GRAZING GUIDELINES FOR NAMAQUALAND

RECOMMENDED PRINCIPLES TO APPLY WHEN DEVELOPING MANAGEMENT PLANS
FOR GRAZING IN PROTECTED ENVIRONMENTS

WILDERNESS FOUNDATION AFRICA

WWF

DEVELOPED IN CONJUNCTION WITH LOCAL PARTNERS & STAKEHOLDERS
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INTRODUCTION

The Namaqualand landscape is renowned for its globally important and abundant biodiversity (primarily plants, reptiles and insects). While there is a documented increase in mining activity in some parts of Namaqualand as well as limited cropping the area is used extensively for livestock farming. There is thus considerable interest in seeking ways of promoting sustainable livestock production while simultaneously reducing the negative impacts of livestock farming on the region's biodiversity – particularly the flora. The National Protected Area Expansion Strategy (2016) indicates that of the 64 ecosystems in the Succulent Karoo, only 19 are well or moderately protected and 45 are poorly or not protected at all. To meet national protected area targets, there is thus a need to add considerably to the national protected area system.

Purchasing and managing the amount of land required is beyond the resources and capability of the state. There are, however, alternative mechanisms for declaring and managing areas which are critical or important for meeting national biodiversity targets e.g. using Biodiversity Stewardship Agreements. The core thrust of the Biodiversity Stewardship Programme (BSP) is recognition that private and communal land owners can contribute to national biodiversity conservation targets by contractually committing to manage their land in an agreed manner which promotes biodiversity conservation; i.e. that land owners can be the custodians of the biodiversity on their land. Under the BSP there are five types of biodiversity stewardship agreement ranging from non-binding short-term agreements providing the least protection to long-term formal declarations under which the targeted land is afforded high levels of protection. Of the five possible contractual mechanisms, two are of interest in these guidelines. They are the two which afford legally binding protection over longer time horizons. These options, i.e. Nature Reserves and Protected Environments are established in terms of the Protected Areas Act (57 of 2003).

Protected Environments offer an important level of protection to biodiversity - just below that of National Parks and Nature Reserves. A key difference between a Nature Reserve and a Protected Environment is that while a Nature Reserve is managed purely for biodiversity conservation, in a Protected Environment it is permissible to use the land for commercial production purposes as well as for biodiversity conservation. The extent of the commercial use needs to be agreed upon with the relevant authorities and must largely favour biodiversity conservation.

Earlier efforts to reduce the loss of biodiversity in the Namakwa District from livestock browsing/grazing resulted in the production of Ecological Best-Practice Livestock Production Guidelines for the Namakwa District (Todd et al., 2009). The 2009 guidelines target a specific point on the land-use spectrum i.e. sustainable livestock production (Figure 1) and are written for a production landscape which seeks to improve sustainability by adequately factoring ecological and biodiversity considerations into land management decisions.

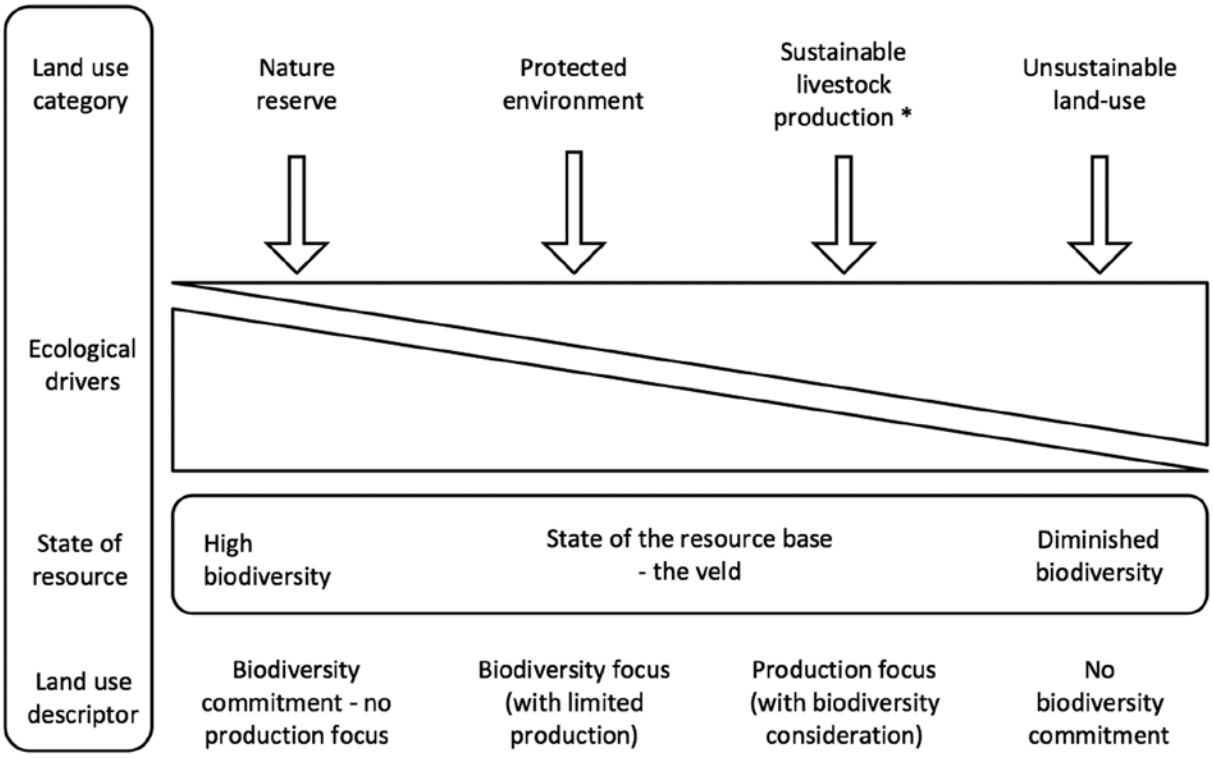

*Figure 1. Schematic representation of the land-use spectrum in relation to the resource state in Namaqualand. * Identifies the positioning of the existing guidelines for sustainable livestock production (Todd et al., 2009) in the spectrum.*

With the recent increased interest in, and declaration of, Protected Environments in Namaqualand the need for a new set of guidelines tailored for Protected Environments was identified (second arrow from the left in Figure 1). These new guidelines aim to specify good practice for the management of Protected Environments. The guidelines are structured such that an initial ecological and biodiversity context is provided, followed by the broad management context before detailing a more in-depth approach to management decision-making for each of 20 vegetation types.

These guidelines are aimed at land managers/users who seek to achieve biodiversity outcomes on their land which are in agreement with those expected of a Protected Environment or a Nature Reserve.

BIODIVERSITY OF NAMAQUALAND

The biodiversity and ecological context of Namaqualand are described in a number of scientific and management texts (see Cowling et al., 1999; Desmet, 2007 & Esler et al., 2010 for particularly useful coverage of the topic) and are presented here in summary only. Covering approximately 30% of the Succulent Karoo biome, Namaqualand is an arid and semi-arid desert region with a largely winter rainfall regime that, although low, is characterized by a relatively high level of reliability.

This has resulted in a very diverse array of vegetation communities that are dominated by dwarf, shallow-rooted and drought-sensitive leaf succulent and non-leaf succulent shrubs which can be short or long lived as well as an abundance of geophytes. The levels of endemism are high (˜25% of the plants are found nowhere else in the world) as is the diversity of plant species, genera and families. There is also a widespread and diverse annual flora with regular and spectacular spring flowering displays following good rains.

Although there is a notable spatial concentration of plant diversity (centres of endemism), often linked to geology, there are important ecological attributes such as rapid population turnover of perennial plants and weak competitive interactions between plants.

CHARACTERISTIC	**METRIC**
Rainfall	Ranges from 50 to 250 mm/annum – up to 400mm/annum on high peaks
Rainfall Seasonality	More than 60% of the rain falls between May and September
Growth phenology	Winter and spring; but strongly linked to rainfall
Plant families	˜135
Plant genera	˜724
Plant species	˜3,500
Highest peaks	˜1,200 m above mean sea level rising to over 1,700 m

The overall landform of the Namaqualand region and its positioning in relation to the continent and Atlantic Ocean as well as localized geology play an important role in the ecology and diversity of the plant life. Rising to the east of the broad marine derived sandy coastal plain the granite hardeveld forms the western escarpment of the sub-continent which transitions further to the east into the higher altitude red Aeolian sandy plains of the Bushmanland interior.

The underlying geology, of this regional landform is of Gondwanan origin and is extremely complex including granitic, quartzitic and other metamorphic schists and shales. The rainfall follows a typical pattern of increasing with increasing altitude. On the boundary between the hardeveld and the Bushmanland sands the rainfall seasonality shifts over a short distance to predominantly summer rainfall.

IMPORTANT ECOLOGICAL INSIGHTS

From a management perspective there are a number of insights which are important for informing management decisions. Some of the important insights are listed here.

- From a livestock grazing perspective there are three dominant vegetation growth forms – perennial shrubs (bossies) which persist for two years or more, annuals (opslag) which respond to rainfall events and grasses. The perennial shrubs themselves can be divided into leaf succulent shrubs (the vygies) and non-leaf succulent shrubs (Karoo bossies). These growth forms have very different ecologies which should be understood in order to manage the land effectively. From an ecological and sustainable livestock production perspective the opslag is the least valuable but it can be optimally utilized as part of a grazing system to the benefit of the livestock.
- In addition to the perennial shrubs, annuals and grasses, more than 15% of the species in Namaqualand are comprised of geophytes (bulbs) which are not grazed; indeed their proportion increases under heavy grazing conditions.
- Good indicators of range condition are i) total cover, ii) perennial cover and iii) perennial diversity. Also useful are Pierre du Toit's Grazing Index Values and the relative abundance of leaf succulent shrubs. The abundance of grass varies with rainfall and the sandiness of the soil and is not always a good indicator of veld health in the winter rainfall regions.
- Different plant growth forms compete for moisture following rain and the intensity and duration of post rain grazing can influence the outcome of that competition. This is particularly the case between opslag and grass.
- Because water is so limiting, plants grow immediately following rainfall. This growth is moderated by temperature and is best in cool moderate conditions. If the temperature is very cold (below 5^{o}C) or very hot (above 35^{o}C) growth is impeded.
- The timing of rain (March, May or later) is important and management should be responsive and adaptive to the timing of the annual rains.
- If grazing can be restricted to new annual growth rather than standing biomass (i.e. the plant material that existed before the growth period), the veld will remain in better condition. For this reason it is wise to allow the vegetation to grow for three weeks after rain before it is exposed to grazing pressure – this allows for the accumulation of new growth. This can be achieved by adjusting stocking rates, grazing duration and rotation of animals. The use of supplementary feeding can also be used to achieve this.
- Vegetation cover ranges from 25% in the drier regions to 40% at the wetter end of the rainfall gradient in Namaqualand. Allowing the cover to decrease below these values will likely lead to increased run-off and erosion. It will also result in reduced new seed germination and establishment success due to the increased exposure to heat and cold and a decrease in water infiltration.
- The landscape is very heterogeneous and wise use of this knowledge can assist a farmer. ; For example, Rantjiesveld (vegetation on rocky ridgelines) is often not grazed as frequently as the veld on the plains and it is possible to use rantjiesveld to improve the health of the animals during certain times of the year or during extended drought periods.
- However, in some rocky areas there are plants with toxic flowers and leaves (many Crassulaceae) that affect the health of livestock and cause a neuro-toxic disorder called krimpsiekte. Their presence serves as a form of natural grazing regulator at certain times of the year and their presence should be factored into any grazing management system. There should be no effort made to remove them from the veld.
- Grazing lands with high a proportion of newly germinated seedlings will likely lead to the loss of future standing biomass and ultimately to unsustainable land-use. It is better to allow seedlings to mature prior to them being grazed.
- Clay soils are very prone to "capping" by stock trampling which reduces the effective availability of water to plants as it results in run-off. Efforts should be made to avoid this. In carefully managed situations trampling can be used to breakup any capping that exists.
- Riparian zones, wetlands and pans, even without standing water, are key resource areas in the landscape and if over-utilized can lead to rapid degradation of the veld.
- The dominance of toxic plants is often an indicator of over grazing and the management response should be to rest the veld for an extended period.
- Scale is important to consider and generally the larger the area being managed the better the outcome from a biodiversity perspective although the number of animals utilizing an area and their movement over space and time have an important influence on the veld.

MANAGEMENT OF THE LAND

Land tenure in Namaqualand is split between a) privately owned farms of varying sizes and b) municipality owned, communally occupied and collectively managed lands which are generally significantly larger areas. The approach to the management of the two land tenure units is significantly different. This guideline deals only with land under private ownership.

Under current average property sizes it is not feasible to maintain and manage herds of indigenous game in a manner that favours biodiversity largely because of the restrictions that fencing places on natural movement of the animals. As livestock are more responsive to herding and translocation they are easier to manage than game although it needs to be kept in mind that they are also selective grazers.

Agricultural "long-term grazing capacity estimations" (i.e. what is considered sustainable) for small livestock (sheep and goats) ranges from 7 to 20 ha/small stock unit (SSU). Historically the actual stocking rate of the land has generally been higher than this (estimated at 20% higher for areas with rainfall of 200 mm/annum and up to 100% higher for areas with ≥400 mm/annum). Many farmers state that it is not economically viable to stock the veld at a lower rate, but there is also evidence that historical stocking rates have resulted in a reduction in the average carrying capacity over the 20th century of 60% or more.

In the 1990s 6,000 ha was considered economically viable while currently that figure is closer to 8,000 ha. In most instances it is not possible to increase the size of the land being managed for biodiversity and continued improvement of the veld should be the target which is set in the management plan, rather than setting a desired biodiversity state.

Due to the importance of avoiding over grazing of shrubs to the extent that the standing biomass is removed, and particularly avoiding extensive removal of new growth and/or recently germinated seedlings, as well as to avoid other impacts such as capping, over trampling or over-exposure of stock to toxic plants, a management system that enables flexible and rapid movement of stock in the landscape is essential.

This is traditionally achieved through two mechanisms. At a large scale animals were moved seasonally from one grazing area to another e.g. between lowlands and highlands or between winter and summer rainfall regions; a practice known as transhumance. At a local farm scale animals are moved regularly between fenced-off camps. In doing so the land manager should seek to achieve the following:

- Avoid the grazing of at least 50% of the land in the peak growing season. This suggests that there is no single formula for managing all areas in Namaqualand. Rather, it is better for landowners to be responsive to the timing of the rains and the condition of the veld.
- The movement of animals should be such that the land owner is able to avoid exposing any one specific camp to more than 30 days continuous grazing without rest. If practically possible it is preferable to keep this number to 20 or even 15 days;
- The design of the camp system should be such that it is possible to rest each camp for 12 continuous months every four years;
- Ensure the availability of supplementary fodder so as to enable the protection of the veld and if animal condition drops to below 60%. This can be bought in or made available through old lands (stoppellande) or transhumance if the opportunity arises. Generally, the need for supplementary feeding is an indicator of overstocking in the first place;
- Transhumance movement of stock to Bushmanland should only take place once the rain has fallen and sufficient grass growth has taken place to provide hay for the year to follow. This is commonly three weeks, but it should be monitored;
- Transhumance should take into consideration the reproductive status (pregnancy) of the ewes. The ideal is for ewe's to lamb after it has rained (usually between April to August) as without rain there is not enough fodder for the ewes;
- Indigenous game which are present should be included in stocking rate calculations but due to the difficulty in managing them (i.e. moving them between camps), it is not recommended that they are introduced into a Protected Environment. However, if the primary land use is intended to be game farming then the management approach of the area needs to be developed on a case-by-case basis; and
- The landscapes are generally not homogeneous and it is important that each land owner has a good understanding of the vegetation on their land for management decision making. For this reason a map of the vegetation units and habitat types should be developed.

MANAGEMENT GUIDELINES FOR SELECTED VELD TYPES

Note 1: all Vegetation Unit names and references are from Mucina and Rutherford (2006) (See Figure 2).

Note 2: all the Recommended stocking rates (i.e. agricultural and for a protected environment) were provided by workshop participants based on their expert knowledge of the area.

Under most conditions no domesticated animals should be stocked on a Nature Reserve and indigenous game should only be stocked at very low densities (> 50ha/SSU), if at all. However, it is acceptable to stock domestic animals at low densities on a Nature Reserve for the purpose of imitating ecological processes that are otherwise missing.

NAMAQUALAND KLIPKOPPE SHRUBLAND	**VEGETATION UNIT SKn 1**
RECOMMENDED STOCK	Dorper, Damara & Meat Master
STOCK TO AVOID	Karakul as they tend to herd and damage shrubs
RECOMMENDED STOCKING RATE	Agriculture: 7ha/SSU Protected Environment: 10 to 13ha/SSU
MANAGEMENT SYSTEM	In this terrain it is difficult to move animals so fewer larger camps with longer duration grazing may be the pragmatic approach – but not more than 30 days in a camp. The use of electric fencing (as per Holistic Resource Management) (HRM) was considered impractical. Important to avoid concentrating animals (e.g. around stock-posts or by night time kraaling) due to negative impacts on the veld due to trampling.

NAMAQUALAND BLOMVELD	**VEGETATION UNIT SKn 3**
RECOMMENDED STOCK	None
STOCK TO AVOID	-
RECOMMENDED STOCKING RATE	Agriculture: > 10ha/SSU None
MANAGEMENT SYSTEM	Namaqualand Blomveld is essentially regarded as disturbed/degraded land and should not be managed as production land. Rather it should be managed as land that can be used as supplementary feeding if required with the understanding that it is likely to provide very little if the rainfall is below average or very late. In this case it is better to "do no harm" by keeping animals off these lands. Camps with Blomveld must be managed to prevent opportunistic use by animals and only grazed once seed production has occurred.

AZONAL RIPARIAN AREAS	**VEGETATION UNIT AZi 1**
RECOMMENDED STOCK	None on a regular basis
STOCK TO AVOID	-
RECOMMENDED STOCKING RATE	Agriculture: > 10ha/SSU Protected Environment: None
MANAGEMENT SYSTEM	Riverine areas are essential for the ecological functioning of the landscape and should be managed at all times for their own protection. This means avoiding capping, invasion by alien plants and over utilization by stock. Because of the volumes of water which are sometimes carried by riparian areas they are subject to increased risks of erosion. Knickpoints and gullies should be rehabilitated as soon as possible.

BUSHMANLAND INSELBERG SHRUBLAND	VEGETATION UNIT SKr 18
RECOMMENDED STOCK	Goats and indigenous game
STOCK TO AVOID	All breeds of sheep
RECOMMENDED STOCKING RATE	Agriculture: 20 ha/SSU Protected Environment: 20 ha/SSU
MANAGEMENT SYSTEM	The current management system for the inselbergs is to largely exclude stock except for a few goats. This can shift to a more proactive approach to management in which an appropriate density of goats and indigenous game is stocked on the land. This could be enhanced by moving the surrounding fence 50 to 100 m into the surrounding plains land, and by making this fence permeable to small animals, to "soften" the edge and to include a greater variety of habitats into the fenced camp. No additional water should be provided. For a Nature Reserve no goats should be permitted.

PLATBAKKIES SUCCULENT SHRUBLAND	VEGETATION UNIT SKn 5
RECOMMENDED STOCK	Goats and indigenous game, but none on a regular basis
STOCK TO AVOID	All breeds of sheep
RECOMMENDED STOCKING RATE	Agriculture: >20 ha/SSU Protected Environment: >20 ha/SSU
MANAGEMENT SYSTEM	This vegetation type has a diverse range of succulents and is very fragile in response to trampling and to a lesser extent grazing by livestock. It should be camped off and stock numbers kept very low or it should only be used for short periods at low density after the summer growth period – i.e. in late summer or winter. Natural utilization by porcupines and tortoises is normal.

KAMIESBERG MOUNTAINS SHRUBLAND	VEGETATION UNIT SKn 6
RECOMMENDED STOCK	Dorper, Damara & Meat Master
STOCK TO AVOID	Karakul as they tend to herd and damage shrubs
RECOMMENDED STOCKING RATE	Agriculture: 7ha/SSU Protected Environment: 10 to 13ha/SSU
MANAGEMENT SYSTEM	This veld is more sour than the Klipkoppe shrub lands, probably because of the higher rainfall. It is important to avoid concentrating animals (e.g. around stock-posts or by night time kraaling) due to negative impacts on the veld due to trampling. There is legislation which regulates ploughing in the Kamiesberg shrublands. Re-ploughing of old lands should be avoided and there must be no new ploughing in Protected Environments or Nature Reserves.

NAMAQUALAND GRANITE RENOSTERVELD	VEGETATION UNIT FRg 1
RECOMMENDED STOCK	Dorper, Damara & Meat Master
STOCK TO AVOID	Karakul as they tend to herd and damage shrubs
RECOMMENDED STOCKING RATE	Agriculture: 7ha/SSU Protected Environment: 10 to 13ha/SSU
MANAGEMENT SYSTEM	This veld contains a large number of wetlands (vleilande) which need to be managed in a manner appropriate for these ecologically sensitive habitats. This includes the removal of alien plants such as poplar and eucalyptus species and the management of fire. Fire should be avoided in this vegetation type but if it burns accidentally (e.g. when bees are being smoked out) it should be rested for three years before it is grazed again.

NAMAQUALAND SAND FYNBOS	VEGETATION UNIT FFd 1
RECOMMENDED STOCK	Dorper, Damara & Meat Master
STOCK TO AVOID	Karakul as they tend to herd and damage shrubs
RECOMMENDED STOCKING RATE	Agriculture: 50ha/SSU Protected Environment: >50ha/SSU
MANAGEMENT SYSTEM	This veld type is very limited in extent and there is the possibility that it may be included within the Namaqua National Park. There is a need to better understand Sand Fynbos before clear guidelines for management can be provided. Alien plants such as Acacia cyclops need to be cleared.

NAMAQUALAND COASTAL DUNEVELD	VEGETATION UNIT SKs 8
RECOMMENDED STOCK	Dorper, Damara & Meat Master
STOCK TO AVOID	Karakul as they tend to herd and damage shrubs
RECOMMENDED STOCKING RATE	Agriculture: 7ha/SSU Protected Environment: 10 to 13ha/SSU
MANAGEMENT SYSTEM	This is good grazing veld although there is limited water which means that animals may need to be moved large distances, so fewer larger camps with longer duration grazing may be the pragmatic approach – but not more than 30 days in a camp. It is important to avoid concentrating animals (e.g. around stock-posts or by night time kraaling) due to negative impacts on the veld due to trampling.

NAMAQUALAND STRANDVELD	VEGETATION UNIT SKs 7
RECOMMENDED STOCK	Dorper, Damara & Meat Master
STOCK TO AVOID	Karakul as they tend to herd and damage shrubs
RECOMMENDED STOCKING RATE	Agriculture: 10ha/SSU Protected Environment: 12 to 13ha/SSU
MANAGEMENT SYSTEM	This is good grazing veld with noticeably more palatable species than many other vegetation types in the area. The lack of water is partially compensated for by the regular occurrence of sea mist. The camp system, preferably with summer transhumance, is recommended although it is not absolutely necessary. If summer transhumance is not used the stocking rate should drop substantially to >25ha/SSU. The vegetation is sensitive to trampling.

NAMAQUALAND HEUWELTJIEVELD	VEGETATION UNIT SKn 4
RECOMMENDED STOCK	Dorper, Damara & Meat Master
STOCK TO AVOID	Karakul as they tend to herd and damage shrubs
RECOMMENDED STOCKING RATE	Agriculture: 10ha/SSU Protected Environment: 12ha/SSU
MANAGEMENT SYSTEM	This vegetation type has above average productivity but is very susceptible to over grazing with the heuweltjies in general having already been overgrazed. There needs to be a four camp system with one camp undergoing a yearlong rest and the other camps having animals for 15 to 30 days at a time. Transhumance is important in this veld type but if this is not possible the stocking rate should be 20ha/SSU or the property should not be considered for Protected Environment status.

NAMAQUALAND ARID GRASSLAND	VEGETATION UNIT SKs 11
RECOMMENDED STOCK	Dorper, Damara & Meat Master
STOCK TO AVOID	Karakul as they tend to herd and damage shrubs
RECOMMENDED STOCKING RATE	Agriculture: 10ha/SSU Protected Environment: 12ha/SSU
MANAGEMENT SYSTEM	This vegetation type occurs on deep red sands and is largely included in the Namaqua National Park. For the small area outside it will only ever represent a portion of a farm. It provides good summer grazing but cannot sustain year-long grazing and this veld won't survive winter grazing.

RIETHUIS-WALLEKRAAL QUARTZ VYGIEVELD	VEGETATION UNIT SKs 10
RECOMMENDED STOCK	None
STOCK TO AVOID	All
RECOMMENDED STOCKING RATE	Agriculture: - Protected Environment: -
MANAGEMENT SYSTEM	Most of this vegetation type is already protected within the Namaqua National Park and the goal is to include it all under conservation, but not as a Protected Environment as it is very sensitive to grazing.

NAMAQUALAND SHALE SHRUBLAND	VEGETATION UNIT SKn 2
RECOMMENDED STOCK	Dorper, Damara & Meat Master
STOCK TO AVOID	Karakul as they tend to herd and damage shrubs
RECOMMENDED STOCKING RATE	Agriculture: 10ha/SSU Protected Environment: 12ha/SSU
MANAGEMENT SYSTEM	This vegetation type has a high proportion of endemic species and is very patchy such that small patches are possible on individual properties. It is likely to be palatable and very sensitive to over grazing. It is highly erodible and is commonly found on a slope so this will need to be monitored where it is present.

BUSHMANLAND ARID GRASSLAND	VEGETATION UNIT NKb 3
RECOMMENDED STOCK	Dorper, Damara & Meat Master
STOCK TO AVOID	This is not ideal for goats and wildlife
RECOMMENDED STOCKING RATE	Agriculture: 10ha/SSU (65ha/LSU) Protected Environment: 12ha/SSU
MANAGEMENT SYSTEM	This vegetation is dominated by summer rainfall grasslands with very few shrubs. It is used primarily as summer grazing (part of a transhumance approach) for sheep which can be facilitated by cattle as they reduce the height of the grass. It can be grazed to low cover (at which stage animals should be removed) and will recover rapidly after rain although the quality of the recovery depends on the degree of degradation of the land and the period of the recovery – substantial rest is beneficial. This vegetation type can be stocked year round but then summer grass needs to be harvested (by hand) and used as winter roughage. Under these conditions the stocking density needs to be halved. Bushmanland Arid Grassland may be vulnerable to increasing aridity due to climate change.

KAMIESBERG GRANITE FYNBOS	VEGETATION UNIT FFg 1
RECOMMENDED STOCK	Dorper, Damara & Meat Master
STOCK TO AVOID	Karakul as they tend to herd and damage shrubs
RECOMMENDED STOCKING RATE	Agriculture: 20ha/SSU (65ha/LSU) Protected Environment: 25ha/SSU
MANAGEMENT SYSTEM	This vegetation type occurs on the highest peaks and is not grazed much with the exception of the areas on the eastern slopes of the Rooiberg – for this reason grazing guidelines are not necessary. However it is worth mentioning that Fynbos grows between June and October and grazing should thus be avoided over this period. The area should not be ploughed or burnt and the wetlands need to be managed. Natural fires should be left to run their course.

VELD MONITORING

Effective land management requires that both the veld and the livestock are monitored. This section deals with veld monitoring and aims to provide a tool that is not too onerous for the land manager yet is effective in monitoring the condition of the veld. The approach to monitoring as proposed by Esler, Milton and Dean (2010) in their book *Karoo Veld – Ecology and Management* has been adopted. It is recommended that the book be further consulted for useful information. The approach is summarized here:

1. MAPPING

- In order to effectively monitor the vegetation it is necessary to know what vegetation there is on the property and it is thus important to develop a map of the vegetation delineating the various vegetation types.
- The vegetation map needs to be overlain by relevant management infrastructure such as camp fencing, water points and roads. It is also useful to include contours and drainage lines.

2. SELECT MONITORING SITES

- Ensure a minimum of one monitoring site per camp in a three (or four) camp system, or at least 10% of the camps in a multi-camp system;
- In a multi-camp system attempt to cover different aspects of the landscape;
- If a camp is very large there is value in establishing two monitoring sites – one close (1 km) and one further away from water.
- Land which has a specific management goal (e.g. it is being rehabilitated) should also be monitored by establishing a site;
- A monitoring site should be selected to be "typical" of the area being monitored and not too close to water, drainage lines or atypical soils, shade, a road or perimeter fencing;
- The size and shape of the monitoring site should be standardized at 100m x 2m;
- The site should be marked at either end along the centre line (i.e. 100m apart) with metal stakes. The end points should be on the same contour – i.e. avoid running a monitoring site up or down a slope;

3. MAKE MONITORING OBSERVATIONS

- Monitoring data should be collected twice annually – in spring and in autumn – and this should be standardized over the years;
- It is generally easier to identify plants (bossies and grasses) after rain and the best time to conduct monitoring in rested camps is within two to three weeks of the last rains;
- In order to be able to track changes over time it is important to record all monitoring observations in a standardized format as well as by noting additional observations including soil health indicators;
- It is very useful to take photographs of each site from the same point and height using a standard lens and magnification and collating these properly for future reference;
- Complete the attached Veld Assessment form, including the scoring, in line with the instructions and include information from your livestock monitoring records;

4. INTERPRETING THE SCORE

- A score of more than 20 indicates good or excellent veld condition. You should aim to keep the veld in this condition or to improve it;
- A score of 16 to 20 should raise a red flag, particularly if at an earlier stage the score was higher. Action, in line with these guidelines, needs to be taken to increase the score;
- A score of 15 or less means that the veld is in poor condition and that the land needs focused efforts to improve the veld. This will require a lengthy period of rest – i.e. no grazing - followed by careful management to maintain the improved condition.
- If there is a small area of concern, it should be fenced off using temporary electrical fencing to ensure that there is no further use by grazing livestock.






KAROO VELD ASSESSMENT FORM

[Modified from: Esler, Milton and Dean (2010)]

SITE DESCRIPTION

Farm name:		Assessment date:	
Camp name:		Vegetation type:	
Topography:		Soil type:	

Distance from water (km):		Rainfall (past 3 months):	

Can you see:	a) Dongas	Y / N	b) Trampled areas/paths	Y / N	c) Bare heuweltjies	Y / N
Other Comments:						

GRAZING RECORD

Area of camp (Ha):		Animal breed:		Herd size:	
Animals in SSU's:		Grazing period (days):			

VELD ASSESSMENT

MONITORING CRITERION	1	2	3	4	5	SCORE
Vegetation cover (not opslag) (% of soil covered by living plant material)	0-10	11-20	21-30	31-50	>50	
Forage value (% of vegetation that is palatable)	0-20	21-40	41-60	61-80	>80	
Grazing impact (% new shoot removal from palatable plants)	100	75	50	25	<5	
Indicators of disturbance (% of cover comprising opslag, weeds, mat plants)	100	75	50	25	<20	
Seedling palatability ratio (Ratio of palatable to unpalatable seedlings)	5:95	20:80	40:60	60:40	80:20	
Soil health -ve signs: erosion, capping +ve signs: lichen,diggings, organic litter (Proportion of negative to positive indicators)	All -ve	Mostly -ve	Balanced	Mostly +ve	All +ve	
> 25 = Excellent 21-25 = Good 16-20 = Fair	11-15 = Poor <11 = degraded 6 – 10 = severely degraded			**Total Score** (max = 30):		

Species numbers & types in 100m x 2m transect	Trees	Bossies (leaf succulent)	Bossies (non-leaf succulent)	Grasses	Opslag	**Total Species**

Conclusions:

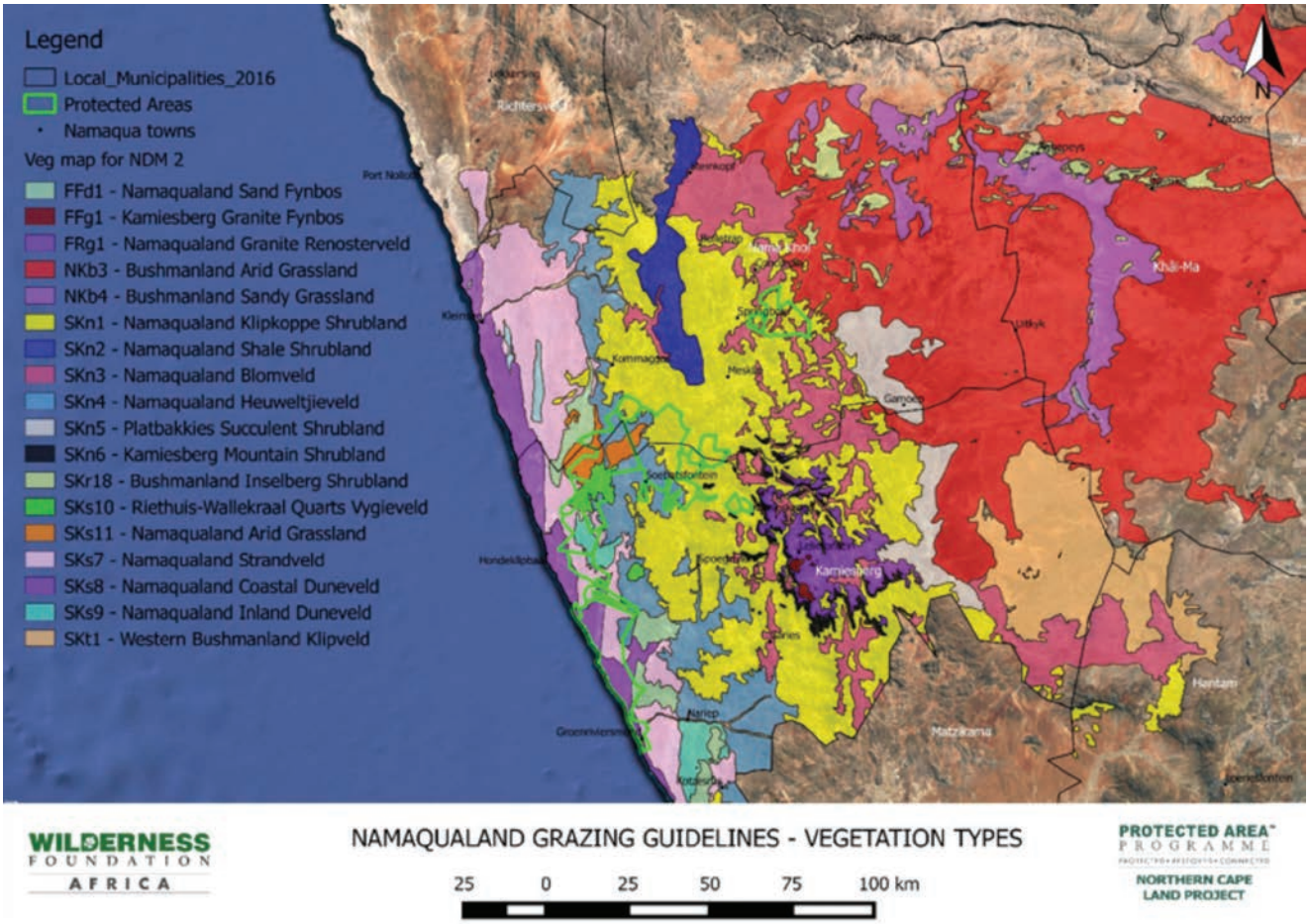

Figure 2. Namaqualand South African National Vegetation Types according to Mucina and Rutherford (2006)

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THIS DOCUMENT WILL BE UPDATED FROM TIME TO TIME WHEN NEW INFORMATION BECOMES AVAILABLE.