



4.13 *Protea welwitschii*-*Tristachya leucothrix* Low Open Shrubland

The size of this plant community is 438 ha and covers 1,5 % of the study area. The grazing capacity is 10,9 ha/LSU (Table 4.9).

The ecological index of the veld is at present 739, which shows that it is in a good condition, because of the high percentage Decreaser species and Increaser 1 species. In the past this veld was extensively grazed by cattle and since it has been part of MNP, little or no grazing occurred in this veld, because of the lack of grazing animals.

Grazing animals were recently introduced into this part of MNP. During the time that little or no grazing occurred in this veld, MNP burnt every second year because of lightning fires. The accumulation of moribund material did not occur which helped to maintain the present status of this veld.

During a year with below average rainfall, the grazing capacity would decrease from 10,9 ha/LSU to 17,9 ha/LSU (Table 4.9). The grasses with the highest frequency are as follows:

Species	% Frequency
<i>Andropogon schirensis</i>	14 %
<i>Trachypogon spicatus</i>	12 %
<i>Panicum dregeana</i>	10 %
<i>Loudetia simplex</i>	9 %
<i>Themeda triandra</i>	8 %
<i>Tristachya rehmannii</i>	8 %
<i>Schizachyrium sanguineum</i>	7 %
<i>Hyparrhenia hirta</i>	4 %
<i>Panicum coloratum</i>	4 %



Table 4.9 Grazing capacity of *Protea welwitschii-Tristachya leucothrix* Low Open Shrubland

The size of this plant community is 9 635 ha and covers 33.2 % of the study area. The grazing capacity is 10.5 ha/LSU (Table 4.10).

The ecological index present 718, which shows that this veld is in good condition, because of the moderate percentage Decreaser species and high percentage Increaser 1 species present in this veld. The condition of the vegetation for this veld is

AVERAGE RAINFALL BELOW AVERAGE RAINFALL

SIZE (ha) = 438

% BUSH COVER	TREES:	0	0
	SHRUBS:	10	10
		---	---
		1.0	1.0
% DECREASERS		31	31
% INCREASERS 1		57	57
% INCREASERS 2a&b		6	6
% INCREASERS 2c		6	6
		---	---
TOTAL		100	100
ECOLOGICAL INDEX		739	665
% GRASS COVER		18	14
AVERAGE RAINFALL (mm/year)		551	468
ACCESSIBILITY			
(.9 =hills / 1 =plains)		.9	.9
FIRE			
(1 =regular/ never= .8)		1	1

The grasses with the highest frequency are as follows:

GRAZING CAPACITY FOR GAME 10.9 (ha/LSU) 17.9 (ha/LSU)

Trachypogon daniellii 25 %
Stylosanthes sanguinolentus 20 %
Cenchrus ciliaris 17 %

4.14 *Andropogon schirensis*-*Dicoma anomala* Short Closed Grassland

The size of this plant community is 9 635 ha and covers 33,2 % of the study area. The grazing capacity is 10,5 ha/LSU (Table 4.10).

The ecological index of the veld is at present 718, which shows that this veld is in good condition, because of the moderate percentage Decreaser species and high percentage Increaser 1 species present in this veld. The condition of the vegetation for this veld (plant community) was described by Westfall (1981) and during that time the vegetation was grazed by cattle that were driven to the summit by a road.

This veld was grazed periodically because the cattle could not reach the summit of their own accord, due to fences. Westfall (1981) found low proportion Decreaser species and a high proportion Increaser 2a+2b and Increaser 2c species. Since this veld became part of MNP, no or very little grazing occurred in this veld, because the only grazing animals that occurred in this veld was Mountain Rhebuck. The grass was not moribund due to periodically natural fires (lightning), which changed the species composition from high Increaser 2a+2b & 2c species to high Increaser 1 species (Table 4.10).

Grass species like *Loudetia simplex*, *Trachypogon spicatus*, *Tristachya leucothrix* and *Andropogon schirensis* become dominant as a result of undergrazing. Grasses became unpalatable in the absence of regular burning or with protection from fire (Trollope et al. 1989). During a year with below average rainfall, the grazing capacity would decrease from 10,5 ha/LSU to 15,8 ha/LSU (Table 4.10).

The grasses with the highest frequency are as follows:

Species	% Frequency
<i>Trachypogon spicatus</i>	23 %
<i>Andropogon schirensis</i>	20 %
<i>Loudetia simplex</i>	17 %



Table 4.10

Grazing capacity of *Andropogon schirensis*-*Dicoma anomala*

Short Closed Grassland

SIZE (ha) = 9 635

AVERAGE RAINFALL BELOW AVERAGE RAINFALL

% BUSH COVER	TREES:	1	1
	SHRUBS:	2	2
		1.0	1.0
% DECREASES		13	13
% INCREASES 1		81	81
% INCREASES 2a&b		5	5
% INCREASES 2c		1	1
TOTAL		100	100
ECOLOGICAL INDEX		718	646
% GRASS COVER		29	23
AVERAGE RAINFALL (mm/year)		551	468
ACCESSIBILITY (.9 =hills / 1 =plains)		.9	.9
FIRE (1 =regular/ never= .8)		1	1
GRAZING CAPACITY FOR GAME		10.5 (ha/LSU)	15.8 (ha/LSU)



Species	% Frequency
<i>Tristachya leucothrix</i>	10 %
<i>Panicum natalense</i>	8 %
<i>Urelytrum agropyroides</i>	7 %
<i>Eragrostis racemosa</i>	4 %
<i>Schizachyrium sanguineum</i>	4 %
<i>Monocymbium ceresiiforme</i>	3 %
<i>Themeda triandra</i>	3 %

4.15 *Burkea africana-Diplorhynchus condylocarpon* variation

The size of this plant community is 3 106 ha and covers 10,7 % of the study area. The grazing capacity is 7,9 ha/LSU (Table 4.11).

The ecological index of the veld is at present 556. The frequency of Decreaser species is 19 %, Increaser 1 species 44 % and Increaser 2c species 30 % (Table 4.11). This veld occurs on gentle to moderate slopes and it was heavily grazed on the gentle slopes whereas, on the moderate slopes, no grazing or little grazing occurred. With the correct veld management and adequate rainfall the grass species composition may improve from Increaser species to Decreaser species.

During a year with below average rainfall, the grazing capacity would decrease from 7,9 ha/LSU to 12,4 ha/LSU (Table 4.11). The grasses with the highest frequency are as follows:

Species	% Frequency
<i>Schizachyrium sanguineum</i>	15 %
<i>Andropogon schirensis</i>	14 %
<i>Melinis repens</i>	12 %
<i>Aristida transvaalensis</i>	11 %
<i>Setaria sphacelata</i>	10 %
<i>Loudetia simplex</i>	9 %
<i>Aristida scabrivalvis</i>	6 %



Table 4.11

Grazing capacity of *Burkea africana*-*Diplorhynchus condylocarpon* variation

SIZE (ha) = 3 106

AVERAGE RAINFALL BELOW AVERAGE RAINFALL

% BUSH COVER	TREES:	39	39
	SHRUBS:	33	33
		---	---
		.6	.6
% DECREASESERS		19	19
% INCREASESERS 1		44	44
% INCREASESERS 2a&b		7	7
% INCREASESERS 2c		30	30
		---	---
TOTAL		100	100

ECOLOGICAL INDEX	556	% Frequency	500
% GRASS COVER	34		27
AVERAGE RAINFALL (mm/year)	551	13 %	468
ACCESSIBILITY		10 %	
(.9 =hills / 1 =plains)	.9	8 %	.9
FIRE		6 %	
(1 =regular/ never= .8)	1	6 %	1

GRAZING CAPACITY FOR GAME 7.9 (ha/LSU) 12.4 (ha/LSU)



Species **% Frequency**

<i>Trachypogon spicatus</i>	5 %
<i>Digitaria eriantha</i>	3 %

4.16 *Burkea africana-Englerophytum magalismontanum* variation

The size of this plant community is 1 428 ha and covers 4,9 % of the study area. The grazing capacity is 8,3 ha/LSU (Table 4.12).

The ecological index of this veld is at present 664. The veld is in a moderate condition, because the frequency of Decreaser species are 37 % and the Increaser 1 species are 31 % (Table 4.12). The percentage Increaser 2a+2b & 2c species is also moderately high, which shows that this veld was extensively grazed in the past. The grass species composition in this veld will improve through correct veld management and adequate rainfall.

During a year with below average rainfall, the grazing capacity would decrease from 8,3 ha/LSU to 12,8 ha/LSu (Table 4.12).

The grasses with the highest frequency are as follows:

Species	% Frequency
<i>Setaria sphacelata</i>	13 %
<i>Digitaria eriantha</i>	10 %
<i>Brachiaria nigropedata</i>	8 %
<i>Melinis repens</i>	8 %
<i>Schizachyrium sanguineum</i>	8 %
<i>Andropogon schirensis</i>	7 %
<i>Eragrostis rigidior</i>	6 %
<i>Loudetia simplex</i>	5 %
<i>Trachypogon spicatus</i>	5 %
<i>Enneapogon cenchroides</i>	4 %
<i>Eragrostis curvula</i>	4 %
<i>Tristachya leucothrix</i>	4 %
<i>Diheteropogon amplectens</i>	3 %
<i>Eragrostis chloromelas</i>	3 %
<i>Pogonarthria squarrosa</i>	3 %

4.17 *Fuirena pubescens-Aristida junciformis* Low Closed Grassland

The size of this plant community is 408 ha and covers 1,4 % of the study area. The grazing capacity is 9,2 ha/LSU (Table 4.13).

The ecological index of the veld is at present 562. There is an equally high percentage Decreaser species (40 %) and Increaser 2c species (42 %) present in this veld. In the past this veld was severely grazed by cattle and it was frequently burned. The fact that it is a wetland that have permanent water, it was suitable for grazing just after the winter months when the farmers burned the veld. New grass would emerge shortly after the fire and the cattle were driven onto the veld.

This plant community must not be burned frequently, because it could lead to the drying out of the wetland. During a year with below average rainfall, the grazing capacity would decrease from 9,2 ha/LSU to 14,0 ha/LSU (Table 4.13). The grasses with the highest frequency are as follows:

Species	% Frequency
<i>Aristida junciformis</i>	39 %
<i>Panicum dregeanum</i>	12 %
<i>Monocymbium ceresiiforme</i>	11 %
<i>Andropogon huilensis</i>	10 %
<i>Miscanthus junceus</i>	7 %
<i>Brachiaria bovonei</i>	6 %
<i>Panicum volutans</i>	4 %
<i>Aristida bipartita</i>	3 %



Table 4.12

Grazing capacity of *Burkea africana*-*Englerophyton magalis-*
montanum variation

SIZE (ha) = 408

SIZE (ha) = 1428

AVERAGE RAINFALL BELOW AVERAGE RAINFALL

		AVERAGE RAINFALL	BELOW AVERAGE RAINFALL
% BUSH COVER	TREES:	13	13
	SHRUBS:	12	12
		---	---
		.9	.9
% DECREASES		40	40
% INCREASES 1		16	16
% INCREASES 2a&b		15	15
% INCREASES 2c		17	17
TOTAL		100	100
ECOLOGICAL INDEX		664	598
% GRASS COVER		29	23
AVERAGE RAINFALL (mm/year)		551	468
ACCESSIBILITY (.9 =hills / 1 =plains)		.9	.9
FIRE (1 =regular/ never= .8)		1	1
GRAZING CAPACITY FOR GAME		8.3 (ha/LSU)	12.8 (ha/LSU)



Table 4.13 Grazing capacity of *Fuirena pubescens*-*Aristida junciformis* Low Closed Grassland.

SIZE (ha) = 408			
AVERAGE RAINFALL			
BELOW AVERAGE RAINFALL			
% BUSH COVER	TREES:	0	0
	SHRUBS:	0	0
		1.0	1.0
% DECREASES		40	40
% INCREASES 1		16	16
% INCREASES 2a&b		2	2
% INCREASES 2c		42	42
TOTAL		100	100
ECOLOGICAL INDEX		562	506
% GRASS COVER		78	63
AVERAGE RAINFALL (mm/year)		551	468
ACCESSIBILITY			
(.9 =hills / 1 =plains)		.9	.9
FIRE			
(1 =regular/ never= .8)		1	1
GRAZING CAPACITY FOR GAME		9.2 (ha/LSU)	14.0 (ha/LSU)



Species	% Frequency
<i>Arundinella nepalensis</i>	3 %
<i>Pennisetum sphacelatum</i>	3 %

4.18 *Fuirena pubescens*-*Chironia purpurascens* Low Closed Grassland

The size of this plant community is 45 ha and covers 0,3 % of the study area. The grazing capacity is 8,2 ha/LSU (Table 4.14).

The ecological index of the veld is at present 634. The frequency Decreaser species is 29 %, the Increaser 1 species 36 %, the Increaser 2a+2b species 19 % and the Increaser 2c species 16 % (Table 4.14). The grass cover for this veld is high, but a fair amount of the grass species become unpalatable for grazing animals. To increase the Decreaser species this veld could be burned more often, but from a management point of view, this would be detrimental for the wetland community. Care should be taken not to attract large numbers of grazing animals to this veld because it could be detrimental for the veld.

During a year with below rainfall, the grazing capacity would decrease from 8,2 ha/LSU to 12,1 ha/LSU (Table 4.14). The grasses with the highest frequency are as follows:

Species	% Frequency
<i>Miscanthus junceus</i>	22 %
<i>Eragrostis inamoena</i>	19 %
<i>Panicum dregeanum</i>	17 %
<i>Andropogon huilensis</i>	14 %
<i>Monocymbium cerasiiforme</i>	12 %
<i>Aristida bipartita</i>	9 %
<i>A. junciformis</i>	7 %



4.19 Summary

The total grazing capacity for the study area as a whole, was determined from the grazing capacities for each plant community (except for the six plant communities discussed in section 4.7), and is summarized in Tables 4.15 and 4.16. The present average grazing capacity for the study area is 7,8 ha/LSU (Table 4.15). The results show that the veld is at present in a moderate to good condition. It must be emphasized that the grazing capacity decreases during years with low rainfall, so the numbers of the game must be adjusted in accordance with the veld condition at that specific stage. If the rainfall decrease to 468 mm per annum, the grazing capacity decreases from 7,8 ha/LSU to 11,7 ha/LSU.

The game numbers are at present very low for the study area, because a relocation program of game for MNP was only introduced two years ago and the numbers reintroduced are still low. Aerial censuses must be conducted annually to accurately determine the number of game present in the study area. This is necessary for effective veld management and nature conservation of MNP.

The game species composition and game numbers recommended for the study area (MNP) are shown in Table 4.17. According to Table 4.17 the study area is understocked with game so the veld will not be overutilised and might get a chance to further improve. Presently only 73,86 % of the grazing capacity of the area is achieved, giving opportunity for further increases in game numbers.



Table 4.14 Grazing capacity of *Fuirena pubescens*-*Chironia purpurascens* Low Closed Grassland.

Unit Number	Hectare	Grazing Cap SIZE (ha) = 45	LSU Game
1	385	5.40	71
2	1 675	AVERAGE RAINFALL	
3	743	BELOW AVERAGE RAINFALL	
% BUSH COVER	TREES:	0	0
	SHRUBS:	0	0
6	5 555	---	---
7	438	1.0	1.0
8	9 035		
9	3 106		
10	1 425		
% DECREASERS		29	29
% INCREASERS 1		36	36
% INCREASERS 2a&b		19	19
% INCREASERS 2c		16	16
TOTAL		100	100
Total grazing capacity for game = 7.8 ha/LSU			
ECOLOGICAL INDEX		634	571
% GRASS COVER		88	71
AVERAGE RAINFALL (mm/year)		551	468
ACCESSIBILITY (.9 =hills / 1 =plains)		.9	.9
FIRE (1 =regular/ never= .8)		1	1
GRAZING CAPACITY FOR GAME		8.2 (ha/LSU)	12.1 (ha/LSU)



Table 4.15 Total present grazing capacity for Marakele National Park.

Unit Number	Hectare	Grazing Cap. ha/LSU: Game	LSU Game
1	385	5.40	71
2	1 675	7.40	226
3	743	5.10	146
4	2 458	5.40	455
5	180	6.70	27
6	5 555	6.70	829
7	438	10.90	40
8	9 635	10.50	918
9	3 106	7.90	393
10	1 428	8.30	172
11	408	9.20	44
12	45	8.20	5
TOTAL	26 056		3 326

Total Grazing capacity for game = 7,8 ha/LSU



Table 4.16 Total grazing capacity for an under average year for Marakele National Park.

Unit Number	Hectare	Grazing Cap. ha/LSU: Game	LSU Game
1	385	7.80	49
2	1 675	11.50	146
3	743	7.30	102
4	2 458	7.80	315
5	180	9.80	18
6	5 555	9.90	561
7	438	17.90	24
8	9 635	15.80	610
9	3 106	12.40	250
10	1 428	12.80	112
11	408	14.00	29
12	45	12.10	4
TOTAL	26 056		2 220

Total Grazing capacity for game = 11,7 ha/LSU



Table 4.17 Current numbers of game for Marakele National Park
(Modified from Graze, Bredenkamp & van Rooyen 1991 a&b)

Maximum LSU Game:- 3326

Species	Number	LSU	LSU Conversion	% of Max. equivalent	Capacity

A. Grazers					
Non-selective Feeders					
Buffalo	20		1.00	20.00	0.60
Bushpig	50		4.00	200.00	6.01
Hippo	3		0.55	0.00	0.00
Ostrich	12		3.50	42.00	1.26
White Rhino	29		0.41	11.89	0.36
Zebra	280		1.84	515.20	15.49
	***			*****	*****
	391			789.09	23.72
Selective Feeders					
Blue wildebeest	35		2.65	92.75	2.79
Reedbuck	20		6.14	122.80	3.69
Redhartebeest	35		2.61	91.35	2.75
Roan antelope	0		2.28	0.00	0.00
Sable antelope	80		1.95	156.00	4.69
Gemsbuck	0		2.30	6.09	1.78
Waterbuck	15		2.17	32.55	0.98
	***			*****	*****
	185			501.54	16.68
Mixed Feeders					
Eland	24		1.23	29.52	0.89
Impala	60		6.14	368.40	11.08
Njala	6		3.91	23.46	0.71
Warthog	30		5.62	168.60	5.07
	***			*****	*****
	120			589.98	17.75
B. Browsers					
Black Rhino	10		0.64	6.40	0.19
Bushbuck	20		7.62	152.40	4.58
Duiker	12		12.00	144.00	4.33
Giraffe	19		0.68	12.92	0.39
Kudu	60		2.45	147.00	4.42
Steenbuck	4		15.00	60.00	1.80
	***			*****	*****
	125			522.72	15.71
Total	821			2403.33	73.86