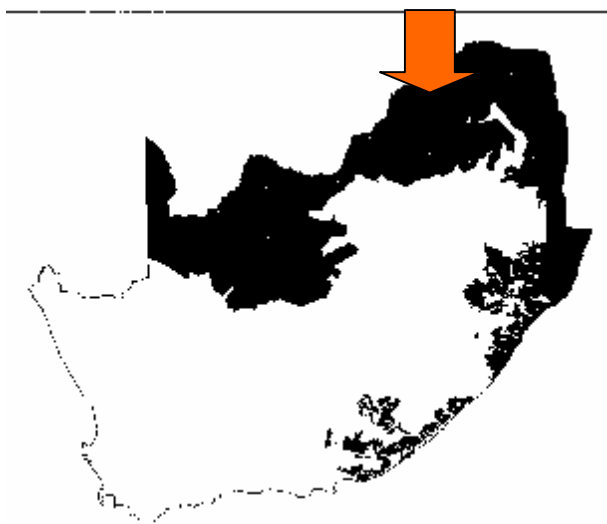


## 1. Introduction

### 1.1 Our Brief

Early in 2004 the management of Hermanusdoorns (HD) approached Wildlifegame Consultants (WC) to compile a holistic Wildlife Management Plan for the farm HD. As agreed in our original proposal the starting point for this study was a discussion with Hermanusdoorns Management (HM) on the long term goals and short term objectives for the area under their control.



Hermanusdoorns lies in the savanna biome covering an area classified as a combination of moist mountain bushveld and mixed bushveld. Conservation status is currently 'poorly conserved'. (Louw & Rebelo 1998)

### 1.2 Goals and Objectives

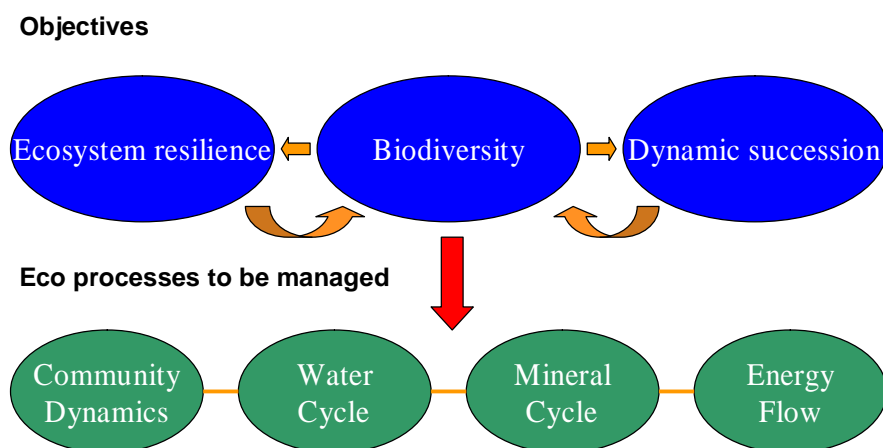
HM's primary responsibility lies in creating the type of 'wildlife and or nature' experience that its stakeholders expect. The stakeholders would be all the owners of HD. As a secondary objective HM intends the harvesting of wildlife to generate income. Taken into account are all the stake holder's perceptions of the desired habitat and desired wildlife experience. Ecologists and Wildlife Biologists are in an ongoing debate as to what the perfect or climax condition is in any number of preserves and reserves around the world. The discussion goes further and arguments about whether a habitat should be maintained at climax status or allowed to fluctuate through the succession dynamic continue. HD is fortunate in the variety of habitats available to biota on the farm. HM's philosophy is one

adopted by many successful wildlife management practitioners and that is, that nature manages itself best. Having said this there is also a clear understanding that HD is a finite reserve of relatively small size; some 1500 hectares with some rather unique pressures on it e.g. heavy non-consumptive tourism (owners and guests on game drives and walks). The demands of stakeholders mean that habitats have to be ‘designed’ to create a suitable wildlife and/or nature experience. This means manipulating habitats. A risky business but if managed and monitored carefully one that can achieve the results desired. A typical example of this is bush clearing which is one of HM’s short term objectives in achieving the goal as set out above.

The two flow charts below give a simplistic view of a basic bio-management system designed for HD. Unfortunately the term wildlife management is a narrow one and often the building blocks of such a system as illustrated below are ignored. To create a sustainable, dynamic, resilient, multi species reserve we need a solid foundation. Biodiversity is the key to this foundation. As the flow chart indicates (Fig. 1) Ecosystem resilience and dynamic succession are both supportive of this diversity and complimentary to it. In order to maintain our foundation we need to manage correctly the eco processes that support them.

*Fig 1*

### Strategic Bio Management - Hermanusdoorns



In Fig, 2 we get closer to our operational requirements. We have a number of tools to assist us in the management of eco processes. Human creativity and modern technology go hand in hand. Here we look at just two examples fertilization and the use of heavy machinery for bush clearing.

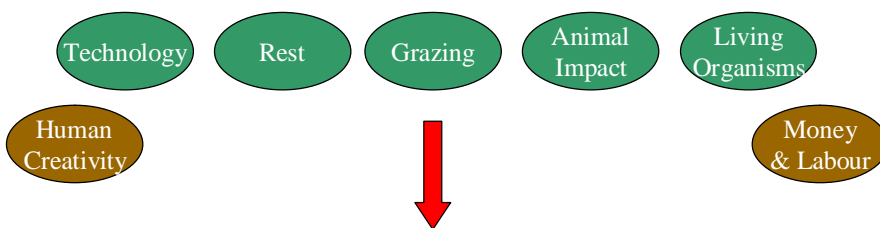
Game has a symbiotic relationship with both pasture and browse and can be used to facilitate the tools of rest, animal impact and grazing. Animal impact- we have lost much of the huge herd effect catalyzed by predators that we had in ages past. The object is to recreate this type of animal impact- the churning and fertilizing of the soil and the distribution of seeds.

Living organisms are measured in our monitoring system. Dung beetles, termites, ants, ticks all play vital roles in the ecosystem and without considering them and their effects our management will fail. The last group of tools tend to be where the most focus lies. While it is true that almost any habitat can be created albeit not perfectly with a limitless amount of money and labour this is not our mandate. All wildlife management operations work within a budget and must look at the labour resources they have available. There is little point in planning for large scale fertilization or vast mechanical bush clearing when there simply is not the finance available for such a project.

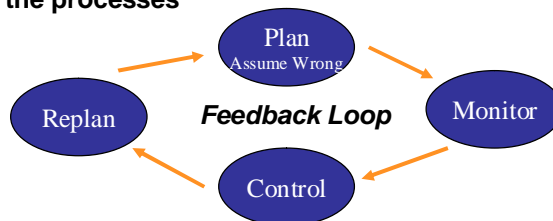
Fig 2

**Strategic Bio Management – Hermanusdoorns cont.**

**Tools for managing these processes**



**Managing the processes**



Lastly the feedback loop while seemingly very simplistic is critical to effective bio management. In terms of managing the biodiversity, resilience and the dynamics of succession within our ecosystems we need to have an initial plan. Erring on the side of caution is always a good idea. When dealing with biological factors we always assume our assumptions are in the planning stage.

We need to monitor to see if we are achieving our objectives, we need to keep tight control of our action plan and the monitoring will tell us if we are heading in the right direction. Based on the monitoring results, we need to re-plan and so the cycle begins again.

## 2. Method

We aimed to avoid any repetition in this study of the work already done by Brown and Bredenkamp in 2001. This study serves as a comprehensive baseline in terms of a vegetation inventory and is an excellent starting point for establishing homogenous units, 13 of which have been identified and named. While it is interesting to note the changes in vegetation it is difficult for a number of reasons to make any kind of meaningful comparisons or come to a conclusion on a trend. It is standard practice to identify and quantify homogenous vegetation units. An area and carrying capacity are then established for these areas. Problems arise when trying to establish a management plan that consolidates all of these areas and manage them as a whole. WC's approach is to look at the system as a whole from start. For example let us say you have identified a 4 hectare homogenous unit in which there is a lot of moribund growth. The tool you identify to deal with this problem is fire. Well there are a number of realities, firstly how do you contain the fire within that 4 hectares without incurring enormous costs. The result of this kind of fire will be to attract large amounts of game to the area putting a lot of pressure on it in terms of animal impact and grazing pressure. This simple example illustrates the need to take a holistic view in any type of bio-management. WC have established 19 permanent bio monitoring sites on HM. These are point transects. We look at cover, quality of cover, density of cover and canopy. We look at age and condition of soil surface. We identify animal signs, any annuals present and any type of soil movement. We identify species and look at their habitat age and form. When deciding where to establish these plots we used satellite and ortho imagery to establish possible homogenous units. The idea being to gather the data

mentioned above from each of these units and thereby measure the resilience, diversity and how dynamic the succession process is within each of these units. We also make comparisons between units and this combined with rainfall data and game census data gives us a fairly good indication of what stocking rates should be. Obviously there are any number of variables that can affect the assumptions made and we try to include as many of the major influences (e.g. fire) as possible. The true benefits of this type of data collection and analyses only become evident after a number of years. It is only after 3 or four years of collection that the data really can indicate any sort of trend within individual plots and that we can begin to plan proactively around these results. The first year however becomes our baseline and gives us a fair indication of where we stand. The first map (Appendix 1) illustrates the homogenous units on HD with a brief description in the legend as per (Brown and Bredenkamp 2001). The bio-monitoring plots are layered over these units to give an indication of their spread.

### 3. Discussion

The first thing we looked at was grass species, quantity and quality. (Appendix 3) For analyses of the quality of a habitat this is probably the single best indicator. Plots 17, 16, 14, 7, 6 and 4 hold densities of 'decreaser' species (those that are abundant in good veldt and decrease in the case of over or under grazing) in this case panicum maximum and digiteria eriantha spp dominate. These plots indicate good health in at least six biomes a good sign of a vibrant succession dynamic. Appendix 4 retains the previous map's 'decreaser' plots and also shows a number of transects where 'increaser 2' species dominated (these are grasses abundant in overgrazed veld and increase in the case of overgrazing). These two maps indicate a trend, while habitat to the west and east of the farm seem to be in fairly good condition there is a concerning trend toward the central area of the property. WC was not satisfied with just the story as told by the indicator species and decided to take our analysis one step further and create a 'habitat index' based on all the data collected in our sampling of individual transects.

The data collected gives us a large range of information about each plot. Plot 3 for example also has only 6% incidence of basal hits (this

*Photo showing transect dominated by Digitaria spp. Mostly decreaser status.*



means only 6% of the actual area is covered by any type of vegetation), 92% of hits were recorded as bare ground and another 2% as deep litter cover. At least 78% of the soil capping is mature. There is a 26% incidence of insect activity 16% small mammals and 8% large mammals. There is no sign of soil movement or erosion. Every aspect of this and every other transect was formulated with a value for each characteristic placing it in an index that can be viewed in Appendix 2. The results give a clearer idea of the total health or condition of the habitat.

For each site and similar group of sites we should be asking four questions. 1. What are we trying to achieve in the area surrounding the site? 2. What were the main tools used in this area since monitoring. 3. Does our monitoring show positive changes in the direction of our goal? If not, why not? 4. What control or planning steps (if any) are we going to take? Questions 2 and 3 are difficult to answer with only one years monitoring. But we can certainly have a goal and a plan to reach that goal as in questions 1 and 4.

The index as displayed in Appendix 2 shows the various transects each with a value next to them. The higher the value the healthier the plot. The colouring of the map indicates that the area to the east needs to be our focus. I would like to point out at this time that a comparison between transects here does not carry a lot of weight in terms of the transect's actual placing on the degradation gradient. Each plot has innumerable variables that influence its performance e.g. gradient, rainfall specific to that area, fire etc. For that reason WC puts a lot of emphasis on consistent precise repeats of the transects in order to produce meaningful long term trends. Having said this there are some

simple tools that can be used on HD to facilitate an improvement in the areas where the transects indicate poor performance. One aspect the index clearly indicates is that poor performance crosses habitats and we need to manage areas holistically to reverse the trend.

#### 4. Actions

It was noted that most of the watering points on HD are linearly situated proximate and parallel to the main Vaalwater – Lephale road. While it is impractical and unadvisable to place watering points on a gradient it is suggested that some of these water holes could be

*Photo typical of a large portion of the predominant habitat on HD. The area around Plot 13 is in good health this is an area where we would also like to see more utilization.*



positioned closer to the base of the mountain in order for game to utilize more resilient so called ‘sour’ mountain areas.

This rainy season management should look at closing down cribs in the area of plots 6, 5,7,8,3 and 2 along with the careful monitoring of rainfall with the objective of habitat improvement in these areas. Now is a good time to emphasize the critical part the rainfall variable plays. While the 2003-04 season was a fairly good one for HD it was preceded by three years of below average rainfall. It must be remembered that normally the effects of rainfall are only felt a year after a good season. In brittle environments like the one HD exists within, double the amount of rainfall means double the amount of biomass. This means you can double the stocking rate. Unfortunately for management it is not always possible to manipulate stock at this tempo. The result is a situation where stocking rates should generally be held at drought levels. In the event of a drought we can then be assured of minimum deaths. The reality lies somewhere between these

two theories. We try to predict rainfall trends and increase stocking rates to make the operation viable. Monitoring is the way to understand if we are succeeding in our efforts without adversely affecting the habitat. HD needs at least 4 rainfall measuring points spread across the farm that should be checked and recorded after each event in the season.

*Thick Dichrostachys cinerea ideal for bush clearing and packing (Plt. 10)*



For the purposes of turning the situation around in the areas we have referred to above; we are primarily looking at the tool of rest. While there are certainly sites within our target area that would benefit from heard impact, HD does not have the big herds to facilitate this. Bush clearing and packing along with the use of a basin plow in areas that have severe soil capping are recommended. Before and after photo's of these specific areas are critical to measure effectiveness of the action. Bush clearing should be done in line with the demand for a more open 'savanna' like feel in certain areas combining the aesthetic with the practical. We have considered fertilization but felt it impractical and not cost effective. Strategic location of both salt & mineral licks can be used as effectively as water points and with more flexibility. Phosphate and other licks need to be carefully controlled in the summer months as much can be lost to rainfall. Again we need to look at placing licks against the mountain and in against the eastern edge of the farm. There are some thicker areas e.g. the woodland around plot 4 that would benefit from a lick. Licks could certainly be used at the beginning of summer to facilitate some kind of herd impact particularly in old lands but this should not continue for long.

*This photo is typical of the 'old land' scenario as seen in plot 11. Cover is good and there is little soil movement but grass species are restricted mainly to the hardy Cynodon dactolyn. These are areas that would benefit from animal impact early in the rainy season.*



Unsustainable collection of firewood should be stopped in the targeted area to encourage biodiversity particularly insect life. HD has a restricted amount of habitat for the plains game species it holds. The larger portion of the farm is typical 'moist mountain bushveld' with a small margin on the flats in the 'mixed bushveld' category. While this means a variety of habitat it also means very small portions really suitable for typical plains game species.

*Dense woodland areas with high quality grasses like plot 4 also need more utilization before they become moribund.*



## 5. Wildlife

Appendix 5 is a stock sheet with HD's current numbers and a projection for 2006 based on average increases in known game populations. Obviously these accepted percentages are highly variable and influenced by a variety of factors. There is a conflict on HD between the need to create a multi-species reserve with a variety of game for viewing purposes and the need to maintain sustainable populations. Trying to manage small groups of animals on an extensive basis is always difficult. High value species such as sable and roan while nice to have are sensitive to habitat change and

competition. We also need to synchronize the realities of this situation with our philosophy on biodiversity,

At the current carrying capacity for grazers about 1 large stock unit (LSU) per 17 hectares, HM can afford to increase the grazing component provided the rainfall stays in the 600mm range. Without a significant decrease in browsers we would not suggest an added browser component (i.e. eland) being introduced at this time.

We have included an extra 15 zebra and 10 waterbuck to increase the ratio of bulk grazers. A suggestion to be considered that would increase the bulk grazing component even further would be white rhino and/or buffalo. These animals are generally placid and compatible with an operation like the one on HD provided a few simple safeguards are put in place. They would also increase the attraction and value of the farm considerably. They are long living relatively slow breeding animals where small populations make sense. We would also like to suggest a group of mountain reedbuck to take advantage of the habitat available.

There are live sale take-offs of kudu and impala in meaningful numbers in 2005. Blesbuck capture should take place in 2006 these animals are not endemic and should be managed carefully. There are a number of good trophy animals on HD and while rifle hunting does not seem compatible with operations on HD there is a growing bow hunting market which would fit in well with both the infrastructure and the need to keep game relaxed for viewing. Bow hunting blinds can be used for game viewing/bird watching. There is no noise factor; the hunter is confined to a specific area over which management has control. There is good income in trophy hunting both local and overseas.

Stocking rates for the purpose of this exercise were determined after consultation with local land extension officers and local wildlife managers. WC normally uses the Dancwerts model to facilitate the computation of a carrying capacity but it was felt that at there was not enough data to make this worthwhile. A current rate of 1 unit to 13 hectares is conservative at this stage but optimal in terms of effective management. We intend to refine this as more data becomes available.

## 6. Conclusion

Despite our focus on the negative HD is in good all round condition. Game numbers have been well managed and some care has been taken in dealing with erosion and bush encroachment. The plan we have laid out is basically a single season objective, the results of any actions now will perhaps not be visible for a few years. Yearly monitoring will indicate whether we are moving in the right direction and as stated in the introduction we must be flexible enough to respond to changes in the ecosystem. HM seems very aware of the impact of a large amount of residences and people associated with them. The area has a finite carrying capacity for human habitation which can only be ignored if management is prepared for the intensive management of the associated effects. HD is fast approaching saturation point in terms of this. WC will gladly assist management with the placing of waterholes and licks and sites for bush clearing. All relevant data now resides in a GIS package making this a simple exercise and making it a lot easier to record. Please do not hesitate to contact us if there are any questions.