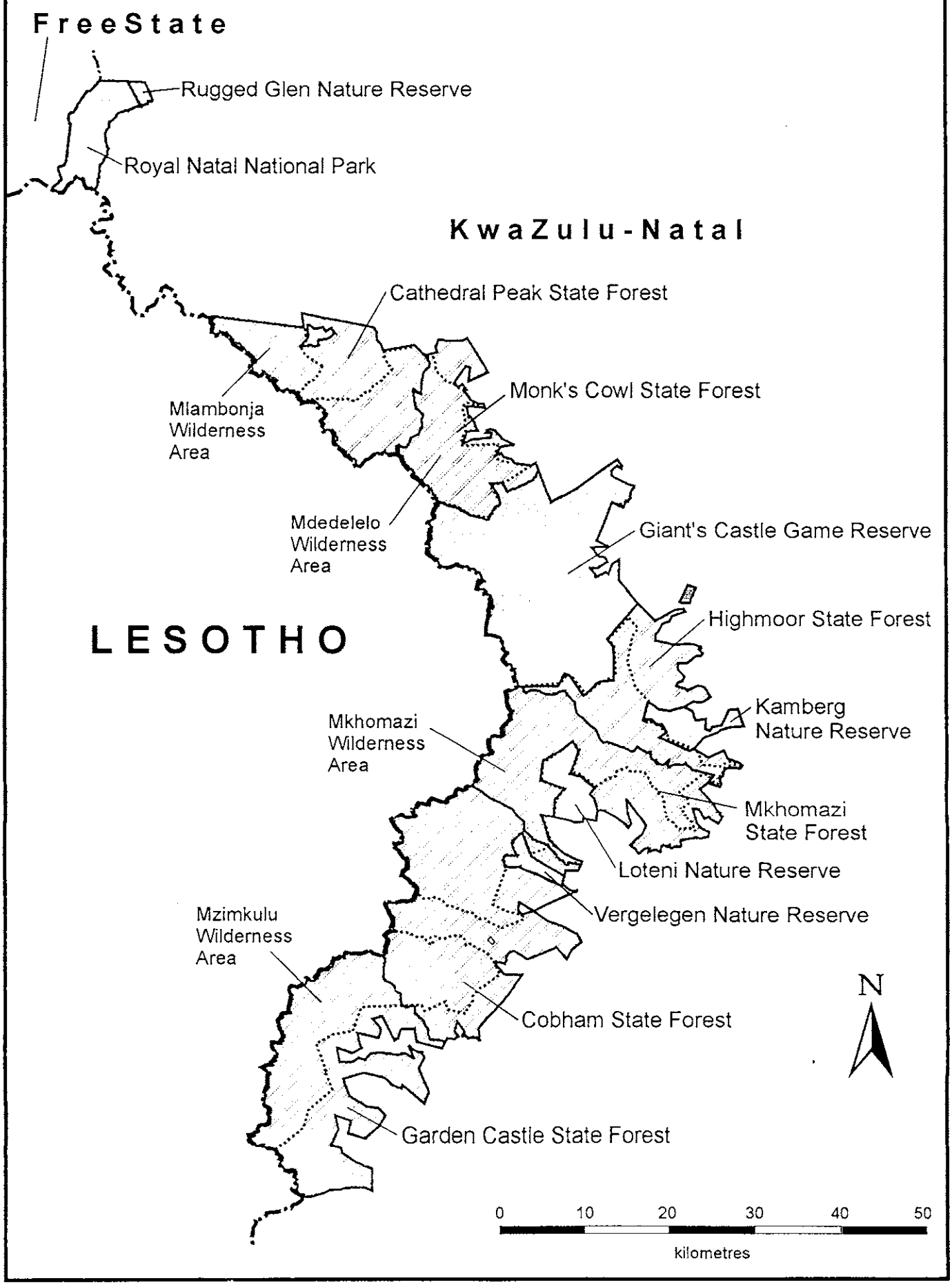
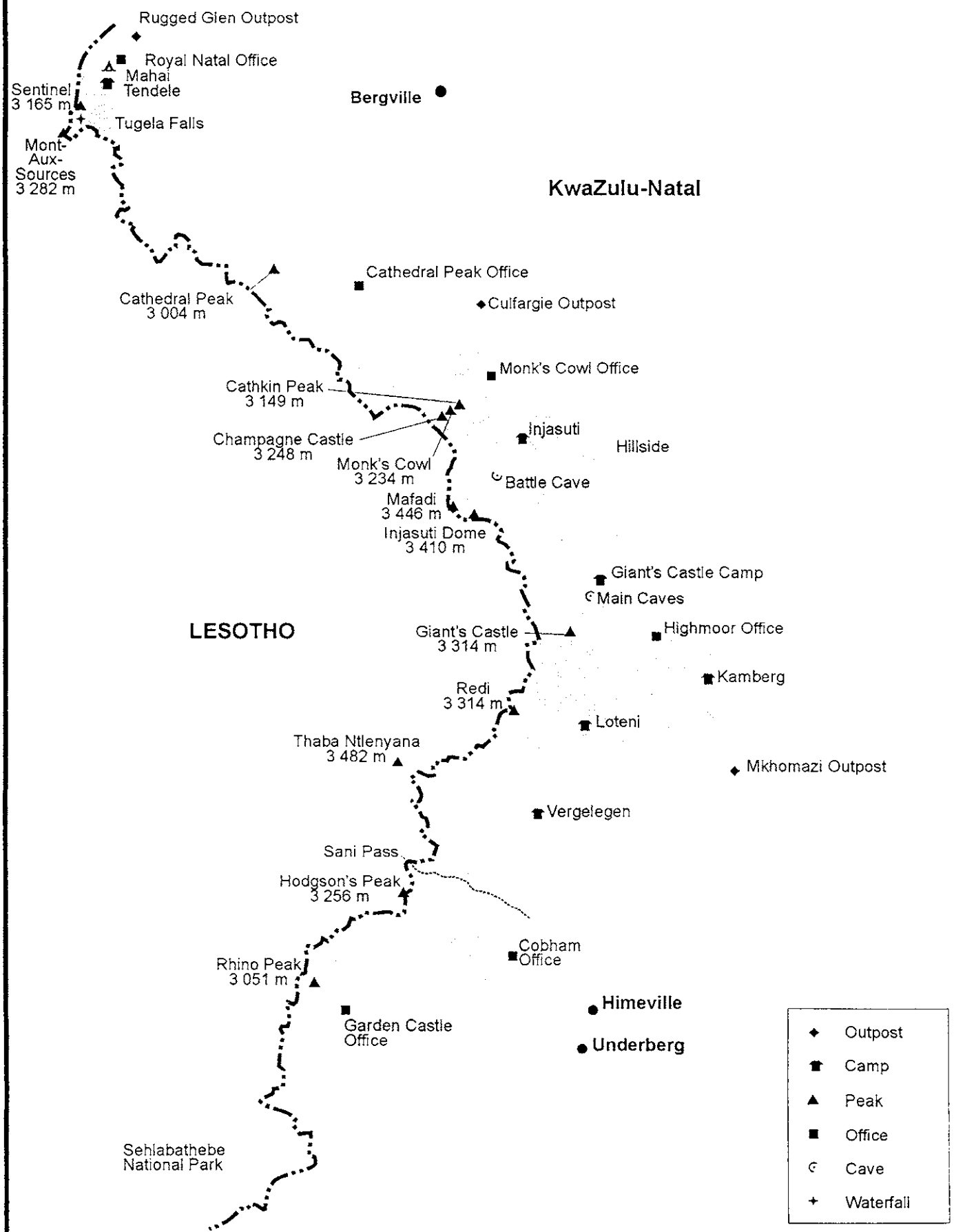


Figure 4.
Location of place names referred to in the text of this nomination proposal



1. IDENTIFICATION OF THE PROPERTY

1.1 Country : Republic of South Africa

1.2 Province : KwaZulu-Natal

1.3 Name of property: Drakensberg Park alternatively known as oKhahlamba Park

1.4 Location

The Drakensberg Park alternatively known as oKhahlamba Park (hereafter referred to as the "Park") is an inland mountain range in south-eastern Africa. The location of the Park within South Africa is given in Figure 1. The extreme western edge of the Park lies at 29° 45' E and extends to 28° 52' E, the northern border of the northern component area is located at 28° 38' S and extends to 28° 46' S, and the southern component area lies between 28° 55' S and 29° 55' S.

The Drakensberg Park is the nominated site and comprises a northern and much larger southern sections. The mountainous area situated between these two sections, known as the Mnweni area, is tribal land. The need to establish a conservation area in the Mweni region that would join the two sections of the Park has been recognised. This matter has been part of two planning programmes presently being undertaken (see sections 4.6.2 and 4.6.3). The programmes have also identified additional land that could become a possible future conservation area on privately owned land. If this land is acquired it would extend the Park further southward along the mountain escarpment.

1.5 Maps of the area proposed for inscription

Included with this submission (Appendix 1) is a set of 14 maps at a scale of 1:50 000 on which the boundaries of the nomination site, the Park and its core and buffer areas, have been demarcated. The Park is also indicated on a colour satellite photograph (Figure 2). The various protected areas that collectively constitute the nomination site are shown in Figure 3, principal features in Appendix 2, and place names referred to in this proposal in Figure 4.

1.6 Area of property and zonation

Table 1 lists the year of declaration and the extent of each component protected area that collectively comprise the Park. The total extent of the Park is 242 813 ha. The core and buffer areas have been demarcated on the set of 1:50 000 maps (Appendix 1), and the zonation for ecotourism use is shown in Figure 5.

Table 1. Component protected areas of the Drakensberg Park.

Area Name	Year of Proclamation	Area (ha)
Cathederal Peak State Forest	1927	32 246
Cobham State Forest	1927	30 498
Garden Castle State Forest	1951	30 766
Giant's Castle Game Reserve	1903	34 638
Highmoor State Forest	1951	28 151
Kamberg Nature Reserve	1951	2 980
Loteni Nature Reserve	1953	3 984
Mkomazi State Forest	1951	49 156
Monk's Cowl State Forest	1927	20 379
Royal Natal National Park	1916	8 094
Rugged Glen Nature Reserve	1950	762
Vergelegen Nature Reserve	1967	1 159

Large parts of the State Forest areas were subsequently proclaimed Wilderness Areas in terms of the Forest Act (Table 2)

Table 2. Proclaimed Wilderness Areas falling within the Drakensberg Park.

Wilderness Area	Proclamation	Area (ha)
Mdedelo	G.N. 791 of 1973	27 000
Mkhomazi	G.N. 791 of 1973 G.N. 962 of 1989	56 155
Mzimkulu	G.N. 1563 of 1979	28 340
Mlambonja	G.N. 961 of 1989	6 270

In terms of the national system of classification of protected areas (which follows that of the IUCN) the Park presently comprises both the Wilderness Areas - Category I 48,5% (117 765 ha) and 51,5% (125 048 ha) national park and equivalent reserve - Category II. Other candidate wilderness areas on the Park are presently being evaluated and will be proclaimed.

2. JUSTIFICATION FOR INSCRIPTION

The justification for including the Drakensberg Park in the World Heritage List is presented as a "mixed" property that is, as a Natural Property, a Cultural Property and as a Cultural Landscape Property.

2.1 Statement of significance

The Park is the largest protected area established on the Great Escarpment of the southern African subcontinent. This escarpment formation, which includes the Drakensberg Escarpment component, is intimately linked to the geomorphic history of the subcontinent and the fragmentation of the Gondwana supercontinent. Landscapes are outstanding and the geomorphological processes by which they were formed are believed to be of universal importance, that is, the horizontal sequence of geological formations which form the exposed east face of the Drakensberg Escarpment record a ~130 Ma history in the evolution of the African continent before and after the breakup. The Great Escarpment reaches its greatest and most spectacular expression in the form of the Drakensberg Mountains that lie within the Park. Also of outstanding universal importance are the mountain and wetland ecosystems with their full complement of plants and animals with many endemic and internationally recognised threatened species, and including the high altitude and unique Southern African alpine-tundra vegetation and its associated endemic palaeo-invertebrates.

In addition to these natural property values, and located within its original natural setting and ecosystems is one of the world's greatest rock art treasures that is of outstanding cultural value. The art represents uniquely a coherent tradition that embodies the beliefs and cosmology of people whose cultural tradition is now extinct in the region. The uniqueness of the art is evidenced by the diverse subject matter, the minute detail portrayed, the art techniques, and the animation and variety of positions depicted, as well as the remarkable state of preservation.

2.2 Comparative Analysis

The Drakensberg Park contains the most outstanding expression of the escarpment mountain formation within the southern African Great Escarpment. As such it differs from other mountain systems in southern Africa, that is, the Cape Fold Mountains as well as those elsewhere in Africa such as Mount Nimba on the Guinea - Ivory Coast border or the Rwenzori Mountains on the border between Uganda and Zaire in terms of the processes by which it was formed and its composition of geological sequences. Similarly the Drakensberg differs in these respects from other mountain ranges such as the Andies, Rockies, and Himalayas. The Drakensberg can be compared to the Simen Massif in Ethiopia in that both comprise igneous basalts that have been eroded to form precipitous cliffs and deep valley systems. However there are significant differences between them in terms of their geology, geomorphology as well as their diversity of plants and animal species. The Drakensberg lies within the sub-saharan African grassland biome and at subtropical latitudes. The natural systems within the Park are considered to be unique in terms of their biological diversity given its location within one of the major hot-spot areas of plant diversity and endemism in southern Africa. Of universal importance is the inclusion of the unique high altitude alpine tundra vegetation with its associated endemic palaeo-invertebrate fauna.

There are several important areas in southern Africa that contain significant concentrations and assemblages of San rock art sites such as those that are to be found in the Cederberg in the South-western Cape province and the Matopo Hills in Zimbabwe. However, no other area of comparable size to that of the Park in Africa contains such a density and possibly diversity of San rock art sites and images. In addition, the rock art of the Drakensberg region is regarded as being the best preserved when compared to any other region especially south of the Sahara.

2.3 Integrity

The Park contains its full original complement of wild plants and animals, much of which has been lost from other adjoining areas within the south-eastern escarpment mountain region of southern Africa. This natural area with its geological diversity and altitudinal range, its grasslands, wetlands and fynbos plant communities with high numbers of endemic species, is substantially unmodified by people and their effects. Having a total area of 242 813 ha, the Park is large enough to survive as a natural area, and to maintain genetic diversity even though there are outside influences. Management of the Park, particularly over the last fifty years, demonstrates that the natural environmental quality of the area has been maintained and improved.

2.4 Criteria under which inscription is proposed including justification

It is contended that the Park satisfies the criteria for both Natural Property (all four criteria) and Cultural Property [criteria (i), (iii) and (vi)] required for listing as a World Heritage Site, and is therefore better described as a Cultural Landscape Property.

2.4.1 Justification for the Drakensberg Park to be a Natural Property

CRITERIA FOR THE INCLUSION OF NATURAL PROPERTIES IN THE WORLD HERITAGE LIST

In accordance with Article 2 of the Convention, the following is considered as "natural heritage"

"natural features consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view;

geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation;

natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty."

A natural heritage property - as defined above - which is submitted for inclusion in the World Heritage List will be considered to be of outstanding universal; value for the purposes of the Convention when the Committee finds that it meets one or more of the following criteria and fulfills the conditions of integrity set out below. Sites nominated should therefore:

(i) be outstanding examples **representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of land forms,** or significant geomorphic or physiographic features; or

(ii) be outstanding examples representing **significant on-going ecological and biological processes in the evolution and development of** terrestrial, fresh water, coastal and marine **ecosystems and communities of plants and animals**; or

(iii) contain superlative natural phenomena or **areas of exceptional natural beauty and aesthetic importance**; or

(iv) contain the most **important and significant natural habitats for in-situ conservation of biological diversity**, including those containing **threatened species of outstanding universal value** from the point of view of science or conservation;

2.4.1.1 Natural Property - Criterion 1

The most voluminous outpourings of lava on the land surface of the Earth have built imposing stacks of superimposed basalt flows, often exceeding a kilometre in thickness. These are found in the Keweenawan district of north-central USA (Proterozoic), the central sector of the Siberian platform (early Mesozoic), the Drakensberg of southern Africa (Jurassic), the Parana plateau of southern Brazil-Uruguay and the Deccan plateau of western India (both Cretaceous), the plateaux of the Columbia river western USA and Ethiopia-Yemen (both mid-Tertiary). These basalt piles were fed from linear zones of fracturing and fissuring in the earth's crust through which the magma emerged in successive pulses and flooded out over the surrounding region, covering a few hundred kilometres. In most instances these flood basalt eruptions have been intimately associated with initiation and early development of rifted continental margins (Mohr, 1983).

The formation of the Great Escarpment of southern Africa is intimately linked to the fragmentation of Gondwana at the end of the Jurassic period and the earth-forming process that shaped the subcontinent pre- and post-rifting. The Park landscape encompasses examples of these major stages in the Earth's evolutionary history. The Karoo sequence of underlying sedimentary tabular strata overlain by deep basalt lava flows was deposited after 278 Ma in response to tectonism in the Cape Fold Belt. This sequence of lithologies traces the palaeoenvironmental changes which took place as Gondwana moved northwards from "polar" regions (Carboniferous period) to a warmer and dryer mid-latitude position (late Jurassic), that is, over a period from about 300 Ma to 140 Ma. The most outstanding and spectacular section of the Great Escarpment in southern Africa is the part of the Drakensberg Mountain range that lies within the Drakensberg Park. The Drakensberg is the only place where one can view these concordant Karoo sequences *in situ* from the oldest Beaufort Group sandstones of the Triassic (about 258 Ma) to the basalts of the late Jurassic (after 190 to 140 Ma).

The unique geomorphic history of the Drakensberg Escarpment begins prior to the rifting of Gondwana. The component landmass which was destined to form the southern African subcontinent is believed to have been of a relatively high elevation, with an overall westward trend in the drainage of the land surface. Preceding rifting and the separation of Africa from Antarctica and the Falkland Plateau, down-warping of the incipient east coast margin, together with adjacent interior updoming, occurred. It was these events that initially formed the Great Escarpment which separated an elevated interior from the coastal margin. Following continental separation, a generally eastward-facing erosional face was established, and was to recede away from the coast as an effective drainage system grew. This landscape erosion cycle (African Cycle) was of a long duration (100 Ma) and by the time of the mid-Cretaceous, the Drakensberg Escarpment had receded some 100 km inland. At the end of this cycle elevations in the interior were of the order of 500-700 m above sea level, as enormous thicknesses of material had been removed. However, some areas such as the Lesotho highlands with its thick basalt layer had not succumbed to planation and stood above the African erosion surface. During the Miocene, vertical uplift of between 200 to 300 m along the Ciskei - Swaziland axis, ended the African erosion cycle and also resulted in the westward tilting of the African surface. This initiated the short first post-African erosion cycle when back-wearing of the Great Escarpment was limited by comparison with its recession during former Cretaceous times. A second uplift, virtually along the same axis as previously, but of much greater amplitude (600 to 900 m), took place in the Pliocene. This uplift event greatly accentuated the westward tilt, and the asymmetry in the landscape rejuvenated erosion processes that resulted in the progressive and major headward incision to form the Drakensberg Escarpment mountain as it is seen today.

2.4.1.2 Natural Property - Criterion 2

The Park is an outstanding example of one of the few high, mountain, grassland areas within the African Grassland Biome sufficiently large enough for the existing and original ecological and biological processes to operate without interference. The environmental heterogeneity and variability characteristic of the Great Escarpment region in which the Park is situated is expressed by the climate, where temperature extremes and high rainfall occurs, by the geology and associated shallow soils of different origin, the altitudinal range, and by the diversity of terrestrial and wetland physiographic features. Associated with this environmental heterogeneity and variability is a corresponding diversity in natural biota. All the species of plants and animals that historically are known to have been present within the

area of the Park, still occur. The high species richness, especially that of plants, is outstanding. This is due to several factors including the Park's subcontinental position at the interface between Cape and subtropical biota, the complexity of this transition, past speciation events within the Drakensberg Centre of Endemism (Vavilov Centre), the impact of major geomorphological processes of erosion and uplift events of the past, many successful dispersal and establishment events, and the wide diversity of habitats including the only truly alpine tundra habitat in southern Africa.

It is considered that all the processes that have led to and influenced the evolution of the wide diversity of alpine tundra, montane, terrestrial, and wetland ecosystems, together with their component plants and animals, have not been significantly disrupted by external agents, and are therefore still functioning in the Park. The ecological processes within these ecosystems that control the population dynamics of the plants and animals, and are usually present at both micro and macro scales, typically include such major processes as primary production, input and cycling of nutrients, decomposition, inter-and intra-specific competition, disease, parasitism, herbivory, predation and migration. In addition, these systems are characterized by their biotic responses to natural disturbance processes that occur usually at a local level, at different frequencies and intensities. Such disturbance processes include land slides, rock falls, flooding, freezing, area-selective grazing and browsing, and the burning of vegetation.

2.4.1.3 Natural Property - Criterion 3

The park contains landscapes and features of exceptional natural beauty. In a Park that is so geomorphologically and biotically diverse, wild, distinctive and spectacular, it is not possible to list all the features of high aesthetic importance and thus only the superlative examples are given. The slides accompanying this submission illustrate the superlative scenic vistas of significant natural beauty that include :

* The mountain barrier with its jagged high peaks, ridges and intervening spurs silhouetted against the skyline and stretching as far as the eye can see to the north and to the south,

* The high escarpment walls of dark basalt lying above the light coloured Clarens Sandstone,

* The pristine steep-sided river valleys and rocky gorges containing forest patches, grasslands, thickets, waterfalls, cascades and clear rock pools,

* The rolling high altitude grasslands with their contrasting winter or summer colours, displays of spring wild flowers, or snow-fields after winter storms,

* The views from the top of the escarpment mountains across the vast distances of the lower lying grassland topography of the province of KwaZulu-Natal.

2.4.1.4 Natural Property - Criterion 4

The diversity of habitats contained within the Park is outstanding. The range in habitat diversity is from the high altitude mountain peaks and summit plateaux with their diverse vegetation communities including the unique alpine tundra (Fynbos types), such as, *Erica - Helichrysum* Heath, to the steep slopes in mid-altitude areas supporting a wide variety of grassland, fynbos scrubland and woodland vegetation communities, to the lower lying areas in river valleys which contain various grassland and forest vegetation community types (see Appendix 3 for a more detailed description).

Found within these habitats is a remarkable richness of plant and animal species. Species known to be present in the Park are listed in Schedules 1 to 23 and the total number of species in the various taxonomic groups is given in Table 6. Knowledge of many taxonomic groups occurring in the Park is poor, particularly lower plant and invertebrate groups. However, those taxonomic groups that have been researched clearly indicate the universal nature of the species richness contained in this area. It is considered that the biotic communities in the Park contain all or most of their original component species.

TABLE 3. Known species richness in selected taxonomic groups.

Taxonomic Group	Number of Species	Schedule Number
Plants	2 153	1
Mosses	85	1
Ferns	70	1
Gymnosperms	5	1
Angiosperms	1 993	1
Invertebrates		
Earthworms	3	4
Millipedes	33	5
Centipedes	14	6
Onychophora	2	7
Crustaceans	7	8
Dragon &damselflies	44	9
Butterflies	74	10
Cetoniidae	24	11
Lacewings	10	12
Net-winged midges	4	13
Craneflies	61	14
Danceflies	30	15
Hangingflies	6	16
Robberflies	33	17
Vertebrates		
Fish	8	18
Amphibians	26	19
Reptiles	48	20
Birds	299	21
Mammals	48	23

Within the diversity of habitats contained in the Park are those supporting populations of rare and endangered species. The overall number of species for the various groups of international and national importance are given in Table 3 and the various plant species listed in Schedule 3.

Table 4. Number of species of international and national conservation importance.

Taxonomic Group	List of Threatened Species		Species listed by
	International	National	
Plants	109	109	121
Butterflies	-	?	
Fish	-	1?	
Amphibians	-	?	
Reptiles	-	1?	?
Birds	10	18	46
Mammals	-	11	7
TOTAL	119	141	174

Viable populations of all the listed threatened national and internationally important species breed successfully in the Park. In addition population sizes of all other species resident in the Park are believed to be sufficiently large and heterogeneous to ensure their genetic integrity. Re-establishment programmes have guarded against genetic contamination.

The Park is located within the Drakensberg Alpine Region, a centre of plant diversity and endemism. The number of endemic species for different taxonomic groups is given in Table 4. Endemic plant species are a particularly important feature of both the region (394 species) and the Park (247 species).

Table 5. Number of endemic species for selected taxonomic groups.

Taxonomic Group	Endemicity		Notes
	South/Southern Africa	Park	
Plants	247	+98	
Invertebrates			
Earthworms	1	1	To date found only in the Park
Millipedes	21	21	
Centipedes	1	1	
Copepoda			
Dragonflies	6	1	
Butterflies	4	-	
Planthoppers	4	4	To date only found in the Park
Lacewings	4	4	as above
Craneflies	32	32	as above
Hanging flies	1	1	as above
Wormlion flies	1	1	as above
Dance flies	30	21	as above
Net-winged midges	2	1	as above
Dark-winged fungus fly	1	1	as above
Tachinid fly	2	2	as above
Solitary midge	1	-	
Aulacigastrid fly	2	-	
Campichoetid fly	1	-	
Vertebrates			
Fish	1?	-	presence in Park requires confirmation
Amphibian	???	-	
Reptile	1	1	To date only found in the Park
Bird	31	-	
Mammal	11	-	

For the various component areas of the Park, management plans have either been adopted or are in an advanced stage of either revision or preparation. Submitted with this nomination proposal are examples of two management plans for the Park and its cultural resources (Appendices 5 and 6). Management programmes undertaken by the former Natal Parks Board and presently the KwaZulu-Natal Nature Conservation Service staff over the years have ensured the protection of the area through law

enforcement, controlling access by people and the use of sustainable resources. In addition control of alien species, fire management programmes and re-establishment programmes are implemented according to biologically-based rules.

As a contracting party to the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention), South Africa has honoured this commitment in having 16 sites, including the Drakensberg Park, inscribed on the list of Wetlands of International Importance. This Convention is in the process of incorporation into South African law in terms of the provisions of a Wetlands Bill. This new legislation ensures a greater commitment to, and more stringent protection of, these important sites. In addition South Africa has also ratified two other important conventions that add to the measures to safeguard the Park, these are the Convention on Biological Diversity and the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

2.4.2 Justification for the Drakensberg Park to be a Cultural Property

CRITERIA FOR THE INCLUSION OF CULTURAL PROPERTIES IN THE WORLD HERITAGE LIST

A monument, group of buildings or site which is nominated for inclusion in the World Heritage List will be considered to be of outstanding universal value for the purpose of the Convention when the Committee finds that it meets one or more of the following criteria and the test of authenticity. Each property nominated should therefore:

(i) **represent a masterpiece of human creative genius**; or

(ii) exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design; or

(iii) **bear a unique or at least exceptional testimony to a cultural tradition** or to a civilization which is living or **which has disappeared**; or

(iv) be an outstanding example of a type of building or architectural or technological ensemble or landscape which illustrates (a) significant stages(s) in human history; or

(v) be an outstanding example of a traditional human settlement or land-use which is representative of a culture (or cultures), especially when it has become vulnerable under the impact of irreversible change; or

(vi) **be directly** or tangibly **associated with events or** living traditions, **with ideas, or with beliefs, with artistic** and literary **works of outstanding universal significance** (the Committee considers that this criterion should justify inclusion in the List only in exceptional circumstances and in conjunction with other criteria , cultural or natural).

2.4.2.1 Uniqueness of the Drakensberg as an art region

The Drakensberg region presents a unique combination of five features of outstanding cultural significance, these are:

(i) The area is the most densely painted, significantly large area on the African continent; hardly any inhabitable shelters lack paintings. The number of sites is estimated at 600 and the number of individual images in those sites probably exceeds 35 000. The Natal Museum has an extensive record of the Drakensberg paintings in the form of written descriptions, photographs, tracings and redrawings (Ward *pers comm.*). However new discoveries are being made every year and therefore this record is being continually supplemented.

(ii) This density of paintings is, in part, a function of the remarkably wide spectrum of types of sites that were available to the San artists.

(iii) The ecological integrity of the area has been preserved intact since the time when the last artists were living there near the end of the nineteenth century. The climate, vegetation and fauna have not changed and, in most areas, an absence of roads and the mountainous terrain have prevented any significant human impact. Uniquely, it is possible to turn from rock paintings of eland, rhebok and other animals, to look out over pristine valleys and to see those very species feeding, resting or moving about.

(iv) The rock art of the whole region represents a unique coherent artistic tradition. In other parts of the world, rock art in a given geographical area comprises a number of periods or styles, though the allocation of individual images to these styles is often highly problematic. Although some development through time has been detected in the Drakensberg art, it is for the most part, the product of a single tradition and therefore embodies the beliefs and cosmology of a single people, that is, the San of that part of Southern Africa, and their contacts with other peoples. There are however, also paintings done during the nineteenth and twentieth centuries attributable to Bantu speaking people.

(v) The Drakensberg region is unique in that the rock art is far better preserved than in any other region, certainly south of the Sahara. This degree of preservation is remarkable because, unlike the Sahara, Namibia, and some other areas in Africa, the conditions are wetter and therefore it may be expected that these would not have favoured preservation of the rock paintings. However, the paintings were executed, for the most part, on absorbent sandstone of the Clarens Formation. The paint soaked into the rock face, so that a certain amount of weathering can take place before the images are lost. Red is the best preserved colour; white paint, which did not soak into the rock as readily as red paint, nevertheless appears to be as brilliant as the day it was applied. Its excellent preservation has permitted the art to retain highly significant details that are sometimes no larger than a pin-head.

The uniqueness of the Drakensberg as a rock art region thus consists in an exceptional combination of:

* the quantity of sites and paintings,
* the diversity of sites and painting locations,
* the undisturbed harmony between the art and the environment,
* the preservation of the art's cultural context and that the images come from a single artistic tradition,
* the remarkable state of preservation of the art.

2.4.2.2 Uniqueness of the Drakensberg rock art images

The Drakensberg rock art constitutes a unique, well-researched aesthetic and intellectual achievement. The uniqueness of the rock art images may be summarized as follows:

(i) The diverse subject matter.

A wide variety of hunting, dancing, fighting, food gathering and ritual/trance-like scenes were painted which have a large diversity of studies of animal and human figures, and inanimate objects. A more detailed account is given in section 3. of the Description.

(ii) The minute detail portrayed.

The uniqueness of many of the rock art images is primarily in their often minute detail. In comparison with rock art in other parts of the world, the Drakensberg images are small, for example, the average length of depictions of eland antelope is approximately 35cm and some human figures measure no more than 15 to 20 mm in length. Also, unlike any other rock art anywhere in the world, the images are often extraordinarily detailed. Many depictions of eland have eyes and mouth clearly shown, the ears laid back or pricked, hairs no more than 1.5 mm long individually drawn along the back of the neck, and exquisitely neat black cloven hoofs. Depictions of human figures often have five fingers individually drawn, or show them wearing dancing rattles, the segments of which are only a couple of millimetres long. Human figures are sometimes shown with facial features and toes.

The items of material culture that accompany the human figures are similarly detailed. Bows are often shown with the stave in red and the string represented by a less than 1 mm wide white line. Arrows are frequently painted in red and white sections to represent the parts of the composite arrows that the San used. Bags are depicted with sets of leather tassels hanging from them and appear similar to bags made by the San people who live in the Kalahari desert regions of south-western Africa.

(iii) The shaded polychrome technique.

Principally eland and rhebuck but also human and other animal figures, have been executed using this technique. These depictions have two colours usually red and white delicately grading into each other, for example, the red upper body and the white under-belly of an eland. These paintings are regarded as masterpieces of the San rock artists' craft and are therefore considered to be artistically and culturally advanced in terms of a hunter-gatherer culture.

(iv) The animation and variety of positions of the subjects.

In addition to the unique realism, detail and shading of the painted images, there is also a wide variety of positions depicted including animation of the subjects. Animals are depicted not only walking and running, but also lying down, leaping, looking back over the shoulder and, most remarkably, as viewed from the front or from the rear. These foreshortened depictions, often executed in great detail using the shaded polychrome technique, constitute what are probably the most remarkable rock art images in the world.

Similarly, human figures are portrayed not merely standing or walking, as many are in sitting, lying, or running positions with legs widely outstretched in a graphic representation of speed, while others are in dancing and distinctive ritual postures. The postures of the people depicted often carry meaning and identify the paintings as illustrations of supernatural beliefs and rituals (Deacon *pers comm.).* Composed in dancing and other groups, these artistically portrayed human figures present an unparalleled liveliness and realism that alone sets this art apart from all other rock art.

2.4.2.3 The events, traditions, ideas and beliefs of the San people as depicted in the Drakensberg rock art.

(i) The people associated with the Drakensberg rock art

All the people of Southern Africa are, in a number of different ways, associated with the Drakensberg rock art. Consequently, the images present a unifying, unfolding history of the subcontinent.

The San people themselves are everywhere depicted in the rock art. They are recognised as the autochthonous inhabitants of the subcontinent. Today they survive in large communities in and around the Kalahari desert but there are San descendants scattered throughout Southern Africa. Formerly they inhabited the entire subcontinent and have come to be seen as embodying the essence of southern Africa's deep past. Yet there is no monument to them - other than their own art.

Their art chronicles not only the San way of life and beliefs, but also their contact in comparatively recent times with other peoples. More than a thousand years ago the Drakensberg San learned about the Bantu-speaking agriculturalists who were gradually occupying areas closer to the coast. They interacted with these people in diverse and complex ways. Many San beliefs were shared by the farmers, and they looked to the San for guidance in spiritual matters. Some San shamans made rain for the agriculturalists and, in the nineteenth century, some San shamans and their families went to live with the chiefs of these Bantu-speaking people and became resident rain-makers. Contact with the farmers is reflected in the Drakensberg art in a number of ways. Most notably, the farmers and their cattle are depicted in the southern part of the Drakensberg region.

Later, starting in the eighteenth century, the Drakensberg San began to make contact with white colonists who destroyed the hunters' game and mounted raids that were designed to exterminate these people. The San used their traditional shamanic powers in their attempts to defend themselves. Paintings depicting colonists together with their rifles and horses derived from these attempts at shamanic protection. In the end, the rifles proved invincible. Many San died, others intermarried with the Bantu-speaking agriculturalists and with the colonists. Today there are no recognisable, self-proclaimed San communities in the Drakensberg.

(ii) Beliefs and meanings associated with the San rock art

Although today no Drakensberg San survive to explain the meaning of their art, it has become the best understood rock art in the world about which no informants can be interviewed. Insights obtained into the meanings of the Drakensberg images have illuminated not only rock art in other parts of the southern Africa but also elsewhere in the world.

By remarkable sets of circumstances many of the Drakensberg San's key beliefs were recorded in the 1870s. At the same period, comprehensive records were also made of the beliefs, rituals, myths and cosmology of San living in the Kalahari region of southern Africa. Comparison of these independently recorded sets of beliefs shows that the fundamental structures and elements of nineteenth-century San beliefs extended across the subcontinent. Further comparison between these earlier findings and beliefs with those recorded in the twentieth century from San people living in the Kalahari desert shows that certain beliefs and rituals were not only more widespread in southern Africa but were also probably of great antiquity.

At the centre of San belief are concepts of a spirit world that can be reached by people who possessed a multi-faceted supernatural power. These people, the shamans of San society, entered trance at a communal trance dance or in more solitary circumstances. In trance, they cured the sick, made rain, guided antelope towards hunters crouching in an ambush, and visited the spirit world where they could see God and all his animals, especially the most frequently painted creature, the eland. Nearly every shelter with rock art has at least one eland painting and some have over a hundred, many are painted one on top of the other. Each painted eland is more than just a depiction of the animal. An eland painting is

a symbol of, among other things, the power that shamans harnessed to enter the spirit-world. The power resides especially in its fat and a male eland has more fat than the female which is seen particularly in the male's large dewlap, which in old bull animals hangs down between its front legs, whereas a female eland has a much smaller and higher dewlap. These distinctions are made in the eland paintings. Eland fat is greatly valued as a food and as a ritual substance. It is used by the Kalahari San in girls' puberty rituals, when a boy has shot his first eland, and in marriage rituals. The fat sums up all that the San hold to be true, good and valuable in life, and by painting eland superimposed on one another, the artists were increasing their store of power.

The beliefs and rituals practiced by the San were developed as a means for their use and management of natural resources. This was done through rain-making, ritual practices associated with hunting, planned seasonal movements to make the nest of wild plant foods, social organisation that controlled the impact of people on the landscape and more deliberate actions such as a regular fire regime. The rock art illustrates some of these practices, but by no means all of them (Deacon *pers comm.).*

Although there is still some debate about the proportion of the Drakensberg rock art that was associated with the beliefs, power, rituals and supernatural activities of San shamans, much of it was unquestionably religious in character. Ritual and dancing postures frequently and startlingly portray those described in the nineteen-century San ethnography and those still observable in parts of the Kalahari desert. In addition, the art presents the hallucinatory experiences of San shamans, such as rain in the form of a fantasy animal or snakes, or shamans partially transformed into animals, or the somatic experiences of trance, especially attenuation.

Moreover, the placing of these essentially religious figures gives unique insights into the place of the Drakensberg itself in San cosmology. Sometimes images are shown entering or leaving the rock face through steps, cracks or other inequalities in the surface. These features combine with ethnographically recorded beliefs to show that the spirit world, the source of the shamans' power and the goal of their spiritual quests, lay behind the walls of the rock shelters. In other words, the spiritual entities and essences that gave form and power to San belief and cosmology existed deep within the Drakensberg mountain range. The art thus speaks eloquently and graphically of the San's own beliefs about and attitudes towards the towering escarpment and the rock shelters that afforded the shamans access to the spirit world that was contained within the mountains. For the San, the Drakensberg was not only a storehouse of art but also of supernatural, spiritual power. That storehouse has been preserved virtually intact to the present day. We therefore have, in the Drakensberg rock art, a uniquely well understood expression of early hunter-gatherer life and belief.

2.4.2.4 The value and importance of the Drakensberg rock art.

The rock art contained in the Drakensberg Park represents a masterpiece of human creative genius and constitutes a unique, well researched aesthetic and intellectual achievement. It is a record of an important extinct hunter-gatherer culture which demonstrates connections (spiritual beliefs) with the modern day San surviving in the Kalahari. The rock art is supported by ethnographic information that shows a continuity of an artistic tradition over several thousand years. The paintings which are located in their natural setting are of spiritual significance and show a fundamental and deep connection between the San people and nature (biodiversity). There is outstanding diversity in the art in a wide spectrum of respects such as the subject matter, its portrayal and the marvellous detail depicted. Clearly therefore the rock art of the Drakensberg is recognised as being of considerable cultural, research and scientific value. It is an exceptional testimony to a cultural tradition which has disappeared from this region of southern Africa and therefore is considered to be of outstanding universal value.

The art and its setting constitutes a unique monument to which all Southern African people can, in various ways and from diverse viewpoints, relate and in which all can find symbols not only of the past but also of the future. The rock art that the vanished people created was thus not exclusively associated with their own lives. Rather, it unites all of the subcontinent's people and becomes emblematic of the region's history and of South Africa's often turbulent and tragic past.

2.4.3 Justification for the Drakensberg Park to be an Associative Cultural Landscape Property [category (iii)]

CULTURAL LANDSCAPES

Cultural landscapes represent the **"combined works of nature and of man"** designated in Article 1 of the Convention. They are **illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment** and of successive social, economic and cultural forces, both external and internal. They should be selected on the bases both of their outstanding universal value and of their **representivity in terms of a clearly defined geo-cultural region** and also for their capacity to **illustrate the essential and distinct elements** of such regions.

The term "cultural landscapes" embraces a diversity of manifestations of the interaction between humankind and its natural environment.

Cultural landscapes often reflect specific techniques of sustainable land-use, considering the characteristics and limits of the natural environment in which they are established, and a **specific spiritual relation to nature.** Protection of cultural landscapes can contribute to modern techniques of sustainable land-use and can maintain or enhance natural values in the landscape. The continued existence of traditional forms of land-use supports biological diversity in many regions of the world. The protection of traditional cultural landscapes is therefore helpful in maintaining biological diversity.

In addition to the natural and cultural criteria, there is some justification for considering the Park as a cultural landscape as well. Some of the characteristics of this cultural landscape are not unique to the Park. People have been living intermittently in parts of the region for hundreds of thousands of years. Their presence must have subtly altered the landscape and its resources because they hunted game animals and collected medicinal and food plants and practised veld burning to stimulate grazing, but the San are unlikely to have made any more impact on the plants and animals in the Park than hunter-gatherers did elsewhere. The effects of intangible cultural practices, however, are site-specific.

African people cultural landscapes seldom include great walls, monumental buildings or intricate irrigation systems. Instead, the landscape is imbued with religious and ritual meaning that grows in significance the longer people live there. In many cases this significance has been lost because it has no tangible markers, but in the Drakensberg there are a few indicators that these mountains represent a cultural landscape with special qualities.

(i) It was largely within the remarkable Drakensberg landscape with its great altitudinal range, its many valleys, cliffs and numerous streams and rivers, that the San hunter-gatherers found their home for some 8 000 years. This geological landscape contains an extraordinary high density of caves and rock overhangs that provided shelter for these people from both wild predators such as leopard, as well as from inclement weather particularly during periods of cold and rain. The Drakensberg was a remote mountainous region that was a refuge for the San and that, to a large extent, separated them from the midland and coastal areas that became inhabited by Bantu speaking iron age agriculturalists. The Park and including some adjacent areas, has a high density of San rock art sites with approximately 600 recorded rock art sites containing 35 000 images in the area. The rock art sites are found in these caves, overhangs and shelters formed by the process of erosion, and which are distributed over most of the mountainous Drakensberg landscape that includes its foothills and steep-sided river valleys. Archeological cave deposits associated with these sites, some of which have been excavated, bear testimony to past

occupation by the San people.

(ii) The resources for their survival were found within these mountains. Sustenance was obtained by gathering edible plants and hunting the wild animals that also lived in the area. Also, both plant products (straw, bark, pods, etc) and animal products (bone, horn, skins, fat) were used by these people for many different purposes. The use of these natural resources during their long period of occupation is a remarkable demonstration of sustainable consumptive use which only came to an end when competition by immigrant peoples exploited and almost drove to extinction the populations of wild animals during the mid to late nineteenth century.

(iii) The rock art of the Drakensberg is distinctive and was deliberately placed in a particular niche in the natural landscape. This niche is broadly characterised by the rock shelters in valleys and cliffs formed by sandstones of the Clarens Formation. This focus is not found elsewhere in KwaZulu-Natal, although it is repeated on the western side of the Drakensberg range and in Lesotho. Placement is equally important at a micro-level. Artists incorporated cracks, bulges and other natural features in the rock in their paintings, a practice that led Lewis-Williams to suggest that the shaman artists perceived the rock face as a veil between the real and the supernatural world. The images were painted on the rock because the shaman had 'seen' them coming out of the rock during trance visions. A good example of a snake emerging from a step in the rock can be seen at Main Caves, one of the sites open to the public in the Park. The source of the shamans' power and the goal of their spiritual quest therefore lay deep within this mountain range and was shaped by it (Deacon *pers comm.).*

(iv) Apart from their placement, the subject matter of the paintings shows a strong link between myth, ritual and the natural landscape and its resources. As one example, the eland is by far the most commonly painted animal and was highly valued in San conceptual thought. It played an important role in rain-making, and in puberty rituals for boys and girls and it was believed that the eland could help the shaman communicate with God. Nearly every shelter with rock art has at least one eland painting and some have many more. An eland painting is a symbol of, among other things, the power that shamans harnessed to enter the spirit world. The significance of the eland is illustrated in an account by a nineteenth century Drakensberg San man, Qing, who told J M Orpen (1872) that the deity whom he called Cagn "gave orders and caused all things to appear, and to be made, the sun, moon, stars, wind, mountains and animals". Cagn's wife, Coti, gave birth to an eland calf in the fields. He put it in a gourd and took it to a secluded kloof enclosed by hills and precipices and left it to grow there. After a series of events in which the eland was killed and revived, male and female eland were created. A 'chief' killed an eland and purified himself and his wife. He lived in a place enclosed with hills and precipices. They sprinkled canna (herbs) on the ground, "and all the elands that had died became alive again". The ability to revive after death was shared by San shamans. Myths about other animals in the mountains that Qing told Orpen included tales about the water snake, baboon, eagle and rhebok. The mountains were therefore an essential element in the cosmology of the Drakensberg San. By placing paintings there the landscape was subtly over-printed with visual memories of supernatural experiences that recorded intangible cultural practices for posterity (Deacon *pers comm.).*

(v) Interaction between the San, the Bantu-speaking agriculturists and European colonists contributed to the Park as a cultural landscape by affecting the pattern of land settlement. Wright (1971:193) notes that the European farmers' fear of San raids helped to keep the colonists from settling under the mountains until well into the nineteenth century. The British created buffer zones between themselves and the Drakensberg San and settled Zulu and Sotho farmers there. As a result, areas like those incorporated into the Park remained undeveloped. In a sense, then, the Park is an artificial creation, an example of a twentieth century cultural practice. It makes provision for visitor comforts at hotels and other resorts at selected nodes, it re-introduces some animals that were 'shot out' in the last century, it maintains a network of paths for hikers, it protects the rock art, it manages the vegetation in various ways and it prevents people from

settling there. In so doing it creates a refuge for endemic plant and animal species and sustains the landscape as a wilderness (Deacon *pers comm.).*

Today we regard the Park's environment as being near pristine that is, the disturbances by man in the past did not significantly transform the landscape although there were severe impacts on wild animal populations in the area during the latter part of the nineteenth and early twentieth centuries, the natural balance has subsequently been restored and the original complement of species are now present in the Park. Fire, and particularly fires started by lightning, is regarded as one of the major ecological determinants of this grassland region. It has possibly played an influencing role on the biota of the region over several million years. Both plant and animal species have adapted over this time to withstand the effects of fire and thus to ensure their continued survival. The persistence of the wide diversity of species that comprise this part of the African grassland biome is to a large measure due to the fire regime that has prevailed over a long period of time rather than circumstances where fire was absent or occurred at a low frequency. There is good circumstantial evidence that fire was used in the Drakensberg by the San hunter-gatherers and the Bantu speaking agriculturalist to provide natural grazing areas suitable for ungulate animals by the removal of moribund plant growth. Such veld management practices continue to the present day as fire is regularly used by the KwaZulu-Natal Nature Conservation Service in the management of the Park.

Within this large region there was thus an intimate association between the San inhabitants and their physical, natural and spiritual environment. The 242 813 ha area of the Park with its diverse topography, physiographic features, altitudinal range, and biological diversity is sufficiently substantial to represent the totality of the Drakensberg and the cultural landscape of the San people who formerly occupied the area. This vast landscape has not been significantly modified by the activities of man since the time it was originally inhabited by the San with the exception of a small percentage of the area such as where facilities have been provided for visitors to the Park.

3. DESCRIPTION

3.1 Description of property

3.1.1 Physical formations and groups of outstanding universal value

(i) Climate

The climate of the Drakensberg region is dominated by the influence of subtropical anticyclones. In winter, the subsidence of air causes atmospheric stability and consequently a distinct dry season. In summer, the subsidence inversion may rise above the escarpment resulting in an influx of humid air from the Indian Ocean by south-easterly winds. Precipitation, often in the form of thunderstorms, then takes place. Also, due to seasonal shifts in the climatic belts, frontal depressions which have formed at mid latitudes extend far inland in the form of cold fronts and cause sudden drops in temperature and precipitation in winter. (Tyson *et al.*,1976)

The mean annual temperature of the Drakensberg is about 16°C, but variations are considerable both seasonally and between day and night. The highest temperatures (up to 35°C) occur during summer on north-facing slopes at lower altitudes, while the lowest temperatures (down to about -20°C) occur during winter nights on the summit plateau. Frost is common, however the local topography exerts a control on its distribution and intensity. Conditions favourable for frost occur in winter with an annual duration of about 180 days from mid April to October at high plateau elevations, and about 120 days duration from May to about September in the foothill areas. Frost occurs at lower altitudes when drainage of cold air from high plateau areas drains into the lower-lying valleys.

The Drakensberg is one of the best watered, least drought-prone areas of southern Africa. Annual precipitation totals vary in the region between about 1000 mm in the foothills to 1800 mm at the escarpment. Precipitation in the summer months (November to March) accounts for 70% of the annual total, while the winter months account for less than 10% of the annual rainfall. Both orographically-induced and squall-line thunderstorms are almost entirely a summer phenomenon, and due to their local nature and the pronounced effect exerted by relief, precipitation may vary considerably from area to area. Snowfalls, with an average frequency of about 8 days of snowfall per year, occur in winter, and may remain for several weeks to a few months in shadow-sites. Snowfalls at high elevations have been recorded for all months of the year, however at lower altitudes it is rare and melts quickly.

Although strong westerly pressure winds (known as "berg winds") prevail ahead of frontal disturbances, local topographically-induced winds occur at a variety of scales as a result of solar heating of the ground and radiational cooling at night. Thus at a subregional scale a cool mountain-plain wind blows at night whereas in the daytime a warm wind blows towards the escarpment.

(ii) Geological formations

The following description of the geology and the events under which it was formed was provided by G Botha of the Council for Geoscience. The information was obtained from several sources (Dingle, *et al.*, 1983; Smith, *et al.*, 1993; Cole, 1992; Duncan, *et al.*, 1997).

The geology of the Drakensberg records a ~ 130 Ma episode in the history of Gondwana and the evolution of the African continent since the breakup of the super-continent. A thick succession of sedimentary strata is overlain by basalt up to two kilometres thick. The sedimentary rocks preserve fossils which trace the evolution of reptiles through to mammal-like reptiles and dinosaurs. Numerous fossils of insects, crustaceans, fish, herbivores and carnivores have been recovered from these sedimentary rocks. A diverse fauna is preserved, ranging in size from small insects through to the large *Massospondylus* dinosaur. The plant fossils are as diverse as that of the fauna with abundant cycads, ferns (*Dicroidium*) and conifers (*Dadoxylon*). The signature of palaeoenvironmental conditions interpreted from the sedimentary rocks record climatic changes during the drift of Gondwana from a polar position to warmer mid-latitude

regions. The diverse sedimentological sequences preserved, record depositional environments which changed from glacial conditions, to cold tundra, then into an epicontinental basin surrounded by deltas and peat swamps, followed by braided river systems and finally dry arid and sandy desert conditions. The extensive sand areas were smothered by lava resulting from catastrophic volcanism. Subsequent erosion along the margin of the Africa continent resulted in unprecedented rates of erosion and a rapid migration of the high 'Drakensberg' escarpment. The terrain morphology of the region has been moulded by river and slope erosion processes which were influenced by neotectonics and repetitive cycles of climatic change during the Cainozoic era.

The Drakensberg can be divided into distinct physiographic regions. The form of the terrain is influenced by the structure of underlying lithologies. The foothills or "Little Berg" are steep-sided spurs, escarpments and valleys which occur below 2000m elevation while the high main escarpment rises to more than 3400m above sea level.

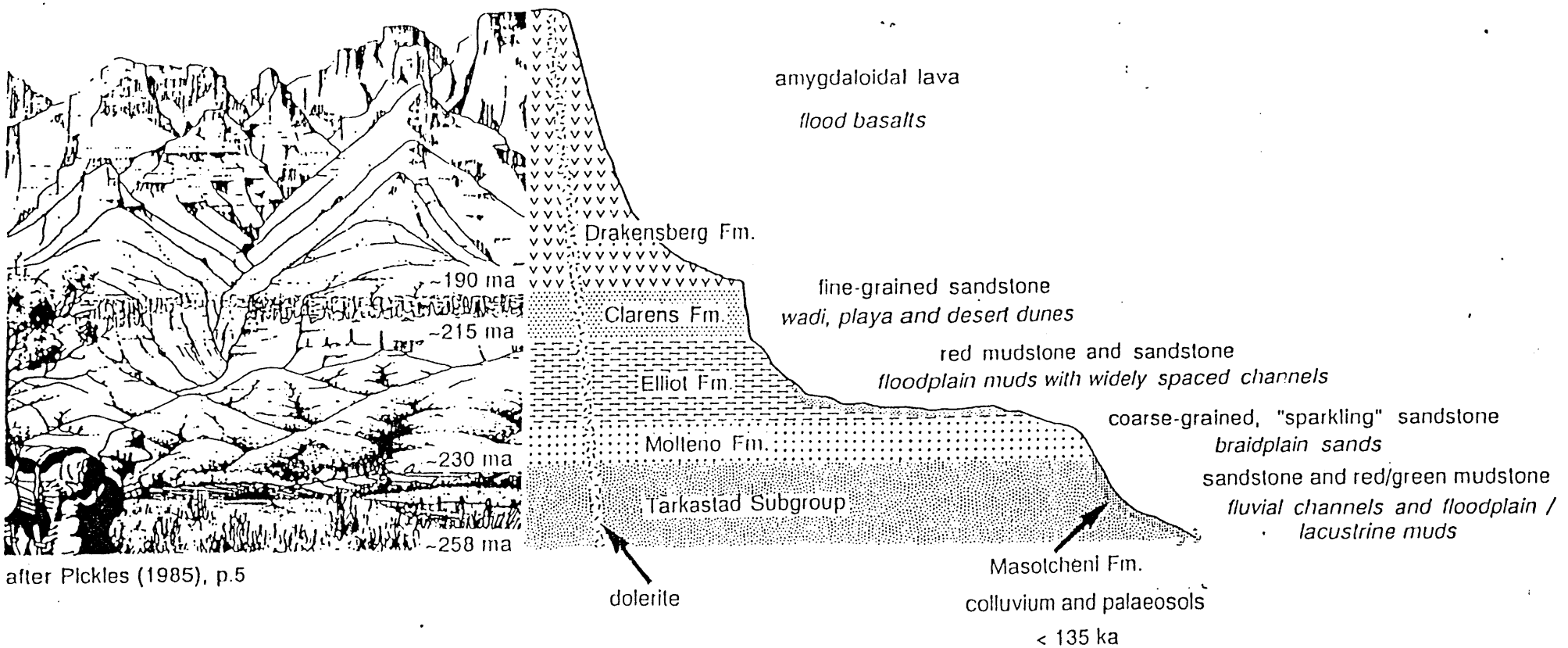
The geology of the Drakensberg is characterised by a thick sedimentary succession which is capped by an accumulation of basaltic lava, comprising the upper part of the Karoo Supergroup succession which has a composite thickness of up to 7 000 m in this area (Figure 6). The sedimentary rocks accumulated in a depositional basin which developed in response to compressional tectonics to the south and south east. Episodes of tectonism in the Cape Fold belt, which was the provenance area for much of the Karoo Supergroup resulted in pulses of sedimentation in the depositional basin. This gave rise to alternations of coarse and fine grained sedimentary units.

The Tarkastad Subgroup (Beaufort Group) of Triassic age is exposed at the lowest elevations in the foothills of the Drakensberg escarpment and is characterised by sandstone (Kamberg Formation) and mudstone (Burgersdorp Formation) deposited in meandering fluvial channel, flood plain and lacustrine environments under semi-arid climatic conditions with highly seasonal rainfall. Vegetation supported a diverse reptilian fauna. The sandstone and mudstone succession currently forms low cliffs along river courses and is exposed in river beds.

Coarse-grained sandstone, hardened by secondary siliceous cement, overlying the Tarkastad Subgroup are represented by the distinctive Molteno Formation. These channel through to flood plain deposits reflect tectonic influences in the south at approximately 230 Ma. The well-bedded sandstone units of this formation form prominent scarps. Weathering of the coarse-grained sandstone gives rise to hillslopes covered with large, scattered, flat-lying slabs of rock. The overlying 'red bed' succession of the Elliot Formation which is about 250m thick, is exposed in the hillslopes below the prominent sandstone cliffs of the Clarens Formation. The thinly-bedded mudstone and sandstone units represent past ephemeral streams and flood plain playas. Associated with this arid palaeoclimate was a change in the fauna from larger dinosaurs to more gracile, light-limbed forms as shown by the fossil record.

The most distinctive physiographic feature of the Drakensberg foothills is the high cliffs formed of cream to maroon, fine-grained sandstone comprising the Clarens Formation lithologies. The sandstone succession is up to 150m thick and accumulated as desert dunes and wadi systems during the arid Late Jurassic period. Thinly-bedded lacustrine, interdune sediments preserve footprints of quadrupedal and bipedal dinosaurs which are exposed in the roofs of caves and overhangs in some areas. Large blocks of massive sandstone litter the slopes below the cliffs. Many caves or over-hangs are present which were inhabited by people in the past and which preserve the rock-art of the San people.

Tensional tectonism attributed to the development of hot spot activity during the incipient break up of Gondwana resulted in regional volcanism which terminated the Karoo sedimentation and gave rise to the Karoo Igneous Province. The full basaltic succession is best preserved in the Drakensberg escarpment and Lesotho. These fissure-type lava flows were fed by numerous hypabyssal dykes and sills which exploited vertical and horizontal planes of weakness in the crust to reach the surface. The narrow dykes intrude all of the lithologies in the Drakensberg area resulting in a contact metamorphic effect on the surrounding sedimentary rocks. Preferential weathering of adjacent softer rocks has resulted in the dykes forming distinctive topographic features.



after Pickles (1985), p.5

Figure 6
Schematic representation of the upper Karoo Sequence exposed in the Natal Drakensberg

The high Drakensberg escarpment comprises a succession of basalt units, vents and diatremes which is up to 1 370 m thick. Basal, flood-type, lava flows rest directly on the palaeo-dune topography of the underlying Clarens Formation sandstone. Thin sandstone units higher up in the basalt pile are present and record synchronous aeolian activity during lava extrusion which was concentrated around 184 Ma. Many lava flows are 10-20 m thick and have a basal zone rich in pipe amygdales, a massive central zone and upper vesicular zone with some flow-tops exhibiting ropy 'pahoehoe' surfaces. Dolerite dyke feeders, which intruded through previously crystallised lavas to overlying flows, commonly define zones of preferential weathering which were subsequently eroded to form steep-sided valleys or 'cut-backs' on the escarpment. The dykes are also important conduits for groundwater recharge.

Active erosion along the Drakensberg escarpment has not permitted deposits shed from the steep slopes during the long period of scarp-retreat to be preserved. Talus deposits are common below cliffs and colluvial debris is preserved on most hillslopes where landslides and arcuate slope-failures have produced hummocky slope surfaces. A series of alluvial terrace deposits occur along river valleys within the gorges of the high escarpment and further downstream in the lower gradient river sections. Colluvial deposits derived from the weathering of the underlying rocks and re-working of soils eroded up slope are susceptible to erosion and result in erosion gullies which are characteristic of the foothill slopes. Block streams and debris deposits on the high-altitude topslopes are regarded by some parties as representing periods of glacial or periglacial activity during the recent geological past.

(iii) Geomorphology of the Drakensberg

The significance of the Great Escarpment of the southern African subcontinent to the development of the landscape of this area has been stressed repeatedly in the literature. This feature separates the marginal areas of the subcontinent from the interior plateau, and it forms an enormous horseshoe-shaped step at distances ranging from 50 to more than 500 km from the present coastline. The geomorphic history of the Great Escarpment, which includes the Drakensberg Escarpment component, is intimately linked to that of the southern African subcontinent and the fragmentation of Gondwanaland. This history will be traced through a series of major evolutionary stages that have been described by Partridge and Maud (1987) in the sections that follow below.

* Gondwanaland

  Within the Gondwanaland supercontinent, Africa had a central position prior to the separation into the various southern continents at the end of the Jurassic period (Dingle *et al.*, 1983). The separation of the eastern masses (east-Gondwanaland consisting of Antarctica, Madagascar, India, and Australia) preceded that of Africa and South America. The distribution of Karoo remnants indicates that rocks of the Karoo sequence covered almost all of southern Africa (with the exception of the Cape Fold Mountains) at this time. These rocks, with their flat arrangement of sequences (tabular disposition) exerted an important structural influence on subsequent landscape development as they are relatively susceptible to erosion. The Gondwana pre-rifting surface has not been found to be preserved anywhere in southern Africa as an exposed planation feature, that is, even in relic form on the crests of the Lesotho Highlands. Examination of the kimberlite pipes at Letseng Le Terai in the Lesotho Highlands (Hawthorne, 1975) indicates that some 300 m of the Drakensberg formation lavas have been eroded since their emplacement some 87 Ma ago (Davies *et al.*, 1977). Relative to present sea level, Partridge and Maud (1987) calculate the absolute prerifting surface elevation would have been at about 2350 m at Letseng, and to the west, elevations were lower (e.g. at Kimberley it was around 1800 m). These derived surface elevations indicate that drainage was predominantly to the west prior to the rifting of Gondwanaland. The features of the Gondwana surface therefore considered by Partridge and Maud (1987) to be important for the later geomorphic evolution of southern Africa, including the Drakensberg escarpment, are:

  - the high initial elevation of the continent,

- the overall westward trend of the drainage,
- the presence of tabular Karoo rocks beneath most of the land surface,
- the existence of the Cape Fold Mountains.

* Creation of the Great Escarpment and erosion of the African surface

The northern Mozambique Basin was formed by rifting between 142 and 133 Ma and resulted in the separation of Africa from Antartica. However along the southern African coast the Falklands Plateau was detached from the Mozambique Ridge later and only cleared the southern tip of Africa about 100 Ma. Large-scale down warping of the incipient continental margin along the east coast had preceded rifting. Within the adjacent interior major updoming, generally parallelling the continental margin, also preceded rifting and continental separation. These events led to the creation of the single most important geomorphic feature of the subcontinent, that is, the Great Escarpment which separates the elevated interior from the coastal margins. The newly established oceanic base levels produced an erosional face which would have receded away from the coast following the establishment and growth of an effective drainage net. The present Great Escarpment, which now lies more than 200 km inland of the original continental margin in some areas, is a perpetuation of this early rift-generated feature.

Erosion proceeded simultaneously both above and below the Great Escarpment and at different levels. In the coastal areas this erosion was controlled by the oceanic base level, but in the interior plateau the operating base level was that of the major river systems (e.g. Orange - Vaal). This landscape erosion cycle, called the African Cycle by Partridge and Maud (1987), was of long duration (more than 100 Ma) and was an episode during which landscape development proceeded under the influence of erosion. It did not proceed without interruption, as several peaks of different ages have been recognized in the sediments found on the continental shelf. Nevertheless, despite its polycyclic nature, the major part of the erosion occurred in the period immediately following rifting. This is supported by comparison of the size of basalt class of the Drakensberg Formation found along the length of Natal rivers with those of similar class preserved in earlier coastal sediments. This analysis indicated that by the mid-Cretaceous the Natal Drakensberg Escarpment had receded some 100 km from the coast, but towards the end of the Cretaceous this distance had increased to approximately 120 km, that is, to a line not far eastward of its present position (Matthews and McCarthy, 1978). By end-Cretaceous to early Tertiary times the subcontinent had been reduced by the erosion processes to a vast, undulating plain punctuated at infrequent intervals by erosional residuals and high-lying massifs. Enormous thicknesses of material had been removed over the interior plateau (e.g. some 1650 m in parts of the Harrismith area). At the end of the African cycle, elevations in the interior were of the order of 500-700 m above sea level. However there were some extensive areas standing above the African surface that had not succumbed to planation, such as the Lesotho Highlands and other major ranges (Partridge and Maud, 1987).

* Miocene uplift

Uplift of the subcontinent about 18 Ma during the Miocene brought to an end the African erosion cycle and its resultant major episode of landscape evolution. However, movement was concentrated along several axes, of which the Ciskei - Swaziland axis, situated some 75 to 175 km inland of the present southeastern coastline, was the most prominent. Here vertical movements ranged from about 300 m in southern Swaziland to about 200 m near Umtata in the Eastern Cape. Also, marginal areas seaward of the axis were flexed gently outwards with the zone of zero movement occurring near the present coastline. The geomorphic manifestation was therefore a slight westward tilting of the African surface with limited coastal monoclinal warping.

* The Post-African I surface

The Miocene uplift caused a rejuvenation in landscape formation processes both in the interior and coastal areas and thus the Post-African I erosion cycle was initiated (Partridge and Maud, 1987). This erosion cycle was of relatively short duration (15-16 Ma) and back-wearing of the Great Escarpment was limited by comparison with its recession in Cretaceous times, involving only a few tens of kilometres.

* Pliocene uplift

The Pliocene movement of about 2.5 Ma was of a much greater amplitude in most areas than the earlier Miocene uplift, and given the deformation of the Post-African I surface which took place, the uplift was concentrated along virtually the same axes as before. The present face of the southern African subcontinent therefore probably owes more to this late Tertiary disturbance than to any previous tectonic event since the fragmentation of Gondwanaland (Partridge and Maud, 1987). Uplift was concentrated in the eastern part of the subcontinent and varied from 600 to 900 m along the Ciskei-Swaziland axis, and thus greatly accentuated the westward tilt that had been initiated by the earlier Miocene movement. This asymmetry in the landscape resulted in the significant rejuvenation of erosion processes along the major inland drainage lines, and resulted in the progressive and major headward incision of the Great Escarpment, and particularly its eastern part. Relatively modest incision occurred in the interior plateau along almost the entire length of each river.

The land seaward of the Ciskei-Swaziland axis underwent major monoclinal (outward) warping. The position of this axis was sharply defined, and lagging of the sub-escarpment area to the west of the axis resulted in many headwater zones being back-tilted towards the escarpment. To the east of the axis down warping resulted in the gradients on the erosion surface increasing from less than 3 m/km to as much as 30 m/km. This increased gradient resulted in high sedimentation rates in the cones at the mouths of the major rivers. In the back-tilted sub-escarpment areas several anomalous drainage features resulted, and major aggregation occurred in a number of high-level basins such as the Cedarville Flats.

* Post-African II surface

The Pliocene uplift and warping of the subcontinent triggered the Post-African II landscape cycle, which is manifested chiefly in the major dissection of the coastal hinterland, for example, the 500m deep Valley of a Thousand Hills in KwaZulu-Natal. The process of erosion of the Drakensberg escarpment thus continues to be active.

3.1.2 Biological formations and groups of outstanding universal value

3.1.2.1 Biogeographic importance of the region

The mountain region in which the Park is situated is an ancient feature that has played an important role in the distribution of ancient invertebrate lineages. This region has remained at a relatively high elevation, and topographical and ecological conditions have also been relatively similar since the time of formation of the Great Escarpment, for example, rainfall has been high and reliable. The mountain region has therefore been a refuge for some relic palaeogenic taxa.

Of particular interest ate the palaeogenic invertebrate groups. These occur in several parts of

the world, but are confined to South Africa in the context of the Afrotropical Region (Africa south of the Sahara). This is largely due to the ancient character of the Great Escarpment and the Cape Fold Mountains in contrast to the more recent features in most of the rest of Africa. Some of these groups are unique in South Africa, such as, certain groups of earwigs, alderflies, stoneflies, planthoppers and flies (including some wormlion flies, snipe flies, net-winged midges and solitary midges). There are two main concentrations of palaeogenic invertebrate species in South Africa. These are the Eastern Highlands Centre (which includes this mountain region as one of its subcentres) and the Cape Centre). Within each of the palaeogenic invertebrate groups mentioned above, there are species that are endemic to the Maloti-Drakensberg Highlands and several species have to date only been found in the Park.

In addition, palynological studies on wetland deposits in areas surrounding the Drakensberg have yielded evidence of significant change in plant communities in response to cyclical climatic change during the Quaternary period. The changes in the amount of insolation experienced by the region affected the seasonality of rainfall which is reflected in the change in composition of the dominant grassland vegetation. The 'Late Pleistocene Hypothermal' resulted in a regional desiccation and lowering of temperature by up to 6°C which lead to a spread of components of the 'fynbos' vegetation typical of high altitudes down to distant river valley areas as much as 900m lower. The effect of vegetation change on faunal populations during these climatic changes has been documented from fossil evidence at numerous sites around the Drakensberg area.

3.1.2.2 Flora

(i) Vegetation

With altitudes varying from 1280 m to nearly 3 500 m, a range of 2 200 m, the Drakensberg has a great variation in its topography, with summit plateaux and peaks, vast basalt and sandstone cliffs, deep valleys and intervening spurs. In addition to the topography, the vegetation of the Drakensberg is further influenced by the effects of climate, soil, geology, aspect, slope, drainage and fire. The interrelationship and interactions between these factors has allowed for the development of a wide diversity in plant community types and associations in the region.

The vegetation of the Drakensberg mountains is altitudinally zoned to form three belts which coincide with the three main topographical features, namely the river valley system, the spurs, and the summit plateau. These belts are: the low altitude belt (1 280 - 1830 m) with *Podocarpus latifolius* Forest as the plant successional climax community, the mid altitude belt (1 830 - 2865m) with *Passerina-Philipia-Widdringtonia* Fynbos as the plant successional climax community, and the high altitude belt (2 865-3 500 m) or alpine tundra with *Erica-Helichrysum* Heath as the plant successional climax community (Killick, 1990; Killick, 1997). A profile through a typical part of the Drakensberg region showing the vegetation belts with their major plant communities is given in Figure 7 and a description of the various plant communities is given in Appendix 3.

(ii) Plant species

A total of 2 153 species of plants has been recorded for the Drakensberg Park and these are listed in Schedule 1. A comparison of the flora of the Park with surrounding regions is given in Table 6.

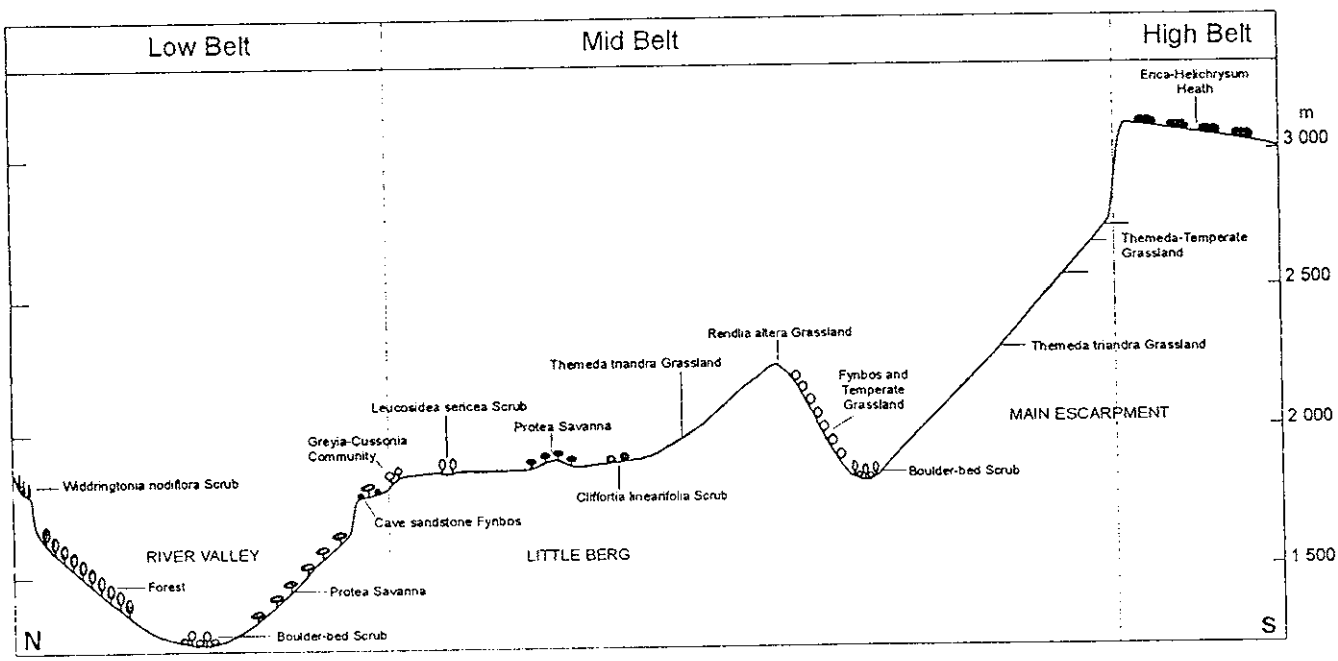


Figure 7.
Profile through the Drakensberg area showing the vegetation belts with their major plant communities (Killick, 1990).

Table 6. A comparison of the flora of the Drakensberg Park with surrounding regions.

Park or Country	Families	Genera	Species
Drakensberg Park	171	585	2153
Lesotho	95	526	1537
KwaZulu-Natal	179	1235	5200

A remarkable feature of the Park is the large number of endemic species present. Of the 394 species and infraspecific taxa recorded by Hilliard and Burtt (1987) for the Drakensberg Alpine Region (Killick, 1994), at least 247 species occur in the Park of which some 98 species (51,5%) are endemic/near endemic to this protected area. The percentage endemism of the whole flora was found to be 29,5%. Since 1987, several new species have been described from the region, while many taxa remain undescribed. A provisional list of plant endemics for the Park (totalling 247 species) is given in Schedule 2. In the southern Drakensberg, local endemic forbs and shrubs are more frequent than in the northern Drakensberg. Despite relatively large areas of forest, there are no endemic forest trees in the region, and most of the endemic plants are associated with grassland (Hilliard and Burtt, 1987; Killick, 1994).

The Park also contains a large number of species that have been included in the international and national Red Data books of threatened plants, or have been listed as Appendix I (1 species) or Appendix II (120 species) by CITES (Schedule 3). The following is a summary of the 109 listed threatened species per Red Data Book category (Hilton-Taylor, 1996; Walter and Gillett, 1997):

Endangered 3

Vulnerable 5

Insufficiently known 21

Indeterminate 19

Rare 61

In an analysis of the composition of the flora (1332 flowering plants) of the southern Drakensberg it was found that although the Compositae was the largest family (285 species), its proportional dominance (21,4% of the flora) was exceptional (Hilliard and Burtt, 1987) and may be compared to that of the Sonoran Desert (15%). The ten largest families, and ten largest genera and their percentage of the whole flora of the southern Drakensberg is given in Table 6. The two outstanding features of the family representation in the southern Drakensberg flora was the high percentage of Compositae and of monocotyledons (five families) which together comprise over 55% of the flora. There were some 23 genera with five or more endemic species (Table 7). Many of the 23 genera have either a Cape centre of origin (*Erica, Crassula, Sutera* etc.), or are essentially genera of the Drakensberg Alpine Region itself (*Merxmuellera, Schoenoxiphium, Rhodohypoxis, Glumicalyx*), or of the summer rainfall area of South Africa (*Kniphofia, Alepidea*). With the exception of *Helichrysum, Senecio* and *Kniphofia*, tropical representation amongst the 23 genera is relatively weak, thus emphasising the southern African continental affinities of the Drakensberg flora.

Table 7. **The ten largest families and genera and their percentage composition of the flora of the Southern Drakensberg (after Hilliard and Burtt, 1987).**

Family	No Spp	%
Compositae	285	21.4
Gramineae	108	81
Liliaceae	84	6.3
Orchidaceae	83	6.2
Scrophulariaceae	79	5.9
Leguminosae	65	4.9
Iridaceae	65	4.9
Cyperaceae	59	4.4
Asclepiadaceae	44	3.3
Ericaceae	26	1.9
Genus		
Helichrysum	85	6.3
Senecio	76	5.7
Erica	25	1.9
Disa	24	1.8
Sebae	19	1.4
Crassula	19	1.4
Argyrolobium	18	1.3
Moraea	16	1.2
Thesium	15	1.1
Hypoxis	15	1.1

Table 8. Genera with five or more endemic plant species (Hilliard and Burtt, 1987).

Genus	Genus
Merxmuellera	Sebae
Pentaschistis	Schizoglossum
Schoenoxiphium	Asclepias
Kniphofia	Diascia
Rhodohypoxis	Sutera
Hesperantha	Glumicalyx
Disa	Wahlenbergia
Thesium	Helichrysum
Crassula	Cotula
Argyrolobium	Senecio
Alipidea	Berkheya
Erica	

A phytogeographical analysis of the flora found in the southern Drakensberg based on the distribution of both genera and species, has resulted in a greater understanding of the flora of the area in relation to that of Africa and especially southern Africa (Hilliard and Burtt, 1987). Previously the Drakensberg flora was considered to have affinities with the flora of the tropical African mountains. This led to the Drakensberg summits being ascribed to the Afroalpine phytogeographical region, and the lower slopes to the Afromontane region (Killick, 1978; White,1983). Based on the improved concepts and terminology of White (1983), Hilliard and Burtt described the Drakensberg as a phytogeographical region where different floras meet but where there is also a richness of endemic species, and argue that this merits recognition in the broader African context of a floral region which they called the South-eastern Mountain Regional Mosaic. The areas above 2750 m altitude in the Drakensberg are alpine, where the climate is cold with considerable frost-thaw activity at least in winter, and the vegetation is treeless with low-growing grasses, perennial forbs and dwarf shrubs, and abundant mosses and lichens.

Cowling and Hilton-Taylor (1994) examined patterns of plant diversity and endemism, and compared the species richness and levels of endemism of the southern African flora with other areas of the world, and also identified the hot-spots of plant diversity and endemism within southern Africa. They describe eight such areas as occurring in southern Africa, one of these being the high Drakensberg (Table 5). Myers (1988) coined the term "hot-spot" to describe areas that are characterized by high species richness, high concentrations of endemic species, and which are experiencing high rates of habitat modification or loss. Subsequently, the Drakensberg Alpine Region has been proposed by the WWF/IUCN as one of nearly 250 major sites for conservation of plant diversity worldwide.

Table 9. Characteristics of the Drakensberg Alpine Region in relation to the other southern African "hotspot" areas (from Cowling & Hilton-Taylor, 1994).

Hotspot	Area (km^2)	No Spp	Endemics (%)	Vegetation
Drakensberg Alpine Region (Eastern Mountain)	40 000	1 750	30	Temperate grassland and rainforest, sclerophyll shrub land
Succulent Karoo	111212	4 750	35	Succulent shrub land
Cape	90 000	8 600	68	Sclerophyll shrub land, temperate rainforest
Maputaland	26 734	1 100	15	Savanna, subtropical rainforest and grassland, wetland.
Kaokoveld	70 000	952	12	Deciduous shrub land, ephemeral herbland, savanna
Albany	22 500	2 000	10	Subtropical thicket
Pondoland	1 880	1 500	8	Subtropical grassland and rainforest
Wolkberg	5 980	2 700	4	Temperate and subtropical grassland and rainforest, savanna

3.1.2.3 Fauna

(i) Invertebrate fauna

The invertebrate fauna of the Park and Drakensberg region is poorly known. However studies which have been undertaken on several taxa, namely the earthworms, millipedes, centipedes, lacewings, crane flies, dragonflies, butterflies, cetonid beetles, hanging flies and robber flies, have been dealt with in sufficient detail to provide some information and insight into the invertebrate groups. In addition, reference was made in section 2.2.1 to palaeogenic insects that are unique to South Africa and particularly to the Drakensberg mountain region. Of particular note are the species listed in Table 10 which includes many species endemic to the region The species are:

Table 10: **The palaeogenic insects recorded for the Drakensberg Park. Species marked with an asterisk(*) have to date only been recorded from the Park and are considered to be endemic to the region.**

Insect Group	Species recorded	
Planthoppers	*Menenches nona**	*Griphissus xenocles**
	*M. decuma**	*Gamergus phintias**
Crane flies	*Ctenacroscelis quathlambicus**	*L. tugela**
	*Longurio drakensbergensis**	*Antocha indumeni**
	*L. syndactylus**	*A. venosa**
	*Nephrotoma basutoensis**	*Austrolimnophila luteipleura**
	*Dolichopeza altiacica**	*Limnophila hetaira**
	*D. aurantiaca**	*Hexatoma preposita**
	*D. cathedralis**	*Quathlambia stuckenbergi**
	*D. chaka**	*Gonomyia daedalus**
	*D. dorsoprojecta**	*G. gnophosoma*
	*D. parvistyla**	*G. unispicata*
	*D. thoracica**	*G. sulphurelloides**
	*Tipula draconis**	*Limnophilomyia stuckenbergi**
	*T. natalia**	*Rhabdomastrix tugela**
	*Limonia satura**	*Tasiocera probosa**
	*L. umkomazanae**	*Ormosia hirtipennis**
	*L. rudebecki**	
Wormlion fly	*Vermipardus sylphe**	
Dance flies	*Drapetis sebetuanei**	*H fasciata**
	*D. Sekeletui**	*H. inerma**
	*Platypalpus similis**	*H. breviseta**
	*Syneches graminis**	*H. neptunus**
	*Syndyas indumeni**	*Hilara sextaseta**
	*Stenoproctus similis**	*Hemerodromia gogi**
	*Empis indumeni**	*Afrodromia montana**
	*E. natalensis**	*Dolichocephala duodecempunctata**
	*Hilarempis adrianus**	*Brachystoma jonesi**
	*H.indumeni**	*B. montana**
	*H. carlieri**	
Net-winged midges	*Elporia hiemis*	*E.scruposa**
Dark-winged fungus fly	*Bradysia novalobata**	
Tachinid flies	*Montonothalma natalensis**	*Mediosetiger microcephala**
Solitary midge	*Afrothaumalea pamelae*	
Aulacigastrid flies	*Aulacigaster africana*	*A.sp*
Campichoetid fly	*Campichoeta natalensis*	
Hanging fly	*Bitticus bicornis**	
Lace wings	*pamochrysa stellata**	*Hermerobius aper**
	*Nimboa natalensis**	*H. natalensis**

(Stuckenberg, 1962; Stuckenberg, 1995).

Three species of earthworm belonging to two families have been recorded for the Park (Schedule 4). The species *Proandricus pajori* has only been collected in the Drakensberg Park but is possibly endemic to the region.

The millipedes are well represented in the Park with 32 species recorded as being present. One genus and 20 species have to date only been found in the Park and therefore several of these may possibly be found after further research to be Park endemics (Schedule 5). Some 14 species of centipedes have been recorded as present in the Park, of which *Lamycetes setigera* has to date, only been found within the Park (Schedule 6).

Two species of that remarkable taxon Onychophora namely, *Opisthopatus cinctipes* and *Peripatopsis moseleyi* have been found to be present in the Park (Schedule 7).

Three species of fairy shrimp occur in emphemeral rock pools in the Park, two of which are endemic to the protected area. Two species of freshwater harpacticoid copepods *Attheyella pauliani* and *A. reducta* are only known from the Park. One species of crab has been recorded which is abundant in the many rivers and streams in the Park. Schedule 8 lists the Crustaceans recorded in the Park.

Of the 156 dragonfly species described for South Africa, 44 species (28,2%) have been recorded for the Park (Schedule 9). Although many of these species are generally distributed, there is one Park endemic and six South African endemic species found in the protected area. The more unusual or interesting species are those associated with the ancient tarns and wetlands at high elevations (e.g. *Enallagma subfurcatum, Agriocnemis pinheyi*) or high altitude streams (*Chlorolestes draconica, Pseudagrion caffrum, and Platycypha fitzsimmonsi*; Samways (1994).

Although the total number of 74 butterfly species in the Drakensberg may be considered relatively low, representing 11,7% of the 632 species recorded for South Africa, the butterfly communities are rich in skippers (Hesperidae), browns (Satyridae), and blues (Lycaenidae), with 19 being typically montane species (Schedule 10). Four species are endemic to the Drakensberg and occur within the Park (Quickelberg, *pers, comm.*).

A total of 24 fruit and flower chafer beetles (Cetonidae) are present in the Park, being 13,9% of the 173 species recorded for South Africa (Schedule 11). There are six South African endemic species of cetonids recorded for the Park.

Species lists of several insect families are available for the Park and include ten species of lace wings, 61 species of crane flies and four species of net-winged midges (Schedules 12 to 15). Six species of hanging flies (Bittacidae) have been recorded in the area and the species *Bittacus bicornis* has only been collected from the Drakensberg Park (Schedule 16). Some 33 species of robber flies (Asilidae) belonging to 14 genera are known to be present in the Park (Schedule 17).

(ii) Fish

Being a mountain area, only seven species of fish, including two introduced alien species of Salmonidae, have been recorded as occurring within the Park (Schedule 18). Although an old record for the endemic Drakensberg minnow (*Pseudobarbus quathlambae*) exists for the Park, the species has not been subsequently recorded as being present, although it does occur in Lesotho close to the border of the Park.

(iii) Herpetofauna

With its four Park endemics and 40 South African endemic species the Park is considered to be one of the eight major centres of herpetofauna diversity in southern Africa (Branch, 1998; Bourquin, *pers, comm.*). This mountainous region forms a link between the mountain regions of the Cape to the south and the

northern, more tropically situated mountain areas, and is considered to function as a corridor along which various faunal taxa can move.

Given a wide range of habitat types at different altitudes, there is an astonishingly high species richness. 26 species and subspecies of frogs occur within the Park, being 21,0% of the 124 species recorded for South Africa. With some 19 species and subspecies, the family Ranidae is best represented among the amphibians (Schedule 19). The frog species found in the Drakensberg include a high proportion of species that are widely distributed throughout South Africa or KwaZulu-Natal. However there are also several species with more limited ranges and habitat preferences including three species (*Rana vertebralis, R. dracomantana, Strongylopus hymenopus*) which are adapted to very high altitudes and low temperatures.

There are 23 lizard and 25 snake species recorded for the Park (Schedule 20). Species richness of amphibians and reptiles in the Park is related to altitude with fewer species being present at the high, cold and wet altitudes where 5 amphibian, 6 lizard and 3 snake species are found above 2 600 m. One endemic reptile species is recorded only for the Park namely, the cream-spotted mountain snake (*Montaspis gilvomaculata).*

(iv) Birds

A total of 296 bird species have been recorded for the Park (Johnson, *pers, comm.*) representing 37% of the non-marine birds recorded for southern Africa (Schedule 21), of which 213 species are considered to be either permanently resident (154 species) or are regular visitors i.e 59 migratory species (Little and Bainbridge, 1992). All 16 palaearctic migrants are non-breeding summer visitors, whereas all 22 Intra-African migrants are summer visitors of which 20 species probably breed. There are 21 local migrant species all of which probably breed in the Park

The majority, 233 species, have AfroTropical affinities, and are relatively widespread elsewhere in Africa. However, not all of these have contiguous ranges, and some of the Drakensberg populations are isolated from their main ranges. Some of these isolations, for example that of the Bearded Vulture, probably represents man-induced inhospitality in areas where the species is now absent. However, others provide a probable demonstration of climate and vegetation changes. One example is the Olive Woodpecker which is confined to cooler forests, there being a single race present in South Africa which is separated by an arid gap from another subspecies found in sub-equatorial Africa.

There is a high degree of endemism present. There are 43 southern African endemics of which 32 species are endemic to South Africa (Schedule 22). These include birds such as : Ground Woodpecker (*Geocolaptes olivaceus*), Buffstreaked Chat (*Oenanthe bifasciata*), Cape Rock Thrush (*Monticola rupestris*), Sentinel Rock Thrush (*Monticola explorator*), Gurney's Sugarbird (*Promerops gurneyi*), Bald Ibis (*Geronticus calvus*), and three high altitude species namely, the Orangebreasted Rockjumper (*Chaetops auranticus*), Drakensberg Siskin (*Serinus symonsi*) and Yellowbreasted Pipit (*Hemimacronyx chloris*). It is considered that 41 of the southern African endemics breed in the Park.

Some 18 species recorded for the Park are listed in the South African Red Data Book as threatened species.

(v) Mammals

There are 48 species of mammals occurring in the Park (Schedule 23), with 16 species of Rodentia, 15 species of Carnivora and 11 species of Artiodactyla present. The largest population of the Clawless Otter and Spotted-necked Otter in KwaZulu-Natal, and possibly South Africa, occurs within the Park (Rowe-Rowe *et al.*, 1994). Large populations of several antelope species are present and include an estimated population of 1 500 - 2 000 of the endemic Grey Rhebuck (*Pelea capreolus*), 1 000 Reedbuck (*Redunca arundinum*), and ca 2 000 Eland (*Taurotragus oryx*) which is also one of the largest populations of this species in South Africa (Rowe-Rowe, 1994).

Table 11: Estimated population sizes of selected species of mammals found in the Drakensberg Park

Species	Population Size	Species	Population Size
Black-backed Jackal	1 000	Chacma Baboon	1 100
Black Wildebeest	40	Red Hartebeest	15
Blesbuck	80	Oribi	150
Grey Rhebuck	2 000	Eland	2 000
Reedbuck	1 000		

The Park is the only protected area in KwaZulu-Natal known to have populations of the following species: Sclater's Golden Mole (*Chlorotalpa sclateri*), Cape Mole Rat (*Georychus capensis*), Ice Rat (*Otomys sloggetti*), and the Small Grey Mongoose (*Galerella pulverulentus*).

Eleven South African endemic species are present, namely: Forest Shrew (*Myosorex varius*), Greater Musk Shrew (*Crocidura flavescens*), Sclater's Golden Mole (*Chlorotalpha sclateri*), Hottentot Golden Mole (*Amblysomus hottentotus*), Black Wildebeest (*Connochaetes gnou*), Blesbuck (*Damaliscus dorcas*), Grey Rhebuck (*Pelea capreolus*), Cape Mole Rat (*Georychus capensis*), Ice Rat (*Otomys sloggetti*), White-tailed Rat (*Mystromys albicaudatus*), and Natal Red Hare (*Pronolagus crassicaudatus*).

Although there are no mammal species included on the international list of threatened species, 11 species occurring in the Park are to be found listed in the South African Red Data Book. There are 7 mammal species that are either on CITES Appendix list I or II.

3.1.2.4 Species of global conservation importance

Ten species of birds occurring within the Park are listed as being of global conservation importance (Collar *et al.*, 1994), these are:

* Globally endangered - Whitewinged Flufftail and Cape Parrot,
* Globally threatened - Lesser Kestral, Corncrake, and Yellowbreasted Pipit,
* Globally vulnerable - Bald Ibis, Cape Vulture, and Blue Crane,
* Globally near-threatened - Black Harrier and Pallid Harrier.

3.1.3 Description and inventory of the Cultural Heritage of outstanding universal value

3.1.3.1 The San rock art of the Drakensberg

The rock art found in the Drakensberg represents a significant component of the cultural heritage left by the San hunter-gatherers who survived in this area until the nineteenth century. These people lived in the Drakensberg from about 8000 years ago to the late nineteenth century. Within the 242 813 ha area of the Park and including adjacent areas, there are almost 600 sites on record at the Natal Museum with some 35 000 individual images represented (Whitelaw, 1997; Wahl *et al.*, 1997). The exact number of sites or images is not known because there are still some areas that have not been comprehensively surveyed for rock paintings. Although all the large, major sites have probably been found, new discoveries are regularly

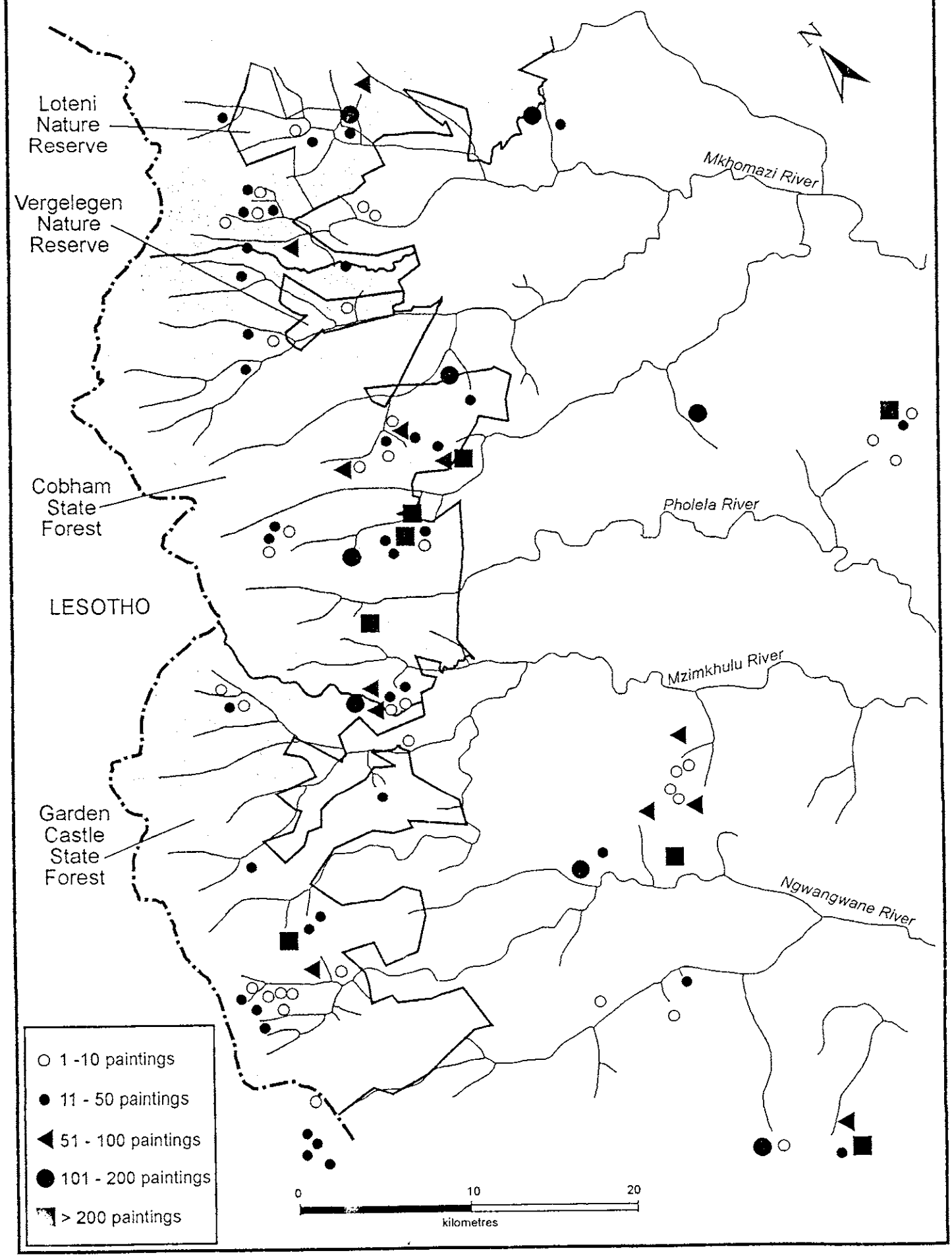
made.

Paintings are found in a diverse range of sites from large rock shelters containing over a thousand individual images, to small rock overhangs with only a few paintings, to the vertical sides of boulders strewn along the steep slopes of valleys. Within sites, paintings are found not only on prominent rock faces that can be viewed from all parts of a shelter, but also on the often comparatively hidden surfaces of the jumble of fallen and broken rocks on the floors of many shelters. Most of these less obvious paintings were done after the rocks had come to rest in their present positions, and therefore their presence on these rocks was intentional. It is apparent that the San artists selected specific rock shelters for repeated visits in order to paint and repaint particular surfaces over a period of time, as paintings are often superimposed.

The age of individual images can be determined only if organic ingredients have been used in the paint, and as the dating method is destructive and expensive, few samples have been taken. If painted rock or fragments of paint have fallen onto the floor of a shelter and have been incorporated into the deposit, organic remains, typically charcoal, can be dated to give a rough estimate of the time when the paint or rock was detached from the cave wall. Using these techniques, the oldest dated painting on a rock shelter wall in the Park is about 2400 years old, while in the region, paint detached from a painting was found at the same level as charcoal dating to about 3800 years ago. At the other end of the time scale the age of the more recently painted images can be more readily established. Historical records and the subject matter of some of the art show that San paintings were created up to the late nineteenth century. There are also paintings in the Drakensberg that are attributable to Bantu-speaking farmers. These were probably done during the nineteenth and twentieth centuries. The art thus represents a very long tradition.

Vinnicombe (1976) investigated 150 rock art sites in the central and southern Drakensberg (Figure 8). Many of these sites contained painted scenes which depict hunting, dancing, fighting, food gathering or ritual and trance scenes of hunting or rainmaking. Of the 8478 images recorded by Vinnicombe, 53% were of human figures, 43% of animals, and 4% were inanimate and abstract subjects. Twenty one shelters were found that contained only animal paintings, compared with eight that had only human figures depicted. The predominant colour for all subjects was red (40%) whereas white, orange and yellow coloured paint was more frequently used on animal paintings. Other colours used included black, and rarely, brown (2%). The majority of the images were between 100 to 250 mm in size, but paintings were found to range from 13 to 2430 mm. Most images were either monochrome (64%) or bichrome (22%), but both polychrome (6%) and shaded polychrome (8%) paintings were present. The shaded polychrome paintings, usually of

Figure 8.
San rock art sites in the central and southern Drakensberg (after Vinnicombe, 1976)



had existed between the indigenous people and their sustainable use of the natural resources of the region and the rock art of this time illustrates some of the anger that the San felt towards them (Deacon *pers comm.)*

Descriptions of the Drakensberg and the naming of landscape features by explorers occurred intermittently from 1835 when Capt A.F. Gardiner first journeyed into the area, and later by the missionaries M T Arbousset and M F Daumas in 1836, also Maj. Grantham in 1861, J. S. Dobie in 1863, J. E. Fannin in 1873 and Col A. W. Durnford in 1874 following the Langalibalele affair. The first recorded climbs were undertaken by A. H. and F. R. Stocker in 1887 and these were described and published together with a map of a section of the Drakensberg from Mont-aux-Sources and the Tugela Falls to Giant's Castle in which a relatively large number of features were named. Such exploration and description led to further settlement of the area. In 1884 surveying of the boundaries of farms commenced, and the properties were put up for sale by the Colonial Government. Although some of these farms were well into the river valleys of the Drakensberg, the highest occupational and agricultural level was about 1675 m; beyond was too extreme for farming, though stock certainly grazed the upper slopes and spurs of the mountain.

3.2.2 History of preservation/conservation

In 1903 the Natal Colonial Government took preliminary steps to establish the first protected area in the Drakensberg by way of a Government Notice (No. 735 of 29 October 1903) which stated its intention to proclaim a "game reserve on the Crown Land in the vicinity of Giant's Castle". Although no specific reason for the establishment of the reserve can be traced it has been generally accepted that the reserve was set aside for the protection of the fast disappearing herds of eland and other antelope species, and the magnificent scenic value of the area (Pearse, 1973). The area was declared a "Demarcated Forest" in 1905 but later proclaimed a game reserve in terms of Government Notice No 356 of 1907 which allowed for the enforcement of the game protection laws. Subsequently, over the years since 1916, there have been twelve proclamations or amending notices which have increased the size of Giant's Castle Game Reserve to its present day area of 34 638 ha.

Several Government-owned farms and adjoining Crown Land in the vicinity of Mont-aux-Sources were to become the nucleus of a second protected area in the Drakensberg. The importance of this area as a potential national park was first recognised by W. F. Clayton, Minister of Agriculture and Lands in 1906 who took the first steps towards its proclamation. A party led by Senator F. Churchill inspected and recommended the area to be a national park to the Natal Government in 1908. However due to lack of funds the scheme was abandoned and the land sold to General J. S. Wylie. After the formation of the Union of South Africa, Wylie sold the land (at cost) back to the Government on condition that it remained for all time a national park for the people of South Africa. The Natal National Park was then formally established by the Natal Provincial Administration on the 19 September 1916, and an advisory committee appointed to study the area, control the land and develop its potential. Additional land was added to the Park increasing its original size of 3294 ha to 8094 ha and in 1950 the adjoining area was proclaimed Rugged Glen Nature Reserve making a total area protected of 8846 ha. As a result of the visit by the British royal family to the park in 1947, the name was changed to Royal Natal National Park. Following the establishment of the Natal Parks, Game and Fish Preservation Board (later the Natal Parks Board) in 1947 all these protected areas have been managed by this organization. In terms of the provincial Nature Conservation Ordinance several other nature reserves were proclaimed in the Drakensberg. These were, Kamberg Nature Reserve in 1951, Loteni Nature Reserve in 1953 and Vergelegen Nature Reserve in 1967.

Concerns regarding the exploitation of indigenous forests was expressed in reports submitted to the Colonial Government in 1880, 1889 and 1902. These resulted in the appointment of Mr T. R. Sim as Conservator of Forests and the establishment of a Forestry Department. Given their remoteness and difficulties of access, many of the natural forests in the Drakensberg were not exploited to the same extent as those elsewhere in Natal. However as timber resources became scarce in those forest areas, more permits for tree felling were issued for areas in the Drakensberg. Mr C. Robinson made representations to the South African government which were to lead to the proclamation of the Cathkin Forest Reserve (initially some 40468 ha in extent) in April 1922 and the issuing of permits was then stopped. In 1927

three areas were demarcated as State Forests. These were Cathedral Peak (included the Cathkin Forest Reserve), Monk's Cowl, and Cobham State Forests. This ensured that the high rugged terrain along the face of the escarpment (mostly above 1800 m) remained as Crown Land (unallocated) but areas could be hired out for grazing. A parliamentary resolution in 1934 called for the protection of mountain catchments in South Africa for the conservation of water supplies. Concerns regarding the effects of plantation forestry on catchment water supplies also emerged at this time and led to the founding of a research station in the Cathedral Peak State Forest. However it was only after World War II in 1948 that the Drakensberg Catchment Reserve (later the Drakensberg Catchment Area) was proclaimed which ensured the protection of these important water-producing areas of South Africa. Large areas of the Drakensberg, known as Garden Castle, Highmoor and Mkomazi were demarcated as State Forests and placed under the control of the national Department of Forestry in 1951. The administration of all the State Forest areas in the Drakensberg was assigned by the State President to the then Natal Provincial Administration in August 1992 and their control transferred to the Natal Parks Board in December 1993 by the Administrator. This allowed for the consolidation of the conservation management of all of the protected areas in the Drakensberg under one nature conservation body (the NCS) and the establishment of the Drakensberg Park.

In 1973 two large areas within the Park were proclaimed as Wilderness Areas in terms of the Forest Act of 1968. These were the, Mdedelelo (27 000 ha) and Mkhomazi (56 122 ha) Wilderness Areas. They were two of the first three wilderness areas to be so proclaimed in South Africa. Subsequently, the Mzimkulu (28 340 ha) and Mhlambonja (6 270 ha) in 1989 Wilderness Areas were proclaimed. Management policy for wilderness areas is to "leave no trace" that is to retain the wild character of these areas by prohibiting all forms of man-made developments (roads, buildings etc.). Although people may gain access by foot or horse, recreational opportunities within wilderness areas are managed to allow for an experience of solitude within an intrinsically unaltered natural environment, and thus to provide opportunities for inspiration, enrichment, self-reliance, and physical adventure.

Several conservation programmes have achieved successful results and have been widely acknowledged:

(i) Ungulate conservation

At the time of the establishment of Giant's Castle Game Reserve, only a remnant population of eland were present in the Drakensberg, and populations of all other antelope species were nearing the point of extinction. Conservation programmes in the Park ensured that populations were adequately protected, and have resulted in an increase in population size and range.

(ii) Protection of rock art sites

Archaeological research and particularly rock art research has been undertaken by several archaeologists notably in the last few decades and a discussion on the history of this research can be found in Mazel (1989). The results of this research has led to the implementation of additional measures to protect rock art sites in the Drakensberg.

Several caves containing important San rock art were declared national monuments in terms of the National Monuments Act, namely Battle Cave, Main Caves, Game Pass 1, and Kanti 1. In addition, conservation programmes within the Park have also ensured that archaeological sites, and especially rock art sites, were protected. These programmes focussed on preventing damage to the paintings by people by ensuring controlled entry to the Park, awareness creation, guided access to selected sites, keeping the location of other sites confidential, and the prohibition of camping and or making of fires inside shelters with rock art. Appendix 6 details the management and monitoring measures that are being implemented that should ensure the protection of the rock art sites in the Park.

3.3 Form and date of most recent records of the property

There are extensive records of the Park on the physical environment, the biota, management activities and

animals such as eland and rhebuck, are virtually unique to this south-eastern mountain region of southern Africa. Finally Vinnicombe recorded superimposed paintings in 51% of the rock shelters in the study area.

The subject matter of the art is diverse and may be classified as follows (Vinnicombe, 1976):

Animal subjects (3 606 images)

(i) Antelopes comprised 77% of the animal images with eland (35%) and rhebuck (18%) being the most frequently painted subjects. The eland paintings range in size from 80 to 230 mm and the rhebuck from 13 to 160 mm. Most eland paintings show groups of animals in superimposed freezes or masterly compositions in a variety of restful poses. Eland were treated elaborately by the artists. Other antelope species depicted included hartebeest, reedbuck, oribi, grey rhebuck, black wildebeest, bushbuck, and roan antelope.

(ii) Other indigenous species less frequently painted include, baboon, snakes, birds, shoals of fish, small carnivores, leopard, hyaena, buffalo, bushpig, warthog, aardvark, elephant, rhinoceros, hippopotamus, jackal, hare, lizard, and mongoose.

(iii) Domestic animals were also painted with cattle and horses being most common.

Human and therianthropic subjects (4 530 images)

(i) Most human subjects painted appear to be naked (58%) but the sex was indeterminate for 89% of the figures. However male figures (9%) were more frequent than female (2%).

(ii) Dressed figures were clothed in a variety of garments that include apron, cloak, short kaross, long kaross, or European clothing. The figures may have accompanying weapons or equipment such as bow, arrows, quiver, stick, digging-stick, assegai, bag, fly-switch, or shield.

(iii) The head of the figures may be round, concave, hooked, or that of an animal. Headgear may be portrayed as a knob, hat, cap, horns, feathers, both horns and feathers, lines up, or lines drawn down.

(iv) Parts of the body, such as the head, neck, body, arms, legs, or penis may be decorated.

Non-representational paintings

These paintings comprise a variety of images such as intentional finger smears often in pairs, crossed lines in rectangles, rope-like lines drawn from an animal or a therianthropic figure, or feathery white lines leading from the head area of an animal or animal-like figure.

The 5,5km Didima gorge situated within the Cathedral Peak State Forest is possibly the richest art area in South Africa with some 3909 individual paintings in 17 rock shelters. Pager (1971) undertook a survey and recorded in detail the rock art in a study area that included the Didima gorge. He found that in terms of subject matter, 57% of images were human figures, 36,29% were animals 1,62% mythological creatures, and the remaining images were of man-made structures, bees' nests, ground features, equipment or were paintings of obscure meaning. However his analysis did show that the significance of the human figures in the art is of less consequence than the animals which feature as the predominant element as these are larger, often more colourful, and more elaborately executed than most other figures. He found that only a few paintings depicted Bantu and their domestic animals and none portrayed Europeans. About 60% of the paintings were monochrome, the others had two to four colours, and most paintings were only a few centimetres in size.

3.2 History and Development

3.2.1 History of the region

The Drakensberg region ranks as one of the most important archaeological areas in southern Africa. Archaeological sites from the Early, Middle and Late Stone Ages, and the Late Iron Age are present, indicating that the period of human occupation in this mountainous region possibly extends over the last million years. Important Middle Stone Age sites are, for example, found in the eastern Free State Province and eastern Lesotho. Several of these sites have been excavated and they have yielded important information relating to hunter-gatherer occupation during the last 100 000 years. The majority of excavated sites in the Drakensberg, particularly in Lesotho and the eastern Free State, have had late stone age occupation deposits

Although the first evidence of human occupation of the Drakensberg Park dates from the Middle Stone Age and may go back 20 000 years or more (Mazel, 1982), it was Late Stone Age people the ancestors of the nineteenth century San, who inhabited the area from about 8000 years ago. The San were hunter-gatherers and often lived in caves and rock shelters, many of which were adorned with rock paintings. The population was small, probably never more than a thousand in the Park, and therefore they had little significant impact on the vegetation or wildlife populations of the area (Wright, 1971).

The settlement of Iron Age farmers in the foothill areas east of the main escarpment may possibly date from the 1200s, or even slightly earlier. These people brought cattle and sheep into the region. However by the late 1600s there were African cattle-herding people living in permanent settlements in areas adjacent to the northern and central Drakensberg region (Wright, 1971, Irwin and Irwin, 1992). Although there were different impacts, natural resources continued to be managed in a sustainable way. The people living in the area to the north were known as the Zizi and to the south, the Tholo. Relations between these people and the San appear to have been reasonably harmonious during their initial period of contact during the first millennium AD in the low-lying regions of KwaZulu-Natal, but archaeologists are less clear about the nature of their relations during the second millennium AD. However it is likely that these relations became more complex during the nineteenth century. From 1816, under the leadership of Shaka, the rise of Zulu military power in Zululand far to the north-east brought an end to peace in the region as successive waves of refugees displaced by the Zulu army (impis) settled towards the Drakensberg, in turn attacking those already there.

At the time of the arrival of the first white settlers (Voortrekkers) in late 1837, large areas in the Drakensberg and adjacent country to the east appeared to be virtually uninhabited apart from the San and a few surviving fugitive groups (Irwin and Irwin, 1992). Some of the Voortrekkers settled in the foothill areas where they established farms on land where good grazing for cattle was present. Many turned to sheep farming after 1855 following severe outbreaks of bovine lung disease, and this was to continue on a large scale until the 1930s. These settlers hunted the game animals and significantly reduced their numbers. The disappearance of game animals was a major impact after millenia of careful management by the indigenous people (Deacon *pers comm.)*. This was to bring them in conflict with the San who also hunted over these areas. The San would raid the stock of farmers, who would retaliate by pursuing them in an attempt to recover their animals. Usually the San were overtaken and in the ensuing battle, men were invariably shot. The farmers complained to the Natal colonial authorities, and in 1847 a military post was established in an attempt to control, what was deemed by the colonists to be stock theft (Vinnicombe, 1976). The raids continued and the Natal Government attempted to check stock theft from white-owned farms by settling Bantu-speaking farmers in areas along the Drakensberg in an effort to seal off the approaches used by San raiders. By 1865 this human barricade had been completed and was successful in ensuring an immediate and organized pursuit of the San raiders and the stolen animals by farmers, military and native levies. The raiders were often tracked high up into the mountains. By 1870 the raids had almost ceased, the last recorded being in 1872 in the upper Pholela area. Counter measures were swift and five San were killed and four taken prisoner. In 1871 the last of the Lesotho San were destroyed and it is generally accepted that by 1875 the San hunter-gatherers as a viable community were no longer to be found in the Drakensberg. Thus within about 50 years, European colonists had upset the balance that

results, both past and present research projects being undertaken. Monitoring records are either updated annually or more frequently as required by the respective programme. The records are in the form of several computerized databases including a geographical information system. These are located at the Pietermaritzburg head office and other institutions such as universities and the Natal Museum. Many records are in the form of reports and publications contained in offices and libraries under the control of the KwaZulu-Natal Nature Conservation Service.

3.4 Present state of conservation

Almost the entire area of the Park is in an unmodified, near-pristine condition. A portion of the Park has been formally protected for almost a century, being amongst the oldest areas set aside for conservation in Africa. The Park, although used by man for a long time, has never been occupied by significantly large human settlements, nor has the area been subjected to significant man-induced land disturbances. The past presence of hunter-gatherers and iron age agriculturalists in the Park is likely to have contributed to the diversity of habitat types in some areas. The largest areas transformed in recent history, representing approximately 1,0% of the total area (242 813 ha) are areas of alien plant infestation in the Cathedral Peak, Vergelegen and Kamberg areas of the Park and most of this will be eliminated and the areas rehabilitated in the near future. In addition a system of roads used by visitors and for management purposes has been established, mainly at lower elevations within the Park. Sensitively planned accommodation is provided within designated development nodes at Tendele and Mahai, Giants Castle Camp, Loteni Camp, Kamberg Camp, Injasuti Camp and Vergelegen Camp. Based on the principles of integrated environmental management, the nature-based tourism plan has been designed to provide appropriate and sustainable access to the resources within the Park, while ensuring the protection of the fragile resources and the equitable distribution of benefits to local communities in the region. It is estimated that the total area of the Park transformed by both alien plant infestation and infrastructural development is approximately 1,4% of the area (3 452 ha). The natural ecological and geomorphological processes therefore function with little or no significant detrimental interference by the activities of man. Where there have been impacts, the Park management approach is to restore such areas to their former status.

3.5 Policies and Programmes : presentation and promotion of the property

There is a progressive neighbour relations policy, to foster good relations with communities who reside in the immediate vicinity of the Park. This policy promotes the value of the protected area to its neighbours. It ensures that they derive direct benefits from the protected area in a variety of ways, including free access and business and employment opportunities. The range of business opportunities includes the marketing of curios at designated market places.

4. MANAGEMENT

4.1 Ownership

All the land comprising the Park is state-owned, being registered in the name of the President of the Republic of South Africa. Control and management of the Park has been delegated by the KwaZulu-Natal Provincial Administration to the KwaZulu-Natal Nature Conservation Service. The address is:

KwaZulu-Natal Nature Conservation Service
P O Box 13053
CASCADES
3202
SOUTH AFRICA

4.2 Legal status

The laws which establish the Park as a conservation unit are the KwaZulu-Natal Nature Conservation Management Act No 9 of 1997 as amended and the Republic of South Africa National Forests Act No 84 of 1998. The right of the President of South Africa to assign responsibility for the acts to ministers in charge of various portfolios, and the Premier of KwaZulu-Natal, emanates from the Republic of South Africa Constitution Act No 108 which came into effect in 1996. Legislation that has enabled the amalgamation of the former Natal Parks Board and KwaZulu Department of Nature Conservation was only recently approved by the Provincial Parliament, that is the KwaZulu-Natal Nature Conservation Management Act No 9 of 1997. This new legislation has resulted in the establishment of the KwaZulu-Natal Nature Conservation Service, which is responsible for the control and management of the Park. All component areas forming the Drakensberg Park are defined as protected areas by this legislation and listed in a schedule in the act. Proclamation of nature reserves or any future areas that may be acquired as additions to the Park is the responsibility of the provincial Minister responsible for environmental protection and nature conservation.

The legislative enactment governing the former Natal Parks Board, and under which the then Administrator of Natal proclaimed nature reserves in the province including the Park, was the Nature Conservation Ordinance No. 15 of 1974. This Ordinance was assented to by the State President in council on 21 August 1974, in terms of the Republic of South Africa Constitution Act No 32 of 1961 and came into effect on 12 September 1974. With regard to the establishment of State Forest Reserves and Wilderness Areas, in terms of the Forest Act No. 122 of 1984, the State President, acting in terms of the Republic of South Africa Constitution Act No. 32 of 1961, assigned the responsibility for proclamation of these areas to the then Ministers of Environment Affairs and Environment Affairs and Fisheries respectively. The control and management of areas proclaimed under the National Forest Act No 84 of 1998 lies with the Minister of Water Affairs and Forestry and his department. In terms of post legislation, management of the State Forest areas within the Park were assigned to the province and the former Natal Parks Board controlled these areas. Under the new legislation these past assignments could be withdrawn by the Minister, however, the power of delegation or assignment has been retained in the new forest legislation. Nevertheless, the KwaZulu-Natal Nature Conservation Service is presently seeking re-assignment of the control and management responsibilities for the State Forest component areas of the Park.

The following component areas of the Park have now been incorporated under the new KwaZulu-Natal Nature Conservation Management Act:

Giant's Castle Game Reserve

Kamberg Nature Reserve

Loteni Nature Reserve

Royal Natal National Park

Rugged Glen Nature Reserve

Vergelegen Nature Reserve

The following component areas were set aside under the Government of South Africa, Forest Act No. 122 of 1984, as amended:

Cathedral Peak State Forest

Cobham State Forest

Garden Castle State Forest

Highmoor State Forest

Mkhomazi State Forest

Monks Cowl State Forest

The Park enjoys full legal protection under the provisions of the KwaZulu-Natal Nature Conservation Management Act No 9 of 1997 as amended, the National Forests Act No 84 of 1998 and assignments. Provisions within the Water Act No 54 of 1956 as amended and the Environment Conservation Act No 73 of 1989 as amended, also ensure the protection of certain natural resources.

4.3 Protective measures and means of implementing them

The following instruments provide for the legal protection of the Park :

4.3.1 The KwaZulu-Natal Nature Conservation Management Act No. 9 of 1997 as amended

This legislation provides for the institutional structures for nature conservation in the province and the establishment of control and monitoring bodies and mechanisms. The administration of the Act falls under the Member of the Executive Council (MEC) responsible for the protection and conservation of the environment and nature conservation. This minister is also responsible for nature conservation policy, the implementation of the Act, and the proclamation of protected areas. The Act establishes a decision-making body in the form of the KwaZulu-Natal Nature Conservation Board having the primary functions of (i) directing the management of nature conservation, protected areas, the development and promotion of ecotourism facilities within protected areas, and (ii) ensuring an effective Nature Conservation Service under the direction of a Chief Executive Officer. Section 5(3)(c) of the Act requires that the Nature Conservation Board must ensure the protection and management of heritage resources within the protected areas according to the principles of the KwaZulu-Natal Heritage Act of 1997. All former proclaimed protected areas in KwaZulu-Natal have been listed in a Schedule to the Act and include all the component areas of the Drakensberg Park. The Act also makes provision for local protected area boards which provide a statutory basis for the direct involvement of communities living in the area in the decision-making for the protected area. The first local boards are to be established during 1999.

4.3.2 The National Forests Act No. 84 of 1998

The Act protects State Forests, Forest Nature Reserves and Wilderness Areas, and the plant and animal life contained therein. In addition the Act allows for management programmes to be established in order to prevent soil erosion and fire, maintain the natural genetic and species diversity and control plants and animals which are harmful to a particular area. The Act provides for the control and reasonable access to State Forests for the purposes of recreation, education, culture or spiritual fulfilment. Also, any person

is prohibited from damaging State Forests or contributing to the threat of fire. Forest officers are empowered to arrest any person who has contravened this Act and may seize such person's property.

4.3.3 The National Water Act No 36 of 1998

The Act allows for the nation's water resources to be protected, used, developed, conserved, managed and controlled. In undertaking these actions the Act requires that several factors need to be taken into account including the protection of aquatic and associated ecosystems and their biological diversity as well as reducing and preventing pollution and degradation of water resources. In addition the Act reserves water for the maintenance and protection of natural aquatic ecosystems, that is the ecological reserve, and refers to both the quantity and quality of the water and their determination.

4.3.4 The Environment Conservation Act No. 73 of 1989 as amended

This Act provides for the protection and controlled utilization of the environment. In particular, the Act is aimed at protecting natural ecological processes against harm caused by human activities, promoting environmental education and the effective management of cultural resources, and the co-ordination of integrated environmental management programmes. Regulations in terms of this legislation make the undertaking of environmental impact assessments for listed activities mandatory. The Act empowers the President to add any schedule containing provisions of an international convention, treaty or agreement relating to the protection of the environment which has been entered into or ratified by the South African Government. The Act prohibits littering and obliges any person in control of areas to which the public have access to remove any litter. It also seeks to control noise pollution, vibration and shock.

4.3.5 The National Monuments Act No. 28 of 1969

The Act seeks to preserve and protect the historical and cultural heritage of South Africa. Thus any unauthorised interference with sites protected by this Act is prohibited and includes four national monument sites within the Park. In particular, the Act provides for the protection of burial grounds and graves, the erection of memorials, the preservation of property as national monuments, including the drawings or paintings made by previous inhabitants of South Africa.

4.3.6 The KwaZulu-Natal Heritage Act No. 10 of 1997

This Act provides for the establishment of a statutory body to administer heritage conservation on behalf of the provincial government. Amongst other things, particular attention is paid to historically important sites, monuments and memorials, military cemeteries, traditional burial places, archaeological and paleontological sites and artifacts, rock art, important cultural objects and trade therein. The Act also establishes educational, training and tourism-related projects in the province. It prohibits interference with any site or object protected in terms of the Act.

4.3.7 National Environmental Management Act No 107 of 1998

This law develops a framework for integrating good environmental management into all development activities. The Act provides for co-operative environmental governance by;

(i) establishing principles for decision-making and conflict management on matters affecting the environment

(ii) establishing the institutions responsible for promoting co-operative governance in particular the National Environmental Advisory Forum and the Committee for Environmental Co-ordination

(iii) establishing the procedures for co-operative governance and the co-ordination of environmental functions. These require that environmental implementation plans and management plans are prepared,

(iv) promoting the application of appropriate environmental management tools to ensure integrated environmental management of activities,

(v) the incorporation of international environmental instruments.

4.3.8 White Paper on a National Environmental Policy for South Africa

The principles and objectives of the Environment Policy were published as a Government White Paper. These policies ensure the protection and/or sustainable utilization of all natural resources in the country and also supports ratification of international conservation conventions including the designation of World Heritage Site properties and the conservation of biodiversity.

4.3.9 White Paper on the Conservation and Sustainable Use of South Africa's Biodiversity

As a party to the United Nations Convention on Biological Diversity, South Africa is obliged to ensure that the agreement is implemented in accordance with its objectives as well as to develop national strategies, plans or programmes to address the conservation and sustainable use of biodiversity into policies and plans. The Department of Environmental Affairs and Tourism has undertaken a consultative process which ultimately resulted in the publication of the government's White Paper on the conservation and sustainable use of the country's biological diversity. In addition to defining biodiversity policy and strategy, the White Paper also states the vision, mission and principles which guide the policy and strategy as well as its implementation.

4.3.10 Wetlands Bill

A draft Wetlands Bill has been prepared by the national Department of Environmental Affairs and Tourism. This proposed legislation provides protection for wetland systems and incorporates the provisions of the Convention on Wetlands of International Importance (Ramsar Convention) into South African law.

4.3.11 Policies for nature conservation in KwaZulu-Natal

Given the recent amalgamation of the former Natal Parks Board and Department of Nature Conservation to form the KwaZulu-Natal Nature Conservation Service, it is important that there is a vision and policies that will guide the new organization. The following vision and policies have been outlined.

The vision of the KwaZulu-Natal Nature Conservation Service is the long term conservation of the indigenous biodiversity of KwaZulu-Natal in such a manner that the people of KwaZulu-Natal and of South Africa, in particular, and humanity in general, will benefit from and share in the diversity, economic value and opportunities for spiritual well-being and recreation which it offers.

The Mission is :

TO CONSERVE THE INDIGENOUS BIODIVERSITY OF KWAZULU-NATAL , WHICH INCLUDES THE LANDSCAPES, ECOSYSTEMS AND PROCESSES UPON WHICH IT DEPENDS, AND TO ASSIST ALL PEOPLE IN ENSURING THE SUSTAINABLE USE OF THE BIOSPHERE.

Where:

- To conserve means to ensure the survival of indigenous fauna, flora and natural ecosystems and the promotion of public environmental awareness.
- Biodiversity means the wealth of life on Earth, including the millions of different animal and plant types, the genes they contain and the communities, ecosystems and landscapes of which

they are part.

- KwaZulu-Natal means the provision of KwaZulu-Natal and adjacent territorial waters
- Sustainable use is the level of consumptive or non-consumptive use that will not threaten the long-term survival of biodiversity or its benefits to current and future generations.
- Biosphere means that part of the Earth which sustains living organisms.

To achieve the above mission, the KwaZulu-Natal Nature Conservation Service must:

a) Promote awareness of the functioning and importance of the biosphere.

b) (i) Prevent the man-induced extinction of any species indigenous to KwaZulu-Natal.

(ii) Ensure the survival of viable populations of all species indigenous to KwaZulu-Natal.

c) Recognise the link between rural poverty and environmental degradation and promote the conservation of biodiversity and ecological processes in KwaZulu-Natal and ensure their conservation in protected areas administered by the Service and other areas where biodiversity conservation is a declared goal.

d) Promote the sustainable and equitable use of wildlife resources in KwaZulu-Natal, and exercise the necessary controls to ensure sustainability and equity.

e) Create conditions and incentives that support the conservation and sustainable use of biodiversity.

f) Facilitate public access to protected areas and provide appropriate services including opportunities for education and scientific study.

g) Participate in KwaZulu-Natal's ecotourism industry by providing visitor facilities and experiences in protected areas on a self funding basis and by developing partnerships with local communities and the private sector all of which must be compatible with the Mission of the Service.

h) Conduct its activities effectively and efficiently through the employment of appropriately skilled people dedicated to service and committed to biodiversity conservation.

i) Ensure the social, economic and environmental integration of protected areas locally, sub-regionally, and regionally.

j) Be aware of the increasing threats to the environment as a result of pressure from rival poverty, unsustainable population growth and lack of individual responsibility and accountability, and foster sustainable living through the economic and social development of communities, especially those adjacent to protected areas.

In pursuit of its mission, and the realisation of its objectives, the KwaZulu-Natal Nature Conservation Service understands:

- that the State provides limited funding and legislative support for the conservation of wildlife resources and the promotion of public biodiversity conservation awareness in KwaZulu-Natal.

The KwaZulu-Natal Nature Conservation Service recognises:

- that the long-term survival of Man depends on the universal acceptance and understanding of the need for natural life-support systems to operate at sustainable levels;

- that the provision of natural resource-based recreation and opportunities for spiritual fulfilment in protected areas, accessible to all who desire to use them, is an indispensable contribution towards increasing public awareness of the importance of biodiversity conservation;

- that formal biodiversity conservation agencies have a leading role to play in developing an awareness and understanding of, and sensitivity to, the protection and management of the biosphere; and

- that, as the statutory custodian of the wildlife resources in KwaZulu-Natal, it also has a wider role to play through the support of local, regional, national and international biodiversity conservation endeavours.

The KwaZulu-Natal Nature Conservation Service acknowledges:

- that it holds in trust, for the benefit of all the people of KwaZulu-Natal and of South Africa, the protected areas over which it exercises custodianship;

- the IUCN World Conservation Strategy, expresses its support for its guidelines and undertakes actively to support international conservation by espousing the principles and endeavours of the World Conservation Union and its Commissions;

- that South Africa is a signatory to CITES, The Convention on Biological Diversity, the RAMSAR Convention, The Convention on the conservation of migratory species of wild animals, the World Heritage Convention and others, and pledges its support to uphold their principles and undertake the management responsibilities assigned to the Service;

- the role of the KwaZulu-Natal Department of Traditional and Environmental Affairs;

- the role of the Department of Environmental Affairs and Tourism in biodiversity and environmental conservation in South Africa.

The KwaZulu-Natal Nature Conservation Service:

- pledges its co-operation to all other local, regional, national and international biodiversity and environmental conservation authorities;

- confirms its commitment to and support for the communities and publics its services and with whom it interacts; and

- dedicates its staff to the fulfilment of its mission.

The core strategies developed in order to achieve the Mission are:

(i) **Universal acceptance of the value of biodiversity conservation**

<u>Objectives:-</u>

- to use biodiversity conservation as a basis for environmental education and awareness programmes, and to promote appropriate environmental ethics;

- to demonstrate the aesthetic values and economic contributions of biodiversity conservation and ecotourism;

- to expand the diversity and enhance the quality of products and services;
- to build powerful alliances.

(ii) **Contribution to social stability and economic development in the region**

Objectives:-

- to provide and support Conservancies, Biosphere Reserves and Community Conservation areas;
- to support, promote and develop ecotourism as an industry;
- to support, promote and develop the sustainable use of wildlife and protected areas;
- to use formally protected areas as a catalyst for development, especially in rural areas, through:
  - encouraging infrastructural development;
  - stimulating local entrepreneurship;
  - empowerment of local communities through training and transfer of skills;
  - initiating and supporting local community projects;
  - optimising local employment opportunities;
  - seeking and channelling funds to address community needs through for example the Community Trust;
  - empowerment of local communities through the development of partnerships in ecotourism activities.

(iii) **Adequate financial resources**

Objectives:-

- to ensure that the State recognises biodiversity conservation as a foundation of economic development and provides adequate subsidisation;
- to use the Provincial subsidy effectively and efficiently in the best interest of biodiversity conservation;
- to optimise the generation of funds from ecotourism, sustainable use of wildlife resources and other services;
- to generate additional funds through joint ventures, concessions sponsorships, donations and contributions;
- to actively support the KwaZulu-Natal Conservation Trust, Wildlands Trust and Isivuno, established to assist the Service in meeting its conservation responsibilities;
- to generate international financial support;
- to manage assets and resources efficiently.

(iv) **Provincial, parastatal biodiversity conservation structure for the management of integrated biodiversity conservation activities throughout KwaZulu-Natal**

Objectives:-

- to demonstrate the effectiveness, flexibility and success factors of the Service as a provincial parastatal biodiversity agency;
- to demonstrate competence, expertise, credibility and effectiveness at local, regional, national and international level;
- to demonstrate relevance and commitment to and knowledge of KwaZulu-Natal.

(v) **Shared vision and commitment throughout the Service and Board**

Objectives:-

- to pursue the appointment of a well-balanced Board with representatives of appropriate skills and knowledge, previously disadvantaged groups and traditional authorities;
- to recruit, develop and retain competent, skilled and committed staff;
- to ensure effective internal communications;
- to empower and uplift staff from disadvantaged backgrounds to enable them to fulfil their potential;
- to pursue participatory management practices.

(vi) **Excellence of products and services**

Objectives:-

- to comply with the standards required for sound environmental management;
- to develop facilities which set the highest standards for environmentally sensitive development in protected areas;
- to meet the broadest spectrum of demands of the public for biodiversity based products and services, within a sustainable framework, environmentally, socially and economically;
- to strive for the development of research excellence and exemplary management practice in all relevant disciplines.

The Service believes that it has already made a significant contribution to the recognition of biodiversity conservation. KwaZulu-Natal has a rich biodiversity conserved through an extensive system of protected areas and conservation-orientated private sector management systems such as Conservancies, Community Conservation Areas and Biosphere Reserves. The economic value of KwaZulu-Natal's wildlife resources has been quantified to the extent that it can be seen to be making a substantial contribution to commerce, social stability and the economic needs of this Province and its people.

The economic and social contributions of KwaZulu-Natal's protected areas to adjacent communities are increasingly invaluable and widely appreciated.

Given that social stability will be achieved in South Africa in general, and KwaZulu-Natal in particular, the Service believes that the demand for wildlife resources, both consumptive and through eco-tourism,

will increase exponentially employment opportunities and increased prosperity.

Accepting the State's responsibility for funding the public good generated by biodiversity conservation, it is the Service's firm conviction that a regional nature conservation agency with statutory autonomy, a system already proven in South Africa and aspired to by other countries such as Kenya and Zimbabwe, is the best guarantee of the most rapid achievement of the Service's vision.

4.4 Agency(ies) with management authority

The KwaZulu-Natal Nature Conservation Service is currently the agency responsible for the control of the Park. This mandate is carried out in collaboration with the KwaZulu-Natal Provincial Administration and in accordance with legislation at national and provincial levels.

4.5 Level at which management is exercised

Management of the Park is currently exercised at the provincial level by the KwaZulu-Natal Nature Conservation Service. The annual budget is allocated by the KwaZulu-Natal Provincial Legislature. The responsible officer who is accountable to the Minister of Traditional and Environmental Affairs is the Acting Chief Executive Officer, Dr G.R. Hughes who is empowered to take the day to day decisions, which he does in consultation with his executive staff representing three Branches, namely Conservation (with four sub-directorates), Scientific Services (with three sub-directorates), and Administration (with three sub-directorates). All major decisions, including those of policy, are taken by the KwaZulu-Natal Nature Conservation Board, appointed by the Minister. The KwaZulu-Natal Nature Conservation Board is the successor in title to the Natal Parks Board.

In addition to the primary conservation functions, staff are also employed to undertake support functions such as construction, planning, public relations, secretarial services, accounting and accommodation bookings. Staff stationed within reserves are responsible either for implementing wildlife management programmes, the management of visitor facilities, the provision of environmental awareness programmes, or for undertaking research and monitoring projects.

The services and benefits provided by the KwaZulu-Natal Nature Conservation Service are:

* The preservation of the biodiversity of KwaZulu-Natal through :
  - the establishment of a network of protected areas ;
  - the regulation of the use of wildlife resources ; and
  - the encouragement and development of nature conservation activities by the public.
* The knowledge base, skills and management expertise essential for the wise use of wildlife resources which it has developed and which is readily available to the public.
* A diversity of natural resources based activities available to the public.
* The provision of wildlife resources from protected areas.
* The infrastructure, facilities and services within protected areas contributing significantly to a growing eco-tourism industry.
* Opportunities for local employment and entrepreneurship, and the seeking and

channelling of funds for specific projects to address community needs and facilitate rural development.

4.6 Agreed plans related to property

4.6.1 Regional planning initiatives

Existing land uses in the region in which the Park is situated, consist primarily of formal and informal agriculture, plantation forestry, nature conservation, and ecotourism. Ecotourism is a significant and important industry, because of the appeal of the high quality of the resource base provided by the natural environments to visitors. It is likely to become an increasingly important form of sustainable land-use in the region.

At the regional level, KwaZulu-Natal provincial authorities are in the process of compiling structure plans for the two Regional Council areas in which the Park falls and which will provide a development framework and policy guidelines for the control of development in their regions. These two areas are largely under-developed, being relatively densely populated in certain parts by a majority of poor people. Unemployment levels are therefore high. The plans aim at an appropriate mix of land uses to accommodate both environmental concerns as well as development needs including infrastructural developments. Ecotourism is recognised as one of the more attractive development options, because of an anticipated escalation in the growth of the ecotourism market, and because of the sustainable nature of nature conservation as an appropriate land use in sensitive natural environments. Ecotourism and nature conservation are seen to be a labour intensive industry with the potential to provide employment and other benefits to neighbouring impoverished rural communities. In this and other aspects, it is expected that support for upholding the integrity of the Park will be provided by the plans.

4.6.2 Drakensberg Special Case Area

The KwaZulu-Natal Planning and Development Act empowers the Minister of Local Government and Housing to prescribe areas where restrictions on development would be applied so as not to destroy those features which make the region special in the first place. These are called special case areas and a study to define and plan the Drakensberg Special Case Area and the regulations that would be applied to the area, is being undertaken. The first phase of the study has been completed in which the unique and sensitive nature of the Drakensberg environment was recognized and the need for a planning framework for the co-ordination of appropriate and sustainable development. The underlying principles identify the need for development to comply with sustainability criteria and stem from a recognition of the growing impact of human activity and numbers on the environment. The study has taken into account present policy, planning, development needs and realities and suggests a spatial framework based on the boundaries of the area, sub-regions and zones in which preferred, prohibited or non-preferred land uses have been identified. Specific controls have been assigned to each land use category within the zones and which ensure that the overall objectives are achieved. The study has drawn on the provisions of the Seville Strategy (UNESCO, 1996) for the statutory requirements for the designation of biosphere reserves. A buffer zone has been defined surrounding the core area of the Drakensberg Park. The purpose of the buffer zone is to establish a protective strip or shield of land between the core and neighbouring areas and to protect the aggregation of various environmental characteristics such as the biodiversity resource, sensitive environments (e.g. steep slopes and wetlands) as well as the scenic qualities of the foothills peripheral to the Park. Beyond the buffer zone and away from the Park a flexible transition area has been designated which allows for a variety of land uses that includes agriculture, settlement, and tourism. The study is to continue and will involve wider consultation on the suggested policy, guidelines and spatial framework. On completion the study will recommend to the Minister the establishment of and regulations for, the Drakensberg Special Case Area.

4.6.3 The Drakensberg - Maloti Transfrontier Conservation and Development Area

In 1982, a collaborative effort known as the Drakensberg - Maloti Programme was initiated between the governments of Lesotho and South Africa and which was supervised by an intergovernmental liaison committee. Although base line information was gathered, funding was withdrawn before land-use planning and implementation strategies had been formulated or applied. Subsequently financial assistance has been received from the European Community towards the preparation of a programme of conservation and protection measures for the Lesotho component of the transfrontier region. Also further assistance has recently been provided for the preparation of an integrated natural resources management plan for a 1000 km^2 pilot area in the Lesotho highlands.

In a new initiative to conserve this transboundary mountain region and its resources as well as meet the development needs of the people who depend on it, the Drakensberg - Maloti Transfrontier Conservation and Development Area Programme is being developed jointly by representatives from the National Environment Secretariat of Lesotho, the KwaZulu-Natal Nature Conservation Service and the Global Environment facility through the World Bank. A meeting between these parties and other stakeholders resulted in the finalization of a declaration, known as the Giant's Castle Declaration (Appendix 7). The declaration endorsed the concept of a transfrontier conservation and development area which embraces the Lesotho Maloti Highlands and the KwaZulu-Natal Drakensberg mountains in South Africa, and also recognised the importance of the formal declaration of a core Transfrontier Peace Park linking the Sehlabethebe National Park in Lesotho and the Drakensberg Park. Further the declaration recommends that Lesotho considers ratifying both the World Heritage Convention and the Convention on Wetlands of International Importance, the incorporation of Sehlabethebe National Park as a component of a transfrontier World Heritage Site, and the inscription of the Lesotho Highlands as a wetland of international importance. Co-ordination of the programme is effective from an office in Maseru and is funded by a Japanese PHRD grant and a project preparation grant by the Global Environment Facility.

4.6.4 Extended Community Conservation programme.

The KwaZulu-Natal Nature Conservation Service has instituted a comprehensive community conservation programme for the whole Drakensberg Park. A team of community conservation officers has established partnership forums with all local communities and interest groups to co-define and develop a sustainable relationship with the protected area. An integrated conservation and development programme known as the Partners in Mountain Conservation Programme has been running for several years. The programme aims to ensure that the benefits derived from conserving the Park are harnessed by communities within a framework of community-based natural resource management that is environmentally, economically and socially self-sustaining. The programme is centred on the establishment of partnership forums with local communities and interest groups in order that sustainable relationships can be established. The emphasis has been on building relationships with communities through facilitation of access to development opportunities. This has resulted in obtaining funding for community development projects and for building capacity. A number of projects have been successfully completed and several more are presently ongoing or in the pipeline.

The programme also addresses situations where conflicts between the Park and neighbouring communities have arisen. In most cases an improved relationship and understanding between the communities and Park management has resulted which led to the matter being resolved.

Whilst community development has been the prime focus of the programme at a grassroots level, there are a number of other issues that are dealt with on a regular basis. For example, neighbouring communities harvest specific plant species such as thatch grass prior to the burning season. Furthermore, biodiversity education workshops are held in and outside of the Park to

encourage teachers to use the environment, including the protected area, in their teaching. Local schools are also visited by staff who run education programme at these institutions.

Traditional healers are encouraged to grow their own medicinal plants in order to reduce the pressure on the remaining wild stocks. In some cases, these gardens are also serving as tourist attractions and facilities have been built to enable the healers to dispense their medicines to local people.

Entrepreneurship is encouraged wherever viable markets occur. There are several womens' groups selling their crafts to visitor to the Park and at Cathedral Park accredited community guides take groups of visitors into the mountains on walks to view rock art.

The KwaZulu-Natal Nature Conservation Service has run an extensive programme to inform and consult with communities, stakeholders and visitors to the Park regarding its intention to submit this World Heritage nomination proposal. Pamphlets in English and Zulu were prepared which informed the reader of the World Heritage Convention, the requirements for designation of natural and cultural properties, the possible implications should the Drakensberg Park be listed as a World Heritage Site and why the KwaZulu-Natal Nature Conservation Service believed that the Park was a candidate site and should qualify. The pamphlet also included a short questionaire which could be filled in by the reader and returned to the co-ordinator for the programme. All details from the questionaires received have been recorded and comments noted. A total of 1742 completed questionaires have been received to date of which 99.5% (1733) were in support of the Drakensberg World Heritage site nomination proposal.

Given that in a number of areas the Park is bordered by neighbouring communities comprising people many of whom are illiterate. Staff from the KwaZulu-Natal Nature Conservation Service made presentations and held discussions with all the local community forums on the matter of the proposed nomination of the Drakensberg Park. Records of every meeting were made and in almost all cases these forums unanimously supported the proposal.

4.6.5 Programme for the rehabilitation of areas infested by alien plants.

Programmes for the removal and treatment of infestations of alien plants, particularly wattle, in the Park are in operation. The Working for Water project is a nationally funded programme by the Department of Water Affairs and Forestry aimed at the removal of plant infestations from important water producing catchments in South Africa. The programme undertaken in the Park is managed by the KwaZulu-Natal Nature Conservation Service. In addition the KwaZulu-Natal Nature Conservation Service's programme is funded by the Sappi Limited Edition Fund through WWF-SA. Another programme is being undertaken in areas adjacent to the Park which is funded by the Rand Water Board.

4.7 Sources and levels of financing

The headquarters of the KwaZulu-Natal Nature Conservation Service is situated in Pietermaritzburg from where it administers 110 protected areas with a total area of approximately 796 km^2. The KwaZulu-Natal Nature Conservation Service is a semi-autonomous and non-profit making organisation, partly funded (approximately <60% of total receipts) by the KwaZulu-Natal Provincial Legislature. The balance is from revenue earned through fees, charges for accommodation, sale of curios and other sources of income, which accrue to the Service's account. Some 4170 people were employed by the former KwaZulu -Natal Nature Conservation Service which earned R131 613 712 during the 1998/99 financial year.

4.8 Sources of expertise and training

The staff of the KwaZulu-Natal Nature Conservation Service is skilled and highly trained in a

variety of fields such as wildlife management, protected area administration, the natural sciences, financial and tourism management, the provision of secretarial and construction services. In addition to its own staff resources, the KwaZulu-Natal Nature Conservation Service is able to draw on both local and international experts located at universities or other government and non-government institutions for advice and assistance. In-house training is provided and a large variety of courses are made available to staff every year.

4.9 Visitor facilities and statistics

There are 15 entrance gates to the Park. Members of the public enter either as day or overnight visitors who make use of hutted accommodation, camping facilities, caves and mountain huts. The Park can currently accommodate 2 000 persons per night. In addition, almost 2 200 beds are provided by private enterprise outside the Park but in close proximity. The number of visitors to the Park have ranged between 224 000 (1994/95) to 288 200 (1996/97).

Access to the recreational opportunities of the Park via wilderness trails, day walks, guided walks, day hikes and overnight hiking, vehicle drives and horse riding is provided by the Nature Conservation Service and private operators.

The non-consumptive use of the area is encouraged. Activities permitted are:

* day-walks and overnight hiking, with or without a guide, horse riding and trails,
* camping, caravanning, and accommodation in chalets, mountain huts, and caves,
* game and plant viewing, bird watching
* mountaineering, rock and ice climbing,
* education and interpretation (biodiversity, rock art, conservation, environment), photography, painting
* recreation and relaxation
* religious worship

4.10 Property management plan and statement of objectives

The following management plans have been compiled for component areas of the Park:

* Policy statement for the management of the Drakensberg State Forest (1986)
* Kamberg Nature Reserve Management Plan (1992)
* Monks Cowl State Forest Management Plan (1998)
* Giants Castle Management Plan (1985)
* Royal Natal National Park and Rugged Glen Nature Reserve Management Plan (1985)

A master management plan for the Drakensberg Park is currently being prepared (Appendix 5). In addition, a Cultural Resource Management Plan for archeological and rock art sites within the Park has been prepared (Appendix 6).

A neighbour outreach programme is in place. It is based on liaison forums within each

community living adjacent to the Park and provides a means of communication between the Park authority and neighbouring people for resolving problems of common interest, facilitating development, reaping of natural products, and promotion of environmental awareness. Access to outside capacity building and or funding agencies is also facilitated. This has resulted in a large number of development projects being facilitated in poor communal areas adjacent to the Park boundary.

4.11 Staffing levels

The responsibility for administering the Park lies with the Chief Conservator. His staff are responsible for nature conservation and management in the area. There are three administrative centres, as follows:

* At Royal Natal National Park in the Northern Region of the Park, having five management offices (at Royal Natal National Park, Rugged Glen, Cathedral Peak, Monk's Cowl, Culfargie)

* At Giants Castle Game Reserve in the Central Region of the Park having six management offices (at Witteberg, Hillside, Injasuti, Highmoor, Mkhomazi, Kamberg)

* At Himeville (a town located outside the Park) in the Southern Region where there are four management offices inside the Park (at Loteni, Vergelegen, Cobham, Garden Castle)

The total staff complement numbers 604 permanent and part-time employees.

5. FACTORS AFFECTING THE PROPERTY

5.1 Development pressures

Threats which potentially affect the integrity of the ecological functioning of the Park include:

* possible land use changes within certain Park component areas,
* invasive alien plants.

The location of the Park within a region where there are several impoverished communities raises the possibility of claims to the land in the Park. For such claims to be successful, it would require that the claimants prove prior ownership or occupation. In addition, the authorities would consider the desirability of restoration of a land right and would have to find in favour of the claimants. It is generally accepted that conservation of biodiversity and the water production potential of this fragile mountainous area is of the highest national priority and therefore it would be improbable that any land falling within the Park would be restored. A successful claimant would instead be compensated. From time to time there are requests from local communities to graze domestic stock inside the Park, to establish water supply schemes, or from developers wishing to establish resorts.

5.2 Environmental pressures

Possibly the most serious threat to the ecological integrity of the Park is from alien invasive plants, although the area currently affected by such invasions is limited. Principal threats are posed by; *Acacia mearnsii* (Black Wattle), *A. dealbata* (Silver Wattle), *Pinus patula* (Pine), *Rubus cuneifolius* (American Bramble), *Populus canescens* (Poplar), *Cotoneaster spp* (Cotoneaster). As part of the South African "Working for Water" campaign, areas within the mountain catchments of the Drakensberg have been cleared, or are presently in the process of being cleared, of major infestations of alien tree species. In addition, there is a relatively low level of poaching as well as uncontrolled fires that enter the Park from neighbouring areas or are started within the Park.

It is recognized that there are several important threats to the rock art of the Drakensberg. The main causes of deterioration in rock paintings are natural weathering of the rock and paint, as well as vandalism (Ward, 1997). The principal threat is the irreversible process of weathering, these are the forces that created the rock shelters in the first place and the process is ongoing. Research is presently being conducted on weathering processes to determine steps that may be taken to reduce, if not ultimately eliminate, natural threats to the art. A management plan that focuses on the cultural resources of the Park has been prepared and is included as Appendix 6.

5.3 Natural disasters and preparedness

The Drakensberg is prone to heavy winter snow falls, summer rainfalls which may result in flooding in valleys and landslides on the mountain slopes. A mountain rescue service is in place, fully equipped, and is on stand-by full time. It can draw on the South African National Defence Force for assistance in helicopter search and rescue operations should this be necessary.

5.4 Visitor / tourism pressures

A major threat to all Southern African rock art is human in origin. For example, campers light fires in painted rock shelters, and the smoke blackens the walls and ceilings. Moreover, people often wet the paintings to bring out the colours, sometimes they use substances such as carbonated soft drinks that have an even more destructive effect. The addition of graffiti and malicious scratching is also a threat to southern African rock art.

Fortunately, and indeed uniquely, the risk of these dangers of human origin have been significantly reduced in the Drakensberg region. The KwaZulu-Natal Nature Conservation Service has prohibited, with rare exceptions, camping in painted caves, and access to the entire region is strictly controlled. In addition, the locations of most painted sites do not appear on maps available to the public. A few sites (Main Caves, Game Pass, Battle Cave) have been fenced and access to them is permitted only in the company of a guide. In addition, a rock art interpretive centre has been planned for the proposed Didima camp at Cathedral Peak State Forest which would , amongst various other aspects, also deal with the threats to rock art, creating an awareness of its importance and value, and the need to conserve and protect rock art sites.

As a result of these management measures, the Drakensberg rock art is largely unspoilt by human agency and should remain so. Management strategies instituted by the KwaZulu -Natal Nature Conservation Service have also heightened public awareness of the unique value of the art, and public access to site such as Main Caves has been upgraded. Such improvements allow for further protection.

5.5 Number of inhabitants within the property and buffer zone

No private persons occupy the Park. Staff in the employ of the Nature Conservation Service are housed in the Park.

5.6 Other

Sustainable consumptive uses of certain natural products is permitted. Included are:

* harvesting of various grass and sedge species for construction of buildings, thatching and handicrafts, and the collection of seed of medicinal plants,
* removal of certain surplus herbivores, for translocation to other conservation areas or to private game ranches,
* collection of biological material for scientific research,
* fishing, fly fishing (trout) in dams and rivers,
* removal of timber of alien species for fuelwood.

Many organisations and people have expressed their support for this nomination proposal. These have included the Wildlife and Environmental Society of South Africa, Bergwatch, Wilderness Action Group, South African Crane Foundation, Mountain Club of South Africa, Backpackers Club and people from a large number of organisations such as universities, fly fishing clubs, staff of nature conservation authorities including the KwaZulu-Natal Nature Conservation Service, Rock Art Research Units, farmers and tourism associations and others.

6. MONITORING

6.1 Key indicators for measuring state of conservation

Key components of both the physical and biotic environment of the Park are monitored in order to determine the ecological state of the natural systems and to determine trends and changes over time. In terms of monitoring climate, daily records of rainfall are made at twelve stations and all unusual climatic events are recorded such as particularly heavy snowfalls. Vegetation is monitored using fixed-point photography, the annual mapping of areas burnt where the cause and season of burning are recorded, and at Royal Natal National Park the effects of burning on grassland species composition and the population dynamics of *Protea* Woodlands is scientifically monitored. Seasonal route count censuses of ungulates and any other mammals seen, and an annual aerial census of Eland are undertaken. The distribution, sex and age structure of the Eland population as well as all problem animal species destroyed (e.g. baboon) are recorded.

Rock art sites within the Park are regularly monitored by at least an annual inspection and the completion of a Rock Art Site Card in order to determine whether any impacts are having an unacceptable effect on these cultural resources. Sites are assessed to determine use by people, the affects of vegetation or wild animals, interference with the rock art, or if any water damage that is apparent. Appropriate management actions are then undertaken.

Monitoring of the consumptive use of natural products is undertaken. Areas and the amount in kilograms harvested are recorded for thatching grass, reeds, firewood (alien species), leaves (*Hypoxis* sp) and medicinal plants.

In terms of management actions undertaken by staff in the various component areas of the Park several activities are monitored, including the areas, species and treatments of alien plant infestations, the areas and sites of soil erosion reclamation, the species and numbers of animals poached or removed by live capture (eg eland) for restocking purposes, the numbers of feral dogs and cats destroyed, and numbers of stock animals removed that had entered the Park from neighbouring areas.

6.2 Administrative arrangements for monitoring property

Staff within each component area of the Park are required annually to review the management programmes (including research and monitoring programmes) which stem from the protected area management plan that were undertaken during the previous reporting year and formulate their programme for the current year. Management goals are set and reported on in the following year. These programmes are tailored according to resources (budgets, staff, and time) availability. A detailed annual report is compiled for each component protected area which collectively form a document called the yearbook. The yearbooks are used for compiling the annual report of the KwaZulu-Natal Nature Conservation Service which is submitted to the Minister and members of the Provincial Legislature.

6.3 Results of previous reporting exercises

The results of monitoring and reporting are contained in a long series of yearbooks for the respective past financial years. These are housed in the library at the headquarters in Pietermaritzburg and at stations in the KwaZulu-Natal Nature Conservation Service. The results are used to up-date management plans, formulate future management programmes or actions as well as monitoring and or research programmes.

7. DOCUMENTATION

7.1 Photographs

A collection of slides has been provided (attached) and several of these have been selected to illustrate this document.

7.2 Management plans

Management plans included as part of the documentation are :

Appendix 5	-	Drakensberg Park Management Plan
Appendix 6	-	Cultural Resources Management Plan for the Drakensberg Park

7.3 Bibliography

A bibliography of publications on the Drakensberg is given in Appendix 4.

7.4 Address where inventories and records are held

Records are kept at both the headquarters and the offices at management stations in the Park. All correspondence should be addressed to :

Chief Executive Officer
KwaZulu-Natal Nature Conservation Service
P O Box 13053
CASCADES
3202
SOUTH AFRICA

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CHECKLIST OF PLANTS

MOSSES

PALLAVICINIACEAE	*Symphyogyna* sp.
RADULACEAE	*Radula boryana*
SPHAGNACEAE	*Sphagnum africanum* *Sphagnum capense*
ANDREAEACEAE	*Andreaea rupestris*
FISSIDENTACEAE	*Fissidens bryoides* *Fissidens glaucescens*
DITRICHACEAE	*Distichium capillaceum* *Ditrichum brachypodum* *Ditrichum difficile* *Saelania glaucescens*
DICRANACEAE	*Campylopus atroluteus* *Campylopus flaccidus* *Campylopus inchangae* *Campylopus introflexus* *Campylopus pilifer* *Dicranella rigida* *Dicranella symonsii*
CALYMPERACEAE	*Hypodontium dregei*
ENCALYPTACEAE	*Encalypta ciliata*
POTTIACEAE	*Anoectangium wilmsianum* *barbula microcalycina* *Gymnostomum bewsii* *Hymenostylium recurvirostrum* *Oxystegus cylindricus* *Tortella fragilis* *Tortella xanthocarpa* *Tortula fragilis* *Trichostomum brachydontium* *Bryoerythrophyllum jamesonii*
GRIMMIACEAE	*Grimmia ovalis* *Grimmia pulvinata* *Racomitrium crispulum* *Schistidium apocarpum*
FUNARIACEAE	*Funaria hygrometrica*

	Funaria rottleri
BRYACEAE	*Brachymenium pulchrum*
	Bryum alpinum
	Mielichhoferia bryoides
	Mielichhoferia sp.
	Pohlia cruda
	Rhodobryum roseum
	Rhodobryum umbraculum
MNIACEAE	*Plagiomnium rhynchophorum*
BARTRAMIACEAE	*Bartramia aristaria*
	Bartramia hampeana
	Breutelia diffracta
	Philonotis dregeana
	Philonotis falcata
	?? Philanotis laeviscula
	Anacolia breutelii var. *squarrifolia*
	Conostomum pentastichum
	Plagiopus oederi
PTYCHOMITRIACEAE	*Ptychomitrium cucullatifolium*
	Ptychomitrium diexaratum
	Ptychomitrium subcrispatum
ORTHOTRICHACEAE	*Macrocoma tenue*
	Zygodon sp.
	Stoneobryum mirum
HEDWIGIACEAE	*Braunia secunda*
	Hedwigia ciliata
LEUCODONTACEAE	*Leucodon* cf. *maritimus*
METEORIACEAE	*Papillaria africana*
NECKERACEAE	*Neckera valentiniana*
THAMNOBRYACEAE	*Porotrichum madagassum*
THUIDIACEAE	*Thuidium matarumense*
AMBLYSTEGIACEAE	*Leptodictyum* sp.
	Vittia pachyloma
BRACHYTHECIACEAE	*Brachythecium subrutabulum*
	Brachythecium sp.
	Brahcythecium sp.
	Brachythecium sp.
	Homalothecium afrostriatum

ENTODONTACEAE	*Entodon natalensis*
SEMATOPHYLLACEAE	*Sematophyllum caespitosum* *Sematophyllum* sp.
HYPNACEAE	*Hypnum cupressiforme* *Isopterygium* sp. *Mittenothamnium* sp.
POLYTRICHACEAE	*Atrichum androgynum* *Pogonatum capense* *Pogonatum oligodus* *Polytrichum commune* *Polytrichum piliferum* *Oligotrichum afrolaevigatum*

FERN and FERN ALLIES

LYCOPODIACEAE	*Lycopodium caroliniamum* var. *grandifolium* *Lycopodium clavatum* *Lycopodium saururus* *Lycopodium verticillatum*
SELAGINELLACEAE	*Selaginella caffrorum* *Selaginella imbricatum*
ISOëTACEAE	*Isoëtes transvaalensis*
EQUISETACEAE	*Equisetum ramosissimum*
OPHIOGLOSSACEAE	*Ophioglossum polyphyllum* *Ophioglossum vulgatum* *Ophioglossum reticulatum* *Ophioglossum sarcophyllum* *Osmunda regalis*
SCHIZAEACEAE	*Schizaea pectinata* *Mohria caffrorum* *Mohria hirsuta*
GLEICHENIACEAE	*Gleichenia umbraculifera* *Gleichenia polypodioides*
HYMENOPHYLLACEAE	*Hymenophyllum turnbridgense*
CYATHEACEAE	*Cyathea dregei*

DENNSTAEDTIACEAE	*Pteridium aquilinum* subsp. *aquilinum*
ADIANTACEAE	*Anogramma leptophylla* *Adiantum capillus-veneris* *Adiantum poiretii* *Pteris cretica* *Cheilanthes eckloniana* *Cheilanthes hirta* *Cheilanthes quadripinnata* *Cheilanthes multifida* subsp. *lacerata* *Pellaea calomelanos*
POLYPODIACEAE	*Pleopeltis macrocarpa* *Pleopeltis schraderi* *Pleopeltis lanceolata* *Polypodium vulgare* *Polypodium ecklonii* *Polypodium schraderi*
ASPLENIACEAE	*Asplenium adiantum-nigrum* *Asplenium aethiopicum* *Asplenium monanthes* *Asplenium platyneuron* *Asplenium stoloniferum* *Asplenium tichomares* *Asplenium varians* subsp. *fimbriatum* *Ceterach cordatum*
ATHYRIACEAE	*Cystopteris fragilis* *Athyrium scandicinum* *Athyrium schimperi*
LOMARIOPSIDACEAE	*Elaphoglossum acrostichoides* *Elaphoglossum drakensbergense* *Elaphoglossum hybridum* *Elaphoglossum spathulatum* *Elaphoglossum angustatum*
ASPIDIACEAE	*Woodsia montevidensis* var. *burgessiana* *Dryopteris athamantica* *Dryopteris dracomontana* *Dryopteris esterhuyseniae* *Dryopteris inaequalis* *?? Dryopteris pentheri* *? Dryopteris thelypteris* *Polystichum alticola* *Polystichum dracomontana* *Polystichum lucidum* *Polystichum monticola* *Polystichum setiferum* var. *stenophyllum* *Polystichum transvaalense*

	Polystichum dracomontanum
	Polystichum lactuosum
BLECHNACEAE	*Blechnum australe*
	Blechnum giganteum
	Blechnum inflexum

GYMNOSPERMS

ZAMIACEAE	*Encephalartos ghellinckii*
PODOCARPACEAE	*Podocarpus falcatus*
	Podocarpus latifolius
	Podocarpus henkelii
PINACEAE	*Widdringtonia nodiflora*

ANGIOSPERMS

TYPHACEAE	*Typha capensis*
POTAMOGETONACEAE	*Potamogeton pussilus*
	Potamogeton thunbergii
	Potamogeton trichoides
APONOGETONACEAE	*Aponogeton junceus*
	Aponogeton ranunculiflorus
HYDROCHARITACEAE	*Lagarosiphon major*
	Lagarosiphon muscoides
POACEAE	*Ischaemum acuatum*
	Phacelarus franksiae
	Hemarthria altissima
	Elionurus muticus
	Imperata cylindrica
	Miscanthus capensis
	Eulalia villosa
	Andropogon amethystinus
	Andropogon appendiculatus
	Andropogon distachyos
	Andropogon eucomus
	Andropogon ravus
	Andropogon schirensis
	Cymbopogon excavatus
	Cymbopogon dieterlenii
	Cymbopogon validus
	Hyparrhenia dregeana
	Hyparrhenia hirta

	Hyparhenia tamba
	Hyparhenia sp.
	Monocymbium ceresiiforme
	Trachypogon spicatus
	Heteropogon contortus
POACEAE (cont.)	*Diheteropogon filifolius*
	Themeda triandra
	Digitaria diagonalis
	Digitaria flaccida
	Digitaria monodactyla
	Digitaria setifolia
	Digitaria ternata
	Digitaria tricholaenoides
	Alloteropsis semialata subsp. *eckloniana*
	Paspalum distichum
	Rhynchelytrum nerviglumae
	Panicum aequinerve
	Panicum ecklonii
	Panicum natalense
	Panicum schinzii
	Setaria obscura
	Setaria pallide-fusca
	Pennisetum natalense
	Pennisetum sphacelatum
	Pennisetum thunbergii
	Ehrharta erecta var. natalensis
	Ehrharta longigluma
	Anthoxanthium eckonii
	Arundinella nepalensis
	Tristachya leucothrix
	Loudetia simplex
	Aira caryophyllea
	Deschampsia caespitosa
	Helictotrichon galpinii
	Helictotrichon hirtulum
	Helictotrichon longifolium
	Helictotrichon natalense
	Helictotrichon turgidulum
	Streblochaeta longiarista
	Lintonia nutans
	Merxmuellera aureocephala
	Merxmuellera disticha
	Merxmuellera drakensbergensis
	Merxmuellera guillarmodae
	Merxmueller macowanii
	Merxmuellera stereophylla
	Merxmuellera stricta
	Merxmueller sp. nov.
	Karroochloa purpurea
	Pentaschistis aurea subsp. *pilosogluma*
	Pentaschistis angustifolia

	Pentaschistis capensis
	Pentaschistis galpinii
	Pentaschistis pilosogluma
	Pentaschistis oreodoxa
	Pentaschistis pallida
	Pentaschistis setifolia
	Pentaschistis tysonii
POACEAE (cont.)	*Pentaschistis* sp.
	Phragmites australis
	Agrostis barbuligera var. *barbuligera*
	Agrostis bergiana var. *bergiana*
	Agrostis bergiana var. *laeviuscula*
	Agrostis continuata
	Agrostis eriantha var. *eriantha*
	Agrostis lachnantha var. *lachnantha*
	Agrostis subulifolia
	Aristida canescens subsp. *canescens*
	Aristida junciformis subsp. *galpinii*
	Aristida monticola
	Stipa dregeana var. *elongata*
	Sporobolus centrifugus
	Sporobolus congoensis
	Sporobolus mauritianus
	Sporobolus pyrimidalis
	Eragrostis aspera
	Eragrostis caesia
	Eragrostis capensis
	Eragrostis curvula
	Eragrostis plana
	Eragrostis planiculmis
	Eragrostis racemosa
	Eragrostis trichophora
	Microchloa caffra
	Rendlia altera
	Cynodon dactylon
	Harpochloa falx
	Chloris virgata
	Eleusine indica subsp. *africana*
	Styppeiochloa gymnoglossa
	Fingerhuthia sesleriiformis
	Koeleria capensis
	Melica racemosa
	Stiburus alopecuroides
	Stiburus conrathii
	Poa binnata
	Poa letoclada
	Poa sp.
	Poa sp.
	Colpodium hedbergii
	Festuca caprina
	Festuca costata

Festuca killickii
Festuca scabra
Festuca sp.
Bromus leptocladus
Bromus speciosus
Hordeum capense
Brachypodium bolusii
Brachypodium flexum
Thamnocalamus tesselatus

CYPERACEAE

Ascolepis capensis
Carpha filifolia
Cyperus albostriatus
Cyperus marginatus
Cyperus obtusiflorus var. *obtusiflorus*
Cyperus rupestris var. *parvinux*
Cyperus schlechteri
Cyperus semitrifidus var. *semitrifidus*
Cyperus sphaerocephalus
Pycreus flavescens
Pycreus macranthus
Pycreus oakfortensis
Pycreus rehmannianus
Pycreus unioloides
Mariscus congestus
Mariscus drakensbergensis
Kyllinga pauciflora
Kyllinga pulchella
Ficinia cinnamomea
Ficinia filiculmea
Ficinia nana
Ficinia stolonifera
Ficinia undosa
Fuirena pubescens
Scirpus burkei
Scirpus falsus
Scirpus ficinioides
Scirpus sp.
Schoenoplectus corymbosus
Schoenoplectus decipiens
Isolepis angelica
Isolepis cernua
Isolepis costata var. *costata*
Isolepis fluitans
Isolepis pellacolea
Isolepis setacea
Eleocharis dregeana
Eleocharis palustris
Fimbristylis dichotoma
Fimbristylis hispidula
Bulbostylis densa

	Bulbostylis humilis
	Bulbostylis oritrephes
	Bulbostylis schoenoides
	Bulbostylis scleropus
	Rhynchospora brownii
	Tetraria cuspidata
	Tetraria macowania
	Scleria bulbifera
	Scleria dieterlenii
	Scleria dregeana
	Scleria welwitschii
	Scleria woodii
CYPERACEAE (cont.)	*Schoenixiphium bracteosum*
	Schoenoxiphium buchananii
	Schoenoxiphium burtii
	Schoenoxiphium caricoides
	Schoenoxiphium distinctum
	Schoenoxiphium filiforme
	Schoenixiphium lehmannii
	Schoenoxiphium ludwigii
	Schoenoxiphium madagascariense
	Schoenoxiphium molle
	Schoenoxiphium rufum
	Schoenoxiphium schweickerdtii
	Schoenoxiphium sparteum
	Schoenoxiphium strictum
	Carex acutiformis
	Carex bequaertii
	Carex austro-africana
	Carex cognata var. cognata
	Carex dimorpholepis
	Carex glomerabilis
	Carex killickii
	Carex monotropa
	Carex merxmuelleri
	Carex mossii
	Carex petitiana
	Carex spicato-paniculata
	Carex subinflata
	Carex zuluensis
ARACEAE	*Zantedeschia aethiopica*
	Zantedeschia albomaculata
RESTIONACEAE	*Ischyrolepis schoenoides*
	Restio galpinii
	Restio sejunctus
	Restio sp.
XYRIDACEAE	*Xyris anceps*
	Xyris capensis

	Xyris gerrardii
ERIOCAULACEAE	*Eriocaulon abyssinicum*
	Eriocaulon dregei var. *sonderianum*
	Eriocaulon gilgianum
	Eriocaulon hydrophilum
COMMELINACEAE	*Commelina africana*
	Cyanotis speciosa
JUNCACEAE	*Juncus bufonius*
	Juncus dregeanus
	Juncus effusus
	Juncus exsertus
JUNCACEAE (cont.)	*Juncus inflexus*
	Juncus mollifolius
	Juncus oxycarpus
	Juncus punctorius
	Juncus tenuis
	Luzula africana
LILIACEAE	*Littonia modesta*
(Colchicaceae)	*Sandersonia aurantiaca*
	Androcymbium longipes
	Androcymbium melanthoides
	Androcymbium striatum
	Wurmbea angustifolia
	Wurmbea burttii
	Wurmbea elatior
	Wurmbea kraussii
	Wurbea pusilla
(Asphodelaceae)	*Bulbine abyssinica*
	Bulbine capitata
	Bulbine favosa
	Trachyandra asperata
	Trachyandra gerrardii
	Trachyandra smalliana
	Anthericum acutum
	Anthericum cooperi
	Anthericum longistylum
	Anthericum fasciculatum ???
	Chlorophytum comosum
	Chlorophytum krookianum
(Hyacinthaceae)	*Bowiea volubilis*
	Albuca affinis
	Albuca fastigiata
	Albuca humilis
	Albuca macowanii
	Albuca polyphylla
	Albuca rupestris
	Albuca setosa

	Albuca shawii
	Urginea calcarata
	Urginea capitata
	Urginea macrocentra
	Urginea modesta
	Urginea multisetosa
	Urginea saniensis
	Urginea tenella
	Galtonia candicans
	Galtonia regalis
	Galtonia viridiflora
	Drimia neriniformis
	Drimia robusta
	Drimia sphaerocephala
	Dipcadi gracillimum
	Dipcadi marlothii
(Hyacinthaceae) (cont.)	*Dipcadi viride*
	Litanthus pusillus
	Scilla dracomontana
	Scilla natalensis
	Scilla nervosa
	Eucomis autumnalis subsp. *clavata*
	Eucomis bicolor
	Eucomis comosa var. *striata*
	Eucomis humilis
	Eucomis schijffii
	Ornithogalum diphyllum
	Ornighogalum graminifolium
	Ornithogalum juncifolium
	Ornithogalum longibracteatum
	Ornithogalum ornithogaloides
	Ornithogalum paludosum
	Ornithogalum sephtonii ????
	Ornithogalum tenuifolium ??
	Elsiae flanaganii ???
	Elsiae tysonii ???
	Drimiopsis lachenalioides
	Ledebouria cooperi
	Ledebouria marginata
	Ledebouria ovatifolia
	Ledebouria revoluta
	Massonia echinata
(Eriospermaceae)	*Eriospermum cooperi*
	Eriospermum hygrophilum
	Eriospermum mackenii
	Eriospermum natalense
	Eriospermum ornithogaloides
(Asphodelaceae)	*Kniphofia albomontana*
	Kniphofia angustifolia
	Kniphofia brachystachya
	Kniphofia breviflora

	Kniphofia caulescens
	Kniphofia evansii
	Kniphofia fibrosa
	Kniphofia fluviatilis
	Kniphofia laxiflora
	Kniphofia ichopensis
	Kniphofia linearifolia
	Kniphofia northiae
	Kniphofia porphyrantha
	Kniphofia ritualis
	Kniphofia thodei
	Kniphofia triangularis subsp. *triangularis*
	Notosceptrum brachystachum ????
(Aloaceae)	*Aloe arborescens*
	Aloe aristata
	Aloe boylei
	Aloe cooperi
	Aloe dominella
(Aloaceae) (cont.)	*Aloe ferox*
	Aloe ecklonis
	Aloe kraussii
	Aloe maculata
	Aloe pratensis
(Aliaceae)	*Agapanthus campanulatus*
	Agapanthus nutans
	Tulbaghia acutiloba
	Tulbaghia leucantha
	Tulbaghia ludwigiana
	Tulbaghia montana
	Tulbaghia natalensis
(Asparagaceae)	*Protasparagus africanus*
	Protasparagus microraphis
	Protasparagus virgatus
	Myrsiphyllum asparagoides
	Myrsiphyllum ramosissimum
(Philesiaceae)	*Behnia reticulata*
(Haemodoraceae)	*Barberetta aurea*
AMARYLLIDACEAE	*Haemanthus humilis* subsp. *hirsutus*
	Scadoxus puniceus
	Nerine appendiculatus
	Nerine bowdenii
	Nerine filifolia
	Nerine pancratioides
	Brunsvigia grandiflora
	Brunsvigia natalensis
	Apodolirion buchananii
	Crinum bulbispermum
	Cyrtanthus attenuatus
	Cyrtanthus breviflorus
	Cyrtanthus contractus

	Cyrtanthus epiphyticus
	Cyrtanthus erubescens
	Cyrtanthus falcatus
	Cyrtanthus flanaganii
	Cyrtanthus stenanthus var. *stenanthus*
	Cyrtanthus tuckii var. *transvaalensis*
	Cyrtanthus tuckii var. *tuckii*
	Cyrtanthus tuckii var. *viridilobus*
HYPOXIDACEAE	*Empodium elongatum*
	Empodium monophyllum
	Hypoxis acuminata
	Hypoxis angustifolia var. *angustifolia*
	Hypoxis cordata
	Hypoxis costata
	Hypoxis filiformis
	Hypoxis galpinii
	Hypoxis gerrardii
	Hypoxis iridifolia
	Hypoxis ludwigii
HYPOXIDACEAE (cont.)	*Hypoxis membranacea*
	Hypoxis multiceps
	Hypoxis neliana
	Hypoxis obtusa
	Hypoxis oligotricha
	Hypoxis parvifolia
	Hypoxis parvula
	Hypoxis regidula var. *rigidula*
	Hypoxis rooperi
	Hypoxis sobilifera
	Hypoxis tetramera
	Hypoxis villosa var. *obliqua*
	Hypoxis villosa var. *pannosa*
	Hypoxis sp.
	Rhodohypoxis baurii var. *baurii*
	Rhodohypoxis baurii var. *confecta*
	Rhodohypoxis baurii var. *platypetala*
	Rhodohypoxis deflexa
	Rhodohypoxis incompta
	Rhodohypoxis milloides
	Rhodohypoxis rubella
	Rhodohypoxis thodiana
	Saniella verna
VELLOZIACEAE	*Xerophyta longicaulis*
	Xerophyta viscosa
	Talbotia elegans
DIOSCOREACEAE	*Dioscorea retusa*
	Dioscorea rupicola
	Dioscorea tysonii

IRIDACEAE	*Apodolirion ettae ??*
	Romulea campanuloides var. *campanuloides*
	Romulea campanuloides var. *gigantea*
	Romulea luteoflora var. *saniensis*
	Romulea macowanii var. *alticola*
	Romulea macowanii var. *oreophulla*
	Moraea albicuspa
	Moraea alpina
	Moraea alticola
	Moraea ardesiaca
	Moraea brevistyla
	Moraea carnea
	Moraea dracomontana
	Moraea graminicola subsp. *graminicola*
	Moraea hiemalis
	Moraea huttonii
	Moraea inclinata
	Moraea modesta
	Moraea natalensis
	Moraea robusta
	Moraea spathulata
	Moraea stricta
IRIDACEAE (cont.)	*Moraea trifida*
	Moraea unibracteata
	Dietes iridioides
	Homeria pallida
	Aristea angolensis subsp. *angolensis*
	Aristea cognata
	Aristea ecklonii
	Aristea flexicaulis
	Aristea grandis
	Aristea montana
	Aristea woodii
	Aristea sp.
	Hesperantha alborosea
	Hesperantha baurii subsp. *baurii*
	Hesperantha baurii subsp. *formosa*
	Hesperantha candida
	Hesperantha crocopsis
	Hesperantha curvula
	Hesperantha glareosa
	Hesperantha grandiflora
	Hesperantha hygrophila
	Hesperantha pubinervia
	Hesperantha schelpeana
	Hesperantha scopulosa
	Hesperantha tysonii
	Hesperantha vernalis
	Hesperantha woodii
	Dierama ambiguum
	Dierama argyreum

	Dierama cooperi
	Dierama dissimile
	Dierama dracomontanum
	Dierama latifolium
	Dierama pauciflorum
	Dierama pictum
	Dierama robustum
	Dierama trichorhizum
	Tritonia distica subsp. *rubrolucens*
	Tritonia lineata var. *lineata*
	Crocosmia aurea var. *aurea*
	Crocosmia paniculata
	Crocosmia pearsei
	Gladiolus crassifolius
	Gladiolus cruentus
	Gladiolus daleni
	Gladiolus ecklonii subsp. *ecklonii*
	Gladiolus elliotii
	Gladiolus flanaganii
	Gladiolus longicollis var. *longicollis*
	Gladiolus loteniensis
	Gladiolus microcarpus subsp. *microcarpus*
	Gladiolus oppositiflorus subsp. *salmoneus*
	Gladiolus papilio
IRIDACEAE (cont.)	*Gladiolus parvulus*
	Gladiolus permeabilis subsp. *edulis*
	Gladiolus permeabilis subsp. *wilsonii*
	Gladiolus pugioniformis
	Gladiolus saundersii
	Gladiolus sericeo-villosus forma *sericeo-villisus*
	Gladiolus symonsii
	Gladiolus woodii
	Watsonia densiflora
	Watsonia gladioloides
	Watsonia lepida
	Watsonia pillansii
	Watsonia watsonioides
	Watsonia sp.
ORCHIDACEAE	*Stenoglottis fimbriata*
	Holothrix incurva
	Holothrix othoceras
	Holothrix scopularia
	Holothrix thodei
	Huttonaea grandiflora
	Huttonaea fimbriata
	Huttonaea oreophila
	Huttonaea pulchra
	Huttonaea woodii
	Habenaria arenaria
	Habenaria chlorotica

Habenaria clavata
Habenaria cornuta
Habenaria dives
Habenaria epipactidea
Habenaria dregeana
Habenaria laevigata
Habenaria lithophila
Habenaria malacophylla
Habenaria schimperiana
Brachycorythis pubescens
Brachycorythis ovata
Neobolusia tysonii
Neobolusia virginea
Satyrium bracteatum
Satyrium cristatum var. *cristatum*
Satyrium cristatum var. *longilabiatum*
Satyrium fanniniae ???
Satyrium hallackii subsp. *ocellatum*
Satyrium ligulatum
Satyrium longicauda var. *longicauda*
Satyrium longicauda var. *jacottetianum*
Satyrium macrophyllum
Satyrium microrrhynchum
Satyrium neglectum
Satyrium parviflorum
Satyrium sphaerocarpum

ORCHIDACEAE (cont.)

Satyrium trinerve
Schizochilus angustifolius
Schizochilus bulbinella
Schizochilus flexuosus
Schizochilus zeyheri
Brownleea coerulea
Brownleea galpinii
Brownleea macroceras
Brownleea parviflora
Disa aconitoides subsp. aconitoides
Disa basutorum
Disa cephalotes subsp. *cephalotes*
Disa cephalotes subsp. *frigida*
Disa chrysostachya
Disa cooperi
Disa crassicornis
Disa cornuta
Disa fragrans subsp. *fragrans*
Disa galpinii
Disa hircicornis
Disa nivea
Disa oreophila subsp. *oreophila*
Disa oreophila subsp. *erecta*
Disa pulchra
Disa patula var. *transvaalensis*

	Disa sanguinea
	Disa sankeyi
	Disa scullyi
	Disa stricta
	Disa stachyoides
	Disa tysonii
	Disa versicolor
	Disa thodei
	Herschelia baurii
	Monadenia brevicornis
	Disperis anthoceros
	Disperis cardiophora
	Disperis concinna
	Disperis fanniniae
	Disperis macowanii
	Disperis oxyglossa
	Disperis renibractea
	Disperis stenoplectron
	Disperis tysonii
	Disperis wealei
	Pterygodium cooperi
	Pterygodium hastatum
	Pterygodium leucanthum
	Anochilus flanaganii
	Corycium dracomontanum
	Corycium magnum
	Corycium nigrescens
	Liparis bowkeri
ORCHIDACEAE (cont.)	*Polystachya ottoniana*
	Eulophia aculeata
	Eulophia calanthoides
	Eulophia foliosa
	Eulophia leontoglossa
	Eulophia ovalis subsp. *ovalis*
	Eulophia parviflora
	Eulophia streptopetala
	Eulophia zeyheriana
	Angraecum chamaeanthus
	Mystacidium gracile
PIPERACEAE	*Peperomia retusa* var. *retusa*
	Peperomia tetraphylla
SALICACEAE	*Salix mucronata* subsp. *woodii*
MYRICACEAE	*Myrica brevifolia*
	Myrica pilulifera
	Myrica serrata
ULMACEAE	*Celtis africana*

MORACEAE	*Ficus burtt-davyi*
	Ficus ingens
	Ficus thonningii
URTICACEAE	*Laportea alatipes*
	Laportea peduncularis subsp. *peduncularis*
	Parietaria micrantha
PROTEACEAE	*Protea caffra*
	Protea dracomontana
	Protea nubigena
	Protea roupelliae
	Protea simplex
	Protea subvestita
LORANTHACEAE	*Tapinanthus natalitius* subsp. *natalitius*
VISCACEAE	*Viscum triflorum*
SANTALACEAE	*Osyris lanceolata*
	Thesium acutissimum
	Thesium alatum
	Thesium angulosum
	Thesium asterias
	Thesium costatum var. *costatum*
	Thesium costatum var. juniperinum
	Thesium cupressoides
	Thesium decipiens
	Thesium durum
	Thesium goetzeanum
SANTALACEAE (cont.)	*Thesium hirsutum*
	Thesium imbricatum
	Thesium impeditum
	Thesium lobelioides
	Thesium macrogyne
	Thesium natalense
	Thesium nationae
	Thesium nigromontanum
	Thesium nigrum
	Thesium pallidum
	Thesium racemosum
	Thesium scirpioides
	Thesium virens
	Thesium zeyheri
POLYGONACEAE	*Rumex acetosella*
	Rumex dregeanus subsp. *montanus*
	Rumex lanceolatus
	Rumex sagittatus
	Rumex steudelii
	Rumex woodii

	Polygonum lapathifolium
	Polygonum meisnerianum
	Polygonum pulchrum
	Polygonum senegalense subsp. *albotomentosum*
	Persicaria amphibia
	Persicaria lapathifolia
	Persicaria serrulata
CHENOPODIACEAE	*Chenopodium mucronatum*
AMARANTHACEAE	*Amaranthus capensis* subsp. *uncinatus*
	Cyathula cylindrica
	Cyathula uncinulata
AIZOACEAE	*Limeum viscosum* subsp. *viscosum* var. *glomeratum*
	Psammotropha alternifolia
	Psammotropha mucronata var. *mucronata*
	Psammotropha myriantha
	Psammotropha obovata
	Psammotropha obtusa
	Pharnaceum dichotomum
MESEMBRYANTHACEAE	*Delosperma alticolum*
	Delosperma ashtonii
	Delosperma deleeuwiae
	Delosperma lavisiae var. *lavisiae*
	Delosperma nubigenum
	Delosperma obtusum
	Delosperma scabripes
	Delosperma sutherlandii
	Delosperma sp.
	Delosperma sp. ?
MESEMBRYANTHACEAE (cont.)	*Mossia intervallaris*
	Ruschia putterllii
CARYOPHYLLACEAE	*Cerastium arabidis*
	Cerastium capense
	Cerastium indicum
	Stellaria sennii
	Silene bellidioides
	Silene burchellii var. *angustifolia*
	Silene burchellii var. *burchellii*
	Silene burchellii var. *latifolia*
	Silene undulata
	Dianthus basuticus subsp. *basuticus* var. *grandiflorus*
	Dianthus mooiensis subsp. *mooiensis* var. *dentatus*
RANUNCULACEAE	*Anemone fanninii*
	Clematis brachiata
	Ranunculus baurii

	Ranunculus meyeri
	Ranunculus multifidus
	Thalictrum rhynchocarpum
MENISPERMACEAE	*Stephania abyssinica* var. *tomentella*
TRIMENIACEAE	*Xymalos monospora*
LAURACEAE	*Ocotea bullata*
	Cryptocarya woodii
PAPAVERACEAE	*Papaver aculeatum*
FUMARIACEAE	*Fumaria officinalis*
	Phacocapnos pruinosus
BRASSICACEAE	*Heliophila alpina*
	Heliophila carnosa
	Heliophila formosa
	Heliophila rigidiuscula
	Heliophila suavissima
	Aplanodes doidgeana
	Lepidium basuticum
	Lepidium myriocarpum
	Lepidium schinzii
	Sisymbrium capense
	Sisymbrium turczaninowii
	Erucastrum strigosum
	Rorippa nudiuscula
	Cardamine africana
DORSERACEAE	*Drosera natalensis*
PODOSTEMACEAE	*Sphaerothylax algiformis*
CRASSULACEAE	*Cotyledon orbiculata* var. *oblonga*
	Kalanchoe thyrsiflora
	Crassula alba var. *alba*
	Crassula campestris
	Crassula capensis var. *promontorii*
	Crassula dependens
	Crassula drakensbergensis
	Crassula filamentosa
	Crassula gemmifera
	Crassula inanis
	Crassula lanceolata subsp. *lanceolata*
	Crassula lanceolata subsp. *transvaalensis*
	Crassula natalensis
	Crassula natans var. *minus*
	Crassula papillosa
	Crassula peploides

	Crassula sarcocaulis subsp. *rupicola*
	Crassula setulosa var. *setulosa*
	Crassula tenuicaulis
	Crassula umbraticola
	Crassula vaginata subsp. *vaginata*
ESCALLONIACEAE	*Choristylis rhamnoides*
PITTOSPORACEAE	*Piitosporum viridiflorum*
ROSACEAE	*Rubus ludwigii* subsp. *ludwigii*
	Rubus ludwigii subsp. *spatiosus*
	Rubus rigidus
	Rubus pinnatus
	Potentilla supina
	Geum capense
	Alchemilla colura
	Alchemilla galpinii
	Alchemilla natalensis
	Alchemilla woodii
	Leucosidea sericea
	Agrimonia procera
	Cliffortia browniana
	Cliffortia filicauloides
	Cliffortia linearifolia
	Cliffortia nitidula subsp. *pilosa*
	Cliffortia paucistaminea
	Cliffortia repens
	Cliffortia spathulata
	Prunus africana
FABACEAE	*Acacia caffra*
(Mimosaceae)	*Acacia karoo*
	Acacia sieberiana var. *woodii*
	Elephantorrhiza woodii var. *pubescens*
(Caesalpiniaceae)	*Chamaecrista mimosoides*
	Calpurnia aurea subsp. *aurea*
	Calpurnia sericea
	Lotononis adpressa subsp. *adpressa*
	Lotononis calycina var. *calycina*
	Lotononis corymbosa
	Lotononis biflora
	Lotononis divaricata
	Lotononis eriantha
	Lotononis foliosa
	Lotononis galpinii
	Lotononis jacottetii
	Lotononis lotonoides
	Lotononis macrosepala

Lotononis ornata
Lotononis procumbens
Lotononis pulchella
Lotononis pulchra
Lotononis sericophylla
Lotononis solitudinis
Lotononis stricta
Lotononis sutherlandii
Lotononis virgata
Lotononis viminea
Lotononis woodii
Pearsonia grandifolia subsp. *grandifolia*
Aspalathus chortophila subsp. *chortophila*
Dichilus lebeckioides
Dichilus reflexus
Dichilus strictus
Melolobium alpinum
Melolobium microphyllum
Melolobium obcordatum
Crotolaria capensis
Crotolaria globifera
Argyrolobium amplexicaule
Argyrolobium collinum
Argyrolobium harveyanum
Argyrolobium humile
Argyrolobium lydenbergense
Argyrolobium marginatum
Argyrolobium nigrescens
Argyrolobium pauciflorum var. *pauciflorum*
Argyrolobium pauciflorum var. semiglabrum
Argyrolobium rupestre
Argyrolobium sankeyi
Argyrolobium sericosemium
Argyrolobium speciosum
Argyrolobium stipulaceum
Argyrolobium summomontanum
Argyrolobium tomentosum
Argyrolobium tuberosum
Argyrolobium tysonii

(Caesalpiniaceae) (cont.)

Argyrolobium variopile
Argyrolobium woodii
Argyrolobium sp.
Medicago polymorpha
Trifolium africanum var. *glebellum*
Trfolium burchellianum var. *burchellianum*
Trifolium repens
Lotus discolor subsp. *discolor*
Indigofera argyraea
Indigofera cuneifolia
Indigofera dimidiata

	Indigofera evansiana
	Indigofera evansii
	Indigofera fastigiata
	Indigofera foliosa
	Indigofera frondosa
	Indigofera heterantha
	Indigofer hedyantha
	Indigofera hilaris
	Indigofera krookii
	Indigofera longebarbata
	Indigofera pseudoevansii
	Indigofera woodii
	Psoralea pinnata
	Psoralea sp. nov.
	Otholobium caffrum
	Otholobium polystictum
	Tephrosia capensis var. *acutifolia*
	Tephrosia diffusa
	Tephrosia macropoda var. *macropoda*
	Tephrosia marginella
	Tephrosia semiglabra
	Sutherlandia frutescens
	Sutherlandia microphylla
	Sutherlandia montana
	Lessertia depressa
	Lessertia perennans var. *perennans*
	Lessertia stricta
	Lessertia thodei
	Desmodium dregeanum
	Desmodium repandum
	Pseudarthria hookeri var. *hookeri*
	Dumasia villosa var. *villosa*
	Rhynchosia caribaea
	Rhynchosia foliosa
	Rhynchosia harmsiana var. *harmsiana*
	Rhynchosia pentheri var.*hutchinsoniana*
	Rhynchosia pentheri var. *pentheri*
	Rhynchosia reptabunda
	Rhynchosia sordida
	Rhynchosia stenodon
	Rhynchosia totta var. *totta*
	Eriosema cordatum
(Caesalpiniaceae) (cont.)	*Eriosema distinctum*
	Eriosema kraussianum
	Eriosema salignum
	Eriosema squarrosum var. *acuminata*
	Vigna nervosa
	Vigna tenuis
	Lablab purpureus subsp. *uncinatus*
	Dolichos angustifolius
	Dolichos angustissimus

	Dolichos linearis
GERANIACEAE	*Geranium angustipetalum*
	Geranium brycei
	Geranium caffrum
	Geranium canescens
	Geranium drakensbergensis
	Geranium flanaganii
	Geranium incanum var. *incanum*
	Geranium magniflorum
	Geranium multisectum
	Geranium natalense
	Geranium ornithopodon
	Geranium pulchrum
	Geranium sparsiflorum
	Geranium wakkerstroomianum
	Monsonia attenuata
	Monsonia brevirostrata
	Monsonia glauca
	Monsonia natalensis
	Pelargonium alchemilloides
	Pelargonium bowkerii
	Pelargonium caffrum
	Pelargonium capituliforme
	Pelargonium dispar
	Pelargonium luridum
	Pelargonium multicaule
	Pelargonium pseudofumarioides
	Polygonium sidifolium
	Pelargonium schlechteri
	Pelargonium zonale
OXALIDACEAE	*Oxalis depressa*
	Oxalis oblinquifolia
	Oxalis semiloba
	Oxalis smithiana
LINACEAE	*Linum thunbergii*
RUTACEAE	*Zanthoxylum capense*
	Zanthoxylum davy
	Calodendrum capense
	Vepris undulata
	Clausena anisata
PTAEROXYLACEAE	*Ptaeroxylon obliquum*
MELIACEAE	*Ekebergia capensis*
POLYGALACEAE	*Polygala confusa*
	Polygala gracilenta

	Polygala ephedroides
	Polygala fruticosa
	Polygala gerrardii
	Polygala hispida
	Polygala hottentotta
	Polygala myrtifolia
	Polygala natalensis
	Polygala ohlendorfiana
	Polygala praticola
	Polygala rhinostigma
	Polygala uncinata
	Polygala virgata var. *virgata*
	Muraltia flanaganii
	Muraltia lancifolia
	Muraltia saxicola
EUPHORBIACEAE	*Adenocline acuta*
	Acalypha peduncularis
	Acalypha punctata var. *punctata*
	Acalypha schinzii
	Acalypha wilmsii
	Clutia disceptata
	Clutia katharinae
	Clutia monticola
	Clutia nana
	Clutia natalensis
	Euphorbia clavarioides var. *clavarioides*
	Euphorbia ephedroides
	Euphorbia epicyparissias var. *epicyparissias*
	Euphorbia ericoides
	Euphorbia gueinzii var. *albovillosa*
	Euphorbia gueinzii var. *gueinzii*
	Euphorbia natalensis
	Euphorbia striata var. *striata*
ANACARDIACEAE	*Rhus chirindensis*
	Rhus dentata
	Rhus discolor
	Rhus divaricata
	Rhus dracomontana
	Rhus gerrardii
	Rhus krebsiana
	Rhus lucida forma *lucida*
	Rhus montana
	Rhus pallens
	Rhus pentheri
	Rhus pyroides var. *gracilis*
ANACARDIACEAE	*Rhus pyroides* var. *integrifolia*
	Rhus pyroides var. *pyroides*
	Rhus rehmanniana var. *rehmanniana*
	Rhus rehmanniana var. *glabrata*

	Rhus rigida var. *margaretae*
	Rhus rigida
	Rhus rupicola
	Rhus tomentosa
AQUIFOLIACEAE	*Ilex mitis*
CELASTRACEAE	*Maytenus acuminata* var. *acuminata*
	Maytenus heterophylla
	Maytenus mossambicensis var. *mossambicensis*
	Maytenus nemorosa
	Maytenus peduncularis
	Maytenus senegalensis
	Maytenus undata
	Pterocelastrus echinatus
	Pterocelastrus rostratus
	Cassine tetragona
ICACINACEAE	*Cassinopsis ilicifolia*
	Apodytes dimidiata subsp. *dimidiata*
SAPINDACEAE	*Allophylus africanus*
	Hippobromus pauciflorus
MELIANTHACEAE	*Melianthus villosus*
GREYIACEAE	*Greyia sutherlandii*
BALSAMINACEAE	*Impatiens hochstetteri* subsp. *hochstetteri*
RHAMNACEAE	*Ziziphus mucronata* subsp. *mucronata*
	Scutia myrtina
	Rhamnus prinoides
	Phylica paniculata
	Phylica thodei
VITACEAE	*Rhoicissus tomentosa*
	Rhoicissus tridentata
	Cissus cussonioides
TILIACEAE	*Sparrmannia ricinocarpa*
	Grewia hispida
	Grewia occidentalis
	Triumfetta annua forma *annua*
MALVACEAE	*Anisodontea julii* subsp. *pannosa*
	Sida alba
	Pavonia columella
	Hibiscus aethiopicus var. *aethiopicus*
MALVACEAE (cont.)	*Hibiscus saxatilis*
	Hibiscus trionum

STERCULIACEAE	*Hermannia coccocarpa* *Hermannia cordata* *Hermannia cristata* *Hermannia geniculata* *Hermannia gerrardii* *Hermannia grandifolia* *Hermannia malvifolia* *Hermannia oligosperma* *Hermannia woodii*
OCHNACEAE	*Ochna serrulata*
CLUSIACEAE	*Hypericum aethiopicum* subsp. *sonderi* *Hypericum lalandii*
FLACOURTIACEAE	*Kiggelaria africana* *Scolopia flanaganii* *Scolopia mundii* *Scolopia zeyheri* *Trimeria grandifolia* *Dovyalis zeyheri*
ACHARIACEAE	*Guthriea capensis*
BEGONIACEAE	*Begonia sutherlandii*
OLINIACEAE	*Olinia emarginata*
THYMELAEACEAE	*Gnidia aberrans* *Gnidia anthylloides* *Gnidia baurii* *Gnidia caffra* *Gnidia compacta* *Gnidia gymnostachya* *Gnidia kraussiana* var. *kraussiana* *Gnidia micorcephala* *Gnidia microphylla* *Gnidia polyantha* *Gnidia propingqua* *Gnidia renniana* *Gnidia singularis* *Struthiola angustiloba* *Englerodaphne pilosa* *Passerina drakensbergensis* *Passerina filiformis* *Passerina montana* *Dais cotinifolia*
LYTHRACEAE	*Rotala capensis*

COMBRETACEAE	*Combretum kraussii*
MYRTACEAE	*Eugenia zuluense*
EPILOBIUM	*Epilobium capense* *Epilobium hirsutum* *Epilobium salignum* *Epilobium tetragonum* subsp. *tetragonum* *Oenothera rosea* *Oenothera stricta* *Oenothera tetraptera*
HALORAGACEAE	*Laurembergia repens* subsp. *brachypoda* *Gunnera perpensa*
ARALIACEAE	*Cussonia paniculata* *Cussonia sphaerocephala* *Cussonia spicata*
APIACEAE	*Centella glabrata* var. *natalensis* *Sanicula elata* *Alepidea acutidens* var. *acutidens* *Alepidea amatymbica* var. *amatymbica* *Alepidea galpinii* *Alepidea insculpta* *Alepidea longifolia* subsp. *comosa* *Alepidea longifolia* subsp. *longifolia* *Alepidea natalensis* *Alepidea pilifera* *Alepidea pusilla* *Alepidea serrata* var. *serrata* *Alepidea stellata* *Alepidea setifera* *Alepidea thodei* *Alepidea woodii* *Agrocharis melanantha* *Conium fontanum* var. *alticola* *Lichtensteinia* sp. *Heteromorpha trifoliata* *Bupleurum mundtii* *Anginon difforme* *Dracosciadium saniculifolium* *Pimpinella caffra* *Pimpinella stadensis* *Sium repandum* *Polemannia montana* *Polemannia simplicior* *Peucedanum caffrum* *Peucedanum capense* *Peucedanum platycarpum* *Peucedanum thodei*

CORNACEAE	*Curtisia dentata*
ERICACEAE	*Erica aestiva* var. *aestiva*
	Erica aestiva var. *minor*
	Erica albospicata
	Erica algida
	Erica alopecurus var. *alopecurus*
	Erica alticola
	Erica anomala
	Erica caespitosa
	Erica caffra var. *caffra*
	Erica caffrorum var. *caffrorum*
	Erica caffrorum var. *luxurians*
	Erica cerinthoides var. *barbertona*
	Erica cerinthoides var. *cerinthoides*
	Erica cooperi
	Erica cubica var. *cubica*
	Erica dissimulans
	Erica dominans
	Erica drakensbergensis
	Erica dracomontana
	Erica ebracteata
	Erica evansii
	Erica flanaganii
	Erica frigida
	Erica glaphyra
	Erica holtii
	Erica lasiocarpa
	Erica leucopelta var. *leucopelta*
	Erica leucopelta var. *pubescens*
	Erica maesta var. *maesta*
	Erica natalensis
	Erica natalitia var. *natalitia*
	Erica oatesii var. *oatesii*
	Erica reenensis
	Erica schlechteri
	Erica straussiana
	Erica thodei
	Erica trichoclada
	Erica tristis
	Erica tysonii
	Erica woodii subsp. *woodii*
	Erica woodii subsp. *platyura*
	Erica wyliei
	Ericinella hillburttii
MYRSINACEAE	*Maesa lanceolata* var. *rufescens*
	Myrsine africana
	Myrsine pillansii
	Rapanea melanophloes

PRIMULACEAE	*Lysimachia ruhmeriana* *Anagallis huttonii*
EBENACEAE	*Euclea coriacea* *Euclea crispa* *Diospyros austro-africana* var. *austro-africana* *Diospyros austro-africana* var. *rubriflora* *Diopsyros lycioides* subsp. *sericea* *Diospyros whyteana*
OLEACEAE	*Olea capensis* subsp. *macrocarpa*
LOGANIACEAE	*Nuxia floribunda* *Gomphostigma virgatum* *Buddleja loricata* *Buddleja salviifolia*
GENTIANACEAE	*Sebaea bojeri* *Sebaea erosa* *Sebaea filiformis* *Sebaea junodii* *Sebaea leiostyla* *Sebaea macrophylla* *Sebaea marlothii* *Sebaea micrantha* var. *micrantha* *Sebaea minutissima* *Sebaea natalensis* *Sebaea pentrandra* var. *pentandra* *Sebaea pleurostigmatosa* *Sebaea procumbens* *Sebaea radiata* *Sebaea rehmannii* *Sebaea repens* *Sebaea sedoides* var. *confertiflora* *Sebaea sedoides* var. *schoenlandii* *Sebaea sedoides* var. *sedoides* *Sebaea spathulata* *Sebaea thodeana* *Sebaea thomasii* *Chironia albiflora* *Chironia krebsii* *Chrionia pegleriae* *Sweria welwitschii* *Nymphoides thunbergiana*
APOCYNACEAE	*Carissa bispinosa* subsp. *zambesiensis*
PERIPLOCACEAE	*Raphionacme hirsuta* *Raphionacme palustris*

ASCLEPIADACEAE

Xysmalobium involucratum
Xysmalobium parviflorum
Xysmalobium prunelloides
Xysmalobium stockenstromense
Xysmalobium trauseldii
Xysmalobium tysonianum

ASCLEPIADACEAE (cont.)

Xysmalobium undulatum
Xysmalobium woodii
Schizoglossum atropurpureum subsp. *atropurpureum*
Schizoglossum bidens subsp. *atrorubens*
Schizoglossum bidens subsp. *pachyglossum*
Schizoglossum crassipes
Schizoglossum elingue subsp. *elingue*
Schizoglossum elingue subsp. *purpureum*
Schizoglossum flavum
Schizoglossum hilliardiae
Schizoglossum montanum
Schizoglossum nitidum
Schizoglossum stenoglossum subsp. *flavum*
Schizoglossum stenoglossum subsp. *stenoglossum*
Aspidoglossum glabrescens
Aspidoglossum interruptum
Aspidoglossum virgatum
Miraglossum pulchellum
Miraglossum superbum
Miraglossum verticillare
Fanninia caloglossa
Pachycarpus campanulatus var. *campanulatus*
Pachycarpus campanulatus var. *sutherlandii*
Pachycarpus dealbatus
Pachycarpus macrochilus
Pachycarpus plicatus
Pachycarpus verticillare
Pachycarpus vexillaris
Asclepias cognata
Asclepias cucullata
Asclepias cultriformis
Asclepias diploglossa
Asclepias flava
Asclepias fruticosa
Asclepias gibba var. *gibba*
Asclepias humilis
Asclepias macropus
Asclepias oreophila
Asclepias reenensis
Asclepias stellifera
Asclepias xysmalobioides
Sisyranthus imberbis
Sisyranthus saundersiae
Anisotoma pedunculata
Brachystelma perditum

	Brachystelma petraeum
	Brachystelma pygmaeum subsp. *flavidum*
	Brachystelma thunbergii
CONVOLVULACEAE	*Seddera capensis*
	Convolvulus sagittatus
BORAGINACEAE	*Cynoglossum austro-africanum*
	Cynoglossum geometricum
	Cynoglossum hispidum
	Cynoglossum lanceolatum
	Cynoglossum spelaeum
	Afrotysonia africana
	Afrotysonia glochidiata
	Lappula squarrosa subsp. *heteracantha*
	Myosotis afropalustris
	Myosotis arvensis
	Myosotis semi-amplexicaulis
	Myosotis sylvatica
	Lithospermum afromontanum
	Lithospermum papilosum
	Lithospermum scabrum
LAMIACEAE	*Ajuga ophyrdis*
	Teucrium trifidum
	Leonotis leonurus
	Leonotis ocymifolia var. *ocymifolia*
	Leonotis ocymifolia var. *raineriana*
	Stachys aethiopica
	Stachys albiflora
	Stahys caffra
	Stachys dregeana
	Stachys flexuosa
	Stachys graciliflora
	Stachys grandifolia
	Stachys hyssopoides
	Stachys kuntzei
	Stachys natalensis var. *galpinii*
	Stachys sessilis
	Stachys simplex
	Stachys sp.
	Slavia aurita var. *galpinii*
	Salvia stenophylla
	Satureja compacta
	Satureja grandibracteata
	Satureja reptans
	Mentha aquatica
	Mentha longifolia subsp. *capensis*
	Aeollanthus buchnerianus
	Pycnostachys reticulata

	Plectranthus dolichopodus
	Plectranthus grallatus
	Plectranthus hilliardiae
	Rabdosiella calycina
	Syncolostemon macranthus
	Hemizygia bolusii
	Hemizygia elliottii
	Hemizygia macrophylla
	Hemizygia sp.
	Becium obovatum var. *obovatum*
SOLANACEAE	*Solanum aculeatissimum*
	Solanum chenopodioides
	Solanum giganteum
	Solanum retroflexum
SCROPHULARIACEAE	*Diascia anastrepte*
	Diascia austromontana
	Diascia barberae
	Diascia capsularis
	Diascia cordata
	Diascia integerrima
	Diascia megathura
	Diascia purpurea
	Diascia ramosa
	Diascia rigescens
	Diascia stachyoides
	Nemesia affinis
	Nemesia albiflora
	Nemesia coerulea
	Nemesia cynanchifolia
	Nemesia denticulata
	Nemesia flanaganii
	Nemesia floribunda
	Nemesia fruticans
	Nemesia glabriuscula
	Nemesia melissifolia
	Nemesia sylvatica
	Diclis reptans
	Diclis rotundifolia
	Halleria lucida
	Phygelius aequalis
	Phygelius capensis
	Bowkeria verticillata
	Manulea crassifolia
	Manulea florifera
	Manulea parviflora
	Manulea platystigma
	Manulea sp.
	Sutera arcuata
	Sutera beverlyana

	Sutera breviflora
	Sutera breviflora x pristisepala
	Sutera caerulea
	Sutera dentatisepala
	Sutera jurassica
	Sutera natalensis
	Sutera neglecta
	Sutera polelensis
	Sutera pristisepala
	Zaluzianskya capensis
	Zaluzianskya chrysops
	Zaluzianskya distans
	Zaluzianskya elongata
SCROPHULARIACEAE (cont.)	*Zaluzianskya glareosa*
	Zaluzianskya maritima
	Zaluzianskya microsiphon
	Zaluzianskya oreophila
	Zaluzianskya ovata
	Zaluzianskya pulvinata
	Zaluzianskya spathacea
	Zaluzianskya rubrostellata
	Zaluzianskya turritella
	Limosella africana
	Limosella capensis
	Limosella grandiflora
	Limosella inflata
	Limosella longiflora
	Limosella major
	Limosella vesiculosa
	Mimulus gracilis
	Ilysanthes conferta
	Veronica anagallis-aquatica
	Glumicalyx flanaganii
	Glumicalyx goseloides
	Glumicalyx lesuticus
	Glumicalyx montanus
	Glumicalyx nutans
	Strobilopsis wrightii
	Melasma scabrum
	Alectra basutica
	Alectra orobanchoides
	Alectra sessiliflora var. *sessiliflora*
	Alectra thyrsoidea
	Graderia scabra
	Sopubia cana var. *cana*
	Buchnera dura
	Buchnera glabrata
	Buchnera simplex
	Cycnium racemosum
	Striga asiatica
	Striga elegans

	Striga bilabiata
	Harveya leucopharynx
	Harveya pulchra
	Harveya scarlatina
	Harveya speciosa
	Harveya sp.
	Hyobanche rubra
	Hyobanche sp.
SELAGINACEAE	*Selago flanaganii*
	Selago galpinii
	Selago immersa
	Selago melliodora
	Selago monticola
	Selago pachypoda
SELAGINACEAE (cont.)	*Selago trauseldii*
	Selago trinervia
	Walafrida densiflora
	Walafrida witbergensis
	Tetraselago nelsonii
	Tetraselago wilmsii
GESNERIACEAE	*Streptocarpus bolusii*
	Streptocarpus gardenii
	Streptocarpus haygarthii
	Streptocarpus johannis
	Streptocarpus pentherianus
	Streptocarpus pusillus
	Streptocarpus rexii
LENTIBULARIACEAE	*Utricularia arenaria*
	Utricularia livida
	Utricularia prehensilis
ACANTHACEAE	*Barleria monticola*
	Crabbea nana
	Blepharis longispica
	Hypoestes triflora
	Isoglossa eckloniana
	Isoglossa grantii
	Isoglossa macowanii
	Adhatoda andromeda
PLANTAGINACEAE	*Plantago lanceolata*
RUBIACEAE	*Kohautia amatymbica*
	Conostomium natalense var. *glabrum*
	Burchellia bubalina
	Coddia rudis
	Rothmannia capensis
	Pentanisia prunelloides subsp. *prunelloides*

	Pygmaeothamnus chamaedendrum var. *chamaedendrum*
	Canthium ciliatum
	Canthium mundianum
	Canthium pauciflorum
	Keetia gueinzii
	Pavetta cooperi
	Pavetta gardeniifolia var. *gardeniifolia*
	Pavetta gardeniifolia var. *subtomentosa*
	Pavetta kotzei
	Pavetta lanceolata
	Galopina aspera
	Galopina circaeoides
	Anthospermum basuticum
	Anthospermum herbaceum
	Anthospermum monticola
	Anthospermum pumilum subsp. *pumilum*
RUBIACEAE (cont.)	*Galium capense* subsp. *garipense*
	Galium scabrelloides
	Galium spurium subsp. *africanum*
	Galium thunbergianum var. *hirsutum*
	Galium thunbergianum var. *thunbergianum*
	Rubia petiolaris
VALERIANACEAE	*Valeriana capensis*
	Valeriana capensis var. *lanceolata*
	Valeriana capensis var. *nana*
DIPSACACEAE	*Cephalaria galpiniana*
	Cephalaria galpiniana subsp. *simplicior*
	Cephalaria natalensis
	Cephalaria oblongifolia
	Scabiosa columbaria
	Scabiosa drakensbergensis
CUCURBITACEAE	*Cucumis myriocarpus* subsp. *myriocarpus*
	Zehneria scabra
	Coccinia hirtella
CAMPANULACEAE	*Wahlenbergia adrosacea*
	Wahlenbergia appressifolia
	Wahlenbergia capillata
	Wahlenbergia cuspidata
	Wahlenbergia dinteri
	Wahlenbergia doleritica
	Wahlenbergia fasciculata
	Wahlenbergia huttonii
	Wahlenbergia krebsii subsp. *krebsii*
	Wahlenbergia lobulata
	Wahlenbergia lycopodioides
	Wahlenbergia paucidentata

	Wahlenbergia paucidentata var. *tysonii*
	Wahlenbergia polytrichifolia subsp. *dracomontana*
	Wahlenbergia polytrichifolia
	Wahlenbergia pulvillus-gigantis
	Wahlenbergia rivularis
	Wahlenbergia squamifolia
	Wahlenbergia undulata
	Wahlenbergia virgata
	Wahlenbergia zeyheri
	Craterocapsa congesta
	Craterocapsa montana
	Craterocapsa tarsodes
LOBELIACEAE	*Cyphia aspergilloides* var. *aspergilloides*
	Cyphia bolusii
	Cyphia coryfolia
	Cyphia elata var. *elata*
	Cyphia elata var. *glabra*
	Cyphia elata var. *oblongifolia*
LOBELIACEAE (cont.)	*Cyphia longifolia* var. *longifolia*
	Cyphia natalensis
	Cyphia rogersii subsp. *rogersii*
	Cyphia rogersii subsp. *winteri*
	Cyphia tysonii
	Lobelia decipiens
	Lobelia filiformis var. *krebsiana*
	Lobelia filiformis var. *natalensis*
	Lobelia flaccida subsp. *flaccida*
	Lobelia flaccida var. *hirsuta*
	Lobelia flaccida var. *scabripes*
	Lobelia flaccida var. *stricta*
	Lobelia galpinii
	Lobelia laxa
	Lobelia nuda
	Lobelia patula var. *pteropoda*
	Lobelia preslii
	Lobelia vanreenensis
	Monopsis decipiens
ASTERACEAE	*Vernonia dregeana*
	Vernonia flanaganii
	Vernonia hirsuta
	Venonia mespilifolia
	Vernonia natalensis
	Vernonia oligocephala
	Aster ananthocladus
	Aster bakeranus
	Aster confertifolius
	Aster erucifolius
	Aster perfoliatus
	Aster pleiocephalus

	Felicia drakensbergensis
	Felicia filifolia subsp. *filifolia*
	Felicia linearis
	Felicia monocephala
	Felicia muricata subsp. *muricata*
	Felicia petiolata
	Felicia quinquenervia
	Felicia rosulata
	Felicia uliginosa
	Felicia wrightiii
	Nidorella agria
	Nidorella anomala
	Nidorella auriculata
	Nidorella undulata
	Conyza gouanii
	Conyza obscura
	Conyza pinnata
	Conyza podocephala
	Nolletia ciliaris
	Nolletia rarifolia
	Chrysocoma ciliata
ASTERACEAE (cont.)	*Heteromma decurrens*
	Heteromma krookii
	Heteromma simplicifolium
	Denekia capensis
	Gnaphalium confine
	Gnaphalium filagopsis
	Gnaphalium griquense
	Gnaphalium limicola
	Gnaphalium sp.
	Troglophyton capillaceum subsp. *capillaceum*
	Troglophyton capillaceum subsp. *diffusum*
	Pseudognaphalium luteo-album
	Pseudognaphalium undulatum
	Achyrocline stenoptera
	Helichrysum acutatum
	Helichrysum adenocarpum subsp. *adenocarpum*
	Helichrysum adenocarpum subsp. *ammophilum*
	Helichrysum albirosulatum
	Helichrysum albo-brunneum
	Helichrysum album
	Helichrysum alticolum
	Helichrysum amplectens
	Helichrysum anomalum
	Helichrysum appendiculatum
	Helichrysum argentissimum
	Helichrysum argyrosphaerum
	Helichrysum asperum var. *comosum*
	Helichrysum aureo-nitens
	Helichrysum aureum var. *aureum*
	Helichrysum aureum var. *monocephalum*

Helichrysum aureum var. *scopulosum*
Helichrysum aureum var. *serotinum*
Helichrysum auriceps
Helichrysum basalticum
Helichrysum bellidiastrum
Helichrysum bellum
Helichrysum caespititium
Helichrysum callicomum
Helichrysum candolleanum
Helichrysum cephaloideum
Helichrysum chionosphaerum
Helichrysum chrysargyrum
Helichrysum confertifolium
Helichrysum confertum
Helichrysum cooperi
Helichrysum coriaceum
Helichrysum cymosum subsp. *cymosum*
Helichrysum cymosum subsp. *calvum*
Helichrysum dasycephalum
Helichrysum drakensbergense
Helichrysum dregeanum
Helichrysum ecklonis
Helichrysum elegantissimum

ASTERACEAE (cont.)

Helichrysum epapposum
Helichrysum ephelos
Helichrysum evansii
Helichrysum felinum
Helichrysum flanaganii
Helichrysum foetidum
Helichrysum fulvum
Helichrysum glaciale
Helichrysum glomeratum
Helichrysum grandibracteatum
Helichrysum griseum
Helichrysum griseolanatum
Helichrysum gymnocomum
Helichrysum haygarthii
Helichrysum herbaceum
Helichrysum heterolasium
Helichrysum hyphocephalum
Helichrysum hypleucum
Helichrysum infaustum
Helichrysum ingomense
Helichrysum inornatum
Helichrysum interjacens
Helichrysum krebsianum
Helichrysum krookii
Helichrysum lepidissimum
Helichrysum lineare
Helichrysum lineatum

	Helichrysum lingulatum
	Helichrysum longifolium
	Helichrysum longinquum
	Helichrysum marginatum
	Helichrysum melanacme
	Helichrysum miconiifolium
	Helichrysum milfordiae
	Helichrysum mixtum var. *mixtum*
	Helichrysum mollifolium
	Helichrysum montanum
	Helichrysum monticola
	Helichrysum mundtii
	Helichrysum nanum
	Helichrysum natalitium
	Helichrysum nimbicola
	Helichrysum nudifolium
	Helichrysum obductum
	Helichrysum odoratissimum
	Helichrysum oligopappum
	Helichrysum opacum
	Helichrysum oreophilum
	Helichrysum oxyphyllum
	Helichrysum pagophilum
	Helichrysum paleatum
	Helichrysum pallidum
	Helichrysum palustre
ASTERACEAE (cont.)	*Helichrysum panduratum* var. *panduratum*
	Helichrysum pilosellum
	Helichrysum platypterum
	Helichrysum praecurrens
	Helichrysum qathlambanum
	Helichrysum retortoides
	Helichrysum ruderale
	Helichrysum rugulosum
	Helichrysum sessile
	Helichrysum sessiloides
	Helichrysum setosum
	Helichrysum simillimum
	Helichrysum spiralepis
	Helichrysum splendidum
	Helichrysum spodiophyllum
	Helichrysum subglomeratum
	Helichrysum subfalcatum
	Helichrysum subluteum
	Helichrysum sutherlandii
	Helichrysum swynnertonii
	Helichrysum tenax var. *tenax*
	Helichyrsum tenuiculum
	Helichrysum tenuifolium
	Helichrysum thapsus
	Helichrysum trilineatum

	Helichrysum umbraculigerum
	Helichrysum vernum
	Helichrysum witbergense
	Stoebe vulgaris
	Metalasia muricata
	Relhania acerosa
	Relhania tuberosa
	Macowania conferta
	Macowania corymbosa
	Macowania deflexa
	Macowania glandulosa
	Macowania hamata
	Macowania pulvinaris
	Macowania sororis
	Athrixia angustissima
	Athrixia arachnoidea
	Athrixia fonata
	Athrixia phylicoides
	Athrixia pinifolia
	Printzia auriculata
	Printzia laxa
	Printzia nutans
	Printzia pyrifolia
	Callilepis laureola
	Eriocephalus eximius
	Eumorphia prostrata
	Eumorphia sericea subsp. *sericea*
	Athanasia grandiceps
ASTERACEAE (cont.)	*Athanasia microcephala*
	Inulanthera calva
	Inulanthera coronopifolia
	Inulanthera leucoclada
	Inulanthera montana
	Inulanthera thodei
	Inulanthera tridens
	Phymaspermum acerosum
	Phymaspermum pinnatifidum
	Phymaspermum woodii
	Inezia integrifolia
	Matricaria nigellifolia var. *nigellifolia*
	Matricaria nigellifolia var. *tenuior*
	Hilliardia zuurbergensis
	Lepidostephium asteroides
	Cotula anthemoides
	Cotula australis
	Cotula hispida
	Cotula leptalea
	Cotula lineariloba
	Cotula membranifolia
	Cotula paludosa
	Cotula radicalis

Cotula socialis
Cotula sp.
Schistostephium crataegifolium
Schistostephium griseum
Schistostephium heptalobum
Schistostephium hippiifolium
Schistostephium rotundifolium
Artemisia afra
Gymnopentzia bifurcata
Pentzia cooperi
Pentzia pilulifera
Cineraria albicans
Cineraria aspera
Cineraria atriplicifolia
Cineraria britteniae
Cineraria deltoidea
Cineraria dieterlenii
Cineraria fruticetorum
Cineraria geifolia
Cineraria geraniifolia
Cineraria lobata
Cineraria longipes
Cineraria lyrata
Cineraria mollis
Cineraria pinnata
Cineraria saxifraga
Senecio achilleifolius
Senecio adnatus
Senecio affinis
Senecio albanensis var. *albanensis*

ASTERACEAE (cont.)

Senecio albanensis var. *doroniciflorus*
Senecio albanopsis
Senecio anomalochrous
Senecio arabidifolius
Senecio austromontanus
Senecio barbatus
Senecio barbertonicus
Senecio basalticus
Senecio baurii
Senecio brachypodus
Senecio brevidentatus
Senecio brevilorus
Senecio breviscapus
Senecio bryoniifolius
Senecio bupleuroides
Senecio burchellii
Senecio caloneotes
Senecio cathcartensis
Senecio caudatus
Senecio chrysocoma
Senecio citriceps

Senecio conrathii
Senecio coronatus
Senecio cristimontanus
Senecio cryptolanatus
Senecio decurrens
Senecio deltoideus
Senecio digitalifolius
Senecio discodregeanus
Senecio dissimulans
Senecio dregeanus
Senecio erubescens var. *crepidifolius*
Senecio erubescens var. *dichotomus*
Senecio erubescens var. *erubescens*
Senecio erubescens var. *incisus*
Senecio exuberans
Senecio flanaganii
Senecio gerrardii
Senecio glaberrimus
Senecio glanduloso-lanosus
Senecio gramineus
Senecio gregatus
Senecio harveyanus
Senecio hastatus
Senecio haygarthii
Senecio heliopsis
Senecio helminthoides
Senecio hieracioides
Senecio hirsutilobus
Senecio hygrophilus
Senecio hypochoerideus
Senecio inaequidens
Senecio ingeliensis

ASTERACEAE (cont.)

Senecio inornatus
Senecio isatideus
Senecio isatidioides
Senecio kalingenwae
Senecio lanceus
Senecio latifolius
Senecio litorosus
Senecio lydenbergensis
Senecio lygodes
Senecio macowannii
Senecio macrocephalus
Senecio macroglossoides
Senecio macroglossus
Senecio macrospermus
Senecio madagascariensis
Senecio marginalis
Senecio mauricei
Senecio mbuluzensis
Senecio medley-woodii

Senecio microglossus
Senecio mikanioides
Senecio monticola
Senecio mooreanus
Senecio napifolius
Senecio natalicola
Senecio ngoyanus
Senecio othonniflorus
Senecio oxydontus
Senecio oxyriifolius
Senecio paludaffinis
Senecio parascitus
Senecio panduriformis
Senecio parentalis
Senecio paucicalyculatus
Senecio pleistocephalus
Senecio polelensis
Senecio polyanthemoides
Senecio polyodon var. *polyodon*
Senecio polyodon var. *subglaber*
Senecio poseideonis
Senecio praeteritus
Senecio pterophorus
Senecio purpureus
Senecio qathlambanus
Senecio quinquelobus
Senecio radicans
Senecio retrorsus
Senecio rhomboideus
Senecio rhyncholaenus
Senecio ruwenzoriensis
Senecio sandersonii
Senecio saniensis
Senecio scitus

ASTERACEAE (cont.)

Senecio scoparius
Senecio seminiveus
Senecio serratuloides var. *serratuloides*
Senecio skirrhodon
Senecio speciosus
Senecio striatifolius
Senecio subcoriaceus
Senecio submontanus
Senecio subrubriflorus
Senecio tamoides
Senecio tanacetopsis
Senecio telmateius
Senecio tenellus
Senecio thamathuensis
Senecio tugelensis
Senecio tysonii
Senecio ulopterus

	Senecio umgeniensis
	Senecio urophyllus
	Senecio variabilis
	Senecio venosus
	Senecio viminalis
	Senecio viscidulus
	Senecio sp.
	Senecio sp.
	Senecio sp.
	Euryops acraeus
	Euryops brevipapposus
	Euryops chrysanthemoides
	Euryops decumbens
	Euryops evansii subsp. *evansii*
	Euryops evansii subsp. *parvus*
	Euryops gilfillanii
	Euryops inops
	Euryops laxus
	Euryops leiocarpus
	Euryops montanus
	Euryops pendunculatus
	Euryops transvaalensis subsp. *setilobus*
	Euryops tysonii
	Othonna burttii
	Othonna natalensis
	Garuleum sonchifolium
	Garuleum woodii
	Osteospermum attenuatum
	Osteospermum caulescens
	Osteospermum jucundum
	Osteospermum thodei
	Chrysanthemoides monilifera subsp. *canescens*
	Chrysanthemoides monilifera subsp. *rotundata*
	Ursinia alpina
	Ursinia montana subsp. *montana*
	Ursinia nana subsp. *nana*
ASTERACEAE (cont.)	*Ursinia tenuiloba*
	Arctotis arctotoides
	Haplocarpha nervosa
	Haplocarpha scaposa
	Gazania krebsiana subsp. *krebsiana*
	Hirpicium armerioides
	Berkheya cirsifolia
	Berkheya draco
	Berkheya echinacea subsp. *echinacea*
	Berkheya latifolia
	Berkheya macrocephala
	Berkheya maritima
	Berkheya mackenii
	Berkheya montana
	Berkheya multijuga

Berkheya pannosa
Berkheya pinnatifida subsp. *stobaeoides*
Berkheya purpurea
Berkheya rhapontica subsp. *aristosa* var. *aristosa*
Berkheya rhapontica subsp. *aristosa* var. *exalata*
Berkheya rhapontica subsp. *platyptera*
Berkheya rhapontica subsp. *rhapontica*
Berkheya rosulata
Berkheya setifera
Berkheya speciosa subsp. *ovata*
Berkheya speciosa subsp. *speciosa*
Dicoma anomala subsp. *anomala*
Dicoma anomala subsp. *cirsioides*
Gerbera ambigua
Gerbera viridifolia subsp. *natalensis*
Gerbera parva
Gerbera piloselloides
Gerbera viridifolia subsp. *viridifolia*
Tolpis capensis
Sonchus dregeanus
Sonchus friesii
Sonchus gigas
Sonchus integrifolius var. *integrifolius*
Sonchus integrifolius var. *schlechteri*
Sonchus jacottetianus
Sonchus nanus
Sonchus wilmsii
Sonchus sp.
Lactuca capensis
Lactuca inermis
Lactuca tysonii
Crepis capillaris

LIST OF THREATENED PLANT SPECIES AND LIST OF PLANTS UNDER CITES APPENDIX I & II

I LIST OF THREATENED PLANTS

Endemics to the Park are indicated as '*'. These are defined as those which have the greater part of their distribution range in the Park.

Agrostis barbuligera var. longipilosa
Agrostis subulifolia
Aira caryophyllea
Albuca affinis
Albuca rupestris
Alectra avensis
Alepidea insculpta
Anthericum acutum
Anthoxanthium brevifolium
Aponogeton ranunculiflorus *
Aristida monticola
Asclepias xysmalobioides
Aspidonepsis reenensis
Aster ananthocladus
Aster confertifolius
Berkheya draco
Berkheya leucaugeta
Berkheya pannosa
Brachystelma perditum
Bromus firmior
Cineraria mollis
Colpodium hedbergii
Comborhiza virgata [= Relhania tuberosa]
Cotula lineariloba
Cotula membranifolia
Cotula paludosa
Cotula radicalis
Crassocephalum grandibracteatum
Crassula drakensbergensis
Crocosmia pearsei *
Crocosmia pottsii
Cyrtanthus erubescens *
Cyrtanthus falcatus
Cyrtanthus flanaganii
Diascia anastrepta
Diascia austromontana
Diascia megathura
Diascia purpurea
Diascia tugelensis *
Diascia vigilis
Dierama tysonii
Dierma cooperi

Dioscorea brownii
Disa galpinii
Disa oreophila subsp. erecta
Disperis concinna *
Dracosciadium saniculifolium *
Ehrharta longigluma
Elaphoglossum drakensbergense
Encephalartos ghellinckii *
Eragrostis congesta
Erica anomala
Erica ebracteata
Erica flanaganii *
Erica holtii
Erica straussiana [= E. symonsii]
Erica thodei [= E. dykei]
Erica wyliei *

Ericinella hillburttii
Eucomis humilis
Eucomis schijffii
Euryops brevipes
Fanninia caloglossa
Felicia wrightii
Festuca dracomontana
Festuca killickii *
Ficinia nana
Galtonia regalis
Garuleum sp. nov.

Geranium angustipetalum *
Geranium drakensbergense *
Gladiolus flannaganii
Gladiolus loteniensis
Gladiolus microcarpus
Gladiolus symonsii *
Glumicalyx flanaganii
Glumicalyx montanus
Glumicalyx natans
Gnaphalium griquense
Gnidia renniana
Gnidia singularis

Hebenstetia cooperi
Hebenstetia sp. H&B 9646
Helichrysum album
Helichrysum alticolum
Helichrysum amplectens
Helichrysum basalticum
Helichrysum confertum

Helichrysum drakensbergense
Helichrysum evansii
Helichrysum fulvum
Helichrysum gymnocomum
Helichrysum haygarthi
Helichrysum heterolasium
Helichrysum hyphocephalum
Helichrysum hypoleucum
Helichrysum inornatum
Helichrysum longinquum
Helichrysum milfordiae
Helichrysum paleatum
Helichrysum palustre
Helichrysum tenuifolium
Helichrysum vernum
Helichrysum witbergense

Helictotrichon galpinii
Helictotrichon natalense
Hemizygia bolusii
Hemizygia cinerea
Hesperantha alborosea
Hesperantha grandiflora
Hesperantha ingeliensis
Hesperantha pubinervia *
Hesperantha tysonii
Hilliardia zuurbergensis
Indigofera evansii
Indigofera pseudoevansii
Jamesbrittenia beverlyana
Jamesbrittenia jurassica *

Kniphofia albomontana
Kniphofia angustifolia
Kniphofia brachystachya
Kniphofia breviflora
Kniphofia evansii *
Kniphofia ichopensis var. ichopensis
Kniphofia northiae
Kniphofia thodei

Lepidium basuticum
Lessertia dykei *
Lessertia sp. aff. thodei [Hilliard]
Lessertia thodei

Lotononis pottiae
Lotononis virgata
Macowania conferta
Macowania corymbosa
Macowania deflexa
Macowania hamata
Manulea florifera

Merxmuellera aureocephala
Merxmuellera drakensbergensis
Merxmuellera guillarmodae
Miraglossum anomalum
Miraglossum pilosum
Miraglossum superbum

Moraea hiemalis
Moraea unibracteata
Myrsine pillansii
Nemesia glabriuscula
Nemesia sylvatica
Nerine pancratioides

Ornithogalum diphyllum
Osteospermum attenuatum
Otholobium fumeum
Othonna burtii
Pachycarpus natalensis
Pachycarpus plicatus
Passerina drakensbergensis

Pentaschistis praecox
Phymaspermum grandiceps [= Athanasia grandiceps]

Phymaspermum woodii
Polygala praticola *
Protea dracomontana
Protea nubigena *
Protea subvestita
Restio sp. nov. *
Rhodohypoxis incompta
Rhodohypoxis thodiana
Rhus dracomontana
Rhynchosia foliosa
Romulea luteoflora var. sanisensis
Saniella verna
Satureja compacta
Satureja grandibracteata
Satureja reptans
Scabiosa drakensbergensis
Schizoglossum bidens subsp. hirtum
Schizoglossum elinque subsp. elinque
Schizoglossum elinque subsp. purpureum
Schizoglossum hilliardiae
Schizoglossum montanum

Schoenoxiphium burttii
Schoenoxiphium molle
Schoenoxiphium strictum
Scilla dracomontana

Sebaea pleurostigmatosa
Sebaea radiata
Sebaea spathulata

Sebaea thodeiana
Selago flanaganii

Selago galpinii
Selago immersa
Selago melliodora
Selago monticola
Selago trauseldii
Selago trinerva

Senecio anomalochrous
Senecio austromontanus
Senecio basalticus
Senecio brevilorus
Senecio brevilorus
Senecio hirsutilobus
Senecio kalingenwae
Senecio mauricei
Senecio paludaffinis
Senecio parentalis
Senecio polelensis
Senecio qathlambanus
Senecio saniensis
Senecio sp. H&B 5238
Senecio sp. H&B 6961
Senecio submontanus
Senecio telmateius
Senecio thamathuensis
Setaria obscura
Sisyranthus fanniniae

Stachys albiflora
Stachys dregeana
Stachys kuntzei
Stachys tysonii

Strobilopsis wrightii
Struthiola anomala *
Syncolostemon macranthus
Thamnocalamus tesselatus
Thesium alatum
Thesium cupressoides
Thesium decipiens
Thesium durum
Thesium flexuosum
Thesium scirpioides

Tulbaghia montana *
Urginea saniensis *
Urginea tenella
Wahlenbergia doleritica
Wahlenbergia pulvillus-gigantis
Wahlenbergia sp. nov. aff. W. rhytidosperma
Wahlenbergia tetramera

Walafrida witbergensis
Widdringtonia nodiflora
Xerophyta longicaulis
Xysmalobium gerrardii
Xysmalobium trauseldii

Zaluzianskya chrysops
Zaluzianskya distans
Zaluzianskya oreophila
Zaluzianskya pulvinata
Zaluzianskya rubrostellata
Zaluzianskya spathacea
Zaluzianskya turritella

II LIST OF CITES APPENDIX I AND II

APPENDIX I

ZAMIACEAE *Encephalartos ghellinckii*

APPENDIX II

(Aloaceae) *Aloe arborescens*
Aloe aristata
Aloe boylei
Aloe cooperi
Aloe ferox
Aloe ecklonis
Aloe kraussii
Aloe maculata
Aloe pratensis

ORCHIDACEAE
Stenoglottis fimbriata
Holothrix incurva
Holothrix othoceras
Holothrix scopularia
Holothrix thodei
Huttonaea grandiflora
Huttonaea fimbriata
Huttonaea oreophila
Huttonaea pulchra
Huttonaea woodii
Habenaria arenaria
Habenaria chlorotica
Habenaria clavata
Habenaria cornuta
Habenaria dives
Habenaria epipactidea
Habenaria dregeana
Habenaria laevigata
Habenaria lithophila
Habenaria malacophylla
Habenaria schimperiana
Brachycorythis pubescens
Brachycorythis ovata
Neobolusia tysonii
Neobolusia virginea
Satyrium bracteatum
Satyrium cristatum var. *cristatum*
Satyrium cristatum var. *longilabiatum*
Satyrium hallackii subsp. *ocellatum*
Satyrium ligulatum
Satyrium longicauda var. *longicauda*
Satyrium longicauda var. *jacottetianum*
Satyrium macrophyllum
Satyrium microrrhynchum
Satyrium neglectum
Satyrium parviflorum
Satyrium sphaerocarpum
Satyrium trinerve
Schizochilus angustifolius
Schizochilus bulbinella
Schizochilus flexuosus
Schizochilus zeyheri
Brownleea coerulea
Brownleea galpinii
Brownleea macroceras
Brownleea parviflora
Disa aconitoides subsp. *aconitoides*
Disa basutorum
Disa cephalotes subsp. *cephalotes*
Disa cephalotes subsp. *frigida*
Disa chrysostachya
Disa cooperi
Disa crassicornis
Disa cornuta
Disa fragrans subsp. *fragrans*
Disa galpinii
Disa hircicornis
Disa nivea
Disa oreophila subsp. *oreophila*
Disa oreophila subsp. *erecta*
Disa pulchra
Disa patula var. *transvaalensis*
Disa sanguinea
Disa sankeyi
Disa scullyi
Disa stricta
Disa stachyoides
Disa tysonii
Disa versicolor
Disa thodei
Herschelia baurii
Monadenia brevicornis
Disperis anthoceros
Disperis cardiophora
Disperis concinna
Disperis fanniniae
Disperis macowanii
Disperis oxyglossa
Disperis renibractea
Disperis stenoplectron
Disperis tysonii
Disperis wealei

Pterygodium cooperi
Pterygodium hastatum
Pterygodium leucanthum
Anochilus flanaganii
Corycium dracomontanum
Corycium magnum
Corycium nigrescens
Liparis bowkeri
Polystachya ottoniana
Eulophia aculeata
Eulophia calanthoides
Eulophia foliosa
Eulophia leontoglossa
Eulophia ovalis subsp. *ovalis*
Eulophia parviflora
Eulophia streptopetala
Eulophia zeyheriana
Angraecum chamaeanthus
Mystacidium gracile

LIST OF THREATENED PLANT SPECIES AND A LIST OF PLANTS UNDER CITES APPENDIX I AND II

Name of species	RDB status	Name of species	RDB status
Aloe aristata	LR(nt)	*Helichrysum palustre*	DD
Aponogeton ranunculiflorus	VU	*Hesperantha alborosea*	LR(nt)
Brachystelma alpinum	DD	*Hesperantha crocopsis*	LR(lc)
Crocosmia pearsei	LR(nt)	*Hesperantha curvula*	LR(lc)
Cyrtanthus erubescens	LR(nt)	*Hesperantha gracilis*	EN
Cyrtanthus falcatus	LR(nt)	*Hesperantha lactea*	LR(lc)
Diascia tugelensis	DD	*Kniphofia albomontana*	LR(lc)
Diascia virgilis	DD	*Kniphofia northiae*	LR(nt)
Diascia austromontana	DD	*Lessertia dykei*	DD
Dierama tysonii	LR(lc)	*Myrsine pillansii*	VU
Dioscorea brownii	DD	*Ocotea bullata*	VU/LR
Disa basutorum	LR(lc)	*Pachycarpus coronarius*	LR(lc)
Disa cephalotes subsp. frigida	LR(lc)	*Polygala practicola*	DD
Disa galpinii	LR(lc)	*Protea nubigena*	EN
Disa montana	DD	*Rhodohypoxis thodiana*	LR(nt)
Disperis concinna	LR(lc)	*Rhodohypoxis incompta*	LR(nt)
Dracosciadium saniculifolium	LR(nt)	*Romulea luteoflora var. sanisesis*	DD
Encephalartos ghellinckii	VU/LR	*Senecio hirsutilobus*	LR(lc)
Erica anomala	LR(lc)	*Senecio kalingenwae*	LR(nt)
Erica ebracteata	LR(lc)	*Senecio mauricei*	LR(lc)
Erica flanaganii	DD	*Senecio polelensis*	LR(lc)
Erica wyliei	DD	*Senecio rhyncholaenus*	LR(lc)
Erica straussiana	LR(lc)	*Senecio saniensis*	LR(lc)
Erica dykei	LR(lc)	*Senecio telmateius*	DD

Name of species	RDB status	Name of species	RDB status
Erica thodei	LR(lc)	*Tulbaghia montana*	DD
Geranium drakensbergense	LR(nt)	*Urginia saniensis*	VU
Gladiolus loteniensis	LR(lc)	*Wahlenbergia doleritica*	VU
Gladiolus symonsii	LR(nt)	*Wahlenbergia tetramera*	DD
Helichrysum amplectens	LR(nt)	*Xerophyta longicaulis*	DD
Helichrysum drakensbergense	LR(lc)		

CHECKLIST OF EARTHWORMS

* Possibly endemic - to date is only known to occur in the Park.

LUMBRICIDAE	*Allolobophora rosea*
	Dendrobaena rubida
MICROCHAETIDAE	*Proandricus pajori* *

CHECKLIST OF MILLIPEDES

* indicatesspecies endemic to Drakensbeg Park
\# inidicates genus endemic to Drakensberg Park

SPHAEROTHERIIDA

SPHAEROTHERIIDAE	*Sphaerotherium dorsale*
	Sphaerotherium dorsaloides
	*Sphaerotherium mahaium**
	*Sphaerotherium perbrincki**
	Sphaerotherium tomentosum

SIPHONOPHORIDA

NEMATOZONIIDAE	*Nematozonium filum*

POLYZONIIDA

SIPHONOTIDAE	*Ryncomecogaster lawrencei**

POLYDESMIDA

GOMPHODESMIDAE	*Ulodemus simplex**
DALODESMIDAE	*Drakensius minor#*
	Gnomeskelus arcuatus
	Gnomeskelus attemsi
	*Gnomeskelus brincki**
	*Gnomeskelus edentulatus**
	*Gnomeskelus gonoarthrodus**
	*Gnomeskelus laevigatus**
	*Gnomeskelus montivagus**
	*Gnomeskelus origensis**
	*Gnomeskelus pugnifer**
	*Gnomeskelus setosus**
	*Gnomeskelus tugelanus**
	*Platytarropus polydesmoides**
	*Platytarrus excelsus**
	*Platytarrus guduensis**
	*Rhopaloskelus minor**
VAALOGONOPODIDAE	*Phygoxerotes myrmecophilus**

SPIROBOLIDA	
PACHYBOLIDAE	*Centrobolus tricolo*
SPIROSTREPTIDA	
SPIROSTREPTIDAE	*Doratogonus cristulatus* *Doratogonus falcatus*
	Orthoporoides pyrocephalus
ODONTOPYGIDAE	*Patinatius bidentatus**
	*Spinotarsus avirostris** *Spinotarsus debilis* *Spinotarsus hospitii*

CHECKLIST OF CENTIPEDES

* indicates species endemic to Drakensberg Park

GEOPHILOMORPHA

GEOPHILIDAE	*Geoperingueyia dentata*
	Geoperingueyia armata
	Aphilodon macronyx

SCOLOPENDROMORPHA

SCOLOPENDIDAE	*Cormocephalus elegans*
	Cormocephalus multispinus
	Cormocephalus nititus
	Cormocephalus pseudopunctatus
	Cormocephalus westwoodi
	Rhysida afra
CRYPTOPIDAE	Cryptops australis

LITHOBIOMORPHA

HENICOPIDAE	*Paralamycetes spenceri*
	Lamycetes castanea
	*Lamycetes setigera**

SCUTIGEROMORPHA

SCUTIGERIDAE	*Scutigerina weberi*

CHECKLIST OF ONYCHOPHORA

PERIPATOPSIDAE	*Opisthopatus cinctipes* *Peripatopsis moseleyi*

CHECKLIST OF CRUSTACEANS

BRANCHIPODIDAE	*Branchipodopsis drakensbergensis* *Branchipodopsis natalensis* *Branchipodopsis underbergensis*
DECAPODA	*Potamonautes depressus*
OSTRACODA	*Korannacythere hamerae*
COPEPODA	*Attheyella pavliani* *Attheyella reducta*

CHECKLIST OF DRAGONFLIES AND DAMSELFLIES

ZYGOPTERA

SYNLESTIDAE

Chlorolestes draconicus	Drakensberg Sylph
Chlorolestes fasciatus	Mountain Sylph
Chlorolestes tessellatus	Forest Sylph

LESTIDAE

Lestes plagiatus	Highland Emerald Damsel

PROTONEURIDAE

Elattoneura glauca	Common Pinfly

PLATYCNEMIDIDAE

Allocnemis leucosticta	Goldtail

COENAGRIONIDAE

Ceriagrion glabrum	Orange Pond Damsel
Pseudagrion assegaii	Spear Sprite
Pseudagrion caffrum	Springwater Sprite
Pseudagrion citricola	Yellow-faced pool Sprite
Pseudagrion inopinatum	Scarce Sprite
Pseudagrion kersteni	Kersten's Sprite
Pseudagrion salisburyense	Salisbury's Sprite
Pseudagrion spernatum natalense	Powdered Mountain Sprite
Ischnura senegalensis	Marsh Blue-tail
Enallagma glaucum	Common African Blue
Enallagma sapphirinum	Sapphire Blue
Enallagma subfurcatum	Delicate Mountain Blue
Agriocnemis pinheyi	Pinhey's Wisp

CHLOROCYPHIDAE

Platycypha caligata	Glade Jewel
Platycypha fitzsimonsi	Fitzsimons' Jewel

ANISOPTERA

GOMPHIDAE

Notogomphus praetoruis	Yellowjack
Ceratogomphus pictus	Common African Cclubtail

Paragomphus cognatus	Brook Brown-tail

AESHNIDAE

Aeshna minuscula	Friendly Pond hawker
Aeshna subpupillata	South African Stream Hawker
Hemianax ephippiger	Vagrant Emperor
Anax imperator mauricianus	The Emperor
Anax speratus	Orange Emperor

CORDULIIDAE

Syncordulia gracilis	Gracile Ssyncordulia

LIBELLULIDAE

Orthetrum abbotti	Abbott's Orthetrum
Orthetrum caffrum	Mountain Marsh Oorthetrum
Orthetrum chrysostigma	Cryptic Orthetrum
Orthetrum julia falsum	Julia's Orthetrum
Nesciothemis farinosa	Ashen Black-tailed Skimmer
Palpopleura jucunda	Lesser Widow
Acisoma panorpoides ascalaphoides	Pintail
Crocothemis erythraea	Scarlet Darter
Crocothemis sanguinolenta	Stream Darter
Sympetrum fonscolombii	Red-veined Darter
Trithemis arteriosa	Red-veined Dropwing
Trithemis dorsalis	Upland Spectrum-blue Dropwing
Trithemis furva	Lowland spectrum-blue Dropwing
Trithemis stictica	Jaunty Dropwing
Pantala flavescens	Globe Skimmer
Diplacodes lefebvrii	Black Percher

CHECKLIST OF BUTTERFLIES

NYMPHALIDAE

Danaus chrysippus aegyptius	African monarch
Bicyclus safitza safitza	Common bush brown
Aeropetes tulbaghia	Mountain pride
Paralethe dendrophilus indosa	Bush beauty
Serradinga bowkeri bowkeri	Bowker's widow
Torynesis pringlei	Pringle's widow
Cassionympha cassius	Rainforest brown
Neita neita	Neita brown
Neita lotenia	Loteni brown
Pseudonympha poetula	Drakensberg brown
Pseudonympha gaika	Gaika brown
Pseudonympha magoides	False silver-bottom brown
Pseudonympha varii	Vari's brown
Pseudonympha paludis	Paludis brown
Pseudonympha machacha	Machacha brown
Pseudonympha penningtoni	Pennington's brown
Stygionympha scotina	Eastern hillside brown
Stygionympha wichgrafi williami	Wichgraf's brown
Acraea horta	Garden acraea
Acraea neobule neobule	Wandering donkey acraea
Hyalites rahira rahira	Marsh acraea
Hyalites anacreon	Orange acraea
Hyalites esebria esebria	Dusky acraea
Charaxes xiphares penningtoni	Forest-king charaxes
Cymothoe alcimeda trimeni	Battling glider
Hypolimnas misippus	Common diadem
Catacroptera cloanthe cloanthe	Pirate
Precis octavia sesamus	Gaudy commodore
Precis hierta cebrene	Yellow pansy
Precis orithya madagascariensis	Eyed pansy
Vanessa cardui	Painted lady

LYCAENIDAE

Alaena amazoula amazoula	Yellow zulu
Durbania amakosa natalensis	Amakosa rocksitter
Durbania amakosa ayresi	Amakosa rocksitter
Thestor basutus basutus	Basuto skolly
Myrina silenus ficedula	Common fig-tree blue
Spindasis mozambica	Mozambique bar
Leptomyrina gorgias gorgias	Common black-eye
Capys alphaeus extentus	Orangebanded protea-butterfly
Capys penningtoni	Pennington's protea-butterfly
Aloeides penningtoni	Pennington's copper
Aloeides oreas	Oreas copper
Aloeides rileyi	Riley's copper
Aloeides trimeni trimeni	Trimen's copper
Aloeides henningi	Henning's copper
Aloeides almeida	Almeida copper

Chrysoritis oreas	Drakensberg daisy copper
Chrysoritis lycegenes	Mooi River Opal
Chrysoritis orientalis	Eastern opal
Chrysoritis pelion	Machacha opal
Cacyreus lingeus	Bush bronze
Cacyreus palemon palemon	Water bronze
Lampides boeticus	Lucerne blue
Tarucus sybaris sybaris	Dotted blue
Tarucus bowkeri bowkeri	Bowker's blue
Harpendyreus noquasa	Marsh blue
Lepidochrysops variabilis	Variable blue
Lepidochrysops pephredo	Estcourt blue
Lepidochrysops asteris	Brilliant blue
Orachrysops lacrimosa	Restless blue
Orachrysops subravus	Grizzled blue
Orachrysops nasutus remus	Nosy blue
Eicochrysops messapus mahallokoaena	Cupreous blue
Cupidopsis cissus	Common meadow blue
Cupidopsis jobates jobates	Tailed meadow blue
Actizera lucida	Rayed blue
Zizeeria knysna	Sooty blue
Azanus ubaldus	Velvet-spotted blue
Azanus natalensis	Natal spotted blue
Zizula hylax	Gaika blue

PIERIDAE

Colias electo electo	Lucerne butterfly
Catopsilia florella	African migrant
Eurema brigitta brigitta	Broad-bordered grass yellow
Pontia helice helice	Meadow white

PAPILIONIDAE

Papilio echerioides echerioides	White-banded swallowtail
Papilio demodocus demodocus	Citrus swallowtail
Papilio nireus lyaeus	Green-banded swallowtail
Papilio ophidicephalus phalusco	Emperor swallowtail

HESPERIDAE

Celaenorrhinus mokeezi mokeezi	Large flat
Spialia asterodia	Star sandman
Spialia agylla agylla	Grassveld sandman
Spialia diomus ferax	Common sandman
Metisella aegipan aegipan	Mountain sylph
Metisella malgacha malgacha	Grassveld sylph
Metisella metis metis	Gold-spotted sylph
Metisella syrinx	Bamboo sylph
Kedestes mohozutza	Fulvous ranger
Kedestes chaca	Shaka's ranger
Kedestes barberae barberae	Barber's ranger
Kedestes niveostriga	Dark ranger

Gegenes pumilio gambica	Dark hottentot skipper
Gegenes niso niso	Common hottentot skipper

CHECKLIST OF FRUIT AND FLOWER CHAFERS

CETONINADAE

Heteroclita raeuperi
Anisorrhina algoensis
Anisorrhina umbonata
Plaesiorhinella plana
Plaesiorhinella trivittata
Raceloma jansoni
Gnathocera hirta
Anoplocheilus globosus
Diplognatha gagates silacea
Diplognatha striata
Porphyronota hebreae
Porphyronota maculatissima
Trichostetha fascicularis
Elaphinis irrorata
Xeloma tomentosa
Atrichelaphinis tigrina
Polybaphes balteata balteata
Polybaphes subfasciata
Rhabdotis aulica
Pachnodella impressa
Pachnoda sinuata sinuata
Pachnoda sinuata flaviventris
Cyrtothyrea marginalis
Leucocelis transvaalensis

CHECKLIST OF LACEWINGS

CHRYSOPIDAE	*Pamochrysa stellata* *Chrysopa squamosa* *Chrysopa congrua*
CONIOPTERYGIDAE	*Helicoconis capensis* *Nimboa natalensis*
HEMEROBIIDAE	*Micromus africanus* *Hemerobious aper* *Hemerobious natalensis* *Hemerobious reconditus* *Hemerobious abditus*

CHECKLIST OF NET-WINGED MIDGES

BLEPHARICERIDAE

Elporia natalensis
Elporia flavopicta
Elporia hiemis
Elporia scruposa

CHECKLIST OF CRANE FLIES

TIPULIDAE

Ctenacroscelis quathlambicus
Longurio drakensbergensis
Longurio inaequipes
Longurio syndactylus
Nephrotoma basutoensis
Nephrotoma petiolata
Dolichopeza altiaroa
Dolichopeza aurantiaca
Dolichopeza cathedralis
Dolichopeza chaka
Dolichopeza dorsoprojecta
Dolichopeza parvistyla
Dolichopeza thoracica
Tipula draconis
Tipula brevisiana
Tipula setosipennis
Tipula soror
Tipula natalia
Tipula phaeocera
Tipula pomposa
Limonia irrorata
Limonia atomaria
Limonia gardineri
Limonia lawrencei
Limonia nairobii
Limonia satura
Limonia tipulipes
Limonia umkomazanae
Limonia rudebecki
Limonia sex-ocellata
Limonia tugela
Antocha indumeni
Antocha melina
Antocha transvaalia
Antocha venosa
Paradelphomyia faurei
Austrolimnophila luteipleura
Pseudolimnophila rhodesiae
Limnophila hetaira
Hexatoma preposita
Elephantomyia pleurolineata
Conosia angustissima
Conosia irrorata
Quathlambia stuckenbergi
Gonomyia daedalus
Gonomyia gunvorae
Gonomyia gnophosoma
Gonomyia mimetica

Gonomyia unispicata
Gonomyia elachistos
Gonomyia sulphurelloides
Limnophilomyia stuckenbergi
Rhabdomastix tugela
Tasiocera probosa
Ormosia hirtipennis
Cheilotrichia brincki
Erioptera inconspicua
Erioptera anthracogramma
Erioptera peringueyi
Erioptera subaurea
Styringomyia edwardsiana

CHECKLIST OF DANCE FLIES

Endemicity: * indicates Southern Africa;
** indicates South Africa (incl. Lesotho);
*** indicates Natal Drakensberg Park

Empididae

*Drapetis sebetuanei****
*Drapetis sekeletui****
*Platypalpus similis****
*Platypalpus aciculatus***
*Trachydromia petrabilis***
*Syneches graminis****
*Syndyas indumeni****
*Sabinios jonesi***
*Stenoproctus similis****
*Empis indumeni****
*Empis vetula**
*Empis natalensis****
*Hilarempis adrianus****
*Hilarempis indumeni****
*Hilarempis carlieri****
*Hilarempis fasciata****
*Hilarempis inerma****
*Hilarempis breviseta****
*Hilarempis neptunus****
*Atrichopleura livingstonei***
*Hilara sextaseta****
*Hemerodromia gogi****
*Hemerodromia magogi***
*Drymodromia simplex***
*Afrodromia montana****
*Dolichocephala duodecempunctata****
*Dolichocephala quadrispina***
*Clinocera tripunctata***
*Brachystoma jonesi****
*Brachystoma montana****

CHECKLIST OF HANGINGFLIES

BITTACIDAE	*Bittacus bicornis*
	Bittacus kimminsi
	Bittacus nebulosus
	Bittacus peringueyi
	Bittacus sobrinus
	Bittacus testaceus

CHECKLIST OF ROBBER FLIES

ASILIDAE

Bactria amastrus
Congomoctherus elferinki
Damalis boslacus
Damalis elongatus
Damalis femoralis
Damalis longipennis
Damalis speciosa
Dasophrys crenulatus
Dasophrys dorattina
Dasophrys nigroflavipes
Dasophrys umbripennis
Gonioscelis longulus
Hypenetes argothrix
Hypenetes doratina
Laxenecera andrenoides
Leptogaster maculipennis
Neolophonotus argyphus
Neolophonotus attenuatus
Neolophonotus cymbius
Neolophonotus fimbriatus
Neolophonotus hirsutus
Neolophonotus hobbyi
Neolophonotus io
Neolophonotus leucodiadema
Neolophonotus ochrochaetus
Neolophonotus natalensis
Neolophonotus variabilis
Neolophonotus wroughtoni
Neomochtherus annulitarsus
Pegesimallus aulicus
Rhabdogaster sp.
Stichopogon punctus
Synolcus dubius

CHECKLIST OF FISH

* Although one old record of this species exists for the Natal Drakensberg, the species has not been found there since, although it occurs in areas in Lesotho close to the Natal border.

** Indicates introduced alien species

ANGUILLIDAE

Anguilla mossambica	Longfin eel

CYPRINIDAE

Barbus anoplus	Chubbyhead barb
Barbus natalensis	Scaly
Labeo rubromaculatus	Tugela labeo
*Pseudobarbus quathlambae**	Drakensberg minnow

AMPHILIDAE

Amphilius natalensis	Natal mountain catfish

SALMONIDAE**

Oncorhynchus mykiss	Rainbow trout**
Salmo trutta	Brown trout**

CHECKLIST OF AMPHIBIANS

PIPIDAE

Xenopus laevis laevis	Common Platanna

HELEOPHRYNIDAE

Heleophryne natalensis	Natal Ghost Frog

BUFONIDAE

Bufo gariepensis nubicolus	Drakensberg Toad
Bufo gutturalis	Guttural Toad
Bufo rangeri	Ranger's Toad
Schismaderma carens	Red Toad

MICROHYLIDAE

Breviceps maculatus	Spotted Rain Frog
Breviceps adspersus pentheri	Penther's Bushveld Rain Frog

RANIDAE

Tomopterna natalensis	Natal Sand Frog
Ptychadena porosissima	Striped Grass Frog
Rana angolensis	Common River Frog
Rana dracomontana	Drakensberg River Frog
Rana fuscigula	Cape River Frog
Rana vertebralis	Aquatic River Frog
Strongylopus hymenopus	Berg Stream Frog
Strongylopus wageri	Plain Stream Frog
Strongylopus grayii grayii	Clicking Stream Frog
Strongylopus fasciatus fasciatus	Striped Stream Frog
Phrynobatrachus natalensis	Snoring Puddle Frog
Cacosternum boettgeri	Common Caco
Cacosternum nanum nanum	Bronze Caco
Cacosternum nanum parvum	Little Bronze Caco
Arthroleptella hewitti	Natal Chirping Frog

HYPEROLIIDAE

Leptopelis xenodactylus	Long-toed Tree Frog
Kassina senegalensis	Bubbling Kassina
Semnodactylus wealii	Rattling Frog
Afrixalus spinifrons intermedius	Natal Leaf-folding frog

CHECKLIST OF REPTILES

GEKKONIDAE

Afroedura karroica halli	Lesotho flat gecko
Afroedura nivaria	Mountain flat gecko
Hemidactylus mabouia	Moreau's tropical house gecko

VARANIDAE

Varanus niloticus niloticus	Nile monitor

CHAMAELEONIDAE

Bradypodion thamnobates	Natal Midlands dwarf chamaeleon
Bradypodion dracomontanum	Drakensberg dwarf chamaeleon

AGAMIDAE

Agama aculeata distanti	Distant's ground agama
Agama atra	Southern rock agama

LACERTIDAE

Tropidosaura montana natalensis	Natal mountain lizard
Tropidosaura essexi	Essex's mountain lizard
Tropidosaura cottrelli	Cottrell's mountain lizard
Nucras lalandii	Delalande's sandveld lizard
Pedioplanis burchelli	Burchell's sand lizard

SCINCIDAE

Mabuya capensis	Cape skink
Mabuya varia varia	Variable skink
Mabuya striata punctatissima	Speckled skink

CORDYLIDAE

Gerrhosaurus flavigularis	Yellow-throated plated lizard
Tetradactylus seps laevicauda	Eastern Cape short-legged seps
Tetradactylus breyeri	Breyer's long-tailed seps
Chamaesaura aenea	Transvaal grass lizard
Pseudocordylus melanotus subviridis	Drakensberg crag lizard
Pseudocordylus spinosus	Spiny crag lizard
Pseudocordylus langi	Lang's crag lizard

TYPHLOPIDAE

Typhlops bibronii	Bibron's blind snake

LEPTOTYPHLOPIDAE

Leptotyphlops scutifrons scutifrons	Peters's thread snake

BOIDAE

Python sebae natalensis	African rock python

COLUBRIDAE

Lycodonomorphus laevissimus fitzsimonsi	Northern black water-snake
Lycodonomorphus rufulus	Common brown water-snake
Lamprophis fuliginosus	Brown house snake
Lamprophis inornatus	Olive house snake
Lamprophis guttatus	Spotted house snake
Lamprophis fuscus	Yellow-bellied house snake
Lycophidion capense capense	Cape wolf snake
Duberria lutrix lutrix	Southern slug-eater
Pseudaspis cana	Mole snake
Psammophylax rhombeatus rhombeatus	Spotted skaapsteker
Psammophis sibilans brevirostris	Short-snouted grass snake
Psammophis crucifer	Cross-marked grass snake
Homoroselaps lacteus	Spotted harlequin snake
Philothamnus natalensis occidentalis	Western Natal green-snake
Dasypeltis scabra	Common egg-eater
Dasypeltis inornata	Southern brown egg-eater
Crotaphopeltis hotamboeia	Herald snake
Amplorhinus multimaculatus	Many-spotted snake
Montaspis gilvomaculata	Cream-spotted mountain snake

ELAPIDAE

Hemachatus haemachatus	Rinkhals

VIPERIDAE

Causus rhombeatus	Rhombic night adder
Bitis arietans arietans	Puff adder
Bitis atropos	Berg adder

CHECKLIST OF BIRDS

(NB: Vagrant species (10) are indicated by an *)

PODICEPIDIFORMES

Tachybaptus ruficollis	Dabchick

PROCELLARIIFORMES

Calonectris diomedea	Cory's Shearwater*

PELECANIFORMES

Phalacrocorax carbo	Whitebreasted Cormorant
Phalacrocorax africanus	Reed Cormorant
Anhinga melanogaster	Darter

CICONIIFORMES

Ardea cinerea	Grey Heron
Ardea melanocephala	Blackheaded Heron
Egretta alba	Great White Egret
Egretta garzetta	Little Egret
Egretta intermedia	Yellowbilled Egret*
Bubulcus ibis	Cattle Egret
Nycticorax nycticorax	Blackcrowned Night Heron
Ixobrychus sturmii	Dwarf Bittern*
Scopus umbretta	Hamerkop
Ciconia ciconia	White Stork
Ciconia nigra	Black Stork
Threskiornis aethiopicus	Sacred Ibis
Geronticus calvus	Bald Ibis
Bostrychia hagedash	Hadeda Ibis
Platalea alba	African Spoonbill

ANSERIFORMES

Dendrocygna viduata	Whitefaced Duck
Thalassornis leuconotus	Whitebacked Duck
Alopochen aegyptiacus	Egyptian Goose
Tadorna cana	South African Shelduck
Anas undulata	Yellowbilled Duck
Anas sparsa	African Black Duck
Anas hottentota	Hottentot Teal
Anas erythrorhyncha	Redbilled Teal
Netta erythrophthalma	Southern Pochard
Plectropterus gambensis	Spurwinged Goose

FALCONIFORMES

Sagittarius serpentarius	Secretary Bird
Gypaetus barbatus	Bearded Vulture

Gyps coprotheres	Cape Vulture
Milvus migrans	Black (Yellowbilled) Kite
Elanus caeruleus	Blackshouldered Kite
Aviceda cuculoides	Cuckoo Hawk
Aquila verreauxii	Black Eagle
Hieraaetus pennatus	Booted Eagle
Lophaetus occipitalis	Longcrested Eagle
Polemaetus bellicosus	Martial Eagle
Stephanoaetus coronatus	Crowned Eagle
Terathopius ecaudatus	Bateleur*
Haliaeetus vocifer	African Fish Eagle
Buteo buteo	Steppe Buzzard
Buteo trizonatus	Forest Buzzard
Buteo rufofuscus	Jackal Buzzard
Accipiter rufiventris	Redbreasted Sparrowhawk
Accipiter minullus	Little Sparrowhawk
Accipiter melanoleucus	Black Sparrowhawk
Accipiter tachiro	African Goshawk
Micronisus gabar	Gabar Goshawk
Circus ranivorus	African Marsh Harrier
Circus pygargus	Montagu's Harrier
Circus macrourus	Pallid Harrier
Circus maurus	Black Harrier
Polyboroides typus	Gymnogene
Pandion haliaetus	Osprey
Falco peregrinus	Peregrine Falcon
Falco biarmicus	Lanner Falcon
Falco amurensis	Eastern Redfooted Kestrel
Falco tinnunculus	Rock Kestrel
Falco rupicoloides	Greater Kestrel
Falco naumanni	Lesser Kestrel

GALLIFORMES

Francolinus africanus	Greywing Francolin
Francolinus shelleyi	Shelley's Francolin
Francolinus levaillantii	Redwing Francolin
Francolinus natalensis	Natal Francolin
Francolinus afer	Rednecked Francolin
Francolinus swainsonii	Swainson's Francolin
Coturnix coturnix	Common Quail
Numida meleagris	Helmeted Guineafowl

GRUIFORMES

Turnix sylvatica	Kurrichane Buttonquail
Turnix hottentotta	Blackrumped Buttonquail
Bugeranus carunculatus	Wattled Crane
Anthropoides paradiseus	Blue Crane
Balearica regulorum	Crowned Crane
Rallus caerulescens	African Rail
Crex crex	Corncrake
Amaurornis flavirostris	Black Crake

Sarothrura rufa	Redchested Flufftail
Sarothrura elegans	Buffspotted Flufftail
Sarothrura affinis	Striped Flufftail
Gallinula chloropus	Moorhen
Fulica cristata	Redknobbed Coot
Neotis denhami	Stanley's Bustard

CHARADRIIFORMES

Charadrius tricollaris	Threebanded Plover
Vanellus coronatus	Crowned Plover
Vanellus melanopterus	Blackwinged Plover
Vanellus armatus	Blacksmith Plover
Vanellus senegallus	Wattled Plover
Actitis hypoleucos	Common Sandpiper
Tringa glareola	Wood Sandpiper
Tringa stagnatilis	Marsh Sandpiper
Tringa nebularia	Greenshank
Philomachus pugnax	Ruff
Gallinago nigripennis	Ethiopian Snipe
Burhinus capensis	Spotted Dikkop

COLUMBIFORMES

Columba livia	Feral Pigeon
Columba guinea	Rock Pigeon
Columba arquatrix	Rameron Pigeon
Streptopelia semitorquata	Redeyed Dove
Streptopelia capicola	Cape Turtle Dove
Streptopelia senegalensis	Laughing Dove
Oena capensis	Namaqua Dove
Aplopelia larvata	Cinnamon Dove

PSITTACIFORMES

Poicephalus robustus	Cape Parrot*

CUCULIFORMES

Cuculus canorus	European Cuckoo
Cuculus gularis	African Cuckoo
Cuculus solitarius	Redchested Cuckoo
Cuculus clamosus	Black Cuckoo
Clamator glandarius	Great Spotted Cuckoo
Clamator jacobinus	Jacobin Cuckoo
Chrysococcyx cupreus	Emerald Cuckoo
Chrysococcyx klaas	Klaas's Cuckoo
Chrysococcyx caprius	Diederik Cuckoo

STRIGIFORMES

Tyto alba	Barn Owl
Tyto capensis	Grass Owl
Strix woodfordii	Wood Owl
Asio capensis	Marsh Owl
Bubo capensis	Cape Eagle Owl
Bubo africanus	Spotted Eagle Owl

CAPRIMULGIFORMES

Caprimulgus pectoralis	Fierynecked Nightjar
Caprimulgus tristigma	Freckled Nightjar
Macrodipteryx vexillaria	Pennantwinged Nightjar*

APODIFORMES

Apus apus	European Swift
Apus barbatus	Black Swift
Apus caffer	Whiterumped Swift
Apus horus	Horus Swift
Apus affinis	Little Swift
Apus melba	Alpine Swift
Cypsiurus parvus	Palm Swift

COLIIFORMES

Colius striatus	Speckled Mousebird
Urocolius indicus	Redfaced Mousebird

TROGONIFORMES

Apaloderma narina	Narina Trogon

ALCEDINIFORMES

Ceryle rudis	Pied Kingfisher
Megaceryle maxima	Giant Kingfisher
Alcedo semitorquata	Halfcollared Kingfisher
Alcedo cristata	Malachite Kingfisher
Ispidina picta	Pygmy Kingfisher
Halcyon albiventris	Brownhooded Kingfisher
Merops superciliosus	Olive Bee-eater*

CORACIIFORMES

Coracias garrulus	European Roller
Coracias caudata	Lilacbreasted Roller
Upupa epops	Hoopoe
Phoeniculus purpureus	Redbilled Woodhoopoe
Rhinopomastus cyanomelas	Scimitarbilled Woodhoopoe
Bucorvus leadbeateri	Ground Hornbill

PICIFORMES

Lybius torquatus	Blackcollared Barbet
Tricholaema leucomelas	Pied Barbet*
Indicator indicator	Greater Honeyguide
Indicator minor	Lesser Honeyguide
Prodotiscus regulus	Sharpbilled Honeyguide
Geocolaptes olivaceus	Ground Woodpecker
Campethera abingoni	Goldentailed Woodpecker
Dendropicos fuscescens	Cardinal Woodpecker
Mesopicos griseocephalus	Olive Woodpecker
Jynx ruficollis	Redthroated Wryneck

PASSERIFORMES

Mirafra africana	Rufousnaped Lark
Mirafra curvirostris	Longbilled Lark
Calandrella cinerea	Redcapped Lark
Galerida magnirostris	Thickbilled Lark
Eremopterix leucotis	Chestnutbacked Finchlark*
Hirundo rustica	European Swallow
Hirundo albigularis	Whitethroated Swallow
Hirundo cucullata	Greater Striped Swallow
Hirundo abyssinica	Lesser Striped Swallow
Hirundo fuligula	Rock Martin
Delichon urbica	House Martin
Riparia riparia	Sand Martin
Riparia paludicola	Brownthroated Martin
Riparia cincta	Banded Martin
Psalidoprocne holomelas	Black Sawwing Swallow
Campephaga flava	Black Cuckooshrike
Coracina caesia	Grey Cuckooshrike
Dicrurus adsimilis	Forktailed Drongo
Oriolus larvatus	Blackheaded Oriole
Corvus capensis	Black Crow
Corvus albus	Pied Crow
Corvus albicollis	Whitenecked Raven
Parus afer	Southern Grey Tit
Parus niger	Southern Black Tit
Turdoides jardineii	Arrowmarked Babbler
Lioptilus nigricapillus	Bush Blackcap
Pycnonotus barbatus	Blackeyed Bulbul
Andropadus importunus	Sombre Bulbul
Turdus libonyana	Kurrichane Thrush
Turdus olivaceus	Olive Thrush
Zoothera gurneyi	Orange Thrush
Turdus litsitsirupa	Groundscraper Thrush
Monticola rupestris	Cape Rock Thrush
Monticola explorator	Sentinel Rock Thrush
Oenanthe monticola	Mountain Chat
Oenanthe bifasciata	Buffstreaked Chat
Cercomela familiaris	Familiar Chat
Cercomela sinuata	Sicklewinged Chat

Thamnolaea cinnamomeiventris	Mocking Chat
Myrmecocichla formicivora	Anteating Chat
Saxicola torquata	Stonechat
Cossypha dichroa	Chorister Robin
Cossypha caffra	Cape Robin
Pogonocichla stellata	Starred Robin
Chaetops aurantius	Orangebreasted Rockjumper
Parisoma layardi	Layard's Titbabbler
Hippolais icterina	Icterine Warbler*
Acrocephalus arundinaceus	Great Reed Warbler
Acrocephalus palustris	European Marsh Warbler
Acrocephalus gracilirostris	Cape Reed Warbler
Chloropeta natalensis	Yellow Warbler
Bradypterus baboecala	African Sedge Warbler
Bradypterus barratti	Barratt's Warbler
Schoenicola brevirostris	Broadtailed Warbler
Phylloscopus trochilus	Willow Warbler
Seicercus ruficapillus	Yellowthroated Warbler
Apalis thoracica	Barthroated Apalis
Sphenoeacus afer	Grassbird
Cisticola juncidus	Fantailed Cisticola
Cisticola ayresii	Ayres' Cisticola
Cisticola brunnescens	Palecrowned Cisticola
Cisticola lais	Wailing Cisticola
Cisticola tinniens	Levaillant's Cisticola
Cisticola aberrans	Lazy Cisticola
Cisticola fulvicapilla	Neddicky
Prinia hypoxantha	Spotted Prinia
Muscicapa adusta	Dusky Flycatcher
Melaenornis pammelaina	Black Flycatcher
Sigelus silens	Fiscal Flycatcher
Batis capensis	Cape Batis
Stenostira scita	Fairy Flycatcher
Trochocercus cyanomelas	Bluemantled Flycatcher
Terpsiphone viridis	Paradise Flycatcher
Motacilla aguimp	African Pied Wagtail
Motacilla clara	Longtailed Wagtail
Motacilla capensis	Cape Wagtail
Anthus cinnamomeus	Grassveld Pipit
Anthus hoeschi	Mountain Pipit
Anthus similis	Longbilled Pipit
Anthus leucophrys	Plainbacked Pipit
Anthus crenatus	Rock Pipit
Anthus brachyurus	Shorttailed Pipit
Hemimacronyx chloris	Yellowbreasted Pipit
Macronyx capensis	Orangethroated Longclaw
Lanius collaris	Fiscal Shrike
Lanius collurio	Redbacked Shrike
Laniarius ferrugineus	Southern Boubou
Dryoscopus cubla	Puffback
Nilaus afer	Brubru
Tchagra senegala	Blackcrowned Tchagra
Telophorus zeylonus	Bokmakierie

Telophorus sulfureopectus	Orangebreasted Bush Shrike
Telophorus olivaceus	Olive Bush Shrike
Malaconotus blanchoti	Greyheaded Bush Shrike
Acridotheres tristis	Indian Myna
Spreo bicolor	Pied Starling
Cinnyricinclus leucogaster	Plumcoloured Starling
Lamprotornis nitens	Glossy Starling
Onychognathus morio	Redwinged Starling
Promerops gurneyi	Gurney's Sugarbird
Nectarinia famosa	Malachite Sunbird
Nectarinia chalybea	Lesser Doublecollared Sunbird
Nectarinia afra	Greater Doublecollared Sunbird
Nectarinia amethystina	Black Sunbird
Zosterops pallidus	Cape White-eye
Passer domesticus	House Sparrow
Passer melanurus	Cape Sparrow
Passer diffusus	Greyheaded Sparrow
Petronia superciliaris	Yellowthroated Sparrow
Ploceus ocularis	Spectacled Weaver
Ploceus cucullatus	Spottedbacked Weaver
Ploceus capensis	Cape Weaver
Ploceus velatus	Masked Weaver
Quelea quelea	Redbilled Quelea
Euplectes orix	Red Bishop
Euplectes afer	Golden Bishop
Euplectes capensis	Yellowrumped Widow
Euplectes axillaris	Redshouldered Widow
Euplectes albonotatus	Whitewinged Widow
Euplectes ardens	Redcollared Widow
Euplectes progne	Longtailed Widow
Lagonosticta rubricata	Bluebilled Firefinch
Uraeginthus angolensis	Blue Waxbill
Estrilda astrild	Common Waxbill
Estrilda melanotis	Swee Waxbill
Ortygospiza atricollis	Quail Finch
Sporaeginthus subflavus	Orangebreasted Waxbill
Amadina erythrocephala	Redheaded Finch
Spermestes cucullatus	Bronze Mannikin
Vidua macroura	Pintailed Whydah
Vidua funerea	Black Widowfinch
Serinus mozambicus	Yelloweyed Canary
Serinus canicollis	Cape Canary
Serinus scotops	Forest Canary
Serinus symonsi	Drakensberg Siskin
Serinus sulphuratus	Bully Canary
Serinus flaviventris	Yellow Canary
Serinus gularis	Streakyheaded Canary
Emberiza flaviventris	Goldenbreasted Bunting
Emberiza capensis	Cape Bunting
Emberiza tahapisi	Rock Bunting
Emberiza impetuani	Larklike Bunting

LIST OF ENDEMIC BIRDS

Geronticus calvus	Bald Ibis
Tadorna cana	South African Shelduck
Gyps coprotheres	Cape Vulture
Buteo trizonatus	Forest Buzzard
Buteo rufofuscus	Jackal Buzzard
Circus maurus	Black Harrier
Francolinus africanus	Greywing Francolin
Anthropoides paradiseus	Blue Crane
Geocolaptes olivaceus	Ground Woodpecker
Mirafra curvirostris	Longbilled Lark
Galerida magnirostris	Thickbilled Lark
Parus afer	Southern Grey Tit
Lioptilus nigricapillus	Bush Blackcap
Monticola rupestris	Cape Rock Thrush
Monticola explorator	Sentinel Rock Thrush
Oenanthe monticola	Mountain Chat
Oenanthe bifasciata	Buffstreaked Chat
Cercomela sinuata	Sicklewinged Chat
Myrmecocichla formicivora	Anteating Chat
Cossypha dichroa	Chorister Robin
Chaetops aurantius	Orangebreasted Rockjumper
Sphenoeacus afer	Grassbird
Prinia hypoxantha	Spotted Prinia
Sigelus silens	Fiscal Flycatcher
Batis capensis	Cape Batis
Stenostira scita	Fairy Flycatcher
Anthus hoeschi	Mountain Pipit
Anthus similis	Longbilled Pipit
Anthus crenatus	Rock Pipit
Hemimacronyx chloris	Yellowbreasted Pipit
Macronyx capensis	Orangethroated Longclaw
Laniarius ferrugineus	Southern Boubou
Telophorus zeylonus	Bokmakierie
Spreo bicolor	Pied Starling
Promerops gurneyi	Gurney's Sugarbird
Nectarinia chalybea	Lesser Doublecollared Sunbird
Nectarinia afra	Greater Doublecollared Sunbird
Zosterops pallidus	Cape White-eye
Passer melanurus	Cape Sparrow
Ploceus capensis	Cape Weaver
Estrilda melanotis	Swee Waxbill
Serinus scotops	Forest Canary
Serinus symonsi	Drakensberg Siskin

CHECKLIST OF MAMMALS

INSECTIVORA

Myosorex varius	Forest shrew
Crocidura flavescens	Greater musk shrew
Crocidura cyanea	Reddish-grey musk shrew
Crocidura silacea	Lesser grey-brown musk shrew
Crocidura maquassiensis	Makwassie musk shrew
Chrysospalax villosus	Rough-haired golden mole
Chlorotalpha sclateri	Sclater's golden mole
Amblysomus hottentotus	Hottentot golden mole

CHIROPTERA

Taphozous mauritianus	Mauritian tomb bat
Rhinolophus clivosus	Geoffroy's horseshoe bat
Eptesicus capensis	Cape serotine bat
Scotophilus borbonicus	Lesser yellow house bat

PRIMATES

Papio ursinus	Chacma baboon
Cercopithecus aethiops	Vervet monkey

CARNIVORA

Canis mesomelas	Black-backed jackal
Aonyx capensis	Clawless otter
Lutra maculicollis	Spotted-necked otter
Poecilogale albinucha	Striped weasel, African weasel
Ictonyx striatus	Striped polecat, zorilla
Genetta genetta	Small-spotted genet
Genetta tigrina	Large-spotted genet
Herpestes ichneumon	Large grey mongoose
Galerella pulverulenta	Small grey mongoose
Ichneumia albicauda	White-tailed mongoose
Atilax paludinosus	Water mongoose
Proteles cristatus	Aardwolf
Panthera pardus	Leopard
Felis caracal	Caracal
Felis serval	Serval
Felis lybica	African wild cat

HYRACOIDEA

Procavia capensis	Rock dassie

TUBULIDENTATA

Orycteropus afer	Aardvark

ARTIODACTYLA

Connochaetes gnou	Black wildebeest
Alcelaphus buselaphus	Red hartebeest
Damaliscus dorcas phillipsi	Blesbok
Sylvicapra grimmia	Common duiker, grey duiker
Oreotragus oreotragus	Klipspringer
Ourebia ourebi	Oribi
Pelea capreolus	Grey rhebuck
Tragelaphus scriptus	Bushbuck
Taurotragus oryx	Eland
Redunca arundinum	Reedbuck
Redunca fulvorufula	Mountain reedbuck

RODENTIA

Hystrix africaeaustralis	Porcupine
Cryptomys hottentotus	Common mole rat
Georychus capensis	Cape molerat
Otomys laminatus	Laminate vlei rat
Otomys irroratus	Vlei rat
Otomys sloggetti	Ice rat
Mystromys albicaudatus	White-tailed rat
Dendromus melanotis	Grey climbing mouse
Dendromus mesomelas	Brant's climbing mouse
Dendromus mystacalis	Chestnut climbing mouse
Steatomys pratensis	Fat mouse
Steatomys krebsii	Kreb's fat mouse
Rhabdomys pumilio	Striped mouse
Dasymys incomtus	Water rat
Grammomys cometes	Mozambique woodland mouse
Grammomys dolichurus	Woodland mouse
Mus minutoides	Pygmy mouse
Mastomys natalensis	Multimammate mouse
Graphiurus murinus	Woodland dormouse

LAGOMORPHA

Lepus saxatilis	Scrub hare
Pronolagus crassicaudatus	Natal red hare

APPENDICES

NOMINATION PROPOSAL

for

THE DRAKENSBERG PARK ALTERNATIVELY KNOWN AS OKHAHLAMBA PARK

to be

LISTED AS A WORLD HERITAGE SITE

APPENDIX 3

APPENDIX 3

A DESCRIPTION OF THE PLANT COMMUNITIES IN THE DRAKENSBERG PARK

The following description of the plant communities found within the Drakensberg Park has been based on Killick (1990, 1997).

1. LOW ALTITUDE VEGETATION

The montane belt extends from the valley floors to the lowermost basalt cliffs just above the Clarens Sandstone.

1.1 Grasslands

1.1.1 *Themeda triandra* Grassland

The greater part of the belt is occupied by *Themeda triandra* Grassland, often as an understorey to *Protea* Savanna. The average leaf height of the sward is 230 - 300mm with a culm height of 0,6 - 0.9m. Apart from the dominant grass, *Themeda triandra* (Red Grass), the important species are *Hyparrhenia hirta* (Common Thatch Grass), *Tristachya leucothrix* (Red Seed Grass), *Phacelurus franksiae, Diheteropogon filifolius* (Wire Bluestem), *Harpochloa falx* (Caterpillar Grass), *Rendlia altera* (Toothbrush Grass), *Trachypogon spicatus* (Giant Spear Grass), *Alloteropsis semialata* subsp. *semialata* (Blackseed Grass) and *Loudetia simplex* (Russet Grass). The composition of the grassland varies from area to area and depends very largely on how the grassland has been managed in the past, for example the kind of fire regime applied or whether, in areas outside of the Park, it has been overgrazed. Indicators of disturbance include species of *Sporobolus* (Dropseed) and *Eragrostis* (Lovegrass).

Numerous herbs are associated with the grasses. Prominent herbs include *Eriosema kraussianum,* species of *Acalypha, Helichrysum aureonitens* (Golden Everlasting), *Becium grandiflorum* var. *obovatum* (Cat's Whiskers), *Barleria monticola, Callilepis laureola* (Ox-eye Daisy), *Pentanisia prunelloides* (Wild Verbena), *Graderia scabra* (Wild Penstemon), *Dierama latifolium* (Broad-leaved Harebell), *Brunsvigia natalensis, Crocosmia paniculata* (Zigzag Crocosmia) which usually grows in grassland just below the Clarens Sandstone cliffs and is about a metre tall and has panicles of attractive orange flowers, and many others.

1.1.2 *Hyparrhenia* Grassland

With protection from fire, *Themeda triandra* Grassland is replaced by *Hyparrhenia* Grassland. This is tall grassland, 0,8 - 2,7m high, has a patchy distribution, occurring in moist gullies, at the foot of cliffs and in disturbed areas. The dominant grasses are *Hyparrhenia hirta* (Common Thatch Grass), *H. dregeana* (Giant Thatch Grass) *and H. tamba* (Blue Tambookie Grass). These grasses are late summer or autumn flowering.

1.1.3 *Miscanthus-Cymbopogon* Grassland

This is a tall grassland up to 2,5m high, found mostly in moist areas - streambanks, gullies and forest margins. The dominants are *Miscanthus capensis* (East Coast Broom Grass) and *Cymbopogon validus* (Giant Turpentine Grass). The grassland is invaded by a heterogenous assemblage of herbaceous and woody plants, such as *Artemisia afra* (Wormwood), *Anemone fanniniae, Myrsine africana* (Small Cape Myrtle), *Agapanthus campanulatus* subsp. *patens, Polygala virgata* (Purple Broom), *Euphorbia epicyparissias* (Pisgoedbossie) and *Helichrysum* spp. (Everlastings).

1.2 Scrub

There are five distinct communities in the montane belt.

1.2.1 Streambank scrub

Several trees and shrubs form a scrub community on streambanks and at the edge of pools. Constituents include *Salix mucronata* subsp. *woodii* (Wild Willow), *Ilex mitis* (Cape Holly), *Bowkeria verticillata* (Natal Shell Flower), *Halleria lucida* (Tree Fuchsia), *Dais cotinifolia* (Pompom Tree) and *Cyathea dregei* (Common Tree Fern).

1.2.2 Boulder-bed Scrub

This community occurs on river-beds where the roundish grey boulders are separated by fairly large stretches of coarse sand or where the boulders are piled high with little or no intervening sand. Common plants in this habitat are *Aristida junciformis* subsp. *galpinii* (Galpin's Bristlegrass), *Sutera pristisepala, Chrysocoma ciliata* (Bitter Bush, an invader from the summit), *Senecio haygarthii, Sutherlandia montana* and *Felicia filifolia* subsp. *filifolia* (Wild Aster). Mature Boulder-bed Scrub comprises the trees *Leucosidea sericea* (Old Wood) and *Bowkeria verticillata* (Natal Shell Flower) with an understorey of *Aristida monticola* (Mountain Bristlegrass) and *Cymbopogon validus* (Giant Turpentine Grass).

1.2.3 *Leucosidea - Buddleja* Scrub

Leucosidea sericea (Old Wood) and *Buddleja salviifolia* (Sagewood), sometimes form extensive communities of trees or shrubs up to 3,5m high, either singly or together, wherever soil moisture conditions are above average and there is protection from fire. The scrub is soon invaded by forest precursor species such as *Rhamnus prinoides* (Dogwood), *Euclea crispa* var. *crispa* (Blue Guarri), *Rhus dentata* (Nana-berry) and *Olinia emarginata* (Transvaal Hard Pear).

1.2.4 *Widdringtonia nodiflora* Scrub

This community is dominated by *Widdringtonia nodiflora* (Mountain Cypress) and occurs between the Sandstone and lowermost basalt cliffs. It forms a very dense almost pure community often with a shrub layer of *Myrsine africana* (Small Cape Myrtle).

1.2.5 Cliff Shrub

The cliffs of the Sandstone and the lowermost basalt provide a varied assortment of habitats - horizontal pavements at the cliff-tops, vertical faces, some dry, some wet, crevices and ledges - and this is reflected in the different plant communities occupying these sites:

- algae (black streaks on cliff faces);
- bulbous plants - *Scilla natalensis* (Blue Squill), *Brunsvigia natalensis, Haemanthus humilis* subsp. *hirsutus*;
- cushion and mat plants - *Helichrysum albirosulatum* and *H. nanum;*
- heaths - *Erica drakensbergensis, E. straussiana* and *E. cerinthoides* (Red Hairy Heath);
- rock clingers - *Ficus ingens* (Red-leaved Rock Fig);
- shrubs - *Metalasia densa* (Drakensbergse Steekbos), *Myrica pilulifera* (Broad-leaved Waxberry) and *Cliffortia linearifolia;*
- succulents - *Aloe arborescens* (Oldenland's Bush Aloe), *A. pratensis* (Meadow Aloe) and *Delosperma obtusum* (Mountain Vygie);
- trees - *Protea roupelliae* (Silver Sugarbush), *Leucosidea sericea* (Old Wood) and *Podocarpus latifolius* (Red Yellow-wood);
- tunic plants with a dense sheath of persistent leaf fibres - *Styppeiochloa gynoglossa* (Mountain Tunic Grass) and *Xerophyta viscosa.*
- Characteristic of the lowermost basalt cliffs are trees of the red-flowered *Greyia sutherlandii* (Natal Bottlebrush) and the grey-green *Cussonia paniculata* (Mountain Cabbage Tree).

1.3 *Protea* Savanna

Two species *Protea caffra* (Common Sugarbush) and *P. roupelliae* (Silver Sugarbush) form a very conspicuous and attractive woodland community in the river valleys. The trees are evergreen, about 3 - 3,7m with rounded crowns. The species occur together or separately. *P. caffra* has a wide range of habitat requirements compared to *P. roupelliae* which prefers Clarens Sandstone-derived soils. Burning practices determine the density of *Protea* Savanna. There are four other *Protea* species found in the Drakensberg, these are, *P. subvestita, P. dracomontana, P. simplex* and *P. nubigena.*

1.4 Forest

Forest is very limited in extent in the Drakensberg, particularly in the colder and drier southern area, occurring on streambanks in deep kloofs and gorges and on slopes with a southern, south-eastern or eastern aspect - wherever conditions are sufficiently moist and there is adequate protection from wind and fire. The forests are often triangular in outline, but sometimes these patches have joined up to form a long continuous forest.

The forest margin usually consists of *Leucosidea sericea* (Old Wood) and *Buddleja salviifolia* (Sagewool) and forest precursor species *Rhus dentata* (Nana-berry), *R. tomentosa* (Red Wild Currant), *Euclea crispa* var. *crispa* (Blue Guarri), *Olinia emarginata* (Transvaal Hard Pear), *Rapanea melanophloeos* (Cape Beech), *Halleria*

lucida (Tree Fuchsia), *Rhamnus prinoides* (Dogwood) and *Pittosporum viridiflorum* (Kasuur).

Characteristic of the margin are two showy yellow-flowered climbers, namely *Senecio tamoides* (Canary Creeper) and *S. deltoideus.* Other climbers are *Littonia modesta* (Yellow Bells) and *Sandersonia aurantiaca* (Christmas Bells), *Rhoicissus tridentata* (Wild Grape), *Clematis brachiata* (Traveller's Joy), *Dioscorea sylvatica* (Forest Elephant's Foot), *Myrsiphyllum asparagoides* (Cape Smilax) and *Riocreuxia torulosa* (Candelabra Flower).

The forest itself can be divided into five fairly distinct layers, plus several special forest plant groups.

The dominant tree layer, 12 - 22m high, forms a discontinuous canopy to the forest. The dominant is usually, but not always, *Podocarpus latifolius* (Red Yellowwood) associated with *Scolopia mundii* (Red Pear), *Pterocelastrus echinatus* (White Candlewood), *Curtisia dentata* (Assegai), *Trimeria grandifolia* (Wild Mulberry), *Celtis africana* (White Stinkwood), *Maytenus peduncularis* (Cape Blackwood), *Kiggelaria africana* (Wild Peach), *Cussonia spicata* (Common Cabbage Tree), *Podocarpus henkelii* (Henkel's Yellowwood) and *P. falcatus* (Outeniqua Yellowwood).

The small tree layer, 4 - 6 m high, is dominated by *Diospyros whyteana* (Bladder-nut) an is associated with *Clausena anista* (Horsewood), *Burchellia bubalina* (Wild Pomegranate), *Buddleja salviifolia* (Sagewood) and *Maytenus undata* (Koko Tree).

The shrub layer ranges up to 3m high and comprises the following species: *Carissa bispinosa* (Num-Num). *Canthium ciliatum* (Dwarf Turkey-berry), *Cassinopsis ilicifolia* Lemon Thorn), *Pavetta cooperi* (Cooper's Bride's Bush), *Scutia myrtina* (Droog-my-keel) and *Maytenus mossambicensis* (Black Forest Spike-thorn).

The field layer is often luxuriant and numerous herbs and fern communities flowering usually between November and the end of March. For the rest of the year, the forest floor has an open appearance. Constituents of the field layer include: *Oplismenus undulatifolius* (Berg Forest Grass), *Begonia sutherlandii, Streptocarpus gardenii, Dietes iridioides* (Wild Iris), *Plectranthus grallatus* (Tuberous Spur-flower), *Impatiens hochstetteri* subsp. *hochstetteri, Aloe aristata* (Long-awned Aloe), *Thalictrum rhynchocarpum* (False Maidenhair), *Disperis* spp. (Granny Bonnets), *Desmodium repandum, Sanicula europaea* (Sanicle), *Carex* spp. and ferns such as *Pteris catoptera* var. *catoptera* (Long-tipped Pteris), *Polystichum* spp. (Shield Ferns), *Blechnum giganteum* (Giant Blechnum), *Adiantum poiretii* (Fine Maidenhair Fern), *Asplenium monanthes* (Mother Fern), *Dryopteris inaequalis, Pteris cretica* (Avery Fern) and *Cheilanthes hirta* (Parsley Fern).

The ground layer, where it exists, consists almost entirely of mosses. Scattered throughout the forest are boulders of Sandstone of varying size. These rocks are usually moist and support their own characteristic plant populations. Lichens and mosses are accompanied by the orchid *Stenoglottis fimbriata, Peperomia* spp., *Streptocarpus* spp., *Crassula* spp., *Talbotia elegans, Aloe arborescens* (Oldenland's Bush Aloe) and numerous ferns.

The epiphytes consists largely of lichens and mosses. Species of *Usnea* (Old Man's Beard), are very conspicuous hanging from trees; also *Squamidium brasiliense* (Pendent Forest Moss), a dark green moss festooning trees and shrubs. Epiphytic ferns are *Polypodium* spp. (Polypody), *Pleopeltis* spp. (Lance Ferns), *Asplenium rutifolium* (Carrot Fern) and the delicate filmy fern, *Trichomanes pyxidiferum* var. *melanotrichum.* The only flowering plant epiphytes are *Peperomia* spp. and the orchid *Polystachya ottoniana.*

Climbers are fairly frequent. Woody climbers are represented by *Secamone alpinii* (Monkey Rope), *Rhoicissus revoilii* (Revoil's Wild Grape) and *R. tridentata* (Wild Grape). Herbaceous climbers are also present and these are almost the same as described for the forest margin. Important stragglers are *Rubus pinnatus* (Forest Bramble) and *Scutia myrtina* (Cat-thorn).

This account would not be complete without mention of *Thamnocalamus tessellatus* (Berg Bamboo), the only indigenous bamboo in South Africa. It occurs in dense clumps along streams, below water falls and in forest margins.

2. MID ALTITUDE VEGETATION

This vegetation belt extends from the lower most basalt cliffs to just below the summit of the Drakensberg.

2.1. Grasslands

2.1.1 *Themeda triandra* Grassland

The vegetation of the mid altitude vegetation belt consists mainly of grassland, chiefly *Themeda triandra* Grassland. On the warmer and drier slopes *T. triandra* Grassland extends from the top of the lowermost basalt cliffs to about 2 600m and on the cooler and moister slopes it reaches 2 140m. On warmer and drier slopes it mixes with Temperate Grassland and ultimately high altitude grasslands.

Between 1 830 and 2 140m the grassland is fairly uniform in composition and cover. *Themeda triandra* (Red Grass) is dominant with a basal cover of up to nearly 50%. Other major grasses are *Trachypogon spicatus* (Giant Spear Grass), *Tristachya leucothrix* (Red Seed Grass), *Harpochloa falx* (Caterpillar Grass) and *Heteropogon contortus* (Spear Grass). Other grasses are *Alloteropsis semialata* subsp. *semialata* (Blackseed Grass), *Elionurus muticus* (Wire Lemongrass), *Rendlia altera* (Toothbrush Grass), *Panicum* spp. (Panics), *Monocymbium ceresiiforme* (Wild Oatgrass), *Andropogon appendiculatus* (Bluestem) and *Loudetia simplex* (Russet Grass). An important feature of this grassland in pasture terms is that it is unpalatable to stock during winter.

Associated herbaceous plants are numerous. These include *Acalypha wilmsii, A. schinzii, Hypoxis* spp., *Pentanisia prunelloides* (Wild Verbena), *Ledebouria cooperi, Oxalis obliquifolia, Kohautia amatymbica, Eriosema kraussianum, Helichrysum aureonitens* (Golden Everlasting), *H. acutatum, Senecio glaberrimus, Aster perfoliatus* (Grey-leaved Aster), *A. pleiocephalus, Watsonia lepida* (Elegant Watsonia) and *Zaluzianskya microsiphon* (Short-tubed Drumstick).

Summer is characterized by the appearance of orchids - species such as *Satyrium longicauda* (Long-tailed Trewwa), *Disa versicolor* (Apple Blossom Orchid), *Eulophia foliosa, E. clavicornis* (Mauve Pixie), *Disperis* spp. (Granny Bonnets) and *Habenaria* spp. Other herbs include *Helichrysum allioides, Vernonia hirsuta* (Wild Heliotrope), *Haplocarpha scaposa, Dierama latifolium* (Broad-leaved Harebell) and *Sopubia cana.*

Few herbaceous plants appear in autumn. The list includes *Erica woodii, E. oatesii, Crassula vaginata* subsp. *vaginata, Helichrysum adenocarpum* (Pink Everlasting), several other *Helichrysum* spp. and *Wahlenbergia* spp.

Between 2 135 and 2 590m, several herbaceous plants are present which are not found at higher or lower altitudes in *Themeda triandra* Grassland. There are *Eucomis humilis* (Lowly Pineapple Flower) and *Urginea macrocentra* (Natal Slangkop) which form conspicuous communities at the foot of basalt cliffs. Other species are : *Kniphofia porphyrantha* (Highveld Poker), *Aloe ecklonis, Dierama dracomontanum* (Drakensberg Harebell), *Sutera breviflora, Agapanthus campanulatus* subsp. *patens* and *Pimpinella caffra* (Mountain Saxifrage).

2.1.2 *Rendlia altera* Grassland

This short grassland is found between 1 980 and 2 440m on ridges of spurs. The soil is thin, black, peaty, often covered with small stones and occasionally interrupted by basalt outcrops. The dominant species is *Rendlia altera* (Toothbrush Grass), supported by *Sporobolus centrifugus* (Olive Dropseed), *Eragrostis capensis* (Heartseed Lovegrass), *E. racemosa* (Narrow-heart Lovegrass), *Diheteropogon filifolius* (Wire Bluestem), *Panicum ecklonii* (Ecklon's Panic), *Bulbostylis humilis* and herbaceous species such as *Rhodohypoxis baurii, Wurmbea kraussii.*

2.1.3 Temperate Grasslands

Temperate Grasslands are dominated by three evergreen species, namely *Festuca costata* (Tussock Fescue), *Pentaschistis tysonii* and *Bromus firmior* (Strong Brome).

(a) *Festuca costata* Grassland occurs in moist situations in the lower part of the mid altitude vegetation belt. Its altitudinal distribution is 1 830 - 2 865m. *F. costata* is a tall tussock-forming, summer-flowering grass with flat leaves 0,6m and culms 1,2m high. The tussocks are usually separated by shorter grasses like *Themeda triandra* (Red Grass), *Koeleria capensis* (June Grass), *Poa binata, Agrostis barbuligera.*

(b) *Pentaschistis tysonii* Grassland covers fairly large areas, occurs between 1980 and 2 290m on moist slopes and between 2 590 and 2 870m on dry slopes *P. tysonii* is summer-flowering and has tightly rolled leaves about 300mm high.

(c) *Bromus firmior* (Strong Brome) is a broad-leaved grass with leaves up to 300mm long and culms up to 1,2m high.

2.1.4 *Themeda triandra* - Temperate Grassland

Above about 2 600m on dry slopes, *Themeda triandra* Grassland occurs in varying proportions with Temperate Grasslands. With increase in altitude, certain constituents of both grassland types become more important and others are added. Between 2 500 and 2 740m *Aristida monticola* (Mountain Bristlegrass), much dwarfed in stature, assumes greater importance and in parts is even locally dominant. Also prominent are the grasses *Koeleria capensis* (June Grass), *Trachypogon spicatus* (Giant Spear Grass), *Tristachya* leucothrix (Red Seed Grass), *Eragrostis racemosa* (Narrow-heart Love Grass), *Anthoxanthum ecklonii* (Sweet Vernal Grass) and *Pentaschistis aurea* subsp. *pilosogluma* (Giant Pentaschistis). Herbs present include *Senecio haygarthii, Berkheya macrocephala* (Large-headed 'Thistle'), *Helichrysum drakensbergense, Selago monticola, Bupleurum mundii* and *Tetraria cuspidata.*

Above 2 740m, *Merxmuellera disticha* (Copper Wire Grass), *Festuca caprina* (Goat-beard Grass) and *Pentaschistis oreodoxa* (Mountain Glory), the dominant grasses of the high altitude vegetation belt are present. *Koeleria capensis* (June Grass), *Harpochloa falx* (Caterpillar Grass) and *Eragrostis caesia* (Pangrass) become more prominent and are accompanied by *Festuca scabra, F. killickii* and *Merxmuellera* aureocephala. Other plants characteristic of this region are *Guthriea capensis* (Hidden Flower), *Erica alopecurus, Diascia anastrepta* (Upturned Twinspur), *Fumaria officinalis* (Fumitory), *Lobelia* spp., *Eucomis humilis* (Lowly Pineapple Flower), *Moraea alticola* (near streams), *Senecio macrospermus* and *Nerine bowdenii.*

2.1.5 Tall Grassland

This grassland includes those grass communities dominated by tall grass species.

(a) *Miscanthus capensis* Grassland is found on streambanks, moist flats and in gullies below 1 980m. The dominant is *Miscanthus capensis* (East Coast Broom Grass), up to 2,4m tall. The majority of the associated plants are tall herbs and shrubs, many belonging to the families Asteraceae and Lamiaceae: *Leonotis ocymifolia* var. *raineriana, Rabdosiella calycina* (Spur Flower), *Stachys albiflora, Pycnostachys reticulata, Heteromma decurrens, Vernonia hirsuta* (Wild Heliotrope) and *Helichrysum* spp. (Everlastings), *Inulanthera calva, Gunnera perpensa* (Wild Rhubarb), *Kniphofia linearifolia, Anemone fanniniae, Geranium pulchrum* and *Afrotysonia glochidiata.*

(b) *Hyparrhenia* Grassland is similar to (a) above but with *Hyparrhenia dregeana* (Giant Thatch Grass) dominant and occupying very much smaller areas.

(c) *Cymbopogon validus* Grassland also similar to (a) above, but with *Cymbopogon validus* (Giant Turpentine Grass) dominant and occupying much smaller areas up to 2 745m.

2.2 Streambank Communities

The three major communities fringing streams are the *Merxmuellera macowanii* Community, *Cliffortia linearifolia* Scrub and *Leucosidea sericea* Scrub.

2.2.1 *Merxmuellera macowanii* Community

This plant community is found on approximately level streambanks between 1 830 and 2 285m. *Merxmuellera macowanii* is a grass with stiff leaves up to 0,75m long and culms 1,2m long and forms large tussocks, some nearly 0,6m in diameter. The grass is very conspicuous when in flower in summer. Associate species include *Geranium* spp., *Gunnera perpensa* (Wild Rhubarb), *Alepidea amatymbica* (Star-flowered Kalmoes), *Berkheya macrocephala* (Large-headed 'Thistle'), *Galium wittbergense,* etc.

2.2.2 *Cliffortia linearifolia* Scrub

Cliffortia linearifolia Scrub occurs in deep stream gullies between 1 950 and 2 250m. *C. linearifolia* is the dominant shrub and *Philippia evansii* is frequently subdominant. Associated shrubs include *Myrsine africana* (Small Cape Myrtle), *Anthospermum monticola, Phygelius aequalis* (Riverbell) and *Diospyros austro-africana* var. *rubriflora* (Firesticks). Characteristic herbs are given under 2.2.1 above, plus *Cephalaria natalensis, Valeriana capensis* (Cape Valerian), *Mysotis sylvatica* (Wild Forget-me-not), *Berkheya multijuga* (Spiny Berg 'Thistle') and *Cycnium rasemosum* (Christmas Flower). The common Tree Fern, *Cyathea dregei,* occurs at varying intervals along streams and also in sinkholes.

2.2.3 *Leucosidea sericea* Scrub

Leucosidea sericea (Old Wood) forms scrub in sheltered situations such as streambanks and deep gullies in the mid altitude belt up to 2.040m. Associated species are *Buddleja salviifolia* (Sagewood), *Rhus dentata* (Nana-berry), *Rhamnus prinoides* (Dogwood), *Olinia emarginata* (Transvaal Hard Pear), *Halleria lucida* (Tree Fuchsia) and *Ilex mitis* (Cape Holly).

2.3 Outcrop Vegetation

2.3.1 Outcrop plant Communities

Horizontal rock areas occur along the top edge of the lowermost basalt cliffs, above and adjacent to waterfalls, scattered through grassland and on the ridge of spurs.

Characteristic of these rock areas are communities of low-growing mosses, the creeping fern *Selaginella imbricata,* and *Aristida junciformis* subsp. *galpinii* (Galpin's Bristlegrass), and the succulent *Crassula dependens.* Accompanying these plants are several species of *Eragrostis* (Love Grass), *Ledebouria cooperi, Rhodohypoxis baurii, Oxalis obliquifolia, Psammotropha myriantha* and others.

Scattered through the grassland, often in the form of low humps, are areas supporting small stones and little soil. The dominant plants are the grasses *Loudetia simplex* (Russet Grass), *Diheteropogon filifolius* (Wire Bluestem) and *Panicum natalense* (Natal Panic).

Here and there on hills of varying size, the summits of which rarely exceed 1 950m is a mixed vegetation consisting of *Protea caffra* (Common Sugarbush), *P. roupelliae*

(Silver Sugarbush), *Halleria lucida* (Tree Fuchsia), *Rubus ludwigii* subsp. *spatiosus* (Ludwig's Ample Bramble), *Cliffortia repens,* grasses and many rock-loving herbaceous plants.

The ridges of spurs above 2 440m, which are exposed to strong winds, support a low-growing vegetation. Dwarf shrubs are represented by *Passerina montana, Erica thodei, E. frigida* and *E. dykei* which form low cushions or carpets up to 150mm high, *Buchenroedera lotononoides* (Grey-leaf Bush), *Polygala myrtifolia, Gnidia compacta, Muraltia saxicola, Cliffortia spathulata* and species of *Helichrysum* (Everlastings).

2.3.2 Vertical Outcrop plant Communities

These outcrops occur on the flanks of long spurs leading to the main escarpment and on the buttress slopes of the main escarpment. The outcrops are often arranged in horizontal tiers interrupted at intervals by grassland. Sometimes the outcrops take the form of cliffs.

The most important plants on vertical cliffs are the crevice plants *Scirpus falsus, Xerophyta viscosa* and *Styppeiochloa gynoglossa* (Mountain tunic Grass). *Scirpus falsus,* a sedge about 100mm high, readily invades moist moss mats and forms dense carpets. *Xerophyta viscosa* covers very large areas of moist or dry rock surfaces, often accompanied by a rather dwarfed *Cymbopogon validus* (Giant Turpentine Grass). *Styppeiochloa gynoglossa* is restricted to dry cliffs below 2640m. Other common crevice or ledge plants are *Scilla natalensis* (Blue-squill), *Galtonia regalis* (Royal Berg Lily), *Eucomis humilis* (Lowly Pineapple Flower), *Berkheya rosulata* (Rosette 'Thistle'), *Helichrysum* spp. (Everlastings) and various grass species.

The basalt cliffs of the main escarpment up to 460 m in parts present a variety of rock habitats - sheer faces, crevices, pockets, ledges, overhangs and moist areas near waterfalls.

Much of the rock surface is bare, but a considerable portion is covered with grassland and occasionally heath. Species common on cliffs are *Merxmuellera stereophylla, Xerophyta viscosa, Helichrysum montanum, H. aureum* var. *scopulosum, H. pagophilum* and in moist sheltered situations *Ranunculus baurii, Galtonia regalis* (Royal Berg Lily), *Kniphofia albomontana* and the attractive red-flowered *Gladiolus flanaganii* (Suicide Gladiolus), so-called because of the sometimes inaccessible habitats it sometimes occupies.

2.4 Fynbos

Fynbos is the climax community of the mid altitude vegetation belt. Because of recurrent grass fires, it is limited in extent, occurring in situation providing some protection from fire. The most extensive and best developed stands of fynbos are to be found don steep valley and escarpment slopes at the head of the main rivers.

The community consists of shrubs between 0,9 and 3m tall, the majority of which

are evergreen, though some may be deciduous. Most of the constituents have small leaves which are heath-like, elliptic or linear, variously leathery and glossy or grey-woolly. The vegetation is similar in external features to that found in the south-western Cape. The density of fynbos varies considerably - from shrubs scattered in grassland to an almost impenetrable tangled mass of vegetation. Dominant species include *Passerina drakensbergensis, Philippia evansii* and the conifer *Widdringtonia nodiflora* (Mountain Cypress), *Erica ebracteata, Buchenroedera lotononoides* (Grey-leaf Bush), *Anthospermum monticola, Rhus discolor* (Grassveld Currant), *Protea dracomontana* (Drakensberg Dwarf Sugarbush), *P. subvestita* (Lip-Flower Sugarbush), *Syncolostemon macranthus, Melianthus villosus* (Honey Flower), *Encephalartos ghellinckii* (Drakensberg Cycad) and many others. Several species are conspicuous such as the yellow-flowered, summer-flowering *Euryops tysonii,* the blue and yellow-flowered, *Lotononis trisegmentata* var. *robusta,* the yellow-flowered, autumn-flowering *Gymnopentzia bifurcata* and *Erica algida.*

3. ALPINE TUNDRA VEGETATION (HIGH ALTITUDE)

The vegetation of the summit plateaux consists of climax heath communities, limited in extent, dominated chiefly by low, woody species of *Erica* and *Helichrysum* interspersed with extensive grasslands dominated by species of *Merxmuellera, Festuca* and *Pentaschistis.* In addition, there are aquatic, hygrophilous and lithophilous communities varying in extent. The summit vegetation along the whole length of the Drakensberg is remarkably homogenous.

The vegetation reflects the severity of the climate: it is treeless, consisting predominantly of short grassland; most of the plants exhibit xeromorphic features of some kind. The heath constituents are evergreen dwarf shrubs with small, ericoid, filiform or linear leaves. Some have hard and more or less glossy leaves, whereas others have a softer, grey-woolly leaves. Cushion plants are common as are perennial rosette plants.

3.1 Hygrophilous Vegetation

On the undulating summit area of the Drakensberg there are numerous bogs and streams which form the headwaters of several major river systems e.g. Tugela, Mkhomazi, Mzimkulu and Orange rivers.

3.1.1 Bog Communities

The bogs of the Drakensberg area are of two types: the first, limited in area, is found in seepage areas or flushes on mountain slopes; the second occurs on fairly level areas in the riverheads, where rather extensive swampy areas containing hummocks are formed. Both types are peat-producing. They are of late or post-glacial age (van Zinderen Bakker & Werger, 1974). The bogs often show up conspicuously as low, green carpets of vegetation.

Permanent pools on the summit are rare, but temporary ones are common in summer. Aquatic plants present are *Aponogeton junceus* (Wateruintjie),*Limosella capensis* (Slangbos), *Lagarosiphon muscoides* (Barbel Grass), *Colpodium drakensbergense,* and *Crassula inanis, and* the alga *Nitella dregeana,* Growing

around the edge of these pools are *Ranunculus meyeri, R. baurii, Senecio cryptolantus, Utricularia* spp. (Bladderworts), *Eriocaulon dregei, Poa binata* and *Kniphofia caulescens.* An endemic species which occurs in pools on the summit at Sehlabathebe National Park in Lesotho at c. 2 400m is *Aponogeton ranunculiflorus,* an attractive white-flowered floating aquatic plant.

Bog communities are found on moist to wet soil in a variety of habitats such as hummocks, level areas and mud-patches. Mosses make up the matrix of these plant carpets and include *Brachymenium acuminatum, Bryum alpinum, B. Argenteum, B. Caespiticium, B. Pseudotriquetrum, Philonotis falcata*, and *P. Globosa*. Also included are two liverworts, *Archidium capense* and *Riccia bullosa*. They may be invaded by a large number of higher plants. The latter include the sedge *Scirpus diabolicus, Crassula vaillantii, Limosella longiflora, L. capensis* (Slangbos) frequently among small stones, the minute grass *Agrostis subulifolia, Ranunculus meyeri, R. multifidus* (Buttercup Flower), *Haplocarpha nervosa* (a yellow-flowered rosette plant often dominant and imparting a shiny green colour to the bogs), *Lobelia galpinii, Cotula paludosa, Trifolium burchellianum* (Wild Clover), *Rhodohypoxis rubella, Senecio cryptolanatus, Aster eruciformis, Felicia uliginosa, Geranium magniflorum, Moraea alticola, Cerastium capense, Kniphofia caulescens, Athrixia fontana* and many others.

On drier soil, usually at the edge of bogs, is alpine sedge meadow. The constituent plants form a close continuous turf 5 - 100mm high. Sedges such as *Carex monotropa, C. killickii, Schoenoxiphium filiforme, S. sparteum* and almost any of the plants mentioned above make up the sedge meadows.

3.1.2 Streambank Communities

Streams in the alpine tundra region are small, clear and frequently littered with grey boulders. The principal plant communities are formed by the grass *Merxmuellera drakensbergensis* (Broom Grass), the sedges *Scirpus ficiniodes, Senecio achillaefolius, S. cryptolanatus, S. quathlambanus, Erica alopecurus, E. thodei, Moraea alticola* and *Kniphofia caulescens.*

3.2 Outcrop Vegetation

3.2.1 Outcrop Plant Communities

Horizontal basalt outcrops are fairly extensive in the alpine tundra region on the summit plateaux: they are usually found along the edge of the escarpment, adjacent streams and on the summit of high peaks - exposed as slabs of pavements, boulders or as a litter of small stones. The pioneer plants are lichens and mosses, of which there are many species. The mosses include *Andraea rupestris, Anoectangium wilmsianum, Bryoerythrophyllum recurvirostrum, Bryum alpinum, Grimmia pulvinata, Mielchhoferia bryoides*, and *Pohlia cruda. Merxmuellera stereophylla,* a very tufted grass, is probably the most important higher plant, forming communities on basalt. A dwarf form of *Scirpus falsus* also occupies fairly extensive areas, usually rather moister than *Merxmuellera stereophylla.* Three semi-woody plants which form cushions on rock surfaces are *Euryops decumbens* (Decumbent Resin Bush), *Helichrysum retortoides* and *Muraltia saxicola.* Other

plants include *Felicia drakensbergensis, Lotononis galpinii, Clutia nana* and species of *Helichrysum* (Everlastings), *Zaluzianskya* (Drumsticks), *Craterocapsa, Ursinia, Crassula* and *Delosperma*.

3.2.2 Cliff Communities

Small cliffs on the summit support *Merxmuellera stereophylla, Helichrysum milfordiae, H. pagophilum, Wahlenbergia pulvillus-gigantea* and *Psammotropha alternifolia.* At their base are distinct communities formed by *Kniphofia northiae, K. ritualis, Cyrtanthus flanaganii* (Yellow Dobo Lily), *Zaluzianskya ovata* and *Z. turitella* (Drumsticks) usually mixed with alpine grass species. Important mosses on these cliffs include *Andraea rupestris, Hymenostylium recurvirostrum, Philonotis falcata,* and *Plagiomnium rhynchophorum var. reidii.*

Overhangs, usually damp and shaded, contain their own characteristic flora such as *Helichrysum milfordiae* which forms extensive carpets, *Crassula setulosa* var. *curta, C. dependens, Ranunculus meyeri, Zaluzianskya* spp. (Drumsticks) and the fern *Woodsia montevidensis* var. *burgessiana* are present.

3.3 Alpine Grassland

The grassland on the summit of the Drakensberg has an irregular physiognomy: in parts it is low, even and turf-like, whereas in other it is fairly tall, uneven and open. Everywhere it is interrupted by mud-patches. The dominant plants are three grasses belonging to temperate genera, namely *Merxmuellera disticha* (Copper Wire Grass), *Festuca caprina* (Goat Beard Grass) and *Pentaschistis oreodoxa* (Mountain Glory), occurring in pure or mixed communities. All three species are tufted, xeromorphic, and become dormant during winter months.

Associated grasses are *Koeleria capensis* (June Grass), several species of *Merxmuellera, Festuca* and *Pentaschistis, Harpochloa falx,* Caterpillar Grass, sometimes wide- leaved and prostrate), *Poa binata* (Mountain Blue Grass), *Eragrostis caesia* (Pan Grass), *Deschampsia caespitosa* (Tufted Hairgrass) and, rather rarely, *Themeda triandra* (Red Grass). *T. triandra,* however, is frequently dominant where the summit drops in height.

Accompanying the grasses are numerous associated herbaceous species. Summer to early autumn is the period of maximum profusion while in spring and late autumn there is very little in flower and in winter practically nothing. *Moraea alticola* is perhaps the most striking plant on the summit, forming very dense communities. *Euryops evansii* is the tallest plant, sometimes attaining a height of 1,8m and after a heavy snowfall, it is frequently the only plant visible. *Berkheya multijuga* (Spiny Berg 'Thistle'), is common in moist parts of the grassland, likewise the red and yellow-flowered *Kniphofia caulescens.* During January and February orchids are a prominent feature of the flora. They include *Disa fragrans, Satyrium neglectum* (Overlooked Trewwa), and *Brownleea macroceras.* Grey communities of *Helichrysum* are common, the principal species being *H. flanaganii, H. odoratissumum and H. argentissimum.* Also present are *Dierama dracmontanum* (Drakensberg Harebell), *Lobelia preslii, Alepidea galpinii, Hirpicium armerioides*

subsp armerioides, Moraea alticola, Rhodohypoxis deflexa, Senecio gramineus and S. Retrorsus..

3.4 Alpine Heath

This is the climax community of the Drakensberg Alpine Region and due to the predominance of the genera *Erica* and *Helichrysum,* is called *Erica-Helichrysum* alpine heath. The community consists of dwarf evergreen shrubs 150- 600mm high. There are five distinct heath communities.

3.4.1 *Erica dominans* Heath

This is the most extensive of the heath communities and the dominant species is *Erica dominans,* 50-450mm high with minute leathery, closely adpressed leaves. Occurring on level portions of the high plateau, it forms fairly dense communities invariably interspersed with alpine grasses. Other constituents include : *Anthospermum hispidulum, Basutica propinqua, Cliffortia browniana, Clutia nana, Erica flanaganii, E. frigida, E. glaphyra, Gnidia polystachya var congesta, Helichrysum trilineatum, Lotononis galpinii,* and *Thesium imbricatum.*

3.4.2 *Erica-Helichrysum* Heath

This is a common community usually found above 3 200m. The dominants are *Erica dominans* and *Helichrysum trilineatum* (Alpine Everlasting) with smooth or grey-woolly leaves,

3.4.3 *Erica glaphyra* Heath

Erica glaphyra forms a pure type of heath on broken promontories at the edge of the summit plateau a habitat which provides some shelter and is fairly moist. *E. glaphyra* is dark green and has long, erect leaves.

3.4.4 *Helichrysum-Passerina* Heath

This heath is rather rare and usually found at the edge of the escarpment. The dominants are *Helichrysum trilineatum* and *Passerina montana* in association with the grass *Merxmuellera streophylla.*

3.4.5 Boulder-field Heath

Several shrubs, 0,6 - 1,2m high, form a tallish heath amongst boulders, often near streams. They include *Athanasia thodei, Helichrysum trilineatum, Eumorphia sericea* and grasses such as *Merxmuellera drakensbergensis* (Broom Grass).

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APPENDIX 4

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APPENDIX 5

APPENDIX 5

EZOKONGIWA KWEMVELO KZN
KZN NATURE CONSERVATION SERVICE
KZN NATUURBEWARINGSDIENS

DRAKENSBERG PARK MANAGEMENT PLAN

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PART A

POLICY AND LEGAL CONTEXT OF (THE PROTECTED AREA)

1. Mission Statement of the Service

The kwaZulu-Natal Nature Conservation Service's (referred to as NCS hereafter) vision is the long term conservation of the indigenous biodiversity of kwaZulu-Natal in such a manner that the people of kwaZulu-Natal and of South Africa will benefit and share in the diversity, economic value and opportunities for spiritual well-being and recreation which it offers.

The NCS Board's **mission** is:

To conserve the indigenous biodiversity of kwaZulu-Natal, which includes the landscapes, ecosystems and processes upon which it depends, and to assist all people in ensuring the sustainable use of the biosphere.

Where:

- To conserve means to ensure the survival of indigenous fauna, flora and natural ecosystems and the promotion of public environmental awareness.
- Biodiversity means the wealth of life on Earth, including the millions of different animal and plant types, the genes they contain and the communities, ecosystems and landscapes of which they are part.
- kwaZulu-Natal means the provision of kwaZulu-Natal and adjacent territorial waters.
- Sustainable use is the level of consumptive or non-consumptive use that will not threaten the long-term survival of biodiversity or its benefits to current and future generations.
- Biosphere means that part of the Earth which sustains living organisms.

To achieve the above mission, the NCS must:

(a) Promote awareness of the functioning and importance of the biosphere.

(b) (i) Prevent the man-induced extinction of any species indigenous to kwaZulu-Natal.

(ii) Ensure the survival of viable populations of all species indigenous to kwaZulu-Natal.

(c) Recognise the link between rural poverty and environmental degradation and promote the conservation of biodiversity and ecological processes in kwaZulu-Natal and ensure their conservation in protected areas administered by the Service and other areas where biodiversity conservation is a declared goal.

(d) Promote the sustainable and equitable use of wildlife resources in kwaZulu-Natal, and exercise the necessary controls to ensure sustainability and equity.

(e) Create conditions and incentives that support the conservation and sustainable use of biodiversity.

(f) Facilitate public access to protected areas and provide appropriate services including opportunities for education and scientific study.

(g) Participate in kwaZulu-Natal's ecotourism industry by providing visitor

facilities and experiences in protected areas on a self funding basis and by developing partnerships with local communities and the private sector all of which must be compatible with the Mission of the Service.

(h) Conduct its activities effectively and efficiently through the employment of appropriately skilled people dedicated to service and committed to biodiversity conservation.

(i) Ensure the social, economic and environmental integration of protected areas locally, sub-regionally, and regionally.

(j) Be aware of the increasing threats to the environment as a result of pressure from rival poverty, unsustainable population growth and lack of individual responsibility and accountability, and foster sustainable living through the economic and social development of communities, especially those adjacent to protected areas.

In pursuit of its mission, and the realisation of its objectives, the NCS understands:

- that the State provides limited funding and legislative support for the conservation of wildlife resources and the promotion of public biodiversity conservation awareness in kwaZulu-Natal.

The NCS recognises:

- that the long-term survival of Man depends on the universal acceptance and understanding of the need for natural life-support systems to operate at sustainable levels;
- that the provision of natural resource-based recreation and opportunities for spiritual fulfilment in protected areas, accessible to all who desire to use them, is an indispensable contribution towards increasing public awareness of the importance of biodiversity conservation;
- that formal biodiversity conservation agencies have a leading role to play in developing an awareness and understanding of, and sensitivity to, the protection and management of the biosphere; and
- that, as the statutory custodian of the wildlife resources in kwaZulu-Natal, it also has a wider role to play through the support of local, regional, national and international biodiversity conservation endeavours.

The NCS acknowledges:

- that it holds in trust, for the benefit of all the people of kwaZulu-Natal and of South Africa, the protected areas over which it exercises custodianship;
- the IUCN World Conservation Strategy, expresses its support for its guidelines and undertakes actively to support international conservation by espousing the principles and endeavours of the World Conservation Union and its Commissions;
- that South Africa is a signatory to CITES, The Convention on Biological Diversity, the RAMSAR Convention, The Convention on the conservation of migratory species of wild animals, the World Heritage Convention and others, and pledges its support to uphold their principles and undertake the management responsibilities assigned to the Service;
- the role of the kwaZulu-Natal Department of Traditional and Environmental Affairs;
- the role of the Department of Environmental Affairs and Tourism in biodiversity and environmental conservation in South Africa.

The NCS:

- pledges its co-operation to all other local, regional, national and international biodiversity and environmental conservation authorities;
- confirms its commitment to and support for the communities and publics its services and with whom it interacts; and
- dedicates its staff to the fulfilment of its mission.

The core strategies developed in order to achieve the Mission are:

(i) Universal acceptance of the value of biodiversity conservation

Objectives:

- to use biodiversity conservation as a basis for environmental education and awareness programmes, and to promote appropriate environmental ethics;
- to demonstrate the aesthetic values and economic contributions of biodiversity conservation and ecotourism;
- to expand the diversity and enhance the quality of products and services;
- to build powerful alliances.

(ii) Contribution to social stability and economic development in the region

Objectives:

- to provide and support Conservancies, Biosphere Reserves and Community Conservation areas;
- to support, promote and develop ecotourism as an industry;
- to support, promote and develop the sustainable use of wildlife and protected areas;
- to use formally protected areas as a catalyst for development, especially in rural areas, through:
  - encouraging infrastructural development;
  - stimulating local entrepreneurship;
  - empowerment of local communities through training and transfer of skills;
  - initiating and supporting local community projects;
  - optimising local employment opportunities;
  - seeking and channelling funds to address community needs through for example the Community Trust;
  - empowerment of local communities through the development of partnerships in ecotourism activities.

(iii) Adequate financial resources

Objectives:

- to ensure that the State recognises biodiversity conservation as a foundation of economic development and provides adequate subsidisation;

- to use the Provincial subsidy effectively and efficiently in the best interest of biodiversity conservation;
- to optimise the generation of funds from ecotourism, sustainable use of wildlife resources and other services;
- to generate additional funds through joint ventures, concessions sponsorships, donations and contributions;
- to actively support the kwaZulu-Natal Conservation Trust, Wildlands Trust and Isivuno, established to assist the Service in meeting its conservation responsibilities;
- to generate international financial support;
- to manage assets and resources efficiently.

(iv) Provincial, parastatal biodiversity conservation structure for the management of integrated biodiversity conservation activities throughout kwaZulu-Natal

Objectives:

- to demonstrate the effectiveness, flexibility and success factors of the Service as a provincial parastatal biodiversity agency;
- to demonstrate competence, expertise, credibility and effectiveness at local, regional, national and international level;
- to demonstrate relevance and commitment to and knowledge of kwaZulu-Natal.

(v) Shared vision and commitment throughout the Service and Board

Objectives:

- to pursue the appointment of a well-balanced Board with representatives of appropriate skills and knowledge, previously disadvantaged groups and traditional authorities;
- to recruit, develop and retain competent, skilled and committed staff;
- to ensure effective internal communications;
- to empower and uplift staff from disadvantaged backgrounds to enable them to fulfil their potential;
- to pursue participatory management practices.

(vi) Excellence of products and services

Objectives:

- to comply with the standards required for sound environmental management;
- to develop facilities which set the highest standards for environmentally sensitive development in protected areas;
- to meet the broadest spectrum of demands of the public for biodiversity based products and services, within a sustainable framework, environmentally, socially and economically;
- to strive for the development of research excellence and exemplary management practice in all relevant disciplines.

The Service believes that it has already made a significant contribution to the recognition of biodiversity conservation. kwaZulu-Natal has a rich biodiversity conserved through an extensive system of protected areas and conservation-orientated private sector management systems such as Conservancies, Community Conservation Areas and Biosphere Reserves. The economic value of kwaZulu-Natal's wildlife resources has been quantified to

the extent that it can be seen to be making a substantial contribution to commerce, social stability and the economic needs of this Province and its people.

The economic and social contributions of kwaZulu-Natal's protected areas to adjacent communities are increasingly invaluable and widely appreciated.

Given that social stability will be achieved in South Africa in general, and kwaZulu-Natal in particular, the Service believes that the demand for wildlife resources, both consumptive and through eco-tourism, will increase exponentially employment opportunities and increased prosperity.

Accepting the State's responsibility for funding the public good generated by biodiversity conservation, it is the Service's firm conviction that a regional nature conservation agency with statutory autonomy, a system already proven in South Africa and aspired to by other countries such as Kenya and Zimbabwe, is the best guarantee of the most rapid achievement of the Service's vision.

2. kwaZulu-Natal Nature Conservation Service Policies

Policy decisions are made by the Board to give effect to its Mission, and to provide staff with a standardised position and framework regarding matters of general applicability. Many aspects of protected area management are governed by existing policies. Staff are encouraged to contribute new policy perspectives as decision-making needs emerge, and to critically evaluate current policies. Current policies are binding on all staff, and are contained in a **Policy File** for ease of reference. Staff are encouraged to familiarise themselves with relevant policies. Policies are reviewed on an annual basis for ratification by the Board.

3. Legal Status

All the land comprising the Park is state-owned, being registered in the name of the President of the Republic of South Africa. Control and management of the Park has been delegated by the KwaZulu-Natal Provincial Administration to the NCS.

The laws which establish the Park as a conservation unit are the KwaZulu-Natal Nature Conservation Management Act No 9 of 1997 as amended and the Republic of South Africa National Forests Act No 84 of 1998. The right of the President of South Africa to assign responsibility for the acts to ministers in charge of various portfolios, and the Premier of kwaZulu-Natal, emanates from the Republic of South Africa Constitution Act No 108 which came into effect in 1996. Legislation that has enabled the amalgamation of the former Natal Parks Board and KwaZulu Department of Nature Conservation was only recently approved by the Provincial Parliament, that is the kwaZulu-Natal Nature Conservation Management Act No 9 of 1997. This new legislation has resulted in the establishment of the NCS, which is responsible for the control and management of the Park. All component areas forming the Drakensberg Park are defined as protected areas by this legislation and listed in a schedule in the act. Proclamation of nature reserves or any future areas that may be acquired as additions to the Park is the responsibility of the provincial Minister responsible for

environmental protection and nature conservation.

The legislative enactment governing the former Natal Parks Board, and under which the then Administrator of Natal proclaimed nature reserves in the province including the Park, was the Nature Conservation Ordinance No. 15 of 1974. This Ordinance was assented to by the State President in council on 21 August 1974, in terms of the Republic of South Africa Constitution Act No 32 of 1961 and came into effect on 12 September 1974. With regard to the establishment of State Forest Reserves and Wilderness Areas, in terms of the Forest Act No. 122 of 1984, the State President, acting in terms of the Republic of South Africa Constitution Act No. 32 of 1961, assigned the responsibility for proclamation of these areas to the then Ministers of Environment Affairs and Environment Affairs and Fisheries respectively. The control and management of areas proclaimed under the National Forest Act No 84 of 1998 lies with the Minister of Water Affairs and Forestry and his department. In terms of post legislation, management of the State Forest areas within the Park were assigned to the province and the former Natal Parks Board controlled these areas. Under the new legislation these past assignments could be withdrawn by the Minister, however, the power of delegation or assignment has been retained in the new forest legislation. Nevertheless, the KwaZulu-Natal Nature Conservation Service is presently seeking re-assignment of the control and management responsibilities for the State Forest component areas of the Park.

The following component areas of the Park have now been incorporated under the new KwaZulu-Natal Nature Conservation Management Act:

Giant's Castle Game Reserve
Kamberg Nature Reserve
Loteni Nature Reserve
Royal Natal National Park
Rugged Glen Nature Reserve
Vergelegen Nature Reserve

The following component areas were set aside under the Government of South Africa, Forest Act No. 122 of 1984, as amended:

Cathedral Peak State Forest
Cobham State Forest
Garden Castle State Forest
Highmoor State Forest
Mkhomazi State Forest
Monks Cowl State Forest.

The Park enjoys full legal protection under the provisions of the kwaZulu-Natal Nature Conservation Management Act No 9 of 1997 as amended, the National Forests Act No 84 of 1998 and assignments. Provisions within the Water Act No 54 of 1956 as amended and the Environment Conservation Act No 73 of 1989 as amended, also ensure the protection of certain natural resources.

3.1 Protective measures and means of implementing them

The following instruments provide for the legal protection of the Park :

3.1.1 The kwaZulu-Natal Nature Conservation Management Act No. 9 of 1997 as amended:

This legislation provides for the institutional structures for nature conservation in the province and the establishment of control and monitoring bodies and mechanisms. The administration of the Act falls under the Member of the Executive Council (MEC) responsible for the protection and conservation of the environment and nature conservation. This minister is also responsible for nature conservation policy, the implementation of the Act, and the proclamation of protected areas. The Act establishes a decision-making body in the form of the kwaZulu-Natal Nature Conservation Board having the primary functions of (i) directing the management of nature conservation, protected areas, the development and promotion of ecotourism facilities within protected areas, and (ii) ensuring an effective Nature Conservation Service under the direction of a Chief Executive Officer. Section 5(3)(c) of the Act requires that the Nature Conservation Board must ensure the protection and management of heritage resources within the protected areas according to the principles of the KwaZulu-Natal Heritage Act of 1997. All former proclaimed protected areas in KwaZulu-Natal have been listed in a Schedule to the Act and include all the component areas of the Drakensberg Park. The Act also makes provision for local protected area boards which provide a statutory basis for the direct involvement of communities living in the area in the decision-making for the protected area.

3.1.2 The National Forests Act No. 84 of 1998

The Act protects State Forests, Forest Nature Reserves and Wilderness Areas, and the plant and animal life contained therein. In addition the Act allows for management programmes to be established in order to prevent soil erosion and fire, maintain the natural genetic and species diversity and control plants and animals which are harmful to a particular area. The Act provides for the control and reasonable access to State Forests for the purposes of recreation, education, culture or spiritual fulfilment. Also, any person is prohibited from damaging State Forests or contributing to the threat of fire. Forest officers are empowered to arrest any person who has contravened this Act and may seize such person's property.

3.1.3 The National Water Act No 36 of 1998

The Act allows for the nation's water resources to be protected, used, developed, conserved, managed and controlled. In undertaking these actions the Act requires that several factors need to be taken into account including the protection of aquatic and associated ecosystems and their biological diversity as well as reducing and preventing pollution and degradation of water resources. In addition the Act reserves water for the maintenance and protection of natural aquatic ecosystems, that is the ecological reserve, and refers to both the quantity and quality of the water and their determination.

3.1.4 The Environment Conservation Act No. 73 of 1989 as amended

This Act provides for the protection and controlled utilization of the environment. In particular, the Act is aimed at protecting natural ecological processes against harm caused by human activities, promoting environmental

education and the effective management of cultural resources, and the co-ordination of integrated environmental management programmes. Regulations in terms of this legislation make the undertaking of environmental impact assessments for listed activities mandatory. The Act empowers the President to add any schedule containing provisions of an international convention, treaty or agreement relating to the protection of the environment which has been entered into or ratified by the South African Government. The Act prohibits littering and obliges any person in control of areas to which the public have access to remove any litter. It also seeks to control noise pollution, vibration and shock.

3.1.5 The National Monuments Act No. 28 of 1969

The Act seeks to preserve and protect the historical and cultural heritage of South Africa. Thus any unauthorised interference with sites protected by this Act is prohibited and includes four national monument sites within the Park. In particular, the Act provides for the protection of burial grounds and graves, the erection of memorials, the preservation of property as national monuments, including the drawings or paintings made by previous inhabitants of South Africa.

3.1.6 The kwaZulu-Natal Heritage Act No. 10 of 1997

This Act provides for the establishment of a statutory body to administer heritage conservation on behalf of the provincial government. Amongst other things, particular attention is paid to historically important sites, monuments and memorials, military cemeteries, traditional burial places, archaeological and paleontological sites and artifacts, rock art, important cultural objects and trade therein. The Act also establishes educational, training and tourism-related projects in the province. It prohibits interference with any site or object protected in terms of the Act.

3.1.7 National Environmental Management Act No. 107 of 1998

This law develops a framework for integrating good environmental management into all development activities. The Act provides for co-operative environmental governance by:

(i) establishing principles for decision-making and conflict management on matters affecting the environment;
(ii) establishing the institutions responsible for promoting co-operative governance in particular the National Environmental Advisory Forum and the Committee for Environmental Co-ordination;
(iii) establishing the procedures for co-operative governance and the co-ordination of environmental functions. These require that environmental implementation plans and management plans are prepared;
(iv) promoting the application of appropriate environmental management tools to ensure integrated environmental management of activities;
(v) the incorporation of international environmental instruments.

3.1.8 White Paper on a National Environmental Policy for South Africa

The principles and objectives of the Environment Policy were published as a Government White Paper. These policies ensure the protection and/or sustainable utilization of all natural resources in the country and also supports ratification of international conservation conventions including the designation of World Heritage Site properties and the conservation of biodiversity.

3.1.9 White Paper on the Conservation and Sustainable Use of South Africa's Biodiversity

As a party to the United Nations Convention on Biological Diversity, South Africa is obliged to ensure that the agreement is implemented in accordance with its objectives as well as to develop national strategies, plans or programmes to address the conservation and sustainable use of biodiversity into policies and plans. The Department of Environmental Affairs and Tourism has undertaken a consultative process which ultimately resulted in the publication of the government's White Paper on the conservation and sustainable use of the country's biological diversity. In addition to defining biodiversity policy and strategy, the White Paper also states the vision, mission and principles which guide the policy and strategy as well as its implementation.

3.1.10 Wetlands Bill

A draft Wetlands Bill has been prepared by the national Department of Environmental Affairs and Tourism. This proposed legislation provides protection for wetland systems and incorporates the provisions of the Convention on Wetlands of International Importance (Ramsar Convention) into South African law.

3.1.11 Policies for nature conservation in kwaZulu-Natal

Given the recent amalgamation of the former Natal Parks Board and Department of Nature Conservation to form the NCS, it is important that there is a vision and policies that will guide the new organization. The following vision and policies have been outlined.
The vision of the NCS is the long term conservation of the indigenous biodiversity of kwaZulu-Natal in such a manner that the people of kwaZulu-Natal and of South Africa, in particular, and humanity in general, will benefit from and share in the diversity, economic value and opportunities for spiritual well-being and recreations which it offers.

3.2 Acquisition or disposal of further areas

Refer to Annexure 1.

3.3 History of Establishment

3.3.1 Owner

All the land comprising the Drakensberg Park is state-owned, being registered in the name of the President of the Republic of South Africa. Control and management of the Drakensberg Park has been delegated by the kwaZulu-Natal Provincial Administration to the NCS. The address is:

kwaZulu-Natal Nature Conservation Service
P.O.Box 13053
Cascades
3202
South Africa

3.3.2 History of preservation/conservation

In 1903 the Natal Colonial Government took preliminary steps to establish the first protected area in the Drakensberg by way of a Government Notice (No. 735 of 29 October 1903) which stated its intention to proclaim a "game reserve on the Crown Land in the vicinity of Giant's Castle". Although no specific reason for the establishment of the reserve can be traced it has been generally accepted that the reserve was set aside for the protection of the fast disappearing herds of eland and other antelope species, and the magnificent scenic value of the area (Pearse, 1973). The area was declared a "Demarcated Forest" in 1905 but later proclaimed a game reserve in terms of Government Notice No 356 of 1907 which allowed for the enforcement of the game protection laws. Subsequently, over the years since 1916, there have been twelve proclamations or amending notices which have increased the size of Giant's Castle Game Reserve to its present day area of 34 638 ha.

Several Government-owned farms and adjoining Crown Land in the vicinity of Mont-aux-Sources were to become the nucleus of a second protected area in the Drakensberg. The importance of this area as a potential national park was first recognised by W. F. Clayton, Minister of Agriculture and Lands in 1906 who took the first steps towards its proclamation. A party led by Senator F. Churchill inspected and recommended the area to be a national park to the Natal Government in 1908. However due to lack of funds the scheme was abandoned and the land sold to General J. S. Wylie. After the formation of the Union of South Africa, Wylie sold the land (at cost) back to the Government on condition that it remained for all time a national park for the people of South Africa. The Natal National Park was then formally established by the Natal Provincial Administration on the 19 September 1916, and an advisory committee appointed to study the area, control the land and develop its potential. Additional land was added to the Park increasing its original size of 3294 ha to 8094 ha and in 1950 the adjoining area was proclaimed Rugged Glen Nature Reserve making a total area protected of 8846 ha. As a result of the visit by the British royal family to the park in 1947, the name was changed to Royal Natal National Park. Following the establishment of the Natal Parks, Game and Fish Preservation Board (later the Natal Parks Board) in 1947 all these protected areas have been managed by this organization. In terms of the provincial Nature Conservation Ordinance several other nature reserves were proclaimed in the Drakensberg. These

were, Kamberg Nature Reserve in 1951, Loteni Nature Reserve in 1953 and Vergelegen Nature Reserve in 1967.

Concerns regarding the exploitation of indigenous forests was expressed in reports submitted to the Colonial Government in 1880, 1889 and 1902. These resulted in the appointment of Mr T. R. Sim as Conservator of Forests and the establishment of a Forestry Department. Given their remoteness and difficulties of access, many of the natural forests in the Drakensberg were not exploited to the same extent as those elsewhere in Natal. However as timber resources became scarce in those forest areas, more permits for tree felling were issued for areas in the Drakensberg. Mr C. Robinson made representations to the South African government which were to lead to the proclamation of the Cathkin Forest Reserve (initially some 40468 ha in extent) in April 1922 and the issuing of permits was then stopped. In 1927 three areas were demarcated as State Forests. These were Cathedral Peak (included the Cathkin Forest Reserve), Monk's Cowl, and Cobham State Forests. This ensured that the high rugged terrain along the face of the escarpment (mostly above 1800m) remained as Crown Land (unallocated) but areas could be hired out for grazing. A parliamentary resolution in 1934 called for the protection of mountain catchments in South Africa for the conservation of water supplies. Concerns regarding the effects of plantation forestry on catchment water supplies also emerged at this time and led to the founding of a research station in the Cathedral Peak State Forest. However it was only after World War II in 1948 that the Drakensberg Catchment Reserve (later the Drakensberg Catchment Area) was proclaimed which ensured the protection of these important water-producing areas of South Africa. Large areas of the Drakensberg, known as Garden Castle, Highmoor and Mkhomazi were demarcated as State Forests and placed under the control of the national Department of Forestry in 1951. The administration of all the State Forest areas in the Drakensberg was assigned by the State President to the then Natal Provincial Administration in August 1992 and their control transferred to the Natal Parks Board in December 1993 by the Administrator. This allowed for the consolidation of the conservation management of all of the protected areas in the Drakensberg under one nature conservation body (the NCS) and the establishment of the Drakensberg Park.

In 1973 two large areas within the Park were proclaimed as Wilderness Areas in terms of the Forest Act of 1968. These were the, Mdedelelo (27 000 ha) and Mkhomazi (56 122 ha) Wilderness Areas. They were two of the first three wilderness areas to be so proclaimed in South Africa. Subsequently, the Mzimkulu (28 340 ha) and Mhlambonja (6 270 ha) in 1989 Wilderness Areas were proclaimed. Management policy for wilderness areas is to "leave no trace" that is to retain the wild character of these areas by prohibiting all forms of man-made developments (roads, buildings etc.). Although people may gain access by foot or horse, recreational opportunities within wilderness areas are managed to allow for an experience of solitude within an intrinsically unaltered natural environment, and thus to provide opportunities for inspiration, enrichment, self-reliance, and physical adventure.

Several conservation programmes have achieved successful results and have been widely acknowledged:

(i) Ungulate conservation

At the time of the establishment of Giant's Castle Game Reserve, only a remnant population of eland were present in the Drakensberg, and populations of all other antelope species were nearing the point of extinction. Conservation programmes in the Park ensured that populations were adequately protected, and have resulted in an increase in population size and range.

(ii) Protection of rock art sites

Several caves containing important San rock art were declared national monuments in terms of the National Monuments Act, namely Battle Cave, Main Caves, Game Pass 1, and Kanti 1. In addition, conservation programmes within the Park have also ensured that archaeological sites, and especially rock art sites, were protected. These programmes focussed on preventing damage to the paintings by people by ensuring controlled entry to the Park, awareness creation, guided access to selected sites, keeping the location of other sites confidential, and the prohibition of camping and or making of fires inside shelters with rock art.

3.3.3 Area of property and zonation

Table 1 lists the year of declaration and the extent of each component protected area that collectively comprise the Park. The total extent of the Park is 242 813 ha. The core and buffer areas have been demarcated on the set of 1:50 000 maps, and the zonation for ecotourism use is shown in Figure 5. See zonation map (Annexure 2).

Table 1. Component protected areas of the Drakensberg Park

Area Name	Year of Proclamation	Area (ha)
Cathederal Peak State Forest	1927	32 246
Cobbam State Forest	1927	30 498
Garden Castle State Forest	1951	30 766
Giant's Castle Game Reserve	1903	34 638
Highmoor State Forest	1951	28 151
Kamberg Nature Reserve	1951	2 980
Loteni Nature Reserve	1953	3 984
Mkomazi State Forest	1951	49 156
Monk's Cowl State Forest	1927	20 379
Royal Natal National Park	1916	8 094
Rugged Glen Nature Reserve	1950	762
Vergelegen Nature Reserve	1967	1 159

Large parts of the State Forest areas were subsequently proclaimed Wilderness Areas in terms of the Forest Act (Table 2)

Table 2. Proclaimed Wilderness Areas falling within the Drakensberg Park

Wilderness Area	Proclamation	Area (ha)
Mdedelo	G.N. 791 of 1973	27 000
Mkhomazi	G.N. 791 of 1973 G.N. 962 of 1989	56 155
Mzimkulu	G.N. 1563 of 1979	28 340
Mlambonja	G.N. 961 of 1989	6 270

In terms of the national system of classification of protected areas (which follows that of the IUCN) the Park presently comprises both the Wilderness Areas - Category I 48,5% (117 765 ha) and 51,5% (125 048 ha) national park and equivalent reserve - Category II. Other candidate wilderness areas on the Park are presently being evaluated and will be proclaimed.

3.4 Boundaries

Refer to Figure 1 for legal boundaries of the Drakensberg Park. Refer to latest revised maps for the Drakensberg (Slingsby and Geomap).

Northern Boundary: Natal/Orange Free State Border which also constitutes the northern boundary of Royal Natal and the Drakensberg Park itself.

Southern Boundary: The boundary is bordered by Sehlabatebe National Park and the privately owned farms of the Swartberg near Mount Arthur.

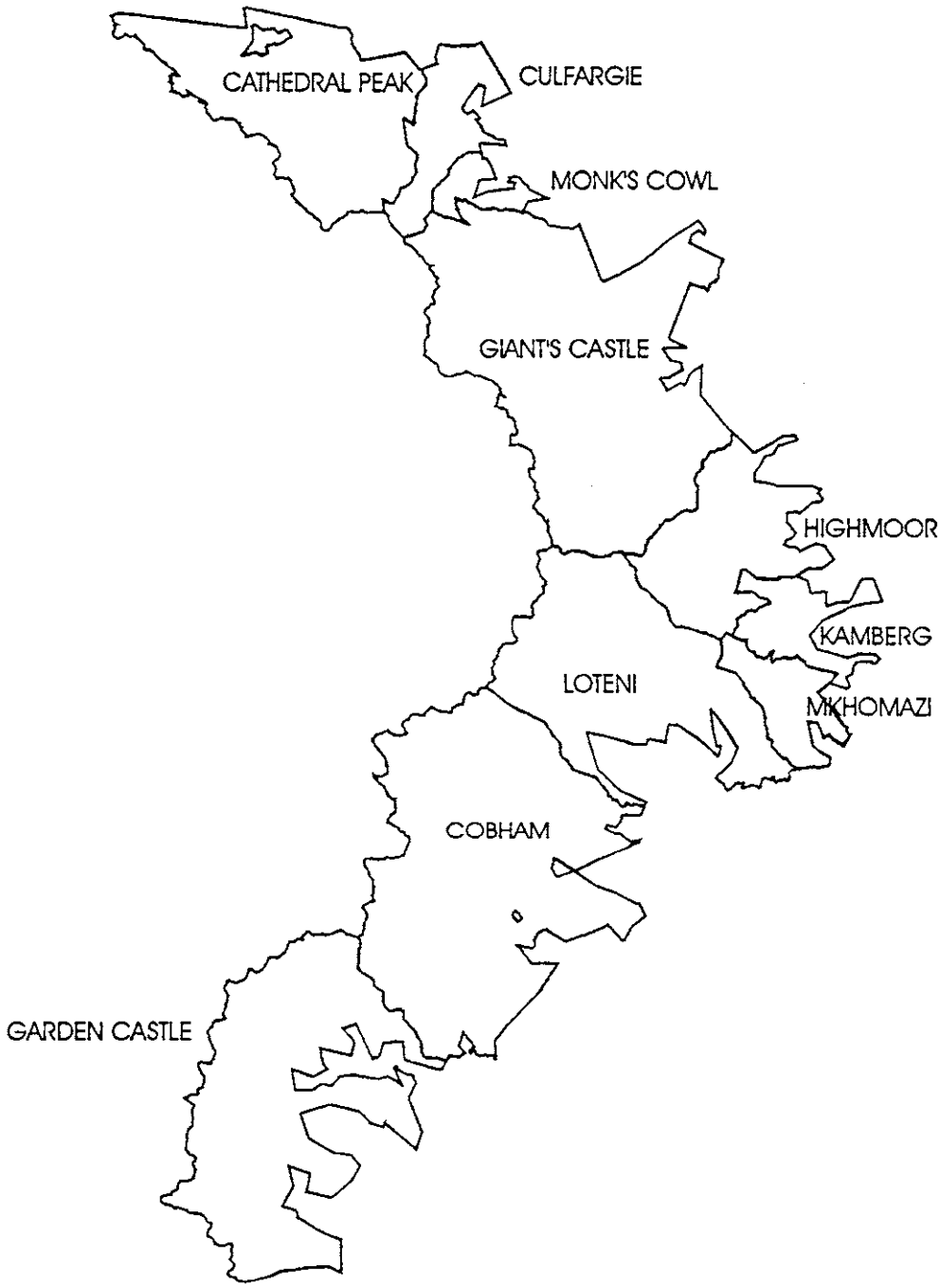
Western Boundary: International border between the Republic of South Africa, Natal, and Lesotho and encompassing the alpine zone of Eastern Lesotho.

Eastern Boundary: Incorporating Oliviershoek Pass and the villages of Himeville, Underberg, Winterton, and Bergville, and defined by the access roads linking these locations.

4. Other Relevant Policies and Legislation

There is a progressive neighbour relations policy, to foster good relations with communities who reside in the immediate vicinity of the Park. This policy promotes the value of the protected area to its neighbours. It ensures that they derive direct benefits from the protected area in a variety of ways, including free access and business and employment opportunities. The range of business opportunities includes the marketing of curios at designated market places.

FIGURE 1



~~Legal~~ boundaries of the Drakensberg Park

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PART B

GENERAL DESCRIPTION OF (THE PROTECTED AREA) AND KEY REFERENCES

1. Physical Environment

1.1 Climate

It is impossible to consider the climate of the Drakensberg Park without recognition of macroscale weather-producing systems, their mesoscale modifications by the mountains and the generation of local climatic conditions by the mountains themselves.

The climate of most of Africa south of latitude 20° is dominated by the influence of subtropical anticyclones of the general global circulation. Over kwaZulu-Natal, including the Drakensberg, the South Indian anticyclone controls the general airflow (Tyson, 1969; Schulze, 1972). In winter, the subsidence of air causes atmospheric stability and consequently a distinct dry season. In summer, the subsidence inversion, if it is present at all, frequently rises above the escarpment resulting in an influx of humid air from the Indian Ocean by southeasterly winds. In this season, high air humidity and precipitation, often in the form of thunderstorms, prevails (Tyson, 1969; Jackson and Tyson, 1971). South of the zone of high-pressure cells lies the belt of westerlies in which mid-latitudinal frontal depressions form. Due to seasonal shifts in position of the climatic belts these disturbances, usually in the form of cold fronts, may extend far inland in winter and cause sudden drops in temperature and precipitation (Hurry and Van Heerden, 1981).

<u>Radiation and Sunshine</u>

Incoming solar radiation (insolation) is attenuated by scattering, reflection and absorption in the earth's atmosphere. The amount of total radiation transmitted to the surface is highest when skies are clear and the air dry. This solar radiation is conventionally measured in energy units called Joules (J), on a per metre squared per day basis, i.e. $Jm^{-2}\,day^{-1}$.

Mean annual total radiation decreases eastward from a maximum over the western interior of southern Africa to $190 \times 10^5\ Jm^{-2}\ day^{-1}$ over the Drakensberg Park.

However cloud and high atmospheric moisture content increase the amount of diffuse radiation (sky radiation) and decrease the direct radiation from the sun. Because the incidence of cloud cover is highest over the eastern coastal margin of South Africa, mean annual diffuse radiation is largest in this area. Consequently the mean annual diffuse radiation intensities over the Drakensberg Park range between $50 - 60 \times 10^5\ Jm^{-2}\ day.^{-1}$

Winter intensification of the high pressure circulation over South Africa and accompanying clear skies explain the east-west orientation of isolines of mean winter incoming radiation (Figure 2). Lowest intensities occur in the southern Cape and the Drakensberg receives about $130 \times 10^5\ Jm^{-2}\ day^{-1}$.

Seasonal variations in insolation reflect both the varying intensity of solar radiation concomitant with the varying solar elevation and atmospheric conditions associated with large-scale weather-producing systems. In summer (December-February): mean total radiation maxima occur in the least cloudy southwestern area of South Africa.

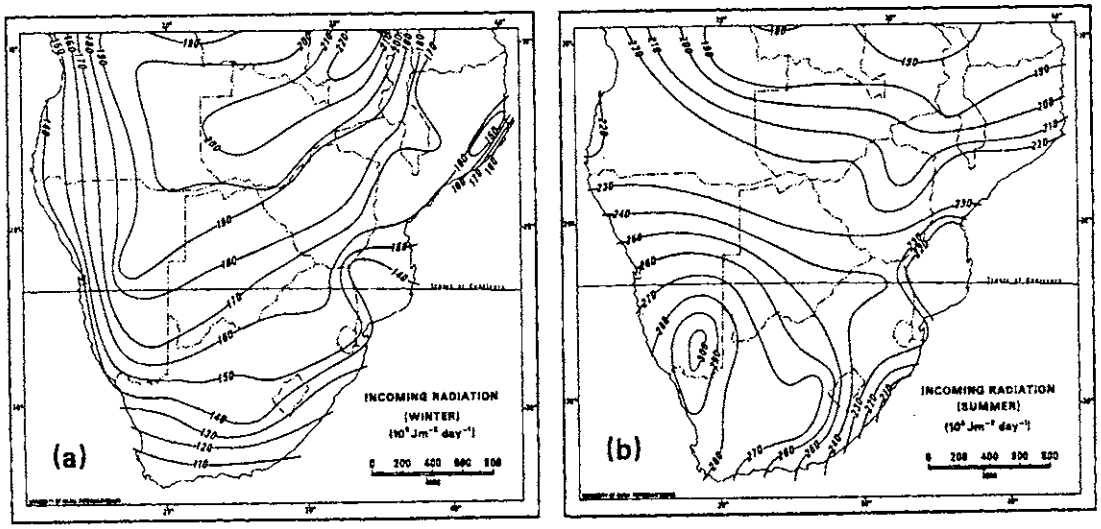


Figure 2. Variations in incoming radiation over southern Africa (after Schulze and McGee, 1976).

The increase in cloud cover frequency from west to east explains the north-south orientation of isolines over the eastern half of the country. Mean incoming radiation in this month over the Drakensberg Park is approximately 230 X 10^5 Jm^{-2} day^{-1}.

Sunshine duration over South Africa changes markedly over time as well as position being closely related to the movement and intensity of the high pressure systems. The western interior of southern Africa receives more than 80% of the possible annual sunshine (Figure 3). The percentage of possible sunshine decreases eastward to a minimum duration (less than 50% of the possible) which occurs in summer over the kwaZulu-Natal escarpment and coastal margin. Winter over the Drakensberg Park is relatively cloud-free and the area receives 70-80% of the possible winter sunshine. However, the transition from a relatively clear winter to a cloudy spring is usually fairly sudden and is accompanied by a drop in sunshine duration to 50-60% of the possible sunshine duration .

Seasonal variations in the amount of incoming radiation are far higher on south-facing rather than north-facing slopes. With increasing slope angles south-facing slopes receive only slightly less radiation than the opposite slope in summer. In winter north-facing slopes receive two to five times as much radiation as south-facing slopes at slope angles of 10° and 30°, respectively.

This difference has a major impact on the temperatures and moisture on these slopes, this being reflected in the distribution of vegetation types and accompanying fauna.

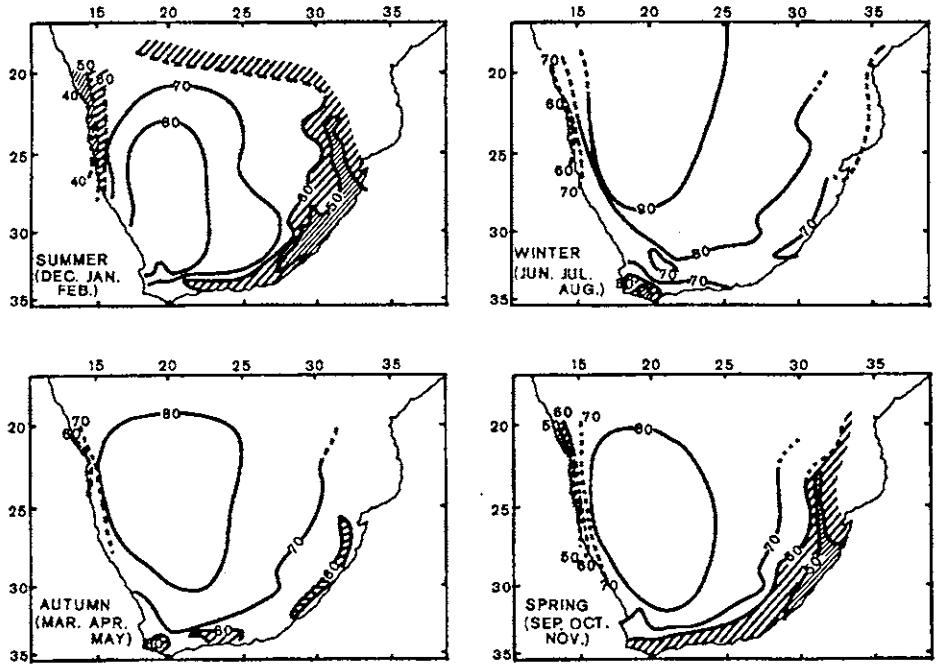


Figure 3. **Percentage summer, winter, autumn and spring variation in sunshine duration (after Schulze, 1965).**

Temperature

The mean annual temperature of the Drakensberg Park is about 16° C, but variations are considerable both seasonally and between day and night. The highest temperatures (up to about 35°C) occur during summer on north-facing slopes on the grass covered slopes of the plateau below the summit plateau (from hereon referred to as the Little Berg- see 1.6 page 25), while the lowest temperatures (down to about -20°) occur during winter nights on the summit plateau.

Temperatures measured in a standard Stevenson screen average slightly below 5°C whereas temperatures measured at grass level show that grass level temperatures at 1860 m may average below zero from May to September. On the summit plateau sub-zero grass-level temperatures may occur at night even in mid-summer. This is ecologically significant because the low temperatures experienced at night and in winter at these high altitudes, together with severe frost, low humidity and strong winds, affects the distribution and abundance of organisms living at these altitudes. This harsh climate results in low productivity, low abundance and diversity of species, sparse and stunted vegetation and a greater proportion of specially adapted rare and endemic species.

The station at Mokhotlong represents temperatures measured near the Lesotho Plateau and the station at Cathkin Peak (1311m) indicates the seasonal temperature range for the Little Berg. Refer to Figure 4.

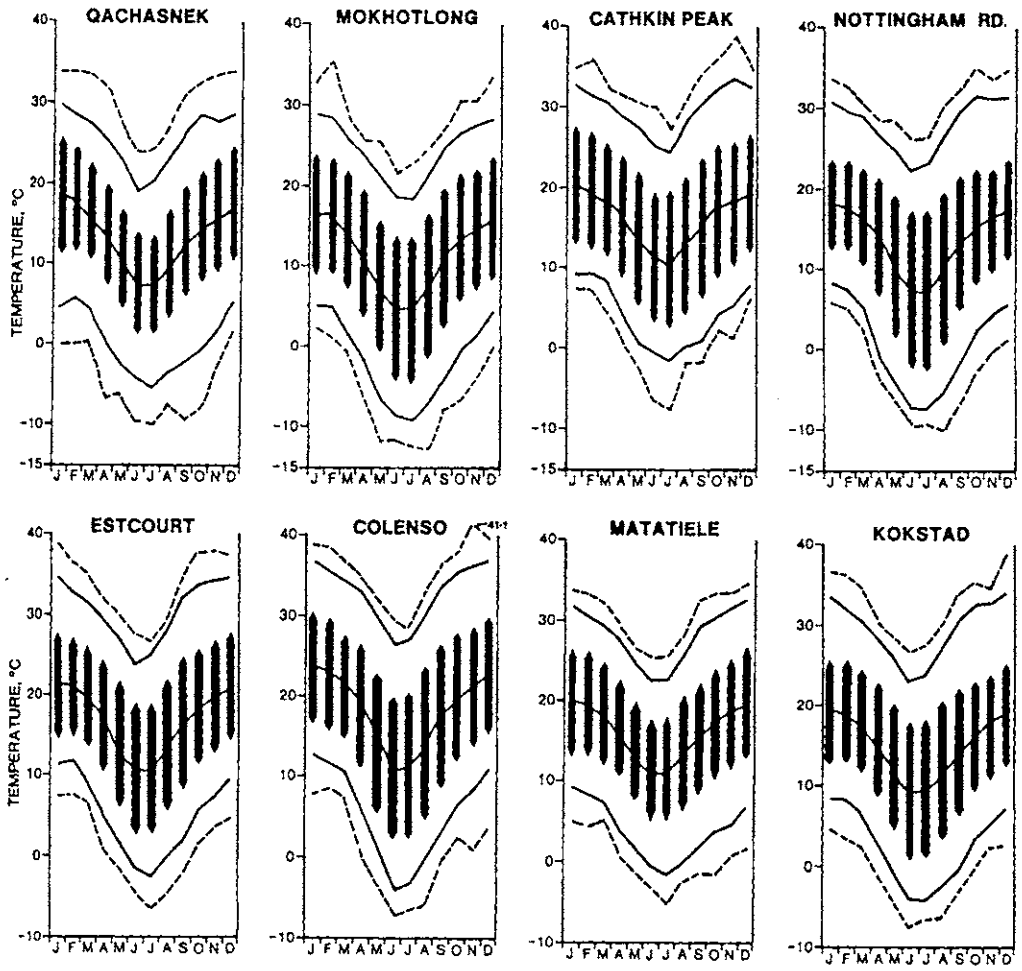


Figure 4. Annual variation of selected temperature parameters for some stations in the Drakensberg area (From Tyson *et al.*, 1976).

Frost

Conditions favourable for frost such as the absence of wind, clear skies and dry air, generally prevail in winter (Tyson *et al.*, 1976). Under these conditions drainage of cold air takes place from the Lesotho Plateau into the valleys of the Little Berg. Although frost is common, the local topography exerts a control on its exact distribution and intensity. Tyson *et al.* (1976) estimate frost to occur on the Lesotho Plateau from middle April until October, with an annual duration of about 180 days per year, while others report freezing throughout the year (Van Zinderen Bakker and Werger, 1974; Granger, 1976). In the Little Berg frost occurs from May to about September and has an annual duration of about 120 days per year (Tyson *et at.*, 1976).

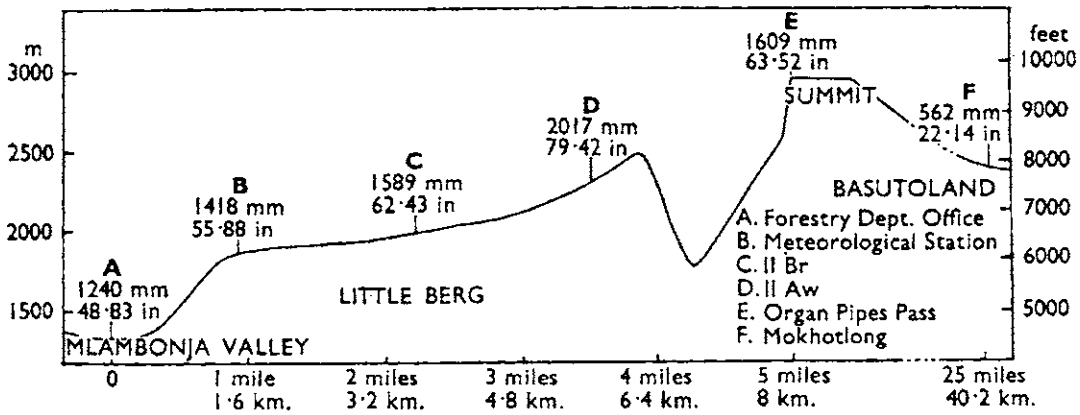
Precipitation

The Drakensberg Park occupies one of the best-watered, least drought-prone areas of South Africa. Most of the Drakensberg experiences over 200 rain days and about

1300 mm of rainfall per annum, but some parts receive as much as 2 000 mm. This may be augmented by up to 30% mist, making the Drakensberg one of the highest rainfall areas in South Africa (Irwin & Irwin, 1992). Annual precipitation totals vary in the region between about 1000 mm in the foothills to 1800 mm at the Escarpment (Tyson *et al.*, 1976). A distinct seasonality occurs, with precipitation in the summer months (November to March) accounting for 70% of the annual total, while the winter months (May to August) account for less than 10% of the annual rainfall (Tyston *et al.*, 1976).

Most of this falls in the form of summer thunderstorms which occur on more than 100 days per year in the escarpment zone. These occur either along organised squall-lines which sweep coastwards from the escarpment or as orographically-induced storms. Plain-mountain winds play an important role in the latter case. Both orographically-induced and squall-line thunderstorms are assisted by the ideal breeding conditions provided by wind structure and moisture distribution over the east coast of South Africa. Thunderstorms are almost entirely a summer phenomenon and, owing to their local nature and the pronounced effect exerted by relief, precipitation may vary considerably from area to area within the Drakensberg Park. In general rainfall varies as a direct function of relief.

Killick (1963) estimated that the highest amounts of rainfall occur close to the



escarpment and show a distinct increase in precipitation totals towards the escarpment (Figure 5).

Figure 5. Profile through Drakensberg showing variation in rainfall with altitude (after Killick, 1963).

Snowfall totals or frequencies are not systematically recorded. Based on newspaper reports, Schulze (1965) estimates an average frequency of 8,27 days of snowfall per year on the Drakensberg. However, snow falling in winter may remain for several weeks to a few months in shadow-sites on the Lesotho mountains. Some authors report snowfalls to occur throughout the year on the Lesotho Plateau but only to reside for prolonged periods in winter (Staples and Hudson, 1938; Granger, 1976). Snowfall in the Little Berg is rare and it melts quickly, often in a matter of a few hours, but may last for about two weeks in sheltered spots (Killick, 1963; Granger, 1976).

Wind

Under the generally clear weather conditions in the Drakensberg, the topography gives rise to a dominance of local winds near the ground (Tyson, 1968a,b). However, these may be obscured when strong pressure winds prevail ahead of frontal disturbances, causing 'Berg Wind' conditions (Hurry and Van Heerden, 1981). Local, topographically induced winds occur on a variety of scales as a result of solar heating of the ground during the day and radiational cooling at night (Tyson, 1968a). Within the valleys of the Little Berg warm valley winds and cool mountain winds occur at day and night time respectively. At ± 2000m altitude, compensating anti-winds may be observed (Tyson, 1968a). On a more regional scale a cool mountain-plain wind blows at night from the escarpment towards the kwaZulu-Natal midlands, overriding the local mountain winds in the individual valleys below. A reverse plain-mountain wind overlies the valley wind during daytime (Tyson, 1968a,b; Tyson *et al.*, 1976).

1.2 Geology

The geology of the Drakensberg is simple, being a series of near horizontal, conformably bedded sedimentary formations topped by deep basalt flows of up to 1 km thick. Table 1illustrates the sequence of the formations, while Table 2 gives a full description of each. The area is covered by the 1:250 000 Geological Series sheet 2928 : Drakensberg, which is explained by Lindstrom (1981).

Stratigraphy

The Drakensberg Park is characterised by a concordant sequence of sedimentary strata overlain by basalts that all belong to the Karoo Supergroup Sequence.

The Beaufort Group

The Beaufort Group is subdivided into the Lower, Middle and Upper Subgroup and Lower Adelaide Subgroup (S.A.C.S, 1980; Erickson, 1983), with only the first subgroup occurring in the Drakensberg Park. The Upper Beaufort Subgroup consists of red and maroon coloured mudstones together with blue and green shales interbedded with widely spaced yellow, fine to medium-grained feldspathic sandstones (Du Toit, 1954; Haughton, 1969).

The Molteno Formation

The Molteno Formation consists of light coloured, fine to very coarse sandstones with interbedded layers of argillaceous sediments, and conglomeratic sandstones forming a subordinate component. The beds of the Molteno Formation lie conformably on the strata of the Upper Beaufort from which they can be distinguished by the absence of deep coloured argillites found in the former. Another distinguishing feature is the sparkling appearance of the sandstones due to the deposition of silica upon quartz grains in such a way that crystal faces have been regenerated . The shales and mudstones are grey or blue, but yellow in their weathered state (Du Toit, 1954; Haughton, 1969). Erickson (1983) estimates a thickness between about 7m and 20m for the Molteno Formation. The sandstone horizons form outcrops whereas the more argillaceous sediments are covered by a vegetated soil cover.

TABLE 1 STRATIGRAPHIC SEQUENCE OF THE KAROO SUPERGROUP
(After S.A.C.S. ., 1980 and Erickson, 1983)

	GROUP	FORMATION	PREVIOUS NOMENCLATURE	AVERAGE THICKNESS IN DRAKENSBERG	COMPONENT ROCK	FOSSIL REMAINS	WEATHERING CHARACTERISTICS	APPROX.ALT (m)
KAROO SEQUENCE				Not applicable, occurs as sills, dykes and minor plugs	Dolerite.	Nil.	May weather rapidly than basalt - forms blocks and columns. Also shows exfoliation-type weathering.	All levels.
		Drakensberg	Drakensberg Stage.	Up to 1 350m.	Horizontal basalt flows, commonly containing pipe and spherically shaped amygdales.	Nil.	Weathers rapidly. Typical spheroidal weathering showing "onion skin" exfoliation.	1 800 - 3440
		Clarens	Cave Sandstone Stage.	150 m. Dips towards Lesotho.	Pale yellow, fine-grained sandstones of aeolian origin formed in arid conditions.	Light dinosaur fossils; also footprints of various species of dinosaur.	Very resistant, cream to yellow sandstone bands that form high cliffs, frequently with caves and rock shelters at base.	1 650 - 2 400
		Elliot	Red Bed Stage.	250 m thinning northwards.	Red mudstones and shale, with medium to fine grained sandstone.	Reptilian (dinosaur) fossils.	Mudstone erodes rapidly, particularly in relation to the over- and underlying sandstones. Presence of more resistant sandstone results in terrac-like outcrops.	1 500 - 1 700
		Molteno	Molteno Stage.	50 m thinning northwards.	Glittering, coarse-grained sandstone, blue and grey shale, oil shale.	Rich in plant fossils.	Differential erosion rates leads to typical terracing of the Molteno slopes. Flat-topped ridges capped with erosion-resistant sandstone from the typical foothills of the Trail Zone. The outcrop are of this formation is usually strewn with large square blocks of glittering sandstone.	1 400 - 1 600
	Beaufort	Tarkastad (North of 31°3'S)	Upper Beaufort Series. Middle Beaufort Series	350 m thinning northwards.	Red shales and mudstones predominate in the upper layers. Erosion resistant fire-grained sandstone forming vertical krantzes predominates in the lower strata.	Rich in reptilian fossils, mainly Hystro-saurus.	Sandstone more resistant than other strata, eroding into block pattern.	Up to 1 500

Note: The use f the name "Stormberg Series" has been discontinued. The Molteno, Eliot, Clarens and Drakensberg Formations are now used on their own and are not grouped(S.A.C.S., 1980; Linstrom, 1981, pers.comm; King, 1972).

TABLE 2 GEOLOGICAL TIME SCALE SHOWING PERIODS DURING WHICH THE DRAKENSBERG WAS FORMED (Irwin & Irwin 1992).

Era	Age (millions of years)	Period	Sequence	Series	Formation	Major geological events
Quaternary	1 2	Recent Pleistocene				Periods of continental uplift and continuous downward erosion.
Caenozoic	12 25 40 60 70	Pliocene Miocene Oligocene Eocene Palaeocene				
Mesozoic	135	Cretaceous				
	150	Jurassic	Upper Karoo	Stormberg	Drakensberg Lavas	Break-up of Gondwanaland; deposition of basalt.
	160				Clarens	Depositions of sediments to form sandstones.
	170				Elliot	
	180	Triassic			Molteno	
	200			Beaufort		

The Elliot Formation

This Formation (formerly known as the Red Beds) is characterised by red and purple massive argillaceous sediments, containing occasional lenses of fine to coarse sandstone. The argillaceous sediments range from mudstone to very-fine grained sandstone and make up 92% of the stratigraphic thickness (Erickson, 1983). The contact between the Molteno and Elliot Formation passes gradually from predominantly arenaceous into massive argillaceous strata. The contact is at the level where the red to purple argillite becomes dominant (Du Toit, 1954; Erickson, 1983).

In the field the slopes underlain by the Elliot Formation have a relatively smooth character due to the absence of resistant sandstone outcrops.

The Clarens Formation

Typically, the Clarens Formation (formerly known as the Cave Sandstone) comprises massive, pale coloured, very fine sandstones and siltstones, which contribute 87% of the total stratigraphic thickness. The remaining 13% consists almost entirely of fine to medium-grained sandstone (Erickson, 1983). At the basal contact with the Elliot Formation the brilliant coloured, massive mudstones of the latter pass into pale coloured sandstones which frequently show waterlain structures (Erickson, 1983; Du Toit, 1954; Haughton, 1969).

In the landscape the sandstones of the Clarens Formation are easily recognisable as they give rise to pronounced rock scarps. Hollows that form shallow caves are common at the base of the scarps. A large number of these caves contain rock paintings made by Bushmen.

The sandstone layers of the formations discussed generally form scarps whilst the argillaceous sediments are overlain by a colluvial cover (Fair, 1947, 1948a; Du Toit, 1954; Erickson, 1983). Variation in rock mass strength is considered the decisive factor in this type of structural control (Fair, 1947, 1948a, b; Moon and Selby, 1983). The alternation of beds in the sedimentary strata also has an effect on the hydrology of the area. In general texts (e.g. Embleton and Thornes, 1979), sandstone layers are said to be more permeable compared with shales and mudstones, thereby causing moisture to appear at the surface near bedding contacts. Higher soil moisture contents may consequently result in increased weathering rates at the base of sandstone outcrops and the generation of several forms of mass wasting in the colluvial cover underneath (Young, 1972; Ollier, 1984). The specific textural composition, as well as stratification, also exerts a control on the weathering processes and the material produced (Embleton and Thornes, 1979), and these in themselves affect the transport processes, modes and the resulting configuration of the relief.

The Drakensberg Group

The basalts of the Drakensberg Group consist of numerous individual lava flows resting directly on the sandstone of the Clarens Formation. These early Jurassic basalts attain a total thickness of over 1350m (King, 1982), whereas the individual lava flows are observed to vary considerably in vertical extent, i.e. 30-50m in northern Lesotho (Venter, 1938), and 5-30m in different parts of Lesotho according to Stockley (1947). Usually, each lava flow has a basal zone rich in pipe amygdales,

a central zone of massive basalt and an upper zone of vesicular basalt. The amygdales have silica, calcite, chlorite and zeolite as main components (Bleackley and Walkman, 1964, quoted in Nixon, 1973). The abundance of amygdales varies considerably between individual lava flows with a marked absence of these enclosures in the highly massive and crystalline horizons (Du Toit, 1954). At the sharp contact with the underlying sandstones contact-metamorphism has caused induration of the sandstone to a quartzite which Visser and Van Riet Lowe (1955) estimate to be only 30cm thick in the eastern Orange Free State, but is observed to be as much as a few metres in thickness by Erickson (1983) in the Giants Castle Game Reserve. The lavas are of the plateau basalt type and erupted quietly from numerous fissures, now present as dolerite dykes. Generally, the dykes have widths between 3 and 6m, and lengths varying from tens of metres to several kilometres. In Nixon (1973) it is demonstrated that 66% of all lineaments (dykes, kimberlites and joints) are orientated between E-W and SE-NW directions. Variations in the chemical composition and texture of the basalt has been suggested to be an important factor in the development of the terraced topography of the kwaZulu-Natal Drakensberg. The amygdaloidal-free basalt is considered to be more resistant to weathering (Venter, 1938; King, 1963) and forms outcrops in the terrain, although these general statements are not further qualified.

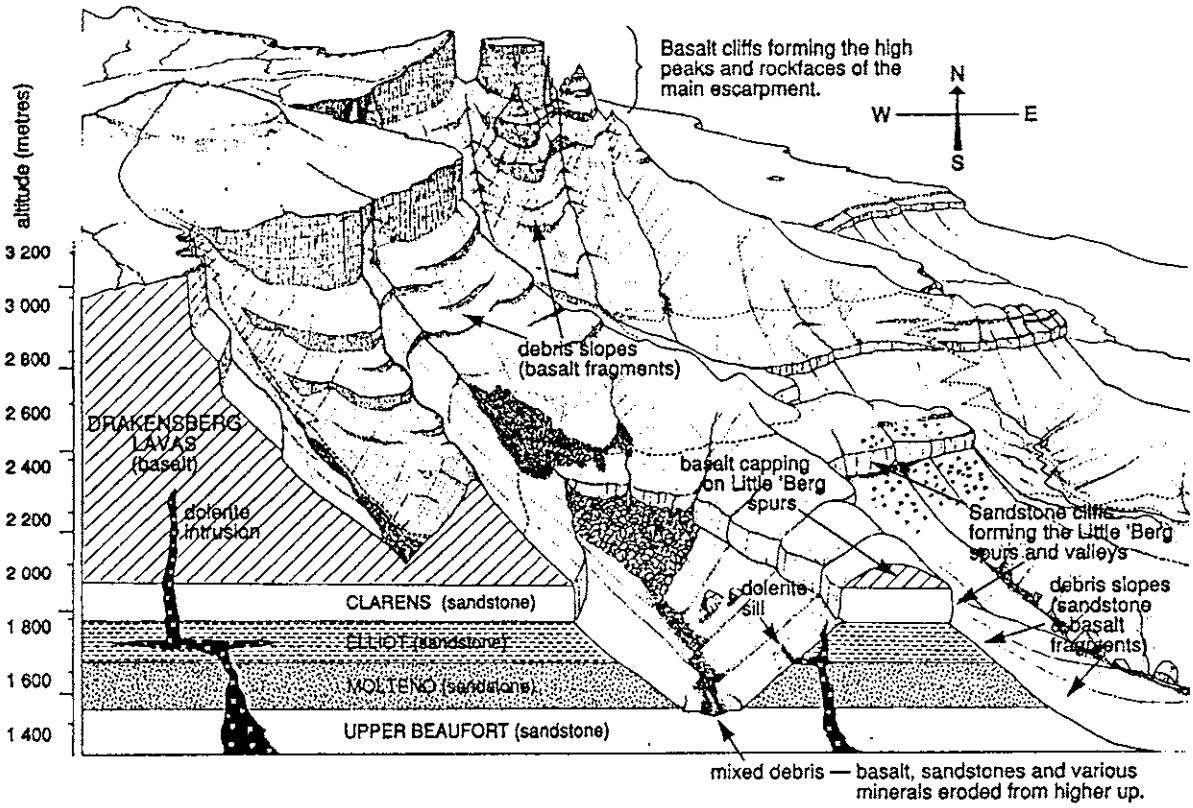
The outstanding geomorphic significance of the basalt is its generally high rock mass strength and the variations therein between the individual lavaflows (Moon and Selby, 1983). This characteristic has been shown to be the major cause for the existence of the main escarpment and the numerous bevelled surfaces (Moon and Selby, 1983; Selby 1982). The joint system developed in the basalts upon cooling (Harper, 1969; Nixon, 1973), has a major impact on the water distribution in the Drakensberg. Several reports suggest that spring levels or horizons provide a continuous source of moisture with distinct effects on soil and vegetation as well as geomorphological processes (Staples and Hudson, 1938; Killick, 1963; Granger, 1976). The chemical composition of the basalt and its massive structure have repercussions on the mode of weathering and its products. This relates to the physical and chemical characteristics of the soils formed and, ultimately, influences the geomorphological mechanisms operating as well as the vegetation cover (Ollier, 1984).

Geological Structure

The strata of the formations in the Drakensberg Park all rest in a near horizontal position with dips seldom steeper than 60 in a south to southwesterly direction (Stockley, 1947). As such, the strata form the northerly part of a shallow syncline that underlies the whole of Lesotho and forms the top section of the Karoo basin that extends and deepens into the Cape Province (Stockley, 1947; Tankard *et al.*, 1982), (Figure 6). Small structural domes and basins in the strata are considered to be the result of intrusions of sills into the underlying formations (Nixon, 1973).

Subsequent gentle flexuring of the whole succession resulted in a series of NE-SW trending ridges and furrows. It was along these that the first river systems developed on the Lesotho Plateau and are still maintained today (Nixon, 1973). Undulations in the contact surface of the Clarens Formation with the basalt are also the result of the palaeotopography of the sandstone surface (Schmitz, 1980, Tankard *et al.*, 1982).

FIGURE 6



Geological features of the Drakensberg (from Irwin & Irwin, 1992).

On the other hand, major joints are present, a number of which are filled with doleritic dykes. In the midlands of kwaZulu-Natal the Karoo sediments dip very gently westward but reappear along the coastal plain.

Two sets of theories, the 'fault' theory and the 'monoclinal' theory, exist to explain the structure of kwaZulu-Natal (Maud, 1961, 1962; Turner, 1967). Early reports have suggested that faulting is responsible for the geological structure of the Province (Suess, 1904). Observations indicated extensive faulting along the coastal plain (Beater and Maud, 1960; Hardie, 1962) and is described by Maud (1961, 1962) as a series of arcuate faults stretching to the southeast. The blocks tilt in this southeasterly direction with a downthrow to the northwest. Horst and graben structures would account for the lowering of the Karoo beds along the coast. This fault system is now recognised to be associated with rifting during the break up of Gondwana (Tankard *et al.*, 1982). An alternative point of view was first presented in 1908 by Penck (quoted in King, 1944, p. 258) who, denying the existence of the Quathlamba-fault, suggested that the dominant structure in eastern Natal is a coastal monocline. This viewpoint has since been strongly advocated by Du Toit (1954), King and King (1959), and King (1940, 1982). Although the fault pattern demonstrated by Maud (1962) is not denied, it is thought to be of secondary origin (King, 1982). In the discussion on the geological and geomorphological evolution of the Drakensberg Park a summary of the monoclinal theory by King (1982) is presented.

Geological and Geomorphological Evolution

The dominant geomorphological structure of the Drakensberg Park is the Great Escarpment and was first explained as being the result of a major fault by Suess (1904). Later work pointed out the absence of such a fault and established this scarp to be of erosional origin (Penck, 1908; King, 1944). Below the escarpment, and extending into the Little Berg and the kwaZulu-Natal Midlands, several bevelled surfaces have been identified at varying elevations. The extent and dating of the described surfaces has been debated at length by Dixey (1938, 1945, 1955), Fair (1944) and King (1944, 1945). Monocyclic and polycyclic stages of uplift have been suggested to have taken place along faults or to have caused a major monoclinal structure, depending on the theory favoured.
The most detailed and elaborate model in explaining the geological and geomorphological evolution of kwaZulu-Natal is that presented by King and King (1959) and King (1974, 1982). It is based on the existence of the Natal Monocline which formed during the break up of Gondwanaland. This episode was followed by tensional faulting along the downward gradient of the monoclinal slope. In the following eras the kwaZulu-Natal interior is elevated in stages along the hingeline of the monoclinal axis, followed by stable periods of backward erosion by streams and renewed planation of the lower land surface. The lower surface is bounded upwards by a scarp explained by parallel slope retreat. A summary of the monoclinal theory is presented as a chronological sequence of periods with crustal activity and stable intermissions characterised by denudation and sedimentation (Table 2). Five stages of uplift are identified, associated with four planation levels in the Drakensberg, of which the 1950m and 1800m level occur in the study area. The Late Pliocene stage of uplift has given rise to rejuvenation of the streams in the Little Berg (King, 1982).

An important re-evaluation on the geomorphological evolution of southern Africa has recently been presented by Partridge and Maud (1987). A summary of events relevant to the geomorphological evolution of the Drakensberg is presented in Table

3. The work by Partridge and Maud (1987) has covered information on the whole of southern Africa, including data on off-shore sedimentation. King (1972), on the other hand, presents a regional model for the kwaZulu-Natal province with more specific statements on the Drakensberg environment. The main difference in the models is the elevation of the Lesotho Plateau at the time of the break up of Gondwanaland. In contradiction to King (1972), Partridge and Maud (1987) suggest that the present-day Lesotho highlands at Letseng Le Terai had an elevation of about 2350m, whereas King (1972) estimates an elevation as low as 600m for this area. According to Partridge and Maud (1987) the break up of Gondwana immediately originated the Great Escarpment, which King (1972) suggests to be the result of a major uplift in the Middle Cretaceous. Further, the Lesotho highlands are estimated to be eroded some 500-600m since the break up of Gondwana and the existence of a Gondwana Landscape and Cretacic Landscape (King and King, 1959; King, 1972) are refuted to exist by Partridge and Maud (1987). The landscape cycle that followed the break up of Gondwana lasted until the end of the Early Miocene and resulted in the African planation surface (Table 1). Most of the inland recession of the Great Escarpment occurred during this period. From Table 1, it can be deduced that the African surface and other cyclic planation surfaces occur at elevations lower than those encountered in the present study area. Following a stage of uplift in the Miocene the Post-African (I) surface formed which ended in the Late Pliocene when another major stage of uplift took place (Table 3). Increased stream incision resulted in the formation of the kwaZulu-Natal interior and the Little Berg. Gradients on erosion surfaces in the kwaZulu-Natal interior are estimated to have increased from 3m/km to 30m/km (Partridge and Maud, 1987). Major dissection still continues in what is called the Post-African (II) cycle (Table 3).

1.3 Geomorphology

The Drakensberg mountains consist of two parallel escarpments stepping up to the Lesotho plateau. The main or Lesotho escarpment along its 180 km length seldom drops below 3 000 m above sea level. The Little Berg escarpment rises, with the level of the underlying Clarens formation, from around 1 800 m at Cathedral Peak to an elevation of 2 400 m at Bushman's Nek. This stepped landscape is deeply dissected by the eastward-tending river valleys, creating a highly broken terrain of steep slopes and a broad spectrum of aspects.

Local relief is extremely high. Within the Little Berg valleys it can reach 300 m, but from the main escarpment to the principal river valleys below it can be as much as 1 100 m, with an average slope of nearly 100% (45°).

Evolution of the landscape

The development of the Drakensberg landscape is the result of about 120 million years of erosion, in five major cycles, of the original Gondwanaland surface (King, 1972). Each cycle is postulated to have followed the establishment of a new erosional base level caused by the seaward up-lifting of the eastern part of South Africa.

Table 3. Summary of major geomorphic events in southern Africa since the Mesozoic, comparing the models of King (1972) and Partridge and Maud (1987) from King (1972) and Partridge and Maud (1987).

King (1972)			Partridge and Maud 1987)		
Event	Geomorphic Manifestation	Age	Event	Geomorphic Manifestation	Age
Intermission VI (Youngest landscape)	Backward erosion giving rise to stream dissection in the Little Berg.		Climatic oscillations and glacio-eustatic sea-level changes.	river terraces	Late Pliocene to Holocene
Active Episode E	1800m uplift with seaward tilting.	Late Pliocene	Post-African II cycle of major valley incision.	downcutting and formation of higher terraces along interior rivers.	
Intermission V (Widespread landscape)	Scarp retreat and pedimentation. 1350m planation surface in Natal Midlands.		Major uplift (up to 900m in eastern marginal areas).	Asymmetrical uplift of the sub-continent, westward tilting of previous land surfaces of interior. Monoclinal warping of eastern coastal margins.	Late Pliocene (± 2,5 Ma)
Active Episode D	600m uplift with pronounced seaward tilting	Late Miocene			
Intermission IV (Rolling Landscape)	Incomplete planation 200-300m below the Moorland landscape. 1800m planation surface in the Little Berg.		Post-African I cycle of erosion.	Development of imperfectly planed Post-African I erosion surface. Highest elevation 1200m in Natal midlands	Early mid-Miocene to Late Pliocene
Active Episode C	Gentle uplift of a 'few hundred' metres over entire Natal.	Early Miocene	Moderate uplift of 150-300m.	Slight westward tilting of African surface, limited coastal monoclinal warping.	End of early Miocene (± 18 Ma)
Intermission III (Moorland landscape)	Extensive planation, retreat of the 1200-1500m high Drakensberg scarp over most of Natal. Summit level at 1950m in Little Berg.		African cycle of erosion (polycyclic).	Advanced planation throughout sub-continent. Surface at 1800m (Harrismith) above and at 1400m (Natal midlands) below Great Escarpment. Most of inland retreat of Great Escarpment.	Late Jurassic/ early Cretaceous to end of early Miocene
Active Episode B	1200m uplift of the interior of Natal, origin of the Great Escarpment.	Middle Cretaceous	Break up of Gondwanaland through rift faulting	Initiation of Great Escarpment due to high absolute elevation of southern African portion of Gondwanaland.	Late Jurassic/ early Cretaceous
Intermission II (Cretacic landscape)	Backward erosion giving rise to 500m high scarp. Planation surface in Lesotho Mountains above 2800m.				
Active Episode A	Break up of Gondwanaland, origin of Natal Monocline. 300-500m uplift.	Early Cretaceous			
Intermission I (Gondwana landscape)	Extensive erosional surface following the outpour of Drakensberg lavas. Summit level of Lesotho Mountains at ± 3300m.				

Erosion

The Drakensberg landscape is actively eroding on a geological time scale. Mass-wasting and fluvial processes dominate. These processes are driven by high inputs and gradients, resulting from high intensity and high total rainfall, extreme slope gradients and local relief, contrasting aspects and insolation, and high daily and seasonal temperature fluctuations. In this high-energy environment the potential for accelerated erosion is very great (Garland *et al.*, 1977). The scars of accelerated erosion are common, having originated from trampling by cattle and recreationists or the poor siting of paths and tracks (Bainbridge, 1979). A comparison of erosion scars on the oldest available aerial photographs (1949) with the present situation showed that the natural recovery rate of such scars is extremely low, even though the cause has long since been removed (Bainbridge, 1979).

The lava flows which formed the main escarpment ceased 150 - 140 million years ago, and since then no more deposition, other than minor alluvial sedimentation, has occurred in the Drakensberg. On the contrary, there has been a steady removal of the basalt and sandstone by headward and downward erosion, and as each rock formation has been removed the layers beneath it have become exposed and weathered to form the present landscape.

The scenery of the Drakensberg has been sculptured primarily by flowing water (Irwin and Irwin, 1992). Each stream carves its own valley with the width and depth of the valley being roughly proportional to the amount of water that has flowed through it over the millions of years it has taken to form (Figure 7).

Drakensberg rivers generally have a steep gradient, and being fast-flowing in their upper courses, tend to erode downwards rather than laterally. This rapid downward erosion is referred to as an attempt to reach base level. The closer a river is to base level the shallower its gradient will be and the slower it will flow. Local base levels occur in the Drakensberg where the river levels out for a short distance and erodes more laterally than vertically downward. This results in the development of undercut and slip-off slopes, and interlocking spurs as the river begins to widen its valley. Local base levels are often caused by the river being temporarily unable to erode through a layer of resistant rock. Nearly all the waterfalls in the Little Berg occur where the river crosses such layers. Once the resistant layer is breached, rapid downcutting into the softer underlying rock is resumed.

In the lower reaches of the river meanders, small ox-bow lakes and marshy conditions are found. Local areas of resistant rock result in stream braiding where the main stream splits into several smaller streams which join up again further downstream.

Through its course the river carries eroded material downstream with it. Dissolved elements and minerals are carried in solution, small fragments in suspension and large rocks and boulders are rolled along the river bed. The Drakensberg streams often yield interesting and attractive rocks and minerals in various stages of fragmentation.

Ice, wind, chemical weathering, lightning, gravity and the uneven expansion and contraction of rock also contribute to the process of erosion, although to a lesser degree than flowing water.

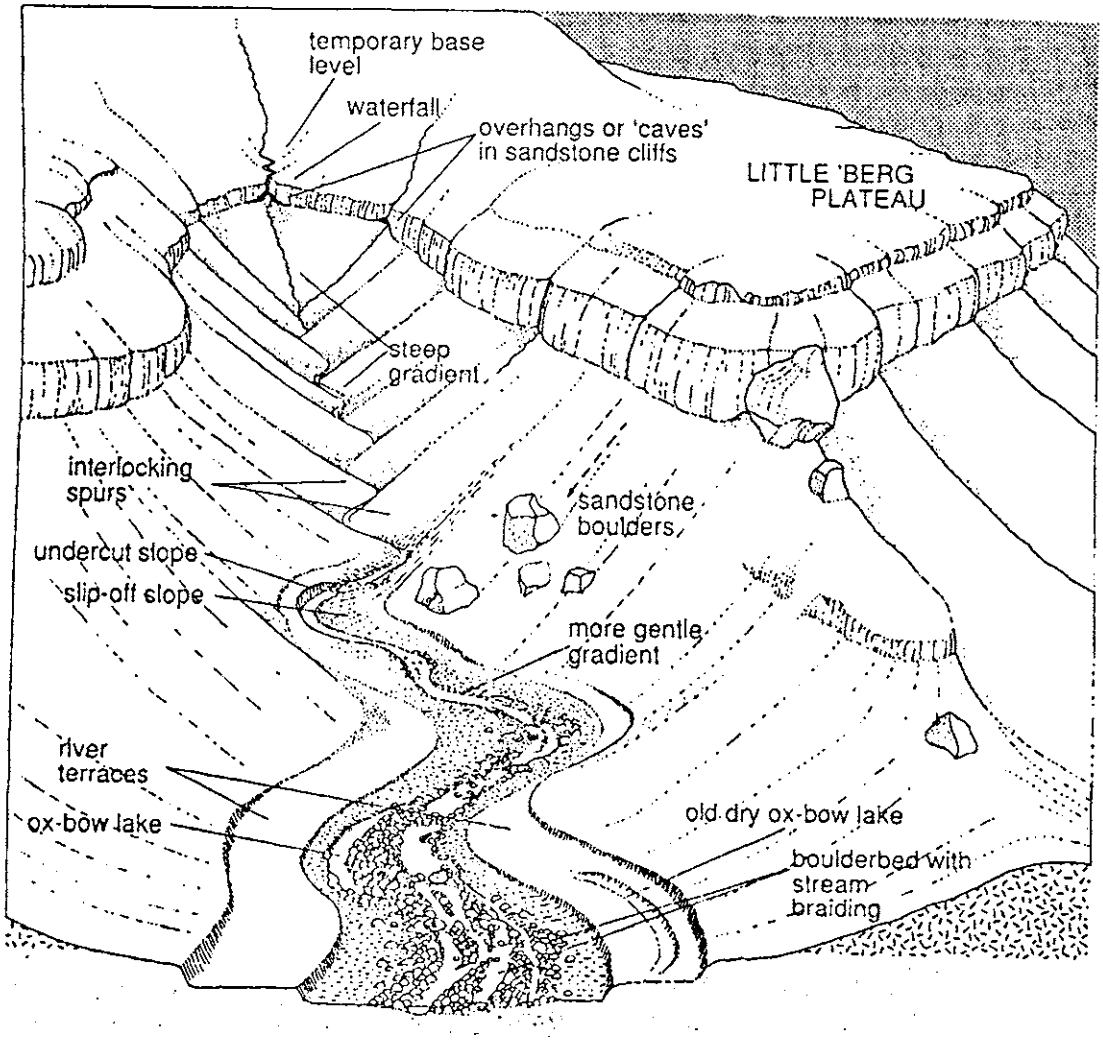


Figure 7. Patterns of erosion in the Drakensberg (from Irwin & Irwin, 1992).

1.4 Soils/substrates

The landscapes of the Drakensberg are ancient, and the soils reflect the age and high rainfall of their environment (Table 4). They are generally shallow, highly weathered and thoroughly leached. Most fertility is contained in the A-horizon as a result of the high humus content. The pH and basic cation exchange capacity (S-values) are low and decrease with increasing soil depth and altitude. Exchangeable aluminium and iron levels are high and are associated with a low availability of phosphates. Levels of aluminium, iron and manganese salts can be near toxic in some B-horizons. The combination of these unfavourable soil nutrient factors explains the slow revegetation of soils which have lost their A-horizon.

Once the Drakensberg soils are disturbed or bared of their vegetation cover, they erode rapidly because of the steep slope gradients and high intensity rainfall. The A-horizons with their high humus content tend to be friable and loose once exposed and hence erode more rapidly than the B-horizons which are better aggregated.

Granger (1976) concluded that in the Drakensberg situation, the clay particles are cemented into stable aggregates by high levels of free iron and aluminium and certain organic matter leachates. These aggregations lead to greater stability of the soils and increased infiltration capacity and permeability. Such desirable physical characteristics are important both in reducing soil erodibility and in permitting the hydrological control functions of the soil. Bainbridge (1979) elaborates on the function of the soil mantle as the principal water storage and control medium in the Drakensberg. Clearly, a healthy vegetation cover is vital not only to protect and bind the soil against accelerated erosion, but also to contribute organic matter for the maintenance of a favourable "soil structure".

1.5 Hydrology/aquatic systems

The Drakensberg catchment area is of major economic importance as it contributes significantly to the flow of the Tugela, Mkhomazi and Mzimkhulu rivers, the three largest catchments in kwaZulu-Natal. The steep gradients and shallow soils of the Drakensberg result in almost half (up to 600 mm) of the annual rainfall leaving the Drakensberg as runoff. Although heavy storms are prevalent, the soils bound by indigenous vegetation rapidly absorb surface flow and exert excellent control over runoff, providing a gradual and sustained water yield throughout the year rather than sporadic flooding followed by dryness. Under these conditions water reaching the streams is sediment free and of very high quality. The only way to maintain these favourable characteristics is by conserving the indigenous vegetation.

Numerous rivers and streams are associated with the three major river catchments. At high altitudes streams often freeze over at night and may remain frozen for several weeks in winter. Water temperature increases as streams lose height, and freezing is uncommon below about 2300m.

Tarn lakes are found mainly on terraces of the southern Little Berg. These vary from shallow seasonal pans to large permanent pools up to 2m deep.

Table 4 The principal soils of the Drakensberg catchments (Bainbridge, 1979).

(i) FREQUENT - DOMINANT

FORM	DESCRIPTION
Champagne Form Ivanhoe series	The principal hydromorphic soil of the vlei areas and bottom-land sites.
Clovelly Form Clovelly & Balgowan series (humic phase)	A ferralitic soil of the crests of mudslopes, dominant on cool sites. Both shallow, deep as well as hydromorphic phases are present. The deep phases, relatively common, occur both on the basalt and on sedimentary rocks of the Landslide and Trail Zones.
Griffin Form Farmhill & Griffin series (humic phase)	A ferralitic soil of the crests and midslopes. With Hutton Farm one of the most common of the Little Berg soils. Usually derived from basalt or dolerite. They occur both on slopes which intercept less incoming radiation than those on which Hutton may be found as well as on the warmer slopes. Both shallow and deep phases occur.
Hutton Form Balmoral & Farningham series (usually humic phase)	An extremely common ferralitic soil of the crests and midslopes covering large areas of the warm aspect slopes on the basalt areas, usually of good depth.
Glenrosa Form Saintfaith series (usually humic phase)	Together with Mispah form, these shallow soils are extremely common on weathering basalt on the Little Berg and the main escarpment. Because of the tongued nature of the B horizon, removal of the A horizon will to a large extent preclude revegetation.
Mispah Form Mispah series (humic phase)	Associated with Glenrosa, Mispah soils are skeletal, commonly only 5-10cm deep over basalt boulders or sheets. Mispah soils consist only of an A horizon over rock. Removal of the soil will permanently preclude revegetation, except in isolated fissures or cracks filled with soil.
Katspruit Form Katspruit Series (organic phase)	Hydromorphic soils at the edges of vleis or streams.
Pinedene Form Ouwerf Series (usually humic phase)	"Hang-gley" soils of the midslopes, footslopes and bottom-lands, grading into Clovellys (as drainage improves). Common in the Landslide and Trail Zones.
Oakleaf Form Jozini/Koedoesvlei series	Transported material of the thalus zones, frequently containing very large boulders. Occurs throughout. Very deep phases are found at the foot of the main escarpment.

ii) RARE

Avalon Form	Plinthic soil of the footslopes
Bainsvlei Form	Plinthic soil of the footslopes
Bonheim Form	Margalitic soil of general occurrence.
Dundee Form	Alluvial soil of the bottomlands.
Inanda Form	Humic ferrallitic soil of the midslopes.
Kranskop Form	Humic ferrallitic solid of the midslopes.
Kroonstad Form	"Hang-gley" soil of general occurrence.
Magwa Form	Humic ferrallitic soil of general occurrence.
Mayo Form	Young humic soil of crests.

1.6 Topography

The Drakensberg can be divided into two sections; the High Berg and the Little Berg.

The High Berg

This section consists of the summit plateau adjacent to the escarpment edge, the peaks and rock faces of the main escarpment and the steep slopes beneath them. The summit plateau is characterised by larges domes and ridges separated by broad valleys. The ridges and valleys may differ in altitude by as much as 350m with a slope gradient of up to 35°. The average altitude of the escarpment edge is 2900m with many peaks, domes and buttresses over 3000m and sheer cliffs of 500m. The peaks of the main escarpment can be classified as either domes and buttresses or as 'free standing' columns, pinnacles and spires. The steep slopes beneath the escarpment are grassy and broken at regular intervals by irregular rock bands and scarred by avalanches.

The Little Berg

This is the grass covered plateau or terrace below the slopes of the High Berg which extends eastward into kwaZulu-Natal as finger like spurs and ridges. These spurs and ridges end in prominent sandstone cliffs which range in height from 1900m in the northern Drakensberg to over 2200m in the south. The steep sided valleys between the spurs are characterised by the presence of cold perennial streams, forests, bolder strewn river beds, waterfalls and deep rock pools. From the Little Berg, the land slopes away to the east forming the Drakensberg foothills and the hills and valleys of the kwaZulu-Natal Midlands.

2. Biological Environment

2.1 Vegetation

With altitudes varying from 1 280m to nearly 3 500m, an altitude range of 2 200m in the Drakensberg provides a great variety of habitats, such as alpine summit plateaux and peaks, vast basalt and sandstone cliffs, deep valleys and intervening spurs. In addition, there are the effects of climate, soil, geology, aspect, slope, drainage and fire, which all serve to produce an interesting and varied vegetation.

On most mountains of sufficient height, the vegetation is altitudinally zoned to form belts. In the Drakensberg the belts are not as clear-cut as on many mountains, but they are nevertheless present. Three belts may be distinguished coinciding with the three main topographical features or terraces of the area, namely the river valley system, the Little 'Berg and the summit plateau. These belts are: the Montane Belt (1 280m-1 830m), with *Podocarpus latifolius* (Real Yellowwood) forest as the climax community, i.e. the highest expression the vegetation can attain; the Subalpine Belt (1 830m-2 865m) with *Passerina-Philippia-Widdringtonia* Fynbos as climax; and the Alpine Belt (2 865m-c.3 500m) with *Erica-Helichrysum* Heath as climax. A profile through a typical part of the Drakensberg region showing the vegetation belts with their chief communities is given in Figure 8.

Montane belt

The montane belt extends from the valley floors to the lowermost basalt cliffs at the edge of the Little 'Berg, i.e. the cliffs just above the Clarens Sandstone cliffs.

Grasslands

- *Themeda triandra* grassland (Southern Tall Grassveld of Acocks, 1957)

The greater part of the belt is occupied by *Themeda triandra* (Red Grass) grassland, often as an understory to *Protea* savannah. In summer, this grassland, particularly if burnt, has a vivid green colour, whereas in autumn and winter it has an attractive tawny-red colour. The average leaf height of the sward is 230 -300mm with a culm hight of 600-900mm. Apart from the dominant grass *T. triandra*, the important species are *Hyparrhenia hirta* (Common Thatch Grass), *Tristachya leucothrix* (Red Seed Grass), *Phacelurus franksae, Diheteropogon filifolius* (Wire Bluestem), *Harpochloa falx* (Caterpillar Grass), *Rendlia altera* (Toothbrush Grass), *Trachypogon spicatus* (Giant Spear Grass), *Ateropsis semialata* subsp. *semialata* (Blackseed Grass) and *Loudetia simplex* (Russet Grass).

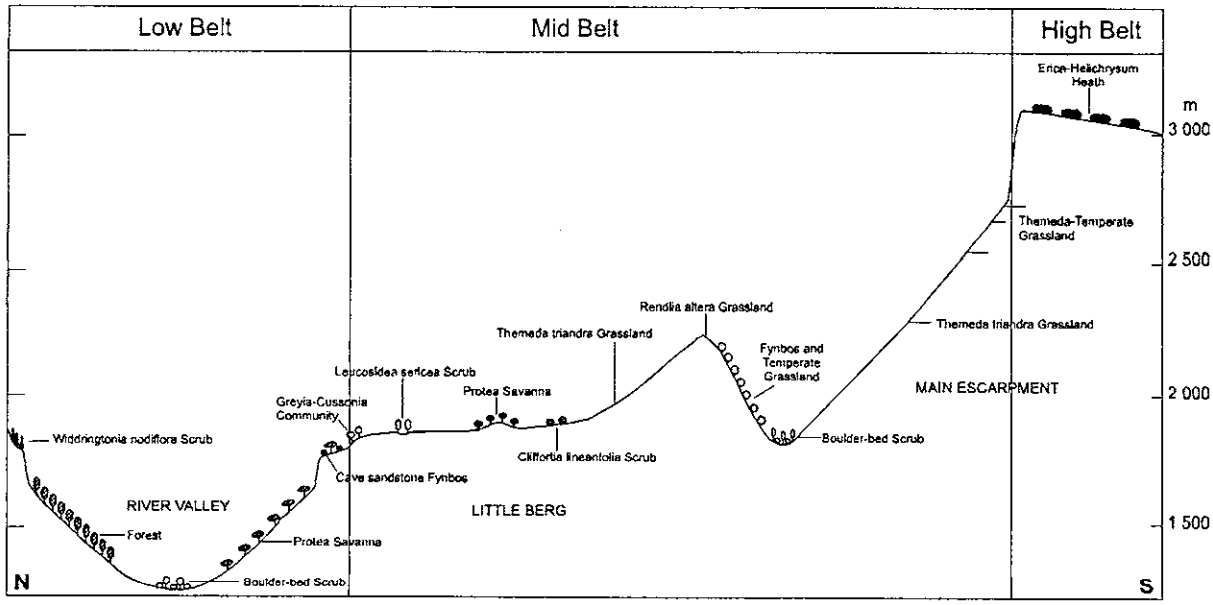


Figure 8. Profile through the Drakensberg area showing the vegetation belts with their major plant communities (from Irwin & Irwin, 1992).

The composition of the grassland varies from area to area and depends largely on how the grassland has been managed in the past, for example the kind of fire regime applied or whether, in some non-reserved areas, it has been overgrazed, etc. Indicators of disturbance include species of *Sporobolus* (Dropseed) and *Eragrostis* (Lovegrass).

Montane belt

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Grasslands

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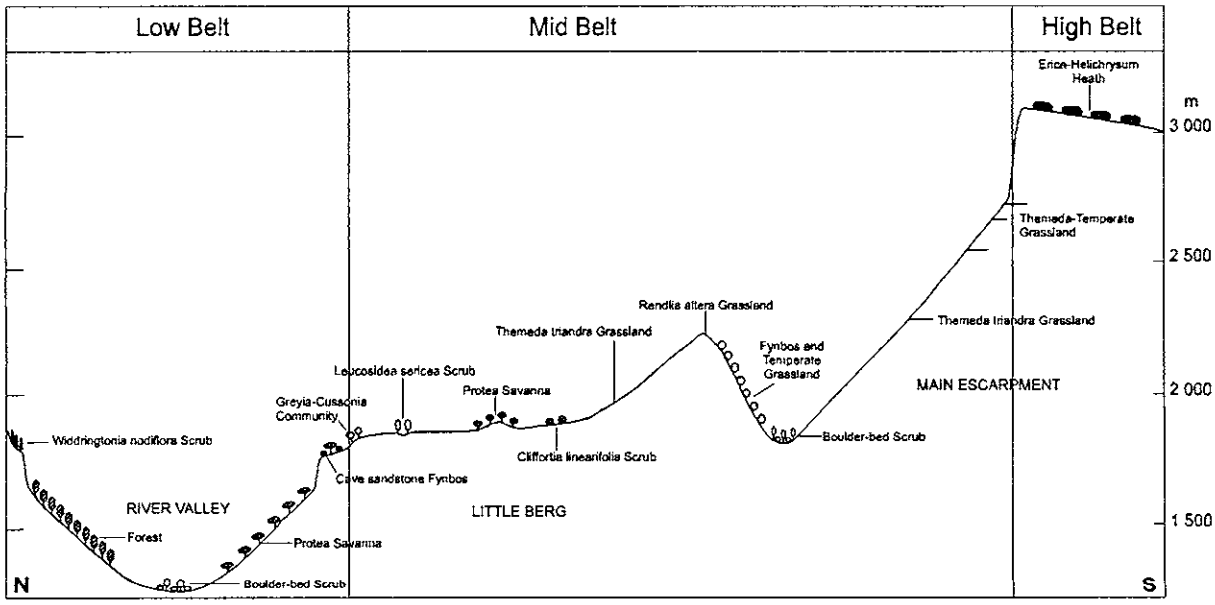

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simplex (Russet Grass).

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Numerous herbs are associated with the grasses. Prominent herbs include *Eriosema kraussianum*, species of *Acalypha, Helichrysum aureonitens* (Golden Everlasting), *Becium grandiflorum* var. *obovatum* (Cat's Whiskers), *Barleria monticola, Callilepis laureola* (Ox-eye Daisy), *Pentanisia prunelloides* (Wild Verbena), *Graderia scabra* (Wild Penstemon), *Dierama latifolium* (Broad-leaved Harebell), *Brunsvigia natalensis* and many others. A very conspicuous and colourful herb community is formed by *Crocosmia paniculata* (Zigzag Crocosmia) which usually grows in grassland just below the Clarens Sandstone cliffs. It is about a metre tall and has panicles of attractive orange flowers.

A surprising constituent of grassland at Loteni in the southern Drakensberg is the 2 - 4m tall stately *Aloe ferox* (*A. candelabrum*), the Bitter Aloe, with its candelabra-like inflorescence of scarlet flowers appearing in July.

(ii) *Hyparrhenia* grassland

With protection from fire, *Themeda triandra* grassland is replaced by *Hyparrhenia* grassland. This tall grassland, 0,8-2,7m high, has a patchy distribution, occurring in moist gullies, at the foot of cliffs and in disturbed areas generally, for example, roadsides and between cultivated fields. The dominant grasses are *Hyparrhenia hirta, H. dregeana* (Giant Thatch Grass) and *H. tamba* (Blue Tambookie Grass). These grasses are all late summer or autumn flowering.

(iii) *Miscanthus* - *Cymbopogon* grassland

This is a tall grassland up to 2,5m high, found mostly in moist areas - streambanks, gullies and forest margins. The dominant species are *Miscanthus capensis* (East Coast Broom Grass) and *Cymbopogon validus* (Giant Turpentine Grass). The grassland also contains a heterogeneous assemblage of herbaceous and woody plants, such as *Artemisia afra* (Wormwood), *Anemone fanniniae, Myrsine africana* (Small Cape Myrtle), *Agapanthus campanulatus* subsp. *patens, Polygala virgata* (Purple Broom), *Euphorbia epicyparissias* (Pisgoedbossie) and *Helichrysum* spp. (Everlastings).

Bracken Veld

This community, dominated by the fern *Pteridium aquilinum* (Bracken), is about 0,9m high and generally occurs on deep, moist soil. In autumn and winter Bracken Veld shows up dark brown against the adjacent tawny-red of the grasslands.

Scrub

There are five distinct scrub communities in the montane belt:

(i) Streambank Scrub

Several trees and shrubs form a scrub community on streambanks and at the edge of pools. Constituents include *Salix mucronata* subsp. *woodii* (Wild Willow), *Ilex mitis* (Cape Holly), *Bowkeria verticillata* (Natal Shell Flower), *Halleria lucida* (Tree Fuchsia), *Dais cotinifolia* (Pompom Tree) and *Cyathea dregei* (Common Tree Fern).

(ii) Boulder-bed Scrub

This scrub occurs on the Drakensberg river-beds where the roundish grey boulders are separated by fairly large stretches of coarse sand or where the boulders are piled high with little or no intervening sand. Common plants in this habitat are *Aristida junciformis* subsp. *galpinii* (Galpin's Bristlegrass), *Sutera floribunda, Chrysocoma ciliata* (Bitter Bush, an invader from the summit), *Senecio haygarthii, Sutherlandia montana* and *Felicia filifolia* subsp. *filifolia* (Wild Aster). Mature Boulder-bed Scrub comprises the trees *Leucosidea sericea* (Old Wood) and *Bowkeria verticillata* (Natal Shell Flower) with an understorey of *Aristida monticola* (Mountain Bristlegrass) and *Cymbopogon validus.*

(iii) *Leucosidia-Buddleja* Scrub

Leucosidea sericea (Old Wood) and *Buddleja salviifolia* (Sagewood), both grey-leaved trees or shrubs 3,5m high, sometimes form extensive communities, either singly or together, wherever soil moisture conditions are above average and there is protection from fire. The scrub is soon invaded by forest precursor species such as *Rhamnus prinoides* (Dogwood), *Euclea crispa* var. *Cri*spa (Blue Guarri), *Rhus dentata* (Nana-berry) and *Olinia emarginata* (Transvaal Hard Pear).

(iv) *Widdringtonia nodiflora* Scrub

This scrub is dominated by *Widdringtonia modiflora* (Mountain Cypress) and occurs between the Clarens Sandstone and lowermost basalt cliffs. It forms a very dense almost pure community, often with a shrub layer of *Myrsine africana* (Small Cape Myrtle).

(v) Cliff Shrub

The cliffs of the Clarens Sandstone and the lowermost basalt provide an incredibly varied assortment of habitats - horizontal pavements at the clifftops, vertical faces, some dry, some wet, crevices and ledges - and this is reflected in the varied vegetation:

- algae (black streaks on cliff faces)
- bulbous plants - *Scilla natalensis* (Blue Squill), *Brunsvigia natalensis, Haemanthus humilis* subsp. *hirsutus*
- cushion and mat plants - *Helichrysum albirosulatum* and *H. nanum*
- heaths - *Erica drakensbergensis, E. straussiana* and *E. cerinthoides* (Red Hairy Heath)
- rock clingers - *Ficus ingens* (Red-leaved Rock Fig)
- shrubs - *Metalasia densa* (Drakensbergse Steekbos), *Myrica pilulifera* (Broad-leaved Waxberry) and *Cliffortia linearifolia*
- succulents - *Aloe arborescens* (Oldenland's Bush Aloe), *A. pratensis* (Meadow Aloe) and *Delosperma obtusum* (Mountain Vygie);
- trees - *Protea roupelliae* (Silver Sugarbush), *Leucosidea sericea* (Old Wood) and *Podocarpus latifolius* (Real Yellow-wood)
- tunic plants with a dense sheath of persistent leaf fibres - *Styppeiochloa gynoglossa* (Mountain Tunic Grass) and *Xerophyta viscosa.*

- Very characteristic of the lowermost basalt cliffs at the edge of the Little Berg are the attractive red-flowered *Greyia sutherlandii* (Natal Bottlebrush) and the grey-green *Cussonia paniculata* (Mountain Cabbage Tree).

Protea Savannah

Two species of *Protea, Protea caffra* (Common Sugarbush) and *Protea roupelliae* (Silver Sugarbush) grow in mixed and pure scattered communities on warm dry grassy slopes and sandstone platforms above and below the Little 'Berg. The trees are evergreen, about 3-3,7m high with rounded crowns. The species occur together or separately. *Protea caffra* seems to be commoner in the northern Drakensberg and *P. roupelliae* is apparently versatile in its habitat requirements, but *P. roupelliae* seems to prefer Clarens Sandstone-derived soils and is hence usually found in the vicinity of the Clarens Sandstone Cliffs. Burning practices determine the density of *Protea* savannah.

Apart from the two species mentioned, there are four other species of *Protea* in the Drakensberg. Brief details are as follows:

- *Protea subvestita* - a shrubby tree species occasional on streambanks in the montane and subalpine belts and locally abundant in subalpine fynbos.
- *Protea dracomontana* - a shrub with an underground rootstock, frequently co-dominant in fynbos on the Little 'Berg.
- *Protea simplex* - a herbaceous dwarf shrublet occasional in montane grassland. Involucral bracts greenish cream to cream flushed pink carmine.
- *Protea nubigena* - a small shrub so far found only in a single almost inaccessible locality at 2 300m in the vicinity of the Witches above Policeman's Helmet Ridge in the Royal Natal National Park. Bracts creamy green flushed brownish carmine.

Forest

Forest is very limited in extent in the Drakensberg Park, particularly in the colder and drier southern Drakensberg, occurring on streambanks in deep kloofs and gorges and on slopes with a southern, south-eastern or eastern aspect - wherever conditions are sufficiently moist and there is adequate protection from wind and fire. The forests are often triangular in outline, but sometimes these triangular patches have joined up to form a long continuous forest, for example the Didima Gorge Forest, one of the largest forests in the Drakensberg.
Drakensberg forest will be described under two headings, margin and forest proper.

(i) Margin

The margin consists of *Leucosidea sericea* (Old Wood) and *Buddleja salviifolia* (Sagewood) and the forest precursor species *Rhus dentata* (Nana-berry), *R. Tomentosa* (Red Wild Current), *Euclea crispa* var. *crispa* (Blue Guarri), *Olinia emarginata* (Transvaal Hard Pear), *Rapanea melanophloeos* (Cape Beech), *Halleria lucida*, *Rhamnus prinoides* (Dogwood) and *Pittosporum viridiflorum* (Kasuur).

Characteristic of the margin are two showy yellow-flowered climbers, namely *Senecio tamoides* (Canary Creeper) and *S. deltoideus.* Two other colourful,

but rather rare climbers are *Littonia modesta* (Yellow Bells) and *Sandersonia aurantiaca* (Christmas Bells), with bright yellow and orange flowers respectively. Less colourful climbers are *Rhoicissus tridentata* (Wild Grape), *Clematis brachiata* (Traveller's Joy), *Dioscorea sylvatica* (Forest Elephant's Foot). *Myrsiphyllum asparagoides* (Cape Smilax) and *Riocreuxia torulosa* (Candelabra Flower).

(ii) Forest Proper

The forest proper can be divided into five fairly distinct layers, plus several special forest plant groups.

(a) The dominant tree layer, 12-22m high, forms a discontinuous canopy to the forest. The dominant species is usually, but not always, *Podocarpus latifolius* associated with *Scolopia mundii* (Red Pear), *Pterocelastrus echinatus* (White Candlewood), *Curtisia dentata* (Assegai), *Trimeria grandifolia (Wild Mulberry), Celtis africana* (White Stinkwood), *Maytenus peduncularis* (Cape Blackwood), *Kiggelaria africana* (Wild Peach), *Cussonia spicata* (Common Cabbage Tree), *Podocarpus henkelii* (Henkel's Yellowwood) and *P. falcatus* (Outeniqua Yellowwoood).

(b) The small tree layer, 4-6m high, is dominated by *Diospyros whyteana* (Bladder-nut) and is associated with *Clausena anisata* (Horsewood), *Burchellia bubalina* (Wild Pomegranate), *Buddleja salviifolia* (Sagewood) and *Maytenus undata* (Koko Tree).

(c) The shrub layer ranges up to 3m high and comprises the following species: *Carissa bispinosa* (Num-num), *Canthium ciliatum* (Dwarf Turkeyberry), *Cassinopsis ilicifolia* (Lemon Thorn), *Pavetta cooperi* (Cooper's Bride's Bush), *Scutia myrtina* (Droog-my-keel) and *Maytenus mossambicensis* (Black Forest Spike-thorn).

(d) The field layer of Drakensberg forest is often luxuriant and numerous herb and fern species form communities flowering usually between November and the end of March. For the rest of the year, the forest floor has an open and scraggy appearance. Constituents of the field layer include: *Oplismenus undulatifolius* (Drakensberg Forest Grass), *Begonia sutherlandii, Streptocarpus gardenii, Dietes iridioides* (Wild Iris), *Plectranthus grallatus* (Tuberous Spur-flower), *Impatiens hochstetteri* subsp. *Hochstetteri, Aloe aristata* (Long-awned Aloe), *Thalictrum rhynchocarpum* (False Maidenhair), *Disperis* species (Granny Bonnets), *Desmodium repandum, Sanicula europaea* (Sanicle), *Carex* species and fern species such as *Pteris catoptera* var. *catoptera* (Long-tipped Pteris), *Polystichum* spp. (Shield Ferns), *Blechnum giganteum* (Giant Blechnum), *Adiantum poiretii* (Fine Maidenhair Fern), *Asplenium monathes* (Mother Fern), *Dryopteris inaequalis, Pteris cretica* (Avery Fern) and *Cheilanthes hirta* (Parsley Fern).

(e) The ground layer, where it exists, consists almost entirely of mosses.

Scattered throughout Drakensberg forest are boulders or blocks of Clarens Sandstone of varying size. These boulders are usually moist

and support their own characteristic plant populations. Lichens and mosses are accompanied by the orchid *Stenoglottis fimbriata, Peperomia* spp., *Streptocarpus* spp., *Crassula* spp., *Talbotia elegans, Aloe arborescens* (Oldenland's Bush Aloe) and numerous fern species.

The epiphytes consist largely of lichens and mosses. Species of *Usnea* (Old Man's Beard), a grey fruticose lichen with round finely branched stems, are very conspicuous hanging from trees; also *Squamidium brasiliense* (Pendent Forest Moss), a dark green moss festooning trees and shrubs. Epiphytic ferns are *Polypodium* spp. (Polypody), *Pleopeltis* spp. (Lance Ferns), *Asplenium rutifolium* (Carrot Fern) and the delicate filmy fern, *Trichomanes pyxidiferum* var. *melanotrichum.* The only flowering plant epiphytes seem to be *Peperomia* spp. and the orchid *Polystachya ottoniana.*

Climbers are fairly frequent and help knit together a rather open canopy. Woody climbers are represented by *Secamone alpinii* (Monkey Rope), *Rhoicissus revoilii* (Revoil's Wild Grape) and *R. Tridentata* (Wild Grape). The first two have stems up to 100mm thick and climb to the tops of the tallest trees. Herbaceous climbers are also present and these are almost the same as described for the forest margin. Important stragglers are *Rubus pinnatus* (Forest Bramble) and *Scutia myrtina* (Cat-thorn).

This account of Drakensberg forest would not be complete without mention of *(Thamnocalamus tessellatus* (Drakensberg Bamboo), the only indigenous bamboo in South Africa. The Drakensberg Bamboo occurs in dense clumps along streams, below waterfalls and on forest margins.

Subalpine belt

The subalpine belt extends from the edge of the Little 'Berg to just below the summit of the Drakensberg.

Grasslands

(i) *Themeda triandra* grassland

As in the montane belt, the vegetation of the subalpine belt consists mainly of grassland, chiefly *T. triandra* grassland. On the warmer and drier slopes *T. triandra* grassland extends from the top of the lowermost basalt cliffs to about 2 600m and on the cooler and moister slopes it reaches 2 140 m. Above 2 600m on warmer and drier slopes it mixes with Temperate Grassland and ultimately Alpine Grassland.

Between 1 830 and 2 140m the grassland is fairly uniform in composition and cover. *Themeda triandra* is dominant with a basal cover of up to c. 50% and immediately subordinate to it are four grasses, namely *Trachypogon spicatus* (Giant Spear Grass), *Tristachya leucothrix* (Red Seed Grass), *Harpochloa falx* and *Heteropogon contortus* which flowers in autumn *en masse*, appears (deceptively) dominant. Other grasses often present are *Alloteropsis semialata* subsp. *semialata* (Blackseed Grass), *Elionurus muticus* (Wire Lemongrass), *Rendlia altera, Panicum* spp. (Panics), *Monocymbium ceresiiforme* (Wild Oatgrass), *Andropogon appendiculatus* (Bluestem) and *Loudetia*

simplex. An important feature of this grassland in pasture terms is that it is sour (hence the name Highveld Sourveld) and therefore unpalatable to stock during winter.

Associated herbs are numerous. The main flush of herbs appears in spring. These include *Acalypha wilmsii, A. schinzii* , *Cyrtanthus breviflorus* (Wild Crocus, one of the first plants to appear after fire), *Hypoxis* spp., *Pentanisia prunelloides* (Wild Verbena), *Ledebouria cooperi, Oxalis obliquifolia, Kohautia amatymbica, Eriosema kraussianum, Helichrysum aureonitens* (Golden Everlasting), *H. acutatum, Senecio glaberrimus, Aster perfoliatus, Aster perfoliatus* (Grey-leaved Aster), *A.pleiocephalus, Watsonia lepida* (Elegant Watsonia) and *Zaluzianskya microsiphon* (Short-tubed Drumstick).

Summer is characterized by the appearance of orchids - species such as *Satyrium longicauda* (Long-tailed Trewwa), *Disa versicolor* (Apple Blossom Orchid), *Eulophia foliosa, E. Clavicornis* (Mauve Pixie), *Disperis* spp. (Granny Bonnets) and *Habenaria* spp. Other herbs include *Helichrysum allioides, Vernonia hirsuta* (Wild Heliotrope), *Haplocarpha scaposa, Dierama latifolium* (Broad-leaved Harebell) and *Sopubia cana,* plus many others.

Few herbs appear in autumn. The list includes *Erica woodii, E. oatesii, Crassula vaginata* subsp. *vaginata, Helichrysum adenocarpum* (Pink Everlasting), several other *Helichrysum* spp. and *Wahlenbergia* spp.

Between 2 135 and 2 590m, *T. triandra* grassland takes on new associates. *Eucomis humilis* (Lowly Pineapple Flower) and *Urginea macrocentra* (Natal Slangkop) form conspicuous communities at the foot of basalt cliffs. Other species are: *Kniphofia porphyrantha* (Highveld Poker), *Aloe ecklonis, Dierama dracomontanum* (Drakensberg Harebell), *Sutera breviflora, Agapanthus campanulatus* subsp. *patens* and *Pimpinella caffra* (Mountain Saxifrage).

(ii) *Rendlia altera* grassland

This short grassland is found between 1 980 and 2 440m on the ridges of spurs on the Little 'Berg. The soil is thin, black, peaty, often covered with small stones and occasionally interrupted by basalt outcrops. The dominant is *Rendlia altera*, supported by *Sporobolus centrifugus* (Olive Dropseed), *Eragrostis capensis* (Heartseed Lovegrass), *E. racemosa* (Narrow-heart Lovegrass), *Diheteropogon filifolius, Panicum ecklonii* (Ecklon's Panic), *Bulbostylis humilis* and herbs such as *Rhodohypoxis baurii* and *Wurmbea kraussii.*

(iii) Temperate grasslands

Temperate Grasslands are dominated by three species belonging to temperate genera, namely *Festuca costata* (Tussock Fescue), *Pentaschistis tysonii* and *Bromus firmior* (Strong Brome). These grasses are characterized by being evergreen.

(a) *Festuca costata* grassland
This grassland occurs in moist situations in the lower part of the subalpine belt, e.g. streambanks and the south side of hills and in both moist and dry situations in the upper part. Its altitudinal distribution is 1 830-2 865m. *Festuca costata* is a tall tussock-forming, summer-flowering grass with flat leaves up to 600mm long and culms 1200m m high. The tussocks are

usually separated by shorter grasses like *T. triandra*, *Koeleria capensis* (June Grass), *Poa binata* (Mountain Bluegrass), *Agrostis barbuligera*, etc. Associated herbs are numerous and well represented in this grassland.

(b) *Pentaschistis tysonii* grassland
This grassland, covering fairly large areas, occurs between 1 980 and 2 290m on moist slopes and between 2 590 and 2 870m on dry slopes. *Pentaschistis tysonii* is summer-flowering and has tightly rolled leaves about 300 mm high. Associates are comparatively few.

(c) *Bromus firmior* grassland
This grassland has a similar distribution to *Festuca costata* grassland, but does not appear to be as extensive. *Bromus firmior* is a broad-leaved grass with leaves up to 300 mm long and culms up to 1,2m high.

(iv) *Themeda triandra* - Temperate grassland

Above about 2 600m on dry slopes, as already indicated, *Themeda triandra* Grassland occurs in varying proportions with Temperate Grasslands.

With increase in altitude, certain constituents of both grassland types become more important and others are added. Between 2 500 and 2 740m *Aristida monticola* (Mountain Bristlegrass), much dwarfed in stature, assumes greater importance and in parts is even locally dominant. Also prominent are the grasses *Koeleria capensis*, *Trachypogon spicatus*, *Tristachya leucothrix*, *Eragrostis racemosa*, *Anthoxanthum ecklonii* (Sweet Vernal Grass) and *Pentaschistis aurea* subsp. *pilosogluma* (Giant Pentaschistis). Herbs present include *Senecio haygarthii*, *Berkheya macrophala* (Large-headed 'Thistle'), *Helichrysum drakensbergense*, *Selago monticola*, *Bupleurum mundii* and *Tetraria cuspidata*.

Above 2 740m, *Merxmuellera disticha* (Copper Wire Grass), *Festuca caprina* (Goat-beard Grass) and *Pentaschistis oreodoxa* (Mountain Glory), the dominant grasses of the alpine belt, enter the picture. *Koeleria capensis*, *Harpochloa falx* and *Eragrostis caesia* (Pangrass) become more prominent and are accompanied by *Festuca scabra*, *F. killickii* and *Merxmuellera aureocephala*. Other plants characteristic of this region are *Guthriea capensis* (Hidden Flower), *Erica alopecurus*, *Diascia anastrepta* (Up-turned Twinspur), *Fumaria officinalis* (Fumitory), *Lobelia* spp., *Eucomis humilis*, *Moraea alticola* (near streams), *Senecio macrospermus* and *Nerine bowdenii*.

(v) Tall grassland

This grassland includes those grass communities dominated by tall grasses.

(a) *Miscanthus capensis* grassland
This community is found on streambanks, moist flats and in gullies below 1 980m. On the Little 'Berg it covers areas up to 2 hectares in extent. The dominant is *Miscanthus capensis* (East Coast Broom Grass), up to 2,4m tall. The majority of the associated plants are tall herbs and shrubs, many very attractive and many belonging to the families Asteraceae and Lamiaceae: *Leonotis ocymifolia* var. *raineriana*, *Rabdosiella calycina* (Spur Flower), *Stachys albiflora*, *Pycnostachys reticulata* (Blue Soldier Salvia), *Satureja repens*, *Schistostephium crataegifolium*, *Nidorella auriculata*,

Heteromma decurrens, Vernonia hirsuta (Wild Heliotrope) and *Helichrysum* spp. (Everlastings), *Inulanthera calva, Gunnera perpensa* (Wild Rhubarb), *Kniphofia linearifolia, Anemone fanniniae, Geranium pulchrum* and *Afrotysonia glochidiata.*

(b) *Hyparrhenia* grassland
As for (a) above, but with *Hyparrhenia dregeana* dominant and occupying very much smaller areas.

(c) *Cymbopogon validus* grassland
As for (a) above, but with *Cymbopogon validus* dominant and occupying much smaller areas up to 2 745m.

Bracken Veld

Bracken Veld is found on moist, deep soil up to 2 135m. Associated with *Pteridium aquilinum* are *Rubus ludwigii* subsp. *spatiosus* (Ludwig's Ample Bramble), *Rabdosiella calycina* (Spur Flower), *Helichrysum cooperi* and tall herbs such as *Agrotysonia glochidiata, Lessertia perennans* (Popping Pea) and *Senecio isatideus* (Dan's Cabbage).

Protea savannah

Protea savannah, dominated by *Protea caffra* and *P. roupelliae* is very limited in extent on the Little 'Berg and is generally restricted to hills and the stony ridges of spurs up to 2 135m where there is some protection from fire.

Streambank Communities

The three major communities fringing streams are the *Merxmuellera macowanii* community, *Cliffortia linearifolia* scrub and *Leucosidea sericea* scrub.

(i) *Merxmuellera macowanii* community
This community is found on approximately level streambanks between 1 830 and 2 285m. *Merxmuellera macowanii* is a grass with stiff leaves up to 750mm long and culms1200mm long and forms large tussocks, some nearly 600mm in diameter. The grass is very conspicuous when in flower in summer, showing up yellow against the adjacent grasslands. Associated species include *Geranium* spp., *Gunnera perpensa* (Wild Rhubarb), *Alepidea amatymbica* (Staf-flowered Kalmoes), *Berkheya macrocephala* (Large-headed 'Thistle'), *Galium wittbergense*, etc.

(ii) *Cliffortia linearifolia* scrub
Cliffortia linearifolia scrub occurs in deep stream gullies between 1 950 and 2 250m. *Cliffortia linearifolia* is the dominant shrub and *Philippia evansii* is frequently subdominant. Associated shrubs include *Myrsine africana* (Small Cape Myrtle), *Anthospermum monticola, Phygelius aequalis* (Riverbell) and *Diospyros austro-africana* var. *rubriflora* (Firesticks). Characteristic herbs are as given under (i) above, plus *Cephalaria natalensis, Valeriana capensis* (Cape Valerian), *Mysotis sylvatic* (Wild Forget-me-not), *Berkheya multijuga* (Spiny Berg 'Thistle') and *Cycnium racemosum* (Christmas Flower). *Cyathea dregei* (Common tree fern) also occurs in this shrub at varying intervals along streams and also in sinkholes.

(iii) *Leucosidea sericea* scrub

Leucosidea sericea (Old Wood) is a montane belt element which forms scrub in sheltered situations such as streambanks and deep gullies on the Little 'Berg up to 2 040m. Associates are *Buddleja salviifolia* (Sagewood, often forming a parallel type of scrub in drier area), *Rhus dentata* (Nana-berry), *Rhamnus prinoides* (Dogwood), *Olinia emarginata* (Transvaal Hard Pear), *Halleria lucida* and *Ilex mitis* (Cape Holly).

Outcrop Vegetation

(i) Horizontal Outcrop communities

Horizontal bare-rock areas occur along the top edge of the lowermost basalt cliffs, above and adjacent to waterfalls, scattered through grassland and on the ridges of spurs.

Characteristic of horizontal (and vertical) bare rock areas, are vegetation mats, sometimes extensive in area. Low-growing mosses and the creeping fern *Selaginella imbricata* are followed by the grasses *Styppeiochloa gynoglossa*, and *Aristida junciformis* subsp. *galpinii* and the succulent *Crassula dependens.* Associated with these species is *Ledebouria cooperi, Rhodohypoxis baurii, Oxalis obliquifolia, Psammotropha myriantha*, several species of *Eragrostis* amongst others.

Scattered through grassland, often in the form of low humps, are areas supporting small stones and little soil. The dominants are the grasses *Loudetia simplex*, *Diheteropogon filifolius* and *Panicum natalense* (Natal Panic). *Loudetia simplex* gives the community a grey, brown-topped (russet) colour in late January and *Diheteropogon filifolius* imparts a red colour in spring.

Here and there on the Little 'Berg are hills of varying size, the summits of which rarely exceed 1 950m. The hill support a mixed vegetation consisting of *Protea caffra*, *P. roupelliae*, *Halleria lucida*, *Rubus ludwigii* subsp. *spatiosus* (Ludwig's Ample Bramble), *Cliffortia repens,* grasses and many rock-loving herbs.

The ridges of spurs above 2 400m, which are exposed to strong winds, support a low-growing vegetation. Dwarf shrubs are represented by *Passerina montana, Erica thodei, E. frigida* and *E. dykei* which form low cushions or carpets up to 150 mm high, *Buchenroedera lotononoides* (Grey-leaf Bush), *Polygala myrtifolia, Gnidia compacta*, a prostrate species with masses of small, yellow flowers, *Muraltia saxicola* and *Cliffortia spathulata.* In addition, there are grey-woody species of *Helichrysum* (Everlastings), rosette plants, grasses (sour, temperate, tunic and 'tall') and many herb species.

(ii) Vertical Outcrop communities

These outcrops occur on the flanks of long spurs leading to the main escarpment and on the buttress slopes of the main escarpment. The outcrops are often arranged in horizontal tiers interrupted at intervals by grassland. Sometimes the outcrops take the form of cliffs.

The most important plants contributing to mat formation on vertical cliffs are the crevice plants *Scirpus falsus, Xerophyta viscosa* and *Styppeiochloa gynoglossa,*

Scirpus falsus, a sedge about 100mm high, readily invades moist mass mats and forms dense carpets. *Xerophyta viscosa*, belonging to the Velloziaceae, covers very large areas of moist or dry rock surfaces, often accompanied by a rather dwarfed *Cymbopogon validus*. *Styppeiochloa gynoglossa* is restricted to dry cliffs below 2 640m. Other common crevice or ledge plants are *Scilla natalensis*, *Galtonia regalis* (Royal Berg Lily), *Eucomis humilis*, *Berkheya rosulata* (Rosette Thistle), *Helichrysum* spp. and various grass species.

Subalpine Fynbos

Fynbos is the climax community of the subalpine belt. Because of recurrent grass fires, it is limited in extent, occurring in situations providing some protection from fire. The most extensive and best developed stands of fynbos are to be found on steep valley and escarpment slopes at the head of the main rivers.

The community consists of shrubs between 0,9 and 3m tall, the majority of which are evergreen, though some may be deciduous. Most of the constituents have small leaves which are heath-like, elliptic or linear, variously leathery and glossy or grey-woolly. The vegetation is similar in external features to that found in the south-western Cape. The density of fynbos varies considerably - from shrubs scattered in grassland to an almost impenetrable tangled mass of vegetation. Dominant species include *Passerina drakensbergensis, Philippia evansii* and the conifer *Widdringtonia nodiflora* (Mountain Cypress), *Erica ebracteata, Buchenroedera lotononoides, Anthospermum monticola, Rhus discolor* (Grassveld Currant), *Protea dracomontana* (Drakensberg Dwarf Sugarbush), *P. subvestita* (Lip-flower Sugarbush), *Syncolostemon macranthus, Melianthus villosus* (Honey Flower), *Encephalartos ghellinckii* (Drakensberg Cycad) and many others. Several species are conspicuous in the Sani Pass, namely the yellow-flowered, summer-flowering *Euryops tysonii*, the blue and yellow-flowered *Lotononis trisegmentata* var. *robusta*, the yellow-flowered, autumn-flowering *Gymnopentzia bifurcata* and *Erica algida*.

Alpine belt

The vegetation of the alpine belt consists of climax heath communities, limited in extent, dominated chiefly by low, woody species of *Erica* and *Helichrysum* interspersed with extensive grasslands dominated by species of *Merxmuellera, Festuca* and *Pentaschistis*. In addition, there are aquatic, hygrophilous and lithophilous communities varying in extent. The summit vegetation along the whole length of the Drakensberg is remarkably homogeneous.

The vegetation reflects the severity of the alpine climate: it is treeless, consisting predominantly of short grassland; most of the plants exhibit xeromorphic features of some kind and the vegetation could be called tundra. The heath constituents are evergreen dwarf shrubs with small, ericoid, filiform or linear leaves. Some have hard and more or less glossy leaves, whereas others have softer, grey-woolly leaves. Cushion plants are common as are perennial rosette plants.

Aquatic and Hygrophilous Vegetation

On the undulating summit area of the Drakensberg there are numerous bogs and streams which form the headwaters of the river systems. The communities of bogs and streams will be considered separately.

(i) Bog communities

The bogs of the Drakensberg area are of two types: the first type, limited in area, is found in seepage areas or flushes on mountain slopes; the second occurs on fairly level areas in the riverheads, where rather extensive swampy areas containing hummocks (small mounds) or thufur are formed. Both types are peat-producing. The bogs often show up conspicuously as low, green carpets of vegetation.

(ii) Pool communities

Permanent pools on the summit are rare, but temporary ones are common in summer. Aquatics present are *Aponogeton junceus* (Wateruintjie), the alga *Nitella dregeana, Limosella capensis* (Slangbos), *Lagarosiphon muscoides* (Barbel Grass) and *Crassula inanis.* Growing around the edge of these pools are *Ranunculus meyeri, R. baurii, Senecio cryptolanatus, Utricularia* spp. (Bladderworts), *Eriocaulon dregei, Poa binata* and *Kniphofia caulescens.* An aquatic which occurs in pools in the Clarens Sandstone on the summit at Sehlabathebe National Park in Lesotho but at only c. 2 400m and therefore not strictly in the alpine belt is *Aponogeton ranunculiflorus*, an attractive white-flowered floating aquatic.

(iii) Semi-aquatic communities

These communities are found on moist to wet soil in a variety of habitats such as hummocks, level areas and mud-patches. Mosses make up the matrix of these carpets or sponges which are invaded by a large number of higher plants. The latter include the sedge *Scirpus diabolicus, Crassula vaillantii, Limosella longiflora, Limosella capensis* (Slangbos) frequently among small stones, the minute grass *Agrostis subulifolia, Ranunculus meyeri, R. multifidus* (Buttercup Flower), *Haplocarpha nervosa* (a yellow-flowered rosette plant often dominant and imparting a shiny green colour to the bogs), *Lobelia galpinii, Cotula paludosa, Trifolium burchellianum* (Wild Clover), *Rhodohypoxis rubella, Senecio cryptolanatus, Aster eruciformis, Felicia uliginosa, Geranium magniflorum, Moraea alticola, Cerastium capense, Kniphofia caulescens, Athrixia fontana* and many others.

On drier but firm soil, usually at the edge of bogs, is sedge meadow. The constituent plants form a close continuous turf 50-100 mm high. Sedges such as *Carex monotropa, C killickii, Schoenoxiphium filiforme, S sparteum* and almost any of the subaquatics mentioned above make up sedge meadow.

(iv) Streambank communities

Streams on the summit flow either into Lesotho or into Natal, depending upon the aspect of the catchment. They are small, clear and frequently littered with grey boulders. The principal communities are formed by *Merxmuellera drakensbergensis* (Broom Grass), *Senecio achillaefolius, S cryptolanatus, S quathlambanus, Erica alopecurus, E. thodei, Moraea alticola* and *Kniphofia caulescens,* etc. Also important is *Scirpus ficiniodes,* a tall thick-stemmed sedge about 1m high.

Outcrop Vegetation

(i) Horizontal Outcrop communities

Horizontal basalt outcrops are fairly extensive in the Alpine Belt: they are usually found along the edge of the escarpment, adjacent streams and on the summit of high peaks - exposed as slabs of pavements, boulders or as a litter of small stones. The pioneers are lichens and mosses, of which there are many species. *Merxmuellera stereophylla,* a very tufted grass, is probably the most important higher plant, forming communities on basalt. A dwarf form of *Scirpus falsus* also occupies fairly extensive areas, usually rather moister than *Merxmuellera stereophylla.* Three semi-woody plants which form cushions on rock surfaces are *Euryops decumbens* (Decumbent Resin Bush), *Helichrysum retortoides* and *Muraltia saxicola.* Other plants include *Felicia drakensbergensis, Lotononis galpinii, Clutia nana* and species of *Helichrysum* (Everlastings), *Zaluzianskya, Craterocapsa, Ursinia, Crassula* and *Delosperma.*

(ii) Cliff communities

The basalt cliffs of the main escarpment up to 460m in parts present a variety of rock habitats - sheer faces, crevices, pockets, ledges, overhangs and moist areas near waterfalls. Owing to the inaccessibility of these cliffs, it is not possible to present an adequate picture of the cliff vegetation.

Much of the rock surface is bare, but a considerable portion is covered with alpine grassland and occasionally alpine heath. Species common on cliffs are *Merxmuellera stereophylla, Xerophyta viscosa, Helichrysum montanum, H. aureum* var. *scopulosum, H. pagophilum* and in moist sheltered situations *Ranunculus baurii, Galtonia regalis, Kniphofia albomontana* and the attractive red-flowered *Gladiolus flanaganii* (Suicide Gladiolus), so-called because of the sometimes inaccessible habitats it occupies.

Small cliffs on the summit support *Merxmuellera stereophylla, Helichrysum milfordiae, H. pagophilum, Wahlenbergia pulvillus-gigantea* and *Psammotropha alternifolia.* At their base are distinct communities formed by *Kniphofia northiae, K. ritualis, Cyrtanthus flanaganii* (Yellow Dobo Lily), *Zaluzianskya ovata* and *Z. turitella* (Drumsticks) usually mixed with alpine grasses.

Overhangs, usually damp and shaded, contain their own characteristic flora - plants such as mosses, *Helichrysum milfordiae* which forms extensive carpets, *Crassula setulosa* var. *curta, C. dependens, Ranunculus meyeri, Zaluzianskya* spp. and the fern *Woodsia montevidensis* var. *burgessiana.*

Alpine Grassland

The grassland on the summit of the Drakensberg is irregular in structure: in parts it is low, even and turf-like, whereas in others it is fairly tall, uneven and open. Everywhere it is interrupted by mud-patches and areas littered with small stones. The dominants are three grasses belonging to temperate genera, namely *Merxmeullera disticha* (Copper Wire Grass), *Festuca caprina* and *Pentaschistis oreodoxa,* occurring in pure or mixed communities. There seem to be two forms of each of these species - a tallish form and a short form with recurved leaves. All three grasses are tufted, xeromorphic and become dormant during the winter months.

Grass associates are *Koeleria capensis*, several species of *Merxmuellera, Festuca* and *Pentaschistis, Harpochloa falx* (sometimes wide-leaved and prostrate), *Poa binata*, *Eragrostis caesia*, *Deschampsia caespitosa* (Tufted Hairgrass) and rather rarely, *T. triandra*. *Themeda. triandra*, however, is frequently dominant where the summit drops in height.

Overgrazed areas are occupied by the grasses *Karroochloa purpurea* (Hare Grass), an invader from the Karoo, *Catalepis gracilis* (Gause Grass) and the rarer *Polevansia rigida.* The most aggressive shrub invader is *Chrysocoma ciliata*. In 1938 Staples and Hudson estimated that it covered 13% of the mountain area of Lesotho. No recent surveys of this species extent have been carried out. Accompanying the alpine grasses are numerous associated herbs. Summer to early autumn is the period of maximum profusion of alpine herbs. In spring and late autumn there is very little in flower and in winter practically nothing. *Moraea alticola* is perhaps the most striking plant on the summit in summer, forming very dense communities. *Euryops evansii* is the tallest plant in the alpine belt, sometimes attaining a height of 1,8m. In winter after a heavy snowfall, it is frequently the only plant visible above the snow. *Berkheya multijuga*, is common in moist parts of the grassland, likewise the red and yellow-flowered *Kniphofia caulescens.* During January and February orchids are a prominent feature of the flora. They include *Disa fragrans* which, as its name implies, has a strong sweet scent which pervades the summit air when in full flower, *Satyrium neglectum* (Overlooked Trewwa), *Brownleea macroceras* and *Monadenia basutorum.* Communities of *Helichrysum* are common, the principal species being *H. flanaganii* and *H. odoratissumum*, both with a pungent smell when bruised, and *H. argentissimum*. Plants occurring casually without aggregating include *Dierama dracomontanum*, *Gladiolus longicollis* (Honey Flower), *Dianthus basuticus* subsp. *basuticus var. grandiflorus* (Large-flowered Lesotho Pink), *Lobelia preslii* and many others.

Alpine Heath

This is the climax community of the Drakensberg. Because of the predominance of the genera *Erica* and *Helichrysum*, it is called *Erica-Helichrysum* heath. The community consists of dwarf evergreen shrubs 150-600mm high. But for fire, heathland would probably occupy greater areas of the summit; parts of the summit support no heaths at all. There are five distinct heath communities.

(i) *Erica dominans* heath

This is the most extensive of the heath communities and the dominant is *Erica dominans*, 50-450mm high with minute leathery, closely adpressed leaves. The plant has an olive green appearance and small pink to purple flowers.

(ii) *Erica-Helichrysum* heath

This is a common community usually found above 3 200 m. The dominants are *Erica dominans* and *Helichrysum trilineatum* (Alpine Everlasting) with smooth or grey-woolly leaves.

(iii) *Erica glaphyra* heath

Erica glaphyra forms a pure type of heath on broken promontories at the edge of the summit plateau. *Erica glaphyra* is darker green than *E. dominans* and has longer, erect leaves.

(iv) *Helichrysum - Passerine* heath

This heath is rather rare. The dominants are *Helichrysum trilineatum* and *Passerina montana.*

(v) Boulder-field heath

Several shrubs, 600 -1200mm high, form a tallish heath amongst boulders, often near streams. They include *Athanasia thodei, Helichrysum trilineatum, Eumorphia sericea* and grasses such as *Merxmuellera drakensbergensis* filling the intervening gaps.

2.2 Animals

Zoogeographically, the 'Drakensberg falls into the East African Province of the Ethiopian Region. Refer to attached Annexure 3 for priority species lists.

2.3 Ecosystems including aquatic systems

The Montane and Sub-alpine grasslands are the major ecosystems of the 'Drakensberg. They cover about 272 000 ha (85%) of the 'Drakensberg and extend almost uninterrupted along the full length of the escarpment. *Podocarpus* forest, fynbos and scrub ecosystems form small islands within the *Themeda* grasslands (mainly in the valleys), and together with the *Erica-Helichrysum* Alphine heathland and aquatic ecosystems, cover the remaining 48 000 ha (15%).
The aquatic ecosystems comprise the catchments of various rivers.

The landscapes and ecosystems represented within the 'Drakensberg are detailed below:

1) Rivers and Streams

The sediment content in these ecosystems is normally very low, with excellent light penetration and a high oxygen content. Algae is not abundant and other water plants are generally absent. Productivity is low and the main source of energy and nutrients is the plant and animal debris from adjacent ecosystems. The abundance and diversity of indigenous fish is low. Consumers are mostly detritivores and omnivores.

2) Tarn lakes

These lakes vary from shallow seasonal pans to large permanent pools up to 2 m deep. The bottoms are usually covered with silt and a thin layer of plant detritus. The abiotic factors of these lakes are similar to those of shallow water bodies elsewhere. Small reed beds, vleis and marshy ground are often found alongside tarns and these support a diversity of small organisms.

3) Evergreen forest and scrub

The climate in this ecosystem is mild in comparison to the others. Water is plentiful, humidity is high and evaporation is low. The soils are relatively deep and fertile and productivity is comparatively high. The main consumers are the tiny invertebrates, insectivorous birds, Forest Shrew and Woodland Doormouse. Since montane valley scrub is generally intermediate between forest and grassland, species of both these ecosystems may be present.

4) Drakensberg fynbos

Very shallow soils, low temperatures and fire are the limiting factors of this ecosystem. Insects tend to dominate the primary consumer levels which in turn support lizards, shrews and birds (chats, cisticolas, rockjumpers and rock thrushes). Omnivores include the Woodland Doormouse and Striped Mouse. Final consumers include raptors and probably mongoose.

5) Protea savannah or woodland

This ecosystem is similar to the grassland and is limited by hard, shallow, infertile soils and fire. Malachite sunbirds and Gurney's sugarbird seem to be the important pollinating agents of proteas and aloes. Small mammals are generally absent.

6) Montane grassland

This ecosystem is limited by fire, frost and infertile soils. Productivity in grassland is limited and carrying capacity varies from moderate in summer to very low in winter. Most of the large herbivores and other consumers occur within this ecosystem.

7) Sub-alpine grassland

This ecosystem is subject to lower temperatures, humidity and insolation, higher evaporation, heavier frost and more frequent snow than the above grassland and is physiographically more varied. Productivity and carrying capacity is low and the abundance and diversity of animals is limited.

8) Alpine grassland and *Erica-Helichrysum* Heath

This ecosystem is subject to a harsh climate. The growing season is short and the vegetation stunted. The ecosystem supports numerous wetlands which are important habitats for plants, invertebrates and amphibians. Most of the consumers are either short lived (insects) or are summer migrants (birds and larger mammals). Resident mammals include the Klipspringer, Sloggett's Rat and the Common Mole Rat.

2.4 Ecosystem processes

The most important medium to long term ecosystem processes responsible for the maintenance and functioning of the 'Drakensberg as a natural/semi-natural system are:

- Soil genesis, erosion and deposition
- Plant recruitment, growth, death, herbivory, defoliation, competition, immigration, emigration and succession.
- Animal birth, death, growth, predation, immigration, emigration, competition and facilitation.

3. Socio-political Context

3.1 Current land tenure or use of adjacent areas

Land tenure adjacent to the Drakensberg Park on the South African side varies between private freehold and communal ownership. On the Lesotho side, the land is owned by communities.
The land adjacent to the Drakensberg Park is used in a variety of ways which vary from informal agriculture, rural settlement, formal agriculture and commercial tourism.

3.2 & 3.3 Cultural and Archaeological context

Cultural resources, both archaeological and historical, occur in every section of the Drakensberg Park. Cultural resources are those natural and modified features of the landscape associated with human activity, both past and present. These include archaeological sites and artefacts, structures and buildings, rock art, ancestral graves, and sites to which oral histories are attached. These resources are critical to understanding and interpreting southern African colonial and pre-colonial history. They are fragile and may be destroyed easily unless properly managed. The material evidence of past human activities is both finite and non-renewable, and once lost, these resources cannot be recovered.

The cultural resources of the Drakensberg Park are many and varied, and include archaeological remains that may be more than 100 000 years old. Rock paintings constitute the most ubiquitous and visible cultural resource of the Drakensberg - the Drakensberg Park alone contains 550 known painted sites, with some 35 000 individual images. These paintings are a unique record of the history of southern Africa's hunter-gatherers (also called Bushmen or San).

The Cultural Resource Management Plan is attached as Annexure 4.

3.4 Historical context

The Drakensberg region ranks as one of the most important archaeological areas in southern Africa. Archaeological sites from the Early, Middle and Late Stone Ages, and the Late Iron Age are present indicating that the period of human occupation in this mountainous region possibly extends over the last million years. Important Middle Stone Age sites are, for example, found in the eastern Free State province and eastern Lesotho. Several of these sites have been excavated and they have yielded important information relating to hunter-gatherer occupation during the last 100 000 years. Investigations of Late Stone Age sites have been widespread and have focused on rock shelters in the Drakensberg, Lesotho, and eastern Free State.

Although the first evidence of human occupation of the Drakensberg dates from the Middle Stone Age and may go back 20 000 years or more (Mazel,1982), it was the Late Stone Age people, particularly the San (Bushman), who inhabited the area and survived there until more recent historical times. The San were hunter-gatherers who occupied the many caves and rock shelters, many of which were adorned with their paintings. Their numbers were small, probably never more than a few hundred, and therefore they had little impact on the vegetation or wildlife populations of the area (Wright, 1971).

The immigration of Iron Age people into the foothill areas east of the main escarpment may possibly date from the 1200's, or even slightly earlier, however by the late 1600's there were African cattle-herding people living in permanent settlements in areas adjacent to the northern and central Drakensberg region. The people living in the area to the north were known as the Zizi and to the south the Tholo people. Although early relations between these people and the San appear to have been reasonably harmonious, their conflicting interests gradually forced the San to retreat to higher areas which they had probably until then occupied only on a seasonal basis. From 1816, under the leadership of Shaka, the rise of Zulu military power in Zululand far to the north-east brought an end to peace in the region as successive waves of refugees displaced by the Zulu army (impis) settled towards the Drakensberg, in turn attacking those already there.

At the time of the arrival of the first white settlers (Voortrekkers) in late 1837 large areas in the Drakensberg and adjacent country to the east appeared to be virtually uninhabited apart from the San and a few surviving fugitive groups (Irwin and Irwin, 1992). Some of these people settled in the foothill areas where they established farms on land where good grazing for cattle was present. Many turned to sheep farming after 1855 following severe outbreaks of bovine lung disease and this was to continue on a large scale until the 1930's. These settlers hunted the game animals and significantly reduced their numbers. This was to bring them in conflict with the San who also hunted over these areas. These people made no distinction between wild and domestic animals, and the San would raid the stock of farmers, who would retaliate by pursuing them in an attempt to recover their animals. Usually the San were overtaken and a battle ensued and the men were invariably shot. The farmers complained to the Natal Colonial authorities and in 1847 a military post was established in an attempt to control, what was deemed by the colonists to be stock theft but to the San was their means for survival in this harsh environment. The raids continued and the Natal Government attempted to check stock theft from white owned farms by settling tribal-speaking people in areas along the Drakensberg in an effort to seal off the approaches used by San raiders. By 1865 this human barricade had been completed and was successful in ensuring an immediate and organised pursuit of the San raiders and the stolen animals by farmers, military and native levies who were often tracked high up into the mountains. By 1870 the raids had almost ceased, the last recorded being in 1872 in the upper Pollela area. Counter measures were swift and five San were killed and four taken prisoner. In 1871 the last of the Lesotho San were destroyed and it is generally accepted that by 1875 the San people were extinct in the Drakensberg.

Descriptions of the Drakensberg and the naming of landscape features by explorers occurred intermitantly from 1835 when Captain A.F. Gardener was the first to journey into the area, and later by the missionaries A.T. Arbousset and M.F. Daumas in 1836, also Major Grantham in 1861, J.S. Dobie 1863, J.E. Fannin 1873 and Colonel A.W. Durnford in 1874 following the Langalibalele affair. The first recorded

climbs were undertaken by A.H. and F.R. Stocker in 1887 and these were described and published together with a map of a section of the Drakensberg from Mont-aux-Sources and the Tugela Falls to Giant's Castle in which a relatively large number of features were named. Such exploration and description led to further settlement of the area. In 1884 surveying of the boundaries of farms commenced, and the properties put up for sale by the Colonial Government. Although some of these farms were well into the river valleys of the Drakensberg, the highest occupational and agricultural level was about 1675m; beyond was too extreme for farming, though stock certainly grazed the upper slopes and spurs of the mountain.

4. Economic Context

The Drakensberg Park is a tourist destination and of economic importance regionally, nationally and internationally.

The attraction of the Park and its outstanding qualities and features is of significance to the neighbouring hospitality industry along the length of the Park.

The Resource Economist will submit a comprehensive summary of the economic context of the Drakensberg Park which will be inserted in due course.

GET WRITEUP FROM RESOURCE ECONOMIST.

PART C

VISION AND OBJECTIVES

1. Purpose and Significance of Area

The Park is the largest protected area established on the Great Escarpment of the southern African subcontinent. This escarpment formation, which includes the Drakensberg Escarpment component, is intimately linked to the geomorphic history of the subcontinent and the fragmentation of the Gondwana supercontinent. Landscapes are outstanding and the geomorphological processes by which they were formed are believed to be of universal importance, that is, the horizontal sequence of geological formations which form the exposed east face of the Drakensberg Escarpment record a ~130 Ma history in the evolution of the African continent before and after the breakup. The Great Escarpment reaches its greatest and most spectacular expression in the form of the Drakensberg Mountains that lie within the Park. Also of outstanding universal importance are the mountain and wetland ecosystems with their full complement of plants and animals with many endemic and internationally recognised threatened species, and including the high altitude and unique Southern African alpine-tundra vegetation and its associated endemic palaeo-invertebrates.

In addition to these natural property values, and located within its original natural setting and ecosystems is one of the world's greatest rock art treasures that is of outstanding cultural value. The art represents uniquely a coherent tradition that embodies the beliefs and cosmology of a single people now extinct in the region. The uniqueness of the art is evidenced by the diverse subject matter, the minute detail portrayed, the art techniques, and the animation and variety of positions depicted, as well as the remarkable state of preservation.

1.1 Comparative Analysis

The Drakensberg Park contains the most outstanding expression of the escarpment mountain formation within the southern African Great Escarpment. The natural systems within the Park are considered to be unique in terms of their biological diversity given its location within one of the major hot-spot areas of plant diversity and endemism in southern African. Of universal importance is the inclusion of the unique high altitude alpine tundra vegetation with its associated endemic palaeo-invertebrate fauna.

There are several important areas in southern Africa that contain significant concentrations and assemblages of San rock art sites such as those that are to be found in the Cederberg in the South-western Cape province and the Matopo Hills in Zimbabwe. However, no other area of comparable size to that of the Park in Africa contains such a density and possibly diversity of San rock art sites and images. In addition, the rock art of the Drakensberg region is regarded as being the best preserved when compared to any other region especially south of the Sahara.

1.2 Integrity

The Park contains its full original complement of wild plants and animals, much of which has been lost from other adjoining areas within the south-eastern escarpment mountain region of southern Africa. This natural area with its geological diversity and altitudinal range, its grasslands, wetlands and fynbos plant communities with high numbers of endemic species, is substantially unmodified by people and their effects. Having a total area of 242 813 ha, the Park is large enough to survive as a natural area, and to maintain genetic diversity even though there are outside influences. Management of the Park, particularly over the last fifty years, demonstrates that the natural environmental quality of the area has been maintained and improved.

2. Protected Area Classification, and International Status

In terms of Government Gazette of 9 May Notice 449 of 1994 the Drakensberg Park (242 813ha) is classified as a Category II National Park and Equivalent Reserves (Wahl and Naude, 1996).
In terms of Government Gazette of 9 May Notice 449 of 1994 the Wilderness Areas of the Drakensberg Park (117 300ha) namely (Mlambonja, Mdedelelo, Mkhomazi and Mzimkhulu) are classified as Category I Scientific Reserves and Wilderness Areas.

The Drakensberg Park is a proclaimed RAMSAR site (1997). An application is in preparation for World Heritage Site status. Blanket protection for the Drakensberg Park as an archaeological monument is envisaged.

3. Vision For The Area

The vision for the Drakensberg Park is:

- To maximise the water production and maintain its high quality through sound management practises.
- To maintain the rich biodiversity of the montane ecosystem.
- To ensure that the Drakensberg Park makes an indispensable contribution to the wellbeing of the sub-regions' people through collaborative partnerships with neighbouring communities and continuous and sustainable contributions to the regional economy.
- To establish a Transfrontier Park with Lesotho and to ensure that land use practises are compatible with sustained utilisation of natural resources.
- To promote the conservation and public appreciation of archaeological resources and historical resources.
- To provide a wide range of ecotourism opportunities compatible with nature conservation principles.
- To ensure the integrity of the proclaimed wilderness areas.
- To provide opportunities for appropriate education and research.
- To pursue partnerships in conservation compatible development.
- To promote the sustainable and equitable use of wildlife resources.
- To ensure that the Drakensberg Park retains its status for continued inclusion in international conventions i.e RAMSAR site, World Heritage Site.

4. Management Philosophy and Principles

The philosophy is to apply adaptive management through a participatory, team approach including partnerships with external interested and affected parties.

The principle of sustainable use of natural resources is implicit in the philosophy.

5. Objectives

5.1 Overall protected area objectives

The overall objectives of the Drakensberg Park are:

(i) Maintain and/or re-instate the ecological processes which are considered the main determinants of ecosystem structure and function. In particular, the function of sustained water production must be paramount.
- Where these processes or regulatory mechanisms have been disrupted and cannot be re-instated, management should attempt to simulate their effects.
- Otherwise, management intervention in the system should be minimised.

(ii) Minimise the rate of species extinction that results from the direct activities of man.

(iii) Maintain and/or re-establish viable populations of species indigenous to the reserve.

(iv) Preserve the integrity and wild character of the environment.
- Retain wild character in all zones, which range from wilderness to developed areas within intensive use zones, by developing in sympathy with the natural environment.

(v) Preserve geological, palaeotological, archaeological and historical sites.

(vi) Encourage non-consumptive uses of the natural resources of the Park such as tourism and outdoor recreation (leisure activities).

(vii) Encourage low-key utilization of natural products, provided this is sustainable and does not jeopardise the attainment of objectives dealing with the conservation of ecological processes and species, and protection of environmental quality.
- This implies the promotion of appropriate research and monitoring and the provision and regulation of education, interpretation and leisure activities based on the natural environment.

<u>Note:</u> Reserves are established based on the assumption that they are of value to society. They must be used in order to demonstrate this value. The "hidden" values of maintenance of ecological processes, sustainable use and long term preservation of genetic diversity, must be clarified and popularised by research and publicity. Consumptive uses which do not jeopardise the objectives dealing with the maintenance of ecological processes, or with the survival of the species, may be permitted, and their use publicised.

(viii) Make contributions to national and regional programmes for nature and environmental conservation, education and interpretation, leisure activities and opportunities, and for economic growth. Promote the integration of park

objectives into the structure plan for the sub-region. Promote also the development of compatible land-uses, as well as development for leisure activities in appropriate zones and nodes, on private and tribal land in the peripheries. Ensure that development projects are planned and implemented within set limits.

Note: The Drakensberg Park has the potential to generate substantial benefits for the people resident in areas adjacent to the Drakensberg Park. Development and land-uses in the peripheries should be guided and controlled in such a way that the benefits are optimized, but the development and land-use activities do not impinge on the integrity of the Drakensberg Park and its natural systems.

(ix) Promote both the maintenance of good relations with neighbouring communities and organizations, as well as programmes to project Drakensberg Park objectives and benefits.

5.2 Specific protected area objectives

See area specific management plans which will be read in conjunction with this overall Drakensberg Park plan.

6. Ecological and Social Importance Zonation

The Planning Division has done considerable work on an integrated development and zonation plan. This plan will be inserted as soon as it is available.

7. Principal Threats to the Protected Area

- Poor management.
- Inadequate funding to effectively manage the Drakensberg Park.
- Alien plant invasion.
- Loss of conservation land.
- Land claims.
- Poor management of natural resources adjacent to the Drakensberg Park.
- Illegal harvesting of natural resources within the Drakensberg Park.
- Catchment degradation disrupting natural ecological processes.
- Inappropriate mass action affecting tourism.

PART D

MANAGEMENT TO CONSERVE BIODIVERSITY

1. Acquisition of Protected Areas

1.1 Principles and policies for acquisition of protected areas

To ensure that all land in the Drakensberg Park and Maluti Mountain ranges is managed correctly as a principal water catchment area in southern Africa.

1.2 Objectives

1.2.1 Protected area

To acquire, for conservation purposes, all land above the physiographic boundary along the Drakensberg Park range.

1.2.2 Cooperative management systems

To investigate the establishment of cooperative management systems in cases where land cannot be acquired and/or to ensure that the land is managed in such a way that conservation is taken into account.

1.3 Priority areas for acquisition

Farms in the Swartberg area, south of Bushmans Nek, as listed in Land Acquisition List (Annexure 1).

1.4 Threats to areas identified for acquisition

Inappropriate land use such as:

(i) Afforestation
(ii) Overgrazing
(iii) Development incompatible with conservation principles

1.5 Management options/actions

(i) Purchase
(ii) Expropriate
(iii) Cooperative management
(iv) Prescriptive management
(v) No action.

1.6 Monitoring/review

Reviewing will be undertaken on an ongoing basis as new information or strategies are implemented.

1.7 Inventory/Research

Refer to Annexure 1 for the Land Acquisition list.

MANAGEMENT OF THE PHYSICAL ENVIRONMENT

2. Soils/substrates

2.1 Principles and policies for soil/substrate management

- Minimise all forms of man induced soil disturbance including compaction.
- Identify erosion which has resulted (directly or indirectly) from soil disturbance by man and apply appropriate management action.
- Identify and attend to erosion which is threatening rare habitats, unique and valuable features.
- It should be noted that the Drakensberg landscape is under continuous transformation from natural erosion processes. This includes landslides and slumping and is quite acceptable.

2.2 Objectives

- To ensure that the natural geomorphological functions of erosion and deposition are maintained.
- To identify the erosion which has resulted directly or indirectly from soil disturbance by man and to assess management options.
- To minimise all forms of man induced soil disturbance.
- To identify and where appropriate attend to erosion which is threatening rare, unique and valuable features.

2.2.1 Reclamation

Objectives

(i) To effectively control soil loss from areas identified in the policy above.

Management Options/Actions

(i) Map all areas of accelerated soil loss.
(ii) Place the areas mapped above in priority order for management attention.
(iii) Each project will be numbered, costed and documented on the appropriate form and field in the Officer-in-Charge's (OiC) office.

Annually

(a) OiC to inspect all previously completed reclamation work by the end of March. Each structure is rated for urgency of attention based on criteria listed on the inspection sheet and graded according to the following scale:

A- structure endangered. Needs maintenance within financial year.
B- damage to structure observed. To be attended to on completion of all A structures or within two years.
C- no work required.

(b) New soil erosion areas are graded as follows:

A- erosion threatens infrastructure or rare habitat or species.
B- serious erosion but not threatening the above.

(c) Annual work priorities are then established according to the following guidelines:

- A grade structures
- A grade new work
- B grade structures
- B grade new work

(d) Based on the annual priority listing, monthly goals will be set at monthly reserve meetings.

(e) Advice regarding the maintenance, surveying and construction of new structures can be sought from the Regional Ecologist and appropriate officer in the soil reclamation section, Department Of Agriculture (Cedara). Reference can also be made to NCS Soil Erosion and Reclamation course notes and the NCS technical manual.

2.2.2 Dredging and quarrying

Objectives

(i) To reclaim abandoned quarries.
(ii) Identify sources of quarry from outside the protected area boundaries, and explore means by which this material may be acquired.

Management Options/Actions

(i) Existing and new quarry sources are to be mapped and quality of quarry at each site to be assessed.
(ii) Quarry reclamation needs are placed in priority order. Cost and method of reclamation are ascertained.

Note: Implementation of reclamation is the direct responsibility of the OiC who will ensure it is placed on the work schedule for their station. This will be confirmed at the biannual management meeting.

Acquisition of quarry material

It is contrary to the soil conservation policy to create quarries within the reserve and every effort should be made to acquire quarry outside the reserve. In the event of the absence of such sources, or subsequent to a cost benefit analysis indicating the non-viability of obtaining quarry from outside

sources, general guidelines for the creation of quarries within the reserve are as follows:

The site should be:

a) Situated so that visual impact is minimal
b) Opened in such a way that erosion from the site and the effect on local water table, rare community, habitat, plants, animals or archaeological deposit is minimised.
c) Evaluation of quarry material must be undertaken before site is opened.
d) No new quarries are to be opened in the reserve unless preceded by an environmental impact assessment by the Regional Ecologist and the decision to open such a quarry is passed at a management meeting and approved by the Chief Conservator Drakensberg.
e) Where a quarry is opened, all topsoil must be stored for use in reclamation when the quarry is closed.

2.3 Threats to soils/substrates

(i) Soil disturbance by man
- roads, tracks and footpaths
- building sites
- quarries
- mining
- fencing.

(ii) Accelerated erosion resulting from management actions
- Concentrated runoff from the structures listed in i) above
- Vegetation removal/defoliation orientated in the direction of water flow, e.g. fence line maintenance on slopes and in drainage lines, etc.
- Accelerated runoff due to management actions e.g. annual boundary firebreak burning on the foothills of the Drakensberg.

2.4 Soil/substrate priorities

Soil is the foundation upon which all life depends. In the Drakensberg soils are at their most fragile and vulnerable, and therefore require extremely careful management with a minimum of physical disturbance.

Erosion and deposition are natural processes that should be allowed to proceed. Management practises should therefore be limited to the control/mitigation of impacts arising from development and restorative actions where ecological functioning has been disrupted.
The maintenance of roads, tracks and footpaths in a state that minimises their impact on the surrounding hydrology, soils and biota.

2.5 Soil/substrate management options/actions

Footpaths and tracks - all paths and tracks to be assessed annually and problem areas prioritised and mapped. Sequence of action to be planned and table at annual management meeting.

Note: All drains and water barriers are to be repaired and cleared annually at the beginning of the rain season.

2.6 Soils/substrates monitoring/review

New erosion sites discovered are to be assessed in association with Regional Ecologist Drakensberg and if they require management, recommendations and costs are to be placed on management meeting agenda.

Existing structures should be re-inspected at a frequency which is reserve and structure specific.

2.7 Soils/substrates inventory/Research

Research is needed on the soils of the basalt landscapes in the Drakensberg and Maluti Mountains.

3. Hydrology / Aquatic Systems

3.1 Principles and policies for aquatic systems management

To maintain natural water bodies in such a condition so as to support the naturally occurring species linked to such bodies. To build, maintain and manage artificial impoundments only when such is necessary to fulfil the primary objective, or when such may not be legally removed. Manipulation of water supplies must have the fullest ecological considerations and where possible, structures erected must blend with surroundings.

3.2 Objectives for aquatic systems management

To reinstate or maintain the natural ecological process of the aquatic systems occurring on the Drakensberg Park.

3.3 Threats to aquatic systems

3.3.1 Water pollution

(i) Effluent from sewage treatment plants
(ii) Leachate from waste disposal sites and septic tanks
(iii) Runoff carrying faeces from heavily used camping areas.

3.3.2 Water flow

Inappropriate impoundment of or extraction from rivers and streams within the Drakensberg Park.

3.4 Priority aquatic systems

The Drakensberg Park is a RAMSAR site and all aquatic systems rate as priority systems.

Note: specific priorities to be recorded at station levels

3.5 Options/actions for the management of aquatic systems

(i) To ensure that sewage treatment works function correctly and that effluent complies with the special standards prescribed by the Water Act 50 of 1956, as amended.

(ii) Ensure that all hikers are made aware of appropriate toilet behaviour.

3.6 Monitoring/review of aquatic systems

Water quality tests to be carried out regularly in streams at sites downstream of sewage effluent outlet points.

3.7 Inventory/Research on aquatic systems

There is a need for research to identify key organisms which could indicate water quality in the Drakensberg Park.

MANAGEMENT OF BIOLOGICAL COMPONENTS

4. Vegetation

4.1 Principles and policies for vegetation management

The maintenance of vigorous vegetation cover will ensure the continued production of high quality water from the Drakensberg Park.

4.2 Vegetation management objectives

The guiding objectives for managing indigenous vegetation are:

(i) To maintain the indigenous plant species richness and community diversity.

(ii) To provide adequate protection to those communities important for the maintenance of hydrological processes.

4.3 Threats to vegetation

- Inappropriate application of fire.
- Alien plant infestations.
- Unsustainable utilisation.
- Genetic pollution.

4.4 Vegetation priorities

Woody communities are susceptible to inappropriate application of fire. Burning must be done in such a way as not to adversely affect forest margins.

4.5 Vegetation management options/actions

4.5.1 Fire management

FIRE MANAGEMENT PLAN FOR THE DRAKENSBERG PARK

Introduction

The application and management of fire in the Drakensberg area of kwaZulu-Natal has been a contentious matter for decades. Various state-of-the-art principles have been applied by land users, ranging from the San hunter-gatherers through settler pastoralists to present-day conservationists. In recent times, it has been argued that agricultural prescriptions do not meet the needs of biodiversity conservation and opinion has been divided on the best management options. This management plan is intended to synthesise current thinking and to function as a guide to the application of fire in the Drakensberg Park at the end of the twentieth century.

History

In discussion about the "correct" application of fire in the Drakensberg Park the question of "natural" fire regimes always crops up. Some argue that under a "natural" regime woody plant communities would be more widespread than they are at present and some even say that the Drakensberg was covered in montane forest, with today's patches being remnants of the former distribution. In the absence of man, the only natural source of fire is lightning (with a slight chance of falling rocks causing sparks which might ignite very dry plant material). Today, lightning strikes are very common in the Drakensberg. According to our records, though, very few veld fires are started by lightning and most of these are extinguished by the rain which usually accompanies thunder storms. What happened in the distant past is a matter of conjecture and is irrelevant under today's circumstances.

Of more relevance is anthropogenic, or man-made, fire. It is known that man has had the use of fire in southern Africa for over 100 000 year and that San people were living in the Drakensberg from about 2 000 years ago until early this century. The San were hunter-gatherers and it is thought that they used fire to burn off dry grass and stimulate the growth of fresh green material to attract animals to suitable killing grounds. Even this is conjecture and it is certainly not known how frequent or widespread the burning may have been.

More recently, tribal cattle herders moved into the Drakensberg area. There can be no doubt that their use of fire was more prevalent than that of the San and it is very likely that they would have applied some fire in autumn to promote a green flush to carry their cattle though winter. Again, in the absence of any records, this cannot be substantiated.

White settlers began to move into the Drakensberg area in the late nineteenth century, bringing with them herds of cattle and sheep. Given the low carrying capacity of the highland sourveld in winter, it was common practise to promote green growth by burning in autumn and it is likely that larger areas than ever were burned in this way as time went on.

Giant's Castle Game Reserve was proclaimed in 1903 and emphasis then was to conserve eland and other antelope. Potential predators were killed on sight

and widespread autumn burning was practised to provide winter feed for the antelope and for the cattle and horses which were kept there by the staff.

The above should not be taken as a suggestion that autumn was the only season in which burning was carried out. As the grass became drier in winter it is almost certain that fire was applied, accidentally or on purpose, and that larger areas would have burned. Spring burning, to remove moribund plant matter and stimulate an early flush, was also widely practised. The point is that it is likely that fire was applied over an extended season and that, relatively recently, the frequency of application and the extent of the fires is likely to have increased.

Research

Research on burning in the Drakensberg area has had a strong agricultural bias and is almost entirely concentrated on the grassland component of the vegetation. There is very little knowledge of the impact of fire on animal life, particularly invertebrates. A list of relevant references is included in the bibliography.

In essence, research results indicate that "ideal" species composition and grass vigour are maintained by spring burning at regular intervals, usually taken to be biennial. Small mammal populations and species richness are also favoured by regular burning and both start to decline after about three years without fire. Ground-nesting birds are similarly affected. Small antelope are adversely affected by the "winter bottleneck", whereby perennial grasses lose their palatability and nutritional value in winter, and are favoured by an early (autumn) burn which stimulates new growth just before grass dormancy. Many woody plant species are not fire tolerant and excessively frequent "hot" fires may eliminate whole communities. Insect fauna associated with *Protea* communities are adversely affected by frequent burning.

In response to the grassland research the Conservation of Agricultural Resources Act makes provision for regulations governing veld burning in various biomes in South Africa. For the Cool Moist Grasslands, in which the Drakensberg Park falls, the regulations permit burning only in the months of August and September.

Present philosophy

Prior to the publication of the agricultural regulations, burning in the portions of the Drakensberg managed by the then NCS was carried out at all times of the year. There was a period when early (autumn) burning was favoured in order to stimulate fresh grass growth for winter feed and to reduce damage to woody plant communities. Analysis of what records are available indicate that this practise was not applied in isolation of other burning periods and that fires occurred throughout the dry season. Following the publication of research findings, there was a shift to later burning, with emphasis on spring burns. Fire frequency was generally annual or biennial and long intervals between burns were unusual.

More recently it has been argued that strict compliance with the regulations

of the Conservation of Agricultural Resources Act is unlikely to facilitate achievement of our objective to conserve biodiversity in the Drakensberg Park. This has been discussed formally with a wide range of experts and it is generally agreed that burning at any time when perennial grasses are dormant is acceptable. Burning when grasses are in active growth is less acceptable, but a limited amount of early (pre-frost, autumn) burning to achieve specific objectives and provided it is not repeated successively in the same area will be permitted under strict control. It has also been agreed that the frequency of burning, generally every two years, has perhaps been excessive and that some variability should be applied to cater for plants and animals that are less fire tolerant.

Four watchwords and one guideline word have been coined. These are:

variability
responsibility
flexibility
patchiness

- Variability
  It is argued that restriction of burning to August and September only, as prescribed under regulations supported by the Conservation of Agricultural Resources Act, cannot be "natural" and that this restriction is unlikely to facilitate the long-term conservation of biodiversity. Here we recommend **variability**, the objective being to apply fire at different times and intervals rather than monotonously.

- Responsibility
  Accepting, though, that the agricultural prescription is based on good research and that burning outside of the prescribed period, particularly when grasses are not dormant, may have detrimental effects on water production, the **responsibility** watchword must apply. While occasional burns before frost induces dormancy may be justifiable for a number of reasons, frequent or repetitive burning will not be permitted.

- Flexibility
  The agriculturally-based recommendations, which have been applied in recent years over much of the Drakensberg, include a biennial burning interval. Research into ground-nesting birds and small mammals supports this interval to a large extent, but make no allowance for short seasonal variation or longer cyclic variation. While a biennial system may well be the most practical to follow in most of the Drakensberg grasslands, this should not be done slavishly. Response to prevailing conditions and the likelihood of achieving burning objectives should introduce **flexibility** and enhance variability.

- Patchiness
  Most of the animals inhabiting the grasslands of the Drakensberg obtain their food and cover from the vegetation. Burning this deprives them of both of these and results in death of an unknown, but probably considerable, number of individuals. The more extensive the burn the greater its impact and the longer it will take to recolonise

from unburnt areas. The Drakensberg Park is divided into a large number of management compartments averaging about 500 hectares in size, each of which was to have been treated separately in earlier fire management plans. The objective was to produce a mosaic of burnt and unburnt areas which would have mitigated against the impact of large burnt areas. Under today's practical and financial constraints application of this system is impossible and much larger areas are treated as single compartments. The guideline word here is **patchiness**; "clean" burns covering hundreds of hectares should be avoided and the aim should be to leave refuge sites in the burnt areas. Patchiness is more likely to be achieved by a "cool" burn than a "hot" one. Cool burns are more likely when humidity is high, wind speed is low and the ground is moist.

The patchiness principle applies to plant communities as well. Burning in the Drakensberg is done simply to defoliate grasslands and remove moribund material which would otherwise accumulate, with various detrimental implications. While grasslands make up the bulk of the area, there are a number of other plant communities, some of which are extremely vulnerable to damage by fire. The compartment system was designed to separate these and allow for specific treatment of different plant communities. This is still possible on a larger scale, but is more difficult to control. Again, a patchy burn, with vulnerable communities treated sympathetically, is preferable to a "clean" burn here.

Given the watchwords, how can our objectives be achieved ? First, we must be clear about the objective. Each OiC should be familiar with all his burning compartments. He should know what animal and plant communities are present and he should be quite clear about what sort of burn he wishes to achieve. While the season has a very strong bearing on fire behaviour and on the likelihood of achieving specific objectives, prevailing conditions on the day (or night) of the burn are probably more important. The principle of variability may be achieved by varying both the season and the conditions under which a burn is carried out.

Specific information on each fire management unit (referred to as compartments, even if several smaller compartments have been amalgamated for management purposes) is provided in section management plans. Only generic principles will be covered in this plan.

Fire Management Application

Firebreaks

Firebreaks are essential to prevent fire spreading into areas which are not scheduled for burning. Firebreak preparation begins in March/April with the spraying with Gramoxone of trace lines demarcating the outer limits. These are burnt as soon as the grass becomes desiccated (and must be done before adjacent grass dries out) and burning of the firebreaks must, by law, be completed by the end of June.

Non-negotiable firebreaks are those protecting boundaries of the Park (from both invasive fires from outside and fires from within which may threaten neighbours' farms or installations and which could result in expensive litigation), installations within the Park, and special management areas or sites. All boundary breaks must be the subject of a legally binding agreement with the relevant neighbour and the effort and cost of burning the break must be shared. The OiC of the section must be present at the burning of all boundary breaks and those protecting major Park infrastructure, such as camps. Internal management firebreaks may vary from year to year depending on burning plans, but certain strategic breaks are likely to be permanent. The OiC should be present at the burning of any "difficult" internal breaks and on station when any other break is burnt.

Appropriate safety equipment must be provided to, and used by, all staff handling potentially dangerous chemicals or equipment.

Fire exclusion compartments

In these compartments fire will be excluded permanently. Firebreaks to protect these compartments must be treated as priority breaks and must be established early in the season. Any fire threatening or burning in such an area must be brought under control. In principle, fire exclusion areas are not favoured. They require special protection and are expensive to maintain. There are a small number of fire exclusion compartments in the Park, dating back in some cases over 30 years. These will be maintained as evidence or witness stands of plant succession in the absence of fire. Most of them have been monitored by fixed point photography only.

Infrequent burn compartments

This is a new concept which has developed in response to our lack of understanding of the dynamics of montane plant succession in the absence of fire, with our focus presently being on fynbos communities in particular. Based on knowledge of the Cape fynbos, the principle is that it is unlikely that these communities would evolve or be maintained in the Drakensberg under a biennial spring burn regime. Good examples of montane fynbos are found in areas naturally protected from frequent burning and the intention is to foster development and maintenance of such communities wherever naturally protected areas are found. These areas will be further protected by strategic firebreaks, but management will not extend much beyond this. We will not purposely burn these areas on a regular basis, but will review management after a number of years.

A number of infrequent burn compartments have been identified and more might be added in our quest for the promotion of biodiversity at the landscape scale. Management will be station and site specific and subject to review by the management committee, with expert assistance where necessary. In general, only lightning-induced fire will be tolerated and all other fire will be extinguished.

Grassland dominated compartments

Most of the Drakensberg Park consists of cool moist grasslands. At high altitudes and in cool, moist situations (*e.g.* south facing slopes) the dominant species is evergreen *Festuca costata*, while in the drier areas, which cover most of the Park, the dominant species are *Themeda triandra* and *Tristachya leucothrix* and these grasslands become dormant and dry in winter. Research has shown that the latter grasslands are maintained in good condition by biennial burning in the dormant period, with spring burning being favoured, but that less frequent burning may be better for the evergreen communities. No definitive research has been done on the grassland communities as a whole (*i.e.* to include non grass plant species and the suite of animals associated with the grasslands) and our intuitive fear is that application of the agriculturally prescribed burning regime may be detrimental to some components. Accordingly, the recommended treatment is to use the biennial frequency as a yardstick, but to vary this and to aim for a patchy rather than clean burn in order to leave refuge sites for some biota. By choosing conditions which favour a patchy burn (cool, moist, not windy, following snow, *etc.*) variability will be further enhanced in the larger compartments by differences in fire behaviour associated with topography and local wind and moisture conditions.

Woody plant community dominated compartments

The distribution of major woody communities in the Drakensberg Park has been mapped. Some woody communities are more susceptible to fire damage than others and there are many examples of severe damage which has taken place in recent years. It is suspected that the frequency and extent of burning has increased in the last century and that this has had a significant impact on some woody communities, leading in some places to complete disappearance and in others to transformation from woodland to scrub.

In general, fire management in compartments with significant susceptible woody communities should aim at minimising adverse impacts. This will be achieved by the application of "cool" fires, which will be associated with season and with prevailing weather conditions. In the past many compartments containing woody plant communities have been subjected to mainly pre-frost (autumn) burns and this has certainly reduced fire damage to these communities and, in particular, to forest margins. Repeated pre-frost burning does, however, have a detrimental impact on grass species composition and basal cover and the consequences of this are in direct conflict with our primary objective. Compartments with significant woody plant communities are identified at section level and fire management options are detailed in the section management plan.

Compartments containing sensitive features

Compartments which contain sites or features which might warrant very specific fire management are identified in section management plans. Such sites include rock art in close proximity to dense vegetation (especially tall grass), animal breeding sites (such as wattled crane nest sites in densely vegetated wetlands), historical sites, and particularly susceptible plant communities. Management may involve fire exclusion or careful application

and this will vary from site to site. All sensitive sites must be described and fire management prescriptions detailed in section management plans.

Burning season

In the past a number of burning seasons were identified. These were summer (no burning permitted), autumn, winter, and spring. While these seasons were associated with certain months, weather is the critical component and this and the month will in future be used to indicate when a burn is or was applied. Coupled with this is the growth state of the grass plants which make up the bulk of the vegetation of the Drakensberg. In principle, grass plants should not be burnt when they are in an active state of growth. They suffer no harm from fire when they are dormant. Grass dormancy is initiated by the onset of frost and broken when ground temperatures remain above freezing. Growth is not initiated by spring rain but by mobilisation of food reserves stored in the grass roots. In respect to perennial grass plant conservation, it is acceptable to burn at any time between the onset of frost and the advent of warmer weather at the end of winter. It is acceptable to carry out limited burning before frost sets in, but only for specific reasons and not repetitively in the same area. It is also acceptable to carry out burns soon after the initiation of spring growth, but not into the rainy season.

Early burns will be called **pre-frost burns** until such time as frost sets. This may vary from year to year so the burns will be specifically identified by the date of the burn. All other burns will be called **post-frost burns** and will also be identified by the date.

It must be noted that the impact of the fire in this instance is described in terms of the grass plant. The impact of the fire on the grassland is quite different. The grassland includes all plants and animals, as well as non-living components, such as plant litter and soil. The impact of fire on a grassland is much more difficult to quantify or qualify. Our objectives are to maintain the water supply coming from the mountains and to conserve biodiversity in the mountains. Both may be compromised by injudicious application of fire. For example, a very "hot" fire applied at the driest time of the year (say July) will burn off all plant litter, leaving the soil exposed to insolation and wind for several weeks before plant growth resumes. This could result in soil loss, capping, and reduced infiltration, as well as rendering large areas totally inhospitable to a range of large and small animals. Repeated fires like this could destroy certain plant and animal species and make them at least locally extinct. Hence the rationale behind varying the season of burn.

Burning interval

Research carried out on grass communities and on some small mammals and some ground-nesting birds indicates a burn every second year as the most beneficial. This is also a manageable interval, in that grass growth and accumulation of moribund material is not excessive. However, it is highly unlikely that all the plants and animals in a grassland community evolved under such a regular regime and some variability is indicated. This will require careful planning at station level and a degree of flexibility to cater for non-scheduled burns and fluctuations in weather conditions. Variable burning intervals from one to five years are quite acceptable and the aim should be

to achieve a mosaic of different aged grassland. The principle of patchiness within a single burning compartment, if successfully applied, may well achieve this.

Operational planning

At the end of the fire season the OiC must begin planning for the next season. Compartments scheduled for burning must be identified and entered into the station register and map. As the rainy season progresses it may be necessary to revise plans in response to rainfall and grass growth. Final plans must be presented at the management meeting at the beginning of the year.

Before burning is implemented the OiC must carry out a physical inspection of compartments scheduled for burning. This is to make quite certain there are no reasons to postpone any burns or to implement special management measures. The objectives of the burn must be clear to all concerned and the conditions required and burning strategy must be clear.

As many decision aids as possible must be used to ensure that the burn goes according to plan. Weather conditions should be watched and use made of all forecast sources (television, radio, long-range telephonic forecasts and barometer readings). Cold fronts are common in winter; these usually originate south of Cape Town and sweep north and north-eastwards across the subcontinent. They are invariably preceded by strong 'Berg winds which make burning particularly hazardous and are often followed by rain or snow which should be prerequisites for any winter burns. The Lowveld Fire Danger Rating System should be used before any fire is started. This is a simple system which provides added confidence in decision making and is a required part of the fire data sheet record.

Training

It is essential that staff at all levels understand why they are doing things and how to do them. Training in fire management should be an ongoing task of the OiC, both in the form of informal talking and formal training sessions or courses. Formal training needs must be identified at the subregional level and appropriate courses organised through the Service Training Centre or private sources.

Information management

Fire management in the Drakensberg Park must be properly documented in order to assess past impact and to aid in future decision making. Station management plans will contain detailed information on compartment-specific vegetation types, special features, objectives and fire management guidelines.

In addition to this, station-held records will include a fire register and accurate maps for each year's planned and actual burns.

Each fire event must be recorded on the Fire Data Sheet as it occurs. All data sheets for the year must be sent to the Regional Ecologist at the end of the fire season. The Regional Ecologist will develop and maintain a fire management Geographic Information System (GIS) which will contain as

much historical data as is available and which will be updated annually from current data sheets. This GIS will be used to analyse previous fire history, to aid in planning future fire management strategies and as a source of information and maps for various purposes.

See Figure 9 for fire compartment boundaries of the Drakensberg Park.

4.5.2 Management of indigenous priority vegetation components

Objective

(i) To identify and list those plant species which are rare or endangered in kwaZulu-Natal and/or South Africa and which are in need of special protection or conservation measures in order to maintain viable populations within the Drakensberg Park.

Management Options/Actions

(i) Identify rare or endangered species occurring in the Park.
(ii) Establish status and distribution of these populations and also whether they are viable.
(iii) If not, implement management that will ensure survival.

A provisional list is given in Annexure 5.

4.5.3 Control of alien plants

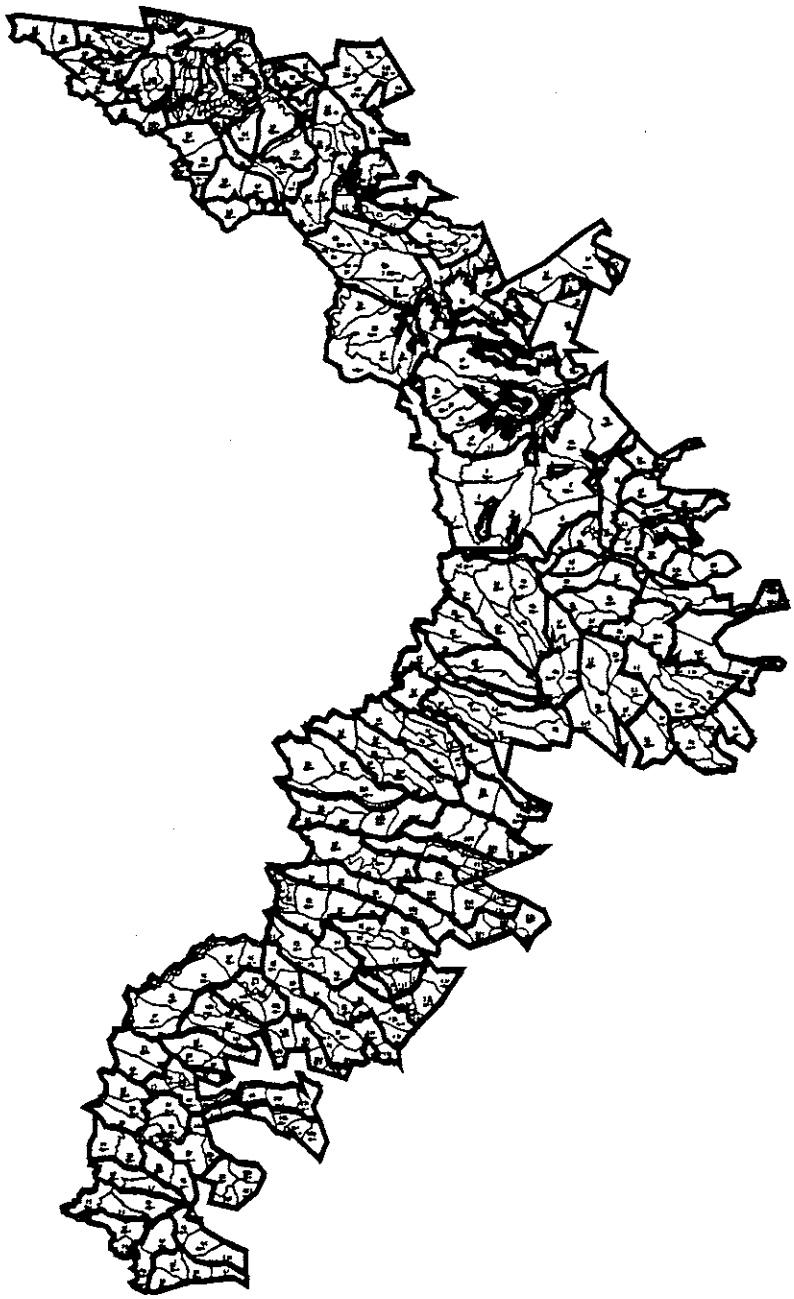
Objective

(i) To eradicate plants that are alien to the area and to prevent further infestations by alien plants known to occur in the Drakensberg Park.
(ii) OiC to produce a distribution map of priority alien plants in his area. This map will be updated at 4-yearly intervals.
(iii) Control goals and priorities will be set at the annual management meeting.
(iv) Reference should be made to the Technical Manual for appropriate control methods.
(v) Records of all alien plant control work must be kept, using the Alien Plant Control Data Sheet. Photographic monitoring should also be undertaken.
(vi) Follow-up work must take precedence over initial treatment.
(vii) No alien plant included in the Schedule of Declared Weeds or the list of plants banned in NCS areas may be planted anywhere in the Drakensberg Park (refer to Annexure 6).

4.5.4 Rehabilitation of degraded areas

Wherever possible plants indigenous to and obtained from the Drakensberg Park should be used in rehabilitation of degraded areas. Where this is not possible non-indigenous plants may only be used with the approval of the Management Committee.

FIGURE 9



Fire compartment boundaries of the Drakensberg Park

4.5.5 Introductions and re-establishment of plants

Re-establishment is indicated where indigenous plants have become extinct or are required for decorative purposes within intensive use zones.

Objective

(i) To re-establish indigenous plants where they have become extinct or are required for decorative purposes within intensive use zones.

Management Options/Actions

(i) Establish which plant species have become extinct from the area and whether suitable habitat still exists for their survival.
(ii) Locate a suitable source of plants for re-introduction, the most biologically suitable being the closest existing population to the planting site, or within 50 km radius of the planting site.
(iii) Once plants have been replanted, suitable protection must be provided until they have become established.

Introduction of locally indigenous plants are controlled by the above guidelines, which includes plants rescued from the road sides and other construction sites. All introductions are to be approved by the Management Committee.

Introduction of plants which are not locally indigenous (occur outside a 50 km radius of reserve's boundary) must be discouraged. If managers are unsure of a plant's status in this regard, the Regional Ecologist should be consulted prior to introduction.

4.5.6 Management of indigenous problem plants

The purpose of control is to institute action that will manage indigenous problem plants.

Objective

(i) To institute action that will manage indigenous problem plants.

Management Options/Actions

(i) Identify problem plants and cause of associated problem either proliferating or declining.
(ii) Examine control options for controlling proliferating species. Biological control options should be exhaustively pursued before mechanical means are resorted to. Chemical control of indigenous plants is not permitted unless unanimous approval has been attained at a management meeting.

4.6 Vegetation utilization

While attempting to ensure that resources are available for use by communities, the purpose of control is to regulate human use of indigenous vegetation to a level which

has no appreciable effect on the population dynamics of the species involved and the dynamics of other affected species, whereas the use of alien species would complement the programmes to control invasive alien plants.

It is necessary to:

- Identify users and needs in an equitable, accountable and transparent way.
- Determine resource availability.
- Identify and assess impacts.
- Ensure effective management of resource utilization.
- To put a value on the resource, the user pays principle must apply and to ensure use does not become a right.
- Immediate neighbours are to be given preference in utilisation of indigenous vegetation.
- No children should be allowed to work in return for harvesting.
- Harvesting must be monitored by a member of staff.

4.6.1 Utilisation of indigenous vegetation

Objectives

(i) To regulate human use of indigenous vegetation to a level which has no appreciable effect on the population dynamics of the species involved and the dynamics of other affected species.

Management Options/Actions

(i) Use of indigenous firewood is prohibited.
(ii) Prior to any permission being granted for the harvest of indigenous plants a survey of the available resource must be carried out.
(iii) The removal of indigenous vegetation must be environmentally and aesthetically acceptable to the Management Committee.

Agreements regarding utilisation

(i) In applying the user pays principle any agreement between the harvesters and the NCS must be recorded in writing by the OiC. In addition, the specific people allowed to harvest, the species permitted and the areas from which material can be taken must be documented.

Monitoring/review

(i) In the case of authorised removal of vegetation, the species and quantities removed must be measured and recorded.
(ii) After the harvesting season a survey of the impact on selected species should be carried out.

4.6.2 Utilisation of alien vegetation

Where it is possible alien vegetation should be made available to neighbouring communities. In principle access to this resource should only be allied to a structured control programme (see 4.5.3).

4.7 Vegetation monitoring/review

Vegetation monitoring in the Drakensberg Park is done mainly by fixed point photography.

Specific monitoring programmes are in place at Royal Natal and Cathedral Peak.

4.8 Vegetation inventory/research

See list of plants known in the Drakensberg Park in Annexure 7. Research is needed on the utilisation of indigenous plants, the impact of fire on certain species and communities, and on rehabilitation and restoration ecology.

5. Animals

5.1 Principles and policies for the management of animals

Re-establish and maintain an indigenous animal community of genetically viable populations in which the specificity of the gene pools is conserved. Where ecological processes and regulatory mechanisms are now no longer operative, management should re-instate these, or if this is not practically possible, simulate these processes. Apart from the latter, and within the constraints set by the vegetation policy, management input should be minimised.

5.2 Animal management objectives

The guiding objectives for managing the indigenous animal community are:

(i) Re-establish and maintain an indigenous animal community (the historical diversity) of genetically viable populations in which the specificity of the local gene pools is conserved.

(ii) Re-instate, or if this is not practically possible simulate through management those ecological processes and regulatory mechanisms which are now no longer operative.

(iii) Where appropriate allow the sustained harvest of faunal populations outside the Park provided this does not conflict with the primary objective of maintaining biological diversity. Apart from points ii) and iii) and within the constraints set by the vegetation policy, management inputs should be minimised.

5.3 Threats to animals

The major threat to the existing populations in the Park is illegal hunting.

Trout may pose a threat to indigenous aquatic animals.

5.4 Priority animals

Refer to Annexure 8 for priority animals.

This list should be regularly reviewed as more knowledge on the status and distribution of animals in the reserve becomes available.

5.5 Options/actions for management of animals

5.5.1 Large herbivore management

Objective

(i) Herbivore management is designed to assist the attainment of a dynamic equilibrium between vegetation and large herbivores.

Management options/actions

(i) Subject to research on the issue of eland ecology and population dynamics, it may be necessary to regulate numbers in relation to the carrying capacity of the Drakensberg Park.

5.5.2 Scavenger management

Not required for the Drakensberg Park.

5.5.3 Predator management

Not required for the Drakensberg Park.

5.5.4 Management of priority animals

Objective

(i) To identify and list those animal species which are rare or endangered in kwaZulu-Natal and/or South Africa and which are in need of special protection or conservation measures for the maintenance of genetically viable populations within the reserve.

Management Options/Actions

(i) A provisional list of rare and/or endangered species occurring in the Drakensberg Park is given in Annexure 8.
(ii) Where possible establish systems to monitor status of those species.
(iii) Establish whether these populations are viable.
(iv) If not, implement management that will ensure survival.

5.5.5 Introductions and re-establishment of animal species

Objective

(i) Where indigenous species have become extinct it is desirable to re-introduce these species provided that the habitat is available.

5.5.6 Control of alien animal species

Objective

(i) Management aims to destroy or remove from the Park all alien animals, other than authorised domestic pets and work animals.

Management Options/Actions

(i) Identify and list alien animals in the reserve.

Known animals at present include:
a) Domestic stock - impound or remove.
b) Feral dogs, cats and alien birds - to be shot on sight.

5.5.7 Problem animals

Objective

(i) To take appropriate action for the control of problem animals.

Management Options/Actions

(i) All reports by neighbours of problem animals emanating from the reserve will be investigated immediately.

In the case of eland, the usual action is for the District Conservation Officer to issue a permit to the affected party to hunt the animal/s. In the case of baboons, either NCS staff or the landowner will be authorised to take action. In the case of NCS staff action, authority to destroy any animal must be obtained from the regional Conservator. In the case of baboons, carcases should be offered for sale to organised local izinyanga groups. In the case of predators, staff will give advice on appropriate action.

5.6 Utilisation of animals

5.6.1 Use of animal products (e.g. horns, skins, shells) derived from management programmes

Dead removal of about five eland and ten blesbok is authorised annually as donations, hence any horns or skins are handled to best advantage by the Reserve OiC.

Problem baboons which are removed are offered to neighbouring Izinyanga for the muti trade.

5.6.2 Controlled hunting

No hunting is permitted in the Drakensberg Park.

5.7 Animal population monitoring/review

Current animal population monitoring in the Drakensberg Park seeks to:

(i) Quantify on an annual basis the absolute or relative trends of selected species;
(ii) Quantify other population parameters which will facilitate an understanding of the dynamics of these and other species.

Current programmes are:

(i) Annual aerial census of the eland population.
(ii) Annual age survey of the eland population.
(iii) Animal observation programme by Field Rangers in the whole Drakensberg Park in April, May and June.
(iv) Route counts of small antelope at Highmoor, Cobham and Royal Natal annually in April, May and June.

5.8 Animal species inventory/research

To be identified at management meetings.

PART E

COMMUNITY CONSERVATION PROGRAMMES

Introduction

The *Partners in Mountain Conservation* programme of the Drakensberg Park is an essential component of the management of the Drakensberg Park as the Park cannot survive without the support and participation of its stakeholders. It is thus essential that adequate consideration is given to this aspect of management by all staff.

1. Overall Objectives

The overall objective of the Drakensberg Park community conservation programme is:

To ensure that the opportunities and values / benefits of nature conservation in the Drakensberg Park can be harnessed by all communities, within a framework of environmentally, socially and economically self-sustaining community-based natural resource management.

The priority communities of the programme are:

(i) Neighbours of the Drakensberg Park (especially the previously disadvantaged neighbours)
(ii) Visitors to the Drakensberg Park
(iii) Staff of the Drakensberg Park.

2. Community Relations With Drakensberg Park Neighbours

2.1 Principles and policies for building community relations with protected area neighbours

The building and maintenance of relationships with the communities neighbouring upon the Drakensberg Park is a critical aspect of the *Partners in Mountain Conservation* Programme. Only through a sound relationship with communities can issues be negotiated and communicated to ensure that issues on both sides are understood and appreciated.

The relationship should be viewed as two-way educational and empowering process in which the NCS and neighbouring communities (in partnership with each other and with those able to assist them) assume the responsibility to address problems, needs and common issues, that they have collectively identified, through individual and collective action that includes adequate planning, management and evaluation.

<u>Principles</u>

a) Community participation in decision-making is essential.
b) The creation of self-reliance in communities and staff is critical.

c) The actions of community and NCS management should be transparent and accountable.
d) The use of power in relationships can distort them to become dependent or non-functional relationships
e) NCS staff must be adequately trained to conduct community conservation programmes.
f) Win-win solutions to problems and issues encountered are essential.
g) The interdependence of the Drakensberg Park and its neighbouring communities must be understood and appreciated by staff and communities.
h) Communities must be recognized as being heterogeneous by staff.
i) A relationship should be understood as a process that seeks to develop sustainable win-win solutions instead of dependency and handout situations.
j) The NCS should be seen as a catalyst and facilitator rather than a community development delivery agency.
k) Issues at a grassroots level need to be addressed.
l) Advantage gained from the NCS needs to be associated with the interdependence of the Drakensberg Park and the community and the fact that the NCS is a conservation agency.
m) NCS staff need to work as a team in order to achieve maximum effectiveness.
n) Periodic evaluation of the programme is critical.

The kwaZulu-Natal Nature Conservation Management Act and the NCS community conservation policy are applicable documents in this respect.

2.2 Objectives

The objectives of developing and maintaining a relationship with the neighbouring communities of the Drakensberg Park are:

a) To ensure that two-way communication occurs in order to achieve maximum understanding.
b) To ensure that communities are fully aware of and are able to participate in the management of the Drakensberg Park.
c) To ensure that the staff of the Drakensberg Park operate in a transparent manner and are accountable for their actions.
d) To ensure neighbouring communities derive maximum advantage from their with the NCS.

2.3 Determine/review priorities

It is essential that a working and trusting relationship with <u>every</u> neighbouring community is established and maintained.

Particular emphasis should be placed on the underprivileged neighbouring communities of Royal Natal; Cathedral Peak; Culfargie; Injasuti; Hillside; Witteberg; Kamberg, Loteni and Vergelegen. Consideration should also be given to the communities in Lesotho.

2.4 Identification of threats

Threats to the maintenance of relationships with neighbouring communities include:

a) Placing of staff that are untrained and/or have the wrong attitude towards communities.
b) Staff dealing with only the elite members of communities instead of the real representatives of communities. This includes dealing with AmaKhosi only and excluding other leaders such as Regional Councillors and youth leaders.
c) Failure of staff to act as a team in dealing with neighbouring communities as long-term relationships cannot be maintained when individual's running their own programmes are transferred or leave the NCS.
d) Failure of new staff to continue with existing initiatives and programmes (including adhering to set policy).
e) Changes in community leadership due to community conflict and power-struggles.
f) Failure to link with external agencies operating in communities in a partnership.
g) Practices aimed at achieving short-term win-lose advantage.

2.5 Management options/actions

2.5.1 Neighbour Liaison Forums

Communication at a grassroots level is critical in order to develop and maintain trust and relationships. The advent of Local Boards should not result in neighbour liaison forums being disbanded as local relationships are crucial to a successful neighbour relations programme. Local Board operate at a more macro-level.

Objectives

To establish and maintain communication and trust with neighbouring communities in order to act in partnership with those communities.

Management Options/Actions

Neighbour liaison forums must be established and maintained with every neighbouring community including farmers. The frequency of forum meetings will depend on the local context. More frequent meetings are recommended in order to maintain relationships and communication (as opposed to an annual meeting). Where a forum collapses, every effort possible should be made to ensure formal contact is established and maintained.

Monitoring/Review

(i) Minutes should be produced after every forum meeting and distributed to the neighbour relations team in order to ensure continuity of agreements and issues and for monitoring purposes.
(ii) The existence of forums and frequency of forum meetings should be monitored on an six-monthly basis (i.e. at every management meeting).

2.5.2 Formalise and honour commitments

Experience has shown that agreements are commonly concluded between neighbouring communities and the NCS. Where these agreements have not

been formalised, situations arise whereby the agreement is disputed in terms of process and/or products or else the arrival of a new officer-in-charge results in the agreement not being adhered to.

Objectives

To identify and formalise every commitment/agreement made with neighbouring communities to ensure continuity and accountability.

Management Options/Actions

(i) Every commitment and agreement must be formally recorded and signed by all parties concerned.
(ii) Station and supervisory staff should be made aware of the contents of these agreements.
(iii) Agreements must be cleared with senior NCS management prior to their being signed.

Monitoring/Review

(i) Every agreement must be included as an appendix in the management plan for that station.

2.5.3 Controlled free access for neighbours

Research has shown that many underprivileged communities feel they are excluded from visiting protected areas due to the apartheid past of South Africa or due to the cost of entering the Park. This action seeks to redress this situation.

Objectives

To waive entrance fees for immediate neighbours through formal control points on the production of a neighbour controlled free entry card issued by the NCS.

Management Options/Actions

(i) The neighbour controlled free access card can only be issued to a person who serves as a head of a family and who is permanently resident on property that neighbours a protected area or is a member of an *isigodi* (Induna area) bordering any protected area. Neighbour status can be accorded to special interest communities or influentials within the broader community. Excluded from the definition of a neighbour are hotel or other paying guests; time-share, share block and sectional title holders; lessees of property and any commercial enterprise including taxi operators and tourist agencies.
(ii) The card can be issued without a photograph if the holder thereof agrees to produce his/her identity document along with the card when entering the Drakensberg Park.
(iii) Every station should ensure neighbours are aware of the scheme and are able to apply for cards.
(iv) All staff should be informed of the scheme.

Monitoring/Review

(i) The number of controlled free access cards issued in any reporting period should be recorded in the station's annual report and the regional yearbook.

2.5.4 Open days/neighbour days

Objectives

To establish understanding and maintain communication and trust with neighbouring communities in order to act in partnership with those communities.

Management Options/Actions

(i) Open days must be run at least once annually on every station for community leaders and influentials from the local neighbouring community.
(ii) Guidelines on running open days are available from the Community Conservation Officer (Drakensberg).

Monitoring/Review

(i) The number of open days held and minutes therefrom should be recorded in the station's annual report and the regional yearbook.
(ii) Minutes from open days recording what was covered and discussed should be filed in the station neighbour relations file (E 21/1) and copies sent to the neighbour relations team.

2.5.5 Resolution of conflicts between the protected area and its neighbours

Objectives

To manage conflict situations so that a win-win solution is achieved.

Management Options/Actions

(i) Staff must be trained in conflict resolution and negotiation.
(ii) A conflict resolution strategy must be devised for the Drakensberg region to ensure appropriate reactions to conflict are embarked upon and to ensure the relevant persons are involved.
(iii) Local and regional staff should be kept informed of the NCS agenda in any situation and of progress.

Monitoring/Review

(i) Conflict situations must be analysed after the event to refine how the NCS reacts to the situation and in order to develop strategies to proactively prevent conflict.

2.5.6 Boundary and land issues

This is an extremely complex and often emotional issue that needs to be dealt with extremely carefully. The policy is that no area of the Drakensberg Park will not be given up and that the official boundaries of the Drakensberg Park will be maintained. Decisions as regards land and boundary issues can only be taken by the provincial and/or national parliaments. Staff may not negotiate issues without the expressed permission of the NCS executive.

Land claims may not be facilitated by staff as staff may open themselves up to accusations of bias when issues are not resolved to the satisfaction of the community concerned. All matters as regards claiming land should be referred to the Department of Land Affairs.

Objectives

To ensure that the integrity of the Drakensberg Park is maintained whilst addressing land and boundary issues within the fullest extent of the law.

Management Options/Actions

(i) Staff must be trained in conflict resolution and negotiation.
(ii) A conflict resolution strategy must be devised for the Drakensberg region to ensure appropriate reactions to conflict are embarked upon and to ensure the relevant persons are involved.
(iii) Local and regional staff should be kept informed of the NCS agenda in any situation and of progress.

Monitoring/Review

(i) Conflicts situations must be analysed after the event to refine how the NCS reacts to the situation and in order to develop strategies to proactively prevent conflict.

2.5.7 Sustainable use of wildlife resources in the protected area

Objectives

To ensure that natural resources made available for utilisation by neighbouring communities are utilised to the advantage of neighbouring communities sustainably.

Management Options/Actions

(i) Staff should identify which natural resources the poor members of the neighbouring communities require and determine if they can be harvested on a sustained yield basis. If there is no damage to the species a harvesting strategy is to be worked out.
(ii) The location of these resources must then be mapped.
(iii) The resources should then be assessed by the Regional Ecologist (Drakensberg) to determine the extent of the resource and what can be sustainably harvested. This information should then be conveyed to the CCD for permission to harvest.

(iv) Communities should then be informed of Permission to harvest in an open and transparent manner.

(v) Use should be made of the Controlled Free Access card to identify potential harvesters to ensure that access is made available to the members of neighbouring communities before other people. Where possible, the poorer members and women of the relevant neighbouring community should be granted priority access to the resources.

Monitoring/Review

(i) Harvesters should be controlled when on Drakensberg Park land to ensure no illegal harvesting occurs and to ensure that the set harvesting methods and amounts are adhered to.

(ii) Harvested amounts should be recorded in the station annual report.

(iii) The regional ecologist should monitor specific harvest sites on a long-term basis to develop an understanding of the impacts of harvesting.

2.5.8 Preferential employment

Preferential employment is an unconstitutional practice. The NCS thus walks a fine line between reserving jobs for neighbours and discriminating against job seekers.

Objective

To ensure that maximum economic advantage through employment is derived to as many underprivileged families in neighbouring communities of the Drakensberg Park as possible without compromising effective management practices and issues of constitutionality.

Management Options/Actions

(i) Staff should advertise employment opportunities in neighbouring communities.

(ii) Women and the poorer members of neighbouring communities should receive preferential consideration when employing staff or temporary as this will enable the NCS to make the biggest possible economic difference in the community that is possible.

(iii) Staff should be aware of the widespread practice of nepotism and favouritism especially in the advertising of posts. The goal of making the biggest economic impact in the community should be adhered to at all times.

Monitoring/Review

(i) Percentages of staff from neighbouring communities employed full-time and part-time should be recorded in the annual report.

2.5.9 Job creation and promotion of local entrepreneurship through protected area management

This critical action should not be seen only as the creation of employment and entrepreneurial opportunities generated by ecotourism as most areas in the

Drakensberg do not have a viable tourist trade. Other options to consider include the creation of community centred businesses and service to the NCS (outsourcing) businesses.

Objective

To encourage the creation of jobs and viable small businesses in neighbouring communities.

Management Options/Actions

(i) Potential entrepreneurs need to be capable of running a basic business and should have the necessary desire to do so.
(ii) Determine whether viable markets exist in the desired area for the envisaged business.
(iii) A business plan should be developed once the general viability of the concept and the ability of the entrepreneur has been determined.
(iv) Support to the entrepreneur is essential for the business to survive.

Monitoring/Review

(i) Progress and support should be monitored annually.

2.5.10 Communication Strategies for Protected Area Neighbours

Protected area neighbour relations is basically centered upon communication. This action involves devising specific communication programmes to communicate specific information.

Objectives

To communicate specific information critical information to neighbours in order to secure their understanding and participation in the issue.

Management Options/Actions

(i) Specific concepts should be identified at the annual management meeting and/or by the Drakensberg Management Committee.
(ii) The communication programme should be designed in conjunction with Marketing and Public Relations Division and the Drakensberg management team.
(iii) It is vital to use the communication mechanisms in communities as well as other unconventional mechanisms to advertise the programme.

Monitoring/Review

(i) A communication programme should be monitored during the running of the programme and at coordinating meetings afterwards (including the Drakensberg Management Committee and management meetings).

2.6 Monitoring/review

The entire neighbour relations programme is monitored and reviewed at the Drakensberg Management Committee and annual management meetings. Furthermore regional and sub-regional workshops should be periodically held to review progress and adaptations to management.

3. Biodiversity Education and Awareness for Protected Area Neighbours

3.1. Principles and Policies

Biodiversity education should involve an holistic understanding of the environment. An hands-on approach that enables people to understand their own environment and that of the Drakensberg Park is recommended so that they can plan and implement environmental actions which should then be periodically reviewed before being replanned and continued. Programmes should also aim to develop an appreciation and understanding of basic ecological concepts especially as they relate to the montane development.

The policy is that the Service will support and enable teachers to carry out biodiversity education in their own environment and in the Drakensberg Park. Conservation Service staff only run children's programmes where there are adequate resources to provide such programmes and where the staff running the programmes are adequately educated and trained to run these programmes.

Educational groups from neighbouring communities qualify for free access into their local protected area if this is arranged well in advance with the OiC and occurs through an agreed upon control point. Transport is supplied if the station can afford to and is willing to do so. It is important that educational groups achieve an educational objective during their visit to the protected area.

Each station has a Field Ranger who has as part of his/her duties a community conservation function. This person should provide a basic support service to teachers at their schools (neighbouring ones only) for school visits to the Drakensberg Park.

3.2. Objectives

To provide a biodiversity education service to the formal and informal sectors of communities neighbouring the Drakensberg Park so that they are ecologically literate, they understand the principles of self-reliant natural resource management and they able to take local environmental action.

3.3 Determine and Review/Priorities

Bearing in mind that the programme is aimed at the immediate neighbours only, OiC to assess needs and determine priorities and present these for review at the annual management meeting.

3.4 Management Options/Actions

3.4.1 Biodiversity Education in Formal Education for Protected Area Neighbours

Objective

To provide a biodiversity education service to teachers in neighbouring schools so that they include local and global biodiversity concerns in their teaching. Lessons may take place in the school, communal and/or protected area environments.

Management Options/Actions

(i) A neighbouring teachers workshop should be held annually with the aid of the Community Conservation staff at least once annually. Ideally workshops should be held in the school / communal environment as well as in the protected area.

(ii) Field Ranger to support and encourage schools to use their local environment in their teaching and to achieve environmental objectives.

(iii) The establishment of environmental clubs at schools must be encouraged and supported.

(iv) Field Ranger should run/promote environmental activities on World Environment Day, Arbor Day and Marine Day.

Monitoring/Review

(i) Each teacher that attends a teacher workshop must be given a workshop evaluation form to fill in after a workshop.

(ii) Each Community Conservation Assistant must attend at least two occasions annually when the Field Ranger runs an activity.

(iii) The success of biodiversity education activities in each community should be evaluated every three to five years.

3.4.2 Biodiversity Education in Informal Education for Protected Area Neighbours

Objective

To provide a biodiversity education service to the people residing in the communities that are neighbours to the Drakensberg Park.

Management Options/Actions

(i) To encourage the establishment of environmental clubs and/or action committees.

(ii) To encourage the establishment of izinyanga gardens in the community.

(iii) To encourage the cultivation of natural resources harvested within the Drakensberg Park.

(iv) To give two talks or run two exercises annually related to the environment in neighbouring communities.

(v) To actively support environmental initiatives within the community.

Monitoring/Review

(i) To review the programme every three years.

3.5 Research

To initiate research into the effectiveness of biodiversity education programmes in the communities adjacent to the Drakensberg Park.

4. Nature Conservation Extension Programmes for Protected Area Neighbours

4.1 Principles and Policies

It is important that the environment is viewed broadly instead of merely consisting of biological elements only. Furthermore, it is important to understand that the so-called "tragedy of the commons" is actually a "tragedy of open access" which is due to the lack of real resource ownership and the lack of community institutions to manage and control such resources.

The prevailing philosophy in extension to communities is one of self-reliant, participatory environmental action whereby extensionists work from the resource users perspective to enable him/her to use the environment on a more sustainable basis. The extensionist acts as a catalyst for the resource users to actively participate in the management of their own environment, learning as they progress.

Whilst, the core business of the conservation service is biodiversity Conservation, it has a role to play beyond this frame in terms of extension. It is in the interests of the Drakensberg Park that communities manage their natural resources, especially their grazing, soil and firewood, on a sustainable basis.

4.2 Objective

To enable communities neighbouring the Drakensberg Park to manage their natural resources in a sustainable manner so as to reduce the pressure upon the Drakensberg Park for non-sustainable and non-compatible utilisation of the resources within the Park.

4.3 Priorities

Sections with significant neighbouring formerly disadvantaged communities should be allocated more resources than those without such communities. This is a crucial element of the Drakensberg Park's community conservation effort.

4.4 Management Options/Actions

4.4.1 Cooperative Management

Objectives

To develop cooperative management regimes in areas adjacent to the Drakensberg Park.

Management Options/Actions

(i) Identify potential areas/communities for cooperative ventures.
(ii) Identify and involve all interested and affected parties in developing and implementing a management plan.
(iii) Support and encourage regular events to stimulate enthusiasm in a cooperative venture.

Monitoring/Review

(i) Every cooperative management arrangement must be reviewed by all interested and affected parties every three years.

4.4.2 Natural Resource Management Advice for Neighbours

Objective

To provide a natural resource management advisory service to Drakensberg Park neighbours to reduce the pressures upon the Drakensberg Park.

Management Options/Actions

(i) Identify priority communities to allocate resources to.
(ii) Employ and/or deploy suitably trained district conservation staff in the neighbouring communities of the Drakensberg Park.

Monitoring/Review

(i) Programmes must be reevaluated every three years.

4.4.3 Promotion of Sustainable Natural Resource Utilisation Among Protected Area Neighbours

Objectives

To promote the concept of sustainable natural resource utilisation in neighbouring communities

Management Options/Actions

(i) Natural resource management forums of all government and NGO role players need to be convened for priority areas to ensure a coordinated approach to the situation.
(ii) Project plans to be produced and implemented for specific priority communities.
(iii) Develop strategies for the sustainable and compatible utilisation of natural resources in the Drakensberg Park.

Monitoring/Review

(i) Monitoring of priority resources by Conservation and community monitors required annually in identified areas.

5. Facilitation of Community Development among Protected Area Neighbours

The neighbour relations programme of the Drakensberg Park differs from similar programmes elsewhere in Africa in that it cannot rely on the presence of large mammals. However, the remote and relatively underdeveloped nature of the neighbouring communities of the Drakensberg Park represents an opportunity for the NCS to become constructively involved in our neighbouring communities through the creation of a partnership between the Board and these communities at a local level. This partnership holds a number of advantages for both partners as it enables the Board staff to establish a long-term relationship with prominent community members thus building up a situation of trust and understanding whilst giving the neighbours access to the Boards proud reputation, expertise and infrastructure.

5.1 Principles and Policies

(i) The NCS can support, facilitate, broker and monitor community development. However involvement in these projects should be avoided where other appropriate agencies are to play a role.

(ii) Community development only succeeds in the long-term if it creates self-reliance within the community concerned.

(iii) The building blocks of self-reliant communities include the development of human skills, financially sustainable and viable projects and institutions.

(iv) Community development should encompass the principles of Participatory Learning and Action methodologies.

(v) Community development should improve the situation of the community at large and not the elite of the community. For this reason transparency and accountability to community development structures is vital.

5.2 Objectives

To engage in community development activities within neighbouring communities of the Drakensberg Park in a coordinated manner.

5.3 Project Priorities

(i) To become involved on a regular basis with the local community development committee/forum.

5.4 Management Options/Actions

5.4.1 Community Development and Capacity Building

(i) Objective

To achieve a situation of self reliance.

(ii) Management Options/Actions

Training to include:

NCS Staff: Training in the People First Approach (available from the Community Conservation Officer)
Chairing meeting
Participatory Learning and Action Training (available from the Community Conservation Officer)

Actual management priorities to be determined by management staff.

(iii) Monitoring/Review

(a) Monthly conservator meetings.
(b) Bi-monthly Drakensberg Management Committee meetings.
(c) Annual management meetings.
(d) Interim management meetings.
(e) Annual reports.
(f) Ad-hoc reports to donors.

5.4.2 Entrepreneurship among Protected Area Neighbours

The following principles apply:

a) The entrepreneur should own the idea/opportunity, it should not be imposed upon him/her.
b) A business plan is vital to the success of a venture.
c) The Board does not provide credit.
d) entrepreneurial opportunities only work if they are financially viable which includes a viable market.
e) Products for sale to tourists or external markets should be unique within that market and should not be copies of products produced elsewhere.

Entrepreneurial opportunities exist:

- through the outsourcing of services and products required by the protected area
- through meeting the needs of the incoming tourist market
- through identifying opportunities within the local community/neighbouring communities
- the export of products from the area to urban or overseas destinations

(i) Objective

To encourage the development of entrepreneurs within neighbouring communities.

(ii) Management Options/Actions

(a) The identification of services/products that are currently sourced from markets far away from the protected area which could be sourced from the neighbouring community.
(b) The identification of the requirements of the visitors to the protected area which could be met by a local business/es (eg Zulu dancing, crafts, vegetables, bread, babysitting, Zulu experiences).
(c) Encourage the sale of crafts produced locally.
(d) Encouraging and supporting community members to setup and run businesses that manufacture and/or supply products currently sourced in nearby towns by the community .

(iii) Monitoring/Review

(a) Monthly conservator meetings.
(b) Bi-monthly Drakensberg Management Committee meetings.
(c) Annual management meetings.
(d) Interim management meetings.
(e) Annual reports.
(f) Ad-hoc reports to donors.

5.5 Funding Strategy

Funding should be obtained from external sources for development projects.

Where possible, the Board attempts to jumpstart situations by providing limited infrastructural support to development programmes.

5.6 Monitoring/Review

i) Monthly conservator meetings.
ii) Bi-monthly Drakensberg Management Committee meetings.
iii) Annual management meetings.
iv) Interim management meetings.
v) Annual reports.
vi) Ad-hoc reports to donors.

6. Environmental Awareness among Protected Area Visitors

These are visitor management strategies (how we handle them)

6.1 Principles and Policies

To ensure that the impact of visitors to the Drakensberg Park is compatible with the primary objectives of water production and biodiversity conservation.
Visitors should be aware of the rationale behind Park management practices.

6.2 Objectives

To ensure that visitors to the Drakensberg Park have an acceptable impact upon the Drakensberg Park and other user groups and that they understand the actions within protected areas that impact upon them.

6.3 Determine/Review Priorities

To be determined by management.

6.4 Management Options/Actions

6.4.1 Building Relationships With Visitors To Protected Areas

(i) Objective

To develop a proactive long term relationship with organised visitor groups to the Drakensberg Park.

(ii) Management Options/Actions

a) User Liaison Forums
There are two forums with visitors to the Drakensberg Park that meet at least twice annually:

- The Hiking and Mountaineering Committee.
- The Trout Fishing Liaison Committee.

b) Participation Among User Groups in Protected Area Management:

The members of User Liaison Forums are informed of management actions within the Drakensberg Park and are permitted to have input into actions by management through biannual meetings and irregular workshops on specific themes.

(iii) Monitoring and Review

(a) Monthly conservator meetings.
(b) Bi-monthly Drakensberg Management Committee meetings.
(c) Annual management meetings.
(d) Interim management meetings.
(e) Annual reports.

6.4.2 Promoting Sustainable Recreational Use of Protected Areas

(i) Objectives

To promote the sustainable use of the Drakensberg Park.

(ii) Management Options/Actions

(a) Produce and implement a zonation plan for visitor management.
(b) Control visitor numbers entering the area and/or sections of the protected area.
(c) Develop facilities to cater for high visitor use (eg concrete paths).

(iii) Monitoring/Review

(a) Monthly conservator meetings.
(b) Bi-monthly Drakensberg Management Committee meetings.
(c) Annual management meetings.
(d) Interim management meetings.
(e) Annual reports.
(f) Ad-hoc reports.

6.4.3 Resolving Conflict Between Protected Area Management and Visitors

(i) Objectives

To manage conflict between management and visitors to minimise conflict between management.

(ii) Management Options/Actions

(a) Training for staff in conflict management and public relations.
(b) Zonation of visitor activities.
(c) Increased information provision to visitors through the provision of pamphlets and other literature, mass media releases, notices, displays and the provision of staff to deal with visitor complaints/inquiries.
(d) Provision of a means for visitors to comment.

(iii) Monitoring/Review

(a) Monthly conservator meetings.
(b) Bi-monthly Drakensberg Management Committee meetings.
(c) Annual management meetings.
(d) Interim management meetings.
(e) Annual reports.
(f) Evaluation of public complaints/comments.

6.4.4 Resolving Conflict Among Visitors and Neighbours/Resource Harvesters

(i) Objectives

To minimise conflict between visitors and neighbours/resource harvesters.

(ii) Management Options/Actions

(a) To run an information programme to create understanding between all stakeholders.
(b) To enforce a zonation system.
(c) Develop and implement a conflict management plan.

(iii) Monitoring/Review

(a) Monthly conservator meetings.
(b) Bi-monthly Drakensberg Management Committee meetings.
(c) Annual management meetings.
(d) Interim management meetings.
(e) Annual reports.

6.5 Monitoring and Review

i) Monthly conservator meetings.
ii) Bi-monthly Drakensberg Management Committee meetings.
iii) Annual management meetings.
iv) Interim management meetings.
v) Annual reports.

7. Visitor Interpretation Programme

7.1 Principles and Policies

i) Visitors and leisure settings are diverse and a variety of approaches will be required.
ii) Visitors anticipate a relaxed, enjoyable and informal atmosphere.
iii) Interpretive information must be rewarding to visitors.
iv) Interpretive information must be readily understood.
v) Feedback from visitors is essential.

The approach to visitor interpretation in the Drakensberg Park is to provide self-guided facilities that are funded by the state and conducted facilities that are funded by Conservation Services.

7.2 Objectives

To provide self-guided interpretive facilities at every Drakensberg Park section in accordance with visitor numbers.

7.3 Priorities

Priorities to be listed as per sections visitor numbers and audiences.

High Priority:	Station visited by large numbers of visitors annually.
Medium Priority:	Station visited by medium numbers of visitors annually.
Low Priority:	Station visited by few visitors annually.

7.4 Management Options/Actions

The following standards will be applied:

High priority sections:	Visitor or biodiversity education centre; local station and Drakensberg Park interpretive literature, local station and Drakensberg Park displays, presentations/talks, guided activities.
Medium priority sections:	Drakensberg Park interpretive literature and Drakensberg Park displays.
Low priority sections:	Drakensberg Park displays.

7.4.1 Interpretive literature

(i) Objectives

To interpret the broad environment of the Drakensberg Park including the reasons for the establishment of the Park and current management practices so that visitors have an improved understanding of the Drakensberg Park.

(ii) Management Options/Actions

(a) Each high priority station should have at least one self-guided trail.
(b) Each station with a shop should have quality literature on the kwaZulu-Natal Drakensberg on sale.
(c) Each curio shop should provide quality literature.

(iii) Monitoring/Review

(a) Each self-guided trail should be inspected at least once monthly and all damage to facilities should be repaired as soon as possible.
(b) Each self-guided trail should be assessed every five years.
(c) Interpretive literature to be reviewed every three years.

7.4.2 Displays

(i) Objectives

To interpret the broad environment of the Drakensberg Park including the reasons for the establishment of the Park and current management practices so that visitors have an improved understanding of the Drakensberg Park.

(ii) Management Options/Actions

(a) Each station should have displays on fire, rock art and catchment management.
(b) High Priority stations should have additional displays relevant to specific features at those sections.
(c) High priority stations should have a visitor or biodiversity education centre.

(iii) Monitoring and Review

(a) Each display should be inspected annually and maintained where necessary.
(b) Each display should be assessed every three years for suitability and condition.

7.4.3 Audiovisual Information

(i) Objectives

To interpret the broad environment of the Drakensberg Park including the reasons for the establishment of the Park and current management practices so that visitors have an improved understanding of the Drakensberg Park.

(ii) Management Options/Actions

(a) High priority sections should show environmental video/slide shows during peak season.

(iii) Monitoring/Review

7.4.4 Presentations/Talks

(i) Objectives

To interpret the broad environment of the Drakensberg Park including the reasons for the establishment of the Park and current management practices so that visitors have an improved understanding of the Drakensberg Park.

(ii) Management Options/Actions

(a) Each high priority station should run a peak season interpretive programme which includes presentations and talks.
(b) Trout fishing workshops can be run at stations needing to attract more clients.

(iii) Monitoring/Review

(a) All peak season interpretive programmes should be reviewed on an annual basis.

7.4.5 Guided Activities

(i) Objectives

To interpret the broad environment of the Drakensberg Park including the reasons for the establishment of the Park and current management practices so that visitors have an improved understanding of the Drakensberg Park.

(ii) Management Options/Actions

(a) Each high priority station should offer guided activities at least during the peak season. The use of guides from neighbouring communities is recommended.

(b) All guides must be legally accredited by SATOUR.

(iii) Monitoring/Review

(a) Each guide should be assessed prior to his/her commencing duties.

(b) Each guide should be evaluated annually through the use of a visitor book/visitor interviews/use of questionnaires.

7.5 Research

(i) Objectives

To develop more effective means of interpreting the environment.

(ii) Management Options/Actions

(a) Research on the use of displays, interpretive literature and means of improving interpretation is required.

(iii) Monitoring/Review

(a) An annual assessment of research requirements should be reviewed annually.

8. Visitor Information Programme

8.1 Principles and Policies

Visitors need to know about the stations they may or are going to visit so that they can plan accordingly. Furthermore, visitors should be aware of what they may and may not do once they are at their destination.

8.2 Objectives

To ensure that potential and actual visitors to the Drakensberg Park are informed according to their and the Drakensberg Park's requirements.

8.3 Priorities

As tourism is one of the most important sources of income to the NCS, it is essential that all visitors are adequately informed.

8.4 Management Options/Actions

8.4.1 Literature

(i) Objectives

To provide adequate information on the Drakensberg Park to visitors.

(ii) Management Options/Actions

(a) There should be a "Before Your Visit" brochure for each station.
(b) Medium and high priority stations should have a Visitors Information brochure which is handed to the visitor upon his/her arrival.
(c) Each hutted camp should have an information file in each unit on that station.
(d) Each station should have a display rack with corporate, Drakensberg Park before-your visit and Drakensberg Park information brochures.
(e) Each curio shop should have official maps on sale.

(iii) Monitoring/Review

(a) Each pamphlet and file should be reviewed annually.

8.4.2 Information Notices

(i) Objectives

To provide essential information to all visitors to the Drakensberg Park.

(ii) Management Options/Actions

(a) Directional signage to the station must be adequate.
(b) Each station should have the official Drakensberg Park sign at the entrance gate.
(c) A clock showing gate opening and closing times must be visible at every entrance gate used by visitors' vehicles.
(d) Signs requesting visitors to ensure that they receive a receipt for their entrance fee must be a display at each entrance gate.
(e) Directional signage within the station must be clear and adequate, and must conform to the Drakensberg Park standards.
(f) Official road signage must be used on all public roads.

(g) Paths must be marked in the intensive use area according to the Drakensberg Park standard.

(h) Each hutted camp must have an "accommodation allocation board."

(i) Each station with caves used for overnighting must have a "cave allocation board."

(j) Each camp shop must have a sign showing opening and closing times.

(k) Each hut must have notices as indicating when visitors should vacate their accommodation and as regards the disposal of sanitary napkins.

(l) Each station to indicate the location of the mountain rescue and day walk registers.

(iii) Monitoring/Review

(a) Signage should be inspected annually.

8.4.3 Indemnity Notices

(i) Objectives

To ensure visitors are aware that the NCS is indemnified against any damages incurred by the visitors whilst in the Drakensberg Park.

(ii) Management Options/Actions

(a) Each station must have a clearly visible official indemnity notice at every public entrance to the station.

(iii) Monitoring/Review

(a) Each public entrance should be checked annually for the presence and visibility of an official indemnity notice.

9. Public Relations for the Protected Area

9.1 Principles and Policies

The NCS needs to deliberately ensure that it establishes and maintains a mutual understanding between itself and its publics through planning and sustained effort.

Whilst many of aspects of the Community Conservation Programme cater for this, there is a need to ensure that the NCS is identifying and reacting to issues that arise between itself and its publics.

9.2 Objectives

To identify and react to issues that arise between the Service and its publics.

9.3 Management Actions/Options

(a) To develop a programme to survey priority publics on a regular basis in order to identify priority issues and to develop a plan to react to the issues identified.
(b) To develop a Crisis Reaction Plan for the Drakensberg Park.
(c) To provide training to middle management in media relations and crisis management.
(d) To ensure staff are trained in conflict management and negotiation.
(e) To provide staff training in customer service and care and to implement a customer care competition for the Drakensberg Park.

9.4 Monitoring/Review

(a) To evaluate annually.

PART F

VISITOR FACILITIES AND PROTECTED AREA DEVELOPMENT

1. Overall Objectives

To provide a variety of services to visitors. This includes controlled usage compatible with biodiversity conservation.

- To ensure that revenue generating facilities are financially viable.
- To ensure that neighbouring communities are given preference in employment opportunities and that appropriate entrepreneurial development is facilitated.

2. Integrated Environmental Management

Integrated Environmental Management (IEM) is a process whereby decision-making regarding development can be achieved. The IEM policy and procedures are contained in the Environment Conservation Act, and are binding for all activities which might impact on the environment. Guideline documents were issued by the Department of Environmental Affairs and Tourism. The NCS's **policy** on IEM applies to **all** development projects in protected areas. An in-house **procedure** has been developed, indicating the steps which anyone proposing a project must take to obtain approval for the project or to implement the project. These procedures are obtainable from the Planning Division, which is also responsible for reviewing project proposals made by staff. Refer to Policy File No 5-i.

3. Protected Area Concept Development Plan

This plan is not complete and will be inserted when available.

3.1 Principles and policies for protected area concept development plans

i) That other stakeholders be included in the process of developing the protected area concept plan so that the process is transparent and participatory.

ii) The plan should include an overall ecotourism image and a framework for all physical development in the protected area.

3.2 Objectives

To develop and maintain an up-to-date concept development plan.

3.3 Development Zonation

Development and zonation planning is not complete at this stage however this is being worked on in conjunction with Planning and once completed will be brought in to this Plan as an annexure.

3.4 Priorities

The list of priorities for further development will be part of the development plan which will be done in conjunction with Planning.

3.5 Management Options/Actions

The development of the protected areas concept development plan will be done in conjunction with Planning.

3.6 Monitoring and review

The concept development plan must be reviewed every five years by the working group.

4. Node Concept Development Plans

To be done in collaboration with Planning Division.

4.1 Objectives

i) To identify potential development nodes in the Drakensberg Park.
ii) To develop concept plans for these nodes.

4.2 Identification of development nodes

Development nodes will be identified using clearly stated criteria.

4.3 Priorities

i) Development of a 200-bed camp called Didima at Cathedral Peak including a San culture interpretive centre. Theme of camp to be the San culture, their beliefs, history and rock art.
ii) Extension of Giant's camp (28 additional units). Theme of this development to be flowers of the Drakensberg.
iii) Development of the Royal Natal hotel site. A 200-bed development. Camp to be known as Vivane. Theme to be early exploration by mountaineers, the early role of the Mountain Club of South Africa in exploring and developing walks and climbs and mountain rescue.
iv) Re-development of Injasuti camp.
v) The establishment of a ± 200-bed camp in the Southern Drakensberg (Garden Castle).

4.4 Management Options/Actions

The management options and actions will be determined by the Board.

4.5 Monitoring and review

Progress with the development of node concept development plans will be reviewed annually at the management meeting.

5. Site Concept Development Plans and Design/Layout for Sites

The following list deals with proposed developments:

5.1 Overnight facilities

- Demolition of Royal Natal Hotel and construction of new camp.
- Construction of Didima Camp at Cathedral Peak.
- Extension of Giant's Camp.
- Rustic camp site at Vergelegen.
- Rustic camp site at Garden Castle.
- Relocation of campsite at Cathedral Peak.

5.2 Day visitor facilities

- Improvements for day visitor facilities required at Rugged Glen to take overflow from Royal Natal.
- Improvements to day visitor area at Cathedral Peak to be done in conjunction with the Didima camp development.
- Improvements to day visitor facilities are required at Cobham and are to include a toilet block.

5.3 Entrance facilities

- Royal Natal: the entrance facility requires rebuilding to cater for the level of visitor numbers and to improve safety and security for staff and revenue.
- Cathedral Peak: an entrance facility is to be built to cater for the increased visitor numbers as a result of the Didima camp development. This will include a day visitor parking area and toilet/ablutions for day visitors.

6. Management of Visitor Facilities

6.1 Overnight Facilities

(i) Inventory

a) **Hutted camps**

Tendele	Injasuti	Loteni
Giants	Kamberg	

b) **Camp sites**

Rugged Glen	Mahai	Cathedral Peak
Monks Cowl	Injasuti	Hillside
Highmoor	Loteni	Cobham

c) **Mountain Huts**

Centenary	Bannermans	Giants
Meander		

d) **National Hiking Way Huts**

Polela	Mzimkhulwana	Winterhoek
Swiman	Bushmans Nek	

e) **Caves**

Cathedral Peak

Shermans Cave	Outer Horn	Twins
Xeni	Leopard	Poachers
Ribbon Falls	Drip	Organ Pipes
Tseketseke	Barker's	Bell
Schoongesicht	Ndumeni	

Giants Castle

Sparerib	Lower Injasuti	Fergies
Upper Injasuti	Grindstone	Tom's

Monks Cowl

Hospitaal Spruit	Anton's	Nkosasana
Cowl	Stable	Wonder Valley
Zulu		

Highmoor

Aasvoel Krantz	Caracal	Mkhomazi
Sinclair's	McKenzie's	Cypress
Loteni	Ash	Yellowwood

Vergelegen

Mlahlangubo	Birds Nest	Kaula
Small	Bridge	Sicocosebhaca

Cobham

Sakeng	Gorge	Pholela
Spectacle	Gxalingenwa	Nutcracker
Lakes	Weaver	Chameleon
Venice		

Garden Castle

Wilson's	Bushman's	Tomatu
Fun	Verkyker	Engagement
Pillar	Sleeping Beauty	Mashai
Goats	Lammergeyer	Tarn

(ii) Priorities

Reserves to list their priorities.

(iii) Management Options/Actions

Management options to be recorded in reserve management section.

6.2 Day Visitor Facilities

(i) Inventory

1) Royal Natal - picnic site and Gorge car park
2) Rugged Glen - picnic site, horse riding
3) Cathedral Peak - car parks
4) Monks Cowl - car park
5) Injasuti - car park
6) Hillside - car park
7) Giants - picnic site, car park
8) Highmoor - picnic site, car park
9) Kamberg - picnic sites, car parks
10) Loteni - picnic site, car park
11) Cobham - picnic site, car park
12) Garden Castle - picnic site, car park

(ii) Priorities

Management options to be recorded in reserve management section.

(iii) Management Options/actions

Management options to be recorded in reserve management section.

6.3 Entrance facilities

(i) Inventory

- Royal Natal
- Cathedral Peak
- Monks Cowl
- Giants Castle (Witteberg)
- Loteni
- Cobham

(ii) Priorities

Priorities to be recorded in reserve management section.

(iii) Management Options/Actions

To be recorded in reserve management section.

7. Marketing of Visitor Facilities

The Marketing and Public Relations Division will handle marketing and advertising of visitor facilities. Stations may advertise in magazines, newspapers etc.

The Drakensberg Park is promoted and marketed alongside the NCS' other Parks at the international travel exhibitions, namely World Travel Market in London, and International Tourism Exchange in Berlin and Indaba in Durban, as well as domestic exhibitions such as the Getaway Shows in Cape Town, Johannesburg and Durban.

Printed information specific to the Drakensberg region is provided to and displayed at the Drakensberg Tourism Association offices in Bergville and the Bushmans River Tourism Association in Estcourt - as well as to tourism offices throughout the Province.

Whilst there is no advertising budget which may allow for focussed attention to any specific regions or camps, particular encouragement is always given to the Dutch and Belgian markets to visit the Drakensberg region as it is known to be a major attraction to people from these countries. As the Dutch market is very price conscious, the NCS's present self-catering facilities in the Drakensberg provide ideal value-for-money destinations.

The Unique Selling Points (USPs) of the Drakensberg are:

- Outstanding scenery (the prime attraction to overseas visitors to South Africa).
- Hiking / walking opportunities.
- Rich heritage of rock art.
- Agreeable climate - mostly!

7.1 Market research

To be initiated by the Marketing and Public Relations Division.

7.2 Desired market image

The desired market image is to provide service excellence in well maintained facilities.

7.3 Tariffs

Tariffs will be set by the Tariff Committee taking into account recommendations by staff.

7.4 Promotion

Responsibility of the Marketing and Public Relations Division.

7.5 Access road signage

Every OiC is to ensure that access road signage is prominently and accurately displayed by the KZNPA.

PART G

PROTECTED AREA ADMINISTRATION

1. Management Programme

1.1 Programme of management and staff meetings

(a) The Drakensberg Management Committee, made up of the Chief Conservator Drakensberg, Conservator Northern Drakensberg, Conservator North-Central Drakensberg, Conservator Southern Drakensberg, Community Conservation Officer Drakensberg, Regional Ecologist and Administration Officer Drakensberg, sits every second month.

(b) Each station has an annual management meeting and an annual interim progress review meeting.

(c) Each Conservator holds a monthly sub-regional meeting every second month.

(d) Monthly staff meetings are held at each station.

(e) Conservators hold bi-annual meetings with the reserves staff representatives.

(f) The Chief Conservator holds bi-annual meetings with the reserves staff representatives.

(g) Ad-hoc meetings are held on an irregular basis to deal with specific management issues.

1.2 Reporting

Annual reports, including goal achievement, are prepared by the OiC in April. Conservators summarise these and submit a sub-regional report to the Chief Conservator in May. The Chief Conservator prepares a regional contribution to the West Division yearbook in July. Material from the yearbook is used in the NCS annual report.

Ad-hoc reports are prepared and presented as required.

2. Personnel Management

2.1 Principles and policies for personnel management

Policy: to ensure the Park is adequately staffed in order to achieve the Board's objectives.

2.2 Overall objectives for personnel management

Resident staff

(i) Objective

To improve management efficiency by appointing additional staff when required.

(ii) Management Options/Actions

OiC's to motivate for additional staff at annual estimates meeting.

Non-resident staff

Honorary OiCs to be requested to supplement staff when necessary.

Administration Officer to maintain list and details of Honorary OiCs.

Specialist Services; to be called in when necessary. Regional Ecologist to advise.

2.3 Staff dendogram

See Annexure 9.

2.4 Staff training/capacity building requirements and programme

2.4.1 Technical requirements

- Path maintenance.
- Fence construction.
- Alien plant control.
- Soil reclamation techniques.
- Labour relations.
- Disciplinary procedures.
- Management skills.
- Management of wilderness.
- Law enforcement: court procedures.
- Road maintenance.
- Mountain rescue.

2.4.2 Biological requirements

- Key animal and plant identification.
- Ecological process function.

2.4.3 Organisational requirements

- Board administration.
- Man management.

2.4.4 Environmental awareness and Community relations

(a) Field Rangers (levels 3 and 4)

- Organisational (NCS) Orientation to Community Conservation.
- Introduction to the NCS Business Plan.
- Local Protected Area Boards.
- Community Levy.
- Basic Biological Knowledge (Formal education Grade 8/Standard 6).

- Basic Ecological Knowledge (refer to WESSA Course 1999/2000).
- What is Conservation?
- Why Conserve?
- Ecosystem Studies - forests, grasslands, water and wetlands.
- The Role of Abiotic Elements i.e. sun, water, soil and air.
- Concepts of Sustainable Living.
- Basic Ecological principles and concepts e.g. cycles and sustained usage.
- Responses to the Environmental Crisis.
- Natural Resources Management on communal land.
- Energy Awareness Programmes.
- Guidelines for Traditional Resource use; and promotion of cultivation.
- Philosophy of Commemorative Days / Weeks.
- kwaZulu-Natal Nature Conservation Act.
- Endangered Species Protection Act of South Africa.
- Corporate Product Knowledge.
- Trainer Skills - of children, adults and staff.
- Basic Public Relations.
- Basic Communication Skills.
- Presentation skills.
- Report writing.
- Telephone skills.
- Protocols/cultural orientation.
- Interpersonal skills.
- Literacy (Adult Basic Education and Training - Level 5).
- Elementary Public Speaking.
- Time Management.
- Planning and Organisational Skills.
- Basic committee functions.
- Basic Business Skills (small and medium enterprises).
- Introduction to Environmental Education.
- Locating theory and resources within practical activities.
- Discovery and investigation in a variety of ecosystems.
- NCS Land Claims processes.
- Partnership Management.
- History of area at a regional level.
- Supervisory Skills.
- Basic Extension Methods.
- Key District Conservation Issues.
- Monoculture.
- Agro-chemicals.
- Alien Plants.
- Basic Agricultural Practices.
- Basic Natural Resource Management.
- Basic Computer Literacy.
- Basic Administration Skills.
- Vehicle management.

b) Community Conservation Personnel (Levels 5, 6 and 7)

- Same as level 3 and 4, and
- Knowledge of NCS Business Model.
- Comprehensive Knowledge of Neighbour Relations and Resource Harvesting Policies.
- Biological Knowledge (formal education - Grade 12/Std 10).
- Advanced Ecological Knowledge (refer WESSA Course 1999/2000).
- Macro ecosystems, international implications - based on John Yeld; Caring for the Earth : 1997.
- Opportunities for resource harvesting.
- Advanced Communication Skills.
- Communication Theory and Models.
- Computer Graphic skills.
- Using an Over Head Projector, Slide projector, VCR; creating demonstration materials such as overheads and models.
- Teaching techniques, incl. Ice Breakers.
- Development of specific education resources.
- Communication approaches with rural communities.
- Nature Conservation Education Knowledge - theory and practice.
- Understanding of Outcomes Based Education.
- Facilitation Skills.
- Conflict Resolution Skills.
- Transactional Analysis.
- An Understanding of Developmental issues.
- Introduction.
- Scoping.
- Strategy and Team Builder.
- Project Identification, incl. Funding and fund-raising proposals.
- Monitoring progress.
- History and Trends in Development.
- National and Provincial Development Policy.
- Community Based Natural Resource Management (CBNRM).
- Principles and Models.
- Community Forest and Fisheries Management.
- Tourism.
- Business Plan Insights.
- An Understanding of Relevant General Research Methodologies.
- Participative Research Methodologies.
- Participatory Learning and Action (PLA).
- Project Planning (ZOPP).
- Evaluation Processes.
- Photography.
- Adult Education.
- Advanced Partnership Management Skills.
- Understanding of Leadership and Motivational Theory.
- Interpretation of the Environment Course (Washington State University).
- Networking Skills.

(c) Community Conservation Personnel (Level 8)

- Same as Level 5, 6 and 7, and
- National Diploma in Nature Conservation / or equivalent.
- Financial and Accounting Skills.
- Business Skills.
- Human Resource Management.
- Human Resource Management.
- Disciplinary Hearings and Procedures.
- Public Relations.
- Crisis public relations.
- Media relations.
- Public Relations campaigns.

(d) Protected Area Managers

- Awareness of the Level 5, 6, 7 and 8 skills.
- Neighbour Relations Policy.
- Understanding of CBNRM and Cultural Relativism.
- Zulu Cultural Patterns.
- Awareness of Environmental Education Resource Material.
- Working knowledge of the Environmental Education Philosophy.
- Agenda 21.
- Familiarity with the NCS Community Conservation Agenda.
- Management of Environmental Education programmes.
- Understanding of Basic Development Theory.
- Conflict Management Approaches.

(e) District Conservation OiCs

- Extension Theory, especially Farmer-to-farmer and Beyond Farmer First approaches.
- Biodiversity Education Theory.
- PLA.
- CBNRM.
- Networking Skills.
- Cooperative Management Theory.
- Advanced Partnership Management.
- Facilitation and Fund-raising Skills.
- Conflict Management Approaches.
- Understanding of Basic Development Theory.
- Working Knowledge of Environmental Education Philosophy.
- Tbilisi Principles.
- Management of Environmental Education programmes.
- Familiarity with NCS Community Conservation Agenda.
- Project Management Skills.
- Cultural Relativism.
- Agenda 21.

(f) Planning Division Support Services

- Social Sciences Degree.
- Advanced Ecological Knowledge (WESSA Course 1999/2000).
- Knowledge of Neighbour Relations and Resource Harvesting Policy.
- Community Based Natural Resource Management.
- Agenda 21 and Tbilisi Principles.
- Applied International Sociological Principles in CBNRM.
- Communication and networking skills.
- Educational Resource development skills.
- The diversity of formal education approaches in line with Outcomes Based Education.
- Review of Educational Resource Materials.
- Participatory and Project Evaluation Skills.
- Coordination Skills.
- Advanced Computer Skills.
- Presentation Skills.
- Environmental and Education Development Skills.
- Strategic Planning.
- Strategic Marketing.
- Critically Reflective Discussion skills esp. withing community conservation staff on project work.
- Understanding of Social Theory.
- Constructionism, positivism, phenomenology.
- Planning and Management of Training Courses.
- Conflict Resolution.
- Interpretive Exhibit Design.

2.4.5 Equal opportunities programme

An employment equity plan is currently being developed for the organisation.

In terms of the organisation's Employment and Occupational Equity policy (policy 6-ix), the organisation undertakes to:

(i) ensure that potential candidates for employment or advancement, especially those from disadvantaged groups, know about opportunities as they arise, generally by appropriate advertising;
(ii) advertise skills requirements needed to fill vacant or promotion posts;
(iii) define and communicate clear, non-discriminatory criteria for decisions taken about appointments and promotions;
(iv) give reasons for decisions in the area of appointments and promotions;
(v) avoid unfair discrimination, either directly or indirectly, against any applicant or employee on any arbitrary ground, including but not limited to race, gender, ethnic or social origin, colour, sexual orientation, age, disability, religion, conscience, belief, political opinion, culture, language, marital status or family responsibility;
(vi) demonstrate that the criteria used in employment and occupational decisions reflect inherent job requirements;
(vii) accelerate skills training of its staff in order to better equip them in their occupational field;

viii) retain and review routes of appeal to management or to representative committees, should discrimination be apparent in any occupational circumstances;

ix) implement an employment equity plan and other legislated measures as may be required from time to time.

2.5 Station standing orders

Each station will display standing orders on the staff notice board.

There are a number of general principles contained in each sections standing orders see Annexure 10.

3. Infrastructure Management

3.1 Principles and policies for infrastructure management

(i) Integrated Environmental Management procedures will apply to all infrastructure development and management.

(ii) All infrastructure must be maintained at an acceptable standard as detailed below.

(iii) Regular inspections will be carried out by supervisory and technical support staff.

3.2 Overall objectives for infrastructure management

(i) To maintain infrastructure in a sound and serviceable condition.

3.3 Buildings

Policy: To build and maintain those buildings necessary for effective management, or for visitor utilisation, without hindrance to the achievement of the primary objectives. Building sites must be in relation to zonation. Planning and implementation of building projects are to follow integrated environmental management procedures. The buildings should be compatible with the surroundings and the process of construction must not be in contradiction with the objectives of the Park.

3.3.1 Building development

(i) Objectives

To construct buildings required for effective resource and visitor management.

(ii) Priorities

OiCs' to identify priority needs.

(iii) Management options/actions

List to be drawn up by OiC and submitted via the Chief Conservator to Executive staff with building and site plans, and a quote signed by Chief Technical Officer. The normal procedure is for all new projects to be tabled at Projects Planning Committee meetings. Once the project is passed it is submitted to the Board's Plans Committee for approval. At the commencement of the project progress is reported at the Development Progress Committee meetings. All new buildings require an Environmental Impact Assessment (EIA) (see Policy File). Alterations or additions to existing buildings must be approved by the Chief Conservator before work is commenced.

(iv) Monitoring

A project manager will be nominated for all new major building development and will be responsible for monitoring all aspects of the project.

3.3.2 Building maintenance

(i) Objectives

To maintain all buildings in a safe, hygienic and functional state at all times.

(ii) Management options/actions

(a) By 28 February each year the OiC will inspect each building under his control and complete a building maintenance requirement form.
(b) Building maintenance in the visitor use area is the responsibility of the Camp Manager who will undertake an annual inspection as in (a) above.

iii) Maintenance priorities are listed in the following categories:

(a) Visitor facilities.
(b) Staff accommodation.
(c) Offices and stores.
(d) Static plant rooms.
(e) Workshop area.
(f) Stables.

iv) Maintenance requiring major construction or work of a specialised nature will be the responsibility of the Chief Technical Officer.

3.4 Roads, tracks, paths and quarries

No new roads, tracks or paths will be constructed or made without an EIA (see Policy File) and the prior approval of the Management Committee. Road maintenance priorities to be submitted to Chief Conservator Drakensberg by 1 November each year.

The goal is that all new roads will have a permanent surface, and all existing roads should be upgraded to seal them permanently. All footpaths will be maintained to minimise erosion.

New quarries will only be excavated when absolutely necessary and only with approval from the Management Committee after a full EIA has been done. The topsoil from new quarries must be set aside and placed back once the quarry is no longer in use - this is the responsibility of the road unit who must reclaim quarries before they move out of the area. Potential quarry sites, inside the Park and outside the boundaries, should be identified for future needs. In principle quarry material should be obtained from quarries outside the Park.

(i) Objectives

To provide an all weather, low impact road system for effective reserve management and visitor use.

To provide a network of well maintained footpaths for access within the Park.

3.5 Fencing

To construct and maintain adequate fencing to demarcate the eastern boundary of the Park. Minimum standard is a 5-strand stock fence, but higher standards are required in certain areas to control eland movement. Internal fencing will be restricted to specific needs, such as horse paddocks, protection of sensitive sites, and internal security.

(i) Objectives

To demarcate the boundary of the Park and prevent entry of domestic stock.

(ii) Management options/actions

As per specifications in Technical Manual.

3.6 Communication systems

Policy: To provide and maintain a communication system to facilitate effective management in the Park. Such a system may involve external links.

All communications systems and infrastructure to be subject to the IEM procedure. As far as possible, this must apply outside the Park as well as inside.

3.6.1 Telephones

(i) Objective

To ensure an effective 24 hour telephone system.

3.6.2 Radios and repeaters

(i) Objective

To ensure an effective 24 hour radio system.

3.7 Power

Policy: To supply electricity and electrical installations to facilities and accommodation units under conditions of minimal audio and visual impact and financial cost.

(i) Objective

To ensure that ESKOM electrical power is supplied wherever possible.

(ii) Management options/actions

See station specific management plans

3.8 Domestic water

(i) Objective

(a) To supply potable water in quantities that are required for the effective management of the Park.

(b) To comply with South African health standards.

(ii) Management Options/Actions

See station specific management plans.

3.9 Transport

3.9.1 Motor vehicles

(i) Objective

(a) To provide transport that complies with vehicle safety standards for effective Park management.

(ii) Management Options/Actions

(a) Reserve management plan to record authorised vehicle establishment. Refer to Annexure 11.

3.9.2 Boats

Reserve management plan to record authorised boat establishment.

3.9.3 Horses and Donkeys

Horses play an important role in the efficient management of the Park and are a revenue earning asset at Rugged Glen.

(i) Objectives

To improve patrol efficiency by using horses where possible. However, Field Rangers should not rely only on horses and only working horses necessary for efficient management may be kept on station. Privately owned horses not used for official duty may be kept in the Park only with authority of the Regional Conservator.

(ii) Management Options/Actions

The business of providing Service-funded horse establishments for public use must at least break even financially and must maintain high safety and management standards.

3.10 Airstrips and helipads

(i) Objectives

To provide essential landing zones for light aircraft and helicopters in areas where such facilities will have a minimal ecological and visitor disturbance impact.

(ii) Management Options/Ations

Aircraft and helicopter landing sites are to be maintained in a serviceable state at all times. Exact locations to be recorded in reserve management plan

3.11 Launch sites/jetties

To be recorded in reserve management plan.

4. Waste Management

4.1 Principles and policies for waste management

Sewerage - management of sewerage must ensure that all effluent is treated in accordance with special standards laid down by the Department of Health. All sludge pumped from sewerage systems must be disposed of in a sewerage treatment plant.

4.2 Solid waste

(i) Objectives

(a) Solid waste - all non-biodegradable solid waste should be removed from the Park. Recyclable material to be sorted and transported to appropriate depots.

(b) To sort and deal with solid waste timeously in accordance with the Policy.

4.3 Management option

To be recorded in reserve management plan.

5. Security Management and Wildlife Protection Programme

(i) Principles and policies for security management

The integrity of the Drakensberg Park is threatened in a number of ways, from illegal grazing, hunting and trespassing to theft and robbery. Control measures must be appropriate to the threat and to socio-political circumstances but must be just and firm at all times.

(ii) Objectives

To institute and maintain security management systems necessary to safeguard the integrity of the Drakensberg Park, its infrastructure, staff and visitors.

(iii) Priorities

(a) Land invasion.
(b) Illegal grazing.
(c) Illegal movement across the international border.
(d) Visitor security and safety.

(iv) Management Options/Actions

To be recorded in reserve management plan.

(v) Monitoring

OiC and Regional Conservator to monitor and record all incidents.

5.1.1 Domestic regulations

Policy: To set regulations so that management continuity and standards are maintained. Also, to serve to cover aspects not considered in the Officers Manual, Lawbook and the Policy File No. 6 - ii dealing with the Service's disciplinary procedures.

5.1.2 Civil emergency procedure

Policy: To make available procedures and to establish systems to prepare and guide people in the reserve to take effective action in cases of any emergencies.

Firefighting precautions

(i) Objectives

To provide and maintain equipment and establish systems to effectively extinguish accidental fires.

(ii) Management Options/Actions

See reserve specific management plans

Accidents

(i) Objective

To provide and enforce measures for the prevention of accidents and the speedy removal to safety of injured visitors and staff.

(ii) Management Options/Actions

See Mountain Rescue Procedures (Annexure 12).

Security

(i) Objective

To protect public and private property.

(ii) Management Options/Actions

(a) All stores, depots and equipment storage areas are to be kept locked when not in use.
(b) Only the appointed storeman and OiC will possess keys for these locks.
(c) Tools, materials and equipment may only be removed from the store on completion of a withdrawal statement.
(d) All withdrawals must be made in the presence of the storeman.
(e) All equipment and material must be signed in on their return.
(f) Use of tools, material and equipment by any person other than Drakensberg Park staff will only be under the OiC's authority.
(g) At least two, armed Service staff members will be present at banking deposits or withdrawals.
(h) Nocturnal patrols of the tourist camp and field staff complex will be done by Field Rangers and OiCs on a regular unscheduled basis.

5.2 Wildlife protection programme

(i) Principles and policies for wildlife protection

To ensure effective application of the ordinance and regulations within the Park.

(ii) Objectives

(a) Identify main problem areas and deploy the field ranger force to effective control points.
(b) To ensure close liaison with the local justice department and SAPS.

(iii) Priorities

See station specific management plans

(iv) Management Options/Actions

a) To gain the legal status of any new acquisition and demarcate all protected areas.
b) To establish and maintain adequate protective services for each area.
c) To conduct extension and specialist services in support of the law enforcement programmes.
d) To ensure that the legislation is reviewed on an annual basis.
e) To monitor the approved utilisation of the wildlife resources and bring legal actions to bear against offenders.
f) To set up appropriate effective structures designed to pre-empt activities.
g) To establish and maintain environmental awareness and public relations programmes to gain the public's support in the law enforcement effort.
h) To promote the formation and registration of co-operative management systems in order to extend the law enforcement effort to areas outside protected areas.
i) To ensure that the visitors understand and respect the protected area legislation.
j) To establish a computer programme in order to centralise all records of incidents and prosecutions.
k) To maintain effective law enforcement and specialist teams and to ensure adequate funding for this law enforcement programme.

Notes:

- These objectives support each of the actions required in achieving the Board's Mission Statement.
- Where specialist team refers to Field Reserve and Zone Offices
- assistance and support given by Investigations OiC and Legal Advisor to the law enforcement staff. In addition, outside legal assistance is available where complicated or important cases are being handled.

l) Field Rangers to be deployed at outposts.
m) Horses are to be maintained at selected outposts as a highly mobile patrol force. To this end, holding paddocks are to be established as required.
n) Mounted patrol hours are to be recorded on a monthly basis on station.
o) Foot patrols are to be recorded on station.
p) A mobile field ranger force is to be equipped/deployed in trouble spots when required.
q) Maintain a map indicating incidents and illegal activities to identify problem areas.
r) Regular monthly in-service training to be done.
s) To ensure close liaison with local justice department and SAPS.

(iv) Management Options/Actions (prosecution)

i) Statements taken from Field Rangers must be clear, concise and detailed and any relevant information must be attached to the statement to assist SAPS and public prosecutor.
ii) Reference to OiCs Lawbook must be made to ensure that the correct charges are laid.
iii) Pending cases must be discussed with the local public prosecutors before the trial and all relevant details conveyed to the field ranger before he enters the court room.
iv) An OiC from station should to attend all court cases.
v) Records/registers must be kept on station detailing:
   (a) Names and personal details (chief induna, address, etc) of poachers arrested and conviction results.
   (b) Names of potential poachers given during interviews with arrested poachers.
   (c) Names of poachers who have resisted arrest.
   (d) Field Ranger arrest performance is to be recorded.

This information will assist in obtaining an overall picture of the situation in the area and helps identify the degree of threat to the reserve.

6. Business Plans and Financial Management

(a) Principles and policies for financial management

To ensure that financial priorities are determined and that adequate planning takes place in an endeavour to obtain finances for the efficient running of a reserve, including both the Service and state funded operations.

(i) Objectives

a) To obtain funds to service the goals as set for achievement each year.
b) To balance expenditure and funds at the end of each financial year.

(ii) Priorities

(iii) Management Options/Actions

OiC to maintain accounting ledger of incoming expenditure; also to draw up annual estimates to be submitted to Chief Conservator by the estimates meeting.

(iv) Monitoring

Regional Conservators to check financial management to ensure that vote holders comply with requirements.

PART H

RESEARCH AND INFORMATION

1. Principles and Policies for Research

The NCS encourages and facilitates research where appropriate and possible in all land under its control.

The guiding principle for research in, and associated with, protected areas is to provide relevant information for the efficient conservation and management of biodiversity in kwaZulu-Natal.

2. Objectives

Applied research in the Drakensberg Park should be aimed at improving understanding of all aspects of management of water production and biodiversity conservation in and around the Park. Other research should include socio-economic issues, geography and geomorphology.

3. Research Priorities

To be determined and reviewed by the management team at intervals of no more than 5 years.

Priorities are listed in Annexure 13.

4. Research Programmes.

Where possible, research projects should be part of a research programme. The advantage of this is to co-ordinate and integrate a number of projects to provide an holistic source of information covering many facets of an issue. Programmes can be developed by co-ordinated consultation and networking with a range of experts.

In reality, development and co-ordination of research programmes is difficult and it is more common for individual projects to be carried out. Research needs, however, can be listed in programme form and encouragement given to researches to complete outstanding projects in a programme in preference to moving to new programmes.

Research needs and relevance to existing programmes are listed in Annexure 16.

5. Research Proposals

Research project proposals and plants to be developed by the researcher in accordance with established pro-forma.

6. Research Reports and Papers

Researches to compile annual progress reports in March each year for submission to project co-ordinators.

Final reports will be submitted to project co-ordinators who will call a special management meeting to discuss any recommendation with Park management. Accepted recommendations will be implemented by management.

Researchers will be encouraged to publish their findings in both scientific and popular journals.

7. Protected Area Information System

Regional Ecologist is responsible for the development and maintenance of an information system for the Drakensberg Park. This will include bibliography, inventories, data-bases and maps.

7.1 Protected area bibliography

A bibliography is held by the Drakensberg Ecological Advice team at Queen Elizabeth Park.

7.2 Protected area map collection

(i) Distribution maps for indigenous woody communities.
(ii) Distribution maps for alien plants.
(iii) Drakensberg hiking maps will soon be available in digital format.

a) Management Maps:

Drakensberg North	:	Mont-Aux-Sources - Cathedral Peak
	:	Cathedral Peak - Injasuti
Drakensberg Central	:	Injasuti - Giant's Castle - Highmoor
	:	Highmoor - Kamberg - Mkhomazi - Loteni
Drakensberg South	:	Vergelegen - Cobham - Garden Castle
	:	Garden Castle - Bushmans Nek - Sehlabathebe.

b) Drakensberg Hiking Maps (new series):
Royal Natal - Rugged Glen - Mnweni
Cathedral Peak - Culfargie - Monks Cowl.

The outstanding four maps (Giant's to Bushmansnek) are planned to be completed by December 1999.

c) Drakensberg & Surrounding Areas (1: 50 000 maps):

2828 DB Witsieshoek
2829 CA Oliviershoek
2829 CB Bergville
2828 DD Mont-Aux-Sources
2829 CC Cathedral Peak
2829 CD Zunkels
2929 AA Champagne Castle (West)
2929 AB Champagne Castle
2929 BA Ntabamhlophe
2929 AD Giant's Castle
2929 BC Kamberg
2929 CA Sani Pass (West)
2929 CB Sani Pass
2929 DA Himeville
2929 CC Bushmansnek
2929 DC Pevensey.

7.3 Protected area databases

a) Rock Art Database
b) Animal Population Management Database
c) Fire Management Database.

APPENDIX 6

APPENDIX 6

EZOKONGIWA KWEMVELO KZN
KZN NATURE CONSERVATION SERVICE
KZN NATUURBEWARINGSDIENS

CULTURAL RESOURCE MANAGEMENT PLAN FOR THE DRAKENSBERG PARK (CURE)

FIRST EDITION
APPROVED BY THE BOARD ON 27 NOVEMBER 1998 (ITEM 3.8)

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The Mission, Objectives and Strategy of CURE

Mission:

The mission of the Cultural Resource Management Plan (CURE) for the Drakensberg Park (DP) is:

"to promote the conservation and public appreciation of archaeological and historical resources in the Drakensberg Park, in accordance with conservation, tourism and wilderness management objectives."

Objectives:

The following objectives have been identified for CURE:

- to identify the cultural resources present, and examine their value in terms of the overall mission and purpose of the DP;
- to determine management needs and problems, and rank them in importance;
- to propose specific actions for dealing with needs and problems;
- to present a multi-year program to achieve measurable progress in accomplishing the proposed actions;
- to provide for an annual review and recording of accomplishments to measure the effectiveness of actions;
- to encourage an interdisciplinary approach to the DP's cultural resource management;
- to promote safe tourism to cultural resource sites; and
- to promote the legal protection of cultural resource sites.

The Strategy:

The strategy whereby CURE will manage cultural resources has three components:

A The implementation and maintainance of conservation measures to curb the natural and unnatural deterioration of sites;

B The promotion of an appreciation of cultural resources in the DP;

C The promotion of research opportunities, site recording and monitoring, and the establishment and maintenance of databases;

SECTION A

INTRODUCTION

1. **Introduction:**

Cultural resources, both archaeological and historical, occur in every section of the Drakensberg Park (DP). Cultural resources are those natural and modified features of the landscape associated with human activity, both past and present. These include archaeological sites and artefacts, structures and buildings, rock art, ancestral graves, shipwrecks, and sites to which oral histories are attached. These resources are critical to understanding and interpreting southern African colonial and pre-colonial history. They are fragile and may be destroyed easily unless properly managed. The material evidence of past human activities is both finite and non-renewable, and once lost, these resources cannot be recovered.

The cultural resources of the DP are many and varied, and include archaeological remains that may be more than 100 000 years old. Rock paintings constitute the most ubiquitous and visible cultural resource of the Drakensberg - the DP alone contains 550 known painted sites, with some 35 000 individual images. These paintings are a unique record of the history of southern Africa's Bushmen (also called San), yet their enormous potential value for education and tourism remains virtually unexploited.

Rock art is a legacy left by the Bushmen who lived in the Drakensberg from about 8 000 years ago to the late nineteenth century, and was created primarily for religious and ritual purposes. Tragically, these traditions were lost in the process of colonisation.

Unique Features:

The Drakensberg is possibly the richest rock art region in Africa, due to a unique combination of an important set of features:

- the Drakensberg is the most densely painted, significantly large area on the African continent;
- a wide range of images is depicted in the art;
- the paintings are preserved not only in their natural setting, but also in their cultural context. The floors of painted shelters are often strewn with artefacts made and used by the hunter-gatherers;
- the rock art of the whole region uniquely represents a coherent artistic tradition. It therefore embodies the beliefs and cosmology of the hunter-gatherers of this part of southern Africa, their contacts with other people, and their changed circumstances through time;
- its rock paintings are in many instances better preserved than in any other region, certainly south of the Sahara;
- the age of many paintings can be determined.

Painted sites have particularly urgent management requirements, due to their non-renewable nature and fragility. Rock art is thus a priority in terms of cultural resource management in the DP. The rewards are that well managed rock painting sites can play a major role in understanding the history of people on the subcontinent, and in attracting tourism.

2. Intention:

The intention of CURE is to produce a coherent, accountable and holistic policy for the management of cultural resources in the DP.

This document focuses upon rock paintings. In due course, the scope of the document will be expanded to include the other cultural resources of the DP.

3 Acknowledgements:

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4 Legislation and Permit Requirements:

4.1 Mandate:

The management of cultural resources in the DP is currently mandated by the KwaZulu-Natal Nature Conservation Management Act No. 9 of 1997 as follows:

Powers, Duties and Functions of the KwaZulu-Natal Nature Conservation Board

"The Board must ensure the protection and management of heritage resources within the protected areas, according to the principles of the KwaZulu-Natal Heritage Act, 1997" (Chapter 3, part 5(3)(c)).

Powers, Duties and Functions of Local Protected Area Boards

"Subject to the provisions of any law and the policy issued by the Board, the objects of local boards are to promote local decision making regarding the management of nature conservation and heritage resources within protected areas as well as to promote the integration of activities of the protected area into that of the surrounding area." (Chapter 5, part 27(1)).

4.2 The KwaZulu-Natal Heritage Act

The KwaZulu-Natal Heritage Act (Act No. 10 of 1997) protects all provincial heritage sites (as defined by the Act), through the establishment of a Council known as *Amafa aKwaZulu-Natali* (Heritage/Erfenis KwaZulu-Natal).

Object of *Amafa aKwaZulu-Natali*

"The object of Amafa aKwaZulu-Natali shall be the conservation, protection and administration of the heritage resources of the Province within the terms of this Act and to generally promote and coordinate heritage conservation for the benefit of present and future generations" (Section 3).

It should be noted that:

"Any proposed demolition, addition or alteration of structures or parts thereof which are older than 60 years shall be subject to stipulated permit conditions as determined by Amafa a KwaZulu-Natali (part 26(1));

and that

"No person may destroy, damage, excavate, alter, write or draw upon, or otherwise disturb any archaeological, rock art, palaeontological, battlefield or meteorite site except under the authority of a permit issued by Amafa aKwaZulu-Natali" (part 26(6)(a)).

where:

"alter" means *"any action affecting the structure, appearance or physical properties of a place or object whether by way of structural or other works, by painting, plastering or other decoration or any other means"* (part 1).

"archaeological" means:

(a) *"material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;*

(b) rock art, being a form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and is older than 100 years including any area within 10 m of such representation;

(c) features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found "(part 1).

"Any person who contravenes a provision of this Act shall be guilty of a criminal offence and shall on conviction be liable to a fine or to a term of imprisonment determined by regulations" (part 32).

5. Guiding Principles for the Conservation of Cultural Resources*

(For definitions of italicised terms, refer to Appendix A)

The KwaZulu-Natal Nature Conservation Service (NCS) acknowledges that the following principles must be adhered to in the conservation of cultural resources in the DP:

- The aim of conservation** is to retain the *cultural significance* of a *site* and must include provision for its security, its *maintenance* and its future.
- Conservation is based on a respect for the essential *fabric* and should involve the least possible physical intervention. It should not distort the evidence provided by the *fabric*.
- Conservation should make use of all the disciplines that can contribute to the study and safeguarding of a *site*. Techniques employed should be appropriate.
- Conservation of a *site* should take into consideration all aspects of its *cultural significance* without unwarranted emphasis on any one aspect at the expense of others.
- The conservation policy appropriate to a *site* must first be determined by an understanding of its cultural significance.
- The conservation policy will determine which uses are compatible.
- Conservation requires the maintenance of an appropriate visual setting, for example form, scale, colour, texture and materials. No new construction, demolition or modification that would adversely affect the setting should be allowed. Environmental intrusions that adversely affect appreciation or enjoyment of the *site* should be excluded.
- A building or work should remain in its historical location. The moving of all or part of a building or work is unacceptable unless this is the sole means of ensuring its survival.
- The removal of contents that form part of the *cultural significance* of the *site* is unacceptable unless it is the sole means of ensuring their security and preservation. Such contents must be returned should changed circumstances make this practicable.
- Cultural resource management strategies should be reviewed and upgraded continually on the basis of revised information.

* Adapted from: Australian ICOMOS. 1988. The Australia ICOMOS Charter for the conservation of places of cultural significance (The Burra Charter). Australia ICOMOS: Sydney.

** Conservation in this context refers to the conservation of cultural resources and it includes protection, preservation and sustainable use of places or objects so as to safeguard their cultural significance

SECTION B

PLAN FOR THE

DRAKENSBERG PARK

COMPONENT A: CONSERVATION MEASURES TO CURB SITE DETERIORATION

1. COORDINATION OF MANAGEMENT

Cultural resource management in the DP requires a co-ordinated approach, based on minimum uniform standards, that is open to public scrutiny and the participation of all interested and affected parties.

1.1 Objective:

To manage cultural resources in the DP in accordance with an approach that is co-ordinated, accountable and open to participation by all interested and affected parties.

1.2 Current Management Actions:

A memorandum of understanding has been drawn up between the Heritage agency for KwaZulu-Natal, *Amafa aKwaZulu-Natali,* and the NCS (see appendix h).

The Chief Conservator Drakensberg convenes the Cultural Resource Advisory Committee (formerly called the Rock Art Advisory Committee) annually. The committee includes representatives from both the NCS, *Amafa aKwaZulu-Natali*, the Natal Museum and other interested and affected parties.

As CURE is implemented throughout the province, the Drakensberg will be form a sectionof a provincial CRAC meeting which will be chaired by a member of the executive of the NCS.

1.3 Future Priorities:

The appointment of a cultural resource manager to implement the recommendations of this document, would benefit the management of cultural resources in the DP.

2. SITE MONITORING

Sites within the DP should be monitored regularly in order to determine whether impacts (if any) are having an unacceptable effect upon the cultural resources.

2.1 Objective:

To monitor cultural resource sites within the DP according to a set annual frequency, and to take appropriate action thereafter.

2.2 Current Management Actions:

a) Each station has been issued with a set of site record forms pertaining to the known sites under its administration, along with a map giving the exact location of each site. This site record should be kept in the station's Cultural Resource Management file.

b) Each site has a number that indicates its management status, corresponding to the frequency with which the site should be patrolled.

Table B1: minimum patrolling requirements for sites in the DP

Management Status	Patrol Frequency
0	unknown; urgent assessment required
1	at least once a month; preferably twice
2	every three months
3	every six months
4	once a year

c) The following guidelines apply:

i) Officers-in-charge should develop an annual plan to ensure that sites are monitored as required. This should be presented at the annual management meeting as a series of goals; Achievements should be recorded in the station's annual report and should also be tabled at the annual management meeting.

ii) Officers, field rangers and/or honorary officers should be designated site monitors;

iii) Site monitors may not interfere with cultural resources in any way;

iv) Monitors should complete a cave checklist card (appendix D);

v) Officers-in-charge should debrief monitors, and take appropriate action, in consultation with *Amafa aKwaZulu-Natali* staff, as indicated by the guidelines in this document;

vi) Completed cards should be given to the relevant officer-in-charge, who should enter the relevant information on the relevant site record sheet in station's Cultural Resource Management file.

vii) Blank copies of cards should be ordered from the Administrative Officer (Drakensberg);

viii) Photographs of site contents should be taken whenever possible, and kept in the station's Cultural Resource Management file.

2.3 Future Priorities:

The present system will be refined and evaluated regularly.

3. SITE VEGETATION

Vegetation surrounding sites, including those that are managed for the public, should be retained whenever possible, due to its value:

- as a shield to reduce the impact of direct sunlight on paintings;
- for site microclimate control;
- to buffer daily extremes in temperature and humidity;
- for the consolidation of shelter deposits and soils in the vicinity of sites, for assistance in the suppression of airborne dusts, etc.

However, vegetation has the potential to cause:

- direct abrasion damage to painted surfaces by the rubbing contact of adjacent vegetation;
- damage to the paintings from direct and indirect heat from fire and carbon over the paintings.

Where necessary, site microclimates may be modified and excessive sunlight reduced by encouraging conditions conducive to the natural germination of seedling trees, ground covering creepers, and grasses.

3.1 Objective:

To assess periodically the impact of vegetation on specific cultural resources and to take appropriate action in consultation with Amafa aKwaZulu-Natali.

3.2 Current Management Actions:

a) Vegetation is managed when and where necessary.

b) Where there is doubt as to the impact of the removal of vegetation, a member of *Amafa aKwaZulu-Natali* should be consulted prior to any action being taken.

3.3 Future Priorities:

The present system will be refined and evaluated regularly.

4. FIRE MANAGEMENT

Vegetation surrounding cultural resource sites should always be protected from both scheduled and unscheduled burns.

4.1 Objective:

To prevent fire damage to cultural resource sites.

4.2 Current Management Actions:

The following guidelines apply:

a) When doing a pre-burn assessment of sensitive features, officers-in-charge should take steps to minimize or eliminate fire damage, for example by burning a firebreak around the site.
b) In the case of unscheduled burns, officers-in-charge should identify threatened, fire-sensitive sites, and take immediate steps to avoid potential damage.
c) Where there is doubt as to the impact of the removal of vegetation, a member of *Amafa aKwaZulu-Natali* should be consulted prior to any action being taken.

4.3 Future Priorities:

Long term strategies for the protection of cultural resource sites from fire damage should be developed for every station due to the frequency of uncontrolled unscheduled fires.

This strategy should include placing cultural resource sites, identified as vulnerable to fire damage, on the list of sensitive features for all management blocks.

5. SITE INTERVENTIONS

Various forms of intervention are appropriate and may be necessary for cultural resource sites in the DP, and include:

- removal of graffiti and other signs of vandalism;
- removal of bird and insect nests and excreta;
- removal of vegetation to reduce risk of fire damage;
- vegetation planting to reduce impact of weather extremes and to reduce dust;
- prevention of water flow over paintings.

5.1 **Objective:**

To identify sites requiring intervention and to decide on appropriate actions in consultation with Amafa aKwaZulu-Natali.

5.2 **Current Management Actions:**

Wherever site interventions are required, officers-in-charge should consult with *Amafa aKwaZulu-Natali.*

5.3 **Future Priorities:**

The present system will be refined and evaluated, and new guidelines developed when necessary.

6. ANIMALS IN SHELTERS

Rock paintings and archaeological deposits are easily damaged by animals rubbing against the rock and trampling shelter floors.

6.1 **Objective:**

To identify sites being damaged by animals and to take the necessary remedial actions.

6.2 **Current Management Actions:**

a) The presence of animals in shelters is identified by site monitors and is managed when and where necessary.
b) Any remedies that may affect the microclimate of the cave, the rock surface or the cave floor should be discussed with the Regional Ecologist (Drakensberg) and, if necessary *Amafa aKwaZulu-Natali.*

6.3 **Future Priorities:**

The present system will be refined and evaluated regularly.

7. GENERAL VISITOR MANAGEMENT

Uncontrolled use of cultural resource sites is undesirable as it may result in unnecessary and often irreversible deterioration of such sites.

7.1 **Objective:**

To manage the visitation of cultural resource sites.

7.2 Current Management Actions:

a) At cultural resource sites not managed for public visitation, the impact of human visitation is monitored and regulated as follows:

   i) No camping is allowed in cultural resource sites unless approved by the Cultural Resource Advisory Committee.
   ii) Regular, ongoing monitoring patrols occur to all sites within the DP. Honorary officers are used to supplement the patrols in key areas during peak periods.
   iii) Paths to unmanaged sites are allowed to overgrow and are not maintained.
   iv) Unmanaged sites are not recorded on hikers' maps, or on any literature or displays.
   v) Site information is kept confidential and is not made available to the public (also see section 10).

b) Cultural resource sites managed for the public are discussed specifically in Section C.

c) Every DP camp office has a sign showing the caves that are available for overnight camping and which caves have been booked for the night.

7.3 Future Priorities:

a) Paths leading to or past sensitive sites should be closed or re-routed.

b) Environmental impact assessments should include an assessment of the cultural value of sites.

c) Accurate visitor statistics and other information pertaining to sites visited by the public should be kept to facilitate pro-active site management and conservation.
   Information useful in the development of visitor profiles includes details of group size and composition (including nationality); repeat visitation details; seasonal patterns and peak periods of visitor activity; prime interest in visiting the region and the DP; satisfaction level and suggestions for enhancement of visitor experiences.

d) The use of visitor books pertaining to sites visited frequently is recommended. These will enable park managers to respond to complaints and suggestions and to obtain some of the above information. Visitor books in good condition are also valuable in reducing the incidence of graffiti and other forms of non-compliant behaviour.

e) Each station should have prominent signs informing visitors that rock art sites may not be used for overnighting.

The KwaZulu-Natal Nature Conservation Service undertakes to:

a) Ensure that all cultural resource sites are maintained in as good a condition as possible, given that a poorly maintained site encourages vandalism.

b) Ensure that the movement of visitors at **managed** cultural resource sites is monitored and regulated. This will be done through strategies such as:

- monitoring the effectiveness of existing natural barriers in restraining visitors from closer inspection;
- the delineation of narrow walkways, for example by the use of barrier fences and rubber matting;
- the construction of a raised viewing platform;
- the placement of a low, free-standing barrier to limit visitor proximity to artefacts and/or painted surfaces.

c) Ensure that visitor management structures, including viewing platforms:

- are reversible in construction and cause, where possible and acceptable, no permanent impact to the fabric of the site;
- are designed to take into account optimal viewing and photographic opportunities, consistent with site protection objectives;
- are within the guidelines set by the National Monuments Council (see Appendix E) and *Amafa aKwaZulu-Natali;*
- conform to the principles of archaeological conservation (Appendix A);
- are conceived, designed, built and managed in consultation with *Amafa aKwaZulu-Natali.*

8. THE USE OF CULTURAL RESOURCE SITES BY HOTELS AND OTHER INSTITUTIONS

It is important to manage visitors in their interaction with cultural sites in order to prevent unnecessary and often irreversible deterioration of such sites. The guests of certain hotels adjacent to the DP currently visit sites in an uncontrolled and unsupervised manner. As managers of cultural resource sites in the DP, the NCS cannot allow such unmanaged visitation to continue.

However, hotel guests should be able to visit significant examples of cultural heritage sites within the DP as the presence of these sites is a strong drawcard for visitors to the KwaZulu-Natal Drakensberg.

8.1 Objective:

To manage the use of cultural resource sites by hotels and other institutions to prevent unnecessary deterioration of such sites.

8.2 Current Management Actions:

Proposals have been developed for discussion with the Drakensberg hotel industry.

Proposals for the Management of Hotel Guests Visiting DP Cultural Resource Sites

a) The NCS is responsible for the maintenance of cultural resource sites within the DP that are utilized by hotel visitors and other user-groups;
b) Cultural resource sites utilized by hotels and other institutions should be identified as a matter of urgency;
c) The approximate monthly number of visitors to individual sites should be established;
d) All sites should be restored to and maintained in as "natural" a condition as possible, through the removal of graffiti, bedding, signposts and litter, with the assistance of *Amafa aKwaZulu-Natali*;
e) A permit system for all visitors to the DP, including hotel guests, should be introduced. A permit would list the cultural resource sites that they intend visiting, as well as guidelines for their behaviour. Visitors found contravening their permit regulations will be subject to the relevant law enforcement procedures;
f) As many hotel guests as possible should be directed to designated managed sites;
g) Visits to unmanaged sites should be discouraged by not marking these sites on maps and by withholding directions to these sites;
h) Hotel guests wishing to visit sites should be accompanied by an accredited guide (i.e. who has received training in rock art appreciation);
i) Trained NCS personnel will visit high visitation sites at least monthly to ensure the efficacy of management measures. If sites continue to sustain vandalism or other inappropriate use, more extreme measures will have to be considered;
j) Hotels should contribute financially or otherwise to the upkeep of sites and paths used primarily by their guests.

8.3 Future Priorities:

a) A management system for hotel guests is required.
b) The use of sites outside of the DP needs to be investigated.

9. CONSUMPTIVE UTILIZATION OF ROCK ART

Some traditional healers perceive the paint to be imbued with strong powers and, as a result, use it in the production of traditional medicines. Whilst this practice is in contravention of heritage legislation, it is difficult to prevent. It thus important to consult traditional healers to find mutually acceptable solutions.

9.1 Objective:

To engage with traditional healers to find a practical solution as regards the consumptive utilisation of rock art and to source possible alternatives.

9.2 Current Management Actions:

This issue has been discussed at the NCS Traditional Healers Liaison meeting.

9.3 Future Priorities:

To interact with the appropriate people and organizations to discuss the removal of paint and to investigate solutions.

10. SPECIFIC SITE VISIT REQUESTS

Visitors frequently request directions from field staff to specific painted sites.

10.1 Objective:

To reduce visitor impact on unmanaged cultural resource sites.

10.2 Current Management Actions:

The following guidelines apply:

a) Staff should use their discretion and judgement when people request to visit unmanaged sites.

b) Requests from the general public:

- i) Field staff retain the right to refuse to supply directions to specific sites;
- ii) Site visits should take place by prior arrangement;
- iii) Whenever possible, visitors should be accompanied by a guide, who will simultaneously record the condition of the site on a cave checklist card (see pages 7-9);
- iv) A detailed record of visitors to unmanaged sites should be kept. Details on numbers of visitors to specific sites, ages, and nationality and on how they came to know of the site(s) are required;
- v) Visitors should be requested to sign a site visit permit.
- vi) Whenever possible, field staff should meet visitors prior to their site visit;
- vii) The usual NCS guidelines apply to visitors who wish to visit cultural resource sites for commercial gain, such as filming.

c) Requests from researchers:

- i) All guidelines pertaining to the general public also apply to requests from researchers;

ii) Researchers should provide details of their institutional affiliation and a motivation including whether the proposed visit is for personal or professional purposes. Where necessary, an NCS and/or *Amafa aKwaZulu-Natali* permit should be obtained;

iii) Researchers may be allowed to visit a site unaccompanied.

d) Requests from traditional healers:

Traditional healers are known to value certain painted shelters as sacred sites. Traditional healers should thus be allowed to use painted shelters for sacred purposes under controlled circumstances.

i) All guidelines pertaining to the general public also apply to requests from traditional healers;

ii) Traditional healers may be granted access to painted shelters following liaison with appropriate NCS staff.

iii) Traditional healers should be accompanied to sites by NCS staff who have undergone rock art appreciation training.

10.3 Future Priorities:

These will be determined as and when issues are identified.

11. TOUR GUIDES AND GUIDED SITE VISITS

Guides in the DP, whether they are hiking club leaders, commercial tour guides, hotel guides or community tour guides, represent an opportunity to improve the control of visitors to, and enhance their experience of, cultural resources. Guides should be familiar with and able to enforce appropriate conduct at cultural resource sites. The biological and cultural resource information provided by guides should be of an acceptable standard.

11.1 Objective:

To ensure that all guides within the DP are trained in rock art appreciation and suitable behavior towards cultural resources.

11.2 Current Management Actions:

A community tour guide policy is in place.

11.3 Future Priorities:

a) All commercial guides should be accredited to a relevant standards authority.

b) All guides and trail leaders should undergo a rock art appreciation course.

12. DEVELOPMENT PROJECT PLANS

The standard NCS planning process should be followed when embarking on an action that may affect a cultural resource site.

12.1 Objective:

To ensure that the official planning procedure is followed and to ensure that Integrated Environmental Management (IEM) principles guide all development projects.

12.2 Current Management Actions:

All developments in the DP are subject to IEM and to clearance from the Conservation Branch meeting and Project Planning Committee of the NCS via the relevant line management structures.

12.3 Future Priorities:

Proposals should be referred to *Amafa aKwaZulu-Natali*. Future priorities will depend on the success of the above measures.

13. LEGISLATIVE PROTECTION

Cultural resource sites in the DP are currently afforded blanket protection by the KwaZulu-Natal Heritage Act (Act 10 of 1997). The KwaZulu Natal Nature Conservation Management Act (Act 9 of 1997) requires the NCS to ensure that heritage resources within its protected areas are protected and managed according to the principles of the Heritage Act.

13.1 Objective:

To enforce the KwaZulu-Natal Heritage Act 10 of 1997 to ensure the protection of all of the cultural heritage sites within the DP.

13.2 Current Management Actions

Cultural resources within the DP are managed according to the guidelines contained in this document.

13.3 Future Actions Required

a) NCS staff need to be informed as to how the above act is to be applied in practice through an *Amafa KwaZulu-Natali* written guideline and/or training course.

b) The regulations of the KZN Nature Conservation Management Act should include legislative measures to protect cultural resources in the DP.

COMPONENT B: PROMOTING AN APPRECIATION OF CULTURAL RESOURCES IN THE DRAKENSBERG PARK.

1. VISITOR INTERPRETATION

Visitor awareness as regards the significance, meaning and conservation of cultural resources in the DP is an essential component of their effective management.

The NCS cannot, by itself, provide an adequate cultural resource education programme. However, effective programmes can be offered through the creation of partnerships with cultural resource authorities and institutions.

Furthermore, the promotion of an awareness of the culture resources of the DP amongst neighbouring communities should be incorporated into the Drakensberg Community Conservation programme.

Such initiatives should be based on an integrated strategy for the DP as a whole, with different emphases in the northern, central and southern regions, and with site-specific plans for each station.

1.1 Objective:

To provide an DP visitor interpretative programme that serves to create an awareness of the significance, meaning, conservation and management of the cultural resources of the DP.

Interpretive Mix:

A visitor interpretive programme should offer a range of alternatives according to the degree of visitation, visitor requirements and the interpretive goal of the section concerned. Specific station strategies are contained in Section C.

Visitor Facilities:

The provision of visitor facilities at certain cultural resource sites should ensure that visitors have a quality experience, with the objective of preventing non-compliant behaviour. Facilities and management structures should be designed to encourage an appreciation of the meaning and significance of promoted sites, and their value in terms of a national heritage. Simultaneously, monitoring and management is necessary to ensure that there is minimal visitor impact at managed sites.

1.2 Current Management Actions:

a) A pamphlet entitled *Rock Art in the Drakensberg* has been produced by the NCS and the Natal Museum and is available at every DP station (see Appendix F).

b) Pamphlets about rock art from the National Monuments Council are available at every DP station.
c) Sites currently managed for visitors are Main Caves, Giants Castle; Battle Cave, Injasuti and Game Pass, Kamberg.
d) Postcards and books about rock art are available in the curio outlets at the camps in the DP.

1.3 Future Priorities:

a) The facilities at managed sites should be upgraded (see section C).
b) Interpretive sites are required in the southern and northern areas of the DP (see section C).
c) A display on the rock art of the Drakensberg is required for every DP section.
d) The use of trained tour guides from local communities should be pursued.
e) At least one interpretive centre is required per sub-region of the DP.
f) Appropriate literature should be developed.

2. NCS STAFF EDUCATION

All staff should have appropriate training with regard to the appreciation of and monitoring guidelines relevant to cultural resource sites in the DP. Such training may be provided by *Amafa aKwaZulu-Natali* and should be repeated as frequently as required.

2.1 Objective:

To ensure that all staff undergo appropriate education to ensure that the significance, meaning and conservation of cultural resources in the DP are understood.

2.2 Current Management Actions:

a) The majority of Drakensberg staff (junior and management) have completed a rock art appreciation course.
b) Most officers-in-charge have been involved in workshops to discuss the CURE management plan.
c) Natal Museum and *Amafa aKwaZulu-Natali* staff have visited sites with NCS staff.

2.3 Future Priorities:

Regular educational activities on cultural resource appreciation and management are required for staff, particularly new staff.

3. FORMAL EDUCATION

The cultural resources of the DP, especially the rock art, represent a unique opportunity for visiting educational groups to understand South Africa's cultural heritage.

3.1 Objective:

To support cultural heritage education initiatives and to include cultural considerations in community conservation programs.

3.2 Current Management Actions:

a) The Main Caves, Giants Castle are used regularly by educational groups.
b) Educational groups qualify for an educational concession when entering the DP.

3.3 Future Priorities:

a) Schools should be made aware of managed cultural resource sites.
b) Educational resource materials should be developed in conjunction with *Amafa aKwaZulu-Natali* and other appropriate partners;
c) Rock art information should be included in DP education centres.

4. NEIGHBOUR CONSULTATION

The DP is only one part of a larger cultural environment. Social, economic and political trends outside the DP are having a significant effect on the NCS's ability to conserve the natural and cultural resources within it. It should also be recognised that cultural resources in adjacent areas are as important as those within the DP.

4.1 Objective:

To inform communities neighbouring the DP about the management of the cultural resources of the DP in consultation with Amafa aKwaZulu-Natali.

4.2 Current Management Actions:

a) The KwaZulu-Natal Nature Conservation Management Act No. 9 of 1997 provides for the establishment of local boards for protected areas that will have strong representation from neighbouring communities. These boards are required "*to promote local decision-making regarding the management of nature conservation and heritage resources within protected areas as well as to promote the integration of the activities of the protected area into that of the surrounding area* (part 27(1)).
b) Local community leaders are invited to participate in annual management meetings of the sections of the DP.
c) Local community leaders are invited to an annual open day to enable their participation in the management of the DP section concerned.
d) Representatives of Inkosi Hadebe of the AmaHlubi meet regularly with the management of Witteberg section to discuss the management of the grave of Inkosi Langalibalele.

4.3 Future Priorities:

Neighbouring communities must be fully consulted extensively in the second phase of the development of CURE.

5. NEIGHBOUR EDUCATION

An appreciation of cultural resource sites in the DP should be encouraged within the park's neighbouring communities, not least because similar sites, embodying a national heritage, also occur in those areas.

The NCS can support cultural resource education initiatives by including cultural resource issues in the Community Conservation programmes run by NCS staff in neighbouring communities.

5.1 Objective:

To support cultural resource education initiatives in neighbouring communities and to include cultural resources in community conservation programs.

5.2 Current Management Actions:

a) Teachers have undergone rock art appreciation courses.
b) Community leaders from neighbouring communities have visited sites with a NCS guide.

5.3 Future Priorities:

a) *Amafa aKwaZulu-Natali* should to be approached to facilitate cultural resource appreciation programmes in the communities adjacent to the DP. The feasability of such programmes being run in partnership with the NCS Conservation Education Programme should be investigated.
b) Cultural resource information should be included in open day activities, in community conservation activities and in education centres throughout the DP.
c) District Conservation Officers should be encouraged to promote cultural resource appreciation programs in local communities.

5. MARKETING

The cultural resources of the DP represent a unique marketing opportunity.

7.1 Objective:

To market managed sites in the DP as rock art destinations of international significance.

7.2 Current Management Actions:

a) Rock art is used as a backdrop on the DP colour marketing brochure.
b) Various hotels advertise the presence of rock art in the DP.

c) Rock art memorabilia is sold in DP curio shops.

7.3 **Future Priorities:**

a) A definitive rock art marketing plan should be developed in conjunction with all the relevant stakeholders.
b) Managed rock art sites should be promoted in all DP marketing literature. The location and identity of unmanaged sites and sites in the Didima Special Conservation Area at Cathedral Peak should not be provided.
c) Quality thematic souvenirs should be available in all DP curio outlets.
d) The rock art of the DP, especially managed sites, should be publicized as much as possible in the mass media.
e) Rock art tour packages of a high standard should be marketed.

COMPONENT C: TO PROMOTE RESEARCH OPPORTUNITIES, SITE RECORDING AND MONITORING, AND TO ESTABLISH AND MAINTAIN DATABASES

Archaeological and historical research in the DP should be done to support the management, protection, understanding and interpretation of cultural resources.

Sound planning for the conservation and management of cultural resources within the DP is dependent upon:

- the evaluation of management processes;
- the research results and recommendations stemming from investigation of specific deterioration problems;
- the results of trial conservation measures conducted as pilot projects by heritage specialists;
- research to determine visitor needs and solutions to problems caused by visitation.

1. INVENTORY

The conservation and management of cultural resources within the DP depends on the compilation and frequent updating of a detailed inventory of cultural resources, including their content and significance.

1.1 **Objective:**

To maintain and update a detailed inventory of cultural resources within the DP.

1.2 **Current Progress:**

a) All known archaeological sites within the DP are recorded on the Drakensberg Geographic Information System (GIS) at Queen Elizabeth Park. These details were obtained from the Natal Museum Archaeological Data Recording Centre.
b) Hard copies of the information contained on the GIS have been issued to each station in the DP in the form of site information sheets. An example

of a site record form is attached as Appendix B.

c) Each station has all of the rock art and archaeological sites within its control recorded on 1:50 000 maps, which are held on-station.

d) Every station is required to send details of all new sites discovered to *Amafa aKwaZulu-Natali* by 1 June every year for inclusion in the provincial database.

1.3 Future Priorities:

a) Site names should be standardised to conform to the national site name.

b) The site management rankings for all known sites should be re-investigated.

c) Each station should have copies of the Natal Museum database of photographs identifying site locations, to facilitate the location and assessment of sites.

d) Each officer-in-charge should take photographs to show the location of sites in his/her area, where photographs of site locations are not available from the Natal Museum.

e) Site locations should be re-recorded using a Global Positioning System (GPS).

f) Unsurveyed areas should be surveyed.

g) The Rock Art Management Questionnaire (see Appendix C) should be modified and used in all future surveys.

2. REQUIREMENTS FOR RESEARCH PROJECTS

It isnecessary to monitor cultural resource research in the DP for purposes of management and access.

2.1 Objective:

To promote and monitor cultural resource research conducted in the DP.

2.2 Current Management Actions:

a) All researchers are required to submit a research proposal for consideration by the NCS in a prescribed format (see Appendix G).

b) Researchers are required to apply for the relevant permits from *Amafa aKwaZulu-Natali*, where necessary.

c) See Specific Site Visit Requests.

3. POSSIBLE RESEARCH PROJECTS

Although a large body of research exists as regards the cultural resources of the DP, there are still large gaps in the understanding of the meaning, utilisation and management of these resources.

3.1 **Objective:**

To promote and support cultural resource research within the DP.

3.2 **Current Management Actions:**

a) Several research projects are currently underway. Progress is reported to the Cultural Resource Advisory Committee.

b) Several possible research projects have been identified:

- morphological description of sites including geophysical analysis; site vegetation; determination of baseline dust levels; specific conservation problems noted for each site;
- environmental monitoring of site microclimates; site vegetation;
- the impact of fire;
- rock weathering rates;
- reconstruction mapping of truncated rocks/boulders/slabs;
- photo-monitoring of exfoliating "surface skins" and granular disintegration;
- use of cultural resource sites by visitors.

3.3 **Future Priorities:**

Research concerning visitor use of sites and interpretive materials is needed urgently.

SECTION C

STRATEGY FOR DP SECTIONS

1. CULTURAL RESOURCE MANAGEMENT IN THE NORTHERN DP

The northern region of the DP consists of the Rugged Glen and Royal Natal sections in the north, Cathedral Peak and Culfargie in the centre and Monks Cowl in the south. There is a large section of land between Royal Natal and Cathedral Peak that was not considered for inclusion in CURE as it falls under the authority of the Ingonyama Trust and is not under the management of the NCS.

Component A: Conservation Measures to Curb Site Deterioration

a) Inventory:

The cultural resource inventory for the northern DP is satisfactory, but needs updating.

Table C1: Numbers of known archaeological sites in northern DP sections

Royal Natal National Park	35
Rugged Glen	0
Cathedral Peak	144
Monks Cowl (incl. Culfargie)	16
TOTAL	195

b) General Visitor Management:

Visitor usage of the northern DP mostly affects the cultural resources of Cathedral Peak. Accordingly, the following strategies are proposed to ensure that these resources are adequately protected, while simultaneously providing a quality experience for the visitor.

Tour Guides and Guided Site Visits

Trained community guides at Cathedral Peak take visitors to Brotherton Rock, Procession Shelter and Lower Mushroom Shelter, as well as to sites in the Didima Gorge Special Conservation Area (SCA).
Visitors to Royal Natal will be encouraged to visit Sigubudu. This site requires urgent assessment of the management strategies currently being applied.

Cathedral Peak: The Premier Rock Art Destination of South Africa
It is proposed that Cathedral Peak be developed as South Africa's premier rock art destination. This follows the principle of managing quality sites for visitors with very specific procedures.

Management Strategy for the Didima Gorge Special Conservation Area (SCA)

a) The SCA is demarcated on the official NCS map. The southern boundary of the south-eastern end of the SCA will demarcated on the ground by means of beacons. The confluence of the Mhlwazini and Didima rivers is not be included in the SCA. Painted sites in the SCA are not marked on hikers' maps.

b) The contour path which forms part of the SCA boundary will also be the passage through the Gorge for hikers who do not wish to stop in the Gorge. Hikers who remain on the path will not require guide.

c) Access to the SCA will only be granted to groups or individuals that are accompanied by trained guides accredited by the NCS.

d) Three categories of accredited guides are envisaged:

i) Community guides and porters: These are members of the local neighbouring community. They are trained and supported by the NCS and *Amafa aKwaZulu-Natali* before receiving NCS accreditation in order to operate in the SCA. Visitors reimburse guides and porters for their services.

ii) Club Guides: These are guides nominated by hiking clubs. These guides receive NCS accreditation once they have passed an *Amafa aKwaZulu-Natali* course on appropriate conduct in painted sites.

iii) Individual Guides: These are persons wishing to access the SCA with a group. These guides receive NCS accreditation once they have passed an *Amafa aKwaZulu-Natali* course on appropriate conduct in painted sites.

e) An overnight booking system will be enforced. Overnighting will be allowed only in the company of an accredited guide. Overnighting will be encouraged at the following places:

- unpainted shelters in the gorge,
- at the junction of the Mhlwazini and Didima rivers.

f) Leopard Cave will remain open for overnight use. Damage alleviation measures will be implemented on specialised advice. Access to the rock art in the vicinity of the shelter will be restricted through the implementation of appropriate measures. The access path needs management or should be rerouted.

g) Poacher's Shelter will remain open for overnight use. The site will be zoned into use zones on specialist advice in order to protect the remaining rock art. An interpretive zone will be included.

h) Rigorous monitoring of the two painted shelters that are used for overnight purposes is required. At times, over-utilised shelters will be closed in order to allow them to recover. Should damage to the rock art and/or deposits occur, the matter of the use of that shelter will require renegotiation with all interested and affected parties.

j) Guides and NCS honorary officers will be used to supplement NCS patrols in the valley to ensure compliance with the set guidelines.

k) The SCA should be proclaimed a "Heritage Conservancy" in terms of section 23 of the Heritage Act in order to facilitate the enforcement of the regulations for the SCA.

Component B: Promoting An Appreciation of Cultural Resources

a) Visitor Interpretation

i) *Cathedral Peak Cultural Resource Interpretative Centre is* envisaged as part of the proposed Didima Hutted Camp at Cathedral Peak. The centre should be located so as to be accessible to both day visitors and residents of the hutted camp. It is envisaged that this centre will serve as the focal rock art experience for the majority of visitors to Cathedral Peak.

ii) Rock art should be part of the displays at the Royal Natal Education Centre.

b) Use of Rock Art by Hotels

The hotels will be encouraged to use Sigubudu at Royal Natal and Procession Shelter and/or Rainbow Shelter at Cathedral Peak. Appropriate visitor management and interpretive facilities are required at the sites, which are already used.

c) Marketing

Cathedral Peak should be marketed as the premier rock art destination in South Africa. Package tours using local community tour guides and accommodation at the hotel/Didima Hutted Camp camp should be developed and marketed extensively.

The Cathedral Peak logo could be a rock art symbol. Thematic quality souvenirs should also be sold in the NCS curio shop.

d) Tourist Guides

The northern DP represents a viable opportunity for the establishment of a variety of tourist guide enterprises.

Component C: The Promotion of Research Opportunities, Site Recording and Monitoring and the Establismenth and Maintainance of Databases

Possible Research Projects

Possible research projects include:

i) An assessment of visitor use of and attitudes towards cultural resources in the SCA;

ii) Specialized conservation needs, for example the impact of fire at Botha's Shelter.

2. CULTURAL RESOURCE MANAGEMENT IN THE CENTRAL DP

The central DP consists of the area between the Giant's Castle complex (Injasuti, Hillside and Witteberg) in the north and Mkhomazi in the south. The Kamberg and Highmoor sections are situated in the area between Giant's Castle and Mkhomazi.

Component A: Conservation Measures to Curb Site Deterioration

a) Inventory

The cultural resource inventory for the central DP is incomplete. Although Injasuti has been surveyed well, more work needs to be done in the rest of Giant's Castle. Inventories for Highmoor, Kamberg and Mkhomazi are relatively complete.

Table C2: Numbers of known archaeological sites in central DP sections

Giants Castle	126
Highmoor	24
Kamberg	13
Mkhomazi	12
TOTAL	175

b) General Visitor Management

The majority of visitors are routed to the existing facility at Main Caves at Giants Castle (see below). Battle Cave and Game Pass Shelter should be maintained as secondary visitor facilities. The numbers of visitors to these facilities should be monitored and remedial action, if necessary, should be considered at biannual management meetings.

Battle Cave, Injasuti

As this site is located in the wilderness zone of the DP, visitor facilities cannot be developed on-site. Currently groups visit the site in the company of an NCS guide whose services are booked in advance. Increased tour guide and cave entrance fees have resulted in fewer people visiting the facility, which is desirable given the lack of development at the site and the vulnerability of the paintings to dust. The fence around the site should be maintained and detailed visitor records are being kept.

Game Pass Shelter, Kamberg

This is a fenced, undeveloped visitor facility situated above the Kamberg camp. Access is only allowed with an NCS guide who requires appropriate training. Visitors to the site pass through Waterfall Shelter on their way to the site. Assessment of this shelter by staff of *Amafa aKwaZulu-Natali* has revealed that the paintings at this shelter are not being adversely affected. The site needs to be monitored regularly.

Main Caves, Giants Castle

The Main Caves were upgraded in 1999 to cater adequately for general visitors and educational groups. This upgrading resulted in:

i) The entrance being relocated at the southern entrance to the caves (the forest end).

ii) A waiting facility for tour groups will be located approximately 100 m before the entrance gate, with seating and appropriate displays. A short path will lead to the entrance gate. Visitors will enter Main Caves South first via a boardwalk from the entrance gate.

iii) Visitor facilities at Main Caves South focus on the interpretation of hunter-gatherer history in the Drakensberg. The hunter-gatherer display has been upgraded and a deposit profile has been integrated into the retaining wall. New interpretive displays are sited adjacent to the display.

iv) After their visit to Main Caves South, groups will proceed to Main Caves North along the existing path. Visitor facilities at the latter cave will focus on the interpretation of rock paintings. A timber deck and boardwalk with viewing platforms to maximize photographic and viewing opportunities and to minimize dust has been constructed. Interpretive panels are positioned adjacent to the timber deck.

v) Visitors exit out of the northern gate (which was prevously the entrance).

vi) The site custodian has been trained by *Amafa aKwaZulu-Natali* especially as regards visitor control.

c) **Specific Site Visit Requests**

The number of requests to visit other rock art sites at Kamberg and Witteberg is increasing dramatically. The guidelines in this document should be adhered to strictly and the numbers of visitors to the sites should be recorded and monitored.

d) **Animals in Shelters**

Animals have damaged the paintings at Blesbok Paddock in the past. Regular monitoring of the art is required to determine whether remedial action if necessary.

Component B: Promoting An Appreciation of Cultural Resources

a) **Visitor Interpretation**

Since three rock art sites are currently managed for use by the public, most interpretation in the central DP will remain on-site.
A biodiversity education centre is planned for Witteberg that will cover the biophysical and cultural aspects of Witteberg and the DP. Therefore, no dedicated cultural resource interpretive centre will be developed to service the central DP.

Provision should be made for disabled visitors to the central DP who wish to view rock paintings. A number of sites in close proximity to the offices at Witteberg could be used for this purpose.

d) **Marketing**

The Main Caves, Giants Castle should be marketed extensively to potential visitors and educational groups. This marketing drive should be supplemented by the availability of suitable thematic souvenirs in the NCS curio shop.

e) **Tourist Guides**

The three rock art sites that are managed for visitation are opportunities for the establishment of community tourist guide enterprises.

Component C: To promote research opportunities, site recording and monitoring, and to establish and maintain databases

Possible Projects

Research projects completed or underway include those of Dr Ian Meiklejohn, Dr Aron Mazel, Ms Thembi Russell and Mrs Val Ward, regarding weathering, dating and sequencing of the paintings.

Possible research projects include:

ii) assessment of visitor use of and attitudes towards the rock paintings at Main Caves, Battle Cave and Game Pass Shelter, and at specific sites requested for viewing.
ii) analysis of cave checklist cards.
iii) excavation of rock art shelters to develop a better understanding of Bushman history.

3. CULTURAL RESOURCE MANAGEMENT IN THE SOUTHERN DP

The southern region of the DP stretches from Loteni in the north to Garden Castle in the south, with the Vergelegen and Cobham sections situated in-between.

Component A: Conservation Measures to Curb Site Deterioration

a) **Inventories**

The southern DP in general has been well surveyed but could be updated through ongoing surveys.

Table C3: Numbers of known archaeological sites per southern DP stations

Loteni	29
Cobham (including Vergelegen)	71
Garden Castle	80
TOTAL	180

b) **Site Vegetation**

Painters' Cave (Bushman's Nek) and Ikanti 1 (Cobham) have excessive vegetation that is abrading the paintings.

c) **Site Intervention**

Painters' Cave (Bushman's Nek) has excessive vegetation that poses a fire hazard to the art.

d) **Visitor Management**

Future development nodes in the southern DP are Drakensberg Gardens and Bushman's Nek. As there are many colonial era rock paintings in the area, they should form the focus of the southern DP sub-region's interpretation programme.

Visitor Management Proposals For Southern DP

i) Good Hope 1 and 2 should be developed as twin interpretive sites. The contrast in damage to the paintings at these sites could be the focus of an interesting, informative and educational visitor facility. The sites are located close to the Sani Pass Hotel, but with access not regulated by the hotel. Tour operators or the NCS could regulate site visitation. Development of the Good Hope sites should include consultation with the neighbouring KwaPitela community;
ii) Ikanti 1 should be managed and developed by the NCS, possibly in conjunction with the Sani Pass Hotel. Crisis management of this site is not desirable, and interventions will depend on the implementation of the proposed permit system, and satisfactory negotiations with the hotel;
iii) Ngwangwane 1, 8 and 9 and Langalibalele Cave should be investigated regarding their suitability for visitor use.
iv) Mpongweni Shelter (also known as Siphongweni) remains available for guided visits on request. Dust control measures and the provision of a site-specific interpretive pamphlet may be required in future. Graffiti removal is being investigated at present.

e) **Specific Site Visit Requests**

Directions to a number of unmanaged sites are requested frequently. The recommendations contained in section B of this document should be adhered to, especially regarding the use of a local guide. Visits to Mpongweni may have to be restricted to allow rehabilitation of the site.

Component B: Promoting An Appreciation of Cultural Resources in the DP

Visitor Interpretation

There are no interpretive facilities available in the southern DP. It is thus proposed that:

i) cultural resources should form part of the interpretive centre planned for Bushman's Nek;
ii) trained community guides provide guided tours to Swiman's. Guides could perform an interpretive and regulatory function, as part of a low-level management strategy.

Component C: To Promote Research Opportunities, Site Recording and Monitoring, and to Establish and Maintain Databases

Possible Projects

Possible research projects include:

i) assessment of hotel visitor use and attitudes towards the rock paintings;
ii) analysis of cave checklist cards.

SECTION D

APPENDICES

APPENDIX A: PRINCIPLES OF ARCHAEOLOGICAL CONSERVATION

Definitions:

Adaptation	modifying a *site* to suit proposed compatible uses.
Compatible use	a use that involves no change to the culturally significant *fabric*, changes that are substantially reversible, or changes that require a minimal impact.
Cultural significance	of aesthetic, architectural, historical, scientific, social, spiritual or technological value or significance.
Fabric	all the physical material associated with the *site*.
Maintenance	the continuous protective care of the *fabric*, contents and setting of a *site*, as distinct from repair. Repair involves *restoration* or *reconstruction* and it should be treated accordingly.
Preservation	maintaining the *fabric* of a *site* in its existing state and retarding deterioration.
Restoration	returning the EXISTING *fabric* of a *site* to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material.
Reconstruction	returning a *site* as nearly as possible to a known earlier state and is distinguished by the introduction of materials (new or old) into the fabric. This is not to be confused with either recreation or conjectural reconstruction that are outside the scope of these principles.
Site	place of past human activity, and in respect of a rock art site, any area within 10 m of such site.

APPENDIX B: EXAMPLE OF A SITE INFORMATION SHEET

ARCHAEOLOGICAL SITES

SITE_NO	COMP_NO	OFF_NAME	LOC_NAME
[redacted]	[redacted]	Never Ending Sh.	Never Ending Sh.

CATEGORY	MANAGEMENT	LOCATION
	3	S[redacted] E[redacted]

DIRECTION

[redacted]

DESCRIPTION	CONTENTS
E.N.E. facing site, 40 metres long, 1-3m deep & > 5m high. Moderate natural screening. Good outlook to valley. Seepage & vegetation on rockface. Steep slope in front. Water available.	Paintings - Humans (17) / Eland (18) / Rhebok (2) / Animal (2) /

SITE_NO	COMP_NO	OFF_NAME	LOC_NAME
[redacted]	[redacted]	Ka-Ntuba 1	Ka-Ntuba 1

CATEGORY	MANAGEMENT	LOCATION
	3	S[redacted] E[redacted]

DIRECTION

[redacted]

DESCRIPTION	CONTENTS
South facing Overhang 30 metres long, 1-2 metres deep, & >3 Metres high. moderate –poor screening. moderate outlook. Seepage & vegitation on rockface. Flat in front. water available. Floor covered w	Paintings- Humans (29) / Eland (9) / Rhebok (2) / Hartbeest (3) / Antelope? (1) / Animals? (1) / Quiver (2) / Bag (1) /? Shape (1)

SITE_NO	COMP_NO	OFF_NAME	LOC_NAME
[redacted]	[redacted]	Mknomazi 3	Mknomazi 3

CATEGORY	MANAGEMENT	LOCATION
	3	S[redacted] E[redacted]

DIRECTION

[redacted]

DESCRIPTION	CONTENTS
E.S.E. facing shelter 15 long, 1-4 deep, and 1->3m high. Poor natural screening. Very good outlook to Mkomazi valley. Seepage on rockface. Steep slop in front. water available. Floo covered with sand	Paintings- Humans (27) / Rhebok (6) / Animal (3) / Dog (1) / Small antelope ? (1)

APPENDIX C: ROCK ART MANAGEMENT QUESTIONNAIRE

APPENDIX D: ROCK ART SITE CHECKLIST CARD

KWAZULU-NATAL NATURE CONSERVATION SERVICE ROCK ART SITE CHECKLIST

Site:

Are there any signs of people using the site since the last inspection ? (candle wax, grass bedding, camp fire, toilet paper, litter)	
Was the vegetation near to any paintings burnt ?	
Is there vegetation against paintings ?	
Are there signs of animals interfering with the paintings ?	
Is there any new graffiti ?	
Are there signs of people trying to remove or damage the paintings (not graffiti) ?	
Are there signs of water damage to the paintings?	

Anything else / comments ?

Site Checked By:

Date:

OiC Sign: Date:

KWAZULU-NATAL NATURE CONSERVATION SERVICE UHLA LOKUHLOLWA KWENDAWO ENEMIDWEBO (IMIWEBO YABATHWA)

Indawo:

Ngakube zikhona izimpawu zabantu abasebenzise lendawo emuva kokuba kade ihloliwe ? (izinsalela zamakhandlela, utshani bokulala, umlilo, iphepha langgasese, udoti)	
Kukhona okwakumile eduze kwemidwebo okwasha ?	
Zikhona izimila ezincikene nemidwebo ?	
Ngakube zikhona izimpawu zokuthi izilwane ziyayiphazamisa imidwebo ?	
Kukhona okusha okubhalwe phezu kwemidwebo ?	
Ngakube zikhona izimpawu zokuzama kwabantu ukususa noma ukulimaza imidwebo (hayi imibhalo phezu kwemidwebo) ?	
Ngakube zikhona izimpawu zokuthi amanzi avavilimaza imidwebo ?	

Kukhona okunye / umbono ?

Indawo ihloliwe u:

Usuku:

Isiginisha ye OiC: Usuku:

APPENDIX E: MINIMUM STANDARDS FOR ARCHAEOLOGICAL SITE MUSEUMS AND ROCK ART SITES OPEN TO THE PUBLIC (NATIONAL MONUMENTS COUNCIL)

Archaeological sites, including those with rock paintings or rock engravings, are especially vulnerable to damage caused unwittingly by visitors. Anyone making a site available to the public, either as a formal site museum or simply as a place of interest, should therefore take basic precautions to ensure the safety of the site and its contents. Expert advice should be sought from the National Monuments Council and/or from one of the museums or university departments listed below. No site should be opened to the public without a professional investigation that includes complete documentation in case of damage. Liaison with the local publicity office and regional services council is recommended. The following minimum standards are suggested:

1. APPROACH TO THE SITE

Arrangements for Visiting:

a) If the site is open at all times, there should be adequate signposting;
b) if the site is kept locked, there should be clear arrangements for the collection and return of a key;
c) if it is open only by appointment, there should be someone to guide people to the site and that this person has had clear instructions on what to do and say.

Provision for Vehicles:

a) There should be an adequate and well-maintained road with off-road parking;
b) the parking should not encroach on the site - vehicles should not park closer than about 100 m from the edge of the site;
c) the parking area should be marked by a barrier between it and the start of the path.

Facilities:

a) There should be a litter bin at the parking lot and it should be emptied regularly;
b) consider the need for toilets and the supply of refreshments and other facilities such as a shop, public telephone, rest room, etc., depending on the number of visitors expected;
c) consider the need to establish an interpretive centre *separate* from the site, where people can see the excavated artefacts in a museum-type situation and where you may be able to store material, provide accommodation, etc.

Design of the Path:

a) Make sure that the path to the site is distinct;
b) the path should follow the contours to avoid unnecessary erosion of the hill slope;
c) make sure there are discreet signs to indicate direction where the path crosses a rocky area;
d) the path should not enter the site at a position where the deposits or the rock art can be damaged;
e) the introductory notice board should be displayed at the end of the path and the beginning of the site, where it will not interfere with good photographic views.

2. PROTECTION OF THE SITE

The principles for protecting archaeological deposits and sites are that the methods used should be effective, reversible and recognizable yet harmonious. It is important that visitors get the impression that the site is being well looked after, so it should be clean and as "natural" as possible.

If you take, or expect to take more than 50 people a year to the site, there should be:

a) Provision of Information:

i) At least an introductory notice board explaining that the site is protected by law;
ii) where appropriate, a display with more detailed information on what can be seen at the site and what it means;
iii) a visitors' book in a container to protect it from the weather, or at the farmhouse or other convenient place;
iv) an explanatory leaflet or pamphlet that is specific to the site.

b) Protection of the Art:

i) A psychological or a physical barrier could be set up between the visitor and the rock art or display area in the form of anything from a low wooden railing to a fence that encloses the entire site, depending on the vulnerability of the site or precautions necessary for the safety of the visitor;
ii) every effort should be made to remove graffiti from the site as it attracts more graffiti. A permit from the National Monuments Council is required to remove graffiti at a rock art site.

c) Protection of the Surface and Deposits:

i) An effective cover should be put on the floor of the site to prevent dust being kicked up and damaging rock art and to stop people picking up material on the surface. Cover can be provided by a board walk, geotextile, commercially crushed stone (the layer should be at least 30 mm thick) or medium to large slabs of natural rock from the surrounds of the site. Plastic sheeting can be used to seal off the natural surface from the covering stone or rock but must be completely covered or it will degrade. Do not cover the original surface with soil from the surrounding area as it will not be possible to distinguish this from the natural deposit at a later date;
ii) there should be effective shoring up of excavated sections to prevent the sections from collapsing and to prevent people from entering the excavated area. This should be done in consultation with the National Monuments Council.

d) Regular Maintenance:

i) Provision should be made for regular visits to the site by the manager or the property owner to check on litter, damage, graffiti, etc.;

ii) there should be regular monitoring of vegetation around the site so that, if necessary,
iii) measures can be taken to protect it against trampling,
iv) potentially dangerous plants such as those with thorns can be controlled,
v) dead wood should be removed so that damage by veld fires can be avoided.

e) **Avoid Having:**

i) A litter bin on site unless very large groups are catered for;
ii) braai or picnic places on the site or right next to it;
iii) camping places within 500 m (or preferably 1 km) of an archaeological site;
iv) plastic sheeting or plastic bags exposed to view unless there is no other option;
v) concrete barriers or surfaces;
vi) metal poles or wire in contact with rock shelter or cave walls as they rust and stain the rock;
vii) a sandy surface on the outer side of a fence as this will be eroded by people walking there and the fence will be undercut.

APPENDIX F: PAMPHLET: "NATAL DRAKENSBERG PARK ROCK ART"

South Africa has many cultural treasures. The rock paintings done by San hunter gatherers are among these treasures. Many of these paintings are to be found in rock shelters in the foothills of the Natal Drakensberg Park and it is no exaggeration that this is one of the richest rock painting areas in the world.

FACTS AND FIGURES

Many people have searched for paintings in the Drakensberg during the last 40 years. During this time more than 30 000 individually painted images have been discovered and recorded. There are areas that still need to be properly searched for paintings. We are sure that there are more paintings to be found.

The rock paintings that are on record come from 550 different rock shelters. Some of these rock shelters have more than a thousand paintings in them, and one has close on 1 700 paintings.

The paintings are mainly of people, their equipment and of animals.

Many different types of animals were painted, mainly various antelope. Most of the antelope painted were eland and grey rhebuck but other antelope that appear in the paintings are hartebeest, common reedbuck, wildebeest, bushbuck, oribi, mountain reedbuck, and roan antelope.

Domestic animals such as horses, cattle and sheep, were also painted. These are mostly in the southern Drakensberg. Other animals found in the paintings are lions, leopards, dassies, baboons, hyaenas, bees, elephants, warthogs, bushpigs, aardvarks, snakes, fish, birds, jackals, dogs, rhinoceroses and even a lizard and a moth.

Paintings of wagons are known from the southern Drakensberg and it is thought that a painted scene with a wagon represents a trip that a Captain Gardiner did into the area in 1835.

HOW WERE THE PAINTINGS MADE?

The red, orange, and yellow colours came from iron oxides found in ochre stones. Black was made from burnt wood. White came from white clay. The colours were ground into powder and mixed with a binding medium such as blood, fat or water. Brushes made from animal hair or feathers, small sticks, and pieces of bone were used to apply the paint. People probably also used their hands to paint.

HOW OLD ARE THE PAINTINGS?

The age of the paintings remains largely unknown. San hunter gatherers lived in the Drakensberg from about 8 000 years ago to the 1800s, and the paintings were probably done during this period. Some of the paintings, such as those of wagons and horses, must have been done in the 1800s during the colonial period. Scientific dating techniques are improving all the time and it is hoped that they will give some answers in the near future.

WHAT DO THE PAINTINGS MEAN?

Around a hundred years ago Lucy Lloyd and Wilhelm Bleek interviewed northern Cape San prisoners in Cape Town. They recorded 12 000 pages of notes about different aspects of San life. At roughly the same time James Orpen recorded information about the San in what is now Lesotho. During the last forty years, the Kalahari San have been interviewed by researchers, who have learnt much about their lives.

The information that these people have collected has given us many clues to understanding the San paintings. They have helped archaeologists such as David Lewis Williams to argue that by and large the paintings are of a religious nature. While the paintings are indeed beautiful and many of them have been done in fine detail and are exquisitely shaded, they have many hidden meanings too.

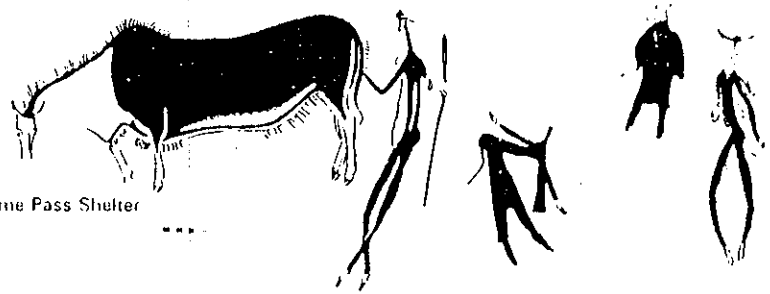
A central ritual in San religion was a trance dance during which some people went into a trance and asked God for power. We call these people shamans. The San thought that shamans in a trance acquired special powers which they got from fusing with animals, most particularly the eland. The shamans believed that with these powers they could influence the spirit world to bring rain, cure disease, ensure successful hunting and contact people far away. Many paintings show aspects of these religious beliefs.

The shamans painted what they had seen and felt while in a trance.

To link these ideas to the paintings, let us look at a scene from the Game Pass rock shelter. It shows a dying eland together with some shaman figures. The San believed that being in a trance was like a form of 'death'. They saw similarities between the behaviour of a shaman in the 'death' trance and a dying eland, especially an eland suffering from the effects of a poisoned arrow. A poisoned, dying eland falls about, sweats, trembles, bleeds from the nose and lowers its head. A shaman going into a trance does these very same things. Paintings such as these linked shamans to strong, but dying animals.

Other interesting types of painting that you might see in the Drakensberg are of human figures that have antelope features such as hooves and antelope faces, ears and horns. You may also see animal figures with human features. These paintings again represent the merging of shamans in a trance with strong animals, such as eland, which they see as the source of their power.

A common question asked is, why are humans often elongated in the paintings? An answer to this can be found in the San belief that during a trance dance, a force which starts in the shaman's stomach travels up the spine until it 'explodes' in their heads. During this event, the shamans feel as though their limbs and body are being stretched.



Game Pass Shelter

In addition to the trance explanations of the paintings, Anne Solomon has argued that there are also images which deal with issues central to women. She maintains that some of the Drakensberg paintings represent birth and initiation scenes, and that paintings such as these relate to the tensions between men and women in San society. These ideas are still being developed.

HELP PRESERVE THE PAINTINGS

The paintings are disappearing fast. The rock shelters that house them continue to erode. Vandalism is accelerating the deterioration of the paintings. Help is required to preserve the paintings so that future generations can admire, appreciate and learn from them.

Please do not:

- Pot water or other substances on the paintings.
- Touch the painted surfaces.
- Chip or scratch the paintings.
- Remove rock paintings.
- Camp or make fire in a painted shelter.
- Scribble or write your name on or near painted surfaces.

Always:

- Report any cases of damage to HPB officials.
- Encourage others not to interfere with the paintings.

FURTHER READING

Lewis Williams, J.D. & Dowson, T.A.D. 1992. Rock paintings of the Natal Drakensberg. Pietermaritzburg: University of Natal Press;

Lewis-Williams, J.D. & Dowson, T.A.D. 1989. Images of Power. Johannesburg: Southern Book Publishers;

Pager, H. 1971. Ndedema. Graz: Akademische Druck.

Vinnicombe, P. 1976. People of the Eland. Pietermaritzburg: University of Natal Press.

Text by A.D. Mazel, Natal Museum;
Cover illustration from P. Vinnicombe, People of the Eland;
Game Pass illustration from J.D. Lewis-Williams, Believing and Seeing

The paintings are protected by the National Monuments Act which forbids people from interfering with them.

People who contravene this law are liable to a fine of up to R10 000 or imprisonment up to 2 years.

Illustrated
NPB Comm. October 1995

APPENDIX G: NCS RESEARCH PROJECT PLAN FORMAT

1. *This FORMAT should be followed when drafting the project plan.*
2. *To be sent for consideration to: Head Scientific Services, KwaZulu-Natal Nature Conservation Service, P O Box 662, Pietermaritzburg, 3200. (Tel 0331 - 471961). (Fax 0331 473278). (e-mail: mbrooks@npb.co.za - queries only)*
3. *Once approved, the following conditions (amongst others) apply:*
   a) *The project details may not change except by negotiation with the Board.*
   b) *Any capture or collection of specimens must be covered by an appropriate permit.*
   c) *Annual progress reports must be submitted.*
   The NCS reserves the right to claim copies of the raw or worked data if project completion is delayed.
   d) *Two copies of the final report, thesis and/or paper(s) must be sent to the NCS co-ordinator.*
4. *The boxes are for office use only. However, when drafting the Plan, please include the headings and text that appear in the boxes to facilitate our processing the document. Allow two lines for each "approval" box shown under the heading "NCS ASSISTANCE".*

PROJECT TITLE

RESEARCHER: Title: ..... Name: .....
Postal address: .....
.....
.....
.....
Tel: (.....) ..... e-mail: .....
Fax: (.....) ..... Organisation: .....

SUPERVISOR: Title: ..... Name: .....
Organisation: .....

CO-WORKERS: Title: ..... Name: .....
Organisation: .....

NCS CO-ORDINATOR	

PROJECT LEVEL: *(Hons, MSc, etc.)* .....

OBJECTIVES: *(State succinctly in point form)*
.....
.....
.....
.....

RATIONALE: *(Brief background to project. State the management problem or information deficit. How will the project help solve the problem, and how will results be applied. Indicate the extent to which the subject has already been researched.)*

STUDY AREA: *(Indicate the geographical extent of the study area: specify any reserves that are included.)*

TIMING: Proposed commencement: .....
Proposed completion: .....

STUDY PROCEDURE: *Briefly describe the methods to be employed. Will there be any environmental impact, e.g. destructive sampling? A permit application must be submitted if animals are to be captured or specimens collected.*

NCS ASSISTANCE: *A detailed budget must be given on an attached sheet using the itemised format as set out in the Annexure. Highlight/asterisk the items and amounts, if any, requested from the NCS.*

Funding: Funds provided by: .....
Funds requested from NCS: R .....

APPROVED: ..... AMOUNT: .....

Accommodation: Specify accom. type: .....
Normal charge: .....
Discount recommended: .....
Requested dates: .....

APPROVED: ..... CHARGE: .....

Manpower: Requested: .....

APPROVED: .....

Equipment use: Requested: .....

APPROVED: .....

For office use only.

Project Plan has been accepted by the NCS, and the study may now commence.

Supported: Chief Conservator ..... Date: .....

SS Divisional Head ..... Date:.....

Approved: Head Scientific Services .....Date: .....

Registration Number: .....

ANNEXURE TO PROJECT PLAN

ITEM	BUDGET		
	Year 1	Year 2	Year 3
Bursary/salary			
Daily paid assistants			
Transport/travel			
Accommodation			
Capital equipment			
Operating expenses (not incl. in above)			
Other			
Totals			

APPENDIX H: MEMORANDUM OF UNDERSTANDING

MEMORANDUM OF UNDERSTANDING

between the

KWAZULU-NATAL NATURE CONSERVATION BOARD (hereinafter referred to as "the Service") duly represented by **MR ANDREW EWING** (in his capacity as the acting Chairman).

and

AMAFA AKWAZULU-NATALI (hereinafter referred to as "Amafa") duly represented by **MR A.J. KRONIGKRAMER** (in his capacity as Chairman of the Board).

PREAMBLE

(i) The Service and *Amafa* having a common commitment to cultural resource conservation.

and

(ii) given the requirements of the KwaZulu-Natal Nature Conservation Management Act. (Act No. 9 of 1997) and the KwaZulu-Natal Heritage Act. 1997 *act No. 10 of 1997) regarding cultural resource management. and

(iii) recognizing that the protected areas of KwaZulu-Natal have a wealth of cultural resources within their jurisdiction;

agree that

(i) collaboration in cultural resource management is desirable to achieve the requirements of the abovementioned Acts; and

(ii) they will regulate their working relationship through this Memorandum of Understanding and agree to abide to the terms and undertakings set out hereunder, whilst realizing that this agreement is not intended to have the force of the law, but rather to implement the law.

1. MUTUAL SUPPORT

1.1 The parties undertake to support each other as far as possible with regard to the conservation of cultural resources in the protected areas managed by the Service. It is recognised that a full disclosure of the needs of either party should be conveyed to the other party in good time in order for such support to be given.

2. ADVISORY SERVICE

2.1 The parties agree that a cultural heritage management specialist from *Amafa* may attend the annual management meetings of protected areas controlled by the Service to provide a cultural resource advisory service to the management team for each protected area.

2.2 General matters regarding cultural resources will be addressed at annual Cultural Resource Advisory Committee (CRAC) meetings.

2.3 The parties agree that only decisions taken at annual management meetings and at CRAC meetings are binding upon both parties.

3. COMMUNICATION

3.1 The parties agree that it is necessary to keep the channels of communication open between them on all aspects of their work and agree to endeavour to inform and communicate with each other on all aspects of the work conducted on, related to or that could have consequences for cultural resource conservation in the protected areas managed by the Service.

4. LIAISON WITH OTHER INTERESTED PARTIES

4.1 Whilst recognising the legal responsibilities of both parties regarding the conservation of cultural resources in KwaZulu-Natal, the parties recognise that it may be necessary to obtain the assistance and participation of other interested parties. The parties recognise the rights of each other to form appropriate liaisons, and agree to inform each other of such liaisons.

5. MUTUAL RESPECT AND CONSIDERATION

5.1 Both parties agree to respect the needs of each other and to adhere to agreements reached at annual management meetings and at CRAC meetings.

6. DISPUTE RESOLUTION

6.1 Where either party feels aggrieved by the actions of the other party, the parties agree to communicate such concern to the other party through channels of communication agreed upon at annual management meetings and at CRAC meetings. Grievances shall be made known to the other party as soon as possible and both parties will endeavour to resolve any such grievances at an appropriate level.

7. SPIRIT OF UNDERSTANDING

7.1 The parties agree that, in order to implement the requirements of the abovementioned Acts regarding cultural resource management in protected areas through the mechanism of this Memorandum of Understanding, the spirit be upheld and adhered to at all times.

DATED at **PIETERMARITZBURG** on this 9th day of January 1999.

AS WITNESSES (original version signed)

G.R. Hughes — A. Ewing
CHAIRMAN: KWAZULU-NATAL NATURE CONSERVATION BOARD

B. Marshall — A.J. Kronigkramer
CHAIRMAN: *AMAFA AKWAZULU-NATALI*

A:\C&D.WPD

APPENDIX 7

APPENDIX 7

GIANTS CASTLE DECLARATION

In RECOGNITION of the grandeur and magnificence of the Lesotho Highlands and the KwaZulu-Natal Drakensberg; the rich and unique biodiversity of these mountains, the singularity of their geological history, their importance as a source of water, the unparalleled richness of their cultural history and rock art, their potential as a major tourism focus for Southern Africa and the desirablitiy of a cohesive land use plan, joint management and control to initiate sustainable development and alleviate poverty in the area, a workshop involving representatives of Lesotho, South Africa, the World Bank, and interested NGO's met at Giants Castle in the Drakensberg Park from 11 - 14 September 1997 to review 15 years of research and conceptualization. It was unanimously resolved that the workshop:

ENDORSES the concept of a Transfrontier Conservation and Development Area embracing the Lesotho Maloti Highlands and the KwaZulu-Natal Drakensberg mountains in South Africa, and

RECOMMENDS that the Governments of Lesotho and South Africa accept and jointly declare their support for the Transfrontier Conservation Area and establish a Joint Steering Committee.

RECOGNISES that an important immediate achievement would be the formal declaration of a Transfrontier Peace Park linking the Sehlabethebe National Park and the Natal Drakensberg Park, and

RECOMMENDS that Lesotho gies consideration to adding Sehlabethebe National Park to the submission so as to give World Heritage recognition to the Transfrontier Peace Park, and

BEING AWARE that the Natal Drakensberg Park is already recognised as a Wetland of International Importance under the auspices of the RAMSAR CONVENTION, it

RECOMMENDS that Lesotho considers ratifying the RAMSAR CONVENTION and proposing that the Maloti Highlands be similarly recognised as a Wetland of International Importance and finally.

CALLS UPON all interested parties and funding agencies to lend support to achieving the vision of a unique and sustainable Transfrontier Conservation and Development Area.

Drakensberg (South Africa)

No 985

Identification

Nomination	Drakensberg Park (oKhahlamba Park)
Location	KwaZulu-Natal
State Party	Republic of South Africa
Date	30 June 1999

Justification by State Party

Notes

1. This property is nominated as a *mixed site*, under the natural and the cultural criteria. This evaluation will deal solely with the cultural values, and the natural values will be covered in the IUCN evaluation.
2. The text below is an abridged version of the justification in the nomination dossier.

The uniqueness of the Drakensberg as a rock-art region consists in an exceptional combination of:

- The quantity of sites and paintings;
- The diversity of sites and painting locations;
- The undisturbed harmony between the art and the environment;
- The preservation of the art's cultural context and the fact that the images come from a single artistic tradition;
- The remarkable state of preservation of the art.

The Drakensberg region is the most densely painted and largest area on the African continent: hardly any inhabitable shelter lacks paintings. The number of sites is estimated as 600 and the number of individual images on those sites probably exceeds 35,000. This density of paintings is, in part, a function of the remarkably wide spectrum of types of site available to the San artists.

The ecological integrity of the area has been preserved intact since the time when the last artists were living there near the end of the 19th century. The climate, vegetation, and fauna have not changed and, in most areas, an absence of roads and the mountainous terrain have prevented any significant human impact. Uniquely, it is possible to turn from rock paintings of eland, rhebok, and other animals to look out over pristine valleys and to see those very species feeding, resting, or moving about.

The rock art of the whole region represents a unique coherent artistic tradition. In other parts of the world, rock art in a given geographical area comprises a number of periods or styles, though the allocation of individual images to these styles is often highly problematic. Although some development through time has been detected in the Drakensberg art, it is for the most part the product of a single tradition and therefore embodies the beliefs and cosmology of a single people, the San, and their contacts with other peoples. There are, however, paintings done in the 19th and 20th centuries attributable to Bantu-speaking people.

The Drakensberg region is unique in that the rock art is far better preserved than in any other region south of the Sahara. This degree of preservation is remarkable because, unlike the Sahara, Namibia, and some other areas in Africa, the conditions are wetter and so it might have been expected that these would not have favoured preservation of the rock paintings. However, the paintings were executed for the most part on absorbent sandstone of the Clarens Formation: the paint soaked into the rock face, permitting a certain amount of weathering before the images are lost.

There is some justification for considering the Drakensberg to be a cultural landscape. The cultures of the African peoples seldom include great walls, monumental buildings, or intricate irrigation systems. Instead, the landscape is imbued with religious and ritual meaning which grows in significance the longer people live there. There are some indications that these mountains represent a cultural landscape with special qualities.

In their placement and their subject matter, the paintings show a strong link between myth, ritual, and the natural landscape and its resources. For example, the eland was highly valued in San conceptual thought: it was believed to enable the shaman to enter the spirit world. Nearly every shelter has at least one eland painting, and some have many.

At a later period, interaction between the San, Bantu-speaking peoples, and European colonists affected the pattern of land settlement. The British created buffer zones between themselves and the San, settling Zulu and Sotho farmers there; as a result these areas remained undeveloped.

Criteria i, iii, and vi

Category of property

In terms of the categories of cultural property set out in Article 1 of the 1972 World Heritage Convention, this is a *site*. It may also be considered to be a *cultural landscape* as defined in paragraph 39 of the *Operational Guidelines for the Implementation of the World Heritage Convention*.

History and Description

History

The Drakensberg region is one of the most important archaeological areas in southern Africa. Archaeological sites from the Early, Middle, and Late Stones Ages and the Late Iron Age indicate that human occupation in this mountain region may extend over the last 1 million years.

The earliest recorded occupation of the Drakensberg Park is from the Mesolithic period, at least 20,000 BP (*Note* Early dates resulting from scientific dating techniques are expressed as "years BP" – ie years before the conventional date of 1950 on which all radiocarbon dating is based.) It was, however, the Neolithic settlers who arrived around 8000 years BP that were the ancestors of the San. They were

hunter-gatherers, often living in caves or rock-shelters. There were probably never more than a thousand people living in the area of the modern Park, and so they left no traces on the landscape beyond their rock-art.

Iron Age farmers moved into the foothills to the east of the main escarpment in the 13th century CE, or perhaps a little earlier, bringing domesticated cattle and sheep into the region. By the late 16th century there were cattle-herding people, the Zizi to the north and the Tholo to the south, living in permanent settlements in areas adjacent to the northern and central Drakensberg region. At first their relationships with the San were peaceable, but from the early 19th century with the rise of Zulu power to the south, under the leadership of Shaka, successive waves of people were forced to migrate northwards into the Drakensberg.

Large areas in the foothills of the Drakensberg were settled by the Voortrekkers from 1837 onwards. They farmed cattle and later sheep on the good grazing lands until the 1930s, and also hunted the game animals of the region remorselessly, bringing them into conflict with the San. To protect their flocks and herds against San raids, the Natal Government settled Bantu-speaking farmers in order to seal off the San raiders. Punitive raids during the 1860s and 1870s led to the eventual destruction of the San communities, upsetting the balance that had existed for thousands of years between the indigenous people and their sustainable use of the natural resources of the region.

Description

Paintings are to be found in diverse sites, ranging from large rock-shelters containing over a thousand individual images to small rock overhangs with only a few paintings and the vertical sides of boulders strewn along the steep valley slopes. They occur not only on prominent rock faces that can be viewed from all parts of the shelter but also on the comparatively hidden surfaces of fallen and broken rocks. Many of the latter were executed after the rocks had fallen and so these sites must have been chosen intentionally. Superimposed paintings indicate that San artists visited sites repeatedly over long periods of time.

Radiocarbon dating of pigments and charcoal from occupation layers indicate that the earliest paintings date to *c* 3800 BP, although the earliest date form a site within the Park is *c* 2400 BP. At the other end of the time-scale historical records and the subject matter of paintings indicate that the San were still producing rock art at the end of the 19th century.

A 1976 study of 150 rock-art sites in the central and southern Drakensberg showed that many of them displayed painted scenes of hunting, dancing, fighting, food gathering, and ritual or trance scenes of hunting or rainmaking. Of the 8578 images recorded in this survey, 53% were of human figures, 43% of animals, and 4% depicted inanimate and abstract subjects. Only animal paintings were recorded in 21 shelters, whilst eight contained only human figures.

The predominant colour for all subjects was red (40%), whereas white, orange, and yellow were used more frequently on animal figures. Other colours used were black and, rarely, brown. Most were between 100mm and 250mm in size, with extremes ranging from 13mm to 2430mm. Some 64% of the images were monochrome and 22% bichrome, but both polychrome and shaded polychrome images were present. Superimposed paintings were recorded in 51% of the rock shelters.

Antelopes comprised 77% of the animal images, eland (35%) and rhebok (18%) being the most frequently recorded species. Most of the eland paintings show groups of animals, painted in elaborate detail. Other antelope species include hartebeest, reedbuck, oribi, grey rhebok, black wildebeest, bushbuck, and roan antelope.

Other indigenous species that occur less frequently include baboon, snakes, birds, shoals of fish, small carnivores, leopard, hyaena, buffalo, bushpig, warthog, aardvark, elephant, rhinoceros, hippopotamus, jackal, hare, lizard, and mongoose. Domestic animals are also depicted, cattle and horses being most common.

Most of the human subjects were depicted naked (58%), but the sex was indeterminate for most of them. Dressed figures were clad in a variety of garments, in some cases of European type. Many bear weapons or implements, including bows, arrows, sticks, digging sticks, assegais, bags, fly switches, and shields. The heads are treated in different ways – round, concave, hooked, or animal (therioanthropic). Parts of the body are decorated in some cases.

The non-representational paintings include intentional finger smears, often in pairs, crossed lines in rectangles, and rope-like and feathery lines attached to animal or therioanthropic figures.

A survey carried out on 17 shelters in the 5.5km Didima Gorge, within the Cathedral Peak State Forest, which is probably the richest rock-art area in South Africa produced comparable results. However, some 5% of the images were of man-made structures, bees' nests, and various forms of equipment. The researcher drew attention to the fact that the animals were more colourful and more elaborately depicted.

Management and Protection

Legal status

The Drakensberg (oKhahlamba) Park was established by the 1997 KwaZulu Nature Conservation Management Act and the 1998 Republic of South Africa National Forests Act. The Park is composed of six reserves: Giant's Castle Game Reserve, Kamberg Nature Reserve, Loteni Nature Reserve, Royal Natal National Park, Rugged Glen Nature Reserve, and Vergelen Nature Reserve. There are six States Forests: Cathedral Peak, Cobham, Garden Castle, Highmoor, Mkhomazi, and Monk's Cowl.

In addition, certain natural resources are protected under the provisions of the 1956 Water Act as amended and the 1989 Environment Conservation Act as amended.

Management

The 1997 KwaZulu Nature Conservation Management Act provides for the institutional structures for nature conservation in the province and the establishment of control and monitoring bodies and mechanisms. The decision-making body is the KwaZulu Nature Conservation Board, which is responsible for overall policy-making and management. Under the terms of the Act, local protected area boards are being set up to provide a statutory basis for the direct involvement of communities living in the area in decision-making.

Direct management is delegated to the KwaZulu Nature Conservation Service, under the direction of its Chief Executive Officer. He is accountable to the provincial Minister of Traditional and Environmental Affairs. There are three branches in the Service, covering conservation, scientific services, and administration respectively. The total staff is more than 600, at all grades.

The framework for the management of the Park is the statement of vision and policies. There is at present no master management plan, but one is under active preparation. There are, however, management plans in force for three of the reserves and one state forest.

The Cultural Resource Management Plan (CURE) for the Drakensberg Park was approved by the Board in November 1998. Its mission statement is "to promote the conservation and public appreciation of archaeological and historical resources in the Drakensberg Park, in accordance with conservation, tourism, and wilderness management objectives." The Plan goes on to identify a series of objectives and defines a strategy with three components: implementation and maintenance of conservation measures to curb the natural and unnatural deterioration of sites; promotion of an appreciation of cultural resources in the Park; and promotion of research opportunities, site recording and monitoring, and the establishment and maintenance of databases.

Conservation and Authenticity

Conservation history

The earliest steps taken to protect the Drakensberg were taken by the Natal Colonial Government in 1903, when a game reserve was created in the Giant's Castle area. This began a process which continued throughout the 20th century, always relating to nature protection.

Archaeological research has been continuous throughout the past half-century, and this led to the implementation of additional measures to protect the rock art. Four important sites (Battle Cave, Main Caves, Game Pass 1, and Kanti 1) have been declared national monuments under the provisions of the 1969 National Monuments Act. A number of conservation programmes aimed at providing better protection for the rock-art sites are now in force, involving controlled entry to the Park, awareness creation, guided access to selected sites, keeping the locations of other sites confidential, and prohibition of camping or lighting fires in caves or shelters containing rock paintings. These are consolidated in the Cultural Resource Management Plan.

Authenticity

The authenticity of the Drakensberg rock art is unimpeachable.

Evaluation

Action by ICOMOS

An ICOMOS expert mission visited the property in January 2000. ICOMOS also consulted its International Scientific Committee on Rock Art.

Qualities

The rock art of the Drakensberg is exceptional in that it represents the artistic expression of a single people, the San, over a period of more than 4000 years. It is also the largest and most densely distributed rock-art group in Africa.

Comparative analysis

Other concentrations of San rock art are to be found in southern Africa, at Cederberg in the south-western part of Cape Province and the Matopo Hills in Zimbabwe. However, none of these is comparable with the Drakensberg in terms of its density and diversity. It is also the best preserved group south of the Sahara because of the physical properties of the rock on which it was painted.

ICOMOS comments and recommendations for future action

ICOMOS is not convinced that the Drakensberg qualifies as a cultural landscape, as defined in paragraph 39 of the *Operational Guidelines for the Implementation of the World Heritage Convention*. It is difficult to argue that the long San occupation has significantly modified the natural landscape. Inscription as a mixed site is therefore more appropriate in this case.

The Drakensberg National Park is defined on the west by the frontier with Lesotho. It seems certain that there will be other San rock-art sites on the territory of that country (which is not yet a State Party to the Convention). It is understood that discussions have been initiated with Lesotho to explore the possibility of extending any eventual inscription of the Drakensberg Park to include similar sites in the neighbouring country.

ICOMOS is concerned that the different management plans have not yet been harmonized by means of a master plan. It is very important that the objectives and policies of the Cultural Resource Management Plan are properly integrated with those relating to the natural heritage, so as to avoid any possible conflicts.

The staff of the Nature Conservation Service is exclusively related to the natural heritage. ICOMOS strongly recommends that a cultural heritage unit be established within the Service. The UK National Parks have benefited considerably since the appointment of archaeological or heritage conservation officers in most of them over the past two decades.

Brief description

The spectacular natural landscape of the Drakensberg Park contains many caves and rock-shelters with a wealth of paintings made by the San people over a period of 4000 years. They depict animals and human beings, and represent the spiritual life of this people, now no longer living in their original homeland.

Recommendation

That this property be inscribed on the World Heritage List on the basis of ***cultural criteria i and iii***:

> ***Criterion i*** The rock art of the Drakensberg is the largest and most concentrated group of rock paintings in Africa south of the Sahara and is outstanding both in quality and diversity of subject.
>
> ***Criterion iii*** The San people lived in the mountainous Drakensberg area for more than four millennia, leaving behind them a corpus of outstanding rock art which throws much light on their way of life and their beliefs.

ICOMOS, September 2000

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

THE DRAKENSBERG PARK / ALTERNATIVELY KNOWN AS OKHAHLAMBA PARK (SOUTH AFRICA)

1. DOCUMENTATION

i) **IUCN/WCMC Data Sheet:** (13 references).

ii) **Additional Literature Consulted:** Armstrong, A. J. 200. Faunal Diversity and Importance. Highlights. Internal Report. KwaZulu Nature Conservation Service; Botha, G. 2000. **Geology and Geomorphlogy of the oKhahlamba Drakensberg Park**. Council for Geoscience Report. 2000-0009; Cowling, N. J. and Hilton-Taylor, C. 1994. Patterns of plant diversity and endemism in southern Africa: an overview. In Huntley, B. 1994. **Botanical Diversity in Southern Africa**, National Botanical Institute, Pretoria. Strelitzia 1 31-52; Davis, S. D. and Heywood, V. H. 1994. **Centre of Plant Diversity: A Guide and Strategy for their Conservation**. WWF/IUCN 1994; Henwood, W. D. 1988. An overview of protected areas in the temperate grasslands biome. **PARKS**. 1998. Vol. 8. No. 3; Killick; D. J. B. 1994. Drakensberg alpine region. In Davies, S. D. and Heywood, V. H. 1994. Oxford University Press, Oxford; Killick; D. J. B. 1997. Alpine tundra of southern Africa. In Wielgolaski, F. E. (ed.). **Ecosystems of the World 3: Polar and alpine tundra**. Elsevier, Amsterdam pp. 199-209; MacRae, C. 1999. **Life etched in stone**. Geological Society of South Africa; Statlersfield, A. J., *et. al.* 1998 **Endemic Bird Areas of the World. Priorities for Biodiversity Conservation**. BirdLife International, Cambridge.

iii) **Consultations:** 7 external reviewers. Relevant officials from federal and provincial park agencies. Local communities and interested groups.

iv) **Field Visit:** David Sheppard, February, 2000.

2. SUMMARY OF NATURAL VALUES

The Drakensberg Park (DP), alternatively known as oKhahlamba Park, is the largest protected area established on The Great Escarpment of the southern African subcontinent. It is located in an inland mountain range in KwaZulu-Natal province in South Africa, along the eastern border of Lesotho (see Map 1). DP covers an area of 242,813ha and comprises a northern and a significantly larger southern section (see Map 2). The mountainous area between these two sections, known as the Mnweni area, is tribal land. DP can be divided into two distinct physiographic regions. The foothills, of "Little Berg" are steep sided spurs, escarpments and valleys which occur below 2,000m elevation, while the high main escarpment rises to more that 3,400m. There is considerable variation in topography, including vast basalt and sandstone cliffs, deep valleys, intervening spurs and extensive plateau areas. This topographical variation contributes to the outstanding scenic value of DP. The climate of the Drakensberg region is dominated by the influence of subtropical anticyclones. In winter, the subsistence of air causes atmospheric stability and thus a distinct dry season. In summer, (November to March), the subsidence inversion may rise above the escarpment resulting in an influx of humid air from the Indian Ocean by south-easterly winds. Precipitation in the summer months accounts for 70% of the annual total rainfall. The Drakensberg is one of the best watered, least drought prone areas of southern Africa. DP has particular significance for catchment protection and the provision of high quality water supplies for surrounding communities; a number of rivers in the region originate from DP.

The geology of the Drakensberg is characterised by a thick sedimentary succession, capped by an accumulation of basalt, comprising the upper part of the Karoo Supergroup succession which has a composite thickness of up to 7,000m in this area. The most distinctive physiographic feature of the Drakensberg foothills is the high cliffs formed of fine grained sandstone comprising the Clarens Formation. The Molteno-Elliot-Clarens transition illustrates a palaeoclimatic transformation during the latter part of a ~250 million year latitudinal drift of

Gondwana from a subpolar position towards the current subtropical location of this part of Africa. This succession also preserves an almost complete fossilised record of 80 million years of reptile evolution.

The vegetation in DP is influenced by topography and the effects of climate, soil, geology, slope, drainage and fire. The vegetation is attitudinally zoned, forming three belts coinciding with the main topographical features, namely the river valley system, the spurs and the summit plateau. These are the low altitude belt (1,280-1,830m) with Podocarp forest, the mid altitude belt (1,830-2,865m) with Fynbos vegetation and the high altitude belt (2,865-3,500m) with alpine tundra and heath. A total of 2,153 species of plants been described in DP, including a large number of internationally and nationally threatened species. A significant feature is the high level of plant species endemism. The Park also includes significant grassland communities.

The fauna of DP includes a total of 48 mammal species, 296 bird species, 48 reptiles, 26 amphibians and 8 fish species. The invertebrate fauna is poorly known but includes many species endemic to the region. A number of globally threatened faunal species occur in DP, including the Long-Toed Tree Frog, the Yellow-Breasted Pipit and the Natal Midlands Dwarf Chameleon.

DP is an area of exceptional natural beauty and aesthetic importance, with the key scenic feature being its spectacular mountain range with its high escarpment walls of dark basalt, ridges and intervening spurs.

3. COMPARISONS WITH OTHER AREAS

DP has been nominated under all four natural criteria and three cultural criteria. There are a number of other mountain protected areas within The Afromontane biogeographical province, as well as a number of World Heritage sites, including Mt. Kilimanjaro; Rwenzori; and Mont Nimba. The DP is distinctive on floristic grounds. Floristically, The Park occurs within a unique floristic region, the Drakensberg Alpine Region of Southern Africa (Davis and Haywood, 1994). This floristic region covers the park and a large percentage of the land area of Lesotho. The Drakensberg Alpine Region in South Africa and Lesotho has been identified in a global review of Centres of Biodiversity (WWF/IUCN) as one of global importance. Additionally, WWF's Global 200 Ecosystems, identifying biologically outstanding regions most representative of the world's biodiversity, includes South African Montane/Grassland, of which Drakensberg is a part. Particularly significant within DP is the high level of floristic endemism and the unique high altitude montane grassland and alpine tundra vegetation with its associated endemic palaeo –invertebrate fauna. DP has outstanding species richness with 2,153 plant species within the park, including 109 which are globally threatened. There is no other World Heritage site within this floristic region. There are other World Heritage sites which protect grassland communities, such as the Manas and Kaziranga World Heritage sites in India which protect unique tall grassland communities. However, the grassland communities within DP, reflecting sharp altitudinal and topographic gradients, are not replicated within other World Heritage sites. This is important in the context of the low level of grassland protection globally, less that 1%, and also specifically within World Heritage sites.

The conservation status within the Drakensberg Alpine Region would also be enhanced through the proposed transboundary expansion of DP, to include adjoining areas in Lesotho (refer Section 4.2). This would significantly increase the overall conservation status within the Drakensberg Alpine Region. DP is also identified as occurring within one of the globally important endemic bird areas of the world: the Lesotho Highlands. DP is noted as having significance for the occurrence of the Yellow-Breasted Pipit, the Drakensberg Siskin and the Orange-breasted Rockjumper. (Stattersfield *et. al.*, 1998). Overall, the DP includes 119 bird species which are globally threatened.

Geologically, DP differs from other mountain ranges, such as the Andes, Rockies and the Himalayas, particularly in terms of the composition of geological sequences and processes of formation. There are similarities with the Simen World Heritage site in Ethiopia, which is part of the Simen Massif, and includes the highest peak in Ethiopia, Ras Dashan Terara (4,620m). This massif was formed some 25 million years ago and, as with the Drakensberg, comprises igneous basalts which have been eroded to form precipitous cliffs and deep gorges. However, there are differences between these two sites in terms of geomorphology, biodiversity and size. There are a number of World Heritage sites inscribed for their superlative natural phenomena of natural beauty. These include sites such as The Wet Tropics of Queensland (Australia), Belize Barrier Reef Reserve System (Belize) and Los Glaciares (Argentina). DP, with its spectacular escarpment walls of dark basalt lying above the light coloured clarens sandstone, compares favourably with these sites.

In summary, DP is distinctive for its floristic diversity and endemism, its montane grassland and alpine tundra communities, and for its features of outstanding aesthetic value.

4. INTEGRITY

The area has a long history of effective conservation management, dating back to 1927 when the first component area of DP (Cathedral Peak State Forest) was proclaimed. The Park is largely unaffected by human development activities. The area is large enough to survive as a natural area and to maintain natural values, even though there are outside influences. The following issues relating to the long term integrity of DP are highlighted.

4.1 Boundary Issues

The DP currently comprises a northern section and a much larger southern one (see Map 2). The intervening area along the escarpment is part of the Mnweni Community Land. The nomination document stressed that "the need to establish a conservation area in the Mnweni region that would join the two sections of the DP has long been recognised". Planning mechanisms currently restrict development above the 1,650m contour to maintain ecological integrity. As a further step to conserve the area a cooperative agreement between the Mnweni Community Trust and KwaZulu-Natal Nature Conservation Service is envisaged. Planning programmes have also identified privately-owned land along the escarpment to the south of the site which could also become a future conservation area to further extend DP.

There is also an important transboundary proposal involving DP and the adjoining area in Lesotho (the Sehlabethebe National Park). The Drakensberg – Maloti Transfrontier Conservation and Development Programme is being developed jointly by the National Environment Secretariat of Lesotho, the KwaZulu Nature Conservation Service and the Global Environment Facility. This builds on the Giants Castle Declaration, which involved key stakeholders from Lesotho and KwaZulu-Natal, and which endorsed the concept of a transfrontier conservation and development area embracing the Lesotho Maloti Highlands and the KwaZulu-Natal Drakensberg mountains in South Africa. This would establish a transboundary protected area between the two countries – an important initiative which would promote more effective biodiversity conservation, as well as enhanced cooperation between South Africa and Lesotho.

4.2 Legal and Planning Framework

i) Legal

The Park is under an effective legal regime, with the key laws being the KwaZulu-Natal Nature Conservation Management Act and the Republic of South Africa National Forest Act. The Nature Conservation Management Act provides an excellent framework for conservation management. The control and management of those areas within DP proclaimed under the National Forest Act lies with the Minister of Water Affairs and Forestry. Management of these areas has been assigned to the Nature Conservation Service and it is important that this arrangement continues, to ensure integrated management of all 12 protected areas comprising the nominated site. Ideally, control and management of all areas within DP should fall under the Nature Conservation Management Act.

ii) Management Plan

There are currently management plans for all of the individual component areas of DP. An overall master management plan for DP is being prepared and it is recommended that this be finalised as quickly as possible, to ensure integrated, effective long-term conservation management through all areas of the site.

(iii) Staff and budget

The DP is adequately staffed (604 permanent and part-time employees in 1999) and the budget available is adequate for effective conservation management.

4.3 Regional Planning and Integration

Existing land uses in the region outside DP include agriculture, plantation forestry and ecotourism. All of these activities have potential to impact on the natural values of DP, particularly if poorly planned and implemented. It

is thus positive to note the Special Case Area Plan (SCAP) being developed through the KwaZulu-Natal Minister of Local Government and Housing for special natural environments, where restrictions on development need to be applied so as not to destroy special features. Studies associated with the SCAP in this region recognise the unique natural values of DP and the need for complementary regional planning. The study has drawn on the provisions of the Seville Strategy for Biosphere Reserves (UNESCO/MAB). These efforts are to be commended and there is potential to nominate all or parts of the SCAP region as an International Biosphere Reserve, with DP as the core zone. It is important that developments outside DP should be sympathetic to, and minimise impact on, the natural values of DP. It is also important that the KwaZulu-Natal Nature Conservation Service play an active role in the development of the Special Case Area Plan.

4.4 Local Community Issues

The KwaZulu-Natal Nature Conservation Service fosters a good neighbour relations policy with communities adjacent to its borders. This involves the development of community based programmes and "partnership forums" which assist local development objectives. These are important in developing a more positive image of DP on the part of local communities. It is important that such programmes build ownership, awareness and support for the protection of the natural values of DP. These local community programmes also include provision for sustainable harvesting of various grasses and collecting seed for medicinal plants within DP. It is important that the long term impact of such programmes on natural values be carefully monitored.

4.5 Management Issues

The management of invasive species and fire are major management challenges for DP. Currently 1% of DP is covered with alien vegetation, including existing plantations and wattle infestations. This poses a threat to the ecological integrity of the Park as well as to the yield of water from its wetlands and river systems. Park management is actively addressing the removal of alien vegetation and these efforts should be continued and, ideally, accelerated. The interaction between the management of invasive species and the management of fire should be carefully considered. For example, increasing fire frequency will favour the expansion of invasive species which are fire tolerant. The general management of fire within DP is comprehensive. However, monitoring the ecological impact of fire, particularly in relation to fire sensitive fauna such as endemic frogs, should be expanded. Management of fire and invasive species needs to be addressed jointly by Lesotho and KwaZulu-Natal, ideally within the framework established for transboundary protected area cooperation.

4.6 Tourism and Infrastructure Development

There are a number of tourism developments within DP and these make a major contribution to visitor appreciation of natural values and to overall park revenue. Some 1,024ha of DP (0.4% of the total area) has been transformed by infrastructure developments. It is important to ensure that any further development does not compromise natural values and that limits of acceptable change are clearly defined. This should be clearly addressed within the integrated master plan for DP.

5. ADDITIONAL COMMENTS

DP is nominated under natural and cultural criteria. The IUCN assessment of whether the site meets natural criteria is set out in section 6.

6. APPLICATION OF WORLD HERITAGE CRITERIA

DP has been nominated under all four World Heritage natural criteria. The IUCN assessment is as follows:

Criterion (i): Earth's history and geological features

The nomination also makes a case for inscription under criterion (i). There are excellent examples within DP of different geological sequences and processes of formation. However, this is not a rarity amongst mountains in general. It is also noted that similar geological processes and characteristics are better represented on the World Heritage list through the Simen Mountains in Ethiopia. <u>IUCN does not consider that the nominated site meets this criterion.</u>

Criterion (ii): Ecological processes

The nomination also makes a case for nomination under criterion (ii): Ecological and Biological Processes. DP represents an important African example of on-going ecological and biological process. It is an important example of an African montane grassland area large enough for ecological and biological processes to operate without interference. It is also significant as the upper watershed area for the immediate and downstream regions and thus is of national importance. IUCN does not consider that the nominated site meets this criterion.

Criterion (iii): Superlative natural phenomena or natural beauty and aesthetic importance

DP has outstanding aesthetic value. Soaring basaltic buttresses, incisive dramatic cutbacks and golden sandstone ramparts all contribute to a spectacular environment. Other features which contribute to the exceptional natural beauty of DP are the rolling high altitude grasslands and the pristine steep sided river valleys and rocky gorges. DP includes areas that are essential for maintaining the beauty of the site. IUCN considers that the nominated site meets this criterion.

Criterion (iv): Biodiversity and threatened species

DP contains significant natural habitats for *in-situ* conservation of biological diversity. It has outstanding species richness, particularly of plants. It is recognised as a Global Centre of Plant Diversity and endemism, and occurs within its own floristic region – the Drakensberg Alpine Region of South Africa. It is also within a globally important endemic bird area and is notable for the occurrence of a number of globally threatened species, such as the Yellow-breasted Pipit. The diversity of habitats is outstanding, ranging across alpine plateaux, steep rocky slopes to river valleys. These habitats protect a high level of endemic and threatened species. IUCN considers that the nominated site meets this criterion.

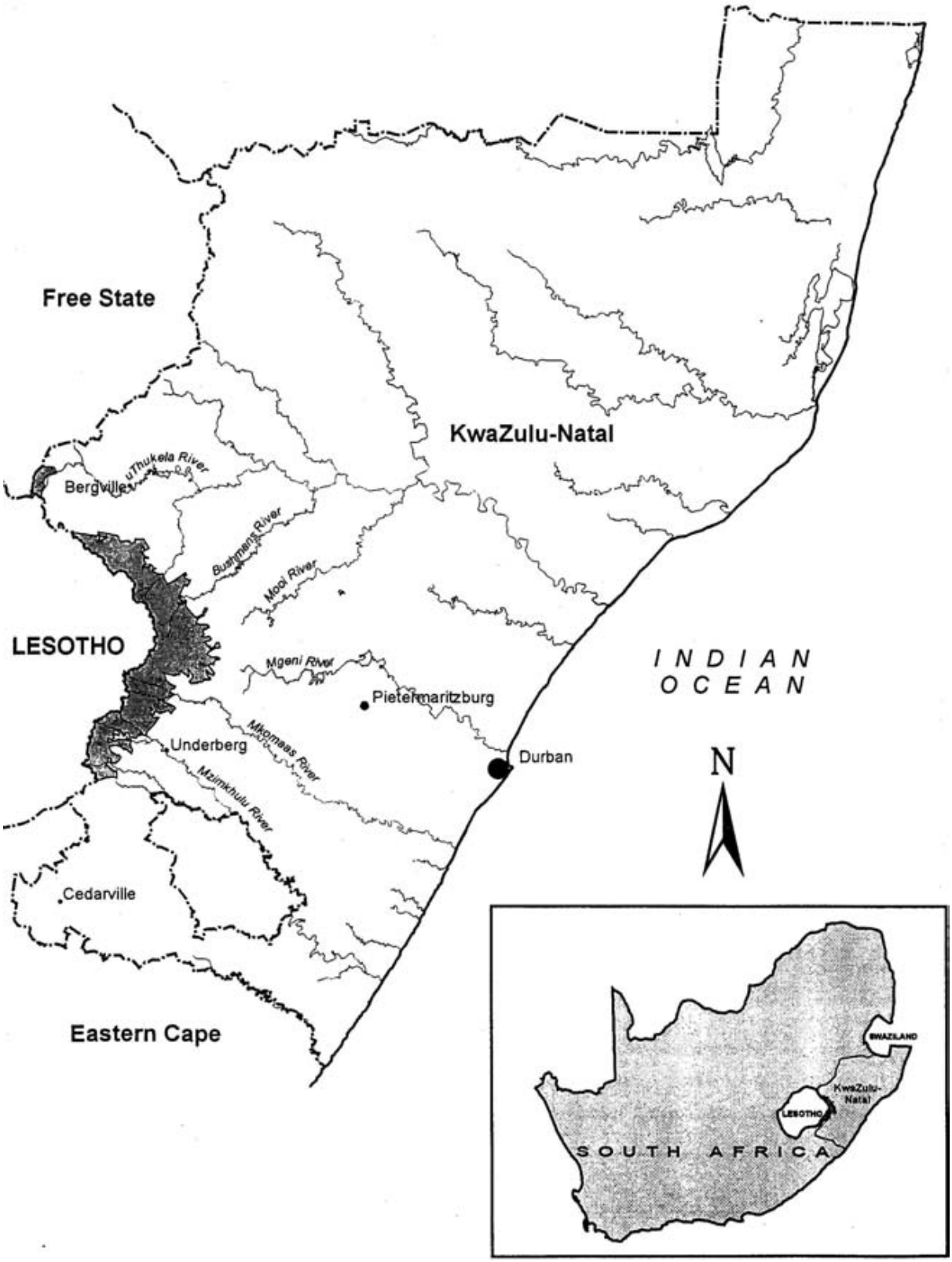
7. RECOMMENDATION

The Bureau recommended to the Committee that the Drakensberg Park, alternatively known as the oKhahlamba Park, be **inscribed** on the World Heritage List under natural criteria (iii) and (iv). The Bureau noted that the site has exceptional natural beauty with soaring basaltic buttresses, incisive dramatic cutbacks and golden sandstone ramparts. Rolling high altitude grasslands, the pristine steep sided river valleys and rocky gorges also contribute to the beauy of the site. The site's diversity of habitats protects a high level of endemic and globally threatened species especially of birds and plants.

The Bureau encouraged the State Party to consider the following:

- the overall integrated master management plan for DP be completed as quickly as possible and that it give priority to the management of fire and invasive species as well as visitor management;
- the stated intention to work towards establishing additional conservation areas to give continuity to the site along the escarpment be pursued;
- efforts to establish the Drakensberg-Maloti Transfrontier Protected Area be strengthened and consideration be given to transboundary extension to the World Heritage site, should Lesotho becomes a State Party to the World Heritage Convention; and
- that efforts to establish a Special Case Area Plan (SCAP) covering DP and adjoining areas be continued.

IUCN noted that consideration should be given to the future nomination of all or part of the SCAP as a Biosphere Reserve.



Map 1: Location Map – The Drakensberg Park/oKhahlamba Park

Map 2: Site Map – The Drakensberg Park/oKhahlamba Park

Drakensberg (Afrique du Sud)

No 985

Identification

Bien proposé	Parc du Drakensberg (également connu sous le nom de parc oKhahlamba)
Lieu	Kwazulu-Natal
État partie	République d'Afrique du Sud
Date	30 juin 1999

Justification émanant de l'État partie

Notes

1. Ce bien est proposé pour inscription en tant que *site mixte*, en vertu de critères naturels et culturels. Cette évaluation ne portera que sur les valeurs culturelles, les valeurs naturelles faisant l'objet de l'évaluation de l'UICN.
2. Le texte ci-dessous est une version abrégée de la justification qui figure dans le dossier de proposition d'inscription.

L'art rupestre du Drakensberg est unique car il réunit une combinaison exceptionnelle :

- La quantité des sites et des peintures ;
- Leur diversité en termes d'emplacement ;
- L'harmonie intacte entre art et environnement ;
- La préservation du contexte culturel de l'art, et l'origine des images, toutes issues d'une seule et même tradition artistique ;
- Le remarquable état de préservation de l'art.

La région du Drakensberg est celle qui offre les peintures les plus denses, sur le territoire le plus étendu sur le continent africain : en effet, pas un abri habitable qui n'ait ses peintures, ou presque. Le nombre de sites est estimé à 600 et les images individuelles qu'ils abritent sont probablement plus de 35 000. Cette densité des peintures est en partie attribuable au spectre de types de sites remarquablement large à la disposition des artistes San.

L'intégrité écologique de la région est demeurée intacte depuis l'époque où y vivaient les derniers artistes, vers la fin du XIXe siècle. Le climat, la végétation et la faune n'ont pas changé et, dans la majeure partie de la région, l'absence de routes et le terrain montagneux ont empêché tout impact humain notable. Fait unique, le spectateur peut se détourner des peintures rupestres représentant des élands, des rhéboks et autres animaux pour contempler des vallées primitives et y admirer les espèces qui ont servi de modèles paissant, se reposant ou se déplaçant.

L'art rupestre de la région toute entière représente une tradition artistique d'une cohérence unique. Dans d'autres parties du monde, l'art rupestre, sur une même zone géographique, est le reflet de plusieurs périodes ou styles, quoiqu'il s'avère parfois éminemment difficile de classifier ces images en fonction des styles. Si l'art du Drakensberg témoigne d'une certaine évolution au fil du temps, il est pour la majeure partie le fruit d'une tradition unique, et représente donc les croyances et la cosmologie d'un seul et même peuple, les San, et leurs contacts avec d'autres gens. On trouve toutefois des peintures réalisées aux XIXe et XXe siècles attribuables à des populations Bantous.

La région du Drakensberg est unique en ce que son art rupestre est bien mieux préservé que dans toute autre région au sud du Sahara. Le degré de préservation est remarquable car, à l'encontre du Sahara, de la Namibie et de quelques autres régions d'Afrique, le climat est plus humide ; on aurait donc été en droit de penser que cela aurait nui à la préservation des peintures rupestres. Mais elles ont dans leur majorité été réalisées sur du grès absorbant de la formation de Clarens : la peinture a imprégné la façade rocheuse au point que l'érosion normale n'a pu détruire les images.

On peut considérer le Drakensberg comme un paysage culturel. Les cultures des peuples d'Afrique, en effet, incluent rarement de grandes murailles, des édifices monumentaux ou des systèmes d'irrigation complexes. Au lieu de cela, le paysage est imbu d'une signification religieuse et rituelle qui croît proportionnellement au temps qu'y passe la population. Certaines indications tendent à donner à penser que ces montagnes représentent un paysage culturel doté de caractéristiques particulières.

Dans leur emplacement et leurs thèmes, les peintures montrent un lien fort entre la mythologie et les rites d'un côté, et le paysage naturel et ses ressources de l'autre. Par exemple, l'éland était particulièrement important dans la pensée conceptuelle San : selon la croyance, il permettait au chaman de pénétrer dans le monde des esprits. Tous les sites, ou presque, possèdent une peinture représentant un éland, et certains en comptent plusieurs.

Plus tard, l'interaction entre les San, les populations Bantous et les colons européens affecta le schéma d'occupation des sols. Les Britanniques instaurèrent des zones tampon entre eux et les San, y installant des fermiers Zoulou et Sotho ; ces régions restèrent donc vierges de tout développement.

Critères i, iii et vi

Catégorie de bien

En termes de catégories de biens culturels, telles qu'elles sont définies à l'article premier de la Convention du Patrimoine mondial de 1972, il s'agit d'un *site*. Le bien peut également être considéré comme un *paysage culturel*, aux termes du paragraphe 39 des *Orientations devant guider la mise en œuvre de la Convention du patrimoine mondial*.

Histoire et description

Histoire

La région du Drakensberg est l'une des plus importantes, du point de vue archéologique, en Afrique du sud. Des sites archéologiques datant du début, du milieu et de la fin de l'âge de la pierre, ainsi que de la fin de l'âge du fer, indiquent que l'occupation humaine dans cette région montagneuse pourrait bien s'étendre sur tout le dernier million d'années.

La première occupation enregistrée du parc du Drakensberg remonte au Mésolithique, c'est-à-dire au moins à 20 000 ans BP (*Note* : les dates anciennes calculées d'après les techniques de datation scientifique sont exprimées en années « BP », c'est-à-dire en années avant la date conventionnelle de 1950, sur laquelle se fonde la datation au radiocarbone). Ce sont toutefois des peuples du Néolithique qui arrivèrent là aux alentours de 8000 ans BP que descendent les San. C'étaient des chasseurs-cueilleurs, vivant souvent dans des abris-sous-roche et des grottes. La population vivant dans la zone qui constitue actuellement le parc ne dépassa probablement jamais un millier de personnes, ce qui explique qu'elle ne laissa aucune trace sur le paysage en dehors de l'art rupestre.

Les fermiers de l'âge du fer s'installèrent au pied des collines à l'est du principal escarpement au XIIIe siècle de notre ère, voire un peu avant, amenant avec eux du bétail domestique et des moutons. À la fin du XVIe siècle, la région comptait également des peuples de pasteurs, les Zizi au nord et les Tholo au sud, peuples sédentaires vivant dans des régions adjacentes au nord et au centre du Drakensberg. Leurs relations avec les San étaient tout d'abord paisibles mais, au début du XIXe siècle, avec l'essor du pouvoir zoulou au sud, sous l'égide de Shaka, des migrations se firent par vagues successives vers le nord, dans le Drakensberg.

À partir de 1837, les Voortrekkers s'installent dans les vastes étendues au pied des collines du Drakensberg. Ils élèvent du bétail, puis des moutons, sur ces terres de pâturage parfaites, jusque dans les années 1930, et chassent également sans remords le gibier de la région, ce qui provoque un conflit avec les San. Afin de protéger les troupeaux contre les raids San, le gouvernement du Natal installe des fermiers Bantous pour y faire obstruction. Dans les années 1860 et 1870, des expéditions punitives conduisent à la destruction définitive des communautés San, détruisant l'équilibre qui avait perduré pendant des milliers d'années entre les peuples indigènes et leur usage raisonné des ressources naturelles de la région.

Description

On trouve des peintures dans des sites divers, qui vont d'immenses abris-sous-roche renfermant plus d'un millier d'images à de petites saillies rocheuses ne comptant que quelques peintures, en passant par les flancs verticaux des blocs rocheux disséminés le long des fortes pentes de la vallée. Elles se trouvent non seulement sur des façades rocheuses bien visibles, que l'on peut contempler de tous les endroits de la grotte, mais aussi sur les surfaces comparativement plus discrètes de roches tombées ou brisées. Un grand nombre de ces dernières ont été exécutées après la chute des pierres ; ces sites doivent donc avoir été choisis intentionnellement. Des superpositions de peintures indiquent que les artistes San visitaient régulièrement les sites sur un long laps de temps.

La datation au radiocarbone des pigments et du charbon des strates d'occupation indique que les plus anciennes peintures remontent à 3800 BP, environ, quoique la date la plus ancienne d'un site au sein du parc soit 2400 BP, approximativement. À l'autre bout de l'échelle du temps, les archives historiques et les thèmes des peintures montrent que les San s'adonnaient toujours à la peinture rupestre à la fin du XIXe siècle.

Une étude de 1976 portant sur 150 sites d'art rupestre au centre et au sud du Drakensberg montre que beaucoup d'entre eux présentaient des peintures de scènes de chasse, de danse, de combat, de cueillette, de rituels de chasse ou de pluie. Sur les 8578 images répertoriées par cette étude, 53 % représentaient des figures humaines, 43 % des animaux et 4 % des objets inanimés ou des sujets abstraits. Vingt et un abris ne comportent que des figures animales, et huit que des figures humaines.

Pour tous les sujets, la couleur prédominante est le rouge (40 %), tandis que le blanc, l'orange et le jaune servent plus fréquemment aux figures animales. D'autres couleurs ont été utilisées : le noir et, plus rarement, le brun. La plupart des images font entre 100 et 250 mm, avec des extrêmes allant de 13 à 2430 mm. 64 % d'entre elles sont monochromes et 22 % associent deux couleurs, mais il existe également des images polychromes et polychromes présentant des dégradés. On enregistre des superpositions de peinture dans 51 % des abris-sous-roche.

Les antilopes composent 77 % des représentations animales, les élands (35 %) et les rhéboks (18 %) étant les espèces les plus fréquemment représentées. La plupart des peintures d'élands montrent des groupes d'animaux, représentés avec des détails élaborés. Parmi les autres espèces d'antilopes, on trouve des bubales, cobes rédunca, ourébis, rhéboks gris, gnous, tragélaphes rayés et des hippotragues.

Parmi les autres espèces indigènes moins fréquentes figurent les babouins, les serpents, les oiseaux, les poissons (en bancs), les petits carnivores, le léopard, la hyène, le buffle, le potamochère, le phacochère, l'oryctérope, l'éléphant, le rhinocéros, l'hippopotame, le chacal, le lièvre, le lézard et la mangouste. Les animaux domestiques sont également dépeints, le bétail et les chevaux sont les plus communs.

La plupart des sujets humains sont nus (58 %), mais souvent de sexe indéterminé. Les figures habillées suivent des modes diverses, arborant parfois même des vêtements européens. Beaucoup portent des armes ou des accessoires : arcs, flèches, bâtons, bâtons fouisseurs, sagaies, sacs, éventails et boucliers. Les têtes sont traitées de différentes manières : elles apparaissent rondes, concaves, crochues ou animales (thérioanthropie). Dans certains cas, le corps est décoré.

Les peintures non figuratives incluent des traces de doigt intentionnelles, qui vont souvent par deux, des lignes se croisant pour former des rectangles, des lignes semblables à des cordes et à des plumes rattachées aux figures animales ou thérioanthropes.

Une étude réalisée sur 17 abris dans la gorge de Didima (5,5 km) au sein de la forêt d'État de Cathedral Peak, probablement la zone la plus riche d'Afrique du Sud, a donné des résultats comparables. Toutefois, 5 % des images représentent des structures humaines, des ruches et diverses formes d'équipement. Le chercheur a attiré l'attention sur le fait que les animaux apparaissaient plus colorés et dépeints de façon plus élaborée.

Gestion et protection

Statut juridique

Le parc du Drakensberg (oKhahlamba) a été fondé par la loi de gestion de la conservation de la nature Kwazulu de 1997 et la loi nationale sur les forêts de la République d'Afrique du Sud. Le parc se compose de six réserves : Giant's Castle Game Reserve, Kamberg Nature Reserve, Loteni Nature Reserve, Royal Natal National Park, Rugged Glen Nature Reserve, et Vergelen Nature Reserve. On compte six forêts d'État : Cathedral Peak, Cobham, Garden Castle, Highmoor, Mkhomazi, et Monk's Cowl.

En outre, certaines ressources naturelles sont protégées aux termes des dispositions de la loi sur l'eau de 1956 et de la loi de conservation de l'environnement de 1989, toutes deux telles qu'amendées.

Gestion

La loi de gestion de la conservation de la nature Kwazulu de 1997 a créé des structures institutionnelles de conservation de la nature dans la province et établi des instances et des mécanismes de contrôle et de suivi. L'instance décisionnelle, le comité de Conservation de la Nature Kwazulu, est globalement responsable de la définition des politiques et de la gestion générales. Aux termes de la loi, des comités locaux de protection sont instaurés pour fournir une base statutaire à l'implication directe des communautés locales dans la prise de décision.

La gestion directe est déléguée au service de la Conservation de la Nature Kwazulu, sous la direction de son directeur général. Il est rattaché au ministère provincial des Affaires Traditionnelles et Environnementales. Le service compte trois branches qui couvrent respectivement, la conservation, les services scientifiques et l'administration. Les effectifs comptent plus de 600 personnes de tous grades.

Le cadre de la gestion du parc est déterminé par les perspectives et les politiques exposées. Il n'existe pour l'instant aucun plan directeur, mais il est en cours d'élaboration. Toutefois, des plans de gestion sont en vigueur pour trois des réserves et une forêt d'État.

Le plan de gestion des ressources culturelles (CURE) pour le parc du Drakensberg a été approuvé par le comité en novembre 1998. Sa mission est de « promouvoir la conservation et l'appréciation publique des ressources archéologiques et historiques du parc du Drakensberg, conformément aux objectifs de conservation, de tourisme et de gestion de la faune et de la flore ». Le plan identifie également une série d'objectifs et définit une stratégie en trois volets : mise en œuvre et maintenance des mesures de conservation pour freiner la détérioration naturelle et artificielle des sites ; promotion de l'appréciation des ressources culturelles du parc ; et promotion des opportunités de recherche, de l'inventaire et du suivi des sites, et établissement et tenue de bases de données.

Conservation et authenticité

Historique de la conservation

Les premières mesures prises pour protéger le Drakensberg l'ont été par le gouvernement colonial du Natal en 1903, avec la création d'une réserve de gibier dans la région de Giant's Castle. Cela a marqué le début d'un processus qui s'est poursuivi pendant tout le XXe siècle, toujours lié à la protection de la nature.

Sur les cinquante dernières années, les recherches archéologiques ont été incessantes, ce qui a motivé la mise en place de mesures supplémentaires pour protéger l'art rupestre. Quatre sites importants (Battle Cave, Main Caves, Game Pass 1 et Kanti 1) ont été classés aux termes des dispositions de la loi de 1969 sur les monuments nationaux. Plusieurs programmes de conservation visant à améliorer la protection des sites d'art rupestre sont actuellement en vigueur. Ils impliquent l'entrée contrôlée sur le parc, la sensibilisation, l'accès guidé à des sites choisis, le maintien de la confidentialité des autres sites, et l'interdiction du camping ou des feux dans les grottes ou abris contenant des peintures rupestres. Ceux-ci sont consolidés par le Plan de gestion des ressources culturelles.

Authenticité

Le degré d'authenticité de l'art rupestre du Drakensberg est incontestable.

Évaluation

Action de l'ICOMOS

Une mission d'expertise de l'ICOMOS a visité le bien en janvier 2000. L'ICOMOS a également consulté son Comité Scientifique International d'Art Rupestre.

Caractéristiques

L'art rupestre du Drakensberg est exceptionnel en ce qu'il représente l'expression artistique d'un seul et même peuple, les San, sur plus de 4000 ans. C'est aussi le groupe d'art rupestre le plus important et le plus dense en Afrique.

Analyse comparative

On trouve d'autres concentrations d'art rupestre San en Afrique australe, à Cederberg, dans le sud-ouest de la province du Cap et dans les collines du Matopo, au Zimbabwe. Toutefois, aucun n'est comparable au Drakensberg en termes de densité et de diversité. C'est aussi le groupe le mieux préservé au sud du Sahara, grâce aux propriétés physiques de la roche sur laquelle il a été peint.

Observations et recommandations de l'ICOMOS pour des actions futures

L'ICOMOS n'est pas convaincu que le Drakensberg constitue un *paysage culturel*, aux termes du paragraphe 39 des *Orientations devant guider la mise en œuvre de la Convention du patrimoine mondial*. On peut en effet difficilement arguer que la longue occupation par les San a notablement modifié le paysage naturel. L'inscription en tant que site mixte est donc, dans ce cas, plus appropriée.

Le parc national du Drakensberg est délimité, à l'ouest, par la frontière avec le Lesotho. Il semble certain que le territoire de ce pays (qui n'est pas encore un État partie à la Convention) abrite d'autres sites d'art rupestre San. Il semblerait que des discussions aient été entamées avec le Lesotho pour explorer la possibilité d'étendre une éventuelle inscription du parc du Drakensberg aux sites similaires du pays voisin.

L'ICOMOS est préoccupé par l'absence d'harmonisation des différents plans de gestion au moyen d'un plan directeur. Il est très important que les objectifs et politiques du plan de gestion des ressources culturelles soient convenablement intégrés à ceux liés au patrimoine naturel, afin d'éviter des conflits éventuels.

Le personnel du service de Conservation de la Nature se charge exclusivement du patrimoine naturel. L'ICOMOS recommande vivement qu'un département chargé du patrimoine culturel soit institué au sein du service. Des responsables en matière d'archéologie ou de conservation du patrimoine ont été nommés, sur ces vingt dernières années, pour la plupart des parcs nationaux britanniques, une mesure qui a eu un impact plus que positif.

Brève description

Le spectaculaire paysage naturel du parc du Drakensberg contient de nombreux abris-sous-roche et grottes, riches des milliers de peintures réalisées par les San sur 4000 ans. Celles-ci dépeignent des animaux et des êtres humains, et représentent la vie spirituelle de ce peuple, qui ne vit désormais plus sur sa terre natale.

Recommandation

Que ce bien soit inscrit sur la Liste du patrimoine mondial sur la base des ***critères culturels i et iii*** :

> ***Critère i*** L'art rupestre du Drakensberg constitue le groupe le plus important et le plus dense de peintures rupestres au sud du Sahara ; il est remarquable tant par sa qualité que par la diversité de ses sujets.
>
> ***Critère iii*** Le peuple San a vécu dans la région montagneuse du Drakensberg pendant plus de quatre millénaires, laissant derrière lui un corpus exceptionnel d'art rupestre qui met en exergue son mode de vie et ses croyances.

ICOMOS, septembre 2000

CANDIDATURE AU PATRIMOINE MONDIAL - ÉVALUATION TECHNIQUE UICN

PARC DU DRAKENSBERG/PARC OKHAHLAMBA (AFRIQUE DU SUD)

1. DOCUMENTATION

i) **Fiches techniques UICN/WCMC** (13 références)

ii) **Littérature consultée:** Armstrong, A. J. 200. Faunal Diversity and Importance. Highlights. Internal Report. KwaZulu Nature Conservation Service; Botha, G. 2000. **Geology and Geomorphlogy of the oKhahlamba Drakensberg Park**. Council for Geoscience Report. 2000-0009; Cowling, N. J. and Hilton-Taylor, C. 1994. Patterns of plant diversity and endemism in southern Africa: an overview. In Huntley, B. 1994. **Botanical Diversity in Southern Africa**, National Botanical Institute, Pretoria. Strelitzia 1 31-52; Davis, S. D. and Heywood, V. H. 1994. **Centre of Plant Diversity: A Guide and Strategy for their Conservation**. WWF/IUCN 1994; Henwood, W. D. 1988. An overview of protected areas in the temperate grasslands biome. **PARKS**. 1998. Vol. 8. No. 3; Killick; D. J. B. 1994. Drakensberg alpine region. In Davies, S. D. and Heywood, V. H. 1994. Oxford University Press, Oxford; Killick; D. J. B. 1997. Alpine tundra of southern Africa. In Wielgolaski, F. E. (ed.). **Ecosystems of the World 3: Polar and alpine tundra**. Elsevier, Amsterdam pp. 199-209; MacRae, C. 1999. **Life etched in stone**. Geological Society of South Africa; Statlersfield, A. J., et. al. 1998 **Endemic Bird Areas of the World. Priorities for Biodiversity Conservation**. BirdLife International, Cambridge.

iii) **Consultations:** 7 évaluateurs indépendants. Fonctionnaires compétents des Agences fédérale et provinciale des parcs. Communautés locales et groupes intéressés.

iv) **Visite du site:** David Sheppard, février 2000.

2. RÉSUMÉ DES CARACTÉRISTIQUES NATURELLES

Le Parc du Drakensberg, également connu sous le nom de Parc oKhahlamba, est la plus grande aire protégée établie sur les hauts plateaux du sous-continent sud-africain. Situé dans un massif montagneux intérieur, dans la province du KwaZulu-Natal en Afrique du Sud, le long de la frontière orientale du Lesotho (voir carte 1), le Parc du Drakensberg a une superficie de 242 813 hectares et comprend un secteur nord et un secteur sud beaucoup plus grand (voir carte 2). La région montagneuse qui sépare les deux secteurs et porte le nom de Mnweni, est un territoire tribal. Le Parc du Drakensberg peut être divisé en deux régions physiographiques distinctes. Les contreforts du «Little Berg» sont des éperons vertigineux, avec des escarpements et des vallées au-dessous de 2000 mètres tandis que le principal escarpement s'élève à plus de 3400 mètres. La topographie est extrêmement variée et comprend d'immenses falaises de basaltes et de grès, des vallées profondes, des éperons qui s'entremêlent et de vastes plateaux. Cette diversité topographique contribue à la valeur panoramique exceptionnelle du Parc du Drakensberg. Le climat de la région est dominé par l'influence des anticyclones subtropicaux. En hiver, la stabilité atmosphérique engendre une véritable saison sèche. En été (novembre à mars), l'inversion atmosphérique peut s'élever au-dessus de l'escarpement et provoquer un influx d'air humide de l'océan Indien apporté par les vents du sud-est. Les précipitations des mois d'été apportent 70% de la pluviosité annuelle totale. Le Drakensberg est une des régions les plus arrosées, les moins sensibles à la sécheresse, de l'Afrique australe. Le Parc du Drakensberg a une importance particulière parce qu'il protège le bassin versant et assure l'alimentation en eau de grande qualité des communautés avoisinantes; plusieurs fleuves de la région naissent dans le Parc du Drakensberg.

La géologie du Drakensberg est caractérisée par une succession sédimentaire épaisse, coiffée par une accumulation de basalte, comprenant la partie supérieure de la succession du supergroupe du Karoo qui présente une épaisseur composite atteignant 7 km dans la région. Les hautes falaises formées de grès fin, de la formation de Clarens sont la caractéristique physiographique la plus distinctive des contreforts du Drakensberg. La transition Molteno-Elliott-Clarens illustre une transformation paléoclimatique à la dernière étape de la dérive latitudinale du Gondwana (qui a duré environ 250 millions d'années) passé d'une position subpolaire à la position subtropicale actuelle de cette partie de l'Afrique. Cette

succession préserve aussi une collection pratiquement complète de fossiles illustrant 80 millions d'années d'évolution des reptiles.

La végétation du Parc du Drakensberg est influencée par la topographie et par le climat, les sols, la géologie, la déclivité, le drainage et les feux. La végétation présente un zonage altitudinal, formant trois ceintures qui coïncident avec les principales caractéristiques topographiques, à savoir le système fluvial des vallées, les éperons et le sommet du plateau. Il s'agit d'une ceinture de basse altitude (1280 à 1830 mètres) portant une forêt de podocarpes, d'une ceinture de moyenne altitude (1830 à 2865 m) avec sa végétation de Fynbos et d'une ceinture de haute altitude (2865 à 3500 m) avec une toundra alpine et la lande. Au total, 2153 espèces de plantes ont été décrites dans le Parc du Drakensberg, notamment un grand nombre d'espèces menacées au niveau national et international. Une des caractéristiques importantes est le niveau élevé d'endémisme des espèces de plantes. Le Parc comprend aussi d'importantes communautés herbacées.

La faune du Parc du Drakensberg comprend 48 espèces de mammifères, 296 espèces d'oiseaux, 48 espèces de reptiles, 26 espèces d'amphibiens et 8 espèces de poissons. La faune d'invertébrés est mal connue mais comprend de nombreuses espèces endémiques de cette région. On trouve, dans le Parc du Drakensberg, un certain nombre d'espèces de la faune, menacées au plan mondial, telles que la rainette à long doigt, le pipit à gorge jaune et le caméléon nain des Midlands du Natal.

Le Parc du Drakensberg est une région de beauté naturelle et d'importance esthétique exceptionnelles avec pour caractéristique panoramique principale, le massif montagneux spectaculaire et ses murailles escarpées de basalte sombre, ses crêtes et ses éperons entremêlés.

3. COMPARAISON AVEC D'AUTRES AIRES PROTÉGÉES

L'inscription du Parc du Drakensberg est proposée au titre des quatre critères naturels et de trois critères culturels. Dans la province biogéographique afro-montagnarde, il existe plusieurs autres aires protégées de montagne et un certain nombre de biens du patrimoine mondial, notamment le mont Kilimanjaro; Rwenzori et le mont Nimba. Le Parc du Drakensberg s'en distingue par sa flore car il se trouve dans une région floristique unique, la région alpine du Drakensberg sud-africain (Davis et Heywood, 1994). Cette région floristique couvre le parc et un bon pourcentage de la superficie terrestre du Lesotho. La région alpine du Drakensberg d'Afrique du Sud et du Lesotho est considérée, dans l'évaluation mondiale des Centres de la diversité biologique (WWF/UICN) comme d'importance internationale. En outre, le Programme «Global 200 Ecosystems» du WWF, qui répertorie les régions biologiquement exceptionnelles les plus représentatives de la diversité biologique mondiale, comprend les montagnes/prairies d'Afrique du Sud dont le Drakensberg fait partie. Ce qui est particulièrement important dans le Parc du Drakensberg, c'est le taux élevé d'endémisme de la flore, la végétation unique de prairie de montagne et de toundra alpine de haute altitude et la faune endémique paléo-invertébrée associée. Le Parc du Drakensberg est extrêmement riche en espèces, avec 2153 espèces de plantes à l'intérieur du parc dont 109 qui sont menacées à l'échelle mondiale. Il n'y a pas d'autre bien du patrimoine mondial dans cette région floristique.

D'autres biens du patrimoine mondial protègent des communautés herbacées, par exemple les Biens du patrimoine mondial de Manas et de Kaziranga en Inde qui protègent des communautés herbacées hautes uniques. Toutefois, les communautés de prairie du Parc du Drakensberg reflètent des gradients topographiques et altitudinaux prononcés que l'on ne trouve pas dans les autres biens du patrimoine mondial. Ce point est important si l'on considère que les prairies sont extrêmement peu protégées, que ce soit à l'échelle mondiale (moins de 1%) ou dans les biens du patrimoine mondial.

Le statut de conservation de la région alpine du Drakensberg serait également renforcé par l'expansion transfrontière proposée du Parc du Drakensberg en vue d'inclure les zones contiguës au Lesotho (voir par. 4.2). Cette mesure permettrait d'augmenter considérablement le statut global de conservation de la région alpine du Drakensberg. On sait aussi que le Parc du Drakensberg se trouve dans une région d'importance mondiale pour l'endémisme des oiseaux: les hauts plateaux du Lesotho. Le Parc du Drakensberg est très important par la présence du pipit à gorge jaune, du serin de Symons et du chétopse doré (Stattersfield et. *al.*, 1998). Globalement, le Parc du Drakensberg compte 119 espèces d'oiseaux menacées à l'échelle mondiale.

Sur le plan géologique, le Parc du Drakensberg diffère des autres massifs montagneux tels que les Andes, les montagnes Rocheuses et l'Himalaya, notamment du point de vue de la composition des séquences géologiques et des processus de formation. On note quelques similitudes avec le Bien du patrimoine mondial de Simen, en Éthiopie, qui fait partie du massif du Simen et comprend le plus haut sommet d'Éthiopie, le Ras Dashan Terara (4620 m). Ce massif s'est formé il y

a 25 millions d'années et, avec le Drakensberg, comprend des basaltes ignés qui ont été érodés de manière à former des falaises vertigineuses et des gorges profondes. Toutefois, les deux sites présentent des différences dans leur géomorphologie, leur diversité biologique et leur dimensions. Plusieurs biens du patrimoine mondial ont été inscrits en raison de phénomènes naturels exceptionnels et de leur beauté naturelle, en particulier des sites tels que les Tropiques humides du Queensland (Australie), le Réseau de réserves du récif de la barrière du Belize (Belize) et Los Glaciares (Argentine). Le Parc du Drakensberg, avec ses falaises spectaculaires de basalte noir, surplombant des grès de Clarens de couleur claire n'a rien à envier à tous ces sites.

En résumé, le Parc du Drakensberg se distingue pour la diversité et l'endémisme de sa flore, ses prairies de montagne et ses communautés de toundra alpine, ainsi que pour sa valeur esthétique exceptionnelle.

4. INTÉGRITÉ

La gestion efficace pour la conservation remonte à 1927, lorsque fut créée la première composante le Parc du Drakensberg (la Forêt d'État de Cathedral Peak). Le parc est pratiquement à l'abri d'activités de développement humaine. Il est assez vaste pour survivre en tant que zone naturelle et maintenir ses valeurs naturelles même s'il subit des influences extérieures. Les questions suivantes, concernant l'intégrité à long terme du Parc du Drakensberg, sont soulignées.

4.1. La question des limites

Le Parc du Drakensberg comprend actuellement un secteur nord et un secteur sud beaucoup plus grand (voir carte 2). La région intermédiaire, le long de l'escarpement, fait partie des terres communautaires Mnweni. Le dossier de proposition souligne que «la nécessité d'établir une aire de conservation dans la région Mnweni qui permettrait de relier les deux secteurs du Parc du Drakensberg est reconnue depuis longtemps». Les mécanismes de planification limitent le développement au-dessus de 1650 mètres afin de maintenir l'intégrité écologique. Un accord de coopération est envisagé entre le Fonds communautaire Mnweni et le Service de conservation de la nature du KwaZulu-Natal afin de renforcer la conservation de la région. Les programmes de planification ont également identifié des terres privées, le long de l'escarpement au sud du site, qui pourraient devenir des aires protégées et venir agrandir encore le Parc du Drakensberg.

Il existe, en outre, une proposition transfrontière importante concernant le Parc du Drakensberg et la région contiguë du Lesotho (le Parc national Sehlabethebe). Le Programme de conservation et de développement transfrontière Drakensberg-Maloti est en train d'être élaboré conjointement par le Secrétariat national à l'environnement du Lesotho, le Service de conservation de la nature du KwaZulu-Natal et le Fonds pour l'environnement mondial. Ce programme s'appuie sur la déclaration de Giants Castle à laquelle ont souscrit les acteurs clés du Lesotho et du KwaZulu-Natal et a adopté le concept de zone de développement et de conservation transfrontière entre les hautes terres Maloti du Lesotho et les montagnes du Drakensberg au KwaZulu-Natal, en Afrique du Sud. Cela permettrait d'établir une aire protégée transfrontière entre les deux pays - importante initiative qui renforcerait l'efficacité de la conservation de la diversité biologique et la coopération entre l'Afrique du Sud et le Lesotho.

4.2. Cadre juridique et de planification

i) Cadre juridique

Le parc est placé sous régime juridique efficace, les lois principales étant la Loi de gestion de la conservation de la nature du KwaZulu-Natal et la Loi de la République d'Afrique du Sud sur la forêt nationale. La Loi sur la gestion de la conservation de la nature fournit un excellent cadre de gestion de la conservation. Le contrôle et la gestion des régions à l'intérieur du Parc du Drakensberg, régis par la Loi sur la forêt nationale, incombent au ministère de l'Eau et des Forêts. La gestion de ces régions a été confiée au Service de conservation de la nature et il importe que ces dispositions soient maintenues pour garantir une gestion intégrée des 12 aires protégées qui constituent le site proposé. Pour bien faire, le contrôle et la gestion de toutes les régions contenues dans le Parc du Drakensberg devraient être régis par la Loi de gestion de la conservation de la nature.

ii) Plan de gestion

Il existe des plans de gestion pour chaque élément composant le Parc du Drakensberg. Un plan de gestion magistral global est en préparation pour le Parc et il est recommandé que ce plan soit terminé le plus vite possible afin de garantir une gestion intégrée et efficace pour la conservation à long terme de tous les secteurs du site.

iii) Personnel et budget

Le Parc du Drakensberg dispose d'un personnel suffisant (604 employés à plein temps et à temps partiel en 1999) et le budget disponible suffit pour garantir une gestion efficace aux fins de la conservation.

4.3. Planification régionale et intégration

Les activités menées à l'extérieur du Parc du Drakensberg comprennent l'agriculture, la sylviculture de plantation et l'écotourisme. Toutes ces activités pourraient avoir des impacts sur les valeurs naturelles du Parc du Drakensberg si elles étaient mal planifiées et mal gérées. Il est donc utile de signaler le Special Case Area Plan - Plan applicable à des aires spéciales - (SCAP), que prépare actuellement le ministre des Collectivités locales et du Logement du KwaZulu-Natal pour des milieux naturels spéciaux lorsqu'il faut appliquer des restrictions au développement afin d'empêcher la destruction de caractéristiques particulières. Les études concernant le SCAP pour cette région reconnaissent les valeurs naturelles uniques du Parc de Drakensberg et la nécessité de préparer une planification régionale complémentaire. Elles s'appuient sur les dispositions de la Stratégie de Séville relative aux réserves de biosphère (MAB/UNESCO). Ces efforts doivent être loués et il se pourrait que l'on puisse inscrire l'ensemble ou des secteurs de la région SCAP en tant que Réserve internationale de biosphère dont le Parc du Drakensberg serait la zone centrale. Il importe que les activités menées à l'extérieur du Parc du Drakensberg soient en harmonie avec les valeurs naturelles du Parc et limitent le plus possible les impacts. Il importe également que le Service de conservation de la nature du KwaZulu-Natal joue un rôle actif dans l'élaboration du SCAP.

4.4. Problèmes relatifs aux communautés locales

Le Service de conservation de la nature du KwaZulu-Natal entretient de bonnes relations de voisinage avec les communautés voisines du Parc. Des programmes communautaires et des «forums de partenariat» ont été mis au point pour contribuer aux objectifs de développement locaux. Tout cela donne une image plus positive au Parc du Drakensberg dans l'esprit des communautés locales. Il importe que de tels programmes renforcent le sentiment de propriété, la sensibilisation et l'appui à la protection des valeurs naturelles du Parc. Les programmes pour les communautés locales contiennent aussi des dispositions concernant la récolte durable de différentes herbes et de graines de plantes médicinales à l'intérieur du Parc du Drakensberg. Il importe que l'impact à long terme de ces programmes sur les valeurs naturelles soit suivi de près.

4.5. Problèmes de gestion

Les espèces envahissantes et le feu sont deux préoccupations majeures pour la gestion du Parc du Drakensberg. Actuellement, 1% du parc est couvert de végétation exotique, notamment des plantations et des infestations d'acacias qui constituent une menace pour l'intégrité écologique du Parc ainsi que pour le rendement de l'eau des zones humides et du réseau fluvial du parc. L'administration du parc s'efforce activement d'éliminer la végétation exotique et les efforts devraient se poursuivre, voire même, être accélérés. L'interaction entre la gestion d'espèces envahissantes et la gestion du feu doit également être soigneusement examinée. Par exemple, une fréquence accrue des incendies favorise l'expansion d'espèces envahissantes tolérantes au feu. La gestion générale des incendies dans le Parc du Drakensberg est complète. Toutefois, la surveillance des impacts écologiques du feu, notamment pour la faune sensible au feu comme les grenouilles endémiques doit être renforcée. La gestion du feu et des espèces envahissantes doit être traitée conjointement par le Lesotho et le KwaZulu-Natal, de préférence dans le cadre établi pour la coopération transfrontière concernant les aires protégées.

4.6. Développement du tourisme et de l'infrastructure

Dans le Parc du Drakensberg, il y a un certain nombre d'infrastructures touristiques qui contribuent au fait que les visiteurs apprécient les valeurs naturelles et qui complètent le revenu global du Parc. Environ 1024 hectares du Parc du Drakensberg (0,4% de la superficie totale) ont été transformés par des infrastructures. Il importe de veiller à ce qu'aucun développement futur ne vienne compromettre les valeurs naturelles et de définir clairement les limites des changements acceptables. Ce point devrait être clairement traité dans le Plan magistral intégré pour le Parc du Drakensberg.

5. AUTRES COMMENTAIRES

Le Parc du Drakensberg est proposé pour inscription sur la Liste du patrimoine mondial au titre des critères naturels et culturels. L'évaluation de l'UICN concernant les critères naturels figure dans le paragraphe 6. Le Parc du Drakensberg est proposé au titre des quatre critères naturels du patrimoine mondial. L'évaluation de l'UICN est la suivante:

6. APPLICATION DES CRITÈRES DU PATRIMOINE MONDIAL

Critère (i): histoire de la terre et processus géologiques

Le dossier de proposition invoque le critère (i). Dans le Parc du Drakensberg, il existe des exemples excellents de différentes séquences géologiques et processus de formation. Toutefois, les montagnes ne présentent pas de caractère de rareté. Il est également noté que des processus et caractéristiques géologiques semblables sont mieux représentés sur la Liste du patrimoine mondial par les montagnes de Simen en Éthiopie. L'UICN considère que le site proposé ne remplit pas ce critère.

Critère (ii): processus écologiques

Le dossier de proposition invoque le critère (ii): processus écologiques et biologiques. Le Parc du Drakensberg est un exemple africain important de processus écologiques et biologiques en cours. C'est un important exemple de zones de prairies de montagne africaines assez grandes pour que les processus écologiques et biologiques puissent se poursuivre sans interférence. Il est également important par son emplacement dans le haut bassin versant pour les régions immédiates et en aval et, en conséquence, d'importance nationale. L'UICN considère que le site proposé ne remplit pas ce critère.

Critère (iii): phénomènes naturels éminemment remarquables ou de beauté exceptionnelle

Le Parc du Drakensberg a une valeur esthétique exceptionnelle. Les contreforts basaltiques jaillissants, les arrière-plans incisifs spectaculaires et les remparts de grès doré se conjuguent pour former un paysage spectaculaire. Les autres caractéristiques qui contribuent à la beauté naturelle exceptionnelle du Parc du Drakensberg sont les prairies ondoyantes de haute altitude, les vallées fluviales encaissées et les gorges rocheuses à l'état primaire. Le Parc du Drakensberg comprend des régions essentielles pour maintenir la beauté du site. L'UICN considère que le site proposé remplit ce critère.

Critère (iv): diversité biologique et espèces menacées

Le Parc du Drakensberg contient d'importants habitats naturels pour la conservation *in situ* de la diversité biologique. Il présente une richesse en espèces, particulièrement de plantes, exceptionnelle. Il est reconnu comme un centre mondial de diversité et d'endémisme des plantes et se trouve dans sa propre région floristique - la région alpine du Drakensberg sud-africain. Il se trouve aussi dans une région d'importance mondiale pour l'endémisme des oiseaux et il est remarquable pour la présence de plusieurs espèces menacées au niveau mondial telles que le pipit à gorge jaune. La diversité des habitats est exceptionnelle, allant de plateaux alpins, à des vallées fluviales, en passant par des pentes rocheuses escarpées. Dans ces habitats, de nombreuses espèces endémiques et menacées sont protégées. L'UICN considère que le site proposé remplit ce critère.

7. RECOMMANDATION

Le Bureau recommande au Comité d'**inscrire** le Parc du Drakensberg, également connu sous le nom de Parc oKhahlamba, sur la Liste du patrimoine mondial, conformément aux critères (iii) et (iv). Le Bureau a noté que le site est d'une valeur esthétique exceptionnelle avec ses contreforts basaltiques jaillissants, ses arrière-plans incisifs spectaculaires et ses remparts de grès doré. Les prairies ondoyantes de haute altitude, les vallées fluviales encaissées et les gorges rocheuses à l'état primaire contribuent à la beauté du site. La diversité des habitats protège de nombreuses espèces endémiques et menacées, surtout d'oiseaux et de plantes.

Le Bureau encourage l'État partie à examiner ce qui suit:

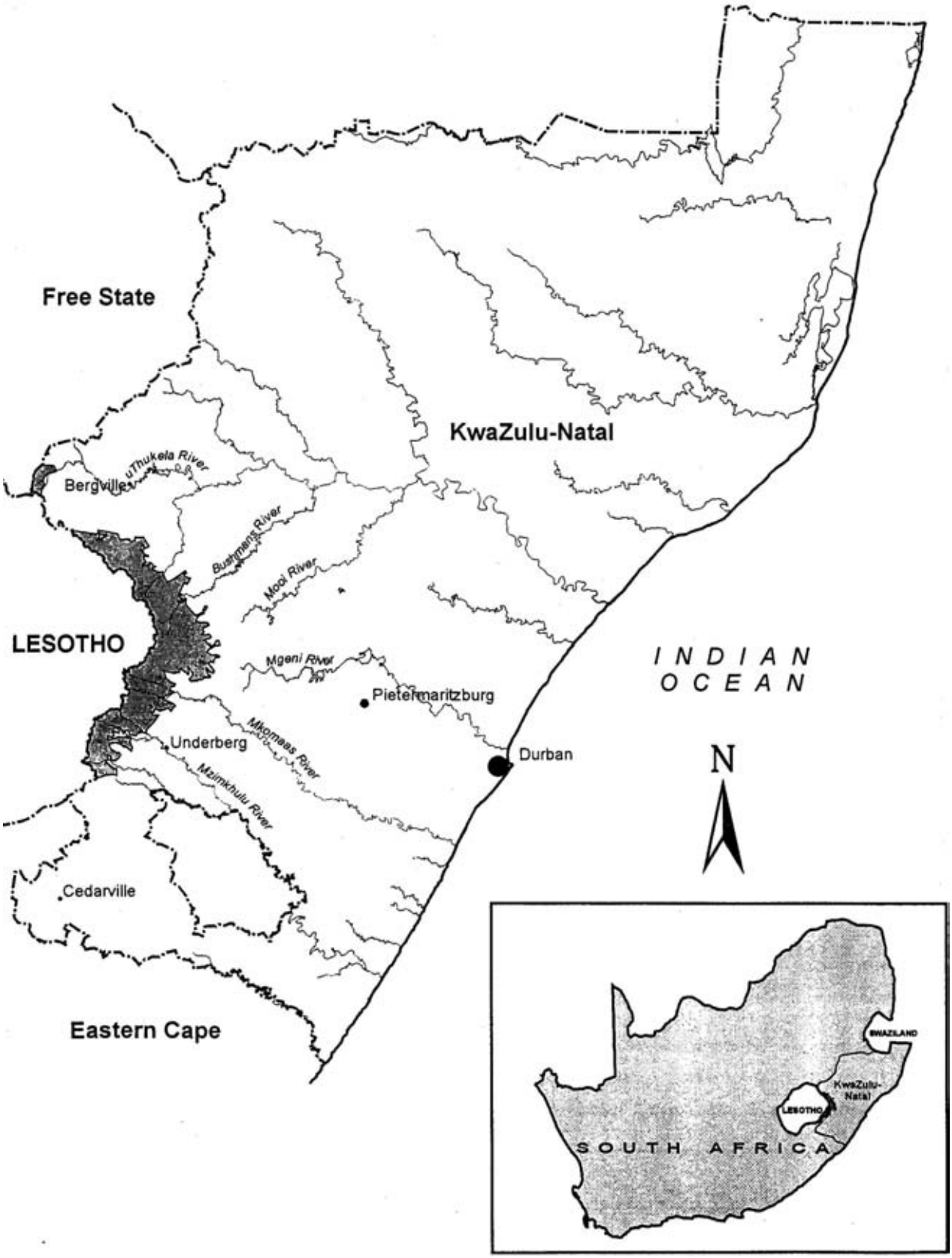
- que le plan magistral de gestion intégrée du Parc du Drakensberg soit terminé aussi rapidement que possible et donne la priorité à la gestion des feux et des espèces envahissantes ainsi qu'à la gestion du tourisme;

- que l'intention d'établir des aires de conservation supplémentaires, afin d'assurer la continuité du site le long de l'escarpement, se concrétise;

- que les efforts visant à établir l'aire protégée transfrontière Drakensberg-Maloti soient renforcés et que l'on envisage de créer une extension transfrontière du Bien du patrimoine mondial si le Lesotho devient État partie à la Convention du patrimoine mondial;

- que les efforts visant à établir le SCAP du Parc du Drakensberg et des régions attenantes soient poursuivis.

L'UICN a noté que la possibilité d'envisager une proposition d'inscription future de l'ensemble ou de certaines parties du SCAP en tant que Réserve de biosphère doit être étudiée.



Carte 1: Localisation – Parc du Drakensberg/Parc oKhahlamba

Carte 2: Carte du site – Parc du Drakensberg/Parc oKhahlamba