

Assessing  
veld condition



## Module # 12-Component # 4

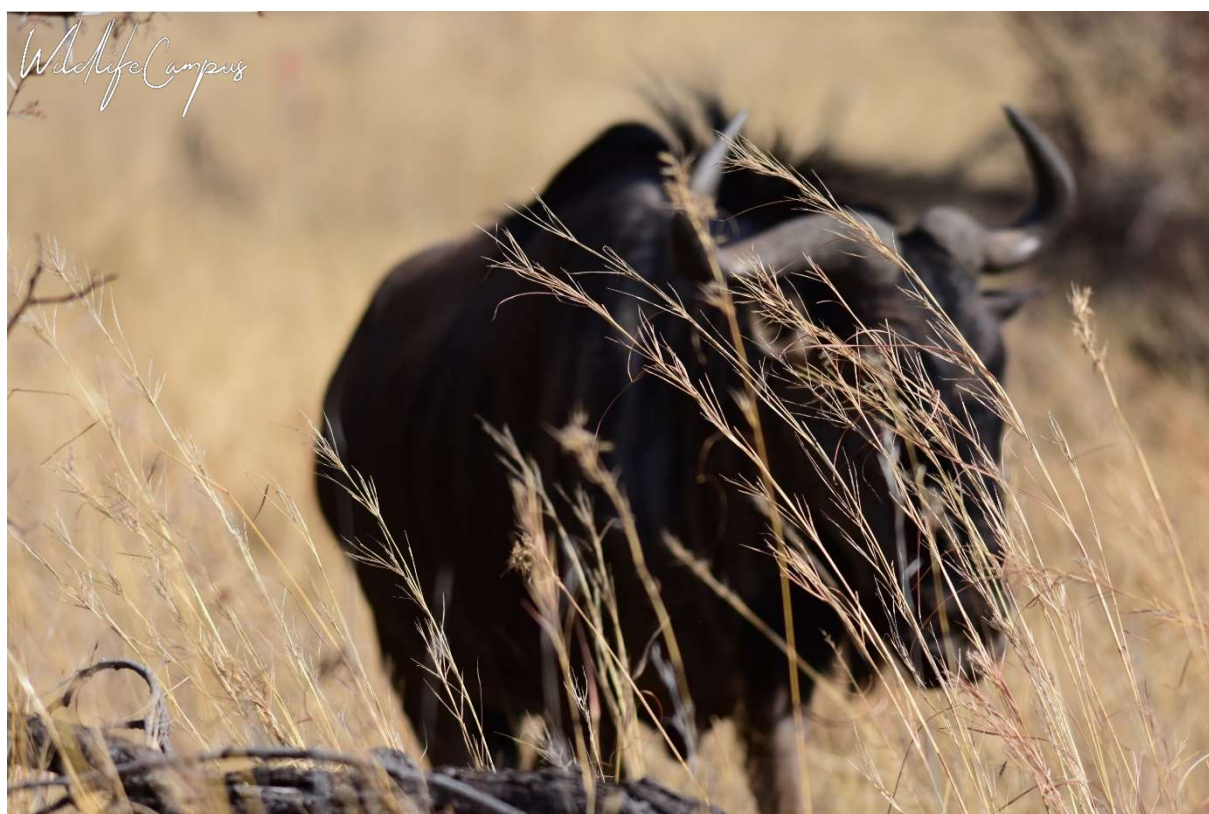
# Assessing veld condition

## Objective

Understand the concept of veld condition, the methods to determine it and the relationship and role of veld condition in management decisions.

## Expected Outcome




- Define veld condition.
- Understand the methods for grass species composition studies.
- Calculate veld condition from the results of grass species composition studies.
- Understand the ecological index method.



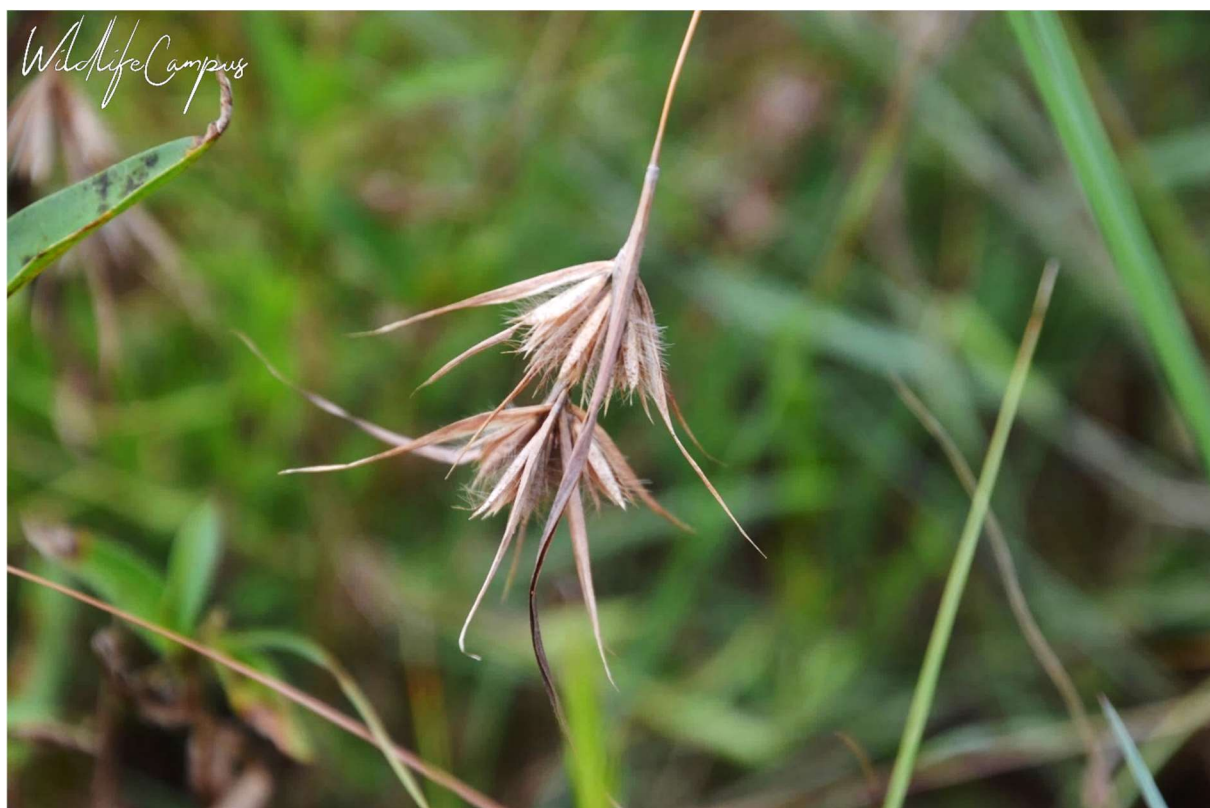
## Veld condition

Veld condition refers to **the condition of the vegetation in relation to some functional characteristics**, generally sustained forage production and resistance to soil erosion.

**Veld condition is assessed using:**

-  Species composition.
-  Basal cover.
-  Production potential of the grass.

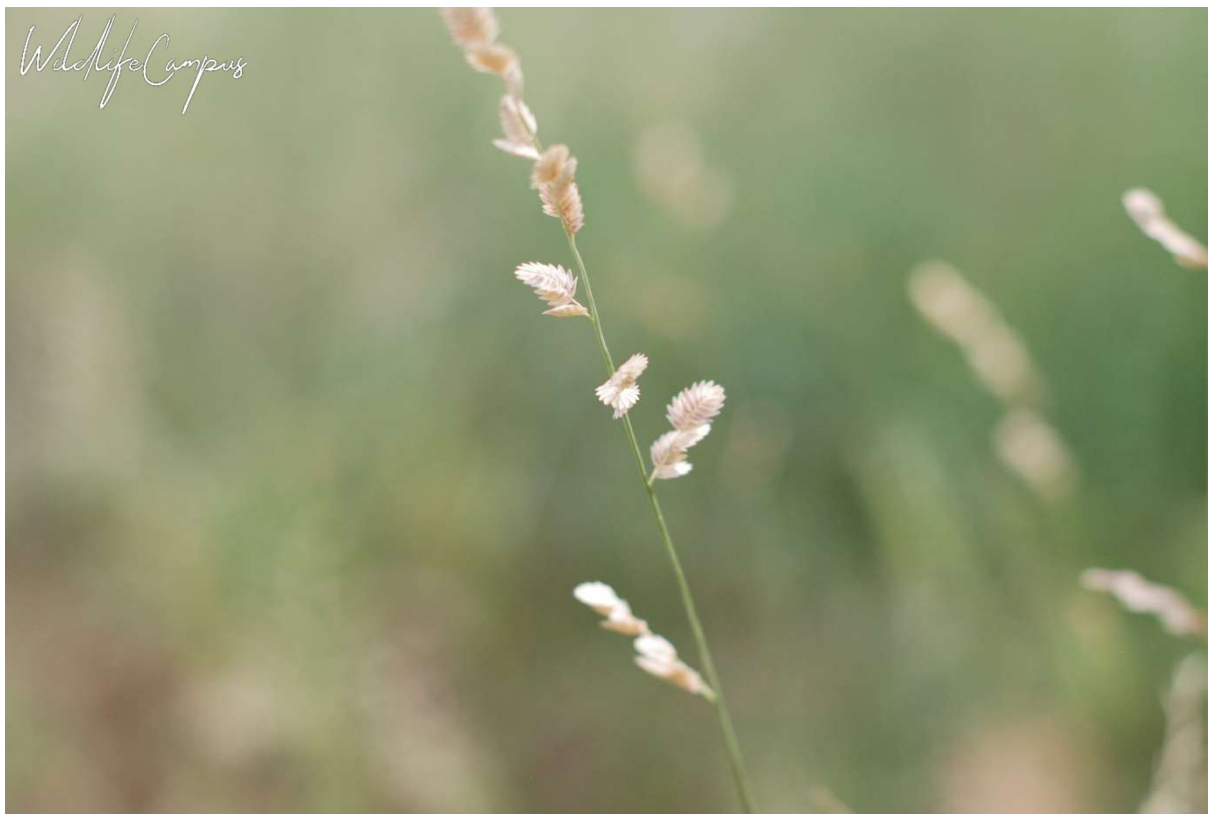
**Grass species diversity** is a **good indication of veld condition** because different species react differently to grazing pressure. The use of ecological groups is invaluable. **Decreasers** are grasses that are **dominant in veld in excellent condition** and which **decrease when veld is under-or overutilised**. Increasers are rare in good veld but increase due to under-or overutilisation. Veld condition is an important determinant of **grazing capacity**, and the **monitoring** thereof **can detect trends in vegetation change** at an early stage. Good veld is characterised by a **high percentage of climax grasses** or **Decreaser species**.



**Red grass:** *Themeda triandra*

The objectives of a veld condition study are the following:

- Determine **species composition** and **basal cover percentage** of the species composition on the plants in each homogenous vegetation unit (HVU).
- Determine a **veld condition score** for each HVU.






**Saw-tooth love grass:** *Eragrostis superba*



## Methods for determining grass species composition

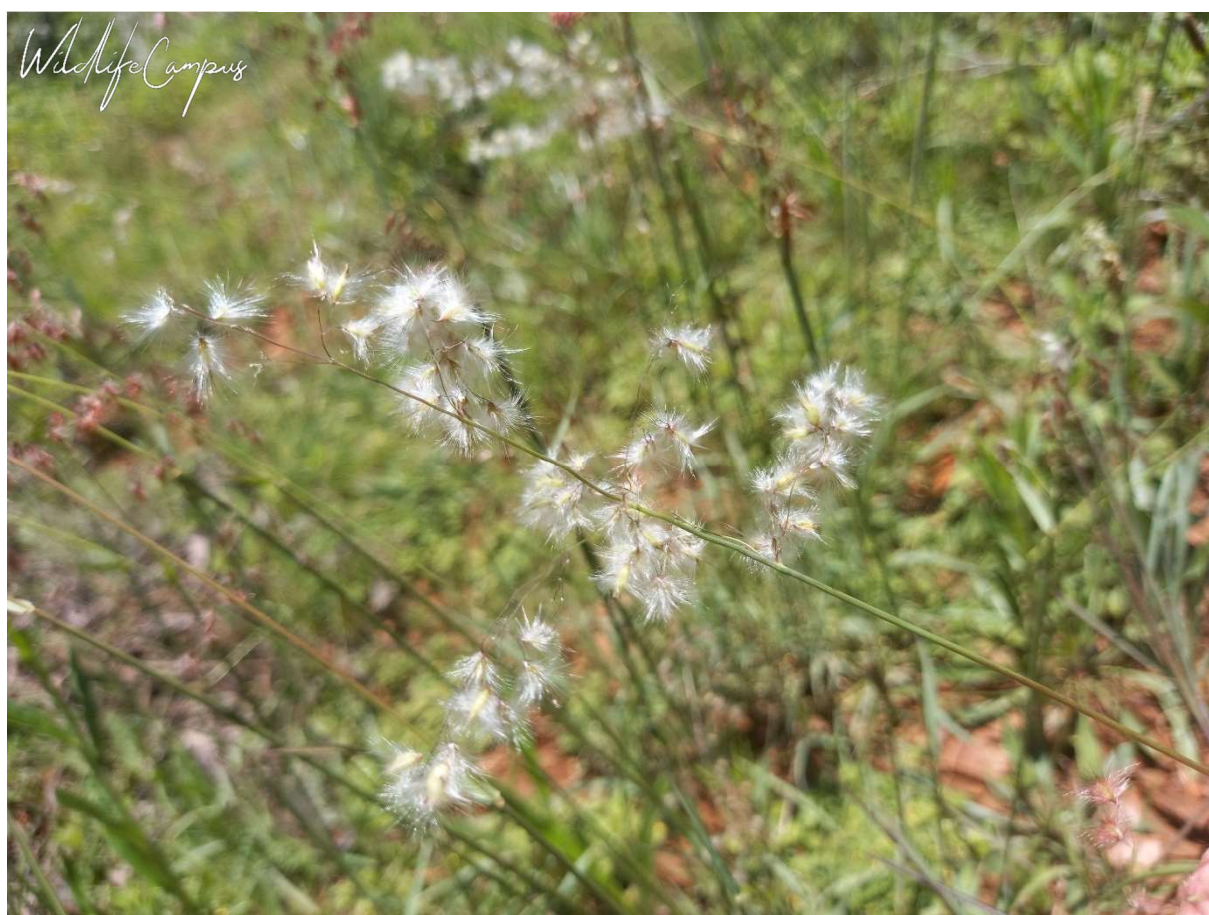
**Point methods** are used to obtain data from which the **frequency of each species** can be calculated. Point methods are **conducted along a transect** which is marked out in each sample site previously used in the HVU's.

The **length of the transect** is determined by the **number of point observations needed** for the survey:

-  **100-point observations** for **coarse management** scale investigations.
-  **200-point observations** for **monitoring programs**.
-  **300-point observation** for **detailed** scientific studies.

### Wheel-point method:

Consists of a large wheel of which **one spoke is marked**. This mark **touches the ground about every 2 m** [ $\pm 6$  ft] as it turns. At the point where the mark touches the ground, **the plant nearest to the mark is recorded**.



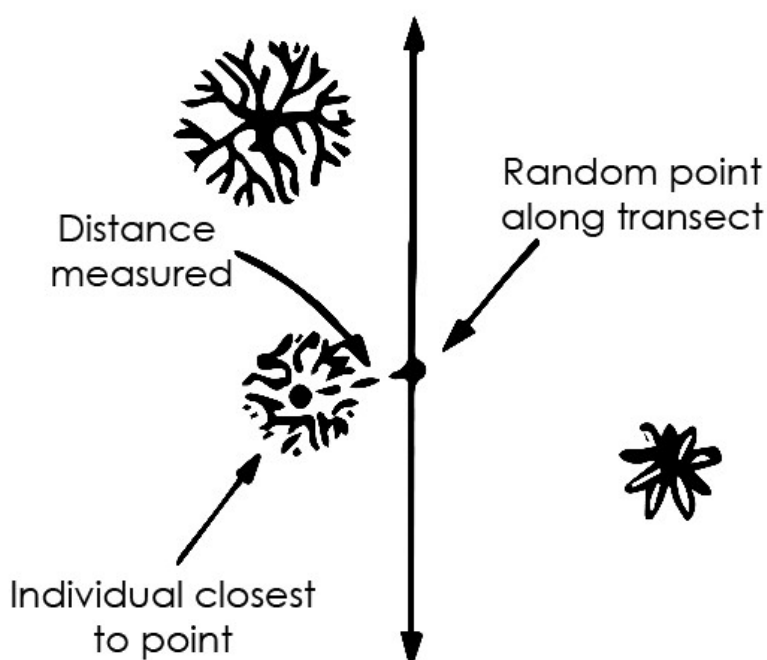
**Natal red top:** *Melinis repens*

## Step-point method

A mark is made on the **front toe of one shoe of an observer**. At **every second step, the nearest plant to the mark is recorded**. Only plants in front of the shoe are considered.

For both the above methods, the **distance to the nearest herbaceous plant is measured**, and a **maximum radius is determined** in which 95% of all encountered grass species occurred. Any plant that was subsequently **within the maximum radius is a strike**, and if not, a miss is recorded. It is recommended that the maximum radius is in the order of 150-300 mm [5.9-11.8 in].

The basal cover is then **calculated from the percentage strikes**, and the **percentage misses** provides a relative index of density.



**In the step-point method, the nearest individual to the point is recorded and the distance measured**

## Methods for calculating veld condition

Various methods exist to calculate veld conditions. The following methods will be briefly explained:

### Benchmark method

The benchmark method **compares the species composition of a sample site to that of a reference site**. This **reference site**, also called the **benchmark site**, is **subjectively chosen to represent vegetation that is in an excellent condition in a homogenous vegetation unit**. All species are subjectively classified in **Decreaser** and **Increaser groups** according to their **reaction to grazing**. The species in the sample site is subjected to certain limits for specific species based on the composition of the grass species in the benchmark site. An index value is then derived relative to the benchmark score.

### Key grass species method






This method observes that **not all grass species are responsive to grazing**. Only the **species that are sensitive to grazing are selected**. Each species is **awarded a value according to its grazing potential** or ecological value. The abundance value of the key species is summed, and the total is used to determine the condition of the veld. A more objective approach of this method uses regression equations to estimate a range of condition scores from proportions of the key species.



**Narrow-leaved turpentine grass:** *Cymbopogon plurinodis*



## Ecological index method

This method is the **most suitable for drawing up a wildlife management plan** and will be discussed in detail.

-  In the ecological index method, **grass species are also classed into Decreaser and Increaser groups.**
-  A specific **value is allocated to every ecological group** based on the grazing value each group represents.
-  By using the data from the grass species composition survey, the **percentage composition of each ecological status class is calculated** and multiplied with the specific value allocated to that class.
-  The sum of these values represents an **ecological index** with a theoretical **maximum value of 1000.**
-  The veld condition of each HVU can be evaluated using the following guidelines:

Ecological index	Veld condition
0-399	Broadly indicates poor veld
400-600	Broadly indicates moderate veld
601-1000	Indicates good veld

### Veld condition vs ecological index

-  This index is **expressed as a percentage** of the similar index of the benchmark site where the veld is in excellent condition is the veld condition percentage.
-  Where there is no benchmark site available with good veld, the total ecological index value (1000) can be used as a rough veld condition value.



Ecological class	Definition	Value
<b>Decreasers</b>	A grass species which is <b>dominant in good veld</b> that is well managed, but which decreases when veld is mismanaged, over-or underutilised.	10
<b>Increaser 1</b>	A grass species that <b>increases when veld is selectively utilised</b> or underutilised.	7
<b>Increaser 2a</b>	A grass species that is dominant in poor veld and increases due to light overgrazing.	4
<b>Increaser 2b</b>	A grass species <b>dominant in poor veld</b> and increases because of moderate overgrazing.	4
<b>Increaser 2c</b>	A grass species <b>dominant in poor veld</b> and increases because of heavy overgrazing.	1
<b>Invaders</b>	A grass species which <b>does not usually occur</b> in the area.	1

### Ecological Index classes



**Sable antelope:** *Hippotragus niger*

**Example:**

The following example illustrates the use of the Ecological Index Method:

1. A **benchmark site is identified** with veld that is in **excellent condition**.
2. In addition, **two sample sites are used** within the same homogenous vegetation unit, site A and site B.
3. The **veld condition percentage** of the sites are determined by using the information in the table below
4. The percentage column indicates what percentage of the 200 recorded points fall in each ecological status class.

Ecological Status Class	Grazing Value	Veld Type					
		Benchmark		Site A		Site B	
		%	EI	%	EI	%	EI
<b>Decreasers</b>	10	59	590	47	470	25	250
<b>Increasers 1</b>	7	2	14	15	105	15	105
<b>Increasers 2a</b>	4	11	44	17	68	41	164
<b>Increasers 2b</b>	4	22	88	15	60	2	8
<b>Increasers 2c</b>	1	6	6	4	4	15	15
<b>Invaders</b>	1	0	0	2	2	2	2
<b>Total</b>	-	<b>100</b>	<b>742</b>	<b>100</b>	<b>709</b>	<b>100</b>	<b>544</b>

An example for calculating the veld condition score two sites, A and B, in relation to the benchmark site



## Calculating veld condition

- The Ecological Index (EI) of the benchmark site is **742**.
- The EI of Site A is **709**.
- The EI of Site B is **544**.

The veld condition percentage of **Site A and Site B** is expressed relative to the benchmark using the following equation:

$$\text{EI (site n)} \times 100 / \text{EI Benchmark} = \text{Veld condition percentage}$$

**Site A:**  $709 \times 100 / 742 = 95.5\%$

**Site B:**  $544 \times 100 / 742 = 73.3\%$



**Gemsbok:** *Oryx gazelle*

## Case study: Msasa Nature Reserve

The **step-point method** was used for the botanical survey of the herbaceous layer due to its ease and relative reliability. Line transects of 400 m [1 312.3 ft] were chosen in the previously identified HVU's. The same sites were used as identified for the Braun-Blanquet survey.

Point observations were made at every second step, **200 points in all**. The nearest plant to the point marked on the shoe was recorded.

The **Ecological Index Method** was used to determine the veld condition. For practical reasons, the **theoretical maximum of 1000 was used as the benchmark** due to difficulty in finding a suitable benchmark in the area.

One advantage of taking 1000 as the benchmark is that it provides a way of detecting the overall direction of change that takes place in vegetation over time.

**The following results were obtained:**

Community	Mean Ecological Index	Percentage veld condition score	Veld condition
1	648.45	64.85 %	Good
2	360.68	38.07 %	Poor
3	418.62	41.86 %	Moderate
4	540.00	54.00 %	Moderate
5	603.00	60.30 %	Good
6	413.58	41.36 %	Moderate

### The veld condition of Msasa Nature Reserve



**Community 1: *Dombeya rotundifolia*-*Setaria homonyma***
**Short open woodland community**

This community is in **good condition**, as indicated by the veld condition score of 648.45.

**Decreaser species were the most abundant**, such as *Setaria homonyma* and *Panicum maximum*. The presence of Increaser 1, such as *Cymbopogon excavatus* species, may indicate underutilisation.

**Community 2: *Englerophytum magalismontanum*-*Mimusops zeyheri***
**Short open woodland community**

This community has **poor veld condition**, as indicated by the veld condition score of 380.68.

The **high incidence of both Increaser 1 and 2c species** is indicative of the poor soils, poor veld management in the past and recent underutilisation. Increaser 1 species dominate in poor veld and increase with underutilisation.

The major Increaser 1 species are *Trachypogon spicatus* and *Loudetia simplex*, while the major Increaser 2c species are *Aristida stipata* and *Aristida junciformes*. The problem with the latter species is that it invades natural veld, particularly in high rainfall mountainous grassveld and is virtually impossible to eliminate by normal grazing management practices.

**Community 3: *Commelina africana*-*Trachypogon spicatus***
**Short open woodland community**

This community has a **moderate veld condition**, as indicated by the veld condition score of 418.6. There is a **high incidence of Increaser 1** and Increaser 2c species. *Melinis repens*, an Increaser 2c species, is a **pioneer species** that often **indicates the recovery of veld**.

**Community 4: *Burkea africana*-*Ochna pulchra***
**Low open woodland community**

This community is in **moderate condition**, as indicated by the veld condition score of 540. Significant frequencies of **Decreasers, Increasers 1 and Increasers 2c species** were recorded. The high incidence of Increasers 1 and 2c could imply overgrazing in the past and subsequent selective grazing. The presence of *Melinis repens* again possibly indicates that the veld is in a **stage of recovery**.

### Community 5: *Protea caffra*-*Gnidia capitata* Low open woodland community

This community is in **good condition**, as indicated by the veld condition score of 603. Although **Decreasers are well represented**, there is also a high incidence of Increaser 1 species which could indicate underutilisation.

### Community 6: *Hyparrhenia hirta*-*Cynodon dactylon* Closed grassland community

This community is in **moderate condition**, as indicated by the veld condition score of 413.58. Since the community includes **old, cultivated fields** that are **reverting back to the natural condition** following the **planting of highly palatable grasses**, the results may seem **ambiguous**. There were high frequencies of both Decreaser and Increaser 2 species.



**Springbok:** *Antidorcas marsupialis*



## Self-Study:

What follows below is a handy self-study exercise. Choose **20 key Grass species** that occur in your area of operation and complete their details in the tables that follow.

## Key Species List:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_
11. \_\_\_\_\_
12. \_\_\_\_\_
13. \_\_\_\_\_
14. \_\_\_\_\_
15. \_\_\_\_\_
16. \_\_\_\_\_
17. \_\_\_\_\_
18. \_\_\_\_\_
19. \_\_\_\_\_
20. \_\_\_\_\_

Scientific name:	1.	2.
Common name: English		
Common name: Afrikaans		
Distribution:		
Habitat:		
Perenniality:		
Leaf blade:		
Ligule:		
Grazing value:		
Plant succession:		
Grazing status:		
Type of inflorescence:		
Description of inflorescence: colour, size etc.		
Interesting facts:		
Basic drawing:		

Scientific name:	3.	4.
Common name: English		
Common name: Afrikaans		
Distribution:		
Habitat:		
Perenniality:		
Leaf blade:		
Ligule:		
Grazing value:		
Plant succession:		
Grazing status:		
Type of inflorescence:		
Description of inflorescence: colour, size etc.		
Interesting facts:		
Basic drawing:		



Scientific name:	5.	6.
Common name: English		
Common name: Afrikaans		
Distribution:		
Habitat:		
Perenniality:		
Leaf blade:		
Ligule:		
Grazing value:		
Plant succession:		
Grazing status:		
Type of inflorescence:		
Description of inflorescence: colour, size etc.		
Interesting facts:		
Basic drawing:		

Scientific name:	7.	8.
Common name: English		
Common name: Afrikaans		
Distribution:		
Habitat:		
Perenniality:		
Leaf blade:		
Ligule:		
Grazing value:		
Plant succession:		
Grazing status:		
Type of inflorescence:		
Description of inflorescence: colour, size etc.		
Interesting facts:		
Basic drawing:		

Scientific name:	9.	10.
Common name: English		
Common name: Afrikaans		
Distribution:		
Habitat:		
Perenniality:		
Leaf blade:		
Ligule:		
Grazing value:		
Plant succession:		
Grazing status:		
Type of inflorescence:		
Description of inflorescence: colour, size etc.		
Interesting facts:		
Basic drawing:		



Scientific name:	11.	12.
Common name: English		
Common name: Afrikaans		
Distribution:		
Habitat:		
Perenniality:		
Leaf blade:		
Ligule:		
Grazing value:		
Plant succession:		
Grazing status:		
Type of inflorescence:		
Description of inflorescence: colour, size etc.		
Interesting facts:		
Basic drawing:		

Scientific name:	13.	14.
Common name: English		
Common name: Afrikaans		
Distribution:		
Habitat:		
Perenniality:		
Leaf blade:		
Ligule:		
Grazing value:		
Plant succession:		
Grazing status:		
Type of inflorescence:		
Description of inflorescence: colour, size etc.		
Interesting facts:		
Basic drawing:		

Scientific name:	15.	16.
Common name: English		
Common name: Afrikaans		
Distribution:		
Habitat:		
Perenniality:		
Leaf blade:		
Ligule:		
Grazing value:		
Plant succession:		
Grazing status:		
Type of inflorescence:		
Description of inflorescence: colour, size etc.		
Interesting facts:		
Basic drawing:		



Scientific name:	17.	18.
Common name: English		
Common name: Afrikaans		
Distribution:		
Habitat:		
Perenniality:		
Leaf blade:		
Ligule:		
Grazing value:		
Plant succession:		
Grazing status:		
Type of inflorescence:		
Description of inflorescence: colour, size etc.		
Interesting facts:		
Basic drawing:		

Scientific name:	19.	20.
Common name: English		
Common name: Afrikaans		
Distribution:		
Habitat:		
Perenniality:		
Leaf blade:		
Ligule:		
Grazing value:		
Plant succession:		
Grazing status:		
Type of inflorescence:		
Description of inflorescence: colour, size etc.		
Interesting facts:		
Basic drawing:		