



**Management Plan:**  
**Raptors View**

October 2011<sub>v2</sub>

**Service provider**

Dr. Mike Peel Agricultural Research Council – Animal Production Institute

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## PREAMBLE

This Management Plan for the Raptors View (RV) is being compiled in term of the National Environment Management: Protected Areas Act No. 57 of 2003 (NEM: PAA).

There is a limited precedent available to guide the compilation of a Management Plan in terms of the new legislation. SANParks have submitted a number of Management Plans for their National Parks. As far as Private Nature Reserves are concerned I am at this stage aware of our submissions for the Associated Private Nature Reserves (APNR – signed off by the MEC of Mpumalanga Province), the Sabi Sand Wildtuin (SSW – accepted by the MTPA and awaiting MEC signature), the Blue Canyon Game Conservancy (BCGC), Hans Merensky Land Owners Association and Mala Mala Game Reserve (MM - accepted by the MTPA and awaiting MEC signature). The 'Environmental Management Plan: Penryn College' being relevant to the surrounds of RV was completed along similar lines.

The plan that is being presented is based on the norms and standards generally accepted in the industry as to what represents an adequate management plan for a large reserve.

A guideline has recently been developed for the development of management plans in terms of Act 57 of 2003 (Cowan 2006)<sup>1</sup>. This includes specific requirements that must be contained in a management plan.

Whilst some of these specific requirements may not be expressed under the same heading, they are addressed as follows in the draft plan for RV:

Required according to the framework (Cowan 2006) (section 41(2) of the Act)	Headings and sections in the draft RV plan
Biodiversity management plan	3. Historical overview of the shaping of the Lowveld savanna  7. Biophysical description  10. Habitat management 10.1. Soils 10.2. Vegetation 10.3. Water  11. Wildlife management 11.1 Guiding principles 11.3. Setting Thresholds of

<sup>1</sup> Cowan G.I. 2006. Management Plan Framework – Guidance for the development of management plans in terms of National Environment Management: Protected Areas Act (Act 57 of 2003). Department of Environment Affairs and Tourism.

	Potential Concern
	16. Research
Coordinated policy framework	5. SWOT analysis 6. Conservation objectives 8. Guiding principles
Planning measures, controls and performance criteria	11.6. Wildlife monitoring 12. Infrastructure development 17. Tourism
Implementation plan and costing	13. Security management 14. Reserve management staff 18. Time table
Procedures for public participation	4. Stakeholder expectations
Community based natural resource management (where applicable)	15. Community outreach
Zoning plan	9. Zonation plan
Invasive species control and eradication strategy	10. Habitat management 10.2. Vegetation

The challenge for all involved (including the landowners, their management team and the service providers) is to simultaneously:

- Adhere to the legal requirements (letter of the law);
- Achieve the legal intent (spirit of the law);
- Realise an affordable and practically feasible plan.

In particular where private reserves are concerned, a Management Plan must not be so onerous and expensive to compile and so costly to implement that it ends up as yet another unused document on a bookshelf.

## 1. SUMMARY

### 1.1. BACKGROUND

This document presents the Management Plan for the Raptors View (RV) that consist of the following property located directly to the south of Hoedspruit town and the R527, to the west of farm Welverdiend (243 KQ) and east of the farm Grovedale (239 KQ) (Table 1):

Table 1 Properties making up RV.

FARM	SIZE/HA	MEMBER
Remainder of Portion 1 of the Farm Happylands No. 241, Registration Division K.T.	1017	Raptors View, a company incorporated in accordance with the provisions of Section 21 of the Companies Act
TOTAL	1017	

The purpose of this plan is to document the vision and goals of RV and to provide the management guidelines by which these goals are to be achieved.

The Management should be reviewed on an ongoing basis but formally at least every five years

### 1.2. WHY A MANAGEMENT PLAN?

The reasons for the compilation of a Management Plan discussed. Besides the legal requirements in terms of the National Environment Management: Protected Areas Act No. 57 of 2003 (NEM: PAA), a Management Plan serves several important purposes. This includes the following:

- It adds value to RV as an integrated concept with clearly defined objectives and approaches. This guarantees continuity;
- The document draws the signatories of RV 'Articles of Association' (Appendix A) together who by also signing off on the management plan will facilitate effective management and monitoring within RV;
- A well-articulated plan assists with obtaining the necessary permits and authorisations (that are needed for effective management, development and regulation of sustainable utilisation) from the relevant Nature Conservation and Environmental authorities;
- The Management Plan assists in the yearly planning of veld management tasks and the budgeting thereof.

### 1.3. THE SHAPING OF THE LOWVELD SAVANNAS

In examining the ecological context of RV, it is useful to investigate the factors that over the past two centuries have shaped the savannas that make up this system. A brief discussion is provided on the socio-political changes and the associated evolution in land use practices that have culminated in the nature, wildlife and tourism based operations that currently characterise this region.

A further encouraging development has been the establishment of the Great Limpopo Trans-frontier Park which extends from areas to the east of the KNP. Further RV forms a corridor for the expansion of this great conservation area to the west and into the Drakensberg. We are thus presented with a continuum of wildlife areas of varying ecological potential and with differing objectives, each requiring timorous and effective proactive management interventions for the achievement of said objectives. The need for clearly articulated objectives embedded in a comprehensive and periodically but formally reviewed management plan is clear.

### 1.4. STAKEHOLDER EXPECTATIONS

RV has many stakeholders who have a direct or indirect interest in its management and the consequences thereof. These stakeholders are both internal and external to RV.

It is important for RV to duly consider the different expectations by the different stakeholders. It must however be realised that some of these expectations are in conflict with other expectations. It is also not possible to fully realise all expectations within the available natural and financial resources and without endangering some of the core attributes of RV.

### 1.5. SWOT ANALYSIS OF RV

The classic Strengths, Weaknesses, Opportunities and Threat analysis, with a focus on those aspects related to RV's management, was applied as it provides a useful tool to identify those aspects that need to be addressed through management.

From the SWOT analysis, the following limited number of vital attributes can be identified as key to RV, its conservation, its management and its development:

- Diverse, albeit small, area that is mostly natural;
- Semi-arid climate with large, mostly unpredictable and certainly unavoidable, variations that have major impacts on vegetation dynamics, carrying capacity of wildlife and on management requirements;
- Ecological functioning for most attributes is at a spatial scale that is smaller than that of 'open' or spatially 'very large' such as the Kruger National Park (KNP) or 'large' areas such as the Associated Private Nature Reserves and even relatively 'larger' areas such as the neighbouring Blue Canyon Game Conservancy;

- Diversity of owners and diversity of opinions;
- Pressure by external stakeholders on decision-making.

## 1.6. CONSERVATION OBJECTIVES OF RV

Conservation objectives can be defined in different ways depending on the main emphasis placed on the area. RV was not originally formed with the main objective of conserving a tract of pristine country and its natural biodiversity. Rather, the objective has been one of setting aside a natural area for the enjoyment and benefit of its Owners.

The objective of the property is thus aimed at developing a quality wildlife residential estate which delivers a product that is more appropriate than the limited agricultural options offered by this harsh natural environment. It has also become apparent that such land use generates superior employment opportunities than that possible through say livestock farming. This is vital in today's prevailing socio-economic conditions.

It is essential that this broad objective is understood and accepted, because this underpins management decisions that may differ from those that would normally be made in a protected area that has the conservation of biodiversity as its primary objective. The following primary and secondary objectives were formulated in consultation with the 'RV Home Owners Rules' document (Appendix B).

The proposed primary objective for RV is as follows:

- 'To provide a high quality lifestyle for residents within a natural wildlife estate ("the estate")'.

There are several secondary objectives:

- To provide for ecologically and aesthetically sustainable (non-consumptive and consumptive) use of the area for its owners, based on wildlife focused recreation;
- To manage the ecosystem, landscapes and species populations so that a meaningful contribution will be made towards their conservation;
- To cost-effectively restore and conserve RV's landscapes, ecosystems and biodiversity where practicable in a productive and aesthetic state that will achieve the primary objective and be considered to be sustainable within the climatic and geological constraints of the area;
- To make investment opportunities available that are compatible with the primary objective and involve the participation of members of the local community wherever appropriate;
- Where possible, to provide direct employment to local communities;
- To manage the estate so that, without compromising the ecological and aesthetic objectives, the economic viability and investment value of the properties are maintained;

- To enlarge RV's sphere of influence by collaborating with other adjoining properties where the objectives and management are similar to those of RV.
- In accomplishing these objectives, 'Best Practices' will be implemented in natural resource management, and in forming constructive and beneficial relationships with the neighbouring communities and conservation bodies.

## 1.7. BIOPHYSICAL DESCRIPTION

The biophysical description is essential to set the scene for the required management actions. A balance needs to be struck in terms of the level of detail of the biophysical description. An exhaustive review would not be appropriate as one could get overwhelmed by the level of available detail. On the other hand, sufficient information is required to enable one to grasp the essential facets of RV and the underlying determinants to its variability and complexity. In that regard, the management plan functions as a repository of the available information (see Chapter 2. Why a Management Plan?).

The different elements of climate, soils, vegetation and fauna are briefly described.

Based on the numbers obtained during the aerial game count of September 2010, the stocking rate on RV is within the recommended guideline for carrying capacity.

## 1.8. GUIDING PRINCIPLES FOR MANAGEMENT

Based on a preliminary SWOT analysis and the identification of the vital attributes of RV, a number of guiding principles are formulated for the management of RV. The most important ones are as follows:

- Management will be aimed at realising well-defined objectives;
- An adaptive management approach will be applied;
- The aspect of 'scale' is of paramount importance and lessons from the much larger KNP/APNR and surrounding protected areas can not necessarily be directly translated to RV. The author has experience on similar sized properties in the Hoedspruit area;
- 'Thresholds of Potential Concern' (TPC's) should be developed for species, communities and systems as upper and lower level indicators for monitoring;
- The policy will not necessarily be one of 'back-to-nature' as conditions may have permanently changed thereby making such an endeavour near impossible or irrelevant;
- The distribution of permanent water should be addressed in a sensitive manner towards achieving ecological objectives whilst minimising potential negative impact on individual owners;

- Zonation should where possible be used to allow for maximum diversity of use and experience whilst ensuring the attainment of the primary conservation objectives;

## 1.9. ZONATION PLAN

The zonation of RV should adopt a strategy to ensure that developments and human use of the area occurs in such a way that these do not take place at the expense of the underlying conservation objectives. It should also attempt to ensure that different developments and uses of the area do not conflict with one another and are, wherever possible, complementary.

In the broader conservation context, the zonation of RV should preferably be synchronised with that of the adjoining properties. This allows on the one hand to maximise the benefits from adjoining low intensity or low impact zones. On the other hand it would minimise the negative impact of a development zone if the adjoining zone on the other property has a similar level of development and disturbance associated with it.

The reality for RV is that the spatial extent of contiguous areas that fit the criteria of for example a 'Wilderness' zone (namely being roadless and without permanent improvements) is very different from areas such as the KNP. RV is overall much smaller and has a relatively higher density of roads and residences that are relatively closely spaced (compared to the KNP, APNR and surrounding protected areas for example). It then becomes almost pointless to classify an area as 'Wilderness' if it is so small as to experience significant influence from adjoining zones with a higher intensity of use and development.

Furthermore, it is important to understand that 'Wilderness' is not necessarily synonymous with biodiversity conservation, although this is often being taken for granted. As an example, one could increase developments on RV and still have reasonable biodiversity conservation if developments and activities adhere to best practices although there would be little 'sense of wilderness' left. On the other hand one could exclude every single person from RV, yet allow animal numbers to increase ten-fold. This would provide a wonderful wilderness experience, but most likely would lead to significant losses of biodiversity.

The desire for 'Wilderness' is perfectly acceptable but must be tempered with the expectations of the landowners within the estate. It is by the pragmatic balance of creating the sense of 'Wilderness' or rather maybe 'wildness' and at the same time managing for biodiversity and an aesthetically pleasing estate that RV's objectives will be achieved.

While it is accepted that peripheral development is very desirable, RV was not developed in this way and the residences are widespread throughout the estate and many are located deep within it. This reality cannot be ignored. It has important consequences as to the feasibility and desirability of establishing 'Wilderness' areas.

## 1.10. HABITAT MANAGEMENT

This section forms the core of the Management Plan.

Aspects that are dealt with in detail are soils, fire management, bush encroachment, and water provision,

The primary objectives for these aspects are:

- To minimise the rate of accelerated erosion;
- To conserve indigenous plant populations and a representative variety of habitats occurring on RV through:
  - *Judicious use of fire by management;*
  - *Control of bush encroachment;*
  - *Control of alien plants;*
  - *Ensuring sustainability of consumptive utilisation.*
- To provide water for animals in places and for periods which are to approximate as closely as possible the natural past distribution of water without affecting adversely the hydrology and consequent ecology of the reserve and to maintain natural water bodies in such a condition so as to support the naturally occurring species linked to such bodies.

RV has no permanent perennial water source. The large non-perennial Sandspruit River traverses RV.

The sub-division and fencing off of land for commercial cattle ranching, and over the past few decades various forms of wildlife utilisation meant that animals were restricted to areas that were seasonally waterless. With fencing it became necessary to provide water artificially year round in areas where water was only seasonally available in the past. This resulted in an eruption of water dependent animal species such as impala and wildebeest, increased concentrations of animals and grazing, trampling, dunging and urination which affects water infiltration, run-off, grass cover, species composition, the tree:grass ratio, and ultimately biodiversity and carrying capacity (depending on the set objectives).

To illustrate this, it has been shown that species that occurred in sizeable numbers in the region that require medium to tall grasses (common reedbuck, roan, sable, tsessebe) decline under such conditions. Vegetation that was naturally rested for part of the year became heavily grazed by the now sedentary, and often unchecked, herbivore populations on units much reduced in size.

So while the provision of water is essential for most game species, it has been conclusively shown that too extensive a development of water points that cannot be managed is detrimental to those species that require medium to tall grasses (common reedbuck, roan, sable, tsessebe). The reason for this is that water points allow water dependent species such as impala, warthog and zebra to move permanently into the areas that they could previously occupy only during the rainy season. This year-round selective grazing and competition causes habitat changes for those species which require longer grass (Owen-Smith 1996, Clegg 1999). The disappearance of roan and sable and the virtual disappearance of reedbuck and roan are in part due to competition for grazing by other more water dependent herbivores (impala, wildebeest, warthog and zebra).

## 1.11. WILDLIFE MANAGEMENT

The primary management objective for the wildlife is to conserve a wide diversity of indigenous animal species on RV without causing a long-term deterioration in the veld condition resulting from accelerated soil loss, bush encroachment or an unfavourable shift in the grass species composition and/or cover.

This will require the setting of Thresholds of Potential Concern (TPC's). The importance of setting the limits of acceptable change has been emphasised in the Hoedspruit area by alarming declines of selective grazers (e.g. wildebeest) in the presence of large predators such as lion and an increase in mixed feeders (e.g. elephant and impala) on the other hand. There must be pre-agreed TPCs or 'amber lights' that will trigger management actions to remedy any situation that may arise in this regard.

It is recommended that preliminary TPCs for herbivores on RV are set on the basis of measurable criteria such as population size, estimated rates of increase and survival, physical condition as well as an element of predator impact, calving percentage and survival and calving interval. Should a population move outside the numerical limits of the TPC, the situation must be investigated and remedial action taken where necessary.

These Thresholds of Potential Concern for herbivore populations within RV must be tested. The critical question is as follows:

Is the number of animals present on RV sufficient to sustain the various species populations in terms of the current veld condition and under existing (albeit low) predation levels?

We now look at the stocking rate situation as follows:

- Using the October 2010 figures;
- Estimating whether game numbers are sufficient to maintain themselves.

The results indicate the following:

- The current overall herbivore biomass is within the guideline

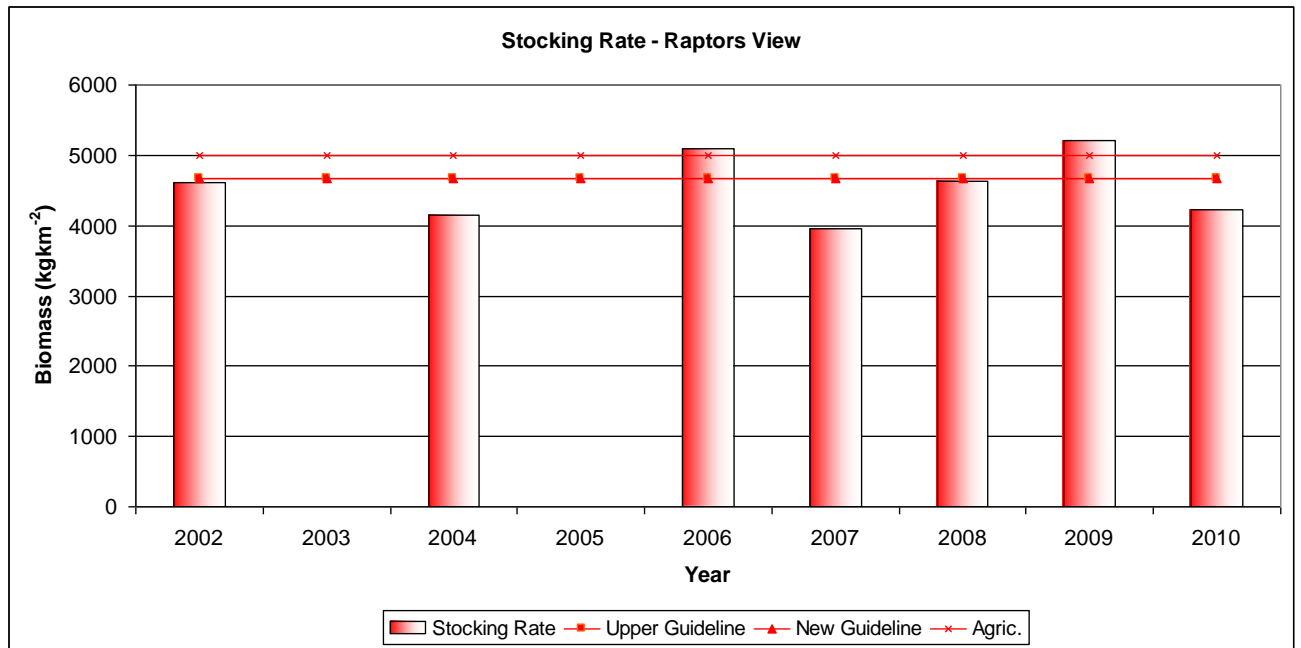


Figure – illustrating the stocking rate on RV over a number of years. The importance of a comprehensive ecological monitoring program is highlighted.

## 1.12. INFRASTRUCTURE DEVELOPMENT AND MANAGEMENT

Management policies and procedures must ensure that RV's infrastructure is acceptable, well maintained, renovated, upgraded and replaced at the required intervals according to specific design norms and standards, including national construction regulations, green building and 'touch the earth lightly' principles. Water saving measures should be incorporated and waste production should be minimised. To this end the 'RV Architec Req Sept 2010' provides the guidelines for RV (Appendix C).

The following aspects are detailed in the management plan:

- Fences;
- Roads;
- Energy;
- Buildings;
- Communications;
- Waste Management.

## 1.13. SECURITY MANAGEMENT

Security management (and more specifically anti-poaching) is essential in an environment that holds species such as rhino and elephant. The increase in crime further warrants dedicated security staff, access control, good communication infrastructure, appropriate training and response plans.

#### 1.14. RESERVE MANAGEMENT STAFF

The natural asset base of RV relies heavily on the continued presence and dedication of competent and reliable staff.

#### 1.15. COMMUNITY OUTREACH

Being a privately-owned estate, RV may have few legal obligations towards any neighbouring or nearby community. However, one cannot ignore the socio-economic setting in terms of its long term impact on the integrity of RV and the positive or negative relationship with its neighbours.

In common with many rural and former homeland areas, unemployment levels in the surrounding areas and the pressure on available land is high. It is quite logical that people living close to RV should look at it as a source of potential benefits either directly (through resource utilisation) or indirectly (through employment and the provision of services).

The policy of RV with regard to its neighbouring and nearby communities should include the following:

- Assist, through the development and management of the Reserve, in improving the quality of life of the disadvantaged communities living nearby;
- Preference will be given to indirect rather than direct interventions (facilitation and provision of opportunities rather than outright financial support or resource utilisation);
- Transfer of knowledge, skills and opportunities towards strengthening SMME development will be favoured.

A number of management actions are formulated in the Management Plan.

#### 1.16. RESEARCH

Monitoring and research are required on RV to provide the guidelines and answers to manage the ecosystem and its components. These answers will be learnt by gaining a better understanding of the ecosystem and the interactions within it. To achieve 'best practices' in the management of the area will require continuous monitoring of current management practices and the formulation, testing and refining of new ones. Monitoring and understanding are also necessary in the social and economic fields that are part of RV's objectives.

The policy with regard to research is to:

- Encourage and facilitate appropriate ecological and socio-economic research and monitoring that is necessary for the effective management of RV; and

- Ensure that all data and information gathered either from a formal research or monitoring programme, or that result from historical enquiry, are properly archived and stored in a form that is easily accessible for future use.

### **1.17. EDUCATION**

The proximity of the Southern Cross School offers great learning opportunities within a relatively safe 'estate' situation. The potential to compile an integrated plan in this regard is considerable. This plan should address the position of the institution within the Lowveld and should recommend an appropriate strategic direction for education development taking into account geographical position, market situation and anticipated future, environmental sensitivities and current developments in the region.

### **1.18. TIME TABLE**

A broad timetable on the management actions is required for the annual planning and budgeting purposes. This timetable will be largely dictated by the seasonal cycle of wet and dry, of production and loss.

### **1.19. ACKNOWLEDGEMENTS**

The service provider benefited much from the input by Mr. Tim Parker of Game Ranch Management Services. The land owners of RV are to be commended for their proactive approach to the management of the area.

### **1.20. REFERENCES**

The descriptions and ideas contained in the management plan are backed by a number of published and unpublished references that provide much additional information on RV and its conservation context.

## 2. WHY A MANAGEMENT PLAN FOR RV?

Why have a Management Plan for RV?

The first, most obvious and binding reason is from a legal perspective. The National Environment Management: Protected Areas Act No. 57 of 2003 (NEM: PAA) requires that a management plan be produced for RV in consultation with stakeholders. The objective of a management plan is to ensure the protection, conservation and management of the protected area concerned in a manner which is consistent with the objectives of the NEM: PAA and for the purpose it was declared.

However, the drafting of a Management Plan should not be merely seen as a cumbersome obligation. Rather, a Management Plan should be welcomed for the following additional reasons:

- It adds value to RV as an integrated concept with clearly defined objectives and approaches. This guarantees continuity;
- A well-articulated plan assists with obtaining the necessary permits and authorisations (that are needed for effective management, development and regulation of sustainable utilisation) from the relevant Nature Conservation and Environmental authorities;
- The Management Plan assists in the yearly planning of veld management tasks and the budgeting thereof;
- It serves as a repository for information on past management actions (such as fires, bush clearing, provision of water, utilisation of wildlife etc.), which will aid in adapting future management actions to achieve the desired results;
- The Management Plan can serve as a repository of the current knowledge about the natural environment of the property;
- It adds value to the Owners in better understanding the natural environment they have invested in.

The Management Plan should be reviewed on an ongoing basis but formally at least every five years.

The appropriate ecological management of RV presents a challenge as RV is made up of a diverse and dynamic environment. RV has a large number of individual owners who although sharing the same passion for conservation, may have very different philosophical and practical views on how to achieve the objectives set for the area.

### 3. HISTORICAL OVERVIEW OF THE SHAPING OF THE LOWVELD SAVANNA

In examining the ecological context of RV, it is useful to investigate the factors that have shaped these savannas over the past two centuries (from Peel *et al.* 2004).

Until the beginning of the nineteenth century, life appears to have been relatively harmonious in the eastern Lowveld. This changed with the coming to power of the Zulu King Shaka to the south of the region, with ripple effects being felt throughout southern Africa as people fled his dictatorship (Eloff 1990). Manukosi, who broke away from Shaka, practiced a scorched earth policy as he and his followers moved through the Lowveld region. When he died, his sons began to fight and every winter until the early 1860s large parts of the eastern Lowveld from the south to as far as the Olifants River was ravaged by fire.

The occurrence of fires is however of much greater antiquity. Humans have used fire in southern Africa for more than 150,000 years (Hall 1984). These fires have often been extensive and of greater importance than fires induced by 'natural' causes such as lightning (Edwards 1984). Given this, it would be better to see man-made fires as a central component of these fire-prone ecosystems rather than being an external factor (Hall 1984).

As early as 1884, President Kruger expressed concern at the levels of game hunting in the eastern Lowveld and advised the setting aside of some land to ensure the continued survival of wild animals in the area (Stevenson-Hamilton 1937). The notice proclaiming the Sabi Game Reserve was gazetted in 1898. In the 1890s, W.H. Gillfillan, who later became first surveyor-general of the Union of South Africa, surveyed the area adjacent to the Sabi Game Reserve between the escarpment and the Lebombo mountains and between the Sabie and Olifants Rivers into 4,000 morgen (3,428 ha) lots (Stevenson-Hamilton 1929; Porter 1970; Bornman 1995). These were sold, first to ranchers and then to mining companies who thought the area might be rich in minerals. In 1903 the protected area of the Sabi Game Reserve was extended north to the Limpopo River and in 1926 the National Parks Bill was passed, which paved the way for the proclamation of the Kruger National Park (Stevenson-Hamilton 1929).

In 1923 the Secretary of Lands announced that the Sabi Game Reserve would be cut up into farms and large land companies began cattle ranching in these protected areas (Porter 1970). This continued until a compromise was reached and an area on the western border was given to the Land Estates Companies in exchange for the portion of land between the Olifants and Letaba Rivers (Porter 1970). From 1922 onwards the Transvaal Consolidated Land and Exploration Company (TCL) ran large-scale cattle operations in much of what is now the Sabi Sand Wildtuin, buying large tracts of land for between 12 and 74 shillings per hectare (Toulon in the Sabi Sand Wildtuin was bought for 30 pounds in 1884) (Kloppers 1970). In the winter of 1928 two rangers were appointed by Harry Kirkman to combat poaching in the western and northern parts of the Sabi Sand Wildtuin (Kloppers 1970). This was the beginning of organised game conservation by private initiative, a relatively revolutionary development for the late 1920s. From 1930 onwards individuals bought up land in the area and in 1948 the name of Sabi Sand Wildtuin was proposed and the reserve was proclaimed in 1965. The idea of forming a nature reserve in the

Timbavati area was mooted in around 1937. The proposal of a game reserve was discussed in 1954 and the Timbavati Private Nature Reserve was proclaimed in 1956 (Porter 1970). A similar pattern is evident for the Klaserie area where by 1936, in addition to cattle ranching, the land was used for hunting (the cost of land at that time was around £1.27 per ha). Cattle farmers were finally bought out in the mid-late 1960s and the Klaserie Private Nature Reserve was proclaimed in 1969.

In the early 1960s the Sabi Sand Wildtuin, Timbavati Private Nature Reserve, Umbabat Private Nature Reserve and Klaserie Private Nature Reserve were separated from the Kruger National Park by the erection of a veterinary fence designed to combat Foot and Mouth disease. The ecological effects of this fence became apparent in 1962 when a drought resulted in the death of large numbers of blue wildebeest (*Connochaetes taurinus*) and zebra (*Equus burchelli*) that were prevented from migrating towards the west in winter.

Cattle farming continued to dominate in the Hoedspruit area to the west of the Kruger National Park and large private nature reserves until the late-1970s. There followed a large-scale switch of land-use, with cattle largely being replaced by game throughout most of the region between the Orpen road and the Olifants and Selati Rivers and up to the escarpment. The cost of land at this time was approximately R70 per ha. At about this time, the first of the small-scale (200–5,000 ha) operations became involved in the ecotourism industry. In 1992, a new era was heralded with the start of the removal of the fence between the Kruger National Park and the large private nature reserves. The latter includes the Sabi Sand Wildtuin and the so-called Associated Private Nature Reserves (APNR) - Timbavati Private Nature Reserve, Umbabat Private Nature Reserve, Klaserie Private Nature Reserve and the Balule Nature Reserve which was amalgamated into the APNR in 2005. At the same time there was ongoing consolidation of properties such as has happened at RV. The current price of land in this area is in excess of R30, 000 per ha.

A further encouraging development has been the establishment of the Great Limpopo Trans-frontier Park which extends from areas to the west of the KNP through the KNP and into Mozambique. We are thus presented with a continuum of wildlife areas of varying ecological potential and with differing objectives, each requiring timeous and effective proactive management interventions for the achievement of said objectives. The need for clearly articulated objectives embedded in a comprehensive and periodically but formally reviewed management plan is clear (Peel 2005).

The purpose of this plan is to document the vision and goals of RV and to provide the management guidelines by which these goals are to be achieved.

## 4. STAKEHOLDER EXPECTATIONS

RV has many stakeholders who have a direct or indirect interest in its management and the consequences thereof. These stakeholders are both internal and external to RV.

It is important for RV to duly consider the different expectations by the different stakeholders. It must however be realised that some of these expectations are in conflict with other expectations. It is also not possible to fully realise all expectations within the available natural and financial resources and without endangering some of the core attributes of RV.

### 4.1 GOVERNMENT – NATIONAL AND PROVINCIAL

The vision of the Government's Environmental Management Policy is one of a society in harmony with its environment. The policy seeks to unite the people of South Africa in working towards a society where all people have sufficient food, clean air and water, homes and green spaces in their neighbourhoods that will enable them to live in spiritual, cultural and physical harmony with their natural surroundings.

This can only be achieved through a new paradigm of sustainable development based on integrated and coordinated environmental management that addresses:

- People's quality of life and their daily living and working environments;
- Equitable access to land and natural resources;
- The integration of economic development, social justice and environmental sustainability;
- More efficient use of energy resources;
- Public participation in environmental governance; and
- The sustainable use of social, cultural and natural resources.

Government today expects landowners to actively engage local communities and work towards bridging the economic gap that exists within South African society. Nowhere is this gap more evident than in many of our rural communities. The need to address unemployment is critical if there is to be any hope to improve socio-economic conditions in these communities and ensure stability in the country.

RV has the opportunity to develop and manage the area to become a role model in establishing workable examples to alleviate this situation whilst conserving the biodiversity and naturalness of the estate.

The provincial government of the Limpopo Province has identified the development of tourism as being one of their priorities in generating revenue and employment by:

- Creating meaningful job opportunities and skills development programmes for members of local communities;
- Stimulating the development of local communities by assisting in the development of SMMEs that can provide employment and generate income;
- Encouraging the private sector to engage previously disadvantaged communities with a view to developing joint venture businesses.

The Department of Environment Affairs stresses the need to promote the education and empowerment of South Africa's people. This is to increase awareness of, and concern for, environmental issues, and assist in developing the knowledge, skills, values and commitment necessary to achieve sustainable development.

#### **4.2 GOVERNMENT – LOCAL**

The local government tier expects RV to fit its development and activities within its spatial development framework and to contribute to local economic growth and beneficiation of the local communities.

#### **4.3 LANDOWNERS ON RV**

The expectations of the owners of RV are generally expressed in the vision and objectives for RV. This can be summarised as follows:

- Owners expect a well-managed, well-protected natural area that satisfies the owners, their families and guests desire to have a great wildlife experience;
- Obviously owners expect their property value to be maintained and preferably increased through this good management and protection.

A survey of land owners should be circulated wherein individual owners are requested to provide feedback on their expectations and interests.

#### **4.4 NEIGHBOURS – PRIVATE LAND OWNERS**

Neighbouring private landowners generally exercise the same type of land use, namely conservation and game farming but also including ecotourism and hunting. Their interests and concerns should mostly coincide with those of RV. RV expect that the perimeter fence of RV is maintained in good condition to prevent incursions into RV by animals such as elephant, lion and wild dog.

#### **4.5 NEIGHBOURS – LOCAL COMMUNITIES**

The neighbouring local communities are expected to have the following main interests and concerns:

- RV is an area from which wildlife may disperse into Hoedspruit town and where it may cause damage to property, gardens, spread diseases to animals

and endanger the lives of residents. It is thus important that the integrity of the perimeter fence of RV is maintained and regularly checked;

- RV is seen as a potential source of employment;
- RV harbours a range of natural resources of interest to local communities (fire wood, medicinal plants etc.) and may be seen as a potential partner.

#### **4.6 LAND CLAIMANTS**

Potential claimants will obviously have their own set of expectations. It is premature at this stage to address these expectations. The process must run its due course.

#### **4.7 EDUCATION POTENTIAL**

The proximity of RV to the Southern Cross School provides great learning opportunities for scholars based on the diversity of wildlife.

#### **4.8 THE GENERAL PUBLIC AND ENVIRONMENTAL GROUPS**

The extended media coverage and the legal processes surrounding wildlife in the area are ample evidence of the degree of interest by the general public and environmental groups in areas such as RV.

This group of stakeholders is by no means homogeneous. Pro- and anti-development views will be found. It is therefore very difficult for RV to accommodate all of these views.

It will be most important for RV to exercise caution when formulating policies and implementing programmes that relate to development and the utilisation of natural resources.

## 5. SWOT ANALYSIS

The classic Strengths, Weaknesses, Opportunities and Threat analysis, with a focus on those aspects related to RV's management, is useful in homing in on those aspects that need to be addressed through management.

### 5.1 STRENGTHS

The 'Strengths' of RV that are relevant to its management are as follows:

- Autonomous in terms of decision making and management;
- Management team with extensive local experience;
- Diverse ownership (future / security of RV is not dependent on the fortunes or the whim of a single owner);
- Relatively diverse environment (varied combination of geology, topography, soils and vegetation);
- Satisfactory diversity of animals; and
- A comprehensive game count database dating back to 2002 and a recently initiated vegetation monitoring programme (started 2010). It is envisaged that RV will make use of this information while setting up its own data repository.

### 5.2 WEAKNESSES

The 'Weaknesses' of RV that are relevant to its management are as follows:

- Relatively small area (in the context of a private nature reserve);
- Due to the nature of the estate development, the area has a widely dispersed infrastructure of permanent infrastructure in the form of residences, roads water points etc. (relatively large footprint on small area);
- Diverse ownership with sometimes divergent conservation philosophies;
- Difference in opinion and vision between different landowners;
- Semi-arid environment with great variability which has important implications as to the carrying capacity at any given time for wildlife. This situation is magnified on small properties such as RV;
- Legacy of past land use practices including animal species that have largely disappeared (tsebebe?), permanent water points; accelerated erosion (from poorly aligned tracks) and areas of thick bush.

### 5.3 OPPORTUNITIES

The 'Opportunities' of RV that are relevant to its management are as follows:

- Potential expansion of its borders;
- Become a role player in consolidating the conservation area between the large conservation areas to the east (including the Greater Limpopo Trans Frontier Conservation Area (GLTFCA) and the Drakensberg Conservation area to the west;
- Educational opportunities for young people

### 5.4 THREATS

The 'Threats' to RV that are relevant to its management are as follows:

- Increase in development pressure from neighbouring properties and Hoedspruit town (housing, other development activities);
- Increased demands by outsiders for a say in decision-making by RV regarding the sustainable use of natural resources and the manner in which such use takes place;
- Poor legislative and practical support from provincial conservation departments due to budgetary and manpower constraints faced by these departments;
- Land claims – in the event of a successful claim the new owners may have different expectations, different objectives and could be inexperienced in terms of understanding the required level of ecological management to successfully sustain RV.

### 5.5 VITAL ATTRIBUTES

From the SWOT analysis a limited number of vital attributes can be identified as key to RV, its conservation, its management and its development.

These vital attributes are as follows:

- Relatively small yet diverse area that is mostly natural;
- Semi-arid climate with large, mostly unpredictable and certainly unavoidable, variations that have major impacts on vegetation dynamics, carrying capacity of wildlife and on management requirements;
- Ecological functioning for certain attributes is at a spatial scale that is smaller than that of areas such as the BCGC, APNR and KNP. This presents a management challenge;

- Diversity of owners and diversity of opinions;
- Pressure by external stakeholders on decision-making.

## 6. CONSERVATION OBJECTIVES OF RV

The setting of vision, missions and objectives are generally used to guide management. They move from broad-level to detailed statements.

The vision statement aims to explicitly embrace spatio-temporal heterogeneity based on composition, structure and ultimately system function (Biggs & Rogers 2003). We move from these broad statements, through increasing levels of detail (Primary Conservation Objectives) to technically stated ecosystem and land user goals (Primary and Secondary Variable Objectives), i.e. a management hierarchy.

The objectives hierarchy fills in the middle ground between high-level vision statements and explicit lower-level statements required to achieve such a vision (Biggs & Rogers 2003).

### 6.1 VISION

The broad vision for RV is as follows:

- The consolidation and enhancement of conservation interests of RV to gain recognition as an integral part of the conservation priorities and regional interests of the Lowveld;
- To consolidate, expand and manage RV as part of a world-class conservation area.

### 6.2 MISSION

The mission of management entails the following:

- RV is committed to the conservation of biodiversity for the sake of posterity, and to manage its assets as a sustainable resource to serve the ecological, social and economic interests of the Lowveld;
- RV landscape will be developed to as far as is practical maintain the faunal and floral assemblages, ecological processes, cultural resources and landscape characteristics representative of the area, to foster co-operation for the development of the central Lowveld, and offer long-term benefit to the people of the area;
- To conserve a wide diversity of indigenous species and their associated habitats using sustainable utilisation principles.

### 6.3 PRIMARY CONSERVATION OBJECTIVES - GENERAL

Conservation objectives can be defined in different ways depending on the main emphasis placed on the area (Hocking *et al.* 2000). RV was not originally formed with the main objective of conserving a tract of pristine country and its natural biodiversity. Rather, the objective has been one of setting aside a natural area for the enjoyment and benefit of its Owners. The objective of the property is thus aimed at developing and maintaining a quality wildlife residential estate which delivers a product that is more appropriate than the limited agricultural options offered by this harsh natural environment. It has also become apparent that such land use generates superior employment opportunities than that possible through say livestock farming. This is vital in today's prevailing socio-economic conditions.

It is essential that this broad objective is understood and accepted, because this underpins management decisions that may differ from those that would normally be made in a protected area that has the conservation of biodiversity as its primary objective. The following primary and secondary objectives were formulated in consultation with the 'RV Home Owners Rules' document (Appendix B).

Under this scenario, where the area is managed mainly for the sustainable use of natural ecosystems, the broad objectives are defined as follows by Hocking *et al* (2000):

- To protect and maintain the biological diversity and other natural values of the area in the long term;
- To protect the natural resource base from being alienated for other land-use purposes that would be detrimental to the areas biological diversity;
- To promote sound management practices for sustainable production purposes;
- To contribute to regional and national development.

### 6.4 TRANSLATION TO RV

The proposed primary objective for RV is as follows:

- 'To provide a high quality lifestyle for residents within a natural wildlife estate ("the estate")'.

### 6.5 SECONDARY OBJECTIVES

There are several secondary objectives:

- To provide for ecologically and aesthetically sustainable use of the area for its owners, based on wildlife focussed recreation;
- To manage the ecosystem, landscapes and species populations so that a meaningful contribution will be made towards their conservation;

- To cost-effectively restore and conserve RV's landscapes, ecosystems and biodiversity in a productive and aesthetic state that will achieve the primary objective and be considered to be sustainable within the climatic and geological constraints of the area;
- To make investment opportunities available that are compatible with the primary objective and involve the participation of members of the local community wherever appropriate;
- Where possible, to provide direct employment to local communities;
- To manage the estate so that, without compromising the ecological and aesthetic objectives, the economic viability and investment value of the properties are maintained;
- To enlarge RV's sphere of influence by collaborating with other adjoining properties where the objectives and management conform to those of RV;
- In accomplishing these objectives, 'Best Practices' will be implemented in natural resource management, and in forming constructive and beneficial relationships with the neighbouring communities and conservation bodies.

## 7. BIOPHYSICAL DESCRIPTION

The biophysical description is essential to set the scene for the requirement management actions. A balance needs to be struck in terms of the level of detail of the biophysical description. An exhaustive review would not be appropriate as one could get overwhelmed by the available detail. On the other hand, sufficient information is required to enable one to grasp the essential facets of RV and the underlying determinants to its variability and complexity. In that regard, the management plan functions as a repository of the available information (see Chapter 2. Why a Management Plan?).

### 7.1 LOCALITY AND SIZE OF RV

RV is located in the eastern Lowveld of South Africa to the east of the Drakensberg escarpment on the western boundary of the Kruger National Park (Fig. 7.1). RV covers an area of 1 017 ha made up of the following areas:

- Remainder of Portion 1 of the Farm Happylands No. 241, Registration Division K.T.

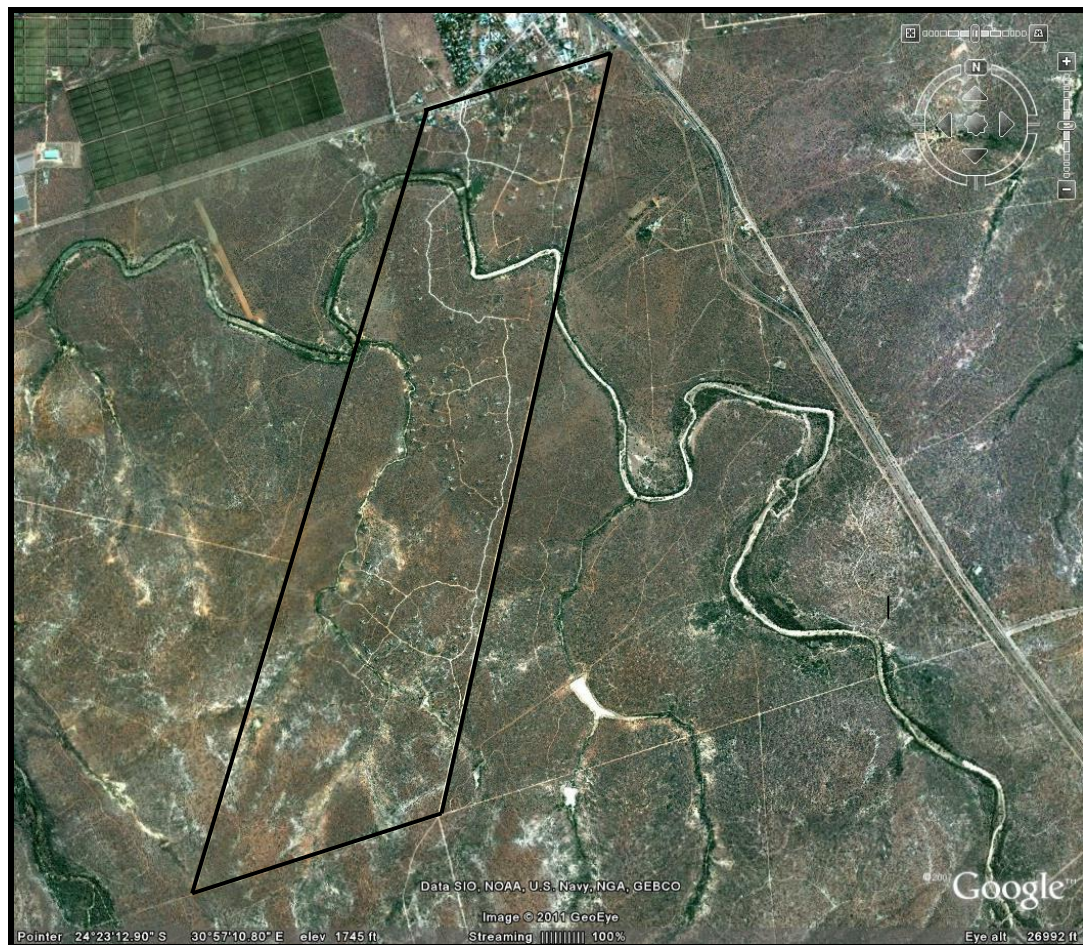


Fig.7.1: Location of RV in relation to Hoedspruit (Google Earth 2011).

## 7.2 TOPOGRAPHY

Altitude on RV is on average around 500 meters above sea level (m.a.s.l.).

## 7.3. HYDROLOGY

The major river (annual) within RV is the **Sandspruit/Moditlo**. The **Sandspruit/Moditlo** enters the reserve in the east and meanders in a westerly direction where it exits the reserve from Happyland into Grovedale (Fig. 7.1). The **Sandspruit/Moditlo** joins the **Rietspruit** north of the Hoedspruit tar road and eventually drains into the Blyde River.

## 7.4 GEOLOGY

Geologically, the study area is dominated by ancient granitoid rocks of Swazian and Randian age, which are grouped together as Basement complex (Fig. 7.1). The majority of rocks in the Basement complex can be classified as gneiss, granite or migmatite (Venter 1990).

The rock type distinguished in the gneisses of the Swazian basement complex on RV is dominated by the Makhutswi gneiss complex (described as biotite gneiss in this area).

## 7.5 SOILS

In semi-arid regions there is usually a good correlation between geological formation, soil type and vegetation type. This implies that the soil and parent rock from which the soil is formed exercise a strong influence on grazing management.

Soil affects the supply of water and nutrients to the plant. The soil moisture regime, a primary determinant of savanna dynamics and by extension vegetation composition, is influenced by four factors other than the pattern and amount of rainfall namely, infiltration, percolation, root extraction and evaporation (O'Connor 1985).

The role that soils play in determining vegetation patterns is vital. The Land Type Series map for Pilgrims Rest (1986) gives a broad outline of the dominant soil types of RV. Land type Fb covers RV and is dominated by Glenrosa and/or Mispah soil forms (other soils may occur). This group includes pedologically young landscapes that are not principally rock, alluvial or aeolian and where the dominant soil forming processes have been rock weathering, the formation of orthic topsoil horizons and clay illuviation giving rise to lithocutanic horizons. Lime is rare or absent in the upland soils but is widespread in the bottomland soils. Lime has been used to indicate the extent to which the landscapes have been leached. Some landscapes have no lime, but soluble salt accumulations occur.

## 7.6 CLIMATE

### 7.6.1 Rainfall

Rainfall, in that it influences soil moisture and nutrient availability to plants, is a major factor in determining variation in the structure and composition of savannas. Rain is principal determinant influencing vegetation in that it determines the amount of soil moisture available to the plant. Soil moisture dynamics are in turn influenced by:

- The total amount and seasonal distribution of the rainfall which in combination with nutrients, especially nitrogen and phosphorous, determine the organic matter production and plant quality;
- The water holding capacity of the soil, which is a function of soil texture and depth; and
- The amount of evapotranspiration, which is related to the climate, soil texture, surface characteristics and vegetation type (Frost *et al.* 1986).

Precipitation in the survey area is low and erratic, characteristic of semi-arid savannas: a hot, wet season of 5-7 months (October to April) and the remainder of the year being dry. The vegetation is under moisture stress which is generally severe and of long duration. Rainfall, including total amount, distribution over a season, runoff, infiltration, storage in the soil profile, evaporation from the soil surface, uptake and transpiration, is important in determining the nature of the vegetation of an area.

The mean annual rainfall for RV, taken from gauges in the area is 477mm (21y).

### 7.6.2 Temperature

RV has hot summers and mild to cold winters. Summer temperatures range between 18°C and 45°C while winter temperatures range between 8°C and 23°C. The mean highest monthly temperature is around 40°C while the lowest mean minimum temperature is around 0°C (Schulze 1975).

## 7.7 MAN AS ARCHITECT – SHAPING OF THE LOWVELD ECOSYSTEM

In the past, herbivores such as blue wildebeest and zebra migrated from the eastern Lowveld west towards the Drakensberg Mountains in response to a decline in winter grazing in the western part of what is now the Kruger National Park. In summer, as grazing conditions improved, these animals migrated back again. This resulted in a natural resting of large areas of the Lowveld at certain times of the year. Under these conditions, fire was probably of critical importance in maintaining the structure of the savanna ecosystem.

The erection of the Kruger Park boundary fence and the sub-division and fencing off of land for commercial cattle ranching, and over the past few decades game ranching, halted these natural migration patterns. Vegetation that was naturally rested for part of the year became heavily grazed by the now sedentary, and often unchecked, herbivore populations on units much reduced in size.

Collinson & Goodman (1982) divide herbivores into four types depending on their potential impact on the vegetation. Species such as zebra, elephant (*Loxodonta africana*), white rhino (*Ceratotherium simum*) and buffalo (*Syncerus caffer*) are capable of bringing about drastic changes to climax vegetation (Type I herbivores), which in turn adversely affects poorer competitors such as sable (*Hippotragus niger*) and roan (*H. equinus*) antelope and tsessebe (*Damaliscus lunatus*) (Type II herbivores) that were previously relatively abundant in the area (White 1951). With fencing it became necessary to provide water artificially year round in areas where water was only seasonally available in the past. As a result the numbers of water-dependent species such as blue wildebeest and impala (*Aepyceros melampus*) increased significantly. These species are able to exploit altered vegetation conditions brought about by the impact of elephant, buffalo and zebra, to the extent that they drive it past the point that would have resulted from use by the latter species alone (Type III herbivores) (Collinson & Goodman 1982). Type IV herbivores are generally browsers and may increase due to changes brought about by Type I and III species, but have little impact on the vegetation (Collinson & Goodman 1982; Peel et al. 1998a).

A similar stocking situation arose in the surrounding communal rangelands where, as early as the 1920s, indigenous communities were allocated less than one sixth of the available land (Stevenson-Hamilton 1929). These areas became densely populated with domestic livestock. Cattle and goat stocking levels were further increased through high survival rates due to a compulsory dipping scheme that largely overcame the many difficulties associated with keeping livestock in the Lowveld region.

The major influence of herbivory involves the interaction of grazing, browsing and fire. Bush encroachment is promoted by heavy grazing (often in conjunction with a reduced browser component) which opens up space where tree seedlings can germinate in the absence of grass competition. This sets up altered tree:grass interactions that include an increase in competition for soil moisture, often with a resultant increase in woody density – woody species having access to water deeper down in the soil profile due to their extensive root systems (Smit 1992).

The major implication of such interactions in the Lowveld savanna is that woody species are, from a game or stock point of view, generally a poor replacement for grasses. A thickening of woody species, particularly in areas where grazers and mixed feeders (e.g., impala) dominate, causes a weakening of the grass layer, resulting in reduced root growth, decreased grass production, exposure of the soil and reduced litter input. This in turn may result in increased exposure to the impact of rainfall, increased soil temperatures, reduced rainfall infiltration, increased run-off, increased soil erosion, lower levels of organic matter in the soil and an increased chance of infiltrating water leaching to soil depths out of reach of grasses. Hot fires, which have the greatest effect on the susceptible woody sapling phase become less frequent due to the weakened grass layer and the woody component is again advantaged (Scholes 1987).

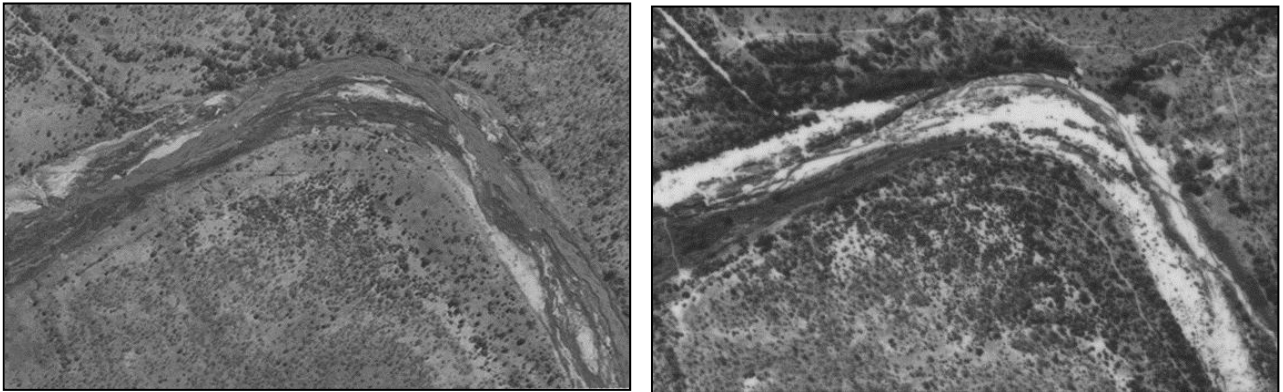
Thick bush is not optimal for the grazing species which, because of their dominance in the Lowveld savannas, are critical to ecotourism operations. In addition, species such as roan and sable antelope, which are characteristically species of open grasslands and open woodland, also decline. Artificial feeding during drought conditions in some protected areas exacerbates the situation as high animal numbers are maintained on already overgrazed areas.

It is important to touch briefly on the complexity of ecological systems. Hierarchies and adaptive cycles comprise the basis of ecological (and social) systems across scales and together they form what is termed a panarchy (Holling 2001). According to Holling (2001) the panarchy describes how a healthy system invents and experiments and benefits from inventions that create opportunity while avoiding those that may destabilise the system because of their nature or excessive exuberance. Each level (scale) from large through intermediate to small operates at its own pace.

The discussion thus far on the causes of bush encroachment has focused on factors operating at (in ecological terms) small scales (lower levels). Larger scale (higher level) issues relating to possible causes of bush encroachment include the impact of elevated CO<sub>2</sub> levels in the atmosphere on tree:grass interactions. Current levels of CO<sub>2</sub> (360 ppm) exceed values for the last 440,000 years, and the prediction is that by the end of the century these levels may exceed estimated values for the last 5 million years (700 ppm) Bond *et al.* (2003). Bond *et al.* (2003) tested the hypothesis that changes in atmospheric CO<sub>2</sub> would change the rates of survival of young trees after burning. They found that trees should disappear from savanna systems where fire is a regular occurrence at low CO<sub>2</sub> levels. This is consistent with paleo-historical records for current South African savanna systems that were previously treeless (Bond *et al.* 2003). They also simulated the effects of increases in CO<sub>2</sub> from pre-industrial times to the present and found large increases in tree density driven by CO<sub>2</sub> fertilisation of tree growth. The latter suggests that bush encroachment in savanna areas may in part be driven by increasing CO<sub>2</sub> levels in the atmosphere (Bond *et al.* 2003). The above discussion illustrates that while we may manipulate the tree:grass ratio at relatively small scales (lower levels) we must be cognisant of the fact that there are scales of system functioning over which we have no control. Fine scale interventions may be able to offset these coarse-scale effects to an extent but require more effort.

The importance of 'favourable' tree-grass interactions must also be highlighted. These include higher grass production beneath trees due to shade and leaf litter, and fruits and pods which provide nutrients and decrease the splash effect of rain. Highly favoured and productive grasses such as *Panicum maximum* are closely associated with the presence of trees. Furthermore, grass production does not necessarily decline linearly with an increase in woody plant density; the woody component can, under certain circumstances, contribute favourably to grass quality and quantity (Smit 1992).

A comparison of the 1944 and 1986 aerial photographs of the eastern Lowveld exhibit a pattern of increasing woody plant density over extensive areas (Fig. 7.2.). Such increases in woody plant density have a negative impact on two of the major land- uses in the area, game viewing and the success of rare species such as roan and sable antelope (Carr 1985; Carr 1986a; Carr 1986b; Carr 1988). There is thus a critical need for thinning and coppice control, which is environmentally responsible and cost effective, and provided appropriate ecological monitoring is in place. No attempt will be made to re-create natural processes but management will be directed towards maintaining habitats and wildlife populations within the pre-agreed limits of acceptable change.



*Fig. 7.2. Comparison of aerial photographs (1944 and 1986) of a sample of the Lowveld clearly indicating the major increase in woody cover (dark areas on the photographs).*

## 7.8 THE ECOLOGICAL MONITORING PROGRAMME WITHIN RV.

The Agricultural Research Council's – Animal Production Institute Savanna Ecosystem Dynamics project, initiated and managed by the author of this document, has been based in the eastern Lowveld since 1989. The project covers an area of some 450,000ha of the eastern Lowveld between the Sabi and Letaba Rivers and includes some 800 vegetation-sampling sites, as well as an ongoing monitoring programme which is aimed at detecting vegetation change over time. The database also includes environmental (e.g. rainfall) and management (e.g. stocking rate) data. The extensive database is used to provide user friendly decision support systems to land users. These models facilitate management that will promote optimal veld condition in line with the setting of realistic goals and objectives for the different areas. The result is a flexible management style option in which hazards are avoided and opportunities grasped, to the benefit of the reserve.

The study area currently covers in excess of 25 conservation areas varying in size from around 3,000ha to 65,000ha and includes sites in the western part of the Kruger National Park. The total sphere of influence of the project is some 4 000 km<sup>2</sup>. Specific project work relating to among others, communal rangelands, water provision, bush thinning, game counting and mine rehabilitation has been undertaken.

RV has been part of the above programme since 2004. Data gathered includes a game estimate in 2002 and annual game counts using the ARC-API team in 2004 and 2006-10. The vegetation monitoring programme was initiated on RV in 2010. The information thus gained is used for the effective management of the area. Where reliable trends are sought, the value of regular consistent survey methods and teams cannot be overemphasised. The importance of the vegetation monitoring programme is apparent, as any change in stocking rate will interact with climatic conditions to influence the vegetation component.

The ecological programme within RV should aim at building up a database from which sound management decisions can be made on RV.

## 7.9 VEGETATION

The study area is situated entirely in the Savanna Biome. Acocks (1988) classifies RV as Arid Lowveld, while Low & Rebelo (1996) classify the area into Mixed Lowveld Bushveld (dominant) and Sour Lowveld Bushveld. According to the latest South African classification (Mucina & Rutherford 2006) the larger part of the vegetation of RV is classified as Granite Lowveld.

### 7.9.1 Vegetation patterns on RV at the landscape scale

We provide a description of vegetation patterns of the areas under conservation management to the west of the KNP at a spatial scale that allows for the meaningful examination and comparison of the structure, functioning, and ultimately effective management, of these savannas. A Two-Way Indicator Species Analysis (TWINSPAN) based on composition and structure was applied to the relatively stable woody component (Peel *et al.* 2007). The resulting TWINSPAN classes for individual monitoring sites were used in two separate supervised classifications of Landsat ETM<sup>+</sup> imagery across the study area. The derived vegetation map was smoothed using a majority filter and after on-screen digitizing a small gabbro intrusion, it was accepted as the best representation of the woody vegetation of the study area at a scale of 1:250,000 (Fig. 7.3). Seven plant communities were identified in the current study and satisfactorily accommodated within various topographical units of four extrapolated Landscapes of the Kruger National Park (Gertenbach 1983). This contribution links to the co-ordinated effort extending into the Trans-Frontier National Park in Mocimboa do Vale (Stalmans *et al.* 2004). Such an effort is essential for ecological monitoring purposes at a landscape scale across RV, private nature reserves, the APNR, KNP and Greater Limpopo National Park in Mozambique.

The broad plant communities and landscapes represented indicate a **wide diversity** of plant communities within RV and may include:

- Plant Community 3: *Terminalia sericea* - *Albizia harveyii* Low Closed Woodland;
- Plant Community 4: *Acacia gerrardii*/*Combretum hereroense*/*Acacia exuvialis*/*Euclea divinorum* Low Closed Woodland;
- Plant Community 5: *Combretum apiculatum*/*Grewia bicolor* Low Closed Woodland; and
- Plant Community 6: *Combretum apiculatum*/*Grewia bicolor* Low Closed Woodland.

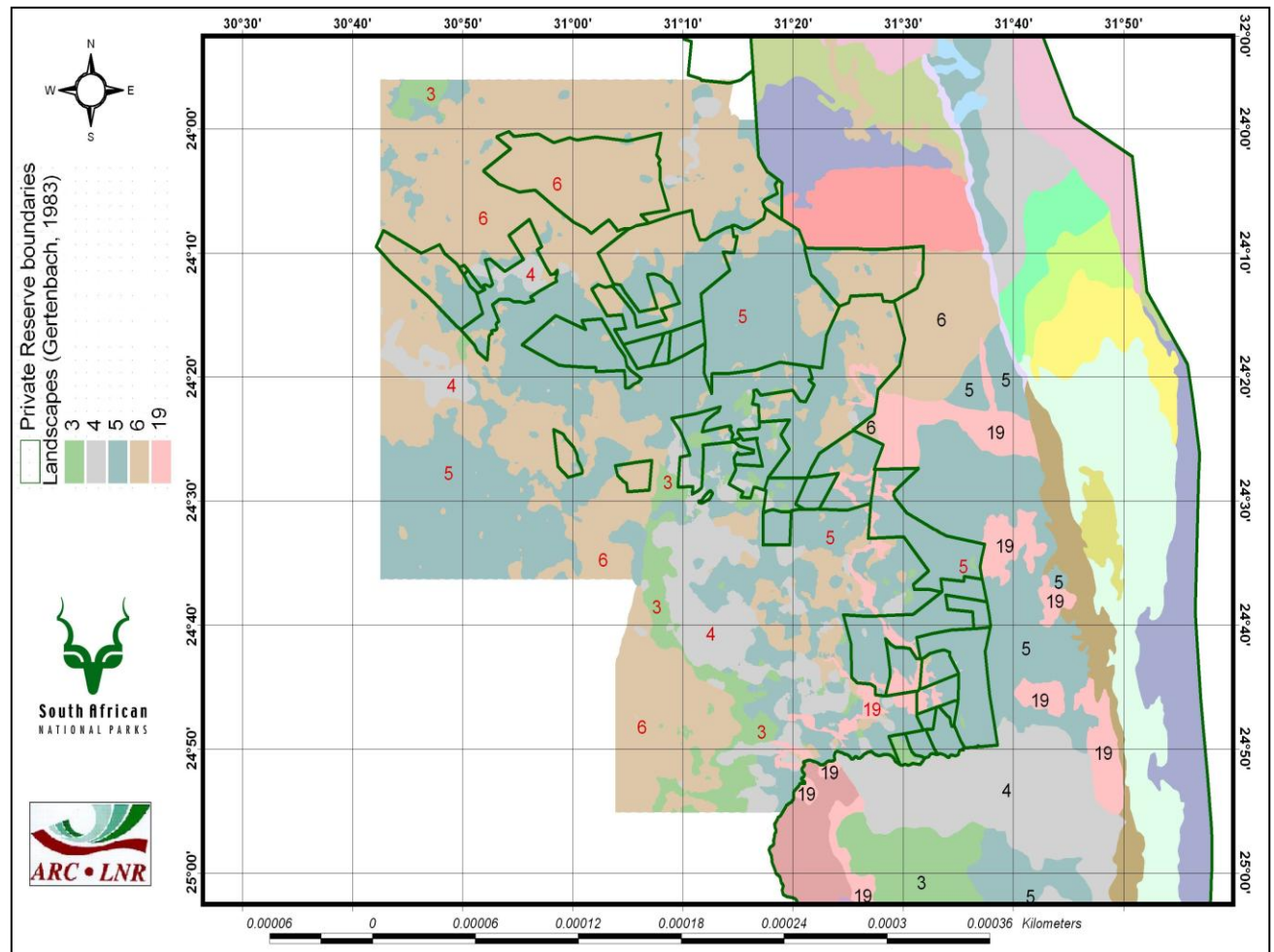


Figure 7.3: A landscape map for the area to the west of the KNP between the Sabie and Selati Rivers.

## 7.9.2 The current state of the vegetation component

As stated, the ecological monitoring programme is aimed at furthering an understanding of savanna functioning and providing sound guidelines for land users and policy makers to assist in contributing to the economic development, in harmony with social and environmental needs, of the region. The results of studies done throughout the sub-region indicate how rainfall, soil, herbivory, fire and grass/woody ratios influence the composition and cover of the **herbaceous layer which is limiting** in these grazer-dominated systems (e.g. Peel 2005). This analysis is used to propose broad guidelines for herbivore stocking density in areas of varying ecological potential and introduces the importance of controlling species mixes.

The following is measured during the vegetation part of the ecological monitoring programme:

- Survey site selection

Belt transects are located to cover the major vegetation types on a property/reserve. Transects are brought to within 20m of the road to negate time wasting when relocating (but far enough from any road or track to avoid the effect of increased water runoff as a result thereof etc.

etc.). A Global Positioning System (GPS) is used to record the location of each transect.

- **The herbaceous layer**

Each transect is marked and is 100m long and the following parameters are measured:

- The herbaceous species nearest to each metre mark;
- The nearest perennial species to the metre mark;
- The distance to 1 and 2 above (if nearest is not a perennial as an index of basal cover);
- The tuft diameter of the recorded species (as an index of the maturity of the herbaceous species);
- The tuft diameter of 1 and 2 above (if nearest is not a perennial species);
- A vertical projection above each metre mark determined the percentage canopy cover at the site.

Regarding basal cover and tuft diameters of the herbaceous plants, measurement of the nearest annual **and** perennial was done for the following reasons:

- The opportunistic life cycle of annuals often results in the annual colonising a bare patch between the transect line and a perennial. By measuring only the nearest plant, one may get the impression that the perennial has disappeared whereas what has actually happened is that an annual has just grown between it and the transect line. It is therefore apparent that the distance to annuals is less than to perennials. An increase to the nearest plants obviously indicates a decline in basal cover, whereas a decrease in the distance indicates an increase in cover; and
- Because of their persistent nature, perennial grasses have greater diameters than annuals. This has important consequences especially in terms of erosion, with larger tufted plants binding the soil and halting water run-off more efficiently than smaller tufted plants.

- **Herbaceous Standing Crop**

Herbaceous production varies as a function of the season, recent rainfall and defoliation in relation to the abundance value of species. In areas where a low erratic rainfall is experienced, such as the survey area, a long run of data may be necessary to show anything other than the dependence of herbaceous production on precipitation. An estimate of herbaceous production as reflected in herbaceous standing crop is also important when making decisions regarding burning and fodder flow.

- **The woody layer**

As regards the woody layer, the following parameters are measured:

- All woody species within the belt transect (100m x 2m);
- Number of stems per rootstock;
- Species per height class (0-1m, 1.1-2m, 2.1-5m, >5m);

- Canopy spread cover (vertical projection above the line and the species);
- Elephant impact per site (Not applicable at RV - Dominant species; where possible 10 individuals/height class; 7 point scale of impact; impact classes (branch/es, uprooted, bark, stems, dead, no impact).

### 7.9.3 Trends in herbaceous layer parameters

The value of the data collected in the ecological monitoring programme will increase in value as time progresses.

## 7.10 FAUNA

### 7.10.1 Diversity and numbers

Historically, RV is expected to have carried a full complement of the megafauna traditionally associated with savanna ecosystems. A range of large grazers and browsers historically occurred in the region (du Plessis 1969) (Table 7.1.).

*Table 7.1 Herbivore species that are known to have occurred on RV area (Rautenbach 1982; Smithers 1983)*

Species	
Black rhinoceros	Nyala
Blue wildebeest	Roan
Buffalo	Sable
Bushbuck	Southern (common) reedbuck
Bushpig	Steenbuck
Eland	Tsessebe
Elephant	Warthog
Giraffe	Waterbuck
Grey duiker	White rhinoceros
Hippopotamus	Zebra
Impala	
Klipspringer	
Kudu	

A wide range of carnivores and other smaller mammals have been recorded for the region (Pienaar 1980; Rautenbach 1982; Smithers 1983) (Table 7.2.).

*Table 7.2 Carnivores and other small mammals that may occur on RV area*

<b>Species</b>	
Aardwolf	Lesser bushbaby
African wild cat	Pangolin
Antbear	Porcupine
Banded mongoose	Rock dassie
Bat-eared fox	Rusty-spotted genet
Black-backed jackal	Serval
Brown hyaena	Sharpe's grysbok
Cape clawless otter	Scrub hare
Cape fox	Side-striped jackal
Cape wild dog	Slender mongoose
Caracal	Small-spotted genet
Chacma baboon	Spotted hyaena
Cheetah	Spring hare
Civet	Striped polecat
	Striped weasel
Dwarf mongoose	Thick-tailed bushbaby
Greater cane rat	Tree squirrel
Hedgehog	Vervet monkey
Honey badger	Water mongoose
Jameson's red rock hare	Wild dog
Large grey mongoose	Yellow-spotted dassie
Large white-tailed mongoose	
Meller's mongoose	
Leopard	
Lion	

As mentioned above, aerial game counts have been done regularly since 2004 within RV. This exercise is imperative for effective reserve management as it yields animal number, stocking rate and feeding class trends for RV.

Appendix D presents an estimated cost for 2010 for the ecological monitoring programme relative to the value of the game only (infrastructure etc. not included).

### **7.10.2. Habitat suitability and carrying capacity**

The concept of 'carrying capacity' is a nebulous one with many definitions and it is difficult to determine in heterogeneous environments experiencing variable environmental and resource conditions (Peel *et al.* 1998). It should therefore not be considered as a static figure but must reflect climatic conditions and influence of management practices followed.

Within the context of RV, 'ecological carrying capacity' is loosely defined as the population size of a species in an area as determined by the capacity of that area to support the individuals in that population and enable them to reproduce (adapted from Caughley 1979 and Grossman 1984). The assessment of carrying capacity looks at ecological carrying capacity. Management decisions as to stocking rate may

however be based on economic carrying capacity that looks at higher production levels (which can be attained by stocking at lower than ecological carrying capacity).

Traditionally, carrying capacity has been expressed as the number of hectares required to support an Animal Unit (ha/LAU). This has several shortcomings including the fact that the unit decreases in magnitude as animal numbers increase (Peel *et al.* 1999). The term is also not linearly related to the number of animals on an area of land and further the Animal Unit also ignores dietary differences. The use of animal biomass (kg km<sup>-2</sup>) is preferred from a methodological viewpoint.

Recent work by Peel *et al.* (2005) was used to determine appropriate stocking rates for RV. Principal driving determinants (rainfall; geology; soil; tree density and canopy cover; animal numbers and feeding classes; fire) of vegetation structure and function in the Lowveld savanna in South Africa were grouped to establish their influence on the limiting herbaceous layer. Grass type, abundance and cover were examined ( $\approx 700$  sites; c. 4 000 km<sup>2</sup>). Using ordination, the variation and differences in the herbaceous-response variables *viz.* perennial composition and cover allowed for the broad environmental grouping of areas of similar ecological potential.

We demonstrated that areas of higher ecological potential carried higher densities of large herbivores without detrimentally affecting herbaceous composition and cover. When the environmental variables were used as covariates three discrete groups were identified.

The work done by Peel *et al.* (2005) shows that appropriate stocking rates, depending on veld condition, for these areas should be adjusted upwards to levels between the Coe *et al.* (1976) upper guideline, a new mean guideline and the agricultural guideline.

It should be noted that in areas that have not previously had large predators (in particular lion) there is generally a relatively high prey species biomass. However with the introduction of these predators many areas have shown dramatic declines in the prey component. This is currently not a major issue although the presence of leopard and periodically wild dog (undesired) will affect future decisions on game removals within RV.

The ability of impala (and in other protected areas) elephant to both graze and browse makes them successful competitors. Impala perform an important 'buffer' role in the presence of predators (again less of an issue on RV). This means that due caution should be exercised when deciding on impala removals based on veld condition.

## 8. GUIDING PRINCIPLES FOR MANAGEMENT

Based on the SWOT analysis and the identification of the vital attributes of RV, the following guiding principles will be used for the management of RV:

- Management will be aimed at realising well-defined objectives;
- An adaptive, manipulative management approach will be applied (see Appendix E for more detail on the concept of 'adaptive management');
- The aspect of 'scale' is of paramount importance and lessons from the much larger KNP or from larger protected areas such as the APNR can not necessarily be directly translated to RV (see Appendix E for discussion on aspects of scale);
- 'Thresholds of Potential Concern' (TPC's) will be defined for species, communities and systems as upper and lower level indicators for monitoring (see Appendix E for more detail on TPC's and monitoring);
- The policy cannot be one of 'back-to-nature' as conditions have permanently changed thereby making such an endeavour near impossible or irrelevant;
- The distribution of permanent water will be addressed in a sensitive manner towards achieving ecological objectives whilst minimising potential negative impact on owners;
- Zonation will, as far as possible in the context of a small area, be used to allow for maximum diversity of use and experience whilst ensuring the attainment of the primary conservation objectives;
- Active management efforts will concentrate on previously disturbed and transformed areas;
- Management of untransformed areas will mostly rely on 'natural' means such as fire if practicable;
- Invasive alien plant species will not be tolerated and a continuous effort will be made to control their spread and presence;
- Untransformed plant communities will be disturbed as little as possible in order to prevent the establishment and spread of alien plants;
- A variety of means that fit within legal and ethical bounds can be used to enhance the wildlife experience (for example licks, fire, etc.);
- Control of bush encroachment will be based on appropriate understanding of the problem, careful planning of operations, and adequate follow-up to prevent regression to the situation prevailing prior to control.

## 9. ZONATION PLAN

### 9.1. ZONATION IN GENERAL

The zoning of a protected area is not a visible element in the landscape (although it is generally guided by landscape characteristics), but only exists in the manager's or planner's mind. It is a tool that assists in dealing with the effects of land use decisions on the ecological and social environment and allows for the realization of potential use whilst at the same time providing protection of sensitive resources and elements.

Despite differences in the existing systems of zonation, they all developed around a common interest, i.e. to provide a framework within which the essential qualities and intrinsic values of a conservation area can be protected and perpetuated, and for any development to take place within specified limits.

### 9.2. ZONATION AND RV

The zonation of RV is to adopt a strategy to ensure that developments and human use of the area occurs in such a way that these do not take place at the expense of the primary conservation objectives. It also attempts to ensure that different developments and uses of the area do not conflict with one another and are, wherever possible, complementary.

In the broader conservation context, the zonation of RV should preferably be synchronised with that of the adjoining properties. This allows on the one hand to maximise the benefits from adjoining low intensity or wilderness zones. On the other hand it would minimise the negative impact of a development zone if the adjoining zone on the other property has a similar level of development and disturbance associated with it.

In the KNP for example, there is a spread of use zones from high intensity leisure to wilderness, with a large focus on remote, primitive and low intensity leisure zones in line with the vital attributes and objectives of this park. A 'Remote Zone' for example does not allow mechanized access, a condition that is definitely not applicable or realistic for RV.

The reality for RV is that the spatial extent of contiguous areas that fit the criteria of for example a 'Wilderness' zone (namely being roadless and without permanent improvements) is very different from areas such as the KNP. RV is much smaller and it has a relatively higher density of roads and residences that are closely spaced (compared to the surrounding protected areas for example). It then becomes almost pointless to classify an area as 'Wilderness' if it is so small as to experience significant influence from adjoining zones with a higher intensity of use and development.

Furthermore, it is important to understand that 'Wilderness' is not necessarily synonymous with biodiversity conservation, although this is often taken for granted. As an example, one could investigate infrastructural developments on RV and still have satisfactory biodiversity conservation if developments and activities adhere to

best practices although there would be little sense of wilderness left. On the other hand one could exclude people from RV, yet allow herbivore numbers to increase unchecked. This would provide a wonderful 'wilderness' experience, but most likely would lead to significant losses of biodiversity.

The desire for 'Wilderness' is a perfectly acceptable value judgment. It must however be balanced with expectations from different segments of the landowners. It is by the pragmatic balance of creating the sense of 'wilderness' and at the same time managing for biodiversity that RV's objectives will be achieved.

While it is accepted that peripheral development is very desirable, RV was not developed in this way and the residences are widespread throughout the estate and many are located deep within it. This reality cannot be ignored. It has important consequences as to the feasibility and desirability of establishing 'Wilderness' areas.

### 9.3. APPLICATION OF ZONATION ON RV

The zonation criteria from the KNP are used accepting the realities of RV. The result is as follows:

- 'High Intensity Leisure' – an area characterised by a substantially modified natural environment. Sights and sounds of man are readily evident and concentration of users is often moderate to high. Such areas include staff housing, office, workshop and store rooms at the headquarters and gate areas of each Reserve;
- 'Low intensity leisure' zone – occupies the larger part of RV and includes the residences;
- 'Quiet' zone – areas that by virtue of their isolation or sensitivity should not be readily traversed by vehicle except for management purposes.

Translating this zonation scheme into a map format will require a comprehensive mapping of all existing housing and lodging as well other infrastructure. Special or sensitive areas need to be delineated based on objective criteria.

### 9.4. IMPLICATION OF RV ZONATION

The zonation scheme only serves to emphasise the need for a broad guideline for the planning and management of RV. Regardless of the zonation adopted, due process still needs to be followed for development proposals even in the development nodes of Intensive Use Zones.

The setting of residences has historically been and will in future probably continue to concentrate on the riverine fringe. This habitat plays a very important ecological role in the wider landscape in terms of its forage reserves in winter and its functional linkage as a corridor for many species. It will therefore be very important to carefully assess the requirements for privacy (developments sheltered by dense riverine vegetation), suitable microclimate (large shade trees in riverine) and aesthetics in terms of their potential impact on the carrying capacity and functioning of these corridors.

This fine-scale planning goes beyond the scale of planning possible within the current Management Plan. There are however well documented guidelines for RV in the 'Raptors View Articles of Association' (Appendix A), the 'RV Home Owners Rules Jan09' (Appendix B) and 'RV Architec Req Sept 2010' (Appendix C).

## 10. HABITAT MANAGEMENT

### 10.1 Soils

RV is located in a semi-arid savanna ecosystem. A semi-arid savanna is dry wooded grassland where the rainfall is usually restricted to 5 or 6 months of the year and which ranges typically from 250mm to 650mm per annum. Rainfall in these areas is exhibiting increasing signs of variability. Moisture, or lack thereof, limits the production of grazing and browse for game, and an integrated land management plan should be aimed at conserving soil moisture by minimising rainfall runoff into drainage lines and maximising rainfall penetration into the soil.

The primary soils objective is to minimise the rate of accelerated erosion through the following approach:

<b>OVERALL OBJECTIVE</b>	<b>SPECIFIC OBJECTIVE</b>	<b>ACTIONS</b>
<b>Erosion reclamation</b>  (See Appendix F for technical detail)	To identify and control (if practicable), or at least minimise, accelerated erosion;  To identify and attend to erosion which is threatening unique, valuable or sensitive features	Identify and map gully erosion into bottomlands;  Identify and map extensive sheet eroded areas and erosion from sodic patches. (compile relevant map);  Draw up a priority programme for erosion reclamation as part of the integrated habitat rehabilitation programme. (based on the map) <ul style="list-style-type: none"> <li>• Stabilise headward gully erosion into bottomlands;</li> <li>• Reduce water run-off and increase infiltration on sodic patches and sheet eroded areas;</li> <li>• Attend to soil erosion caused by misplaced roads, tracks and cattle paths</li> </ul>
<b>Roads and tracks</b> - (includes erosion from roads and tracks and communication links)	To identify areas of active erosion resulting from the road and track network and (if practicable) to prevent, or at least minimise, such erosion by the correct alignment, drainage and (if necessary), closure and reclamation of roads and tracks.	Do a detailed and systematic assessment of roads and tracks;  Map areas of active erosion and recommend appropriate measures to minimise erosion;

<b>OVERALL OBJECTIVE</b>	<b>SPECIFIC OBJECTIVE</b>	<b>ACTIONS</b>
	<p>To maintain all roads and tracks in a state which minimises their impact on surrounding hydrology, soil erosion, and biologically sensitive areas;</p> <p>To provide an all-weather, low impact road system that allows for the achievement of objectives and for effective reserve management</p>	<p>Prioritise roads and tracks for erosion reclamation measures;</p> <p>Reroute roads and tracks which are placed on sodic areas, other erodible soils and on active seep lines (if practicable)</p>
<b>Quarrying</b>	Utilise quarry material for the surfacing of key road and tracks with the minimum of disturbance to the environment and to the aesthetics of RV	<p>Identify sources of quarry outside of RV which can be exploited;</p> <p>Employ contractors to bring in suitable quarry material for the key roads and tracks;</p> <p>Where applicable, investigate the use of the surplus gravel from the pits dug to dispose of rubble, litter and refuse;</p> <p>If no other alternative can be found, then identify suitable quarry site/s within RV;</p> <p>Assess the quality of available quarry material</p>

## 10.2 Vegetation

The biotic state variable of interest in this section is the vegetation comprising the woody and herbaceous layers as influenced by soil physical and chemical properties including soil moisture (rainfall is an indirect measure of soil moisture). The response of the vegetation to the additional effects management actions such as herbivory and/or fire needs to be assessed in relation to rainfall and soil type.

The primary vegetation objective is to conserve indigenous plant populations and a representative variety of habitats occurring on RV using the following approach:

<b>OVERALL OBJECTIVE</b>	<b>SPECIFIC OBJECTIVE</b>	<b>ACTIONS</b>
<p><b>Vegetation monitoring</b></p> <p>(including habitat description)</p>	<p>To facilitate a predictive understanding of the dynamics of specific plant species and the vegetation as a whole in particular in its relation to climate, soils, herbivory, bush control and fire;</p> <p>To quantify the status and relative trend of rare and endangered plant species in the reserve;</p> <p>To detect changes in the vegetation which conflict with the management objectives</p>	<p>Monitor the effect of management and environment on vegetation composition and structure;</p> <p>Monitor the extent and effect of the habitat rehabilitation programme</p>
<p><b>Fire management</b></p> <p>– Including firebreaks</p> <p>To control the use of fire so that it can fulfill its role as a driving force on RV, maintaining grass layer vigour and promoting diversity;</p> <p>To achieve the above within the constraints of legal provisions regarding the use of fire and the requirement of ensuring the safety of people, infrastructure and property.</p>	<p>If practicable to maximise heterogeneity by spreading the use of fire across the year and by varying ignition points and extent of fires away from fixed blocks;</p> <p>To introduce a degree of <i>laissez faire</i> that will benefit diversity but that may also reduce management input costs and manpower requirements;</p> <p>To remove excessive litter and old growth in order to maintain a diverse and vigorous herbaceous sward;</p> <p>To retard woody plant growth (achieve a good topkill of encroaching woody plant species);</p> <p>To retard or reduce the risk of detrimental wild and/or arson fires</p>	<p>Investigate the option of using this type of fire within RV taking due cognisance of safety issues</p> <p>Monitor fuel loads, proportion of moribund grass during a pre-burn survey for late season fires (July to September);</p> <p>Implement a control burning programme;</p> <p>Monitor the effect of control burns during a post-burn survey Record: Location of the fire and GPS map of the burnt area; Date and time of the fire; Weather conditions - temperature, wind speed, humidity; Veld conditions. (Dry, green, fuel load); Cause of the fire. (Management burn, natural, accident etc.); Nature of the fire. (head-fire, back-fire); Follow up observations. (rain, flush, animal pressure )</p> <p>Record and map burns annually;</p> <p>Synthesise all information on past burning</p> <p>Clear peripheral fire breaks as a high priority;</p>

<b>OVERALL OBJECTIVE</b>	<b>SPECIFIC OBJECTIVE</b>	<b>ACTIONS</b>
		<p>Clear internal firebreaks as a lower priority;</p> <p>Training - ensure that staff receive adequate training with particular focus on personal safety;</p> <p>Emergency plan: - an emergency plan will be compiled by the reserve manager to handle any unplanned fire (including firstly the decision making process as to whether control or <i>laissez faire</i> is appropriate), An emergency plan will be jointly drawn up by the reserve and tourism managers to counter fire threats to commercial tourism operations and infrastructure. Emergency plans include channels of communication and reporting.</p>
<p><b>Control of indigenous problem species</b> * see Appendix G for discussion on bush encroachment</p>	<p>To maintain woody plant densities at levels which maximise grass production (by minimising woody/grass competition);</p> <p>To reverse bush encroachment on areas which were previously open woodlands;</p> <p>To create preferred habitat for grazers;</p> <p>To increase the visibility of large herbivores to enhance game viewing;</p> <p>Target those woody plant species and age classes actually responsible for man-induced encroachment (structural considerations)</p>	<p>Monitor vegetation condition and trends in the areas where bush thinning is done and review the success of previous coppice control;</p> <p>Record: Location and GPS reference; Species and approximate number or area of plants; Treatment details (including chemical application information); Costs (transport, man hours, chemicals etc.); Dates and weather (NB. It is important to note rainfall details as this impacts on chemical efficacy);</p> <p>Follow-up observations and treatments.</p> <p>Continue with the integrated habitat management programme;</p>
<p><b>Control of alien species</b></p>	<p>To control, and eradicate if practicable, plants which are alien to the reserve, particularly those which threaten the indigenous the vegetation;</p>	<p>Phase out alien trees in gardens and replace with indigenous trees - only plants indigenous to the province should be permitted at residences. The only exception will be lawn grasses;</p>

<b>OVERALL OBJECTIVE</b>	<b>SPECIFIC OBJECTIVE</b>	<b>ACTIONS</b>
	To control the future introduction and spread of invasive alien species;	<p>Record: Map location and extent of existing alien plant infestation (prioritise species which invade rapidly and have a wide distribution); Location and GPS reference; Species and approximate number or area of plants; Treatment details (including chemical application information); Costs (transport, man hours, chemicals etc.); Dates and weather (NB. It is important to note rainfall details as this can impact on the efficacy of chemical applications);</p> <p>Follow-up observations and treatments;</p> <p>Prioritise species and implement control programme;</p> <p>Monitor results</p>
<b>Consumptive utilisation</b>	To keep 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 associated species	<p>Determine the amount of firewood available for use (internal and external) from any habitat rehabilitation programme;</p> <p>Do ethno-botanical assessment of key species, their conservation status and the extent to which they can be harvested sustainably;</p> <p>Based on above make available indigenous medicinal plants/other plant products (e.g. thatching grass) that can be utilised on a sustainable basis</p> <p>Define zones that may be out of bounds for harvesting.</p>

### 10.3 Water

The living requirements of wild animals include food, cover and water. The sub-division of land and the fencing off of conservation areas in the Lowveld began in the late 1960's. This broke the natural east-west herbivore migration and, because many of the fenced off areas did not have perennial water, artificial water points had to be constructed. The result was a network of artificial water points in the Lowveld supplying excessive surface water in these areas.

RV has no permanent perennial water source although in favourable seasons the larger non-perennial may flow for part of the summer season, i.e. the Sandspruit/Moditlo Rivers and some smaller drainage lines.

The sub-division and fencing off of land for commercial cattle ranching, and over the past few decades various forms of wildlife utilisation meant that animals were restricted to areas that were seasonally waterless. With fencing it became necessary to provide water artificially year round in areas where water was only seasonally available in the past. This resulted in an eruption of water dependent animal species such as impala and wildebeest, increased concentrations of animals and grazing, trampling, dunging and urination which affects water infiltration, run-off, grass cover, species composition, the tree:grass ratio, and ultimately biodiversity and carrying capacity (depending on the set objectives) particularly on units much reduced in size.

So while the provision of water is essential for most game species, it has been shown that species that require medium to tall grasses (common reedbuck, roan, sable, tsessebe) decline under such conditions. The area of RV provides us with an excellent example of the latter.

The primary water objective is to provide water for animals in places and for periods which are to approximate as closely as possible the natural past distribution of water without affecting adversely the hydrology and consequent ecology of the reserve and to maintain natural water bodies in such a condition so as to support the naturally occurring species linked to such bodies

<b>OVERALL OBJECTIVE</b>	<b>SPECIFIC OBJECTIVE</b>	<b>ACTIONS</b>
<b>Water provision for animals</b>	To provide water for animals in places and for periods which are to approximate as closely as possible the natural past distribution of water without affecting adversely the hydrology and consequent ecology of the reserve	<p>Reach agreement for a water supply management programme for animals;</p> <p>Make an inventory of and map natural perennial and non-perennial water sources, and existing artificial points including the current status of each water point;</p> <p>Assess the longer term effect of the artificial</p>

<b>OVERALL OBJECTIVE</b>	<b>SPECIFIC OBJECTIVE</b>	<b>ACTIONS</b>
		<p>provision of water on habitats in the reserve (increasing distance from water placement, and soil type);</p> <p>Take necessary management actions to close down over utilised water points</p>
<b>Rainfall</b>	To monitor the effect of rainfall on the vegetation of the reserve	<p>Collect rainfall data on a regular basis (at least monthly);</p> <p>Summarise and use for interpretation of savanna system functioning on an annual basis</p>

## 11. WILDLIFE MANAGEMENT

### 11.1. GUIDING PRINCIPLES

The guiding principles for wildlife management on RV will be as follows:

- The management of wildlife populations on RV will be to conserve, where possible, viable populations of those species that are indigenous to the Lowveld in such a way that residents and guests will be able to enjoy a high quality wildlife experience;
- Thresholds of Potential Concern (TPCs) will be established, on a general level for all species and a species specific level for those that can be cost-effectively monitored and those that are considered important on RV's objectives;
- Sustainable utilization - A stated objective for RV is that 'Best Practices' will be applied to manage the reserve and in the context of the national and regional economic necessities. It is important to the region, that where animal populations can be utilized sustainably without detracting from the experience of other users of the area, that this form of land use is practiced;
- Genetic diversity - In small populations, there is concern that a small gene pool can result in inbreeding and loss of vigour. Populations should be monitored and managed so as to at least maintain or improve genetic diversity.

### 11.2. IMPLEMENTATION

The management of wildlife will be undertaken in the following manner whilst conserving a wide diversity of indigenous animal species in the reserve without causing a long-term deterioration in the veld condition resulting from accelerated soil loss, bush encroachment or an unfavourable shift in the grass species composition and/or cover:

<b>OVERALL OBJECTIVE</b>	<b>SPECIFIC OBJECTIVE</b>	<b>ACTIONS</b>
<b>Population monitoring</b>	<p>To quantify on an annual basis the absolute or relative trends of selected species;</p> <p>To quantify other population parameters (such as sex and age structure) which will help in understanding the population dynamics of key species</p>	<p>Undertake aerial game count on an annual basis;</p> <p>Present report on animal numbers, stocking rates, and species mix proportions, and guidelines for management (including predator prey relations);</p> <p>Monitor sex and age structures;</p> <p>Monitor physical condition of animals by observation or using faecal analysis techniques;</p> <p>Monitor disease and parasites when necessary;</p> <p>Monitor behaviour when necessary</p>
<b>Population control and sustainable utilization</b>	<p>To assist the attainment of a dynamic equilibrium between the vegetation and the large herbivores;</p> <p>To maintain populations at a level which prevents the loss of a competing species from the reserve;</p> <p>To prevent (or at least minimise) resource related die-offs of large herbivores during drought periods</p>	<p>Identify species which can be utilised on a sustainable basis (using cost effective methods);</p> <p>Consider the removal of certain species such as warthog to minimise resource related die-offs</p>
<b>Damage causing</b>	Take appropriate action for the control	Identify species which in relation to habitat and/or other animal species,

<b>OVERALL OBJECTIVE</b>	<b>SPECIFIC OBJECTIVE</b>	<b>ACTIONS</b>
animals	of damage causing species	<p>can be considered to be problem</p> <p>The policy for damage causing animals will be as follows:</p> <p>“Human safety and lives shall enjoy priority in the reserve. Any potentially dangerous animal that may pose a problem and endanger the lives of people must be destroyed as humanely and swiftly as possible”. This is likely to arise through old age, injury, disease (rabies) or aberrant behaviour the cause of which may be unknown.</p> <p>The Draft revised legislation could impact significantly on this situation. In the case where a potentially damage causing animal is a threat to human life this proposal is clearly impractical as in dealing with such situations, a rapid response is often the most important issue. The management of the properties that make up RV must make application to the Limpopo Department of Economic Development, Environment and Tourism for a permit that will enable them to take immediate action.</p>
<b>Species management plans – elephant, white rhino, black rhino, predators</b>	If <b>applicable</b> to set up a management plan for keystone species and groups in the reserve	<p>To determine the impact of keystone species on various components of the vegetation;</p> <p>To construct ‘Thresholds of Potential Concern’ for selected species/components of the vegetation;</p> <p>To implement management action where necessary</p>
<b>Veterinary matters</b>	Determine ways of marketing game and game products (commercial/community);	

<b>OVERALL OBJECTIVE</b>	<b>SPECIFIC OBJECTIVE</b>	<b>ACTIONS</b>
	Take steps to prevent a notifiable disease outbreak (Foot and mouth, African swine fever, Tuberculosis, Anthrax)	
<b>Introductions</b>	To re-establish and thereafter maintain viable populations of those animal species which historically occurred in the reserve	Identify species for which substantial historical evidence exists for their past occurrence in the reserve and which no longer occur in the reserve
<b>Priority species</b>	To identify those animal species which are rare or endangered in South Africa and which are in need of special protection or conservation measures within the reserves	

### 11.3. SETTING THE THRESHOLDS OF POTENTIAL CONCERN (TPCS)

The importance of setting the limits of acceptable change has been emphasised by alarming trends in many Lowveld areas of declining selective grazers on the one hand (e.g. blue wildebeest) and increasing mixed feeders (e.g. elephant) increasing on the other hand. There must be pre-agreed TPCs or 'amber lights' that will trigger management actions to remedy the situation.

It is recommended that preliminary TPCs for herbivores on RV are set on the basis of measurable criteria such as population size, estimated rates of increase and survival as well as an element (albeit negligible on RV) of predator impact, calving percentage and survival and calving interval. Should a population move outside the numerical limits of the TPC, the situation must be investigated and remedial action taken where necessary.

### 11.4 TESTING THRESHOLDS OF POTENTIAL CONCERN FOR HERBIVORE POPULATIONS WITHIN RV

Thresholds of Potential Concern (TPCs) for the numbers of individual herbivore prey species are set by interplay of the following:

- Minimum population size of resident species that provide for a generally 'good' game experience and that can withstand predator pressure that may periodically arise;
- Maximum number as dictated by available vegetation resources;
- Balance between different feeding groups in terms of respective feeding requirements (bulk grazers, browsers, etc.) and respective role of each feeding group in facilitating/denying the access to vegetation resources by another feeding group;
- Where populations are of high conservation value the minimum population size to maintain a genetically viable population must be determined.

These requirements, balanced against the low success rate of certain species, may lead to specific species becoming marginal. A decision may then be required as to whether a species is allowed to disappear or somehow survive or whether it should be pro-actively removed.

The provisional limits of acceptable change for the larger wildlife species need to be calculated (an exercise outside of this brief). It must be emphasised that these TPCs would be provisional and that they must be investigated so that they can be more accurately determined (requires reliable count data).

### 11.5. SUSTAINABLE UTILIZATION

Where wildlife populations can be managed to provide a sustainable offtake, this will be done in the most cost effective and humane manner and so that it does not conflict with

the enjoyment or safety of residents of RV. The removals may be in the form of live removal, hunting, or harvesting for meat.

## 11.6. WILDLIFE MONITORING

### 11.6.1. Purpose of monitoring

The ongoing monitoring of the wildlife population numbers and performance is essential to be able to determine whether a population is doing well or not and if not, whether it is likely to reach a TPC. The intensity of monitoring of species will be related to their ecological importance.

### 11.6.2. Monitoring of animal numbers

The aerial count is regarded as a total area count and a reflection of the minimum number of animals present. Of critical importance for RV is the need to build up an animal number data base. Although there is a relatively high cost associated with helicopter counts (Bell Jet Ranger), this method provides the best tool currently available to reliably and relatively easily assess the status of wildlife populations on reserves such as RV. It is encouraging that the vegetation monitoring programme has been set up on RV and is now part of the programme that I have been running in areas as far south as the Sabi Sand Wildtuin and as far north as the Selati Game Reserve since 1989.

An amount of 1 % of the total value (not hunting) of the animals present on a reserve is considered reasonable when deciding on doing a game count (ABSA 2003). Game values were obtained from various sources including managers from the area. In addition I assume 1% for the vegetation and faecal analysis-monitoring programme (not including the cost of land, infrastructure etc.). When one examines the cost of the ecological monitoring (game count and veld monitoring) against the value of the animals alone, it is clear that the costs of such monitoring is acceptable (Appendix D).

The importance of the vegetation-monitoring programme is apparent, as any change in stocking rate will interact with climatic conditions to influence the vegetation component. The following insert reports on the 2010 game count and forms the basis of an initial calculation of stocking rate and feeding class proportions on RV.

Work by Peel, Kruger and Zacharias (2005) shows that appropriate stocking rates, depending on veld condition, for these areas should be placed between 4 500 kgkm<sup>-2</sup> and 5 000 kgkm<sup>-2</sup>. The current stocking rate on RV falls within the guideline recommendation (Figure 11.1). As previously discussed, there is little information as to the number of animals of different species that perish due to predation on small areas and the impact of predators on the herbivore population needs to be carefully assessed. The stocking rates are such that it would be relatively easy to reduce the numbers to adapt to any declines in veld condition (which in the case of RV is, I suspect the result of a long history of certain areas being overgrazed). The active game management programme at RV is to be commended but we must realise that a point is reached where further removals yield little benefit and active veld management and rehabilitation is required. I am willing to discuss such issues with your management team.

Figure 11.2 (feeding classes) shows that feeding class 1 (bulk grazers) is below the guideline, feeding class 2 and 3 well below the guideline and Feeding class 4 (browsers) is well above the guideline. As previously stated, the guideline figure for browsers is probably low and browsers should in fact be seen as separate from the other three classes with more emphasis placed on the physical condition of the animals.

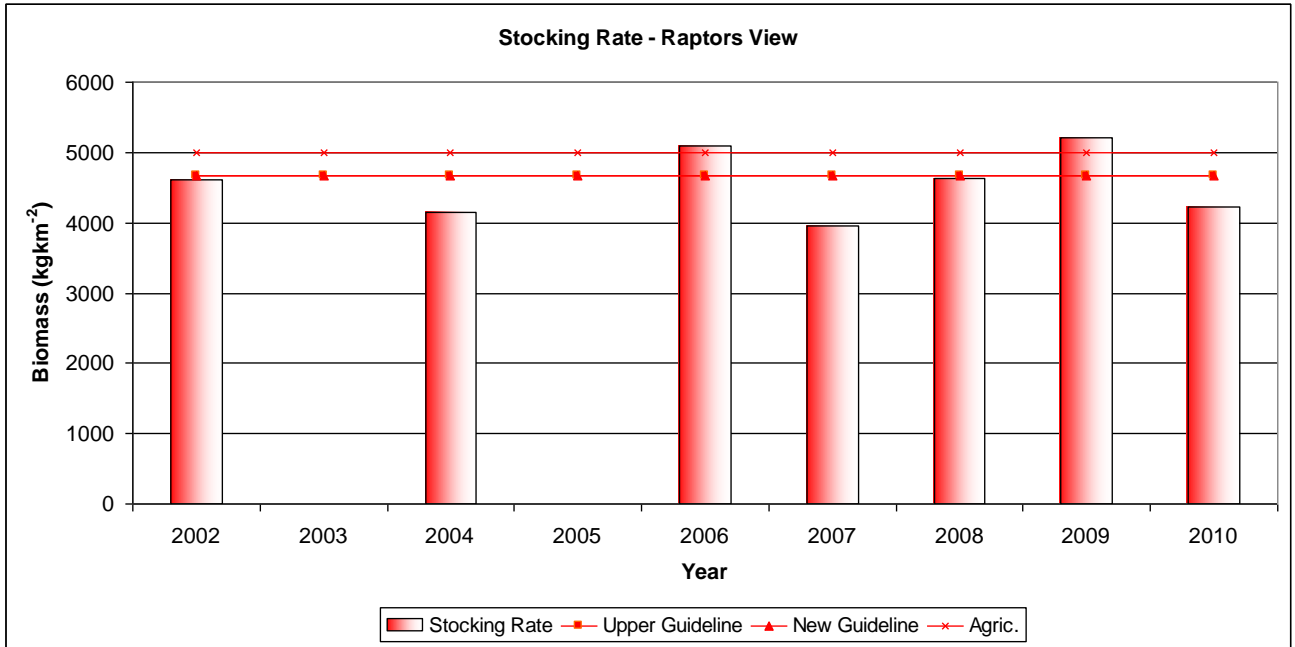


Figure 11.1 Animal biomass (kg km<sup>-2</sup>) on RV.

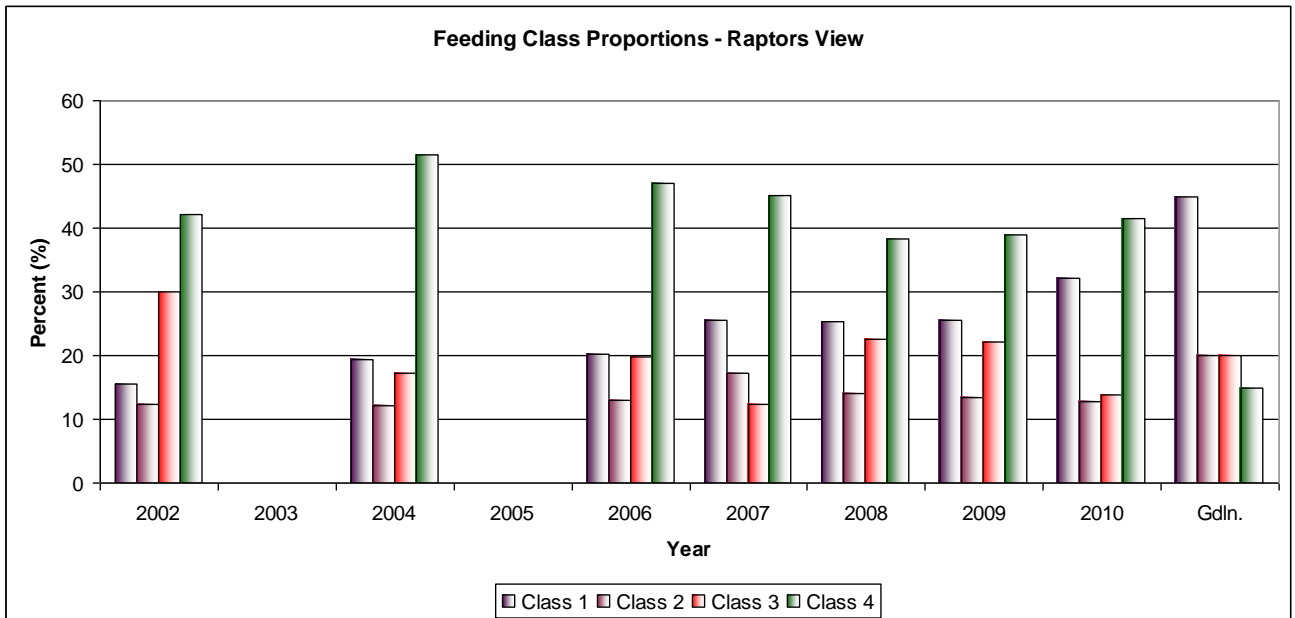


Figure 11.2 Feeding class ratios on RV.

### 11.6.3. Sex & Age Classification

The most efficient non-consumptive manner in which to evaluate the performance of a population is by monitoring its sex and age composition over time. These data will generally explain why population numbers have either declined, are performing badly or are increasing.

The information sought is that which will give the percentage of calves born in relation to the number of adult females and the percentage surviving after one year. Data on the ratio of males to females and the survival rate of yearlings would certainly enhance the results of modeling exercises such as that presented above.

Sex and age classification must be collected shortly after the annual birth pulse (October for eland, December-January for impala, wildebeest and warthog, March for kudu and waterbuck) and then again shortly before the spring rains in October/November to obtain data on calf survival. These data are, as far as possible, collected during the aerial counts (refer to the above insert).

### 11.6.4. Condition assessment

Visual assessment of physical condition of animals should be noted and the reason behind an unexpected drop in condition determined. For antelope and buffalo, the criteria described by Riney (1982) provide a useful field guide.

In the case of carcasses, a visual assessment of internal body fat surrounding the kidneys and mesenteric fat should be recorded and the colour and texture of the bone marrow from a leg bone noted. Further, animal condition should be assessed by the use of faecal nitrogen (Grant *et al* 2000). This technique is already being used in some of the large Lowveld private nature reserves. Faecal samples should be collected at least twice a year, in April, when condition levels are likely to be at a peak and again at the end of winter (say September/October) when animals are nutritionally stressed. This exercise is a useful adjunct to the veld condition assessments as together they may provide an 'early warning' of nutritional stress in individuals or within the population as a whole.

### 11.6.5. Genetic analysis

DNA profiling technique based on molecular genetics was developed by the Animal Improvement Institute of the Agricultural Research Council for white rhino using material collected from Mpumalanga Parks Board. Individual animals can now be unequivocally identified by means of unique bands of micro-satellites. The individual profile consists of a combination of the two parent's profiles, making it therefore possible to construct parental lineages. The next time an individual is immobilized (for whatever reason) a blood and tissue sample should be collected to be added to the database. The information from the database should be accumulated to determine parentage, animal productivity, genetic variation, rate of inbreeding and genetic distances between populations. The DNA profiling technique provides a powerful tool for the prevention of deleterious genetic

consequences of maintaining small, isolated sub-populations. Objective decisions can then be made as to which individual should be sold or exchanged (Steyn & Stalmans 2004). Due to the species assemblage on RV this technique will in all probability not be required at this stage.

#### **11.6.6. Game deaths**

The recording of all game deaths is necessary to complement the census data and to understand cause and effect relationship of habitats, weather, competition and predators. The following information must be recorded for game deaths: species, date, location (GPS if possible), weather, sex, age class, condition, cause of death- including culling, scavengers. Skulls should be collected and the age determined from the stage of tooth wear and eruption.

### **11.7. RE-INTRODUCTIONS**

The following policy for reintroduction of animals onto RV should be considered:

- That only species known to have formerly occurred in the area will be introduced and only if suitable habitat still exists to support a viable population;
- That the conditions that were responsible for the absence of a species have been reversed before it is considered for reintroduction;
- That each introduction will be thoroughly planned and particular emphasis will be placed on the monitoring and management of the reintroduction;
- Where animals are introduced to boost the viability of an existing population, these will come from a source population of the same genotype as the population already present;
- That all relevant veterinary and legal protocols are observed;
- That the perimeter fence and release infrastructure are adequate to contain the species to be introduced;
- That adequate monitoring of the reintroduction is implemented and recorded so that the factors influencing its success or failure can be understood;
- That protocols are adopted and resources made available to deal with the most obvious problems that may arise from the introduction;

### **11.8. GAME REMOVALS**

Animals will be removed in the interests of habitat management and also because 'Best Practice' may indicate that a harvestable surplus can be removed. Management staff needs to consider any removal quotas after the annual game counts

(September/October) so that these can be marketed to best advantage. Removals may take the form of live capture, hunting and culling.

The live capture quota should be decided as soon as the effectiveness of the rainy season can be judged. This will probably be by the end of March. The criteria that will be specified for live removals will be as follows:

- Species, number, sexes, age class;
- Areas targeted for removal of each species;
- Any restrictions on the capture season such as a cut-off date when increasing temperatures and late pregnancies increase the risk of capture related losses; and
- Appropriate capture method - for example nyala may be captured by passive capture techniques.

The removal of game by hunting is decided on the basis of the monitoring programmes and the results of the aerial counts and sex/age surveys. This quota should be set timorously each year so that the outfitters permitted to hunt on RV are able to market the animals. It is absolutely vital that any outfitter and professional hunter operating on RV are trustworthy and adhere to a high standard of ethical hunting.

A quota may be allocated annually for the removal of some of the more common species (e.g. impala) as carcasses for use in the community outreach programme and for special functions.

The proposal as to game removal should be taken after the annual game count at a meeting that includes the management of RV (Mr. Tim Parker), the ecologists doing the ecological monitoring on RV and the ecologists and officials of the Limpopo Department of Economic Development, Environment and Tourism. The final decision would then be taken at a RV board meeting.

If a situation does arise when large scale removals become necessary (highly unlikely on RV), the following criteria should be observed:

- Is culling the only option available to remove the animals?;
- Numbers, sex and age composition of animals to be removed;
- Area in which animals are to be removed;
- Constraints as to the method and time of removal;
- Restrictions as to who may be present at the culling operation;
- Recommendations as to processing and disposal of carcasses;
- Record keeping, processing and interpretation of data;

- Media statements if required; and
- Adherence to all relevant veterinary regulations is mandatory.

When any culling is implemented, this will be undertaken by the most experienced RV staff, or be contracted to an organization with proven expertise to implement the task. The opportunity to provide practical experience for junior RV management staff must always be considered.

The management of any culling done by an outside contractor will always be monitored by a senior member of RV management staff. The monitoring officer or his/her deputy will be present at each operation.

### **11.9. ALIEN SPECIES**

No animal species alien to RV will be introduced to RV and any found on the estate must be removed as rapidly as possible.

### **11.10. DOMESTIC ANIMALS**

Because of issues such as the threat of hybridisation (cats and African wild cats) and the risk of transmission of diseases no domestic animals may be kept on RV.

Staff will not be permitted to keep roosters and/or free-ranging poultry on RV.

### **11.11. INJURED OR SICK ANIMALS**

The guidelines on injured or sick animals are as follows:

- Animals that have been seriously injured due to human activity (e.g. vehicle or snares) will be shot. This will not apply to certain species such as rhino if there is a good chance that they can be returned to health by veterinary treatment;
- Animals that are injured through natural causes will be destroyed if it is considered that they are unlikely to recover and that unnecessary suffering is taking place (particularly if it also increases the risks to owners, staff and visitors);
- Animals that are suspected of being infected with a contagious disease will be collected and samples provided for examination by the state veterinarian; and
- Potentially dangerous animals (excluding rhino) that are obviously sick or injured will demand attention if they could pose a risk to human life. The Manager or delegated person will make a decision as whether the animal is to be destroyed, captured and attended to, or left to its fate.

## 12. INFRASTRUCTURE DEVELOPMENT AND MANAGEMENT

Management policies and procedures must ensure that RV's infrastructure is maintained, renovated, upgraded and replaced at the required intervals according to specific design norms and standards, including national construction regulations, green building and touch the earth lightly principles. Water saving measures should be incorporated and waste production should be minimised. The documents titled 'Raptors View Articles of Association' (Appendix A), 'RV Home Owners Rules Jan09' (Appendix B) and the 'RV Architec Req Sept 2010' (Appendix C) and the cover these aspects comprehensively for RV.

### 12.1. FENCES

Whereas in an ideal world, the Lowveld ecosystem would be totally open without impediments to the movement of wildlife, the reality nowadays is quite different. Different land uses, legal requirements in terms of veterinary precautions and an increased number of people on the boundaries require a 'hard' edge between wildlife areas and other land uses.

#### 12.1.1. Policy

The policy with regard to fences for RV is as follows:

- Maintain the fence to specifications and standards of Limpopo Department of Economic Development, Environment and Tourism;
- Ensure that an adequate perimeter fence around RV is maintained in order to:
  - Contain wildlife on RV in order to prevent losing this precious asset and to prevent damage being caused by wildlife to surrounding properties;
  - Fulfill veterinary regulations with regard to the prevention of disease transfer;
  - Clearly delimit RV as a private property, preventing illegal access and regulating legal access.

#### 12.1.2. Management

The following management actions are required:

- Ensure that the fence line is kept clear to prevent fire damage as well as to ensure that the electrical wires are not shorted and remain effective;

- Different methods can be used to keep the fence line clear, namely manual slashing, hoeing ('skoffel'), chemical 'mowing', and rock packing (on steep sections to prevent erosion);
- Patrolling – regular full circuit to check for any breaches (floodwaters, tree falls etc.), breakouts and illegal entry by people;
- Daily check-up on voltage;
- Minor repairs to be done immediately;
- Major breaches to be sealed immediately and permanent repairs to be done as soon as possible;
- Rescue any wildlife, in particular sparsely distributed species such as pangolin (*Manis temminckii*) that may become stuck under the bottom electrical wire.

## 12.2. ROADS

### 12.2.1. Policy

The policy with regards to roads and tracks is to:

- Maintain all roads and tracks in a condition necessary for the optimal fulfillment of their respective functions;
- Maintain all roads and tracks in a state which minimises their impact on surrounding hydrology, soils and biota;
- Plan any new roads and tracks with due consideration to their functional requirements, erosion danger and required maintenance levels; and
- Regulate access and traffic in terms of vehicle types and numbers in order to minimise erosion and maintain road standards;
- The construction of any road requires an Environmental Impact Assessment (EIA).

### 12.2.2. Management

The following management actions apply:

- Yearly assessment by reserve manager(s) of the existing road network and formulation of maintenance program with priority ranking and costing (manpower/machinery/budget);
- Implementation of maintenance program;
- Report back on progress, problems and results to Directors;

- No new roads and tracks will be developed without approval by the Directors based on a detailed proposal by management with details on:
  - Purpose of new road;
  - Soils and plant communities that will be traversed;
  - Maintenance requirements;
  - Source of gravel.
- The road alignment should avoid areas with potential erosion hazard or that could accelerate the drainage from seep lines;
- Realignment of the existing road and any internal tracks will be made for those parts that would require extensive inputs to bring the infrastructure to a maintainable standard;
- The road must be provided with appropriate camber and adequate drainage systems including mitre drains with bolsters to shed water; Sufficient mitre drains and/or 'speed humps' (as dictated by slope and soil erodibility) will be made and/or maintained on all existing and future roads in the reserve;
- Where possible less utilised tracks will not be graded and will only consist of 2 tracks with a 'middelmanneljje';
- New gravel pits will only be developed based on the outcome of a proper process (assessment, proposal, submission and authorisation);

## 12.3. ENERGY

### 12.3.1. Rationale

The provision of energy is vital for the smooth functioning of management (in particular administrative facilities), for the living comfort of staff and residents and for the efficient operation of facilities at a standard commensurate with the expectations of the owners.

Although much progress is being made with alternative sources of energy (such as solar power), ESKOM remains the most effective supplier. Where environmental concerns limit the erection of overhead lines or where distances become too great, diesel generators are often used. The latter have their own drawbacks, not the least of these being the risks of pollution that accompanies the frequent delivery of diesel along narrow winding roads.

### 12.3.2. Policy

The policy is as follows:

- As far as possible, electricity should be provided to residents and management development nodes;

- The provision of power must be done in an environmentally sensitive manner that does not impact negatively on the conservation objectives of RV, including the preservation of its wilderness character (where applicable);
- Alternative sources of energy and energy-saving designs should be considered.

### 12.3.3. Management actions

The following applies:

- Power lines should be as unobtrusive as possible. This means that power lines must be rationalized and should as far as possible be out of sight of visitors;

Any new overhead powerlines can only be considered and implemented after due EIA processes. The current overhead network of power lines should not be expanded upon. Technology exists that provides for the delivery of power by means of underground cables and this should be promoted.

- There must be as little light pollution on RV as possible;
- No generators are permitted on RV;
- Wherever possible, energy saving options should be incorporated into design and management of all new buildings.

## 12.4. BUILDINGS

### 12.4.1. Guiding Principles

The following principles must be used with the planning and the construction of new buildings on RV:

- Buildings must blend in with the local landscape. They should be against a natural backdrop and exterior colours should be natural and earthy to blend with the site;
- Buildings must not be higher than the surrounding tree-line;
- The structures must be planned around large trees and must minimize the need for the removal of trees or large boulders;
- Light and sound pollution must be minimized in the location, design, structure and management of all buildings and infrastructure;
- New infrastructure must not be located where it may have a potentially negative effect on important existing infrastructure;
- Emphasis must be placed on water and energy saving devices and processes.

See the documents titled 'Raptors View Articles of Association' (Appendix A), the 'RV Home Owners Rules Jan09' (Appendix B) and the 'RV Architec Req Sept 2010' (Appendix C) and for comprehensive detail in this regard.

### 12.4.2. Management actions

The following management actions are applicable:

- Regular maintenance is key to the upkeep of buildings;
- Any new buildings for staff accommodation should be adhere to accepted norms and standards;
- If applicable existing staff accommodation should be gradually upgraded and then maintained;
- Remove old buildings where these are obsolete, no longer functional and/or are an eye-sore (provided such structure is not older than 60 years in which case due process must first be followed in terms of the South African Heritage Resource Act);

## 12.5. COMMUNICATIONS

### 12.5.1. Rationale

The maintenance of reliable internal communications within RV is a priority both for maintaining security in the area and for assisting in emergencies that may arise with staff or visitors. A reliable external communication network is important to assist with liaison and commercial (tourism) activities.

### 12.5.2. Policy

The policy is to:

- Ensure that the internal radio network is operational at all times;
- Ensure that adequate external communication channels (land line and cell phone) are available to those who require these services.

### 12.5.3. Management actions

The following applies:

- Internal communication network:
  - No new repeaters (in particular not on visible high points in the landscape) without due EIA process;

- Ensure security to prevent theft of solar panels;
- Ensure appropriate radio discipline and allocation of frequencies so as not to jeopardise the operation of law enforcement staff.
- External communication network
  - No new overhead land lines except if very peripheral;
  - No new cell phone repeater towers without due EIA process;
  - Individual owners must take care that any extended external antenna's that boost cell phone reception are not visually disturbing to other owners and visitors.

## 12.6. WASTE MANAGEMENT

### 12.6.1. Rationale

Significant volumes of waste are generated and this will further increase over time as new infrastructure is added.

### 12.6.2. Policy

The policy is to minimise all forms of pollution and the effects thereof.

### 12.6.3. Management actions

The following management actions apply:

- The Integrated Environmental Management (IEM) process must be followed before waste disposal methods are implemented or disposal sites sourced outside of the reserve;
- Production of solid waste should be minimized and recycling maximized. Waste must be split at source, rather than having to be sorted later;
- Rubbish bins must be regularly emptied and surrounding areas must be tidied up;
- All solid and chemical waste should be removed from RV to an authorized landfill;
- A proactive attitude towards waste management will be promoted amongst staff and residents;
- Waste derived from catering facilities can possibly be recycled as pigswill and the use of this should be investigated (although veterinary regulations may prohibit this);
- Grey water should be kept separate from sewerage and recycled where possible;
- Residents, staff and contractors will dispose of chemicals in the approved manner. No cleaning of containers will be allowed in and along water courses;

- Spillage of oil and/or fuel from water pumps into the streams must be prevented through adequate construction, operational and maintenance procedures and staff training;
- Sewage disposal systems must be located at the legally and environmentally required distance from streams;
- The use of French drains and septic tanks will only be allowed for smaller systems where reed beds or other waste systems are not feasible;
- Contractors will dispose of all waste and litter and will clean up building sites to the satisfaction of the Reserve Manager. Waste must be properly disposed of.

## 13. SECURITY MANAGEMENT

Security management (and more specifically anti-poaching) is essential. The increase in crime, including the armed robberies, further warrant dedicated security staff, access control, good communication infrastructure, appropriate training and response plans.

### 13.1. CURRENT SITUATION: APPRAISAL AND THREAT LEVEL

RV is in a tenuous position as it is bordered in the north by Hoedspruit town with public tar roads in the near vicinity and thus there is pressure to ensure the security of their properties and wildlife. Because of this, it is considered that the poaching threat is currently relatively moderate-high.

While there is presently a low level of snaring, there is an increase in housebreaking and burglaries in the area. Being a residential area thieves know that there are valuable items on the premises.

It is recommended that a threat assessment is carried out by someone qualified to do so if this has not been done before or if the previous assessment dates back a few years. This assessment will then be used for the planning and deployment of the security staff.

### 13.2. ACCESS CONTROL

Access control is currently practiced at:

- The main entrance at the junction;
- The contractors gate entrance.

### 13.3. GUARDS/FIELD RANGER STRENGTH AND DEPLOYMENT

The current complement of field rangers is as follows:

- There are two guards at the main gate;
- Two guards at the contractors gate; and
- Two guards patrolling the property and checking the fenceline.

### 13.4. GUARDS/FIELD RANGER CAPACITY, TRAINING AND EQUIPMENT

The capacity of all staff involved in security must be assessed; an external body or person should do this. Any deficiencies identified should be remedied as soon as possible. With respect to the current staff it is recommended that:

- The minimum level of training for field rangers must be equivalent to NQF (National Qualifications Framework) level 2. This accommodates a person with no formal education but with appropriate experience and skills. This level of training is provided in courses presented by the Game Rangers Association of Africa;
- All levels of leadership staff must receive appropriate training. It is also imperative that re-training exercises are run several times a year. These should vary from tracking and follow-up exercises to participating in road blocks with the South African Police Services;
- All patrols must be able to make radio communication with their superiors;
- The Response Unit must have a GPS and a Metal detector;
- All staff will need to be taught how to react to potentially dangerous situations with wild animals;
- One member of each patrol operating in the area will have to carry a rifle and training in the use of firearms will have to be given to those staff members selected for this role;
- All people carrying firearms must be in possession of a certificate of competence for the type of firearm, and must adhere to all regulations of the Firearms Control Act.

### 13.5. PROTECTION MONITORING

The effectiveness of any patrolling system can only be evaluated if the degree of measurable effort is compared against measurable results. There needs to be a detailed briefing before any patrol, OP (Observation Post) or roadblock is conducted. There should be a detailed debrief on its completion. Field Rangers need to be competent in the use of a GPS or Cybertracker.

The protection staff in each patrol must have a note book and record at least the following:

- Number of persons on the patrol or OP;
- Date, time start and finish of patrol or OP;
- Area patrolled and routes taken;
- Wind conditions and weather;

- Game seen - location, species, numbers, sex, age and comments;
- Game deaths;
- Raptor nesting sites;
- Alien plant species;
- Erosion sites;
- Signs of human activity - tracks, snares, other signs etc.;
- Other noteworthy observations (training required); and
- Actions taken and results.

These data must be collated and safely filed and analyzed annually for trends in incidents and observations.

### **13.6. INTELLIGENCE GATHERING**

Combating poaching involves pre-emptive action as much as reaction to incidents. The establishment of an information and intelligence system beyond the boundaries of RV is important and this needs to be integrated with SAPS and other landowners in the area that have significant numbers of rhino.

If it does not already take place, the person in charge of security must hold regular meetings with the SAPS, Nature Conservation Authorities (including KNP) and other private stakeholders.

### **13.7. TRACKER DOG**

It is understood that theft is as big an issue as poaching and particularly where houses have been burgled while owners have been in residence. If the occurrence of this type of crime increases, it is expected the risk of the assault of RV residents or staff will increase.

As most incidents occur at night, there is often a delay until the following morning before any follow-up is possible. The use of a tracker dog can not only cut the time on a follow-up, but the knowledge that one is on call can be a strong deterrent.

The cost-effectiveness of having a tracker dog available on RV should be investigated.

### **13.8. STANDARD OPERATING PROCEDURES**

Standard Operating Procedures should be compiled to handle major conflict and danger situations (armed contact, wounded personnel etc.).

## 14. RESERVE MANAGEMENT STAFF

The conservation and proper management of the natural asset base of RV relies heavily on the continued presence and dedication of competent and reliable staff.

The delivery of a sustainable high quality product that will meet owner expectations on RV is only possible if RV management staff produce a high standard of professionalism in their work. One of the stated objectives is that RV will be managed according to “Best Practices”. If this is done then norms and standards must be clearly prescribed and adhered to.

The guiding principles with regard to the staff component on RV are as follows:

- The Conservation staff employed by RV will remain / become a cost-effective core of skilled and experienced staff capable of dealing with all routine tasks and the occasional unforeseen situation that may arise;
- Because of the high level of responsibility that will rest with these senior positions, appointments to these positions will be on the basis of merit. At all other levels, the goal will be to achieve employment equity without compromising on standards of service delivery;
- RV will make every effort to recruit and train middle management from the ranks of the junior staff already employed on the reserve. The second options will be to recruit from local communities;
- Staff employed by RV will necessitate the provision of housing and other benefits yet it is desirable to keep infrastructure on the estate to a minimum. Therefore, where it is cost-effective to do so, RV will outsource certain work in order to keep its own staff levels and associated infrastructure within realistic bounds.

The recruitment of senior positions will be undertaken on a nationwide basis. As the persons filling these positions will have responsibilities that they will be required to fulfill immediately when they are appointed, they must already have the ability and skills required. Middle level RV staff, with the potential ability and enthusiasm for senior positions, will be identified and assisted with training and opportunities to improve themselves so that they may become eligible for senior posts that fall vacant.

In the short term, middle-rank positions may be recruited on a nationwide basis. However, it is the objective of RV that wherever possible promising junior staff will be identified and trained to enable them to occupy middle and senior level positions.

Wherever possible, the recruitment of junior staff will be done locally. RV will train or provide the opportunity for development of staff already working on the reserve so that they are able to advance in their career opportunities.

## 15. COMMUNITY OUTREACH

### 15.1. RATIONALE

RV is a privately-owned reserve. However, one cannot ignore the socio-economic setting in terms of its long term impact on the integrity of RV and the positive or negative relationship with its neighbours.

In common with many rural and former homeland areas, unemployment levels in the surrounding areas and the pressure on available land is high. It is quite logical that people living close to RV should look at it as a source of potential benefits either directly (through resource utilisation) or indirectly (through employment and the provision of services).

### 15.2. POLICY

The policy of RV with regard to its neighbouring and nearby communities is to:

- Assist, through the development and management of the Reserve, in improving the quality of life of the disadvantaged communities living nearby;
- Preference will be given to indirect rather than direct interventions (facilitation and provision of opportunities rather than outright financial support or resource utilisation);
- Transfer of knowledge, skills and opportunities towards strengthening SMME development will be favoured.

### 15.3. MANAGEMENT ACTIONS

The policy translates as follows in practice:

- Employment opportunities will preferably be made available to people living nearby;
- A database of locally available skills will be compiled and will be updated annually;
- Purchases of goods will as far as possible (and within the constraints of price, quality and reliable supply) be sourced locally;
- Services (particularly those that are labour intensive (clearing of firebreaks, road construction, road maintenance, fence maintenance, bush clearing, erosion reclamation, seed collection and re-seeding)) will be as far as possible be sourced locally;

- Skills transfer to SMME's and in particular the setting up of current and previous employees as independent service providers will be encouraged;
- Should natural resources become available (through bush clearing, culling etc) preference will be given to local communities for access to these resources;
- Although wildlife is '*res nullius*' and RV would legally not be liable for losses caused by wildlife that leaves the reserve, RV will strive to minimise the negative impact by such animals;
- Leveraging any donor or government intervention in terms of community conservation or environmental education;
- Supporting and assisting any community conservation actions on land bordering RV.

The above must all take place within the constraints of available funding and managerial resources.

## 16. RESEARCH AND MONITORING

### 16.1. RATIONALE

Monitoring and research are required on RV to provide the guidelines and answers to manage the ecosystem and its components. These answers will be learnt by gaining a better understanding of the ecosystem and the interactions within it. To achieve 'best practices' in the management of the reserve will require **continuous** monitoring of current management practices and the formulation, testing and refining of new ones. Monitoring and understanding are also necessary in the social and economic fields that are part of RV's objectives.

### 16.2. POLICY

The policy is to:

- To encourage and facilitate appropriate ecological and socio-economic research and monitoring that is necessary for the effective management of RV; and
- To ensure that all data and information gathered either from a formal research or monitoring programme, or that result from historical enquiry, are properly archived and stored in a form that is easily accessible for future use.

Both applied and pure research will be encouraged and accommodated within the constraints of resources available on the reserve. Pure research will receive support on condition that the resources provided for this do not reduce those that may be required for more applied research.

Modelling may play an important role towards achieving a better understanding of the system. A system of adaptive management that relies on good monitoring data with simple models for short-term prediction and the use of broad scale models for a longer prediction at a lower level of confidence may present the most cost-effective approach in this regard.

### 16.3. MANAGEMENT ACTIONS

It is recommended that the following conditions should apply to any research activities on RV:

- All research undertaken on the reserve must have the approval of RV through its delegated representative(s) in this matter;

- Research that will provide inputs which contribute towards an understanding of RV ecosystem dynamics and providing answers for the management of the property will be encouraged and have priority;
- RV, with input from the consulting ecologist and other relevant stakeholders will identify the issues that need to be addressed and will prioritize these for prospective researchers;
- Researchers should preferably be affiliated to a recognized institution. Those researchers that do not have proper affiliation should have an established record of research and publications;
- Research projects must have clearly defined goals and the plan for any research project will have to be approved by RV before it can commence. It is recommended that an external specialist be contacted for review of the project proposal if the necessary expertise in a particular field is not available on RV or through the consulting ecologist.
- Research workers will be contractually obliged to provide written progress reports and copies of their final report to RV and to abide by an appropriate code of conduct;
- Researchers and research activities must respect the privacy and nature experience of individual Owners, their families and guests;
- A centralized database will be designed and maintained for the storage and filing of data. It will be maintained to the following standards:
  - Both hard copy and electronic copies will be kept;
  - The database must be readily accessible to all internal and external stakeholders;
  - The data will be stored and presented in formats that are easily interpreted and appreciated by all stakeholders, especially decision makers;
  - The collection of data is promptly stored and filed in the centralized data system (ideally immediately after collection).

## 17. TOURISM

Tourism (not a recognised activity) is included for completeness of the plan and any developments in this regard should be regulated by the documents 'Raptors View Articles of Association' (Appendix A), the 'RV Home Owners Rules Jan09' (Appendix B) and the 'RV Architect Req Sept 2010' (Appendix C). Any such plan should address the position of RV in the context of the Lowveld and should recommend, if required, an appropriate strategic direction for tourism development taking into account geographical position, market situation and anticipated future, environmental sensitivities, current developments and Owners expectations and rights.

The objectives for any tourism development of RV would be:

- To generate revenue that will enable RV to achieve its conservation objectives and meet its annual operating budget;
- To provide more employment and a wide range of skills development opportunities for members of the local community;
- To ensure optimal use of the area so that it is recognized as being an asset to both the province and country;
- To minimise natural resource use and negative environmental impacts associated with tourism development and operation.

The following general guidelines should apply to all sites and all development proposals:

- No development can take place without an Environmental Impact Assessment (EIA) having been done;
- All proposed developments must be visually compatible with the local landscape. Building style and design (including size, height, form, colour of structures and materials used) will not detract from the local natural and cultural landscape. Architect's drawings and ground plans will therefore be submitted before any approvals are granted;
- Developments must be sensitive to the landscape and to the other users by not affecting the landscape's visual qualities and sense of being undisturbed. To this end, structures must be placed against a suitable backdrop and should not be etched against the skyline;
- Planned access road(s) will form part of the total plan submitted and will also be subjected to the IEM procedures followed. Visual impacts, noise, dust and impact on ecosystem functioning (e.g. drainage patterns, animal movement) will need to be minimised according to existing legislation;

- Developments must generally be planned and executed with the minimum disturbance to the surface and vegetation of the site. Large-scale clearing of sites will not be acceptable;
- Only these areas where specific structures or open areas are planned may be cleared. The construction process must also have minimum impact on the surrounding vegetation;
- The surrounding grounds and the plants used therein must assist with blending of the site in the landscape. To this end only species indigenous to biome of the area may be used. Detailed lists of proposed species must be provided for evaluation and approval;
- The control of weeds and invasive alien species on the development site is the responsibility of the developer. Control must be undertaken with the legally registered herbicides for each problem species;
- No permanent structures and bulk services are allowed below the 1:50 years flood line. This flood line needs to be determined as part of any proposal;
- Where possible, ESKOM power will be used at development sites. Local circumstances might not permit the erection of overhead lines. Where generators are used, their placement as well as the storage of fuel will need to take into account noise levels and the prevention of pollution;
- Local circumstances will dictate the use of boreholes, surface water or supply from local authorities. Where applicable, the necessary registration of water rights will be required in terms of new legislation. Overall, the design of the facility must consider ways and means of reducing water use;
- All infrastructure required for communications (overhead telephone lines, cell phone towers, and radio masts) will be subjected to the IEM procedure. They form an integral part of the assessment of any development plan;
- Light pollution must be minimised and special care must be taken to prevent an upward glow at night. Similarly noise pollution must be limited;
- Generally, emphasis should be placed on water and energy saving designs, whilst the waste handling and sewage disposal must be carefully planned to minimise adverse impacts;
- Materials used should emphasise 'environmental friendliness' (for example porous paved surfaces rather than hard impermeable surfaces...);
- As far as practically feasible (in terms of volumes, topography...) artificial wetlands should be used as part of the sewage disposal system; and
- Buildings and structures, including staff accommodation and –facilities, will be designed to meet South African Building & Safety Standards.

## 18. TIMETABLE

A broad timetable on the management actions is required for the annual planning and budgeting purposes.

This timetable will be largely dictated by the seasonal cycle of wet and dry, and of production and loss.

Monitoring of the veld (summer season) and the animal numbers (winter season) and animal condition (twice a year) will lead to the recommendation on eventual off-take numbers. These recommendations must be discussed, amended and authorized by the Directors to allow timorous implementation of live capture operations and to allow for the marketing of any hunting (commercial and landowner) opportunities.

Similarly, the planning of veld management actions such as burning will require the timorous assessment of veld conditions in order to implement the management action under suitable weather conditions.

It is recommended that a formal system with required outputs, deadlines and authority levels be designed to assist the management staff in the annual planning and budgeting.

## 19. ACKNOWLEDGEMENTS

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## APPENDIX A: RAPTORS VIEW: ARTICLES OF ASSOCIATION



Unit 18 Maroela Park  
53 Koedoe Street Hoedspruit  
PO Box 1502, Hoedspruit, 1380

Tel: 015 793 0267  
Fax: 086 684 0514  
Email: rvhoa@mweb.co.za

## 1. INTERPRETATION

In these Articles, unless the context otherwise requires:

“company”	means the Raptors View Home Owners Association, a company incorporated in accordance with the provisions of Section 21 of the Companies Act;
“the Companies Act”	means Act 61 of 1973, as amended or any Act which replaces it;
“the company’s property”	the remaining extent of the property after the developer has sold the residential portions to third parties but excluding the northern part of the property required by the developer as depicted by _____;
“the developer”	Raptors View Wildlife Estate (Proprietary) Limited (No. 1999/011280/07);
“the initial period”	means the period from the registration of these Articles of Association until the Developer has sold all residential portions of the property to third parties who will become members of this association and the company’s property has been transferred to the company or earlier should the developer in its sole discretion decide;
“the manager”	means the manager appointed from time to time in terms of Article 8;
“members”	means the persons referred to in Article 4.1 as read with Article 4.3;
“profits”	includes revenue and capital profits;
“the property”	means the Remainder of Portion 1 of the Farm Happylands No. 241, Registration Division K.T.;
“register”	means the register of members kept in terms of the Statutes;

- “the Republic” means the Republic of South Africa;
- “the residential portion” shall mean any portion of the property to be sold and transferred for residential purposes;
- “the rules” means the rules made by the directors in terms of Article 6 as they apply from time to time;
- “the Statutes” means the Companies Act and any and every other statute or ordinance from time to time in force concerning companies and necessarily affecting the company;
- 1.1 references to members represented by proxy shall include members represented by an agent appointed under a general or special power of attorney and reference to members present or acting in person shall include corporations represented or acting in the manner prescribed in Statutes;
- 1.2 expressions defined in the Companies Act, or any statutory modification thereof, in force at the date on which these Articles become binding on the company shall have the meanings so defined; and
- 1.3 words in the singular number shall include the plural and words in the plural number shall include the singular, words importing the masculine gender shall include females, and words importing persons shall include bodies corporate.

## 2. PRELIMINARY

- 2.1 If the provisions of these Articles are in any way inconsistent with the provisions of the Statutes, the provisions of the Statutes shall prevail, and these Articles shall be read in all respects subject to the Statutes.
- 2.2 Notwithstanding the omission from these Articles of any provision to that effect, the company may do anything which the Companies Act empowers a company to do if so authorised by its Articles of Association.

## 3. ASSOCIATION'S PROPERTY

- 3.1 The company will initially lease the company's property from the developer until the expiry of the initial period whereafter the developer has agreed to transfer the company's property to the company.
- 3.2 The company will permit the company's property to be used as a wildlife estate by all its members subject to such rules as the association may from time to time adopt in terms of clause 6.

## 4. MEMBERS

- 4.1 The following persons shall be members of the company:
- 4.1.1 during the initial period, nominees of the developer who may or may not be registered owners of the property or any portions; and
- 4.1.2 any person who is the registered owner of a residential portion but excluding the developer.
- 4.2 The developer shall be entitled from time to time on notice to the company to terminate the membership of any person nominated as a member by the developer in terms of article 4.1.1 and to nominate some other person as a member of the company in his stead.

- 4.3 No person other than a person referred to in Article 4.1 shall be entitled to be a member of the company.
- 4.4 Where two or more persons are registered as the owners of the same residential portion the registered owners of that residential portion shall be deemed to be one member of the company.
- 4.5 When a member ceases to be the registered owner of a residential portion he shall ipso facto cease to be a member of the company.
- 4.6 The developer and/or its nominees shall, when it is no longer the registered owner of a residential portion in the property, cease to be a member of the company.
- 4.7 Save for the circumstances set out in 4.5 a member may not resign as a member of the company.
- 4.8 The company shall keep a register of members at the place and in the manner specified in the Companies Act.
- 4.9 On the death, insanity or insolvency or liquidation of any member, then as from the date of death or issue of a certificate by a medical practitioner certifying the insanity of such member or the grant of a provisional order of sequestration or liquidation, such member shall be represented by his executor, curator or trustee as the case may be.

## 5. LEVIES

- 5.1 The directors shall, from time to time, charge levies to the members other than the developer for the purpose of meeting all the expenses which the company has incurred, or which the directors reasonably anticipate the company will incur, in the furtherance of its objects. During the initial period, the levies payable by the members referred to in 4.1.2 will be determined by having regard to the total number of residential portions to be sold and transferred.
- 5.2 Members other than the developer shall be liable in respect of any levy made in terms of Article 5.1 from time to time.
- 5.3 Each owner of a residential portion save for the developer shall pay an equal levy.
- 5.4 The directors shall, prior to the end of each financial year, prepare an itemised estimate of the anticipated income and expenditure (which may include a reasonable provision for contingencies) of the company during the ensuing financial year, and therefrom calculate the amount required to be levied upon the members other than the developer during such ensuing financial year and impose a levy upon the members in such estimated amount.
- 5.5 The directors shall, as soon as possible after the imposition of the levy in terms of Article 5.4, advise each member in writing of the amount payable by him. Such amount shall be payable in equal monthly instalments due in advance on the first day of each month.
- 5.6 The directors may from time to time make special levies upon the members who are liable in terms of Article 5.2 or call upon them to make special contributions in respect of all such expenses as are mentioned in Article 5.1 (which are not included in any estimate made in terms of Article 5.4) and such levies and contributions may be made payable in one sum or by such instalments with or without interest and if with interest at such rate as may be determined by the directors, and at such time or times as the directors shall think fit.
- 5.7 Interest shall be payable on arrear levies at such rate as may from time to time be determined by the directors.
- 5.8 Any amount due by a member by way of a levy or interest shall be a debt due by him to the company.

- 5.9 The obligation of a member to pay levies shall cease upon his ceasing to be a member, without prejudice to the company's right to recover arrear levies and interest thereon.
- 5.10 No levies or interest paid by a member shall under any circumstances be repayable by the company upon his ceasing to be a member.
- 5.11 A member's successor-in-title to an erf shall be liable, with effect from the date upon which he becomes a member pursuant to the transfer of that land, to pay the levy attributable to that land.
- 5.12 A member shall be liable for and pay all legal costs, including costs as between attorney and own client, and collection commission, expenses and charges incurred by the company in obtaining the recovery of arrear levies or any other arrear amounts due and owing by such member to the company.
- 5.13 No member shall be entitled to any of the privileges of membership unless and until he shall have paid every levy and interest thereon, and any other sum, if any, which may be due and payable by that member of the company, from whatsoever cause arising.

## 6. RULES

- 6.1 Subject to any restriction imposed or direction given at a general meeting of the company, the directors may from time to time make and amend or add to, rules governing the company's property which is intended to be a wildlife estate. Such rules will be strict to ensure the proper preservation of the wildlife estate and the enjoyment and amenity of the members or their invitees.
- 6.2 For the enforcement of any of the rules made by the directors in terms hereof, the directors may:
- 6.2.1 take or cause to be taken such steps as they may consider necessary to remedy the breach of the rule of which the member may be guilty, and debit the cost of so doing to the member concerned, which amount shall then be deemed to be a debt owing by the member concerned to the company;
- 6.2.2 take such other action, including court proceedings, as they may deem fit.
- 6.3 In the event of any breach of the rules by guests or lessees of a member, or his agents or employees, such breach shall be deemed to have been committed by the member himself, but, without prejudice to the foregoing, the directors may take or cause to be taken such steps against the person actually committing the breach as they in their discretion may deem fit, including but not limited to the imposition of fines and restricting the member's access to the association's property.
- 6.4 In the event of any member disputing the fact that he has committed a breach of any of the rules aforesaid, a committee of two directors, appointed by the directors of the company, shall adjudicate upon the issue at such time and in such manner and according to such procedure as the directors may direct.
- 6.5 Notwithstanding the foregoing, the directors may in the name of the company enforce the provisions of any rules by proceedings in a court of competent jurisdiction and for this purpose may appoint such attorneys and counsel as they may deem fit.
- 6.6 It shall be the duty of the manager, or such other person or body as may be empowered by the directors, to ensure compliance by the members with the rules, and to this end to issue such notices or do such things as may be necessary or requisite.
- 6.7 Each member undertakes to the company that he shall comply with any rules made in terms of this Article 6.

## 7. SECURITY, MAINTENANCE & REPLACEMENTS

The directors shall have the power, without prejudice to any other rights of the company:

- 7.1 to erect security fencing and to implement security or such measures as they in their discretion deem necessary to ensure control of access to the property and all persons therein;
- 7.2 to cause any gatehouse at any access point to the company's property to be manned by security personnel, and to institute appropriate security procedures as they deem fit;
- 7.3 to maintain the company's property and any common property and to instruct the manager to attend to such landscaping and maintenance requirements on behalf of and at the cost of the company.

## 8. MANAGER

- 8.1 The directors shall from time to time, appoint in terms of a written contract a manager to control, manage and administer the company and the company's property and to exercise such powers and duties as may be entrusted to the manager, including the power to collect contributions levied.
- 8.2 The directors shall ensure that there is included in the contract of appointment, which shall be in writing, of the manager a provision to the effect that if he is in breach of any of the provisions of his contract, or if he is guilty of conduct which at common law would justify the termination of a contract between master and servant or contract of mandate, the directors may, without notice, cancel such contract of appointment and the manager shall have no claim whatsoever against the company or any of the members as a result of such cancellation.
- 8.3 The contract with the manager shall further provide for the appointment to be terminated and the manager shall cease to hold office if:
  - 8.3.1 where the manager is a company, an order is made for its provisional or final liquidation, or, where the manager is a natural person, he surrenders his estate as insolvent or his estate is sequestered, whether provisionally or finally; or
  - 8.3.2 the manager is convicted of an offence involving fraud or dishonesty, or, where the manager is a company, any of its directors is convicted of an offence involving fraud or dishonesty; or
  - 8.3.3 a special resolution of the members of the company is passed to that effect, provided that in such event the manager so removed from office shall not be deprived of any right he may have to claim compensation or damages for breach of contract.
- 8.4 The manager shall keep full records of his administration and shall report to the company on all matters which in his opinion detrimentally affect the value or amenity of the properties.
- 8.5 The directors shall give reasonable prior notice to the manager of all meetings of the directors and the manager shall be entitled to be present thereat.
- 8.6 The directors shall from time to time furnish to the manager copies of the minutes of all meetings of the directors of the company.
- 8.7 Should there be no manager in office at any time, then all references in these articles to the manager shall be deemed to be a reference to the directors.

9. **RESTRICTION OF TRANSFER OF RESIDENTIAL PORTIONS AND BUILDING CRITERIA**

- 9.1 No member shall alienate or transfer a residential portion of which it is a registered owner unless:
- 9.1.1 it is a condition of the sale agreement that:
- 9.1.1.1 the person to whom such residential portion is to be sold or otherwise to be alienated ("the transferee") has bound himself to the satisfaction of the company, as a contract for the benefit of the company, to become a member of the company upon transfer of such residential portion to him;
- 9.1.1.2 the registration of transfer of such residential portion to the transferee shall ipso facto constitute the transferee as a member of the company;
- 9.1.2 the company, under the hand of the manager or a director has certified in writing that the member has fulfilled all his financial obligations to the company in respect of the period up to and including the date specified in such notice; and
- 9.1.3 the transfer takes place prior to or on that specified date;
- 9.1.4 the proposed transferee has agreed in writing to become a member of the company and such written agreement has been lodged with the company.
- 9.2 The company may claim from any member or his estate any arrears of levy or interest or other amount due by him to the company at the time of his ceasing to be a member.
- 9.3 No owner may improve any property without first having his plans approved by the company which has established design guidelines, all as set out in the rules of the company.

10. **MEETING OF MEMBERS**

- 10.1 The company, shall at such times as are prescribed in the Statutes, hold general meetings of members to be known and described in the notices calling such meetings, as annual general meetings.
- 10.2 The directors may, whenever they think fit, convene a general meeting, and a general meeting shall also be convened on a requisition by members representing not less than one-twentieth of the total voting rights of all the members of the company having at the date of the lodgement of the requisition a right to vote at general meetings of the company or, in default, may be convened by the requisitionists as provided by and subject to the provisions of the Statutes. If at any time there shall be within the Republic sufficient members capable of acting to form a quorum, any director and any two members of the company may convene a general meeting in the same manner as nearly as possible as that in which meetings may be convened by the directors.
- 10.3 Every meeting of members shall, unless otherwise resolved by the directors, be held in the city or town in which the company's registered office is for the time being situated.
- 10.4 Subject to the provisions of the Statutes relating to meetings of which special notice is required to be given, an annual general meeting and a meeting calling for the passing of a special resolution shall be called by twenty-one days' notice in writing at the least, and a meeting of the company other than an annual general meeting or a meeting for the passing of a special resolution, shall be called by fourteen days' notice in writing at the least. The notice shall be exclusive of the day on which it is served or deemed to be served and of the date of the meeting for which it is given and shall specify the place, the day and the hour of meeting and, in the case of special business, the general nature of the business, and shall be given in the manner hereinafter mentioned or in such other manner, if any, as may be prescribed by the company at a meeting of members, to such persons as are under these Articles entitled to receive such notices from the company; provided that a meeting of the company shall,

notwithstanding that is called by shorter notice than that specified in this Article, shall be deemed to have been duly called if it is so agreed by a majority in number of the members having a right to attend and vote at the meeting. The accidental omission to give notice of a meeting to, or the non-receipt of notice of a meeting by any person entitled to receive notice shall not invalidate the proceedings of that meeting.

#### 11. PROCEEDINGS AT MEETINGS OF MEMBERS

- 11.1 All business that is transacted at a general meeting, and all that is transacted at the annual general meeting, with the exception of the consideration of the audited financial statements, the election of auditors and the fixing of the remuneration of the auditors shall be deemed to be special business.
- 11.2 Business may be transacted at any meeting of members only while a quorum is present.
- 11.3 Save as herein otherwise provided, the quorum at a meeting of members shall be:
- 11.3.1 during the initial period, three members, of whom one member shall be a nominee of the Developer, personally present and entitled to vote;
- 11.3.2 after the initial period, three members personally present and entitled to vote.
- 11.4 If within thirty minutes from the time appointed for the meeting a quorum is not present, the meeting, if convened upon the requisition of members, shall be dissolved; in any other case it shall stand adjourned to the same day in the next week, at the same time and place or, if that day be a public holiday, and if at such adjourned meeting a quorum is not present within thirty minutes from the time appointed for the meeting then, subject to the Statutes, the members or member present shall be a quorum.
- 11.5 The chairman if any, of the board of directors, shall preside as chairman at every meeting of members of the company. If there is no such chairman, or if at any meeting he is not present within fifteen minutes after the time appointed for holding the meeting or is unwilling to act as chairman, the members present shall choose some director or, if not director be present, or, if all the directors present decline to take the chair, they shall choose some member present to be chairman of the meeting.
- 11.6 The chairman may, with the consent of any meeting at which a quorum is present (and shall if so directed by the meeting), adjourn the meeting from time to time and from place to place, but no business shall be transacted at any adjourned meeting other than the business left unfinished at the meeting from which the adjournment took place. When a meeting is adjourned as a result of a direction given in terms of any applicable provision in the Statutes, notice of the adjourned meeting shall be given in the manner prescribed by such provision but, save as aforesaid, it shall not be necessary to give any notice of an adjournment or of the business to be transacted at an adjourned meeting.
- 11.7 At any meeting of members a resolution put to the vote of the meeting shall be decided on a show of hands, unless before or on the declaration of the result of the show of hands a poll shall be demanded by any person entitled to vote at the meeting and, unless a poll is so demanded, a declaration by the chairman that a resolution has, on a show of hands, been carried, or carried unanimously, or by a particular majority, or lost, and an entry to that effect in the minute book of the company shall be conclusive evidence of the fact, without proof of the number of votes recorded in favour of, or against, such resolution. No objection shall be raised as to the admissibility of any vote except at the meeting or adjourned meeting at which the vote not disallowed at such meeting shall be valid for all purposes. Any such objection shall be valid for all purposes. Any such objection shall be referred to the chairman of the meeting, whose decision shall be final and conclusive.
- 11.8 If a poll is duly demanded it shall be taken in such manner as the chairman directs, and the result of the poll shall be deemed to be the resolution of the meeting at which the poll was demanded. Scrutineers shall be elected to declare the result of the poll and their decision, which shall be given by

the chairman of the meeting, shall be deemed to be the resolution of the meeting at which the poll is demanded.

- 11.9 In the case of an equality of votes, whether on a show of hands or on a poll, the chairman of the meeting at which the show of hands takes place, or at which the poll is demanded, shall not be entitled to a second or casting vote.
- 11.10 All business transacted at the meeting is to be decided by a majority vote of those members present.

## 12. VOTES OF MEMBERS

- 12.1 At any meeting of the company:
- 12.1.1 each member of the company, including the nominee of the developer, present in person or by proxy or, if a member is a body corporate, duly represented at any meeting of the company shall have one vote;
- 12.1.2 the developer shall, during the initial period have an equal number of votes as there are the number of other members in the company in addition to the vote conferred upon it in terms of Article 12.1.1.
- 12.2 A proxy need not be a member of the company.
- 12.3 The form appointing a proxy shall be in writing under the hand of the appointee or of his agent duly authorised in writing or, if the appointee is a corporate body, under the hand of an officer or agent authorised by that body. The holder of a general or special power of attorney given by a member shall be entitled to vote, if duly authorised under that power to attend and take part in the meetings and proceedings of the company or companies generally, whether or not he be himself a member of the company.
- 12.4 The form appointing a proxy and the power of attorney or other authority, if any, under which it is signed or a notorially certified copy of such power or authority shall be deposited at the registered office of the company not more than twenty-four hours (or such lesser period as the directors may unanimously determine in relation to any particular meeting) before the time for holding the meeting (including an adjourned meeting) at which the person named in the form proposes to vote, and in default the form of proxy shall not be treated as valid. No form appointing a proxy shall not be valid after the expiration of six months from the date when it was signed, except at an adjourned meeting unless otherwise specifically stated in the proxy itself.
- 12.5 Subject to the provisions of the Companies Act, a form appointing a proxy may be in any usual or common form.

## 13. DIRECTORS

- 13.1 Until otherwise determined by a meeting of members, the number of directors shall not be less than one nor more than three.
- 13.2 During the initial period the Developer shall be entitled to appoint two directors on written notice to the company and, on similar written notice, to remove and replace any of such directors.
- 13.3 The first director of the company shall be:  
Trevor Jordan
- 13.4 Subject to the provisions of Article 13.2, the company may from time to time at any meeting of members increase or reduce the number of directors.

- 13.5 A director need not be a member of the company.
- 13.6 After the initial period, unless otherwise decided by a meeting of members upon any casual vacancy occurring the board of directors may be filled by the directors.
- 13.7 After the initial period, the company at a meeting of members or the directors shall have power at any time, and from time to time, to appoint any person as a director but the total number of directors shall not at any time exceed the maximum number fixed by or in terms of these Articles.

#### 14. REMUNERATION OF DIRECTORS

- 14.1 Save for travelling, hotel and other expenses properly incurred by them in or about the performance of their duties as directors including those of attending and travelling to and from meetings of the directors or any committee of the directors or at any meeting of members of the company, the directors shall not be entitled to any remuneration.
- 14.2 The directors may however pay any director who serves on any committee or who devotes special attention to the business of the company, or otherwise performs services which in the opinion of the directors are outside the scope of the ordinary duties of a director, such remuneration as they may determine.

#### 15. ALTERNATE DIRECTORS

- 15.1 Any director shall have the power to nominate any person to act as alternate director in his place during his absence or inability to act as such director, and on such appointment being made, the alternate director shall, in all respects, be subject to the terms and conditions existing with reference to the other directors of the company. A person may be appointed as alternate to more than one director. Where a person is alternate to more than one director or where an alternate director is a director, he shall have a separate vote on behalf of each director he is representing in addition to his own vote, if any.
- 15.2 The alternate directors, whilst acting in the place of the directors who appointed them, shall exercise and discharge all the duties and functions of the directors they represent. The appointment of an alternate director shall cease on the happening of any event which, if he were a director, would cause him to cease to hold office in terms of these Articles or if the director who appointed him ceases to be a director, or gives notice to the secretary of the company that the alternate director representing him shall cease to do so.

#### 16. GENERAL POWERS AND DUTIES OF DIRECTORS

- 16.1 The business of the company shall be managed by the directors who may exercise all such powers of the company as are not by the Statutes or by these Articles required to be exercised by the company at any meeting of members, subject nevertheless to the provisions of these Articles and of the Statutes and to such regulations being not inconsistent with these Articles or the Statutes, as may be prescribed by the company at any such meeting; but no regulation made by the company at such meeting shall invalidate any prior act of the directors which would have been valid if that regulation had not been made.
- 16.2 The directors may from time to time appoint one or more of their body to the office of managing director for such period and generally on such terms as they may think fit. The appointment of a managing director shall determine *ipso facto* if he shall cease for any reason to be a director, or if the company at any meeting of members shall resolve that his tenure of the office of managing director be determined.

- 16.3 The directors may from time to time entrust to and confer upon a managing director for the time being such of the powers vested in them as they may think fit, and may confer such powers for such time and to be exercised for such objects and upon such terms and with such restrictions as they may think expedient; and they may confer such powers either collaterally or to the exclusion of, and in substitution for, all or any of the powers of the directors, and may from time to time revoke or vary all or any of such powers.
- 16.4 The directors shall have the power from time to time to delegate to any one of their body or to any other person, whether in the Republic or not, such of the powers as are vested in the directors pursuant to the Statutes or under these Articles, as they may deem fit.
- 16.5 The directors may delegate any of their powers to committees consisting of such member or members of their body as they think fit; any committee so formed shall, in the exercise of the powers so delegated, conform to any regulations that may be imposed on it by the directors. Save as aforesaid, the meetings and proceedings of a committee consisting of more than one member shall be governed by the provisions of these Articles regulating the meetings and proceedings of directors.
- 16.6 The directors shall not be entitled to undertake on behalf of the company any works of a capital nature, without the sanction of a resolution of the company in general meeting.

#### 17. **DISQUALIFICATION AND PRIVILEGES OF DIRECTORS**

- 17.1 A director shall cease to hold office as such if:
- 17.1.1 he ceases to be a director by virtue of any of the provisions of the Statutes or becomes prohibited from being a director by reason of any order made under the Statutes; or
- 17.1.2 his estate is sequestrated or he files a petition for the surrender of his estate or an application for an administration order, or if he commits an act of insolvency as defined in the insolvency law for the time being in force, or he makes any arrangement or composition with his creditors generally; or
- 17.1.3 he is found lunatic or becomes of unsound mind; or
- 17.1.4 he is removed by a resolution of the company as provided for in the Statutes; or
- 17.1.5 he resigns his office by notice in writing to the company; or
- 17.1.6 a notice removing him from office is signed by members having a right to attend and vote at a meeting of members who hold more than 75 per cent of the total voting rights of all of the total voting rights of all the members who are at that time entitled so to attend and vote and is delivered to the company or lodged at its registered office; or
- 17.1.7 he is otherwise removed in accordance with any provisions of these Articles.
- 17.2 No director or intending director shall be disqualified by this office from contracting with the company in any manner whatsoever provided full disclosure of the proposed contract is made to the company, prior to entering into the contract.
- 17.3 Such director shall be entitled to vote at any board meeting or otherwise in relation to such contract as freely as if he were not interested therein and he shall be reckoned for the purpose of constituting a quorum of directors.

**18. PROCEEDINGS OF DIRECTORS**

- 18.1 A director may, and any other person appointed by the directors on the requisition of a director shall, at any time summon a meeting of the directors.
- 18.2 The directors may meet together for the despatch of business, adjourn and otherwise regulate their meetings as they think fit.
- 18.3 Unless otherwise resolved by the directors, all their meetings shall be held in the city or town where the company's registered office is for the time being situated.
- 18.4 Questions arising at any meeting of directors shall be decided by a majority of votes.
- 18.5 The chairman shall not have a second or casting vote in the case of an equality of votes.
- 18.6 The directors may determine what period of notice shall be given of meetings of directors and may determine the means of giving such notice. It shall not be necessary to give notice of a meeting of directors to any director for the time being absent from the Republic, but notice of any such meeting shall be given to his alternative, if he has appointed one, provided that such alternate is in the Republic.
- 18.7 Until otherwise determined by the directors, a quorum shall consist of 3 directors. During the initial period not less than 2 of the directors required to constitute a quorum shall be directors appointed by the Developer in terms of Article 13.2. For the purpose hereof a director who has authorised another director to vote for him at a meeting in terms of Article 15 shall, if the director so authorised is present at the meeting, be deemed to be present himself and each director whose alternate is present at a meeting (even if the latter is alternate to more than one director) shall be deemed to be so present.
- 18.8 The continuing directors (or sole continuing director) may act notwithstanding any vacancy in their body, but, if and so long as their number is reduced below the number fixed by or pursuant to these Articles as a quorum, the continuing directors or director may act only for the purpose of summoning a general meeting of the company. If there are no directors or director able and willing to act, and no specific provision is made in these Articles for the appointment of directors, then any two members may summon a general meeting for the purpose of appointing directors.
- 18.9 Subject to the Statutes, a resolution in writing signed by the sole director or by all the directors for the time being present in the Republic and being not less than are sufficient to form a quorum shall be as valid and effectual as if it had been passed at a meeting of the directors duly called and constituted; provided that where a director is not present in the Republic, but has an alternate who is, the resolution must be signed by that alternate. The resolution may consist of several documents, each signed by one or more directors or their alternates in terms of this Article.
- 18.10 A director unable to attend a directors' meeting may authorise any other director to vote for him at that meeting, and in that event the director so authorised shall have a vote for each director by whom he is so authorised in addition to his own vote. If both the director so authorised and an alternative of the director who granted the authority are present at the meeting, the alternate shall not be entitled to vote on behalf of the absent director. Authority in terms of this Article must be in writing (which may take the form of a telefax, telegram, cable or telex) and must be handed to the person presiding at the meeting at which it is to be used.
- 18.11 The directors may elect a chairman of their meetings and determine the period for which he is to hold office; but if no such chairman is elected, or at any meeting the chairman is not present within fifteen minutes after the time appointed for holding it, the directors present may choose one of their number to be chairman of the meeting.

19. **VALIDITY OF ACTS OF DIRECTORS AND COMMITTEES**

As regards all persons dealing in good faith with the company, all acts done by any meeting of the directors or of a committee of directors, or by any person acting as a director, shall, notwithstanding that it be afterwards discovered that there was some defect in the appointment or continuance in office of any such directors or persons acting as aforesaid, or that they or any of them were disqualified or had ceased to hold office or were not entitled to vote, be as valid as if every such person had been duly appointed or was qualified or had continued to be a director or was entitled to vote, as the case may be.

20. **RESERVES**

The directors may set aside out of the profits of the company and carry to reserve such sums as they think proper. All sums standing to the credit of revenue and general reserve shall at the discretion of the directors be applicable for meeting contingencies, for the gradual liquidation of any debt or liability of the company, for repairing, improving or maintaining any property of the company, for meeting losses on realisation of or writing down investments either individually or in the aggregate, or for any other purpose to which profits of the company may appropriately be applied. Pending such application such sums may either be employed in the business of the company (without being kept separate from the other assets of the company) or be invested. The directors may divide the reserve into such special reserves as they think fit and re-allocate the amount of such reserves either in whole or in part to other special or general reserves and may consolidate into one reserve any special reserves or any parts of any special reserves into which the reserve may have been divided. The directors may also carry forward any profits without placing them to reserve.

21. **NOTICES**

- 21.1 A notice by the company to any member shall be regarded as validly given if it is either delivered personally to the member or sent prepaid registered post to him at his registered address.
- 21.2 A member shall be bound by every notice given in terms of Article 21. The company shall not be bound to enter any person in the register of members until that person gives the company an address for entry on the register.
- 21.3 Any notice, if given by post, shall be deemed to have been served on the seventh consecutive day following that on which the letter or envelope containing such notice is posted.
- 21.4 When a given number of days' notice or notice extending over any period is required to be given, the day of service shall not be counted in such number of days or period.

22. **INDEMNITY**

Every director, manager and officer of the company and every person (whether an officer of the company or not) employed by the company as auditor shall be indemnified out of the funds of the company against all liability incurred by him as such director, manager, officer or auditor in defending any proceedings, whether civil or criminal, in which judgment is given in his favour, or in which he is acquitted, or in connection with any application under section 248 of the Companies Act or any amendment thereof in which relief is granted to him by the court.

23. **WINDING-UP**

If the company shall be wound up the liquidator shall comply with the provisions of clause 6.2 of the company's memorandum of association.

## APPENDIX B: RAPTORS VIEW: HOME OWNERS RULES

RVHOA  
HOME OWNER'S RULES  
VER 3 – JANUARY 2009

**ANNEXURE “B”**  
(of the Raptor’s View Sales Agreement)

**RAPTOR'S VIEW WILDLIFE ESTATE**

**RAPTOR'S VIEW HOME OWNERS ASSOCIATION**

**HOME OWNERS' RULES**

**DENEYS REITZ**  
ATTORNEYS

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RVHOA  
HOME OWNER'S RULES  
VER 3 – JANUARY 2009

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## 1. **INTRODUCTION**

- 1.1 The objective of the Raptor's View Home Owners Association ("the Association") is to provide a high quality lifestyle for residents within a natural wildlife estate ("the estate"). The intention of these rules is to protect and maintain this lifestyle and the ecosystem in the estate.
- 1.2 These rules have been established binding on all occupants of the estate, as is any decision taken by the controlling body in interpreting these rules.
- 1.3 The members of the Association are responsible for ensuring that members of their families, tenants, visitors, friends, invitees and all their employees abide by and respect these rules. Tenants are to sign a copy of the Rules before occupation.
- 1.4 Happy and harmonious living within the estate is achieved when residents use and enjoy their private property as well as the common areas and other facilities within the estate.
- 1.5 In respect of the interpretation of these rules, the decision of the Association is final and binding on all parties.
- 1.6 These rules are subject to change from time to time in terms of the Articles of Association of the Association.

## 2. **USE OF PROPERTY**

Notwithstanding the fact that the member is the registered owner of a property, he will not have the use of the property save for the improvements and immediate surrounds. The remainder of the property will by way of servitude be subject to a right of use for the estate and the members of the Association for wildlife conservation purposes.

## 3. **ROADS**

- 3.1 All roads within the estate are for the movement of occupants, whether by foot, or approved vehicular means.
- 3.2 Within the estate are main vehicular roads, link roads to dwellings, game viewing roads and foot paths.
- 3.3 Motorised vehicles may only drive on the main vehicular roads and link roads to and from members' residences and may not travel on the game viewing roads or foot paths or over open spaces, save for those necessary to maintain the estate and members shall obey such signage signifying various roads and game viewing paths.
- 3.4 Pedestrians, electric driven golf carts and bicycles only may take access over the game viewing roads, and only pedestrians and bicycles may traverse foot paths.
- 3.5 The speed limit within the estate shall be 30 kph and road signs displaying this limit will be placed in and around the road system.
- 3.6 Save for the above, all enacted traffic legislation shall apply.
- 3.7 Parents are responsible for ensuring that their children do not play or cause a nuisance on the road system.
- 3.8 Residents are reminded that wildlife and game will frequently cross roads and speed limits must be obeyed.
- 3.9 Please refer to the House Rules - Section VEHICLES & TRAFFIC - for the height, size and weight of furniture removal vehicles able to access the Estate.

**4. GOOD NEIGHBOURS**

- 4.1 No business activity or hobby shall be conducted on any property which will cause aggravation or nuisance to fellow residents or which interferes with the expected tranquil nature of the estate, without written approval from the Association.
- 4.2 The volume of music, electronic instruments, entertainment, or activity of domestic employees, should be at such level as not to cause nuisance to any other residents or wildlife on the estate.
- 4.3 The use of power tools should be restricted to the following hours:  
07:30 to 18:00 Monday to Friday
- 4.4 No washing should be hung on lines unless screened from all roads and neighbouring properties.
- 4.5 Refuse must be properly retained from all wildlife and collection of refuse will be on a system determined by the Association from time to time.

**5. IMMEDIATE SURROUNDS**

- 5.1 Every property owner shall be responsible for the maintenance of the building area of his property only. For the purposes of these rules, building area shall be a radius of 20m of the building peg recorded in the initial purchase agreement for a property. All other areas shall remain part of the wildlife estate over which the Association and its members has a right to traverse.
- 5.2 Trailers, boats, all garden equipment and tools should be sited out of view and screened from roadways or neighbouring properties, to the satisfaction of the Association. Camping trailers may not be used to provide accommodation on the Estate.
- 5.3 No building waste material or garden waste may be dumped anywhere and must be removed from the estate immediately by the property owner or through the refuse removal policy of the Association.
- 5.4 Gardens should be created from indigenous flora only and then only in the building area. The Association has the right at any time to restrict the creation of gardens should the Association be of the opinion that they are not in keeping with the flora of the estate. No non-indigenous, noxious or prohibited flora shall be planted anywhere on the estate, other than lawn.
- 5.5 No poisonous chemicals may be discharged anywhere on the estate, except for recognised pest control.
- 5.6 Swimming pool water may be regulated by the direct insertion of chlorine, salt-water chlorination or other means approved by the Association.

**6. USE OF THE ESTATE**

- 6.1 Residents shall have the right of access over the estate, for the purposes of walking and game viewing but shall not interfere with any flora or fauna on the estate.
- 6.2 Animals shall at all times have right of way within the estate.
- 6.3 No dogs, cats or any domestic animals or birds, caged or otherwise, or domesticated wildlife, are permitted on the estate.
- 6.4 The onus shall be on a resident at all times to see to his or her own safety when walking or game viewing. The liability for the consequences of any injury sustained on the estate from whatever cause shall rest with the injured party.

## 7. **PRESERVATION OF WILDLIFE ESTATE**

In order to preserve the flora and fauna on the estate, every resident, guest or invitee shall:

- 7.1 not chase hunt, shoot, trap, fish, molest, or in any way interfere with the indigenous wild life of the estate, provided that residents may from time to time be permitted to fish at certain pre-determined areas, and according to such rules as the Association may determine;
- 7.2 prevent veld fires and avoid the creating of fire hazards;
- 7.3 not create any disturbing noise;
- 7.4 not make any new foot paths or new roads;
- 7.5 not establish or create any feeding or drinking point for game nor feed any animals or birds on the estate; small standard-size bird-baths will be permitted at the discretion of the Association;
- 7.6 not provide housing to accommodate servants on the estate without the written consent of the Association;
- 7.7 not make any fires other than in areas specifically designated therefore;
- 7.8 not drive in river beds or predetermined river bed roads other than at designated river crossings;
- 7.9 not house on the estate a caravan;
- 7.10 drive only on clearly defined roads within the boundaries of the estate;
- 7.11 not take steps to set up camp on a temporary or permanent basis;
- 7.12 not collect or take anything from the estate, including any wood, stones, flora, fauna or the remains of fauna;
- 7.13 not allow any child under the age of 16 (sixteen) years to reside on the estate unless accompanied by and under the supervision of an adult of 21 (twenty one) years of age or older;
- 7.14 not park unattended vehicles in areas other than those designated by the Association from time to time;
- 7.15 not introduce any motorised generators or power plants onto the estate, without the prior written consent of the Association;
- 7.16 not introduce any motor cycles, quad bikes or other mechanised vehicles that are non-registered, onto the estate save those to commute directly from the entrance of the estate to a residence, subject to Clause 7.3, and which items of transport as defined above shall require the written approval of the Association and which approval shall not be unreasonably withheld;
- 7.17 not drill any holes, including boreholes, on the estate without the prior written consent of the directors;
- 7.18 where applicable, maintain the exterior of any residential improvements, including the paint work, thatching, roof cappings, pipes and windows, in a good and sound condition to the reasonable satisfaction of the directors. Should the owner of a property not adhere to this rule, the Association shall be entitled, but not obliged, to take such steps as may be necessary to make such repairs at the cost of the owner.

## 8. ENVIRONMENTAL MANAGEMENT

- 8.1 No rubble, waste or refuse of any kind shall be dumped or discarded in any undeveloped areas or stands, public area, open space, road, water feature or stream. All rubble, waste and refuse will be removed according to the policy of the Association from time to time.
- 8.2 Residents using open space for any reason are to leave it in the same state in which it was found.
- 8.3 Picnicking shall not be permitted on estate other than in specially approved and demarcated areas.

## 9. SECURITY

- 9.1 Security is an attitude. It is for each member's own benefit and for the benefit of the entire community.
- 9.2 The security guards and the controlling security rules and systems in place from time to time shall not be abused by any person.
- 9.3 Security protocol at any secured entrance shall be adhered to at all times.
- 9.4 Any ID card system for permanent workers, temporary workers, estate staff and contractor representatives and their employees must be conscientiously enforced by every owner and every person in his or her employ.
- 9.5 Every owner must request his or her visitors and contractors to adhere to security protocol. Formalities and rules relating to access by visitors shall be determined by the Association from time to time.
- 9.6 All occupants who require security in their dwelling are requested to install their own security system of the type approved by the Association.
- 9.7 The estate security will be manned 24 hours a day, on a basis to be determined from time to time by the Association.
- 9.8 Vehicle security stickers must be affixed to vehicle windscreens to assist guards in the performance of their duties.
- 9.9 All owners and approved lessees shall be provided with security access cards of a type to be determined and consistent with the central security system selected.

## 10. TENANTS, VISITORS, CONTRACTORS AND EMPLOYEES

- 10.1 Should an owner let his property, he shall inform the Association in writing in advance of the lessee taking occupancy on the form to be provided by the Association. The owner shall inform the lessee of rules of the Association and that such lessee shall be bound by these rules. Despite the foregoing, the owner shall at all times be accountable for the actions of his lessee.
- 10.2 Owners and approved lessees shall be liable for the conduct of their visitors, contractors and employees at all times.
- 10.3 Owners are to ensure that contractors in their employ have signed a Contractor's Code of Conduct and that they abide by the code.
- 10.4 Only one domestic servant will be permitted to reside on each property, unless otherwise approved by the Association.

## 11. ARCHITECTURAL DESIGN GUIDELINES

- 11.1 All building plans must be in accordance with the Design Guidelines and Architectural Guidelines applicable to the development and must be approved by the architectural review committee. This applies also to any subsequent alterations and additions to existing structures.
- 11.2 All builders must comply with Clause 14 hereof and such other rules as may be implemented from time to time.
- 11.3 No more than 8 (eight) beds per individual stand may be permitted. Stands may not be sub-divided but should any stands be consolidated, the number of beds permitted on a consolidated stand will be the number of stands consolidated multiplied by 8.
- 11.4 No boundary demarcation of individual stands of any type is permitted.
- 11.5 Lean-to or temporary carports will not be permitted.
- 11.6 Roofing material for patios and all outbuildings shall be as defined in the design guidelines.
- 11.7 The use of shade cloth is not permitted.

## 12. LETTING AND RESELLING PROPERTY

- 12.1 Should an owner wish to sell or lease his property, only an accredited estate agent as envisaged in 12.6 may be selected to manage the sale or lease, if the owner does not conduct the sale or lease himself.
- 12.2 The owner and any accredited agent must ensure that a purchaser is made aware of all the rules and constitutions applicable to the entire development.
- 12.3 The seller or lessor of a property within the development shall ensure that the sale or lease agreement contains the following clauses:
  - 12.3.1 **Sale**
    - 12.3.1.1 This agreement is subject to the consent of the Home Owners Association.
    - 12.3.1.2 The purchaser acknowledges that the property may not be transferred until the purchaser has agreed to become a member of the Home Owners Association and agrees to be bound by its constitution and all other rules and regulations applicable to the entire development, for so long as he is the registered owner of the property.
    - 12.3.1.3 The property may not be subdivided.
  - 12.3.2 **Lease**
    - 12.3.2.1 The lessee acknowledges that upon occupation of the premises, he and his family, his employees and invitees shall abide by all rules and regulations of whatever nature applicable to the control, management and running of the estate as may be applicable from time to time.
- 12.4 Accredited agents may only operate on an appointment basis and must personally accompany prospective parties to a stand for sale or for lease. No signboards shall be erected under any circumstances.
- 12.5 The seller or lessor shall personally ensure that the lessee or purchaser is informed about and receives a copy of all documentation applicable to the control, management and running of the estate, as may be applicable from time to time.

- 12.6 For so long as the developer requires, an estate agent approved by the developer will be the only accredited agent that may be appointed by the Association unless the said developer agrees otherwise. Thereafter an estate agent is accredited after signing an agreement with the Association, to the effect that such agent shall adhere to the stipulated procedures applicable to the sale or lease of a property in the estate, having been familiarised with respect to all documentation relating to the transaction and the control, management and running of the estate.
- 12.7 The Association reserves the exclusive right to review the accreditation of any agent and the policy relating thereto from time to time. This accreditation will not be unreasonably withheld.
- 12.8 No short term rentals of less than 30 consecutive days shall be permitted.

### 13. **ADMINISTRATION**

- 13.1 All levies are due and payable in advance to the Association on the first day of each month and interest will be raised on overdue accounts at a rate to be determined from time to time by the Association. A further penalty shall be raised on accounts in excess of 60 days. Such penalty shall also attract the interest charge.
- 13.2 The Association may only amend, add or delete any regulation as described in Annexures "B" and "C" at an AGM or an SGM.
- 13.3 The Directors of the Association shall have the right to fine transgressors of any regulations in relation to its seriousness. Such fine shall be recovered via the levy invoicing system.
- 13.4 All levies are due and payable as set out in the agreement of sale.
- 13.5 The Purchaser undertakes to pay the building levy as determined by the Association.

### 14. **CONDITIONS WITH REGARD TO ALL CONTRACTOR ACTIVITY**

#### 14.1 **Introduction**

- 14.1.1 The Association has adopted certain rules relating to Contractor activity within the estate.
- 14.1.2 The primary intention of the provisions hereunder is to ensure that all building activity occurs with the least possible disruption to members/residents on the environment. In the event of any uncertainty, members and/or their contractors are most welcome to contact the Association's appointed project manager.
- 14.1.3 There are no obligations to build on the Estate. However, should building commence, the project must be completed within 9-months from commencement; no uncompleted phases will be allowed. Please obtain a copy of the House Rules from the RVHOA's office, should you decide to build.

#### 14.2 **Legal Status**

- 14.2.1 The conditions governing building activity set out in this document are rules adopted by the Association and are therefore binding on all owners, their contractors and sub-contractors. Furthermore, all owners are therefore obliged to ensure that their contractors and sub-contractors are made aware of these conditions and comply strictly with them.

- 14.2.2 Owners are therefore required to include these conditions in their entirety in any building contract concluded in respect of property within the estate, and all such contracts shall be required to be submitted to the Association for prior approval.
- 14.2.3 The Association, via the project manager, has the right to suspend any building activity in contravention of any of the conditions herein, including the design guidelines, and the Association accepts no liability whatsoever for any losses sustained by an owner as a result hereof.

#### 14.3 Conditions Regarding Selection of a Building Contractor

- 14.3.1 No contractor is permitted onto the estate unless he has concluded a contractor's agreement with the Association, paid the required deposit, and signed a copy of the House Rules, which may be varied by the Association from time to time.
- 14.3.2 A member may request the Association via the project manager to appoint a contractor from a list of recommended contractors to construct any building for which plans have been approved within the design guidelines.
- 14.3.3 A member may nominate his own contractor to undertake building provided that such contractor receives approval from the Association via the project manager and operates within the design guidelines.
- 14.3.4 The project manager, appointed by the Association, shall be responsible for monitoring the adherence to these conditions and the design guidelines as set out from time to time.

#### 14.4 Conditions Regarding Building Contractor Activity within the Estate

- 14.4.1 Contractor activity shall only be permitted during the hours of 6:00 to 18:00 hours Monday to Friday.
- 14.4.2 No contractor activity is permitted on Saturdays, Sundays or public holidays, without the express permission of the project manager. This time is considered as private time. Specific application for contractor activity during private time must be lodged with the project manager and adjacent neighbours one week prior to the proposed period of work.
- 14.4.3 The contractor will not be permitted to have a watchman on site.
- 14.4.4 All workers of contractors and sub-contractors must enter the estate in an approved vehicle with a temporary access token or, alternatively, obtain a casual employee ID card at the security gate, by lodging a valid ID document, which shall be handed back to the worker on the return of the estate ID card, each day. All such workers will gain entry to the estate through an entry point approved by the project manager.
- 14.4.5 The contractor shall provide facilities for rubbish and rubble disposal and ensure that their employees use such facilities. All rubbish and rubble shall be removed from the estate by the contractor each day. No rubbish or rubble shall be burnt on the site.
- 14.4.6 No concrete or other building materials may be mixed on the ground.
- 14.4.7 No materials shall be off-loaded by a supplier onto road verges or roadways. All materials shall be off-loaded on a site or onto the designated

- yard area for the receiving contractor. Likewise the contractor shall not remove rubble, rubbish or materials to within the road verges or roadways.
- 14.4.8 Delivery of materials to site or to designated yards shall not be permitted during private times as defined above.
- 14.4.9 The area of the building site will be demarcated by hessian or such other material approved by the Association and no workers employed on the building site are permitted to leave that demarcated area.
- 14.4.10 The contractor shall provide portable toilet facilities for use by its workers. No pit latrines will be permitted. All toilet facilities will be maintained in a sanitary and healthy manner.
- 14.4.11 Contractor building boards may only be erected if they comply with the project manager's required standards. Details of specification may be obtained from the project manager. No sub-contractor boards shall be permitted. All boards so erected shall be removed from a site on completion of construction.
- 14.4.12 The member and the contractor shall be jointly liable for any damage to kerbs, plants, roadways and private property. Such damage shall be rectified to the satisfaction of the project manager or his representative to the cost of the owner and contractor.
- 14.4.13 Should the Association have any concerns about the conduct or performance of any contractor, sub-contractors or their employees, the matter shall be referred to the project manager whose ruling on the incident(s) shall be final. This clause shall be read in conjunction with 2(c) above.
- 14.4.14 The member, contractor and sub-contractors shall not claim at any time that they are not aware of the existence of these rules and any other applicable to their respective obligations and it is incumbent upon each owner to ensure that every contractor and/or sub-contractor in his employ is aware of their respective responsibilities.
- 14.4.15 The Association reserves the right to amend the foregoing at any time under advice from the project manager. Any changes to the foregoing shall be circularised to all owners, active contractors and newly appointed contractors and sub-contracts, in writing within seven days of a change having been approved.

## APPENDIX C: RAPTORS VIEW: ARCHITECTURAL REQUIREMENTS

**ANNEXURE “C”**  
of the RV Sales Agreement**RAPTOR’S VIEW WILDLIFE ESTATE**  
**ARCHITECTURAL REQUIREMENTS****1. GENERAL**

- 1.1 **BUILDING AREA**  
The bulk of the building and all thatched areas to be within the 15m building area radius. Timber decks and swimming pools to be within a maximum of 20m radius. The intention is to prevent spread over the site.
- 1.2 **MAINTENANCE**  
Owners shall at all times maintain the exterior of their house, swimming pool, garden, screen walling or fencing and decks to the satisfaction of the Association.
- 1.3 **APPEARANCE**  
Owners shall at all times ensure that any object which could, in the opinion of the Association, be considered unsightly or to the detriment of the appearance of the Estate, not be visible from common areas or other properties. Objects, which should be screened from view, include among others washing lines, exposed plumbing and swimming pool pumps.
- 1.4 **RESTRICTIONS**  
The restrictions set out below are in addition to any restriction imposed in terms of conditions of title, town planning schemes or national or any other building regulations. Notwithstanding that any plans or improvements may comply with any such restrictions imposed by third parties, the approval of any plans or improvements within the Estate shall be at the sole discretion of the Raptor’s View Home Owners Association (RVHOA). Similarly, compliance with restrictions imposed by the RVHOA shall under no circumstances absolve the owners from the need to comply with restrictions imposed by third parties, nor shall the RVHOA approval be construed as permitting any contravention of restrictions imposed by any authority having legal jurisdiction.
- 1.5 **DENSITY**  
Only one dwelling may be erected on a stand and shall not exceed the maximum density permitted in terms of the Town planning scheme, with 8 beds maximum and one kitchen per site. Refer to Annexure “B”, Section 11.3.
- 1.6 **HOUSE SIZE**  
Although the maximum house size is not prescribed, the RVHOA shall be entitled not to approve the plans for any house, which in their sole opinion would detract from the appearance of, or reduce the value of, other houses on the Estate. The RVHOA shall not be required to give reasons for rejecting such a plan, nor shall the RVHOA incur liability to any person in doing so.
- 1.7 **BUILDING PEG**  
The numbered peg driven into the ground on the property represents the centre point of the 15m radius for the building area, has co-ordinates from a global positioning system and shall under no circumstance be moved.  
It is the express responsibility of the purchaser to verify the position and its accuracy prior to commencement of building works.
- 1.8 **SECURITY**  
No security spikes, razor wire, electric shock wires or any similar devices shall be permitted.

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## 2. HOUSES

### 2.1 AESTHETIC CONCEPT

The built-up environment on the estate is to project a game lodge visual effect with strict control in terms of the architectural rules as listed. Any external element not described below will be assessed and approved by the RVHOA against the intention of the concept.

### 2.2 HEIGHT RESTRICTION

No double storey dwellings shall be erected on the Estate. The primary consideration is to safeguard the privacy of adjacent residents. The height of any part of the structure is not to exceed 8.5m (eight comma five metres) above the natural ground level at the peg position.

### 2.3 SINGLE STOREY STRUCTURES

Only single storey dwellings with no attic windows on gable front and no dormer windows from which light at night may emanate or from which the sun may reflect. All task lighting to shine directly down and no general spotlighted areas, which could bother neighbours or game, are permitted. Thatched external patios to have wattle lathe gables preventing light emanation to natural areas.

### 2.4 LIGHTNING CONDUCTOR POLES

These are not permitted on the estate.

## 3. WALLS

### 3.1 HOUSE WALLS

Hardwearing, waterproof, ultraviolet resistant patented cement based coating which weathers to give a natural mottled appearance to one approved khaki colour sample to be used, with a limited usage of rock cladding to the approval of the Estate Manager. No deviation will be permitted.

### 3.2 YARD AND SCREEN WALLS

The external screen walling shall not exceed 2.1m in height, shall be finished on both sides, and shall be either wattle lathe on a plinth or brick walling to finish as described under house rules. Washing lines not to be noticeable.

### 3.3 PLINTHS

Plinths are essential design elements for estate houses and to extend past external house walls to stabilize the external gum pole roof support columns, and to be finished with a hardwearing approved khaki finish to complement the internal finish. Colour to be approved and to complement the prescribed house wall colour. All to the satisfaction of the Architectural Review Committee.

### 3.4 OUTBUILDINGS

All garages, staff quarters, housing for electrical meters, lockable refuse enclosures and other outbuildings shall be constructed and finished to match the main house.

## 4. ROOFS

### 4.1 THATCHED ROOFS

All pitched roof coverings to dwellings to be thatch at 45° pitch with optional 25mm wire mesh. Thatch to be done by specialists. No gutters will be permitted. All roof tops to be painted black.

### 4.2 CONCRETE LINKS

Flat concrete sections of roof over the links to be waterproofed with approved drip details and patterned strip. Colour to match the grey weathered look of thatch, to falls and discarded by a spout detail.

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- 4.3 **PATTERNING**  
Pattern strip on concrete links to be 170mm brickwork triangular recesses at 45 degrees.
- 4.4 **SPOUTS**  
Flat concrete link roofs to be drained by a purposely designed spout clearing the outside walls. Water to run down a chain into a rock stacked disperser on ground level.
- 4.5 **CARPORTS & COVERED PATIOS**  
Carports and covered patios to have gum pole structures with approved coverings. Covering could be pitched thatch roofs with wattle lathe gables or approved wattle lathe sunscreens or mesh reinforced waterproofed screed on wattle lathe support with a 100mm fall over 6 metres. Colour of waterproofing to match the flat concrete roof finish. No sheet metal or shade netting will be allowed.
- 5. TIMBER**
- 5.1 **WATTLE LATHE/RETRACTABLE SUNSCREENS**  
External wattle lathe sunscreens to be SABS approved CCA treated, equally spaced to provide a neat yet natural sunscreen, and stained dark brown in contrast with the wall finishes. Retractable/moveable awnings to consist of bush-green ripstop/canvas fabric.
- 5.2 **EXTERNAL TIMBER**  
All external structural timber to be SABS approved CCA treated and dark brown stained to be in contrast with the wall finishes.
- 5.3 **WATTLE LATHE SCREEN WALLS**  
As per external timber, equally spaced to provide a neat yet natural sunscreen or vertical screens never exceeding 2.1 metres.
- 5.4 **TIMBER DECKS**  
75mm x 38mm Thick SABS approved CCA treated SA Pine, or other approved material, fixed to approved detail with adequate support rafters.
- 6. PLUMBING**
- 6.1 **PIPES**  
No visible supply pipes or sewer pipes will be allowed unless painted in the matching khaki colour and vent valves in lieu of vent pipes to be utilized.
- 6.2 **SEPTIC TANKS**  
Septic tanks to be strictly in accordance with the local authority requirements and the position on site to be approved prior to construction.
- 6.3 **GREY WATER SYSTEM**  
Due to the poor percolation of the soils in Raptors View, all new houses must install an approved Grey Water System. All water from baths, basins, showers, prep bowls, washing machines and dishwashers must be piped into a grey water tank. The tank should be fitted with an automatic pump, a float switch and a hosepipe and sprayer. When the tank is full the pump will automatically switch on and spray the surrounding bush.
- 7. POOLS**
- 7.1 **SPLASH POOLS**  
Charcoal or Portland Grey internal finish with pumps out of sight. Splash pools to have timber transition decks as per the specification between the edge of the pool and the garden / veld. Maximum size to be 16 square metres.

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## 8. LIGHTING

### 8.1 LOW LEVEL

Only low-level lighting 300mm above floor level will be allowed in carports, driveways, service areas and external walkways. Lighting should not be visible from neighbour's property.

### 8.2 LIGHT FITTINGS

Light fittings for external patios (covered and uncovered) and entrances to be wall mounted and "eyelid" – type fittings shining down at a maximum height of 1.2m from floor level.

## 9. EXTERNAL FITTINGS

### 9.1 TV AERIALS

Aerials to be positioned as to have minimum impact on the surrounding areas.

### 9.2 SATELITE DISHES

Satellite dishes to be positioned as to have minimum impact on the surrounding areas. To be painted the same colour as the exterior walls/roof thatch.

### 9.3 AIR CONDITIONING UNITS

Wall mounted Air Conditioning Units condensate drainpipes and conduiting to be built into walls, or fitted into trunking. To be painted the same colour as the exterior walls.

### 9.4 SPLIT UNITS

Condensers to be placed on flat roof links, painted to complement the wall finish and piping and conduiting to be built in or placed in trunking. To be painted the same colour as the exterior walls.

### 9.5 FIRE HOSE REELS

May be covered by a bush-green ripstop cover but the appropriate fire emblem in red has to be placed on the cover.

### 9.6 SOLAR PANELS/GEYSERS

All components of the solar system must be SABS approved and must be installed by an approved contractor. Solar panels must be painted black against the dark thatch or adequately screened from view. All geysers shall be of a hybrid type with automatic timers and be SABS approved.

## 10. WINDOWS AND DOORS

### 10.1 WINDOWS

Windows to be approved hardwood stained dark brown, bronze aluminium or mahogany woodgrain finish.

### 10.2 DOORS

Doors to be approved hardwood stained dark brown, bronze aluminium or mahogany woodgrain finish.

### 10.3 GARAGE DOORS

To be horizontally slatted hardwood paneled doors stained dark brown.

### 10.4 RAINWATER STORAGE TANKS

No rainwater storage tanks permitted.

## 11. REFUSE AREA

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Lockable storage rooms for refuse bins accessible from outside. No refuse bins to stand in yards.

**12. GARDENS, ENTRANCES & DRIVEWAYS**

12.1 LAWNS

Lawns are only permitted within the 20m radius and separated from the veld with a 500mm plinth wall or lathe border or timber deck.

12.2 PLANTS / TREES

No exotic plants will be permitted.

12.3 ENTRANCES / DRIVEWAYS

Only red pebbles, grey gravel, flagstones or concrete within the 20m radius will be permitted.

## APPENDIX D: THE COST OF ECOLOGICAL MONITORING

An amount of around 1 % of the total value (not hunting) of the animals present on a reserve is considered reasonable when deciding on doing a game count (ABSA 2003). Game values were obtained from various sources including managers from the area. I assume a similar percentage for the vegetation and faecal analysis-monitoring programme (not including the cost of land, infrastructure etc.). The following table summarises the situation for RV based on the game numbers obtained in the 2010 aerial game count.

Table RV estimate of costs as a proportion of the value of the larger mammals present.

Species	Total Value (R)	(1) Total cost of vegetation monitoring and faecal analysis per annum (Exc. Vat) (R)	(2) Total cost of helicopter count @ say R5 500 per hour (Exc. Vat) – say 1.5h (R)
Bushbuck	7480	10 233	8 250
Giraffe	224000		
Impala	57600		
Kudu	36000		
Nyala	135000		
Warthog	11200		
Waterbuck	205000		
Wildebeest	33600		
Zebra	100000		
	809880		
Cost of ecological monitoring (1) and (2) as percentage of value of game (%)		(1) 1.3	(2) 1.0
Cost of ecological monitoring as percentage of value of game (%)		2.30	
Recommended percentage (%)		2.0	

\* Mean of estimated male and female costs

## APPENDIX E: DETAILS ON THE ASPECTS OF THE GUIDING PRINCIPLES

### ADAPTIVE MANAGEMENT

Ecosystem management is a complex and dynamic process that is best achieved by using an adaptive management system. The principle of 'Adaptive Management' (Bell 1984, Walker 1998) is a systematic approach where, based on present and often incomplete knowledge of the operation of the system, a clearly defined objective is chosen and the most appropriate management is implemented to achieve this objective. The management procedure is recorded and evaluated and the results are monitored. Because the outcomes of management are not always guaranteed, the results are evaluated against the assumptions on which the management was based. Divergence from the expected results will provide knowledge that enables greater understanding of the system. Alternatively the objective may have to be reviewed or the management procedure changed where appropriate.

### SCALE

In the study area, land-use practises have varied markedly over the last century, culminating in intensified multi-use exploitation of wildlife (Peel *et al.* 2004; Peel *et al.* 2005). Scale and heterogeneity are important considerations in any natural resource-based operation aimed at sustainable resource use. The KNP (*ca.* 20,000 km<sup>2</sup>) for example adopted the Noss (1990), definition of biodiversity as underlying basis for their revised management plan (Braack, 1997a; 1997b). Considering biodiversity, the plan defines 'Thresholds of Potential Concern' (TPCs), including a limited percentage of 'degraded' land (Peel *et al.* 1998).

However, next to the KNP adjacent 'intermediate' sized reserves (*ca.* 200 to 800 km<sup>2</sup>) (Adjacent Private Protected Areas (APPA)) has embraced the basic philosophies of the KNP management plan, have similar general objectives but operate at different scales (Peel *et al.*, 1998).

Small fenced properties (<200 km<sup>2</sup>) to the west, which allow restricted movement for animals, have similar objectives but, because of size, present a unique set of management challenges and advance the notion of sustainability as an end goal rather than biodiversity (Peel *et al.*, 1998).

In fact, there is debate as to the relation between biodiversity and stability that, depending on the degree of connectedness between species, will influence stability (May 1974). In this case Allen *et al.* (2003) relegate the notion of biodiversity to a bookkeeping exercise rather than a contribution to functional stability. Landscapes function at spatial and temporal scales that correspond with those of large ecosystems, biomes or communities (Allen *et al.* 2003). So large landscapes link easily with the processes of both smaller

and larger ecosystems thus giving us an insight into ecosystems, biomes and community processes (Allen *et al.* 2003).

Until the early 1990's, most of the research work done in the eastern Lowveld dealt with the 'preservation' aspects of conservation on large reserves and national parks but there was a perceived 'degradation' of land on fenced areas to the west of KNP. These areas are thus strongly influenced by anthropogenic rescaling through water provision and a more sedentary existence adopted by water dependent animals. There was no explicit cognisance of the diversity of land uses and land user objectives, which include ecotourism, recreation, breeding of rare species, hunting, biodiversity conservation and commercial and communal livestock grazing. In addition, these systems operate at a variety of spatial and temporal scales requiring different objectives relevant to different areas at differing scales thus highlighting the need for different or tailor made management approaches to meet the particular objectives (Tables 1).

Table 1: A hierarchy of objectives and their relevance to spatial scale in the study area.

Objective	Relevance (scale>800km <sup>2</sup> )	Relevance (scale<800km <sup>2</sup> )
Maintain essential ecological processes and life support systems	High	Moderate
Preserve genetic diversity	High	Moderate
Sustainable utilisation of species and ecosystems	Moderate-Low	High
Preserve plant and animal life in our country for future generations	<b>High</b>	High – but replace 'preserve' with 'conserve (wise –use)'
Ensure wise utilisation of non-renewable resources	Moderate-High	Moderate-Low
Enrich qualities of life for South Africans	High	Moderate-Low

## THRESHOLDS OF POTENTIAL CONCERN

In the Kruger National Park, Thresholds of Potential Concern (TPCs) define the spatiotemporal heterogeneity conditions for which the KNP is managed (Biggs & Rogers 2003) and are essential in connecting science, monitoring and management as embedded in an integrated ecological management programme.

The TPCs are in turn defined as the upper and lower levels of ecological indicators along a continuum of change (Biggs & Rogers 2003). When a TPC is either reached or predicted to be imminent an assessment is done to decide whether management action is required or whether the TPC needs to be re-stated. The spectrum of TPCs represents an envelope within which the flux of the ecosystem is acceptable to both managers and scientists within the context of the vision statement and objectives hierarchy (Biggs & Rogers 2003).

The width of the TPCs determines the level of risk that will be tolerated, e.g. widely set TPCs mean a risk tolerant approach and visa versa. For example, for blue wildebeest, the KNP set a counter trend TPC. Blue wildebeest in the KNP are particularly susceptible to predation in above average rainfall years due to increased cover for predators (Mills *et al.* 1995). The counter trend TPC is thus set for three monotonic drops of more than 10% of the estimated count in a dry cycle when in fact blue wildebeest numbers should be on the increase.

Properly administered, the approach ensures that management action is correctly implemented, with the TPC, as it defines the system's current state, being returned to the acceptable range. Further, the monitoring system must be shown to be feasible and efficient with the objective being achieved by the return of the TPC to set limits (Biggs & Rogers 2003). This becomes important when considering intergenerational time scales and keeping in mind the inexorable (thermodynamic) running down of the system. If this generation for example, causes a system change it should at least be able to return the system to the current state or to a state that is capable of yielding the ecosystem services required by the next generation. The rate of change of the system also becomes important, how close are we to the edge of the cliff? Will we be able to return to the 'desired' state? We look at operationalising TPCs by investigating OOM (Order-of-Magnitude) concepts and sustainability notions and highlight the embedding of the vision, objectives and TPCs within an adaptive management cycle and the management-research-monitoring continuum.

## MONITORING

Monitoring should be aimed at detecting and/or warning of changes which compromises the achievement of the reserve objectives; and to evaluate the success of management actions which have been implemented; to generate relevant key questions for research

Monitoring techniques and procedures for each of the components (starting with baseline surveys) and the key intervention variables (weather, fire, animal removals and introductions, bush clearing, seeding etc) are developed and applied in accordance with the following criteria.

- Scientifically sound, especially with respect to being repeatable and objectively extrapolated to the system (or subsystem) as a whole;
- Provide data that is realistic with respect to the budget and manpower available;
- Efficient with respect to restricting the nature (parameters and level of detail measured) to that which relates directly to the systems model and measurable components of the objectives set;
- Can be usefully applied by management.

## APPENDIX F: TECHNICAL DETAILS RELATING TO EROSION

### Erosion on cleared areas

Where necessary, soil moisture conservation can be achieved by using the felled tree crowns as contour brush packs above the donga head/s to minimise rainfall runoff into the drainage line (Fig. 1). Important principles include:

- Brush packs must be laid out on the contour;
- A dumpy level should be used to peg out contour lines;
- Do not place brush packs closer than 3x the vertical height of the donga head;
- Leave an opening of about 1m between the brush packs on the same contour line;
- Stagger these openings between brush packs on adjacent contour lines (Fig. 1); d
- If there is old fencing material or wire mesh available use this to anchor the crowns as contour brush packs. Crosscut stems of felled woody plants can be sharpened as anchor pegs.

Eroding donga heads can be stabilised by building stone packs in the donga itself (see Fig. 2).

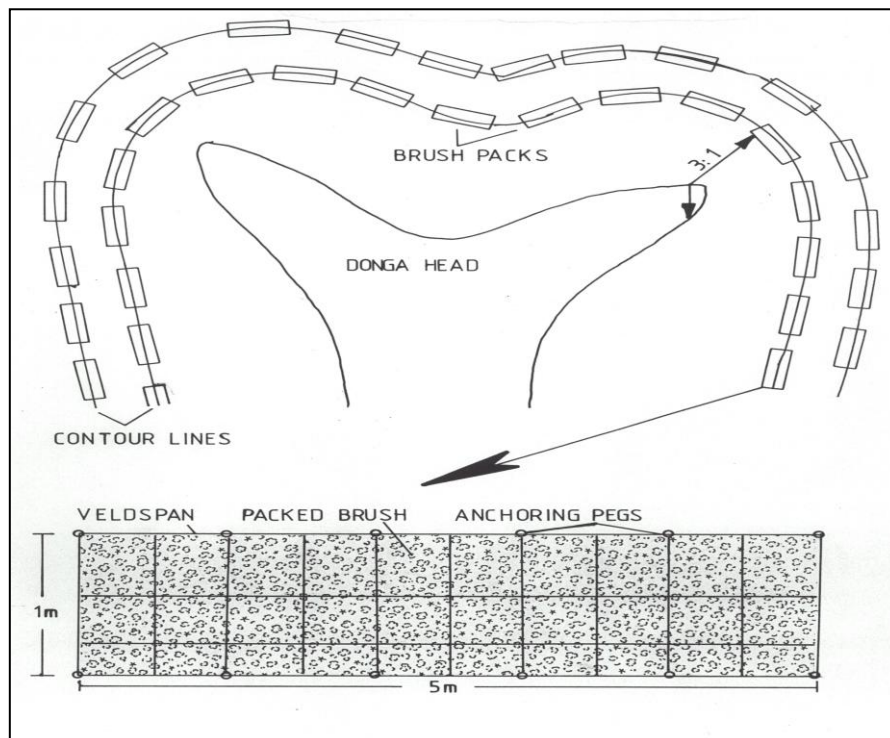
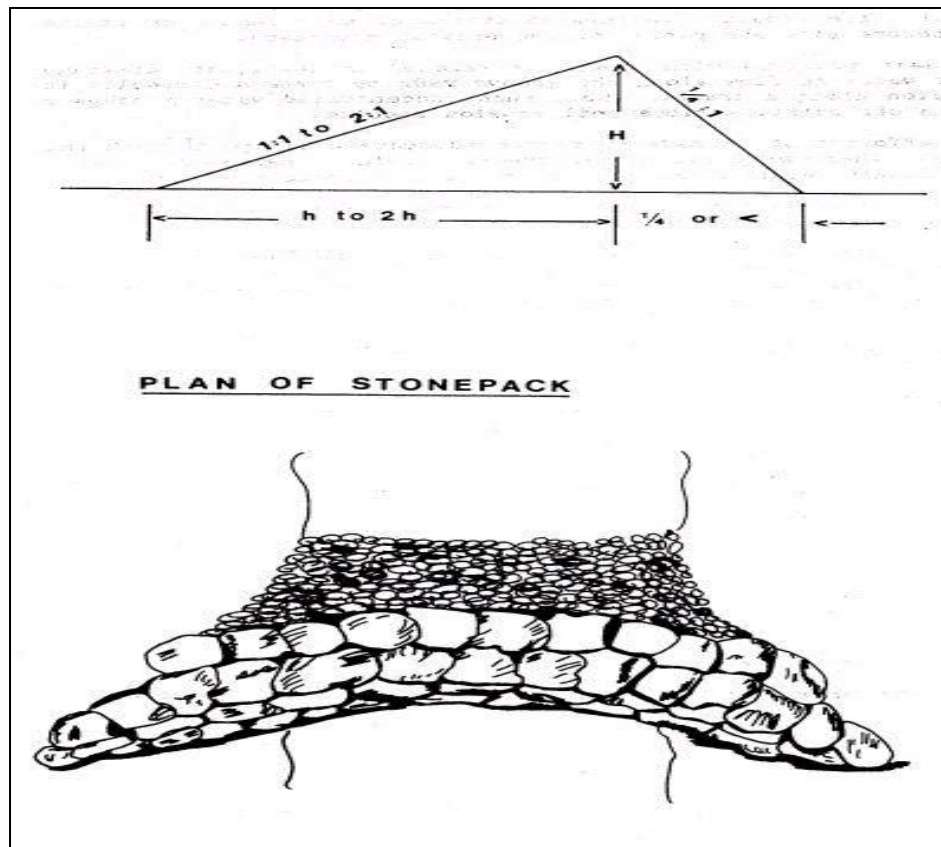


Fig. 1. Layout and dimensions of contour brush packs.



*Fig. 2. Details of typical stone pack – Rocks should be elongated/flat/oval-shaped and hard durable and heavy – Pack the rocks so the long axis lies parallel to the upstream slope of the structure (1.5:1) – Ensure good bond in length and depth of structure with foundation and shoulders.*

Important principles include:

- Stone packs should not exceed 1.2m in height;
- Each stone pack must be keyed in (at least 25cm) on each side of the donga (see Fig. 2);
- The spillway must be as wide as is practicable since the emphasis is on trapping silt and not creating a dam; and

- The entire upstream side of the stone pack should be lined with smaller rocks, stone and gravel as this acts as a filter and traps silt.

## Erosion from roads and tracks

The objective is to minimise soil erosion and rainfall runoff from all roads and tracks on RV by the correct drainage and placement of roads. Specific goals should be to:

- Reroute existing roads that are eroding actively;
- Reclaim eroding sections of rerouted roads; and
- Place new roads so that erosion is minimised.

## Rerouting existing roads

Some soil types are more prone to soil erosion than others and **one of the basic principles of road construction is to avoid, if at all possible, soil types that are highly susceptible to erosion.** In the granitic areas of the Lowveld soils that are most susceptible to erosion are the bottomland soils, particularly those that are saturated with sodium (sodic patch or 'brak kolle'). The excess of sodium that moves down the slope from the uplands causes the clay particles to disperse instead of forming aggregates. This results in a hard impermeable sub-soil that is extremely susceptible to erosion and not conducive to grass growth. The recommendation is that **roads located on sodic areas be rerouted onto ridge crests or above the ecotone and that these tracks are adequately drained.** If it is not possible to reroute these tracks, then they should be hardened (using sandier all weather material) and built up above the surrounding area. **Another basic principle to minimise erosion is that they should be sited on the ridge crests wherever possible as this disposes of a major problem in road maintenance, viz. drainage.** Where it is not possible to place a road on a crest, the next best alignment is on a gentle slope close to the true contour.

Road traffic on wet (especially sensitive areas) can cause surface rutting which concentrates the flow of water on the road. Here cross-drainage measures are needed to interrupt this flow and divert it laterally before it concentrates and causes erosion.

Cross-drainage can be done in a number of ways:

- using mitre drains which are extensions of road drains leading away from the road on the contour at an angle of about 30°- 40°;
- by cross banks which are humps across the road; or
- by outsloping which is the sloping of the camber towards the downhill side of the road.

It is recommended that **roads should be cross-drained using a combination of mitre drains and crossbanks on steep, eroded sections. On flatter sections, roads should**

**be drained using mitre drains only.** Fig. 3 shows the combinations described above and relevant principles are outlined below:

- Place crossbanks and mitre drains where
  - roads are rutted and there are signs of erosion
  - wherever the slope of the road is above 2%
- On steep, eroded sections, crossbanks should extend on either side of the road so that runoff water from the road is not diverted around them and back onto the road;
- If needed bring soil in to build an adequate crossbank;
- Compact the crossbanks well, particularly where vehicle wheels will cross them, otherwise the crossbanks may be breached at these low points;
- The mitre drain should discharge the runoff water along the contour line so that a donga does not form; and
- Regular inspection and maintenance of these structures is critical. The best time is late winter just before the spring rains.

### **Reclaiming eroded roads**

Certain roads on RV are presently acting as waterways and it may be more cost effective to reclaim them than maintain them. Important principles to bear in mind when reclaiming eroded roads are:

- The compacted ground where the vehicle tracks run should be ripped with a grader or tractor drawn ripper;
- Seep areas of roads should be drained with small crossbanks/mitre drains; and
- The entire road should be densely brushpacked with the crowns of the cut brush facing down.

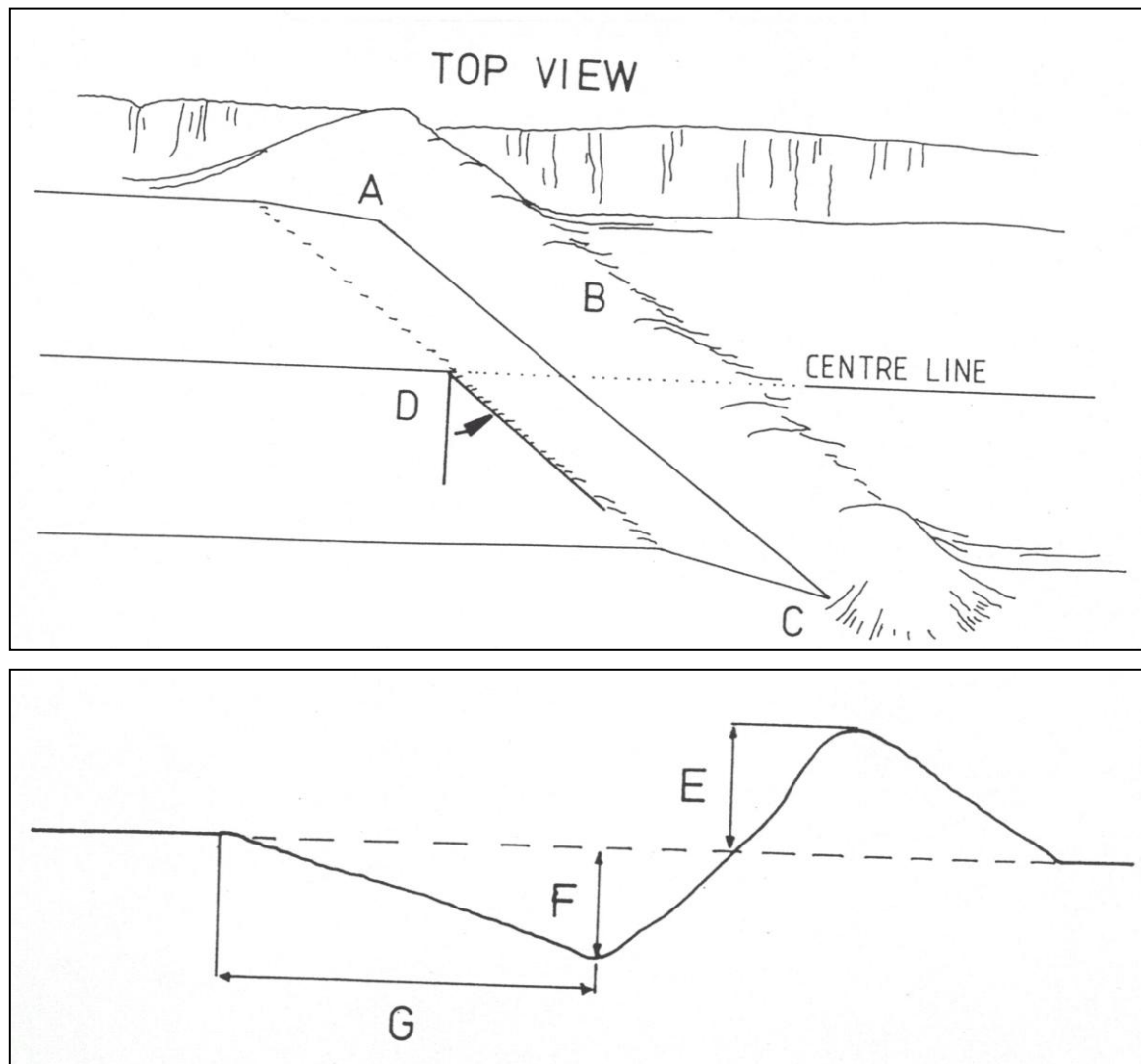


Fig. 3. Layout and dimensions of crossbanks/mitre drain. Average specifications given, adjust for situation as required. A=at tie in point with road verge cut 15-30cm into the road bed; B=crossbank height should be 30-60cm above the road bed; C=mitre drain outlet should be cut 20-40cm into the road verge; D=angle mitre drain  $30^{\circ}$  to  $40^{\circ}$  downslope of the road centre line; E=crossbank height can be up to 60cm; F=mitre drain depth can be up to 45cm; and G=length of G can be 90-120cm.

## APPENDIX G: ECONOMIC AND ECOLOGICAL IMPLICATIONS OF BUSH CONTROL

Shackleton *et al.* (1994) showed that the woody standing crop increases with distance from villages in the Mhala and Mapulaneng areas, which are situated adjacent to and to the west and south of the major wildlife areas of the eastern Lowveld. The mean standing crop is 1011 kg/ha close to the villages, 3,129 kg/ha in intermediate areas and 13,004 kg/ha in more distant areas. The sustainable harvest of deadwood is 17.2 kg/yr per 1,000 kg of live standing biomass (Shackleton 1998). Given the more dense woody vegetation in adjacent protected areas a bush control approach has been taken, i.e. thinning or clearing. It is estimated that 17,000 one-ton truckloads could be removed from 1,800 ha in a protected area in 18 months (equivalent to 4,092 kg/ha/yr) (Davies undated). A one-third thinning approach based on 13,004 kg/ha would be 4,335 kg/ha, while a two-thirds thinning approach would be 8,669 kg/ha/yr. In the hypothetical case studies that follow, a farm-gate value for a 650 kg truck-load is taken as R35 (Davies undated), although this may vary considerably.

The use of a professional contractor and trained field staff is recommended as the most efficient approach to control bush (and is therefore included in the calculated costs below). The use of systemic chemicals is favoured as they allow for the selective control of target woody plant species. Costing for bush control is given for Access (active ingredient Picloram) (Reg. No. L 4920) which is commonly used in the region. It must be remembered that bush control is seldom a once-off operation and follow-up treatment is usually necessary. The success of clearing operations is gauged by the length of time that the area remains open, while maintaining a good herbaceous species composition, cover and production. Sites should be re-visited to determine the amount of coppice, suckering and natural recruitment of tree seedlings in order to determine the type and timing of further treatment. In considering the ecological aspects of bush control (below) we report only studies that provide ecological data both before and after the bush control programme.

The costs for a thinning approach using correctly a 2% mixture of Access together with Actipron (an emulsifiable oil for use as an adjuvant) and water with a dye added is in the region of R2,000 per ha (varying per ha for sparse woodland and for thicker woodland). The cost of re-treatment and follow-up is approximately a quarter that of the initial treatment. Foliar application, using a 0.75% mixture of ingredients as described above, is commonly used as a re-treatment method where re-sprouting does not warrant the more costly mechanical approach. The cost of re-treatment and follow-up varies between R1 000–R2,000 per ha. Both of the above operations are carried out as cut stump treatments (10–15cm above the ground) and costs include labour, equipment and chemicals.

An advantage of Access is that it is water based resulting in a quicker breakdown of dead stumps.

Because of their extensive root systems, species such as *Colophospermum mopane* and *Pterocarpus rotundifolius* trees are not always killed by the first treatment. These species tend to sucker from the rootstock, and often require a follow up treatment when they begin to impede game viewing. The current return time for re-treating *Colophospermum mopane*, assuming correct application, in the eastern Lowveld is up to five and a half years, which is considered highly satisfactory (Peel 2005).