Makana Municipality
Local Environmental Action Plan
Comprehensive Audit Report
Part II: Vegetation, Endangered Species and Wildlife Management
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Table of Contents

1. Vegetation of Makana District

The Makana District has diverse and unique vegetation, comprising ten vegetation types, representing all of the major southern African biomes. It is this diversity which makes it essential that the efforts to conserve and manage this natural resource for the benefit of all the people of Makana be coordinated within a single authority. The district contains 136 red data book (higher plant) taxa, and is an important centre of endemism in southern Africa (2548 native plant taxa). There are 27 endemics of which 17 are vulnerable, 5 are endangered and 5 are critical.

The biodiversity of the thicket within Makana is threatened by four major driving variables, namely:
- overgrazing by domestic livestock;
- development of new lands for arable crop production;
- collection of native species for medicinal purposes, and
- encroachment of invasive alien plants.

Initiatives to reverse these trends should be driven by LEAP and Makana Municipality. These include the effective implementation of the Conservation of Agricultural Resources Act 43 of 1983, which provides for:
i) setting carrying capacity norms for farms in the district;
ii) the control of invasive plants, and
iii) the cultivation of new lands.

The Cape Provincial Conservation Ordinance should be applied rigorously to control the harvesting of plants for medicinal purposes, and the monitoring and protection of rare and endangered taxa. This will be achieved by the appointment of a permanent conservation officer within Makana. This officer should address the wider environmental issues within the district, focusing on effective implementation of all environmental legislation.

2. Assessment of the State of Endangered species in Makana

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2.1 Executive Summary

Biodiversity is an important issue the world over, as it deals with the differences between all living organisms, as well as their ecological habitats, and can apply to all hierarchical levels from genes to whole ecosystems. The major threats to biodiversity in the Makana Municipality were identified by a wide range of stakeholders (see the Preliminary Audit report). These include habitat loss through preparation of cultivated lands, urbanisation, invasion by alien plants, collection of ornamental plants and harvesting of medicinal plants. The Makana Municipality is of global biodiversity importance as it is situated in the Albany Centre of Endemism and this hotspot contains many endemic plant species. Furthermore, a large number of the species that occur in this region are classified as endangered. This study classified endangered species according to the World Conservation Union's categories of critically endangered, endangered and vulnerable.

We compiled the lists of endangered fauna and flora from literature reviews and consultation with external specialists. Where possible, these lists have been transposed onto maps for easier identification of the areas where these species are located. Additionally, several threats that are particularly relevant to the species within the Makana region were identified. The threats that

affect the widest range of species were: urbanisation, unsustainable resource use, alien invasion, and rural land transformation.

Despite South Africa having progressive legislation according to international standards, the current conservation methods in the Makana Municipality do not address specific environmental issues. A detailed list of recommendations was provided to enable future planning strategies to incorporate measures to conserve biodiversity. The recommendations which affect the widest range of species include: effective enforcement of legislation, education about endangered species, the establishment of improved data records and stakeholder engagement involving both interested and affected parties. It must be reinforced that the importance of endangered species cannot be underestimated. As a result, it is necessary to do all in our power to ensure their survival for the benefit of both present and future generations.

2.2   Introduction

Biodiversity is an important issue the world over, as it deals with the differences between all living organisms, as well as their ecological habitats, and can apply at all spatial levels from genetic make up to whole ecosystems (CSIR, 2004). The term biodiversity can be defined in many ways and can be used to describe the variance in species, habitat, and ecosystem processes. However, for the purpose of this report, biodiversity will be defined, according to the IUCN (2004) definition as "the variety and variability of all living organisms, including the genetic variability within species and their populations, the variety of species and their life forms, the diversity of the complexes of associated species and of their interactions, and of the ecological processes which they influence or perform".

Biodiversity is important for many aspects of the environment, such as:
- it is closely linked to human health, in that many medicines come from plants;
- environmental services such as water supply, regulation of floods and the maintenance of fertile soil is closely linked to biodiversity, and
- it provides baseline stocks for crops and livestock, thereby ensuring that the world's population always has sufficient food.

The loss of biodiversity worldwide has resulted in the loss of both its use and non-use values to society. Despite the massive awareness campaigns for the more well known endangered species such as the elephant, wild dog, panda and whale, it is currently thought that at least 24% of mammals, 12% of birds and 48% of plants are still threatened (Mara, 2001). The actual figures of the rate of extinction of species are highly variable. Actual documented extinctions, however, put the figure at 811 species since 1500AD (Dirzo & Raven, 2003).

Since many of the world's species are in danger of extinction, the level of biodiversity is a good record of the state of the environment (CSIR, 2004). This importance is reflected in the amount of global legislation aimed at preserving biodiversity. Examples include the Convention on International Trade in Endangered Species (CITES) and the Convention on Biological Diversity (CDB) both of which are ratified by numerous countries, including South Africa (DEAT, 2004). In response to this, several international have been ratified by many countries, the most note-worthy being the Convention on Biological Diversity (CBD) and Agenda 21 in 1992, and the Convention on International Trade in Endangered Species (CITES) 1972.

South Africa has ratified many treaties and conventions on biodiversity. It is considered an important signatory as it is thought to be the third most biodiverse country in the world and has a

host of endangered and endemic species within its borders (Wynberg, 2002). These international commitments have been further strengthened by the passing of national legislation such as the National Environmental Management Act of 1998, the Environmental Conservation Act of 1989, Biodiversity Bill of 2003 (which is closely linked to the CBD) and the Constitution (Wynberg, 2002; Shackleton, 2003).

There are four main aims for the conservation of biodiversity (Noss, 1999). These are to:
- preserve all kinds of communities in their natural habitats, through a system of protected areas;
- maintain reasonable populations of native species in their natural habitat;
- sustain key processes, such as geomorphological and ecological, at their natural rates, while keeping them adaptable to change, and
- ensure that human activities are compatible with the maintenance of ecological integrity.

The above aims are set to preserve the global level of biodiversity and to protect endangered species, but are nevertheless not achieved in many places.

In the Eastern Cape and Makana Municipality there are many threats to biodiversity which have to be countered. Some of these threats are habitat loss through increased cultivation, urbanisation, impact of alien plants, and collection of medicinal plants (Victor and Dold, 2003). To counter these threats, issues that need to be addressed for the conservation of biodiversity include the high rates of unemployment in the area, expansion of private game reserves and protected areas, and implementation of community-based natural resource management (CSIR, 2004). It is essential that threats to biodiversity are addressed if biodiversity is to continue playing important socio-economic roles in the Eastern Cape (DEAT, 2004).

The Makana Municipality is located within the Albany Centre of Endemism which in turn lies in the Cape Floristic Region. This is a region of floral diversity that spans the southern edge of South Africa. The Albany Centre, or Hotspot, has five main phytochoria and 21 out of 70 of the recognized veld types of South Africa, as well as a high degree of localized endemism (van Wyk and Smith, 2001). The Albany Centre is home to over 4000 species of plants, 15% of which are endemic, 126 are threatened and 6 taxa are already extinct (Victor and Dold, 2003). Endangered animals are also important to the area as recent years have seen a proliferation of game reserves in the municipality such as Kwandwe, Shamwari and Amakhala, as well as the municipal reserves, Thomas Baines and Andreis Vosloo.

Many species within the Makana Municipality have been altered or modified by human activities, such as agriculture, overgrazing, poor land use, invasive alien plants, urbanization, and harvesting of indigenous plant products. One of the most underestimated dangers is the informal trade in medicinal plants. Not much is known about this trade, but it poses a great threat to various plant species in the region (Victor and Dold, 2003). Another major threat appears to be the illegal collection of plants near extinction, usually for commercial purposes. Traders usually focus on cycads and attractive succulents. Urban development is another major threat, along with the increase in agriculture (Victor and Dold, 2003). More important than this is the invasion of alien plants into the region, such as *Acacia cyclops* and *A. mearnsii,* or succulents such as *Opuntia ficus-indica* and *O. aurantiaca.* These threats have been countered by various groups that try and reduce the extent of alien vegetation, such as Working for Water (Victor and Dold, 2003).

Due to this range of threats, many national parks and game reserves have been formed recently. These include Andries Vosloo Reserve, Double Drift Game Reserve, Thomas Baines Nature Reserve, as well as many smaller private parks that are geared towards conservation. Despite the formation of these conservation areas, many unique plant species and ecosystems are not covered

by the network, and thus are not as well protected. For example Subtropical Thicket is probably the most threatened vegetation type in the whole Albany area, as it contains the endemic *Euphorbia coerulescens,* and yet it is not well protected throughout the region (van Wyk and Smith, 2001). Endemic species face many proximate threats to their survival. Our research into the state of endangered species is a vital part of the municipality's Local Environmental Action Plan (LEAP).

Our study attempted to answer the following four key questions:
1) What are the endangered and endemic species found within the Makana Municipality?
2) Where are these species found within the Municipality?
3) What are the major threats to these species? and
4) What conservation methods are currently in place to protect these species?

2.3 Methods

2.3.1 List of endangered and endemic species
A comprehensive literature review was conducted to determine which endangered and endemic species are in the region. This review examined scientific reports on species in both the Albany Centre of Endemism as well as the Eastern Cape region. The IUCN Red Data List was also studied as it forms the basis of defining which species are endangered. External experts were also consulted. These included Tony Dold, the assistant curator at the Schonland herbarium, and an expert on the flora of the Eastern Cape, and Professor Rick Bernard, of the Rhodes University Zoology Department, who is an expert on the fauna of the region. Certain traditional healers in the Grahamstown area were consulted for their knowledge on subjects such as medicinal plants. Another major source of information was local game parks and conservation areas, such as Kwandwe, Thomas Baines, Amakhala, Shamwari and the Great Fish River Game Reserves.

2.3.2 Distribution of endemic and endangered species
The distribution of species within Makana was accomplished by examining previous distribution data, obtained from sources such as the Schonland herbarium and scientific reports, as well as further consultation with specialists and game reserves. Distribution data of some plant species were plotted onto GIS maps.

2.3.3 Threats to species
Specialists such as managers of conservation areas and game parks, as well as the traditional healers were consulted to obtain data on threats to endangered and endemic species. For threats such as urbanisation and land use, previous conditions were compared to present conditions to measure the extent of the changes. Encroachment of alien vegetation was also considered as a threat.

2.3.4 Current conservation measures
The extent of conserved areas was mapped. Alternative conservation methods such as the legislation related to the conservation of biodiversity were examined. Documents such as the National Environmental Management Act, the White Paper on Sustainable Use of South Africa's Biological Diversity and the national Constitution were examined.

2.4 Results and Discussion

2.4.1 List of endangered and endemic species and their distribution
Tables 1-3 show lists of endangered plant species. Five are critically endangered, five endangered and 17 vulnerable. Figures 1-7 show the distribution of some of these species.

Tables 4-6 show lists of endangered animal species. Thirteen bird species, eight mammal species, four reptile species are vulnerable. The Eastern Cape Rocky (*Sandelia banseii*) is a critically endangered fish species. It is found in Gray Dam and the Kowie River.

Table 1: Vulnerable plant species in the Makana region (Palmer, 2004)

Species	Status	Latitude	Longitude
Albuca crudenii Archibald	VU	33.52˚S	26.02˚E
Apodolirion macowanii Baker	VU		
Asclepias rara N.E.Br.	VU		
Brachystelma luteum Peckover	VU	33.24˚S	26.63˚E
Brachystelma luteum Peckover	VU	33.38˚S	26.38˚E
Clivia nobilis Lindl.	VU	33.03˚S	26.55˚E
Clivia nobilis Lindl.	VU	33.18˚S	26.87˚E
Clivia nobilis Lindl.	VU	33.30˚S	26.92˚E
Clivia nobilis Lindl.	VU	33.33˚S	26.52˚E
Clivia nobilis Lindl.	VU	33.33˚S	26.55˚E
Clivia nobilis Lindl.	VU	33.38˚S	26.63˚E
Clivia nobilis Lindl.	VU	33.38˚S	26.63˚E
Clivia nobilis Lindl.	VU	33.43˚S	26.07˚E
Clivia nobilis Lindl.	VU	33.69˚S	26.72˚E
Encephalartos altensteinii Lehm.59	VU	33.26˚S	26.50˚E
Encephalartos altensteinii Lehm.59	VU	33.30˚S	26.56˚E
Encephalartos altensteinii Lehm.59	VU	33.30˚S	26.56˚E
Encephalartos altensteinii Lehm.59	VU	33.31˚S	26.53˚E
Encephalartos altensteinii Lehm.59	VU	33.31˚S	26.53˚E
Encephalartos trispinosus (Hook.) R.A. Dyer 59	VU	33.18˚S	26.40˚E
Encephalartos trispinosus (Hook.) R.A. Dyer 59	VU	33.21˚S	26.72˚E
Encephalartos trispinosus (Hook.) R.A. Dyer 59	VU	33.21˚S	26.72˚E
Encephalartos trispinosus (Hook.) R.A. Dyer 59	VU	33.23˚S	26.63˚E
Encephalartos trispinosus (Hook.) R.A. Dyer 59	VU	33.23˚S	26.63˚E
Encephalartos trispinosus (Hook.) R.A. Dyer 59	VU	33.31˚S	26.53˚E
Euphorbia meloformis Aiton. subsp. meloformis forma meloformis.	VU	33.24˚S	26.63˚E
Euphorbia meloformis Aiton. subsp. meloformis forma meloformis.	VU	33.24˚S	26.63˚E
Euphorbia meloformis Aiton. subsp. meloformis forma meloformis.	VU	33.28˚S	26.52˚E
Euphorbia meloformis Aiton. subsp. meloformis forma meloformis.	VU	33.28˚S	26.52˚E
Euphorbia meloformis Aiton. subsp. meloformis forma meloformis.	VU	33.30˚S	26.50˚E
Euphorbia meloformis Aiton. subsp. meloformis forma meloformis.	VU	33.30˚S	26.51˚E
Euphorbia meloformis Aiton. subsp. meloformis forma meloformis.	VU	33.31˚S	26.50˚E
Faucaria nemarosa L. Bol. Ex L. Groen.	VU	33.18˚S	26.00˚E
Nerine huttoniae Schönland	VU	33.08˚S	26.45˚E
Nerine huttoniae Schönland	VU	33.31˚S	26.53˚E
Ornithogalum britteniae Leight.	VU	33.22˚S	26.42˚E
Ornithogalum britteniae Leight.	VU	33.78˚S	26.63˚E
Ornithogalum perdurans Dold & Hammer	VU	33.22˚S	26.42˚E
Raphionacme lobulata Venter & R.L. Verh.	VU		
Sutera racemosa (Benth.) Kuntze	VU		

Table 2: Endangered plant species in the Makana region (Palmer, 2004)

Species	Status	Latitude	Longitude
Brachystelma comptum N.E.Br.	EN	33.33˚S	26.48˚E
Brachystelma comptum N.E.Br.	EN	33.40˚S	26.48˚E
Encephalartos arenarius R.A. Dyer 59	EN	33.26˚S	26.50˚E
Encephalartos arenarius R.A. Dyer 59	EN	33.31˚S	26.53˚E
Encephalartos horridus (Jacq.) Lehm.59	EN	33.26˚S	26.51˚E
Faucaria gratiae L. Bol.	EN	33.22˚S	26.22˚E
Faucaria tigrina (Haw.) Schwantes var. tigrina	EN	33.28˚S	26.52˚E
Faucaria tigrina (Haw.) Schwantes var. tigrina	EN	33.35˚S	26.37˚E

Table 3: Critically endangered plant species in the Makana region (Palmer, 2004)

Species	Status	Latitude	Longitude
Encephalartos latifrons Lehm.59	CR	33.31˚S	26.53˚E
Isoetes wormaldii Sim	CR	33.30˚S	26.53˚E
Lachenalia convallarioides Baker	CR	33.26˚S	26.51˚E
Lobelia zwartkopensis F. Wimmer	CR	33.63˚S	26.32˚E
Rhus albomarginata Sond.	CR	33.32˚S	26.28˚E

Table 4: Vulnerable Bird Species (Newman, 1993; DEAT, 2004; Craig, 2004)

Common Name	Latin Name	Habitat
African Finfoot	Podica senegalensis	Water bodies
Blue Crane	Anthropoides paradisea	Hilly grasslands, moist valleys, farmland and lakes
Cape Vulture	Gyps coprotheres	High cliffs when breeding
Ground Hornbill	Bucorvus leadbeateri	Bushveld, woodlands and montane grasslands
Knysna Warbler	Bradypterus sylvaticus	Forest fringes and wooded kloofs
Kori Bustad	Ardeotis kori	Bushveld, woodlands and grasslands
Lesser Kestrel	Falco naumanni	Karoo grasslands
Ludwig's Bustad	Neotis ludwigii	Grasslands
Marsh Harrier	Circus ranivorus	Marshlands and reedbeds
Martial Eagle	Polemaetus bellicosus	Bushveld, woodlands, grasslands, thornveld and hill country
Stanley's Bustad	Neotis denhamii	Hilly grasslands, Karoo and Kalahari veld
Whitebacked Night Heron	Gorsachias leuconotus	Waterside vegetation
Whitebellied Korhaan	Eupodotis caffra	Grassland, farmland and thornveld

Table 5: Vulnerable Mammal Species (DEAT, 2004; Bernard, 2004)

Common Name	Latin Name	Habitat
Aardvark	Orycteropus afer	Wild
African Wild Cat	Felis lybica	Kwandwe, Shamwari, Fish River
Black Footed Cat	Felis nigripes	Kwandwe, Shamwari, Fish River
Black Rhinoceros	Diceros bicornus	Kwandwe, Shamwari, Fish River
Cheetah	Acinonyx jubatus	Kwandwe, Shamwari, Amakhala
Honey Badger	Mellivora capensis	Wild
Oribi	Ourebia ouorebi	Farmlands
Wild Dog	Lycaon pictus	Kwandwe, Shamwari

Table 6: Endangered Reptile Species (DEAT, 2004)

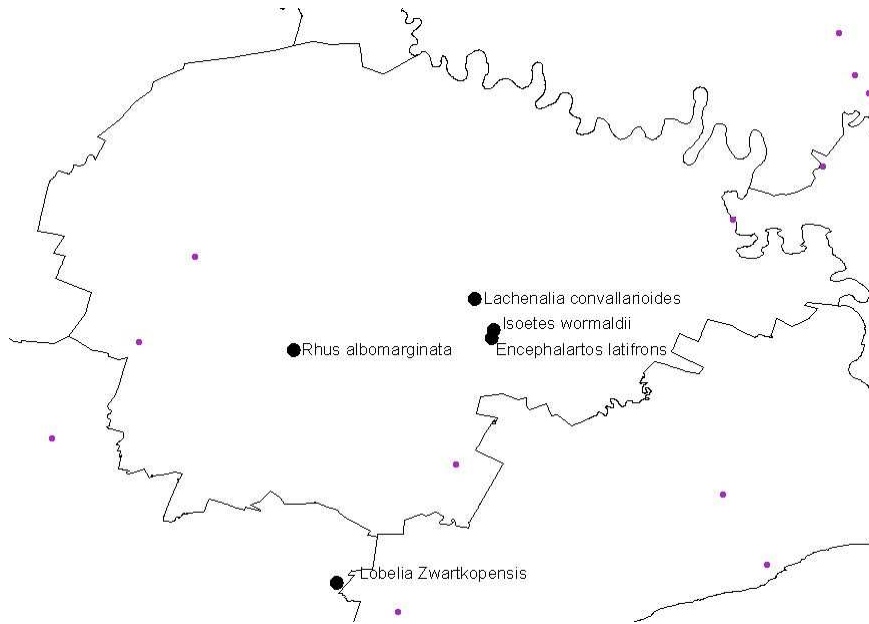| Common Name	Latin Name	Habitat
Common Mountian Lizard	Tropidosaura montana ssp rangerii	Albany Region
Essex's Dwarf Leaf-toed Gecko	Gogga essexi	Albany up to Great Fish River
Southern Dwarf Chameleon	B. ventrali	Thicket Biome
Striped Sandveld Lizard	Nucras taeniolata	Albany Region

Figure 1. Distribution of critically endangered plant species in Makana
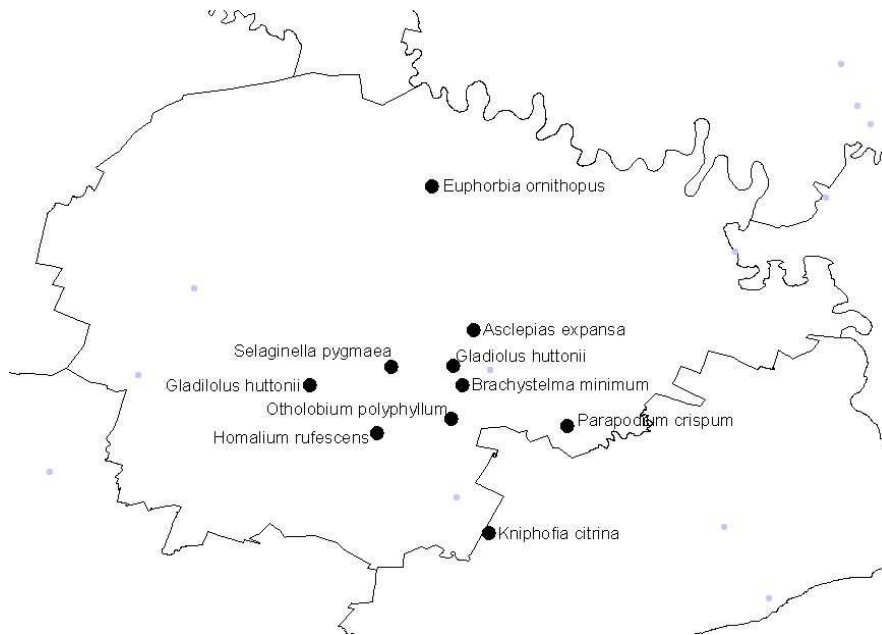

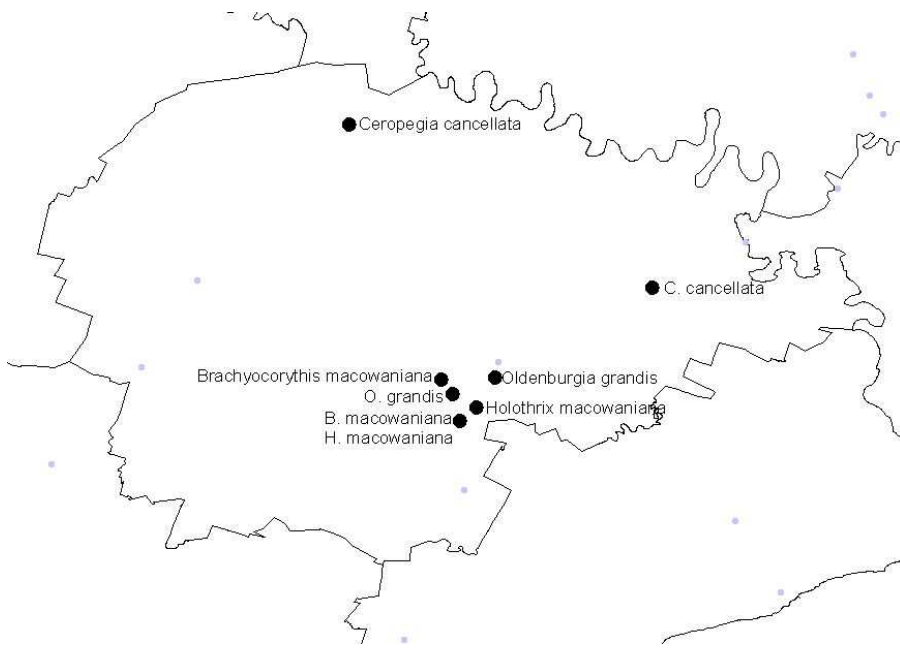Figure 2. Distribution of rare plant species in Makana

Figure 3. Distribution of rare plant species in Makana
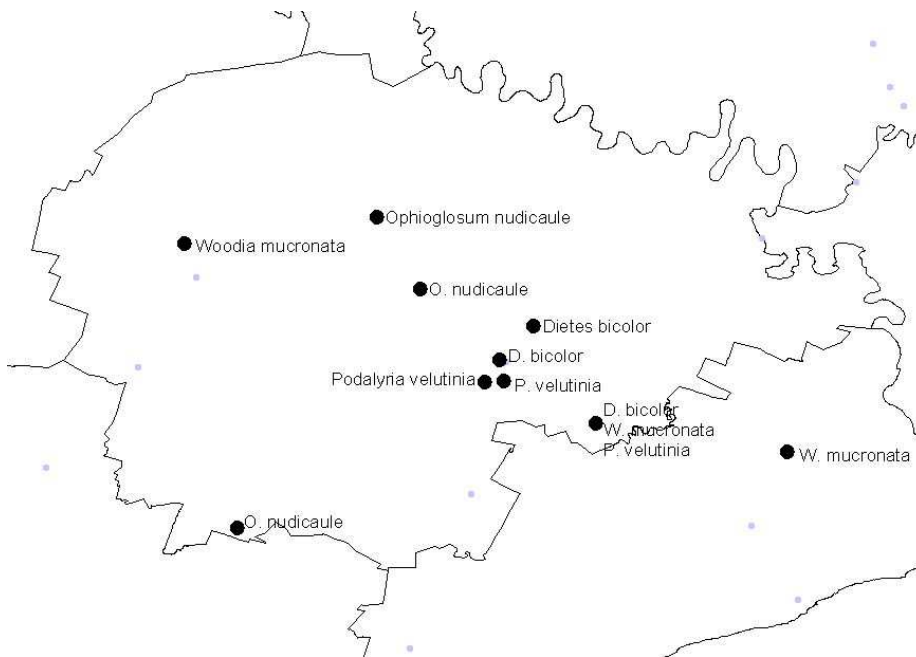

Figure 4. Distribution of rare plant species in Makana
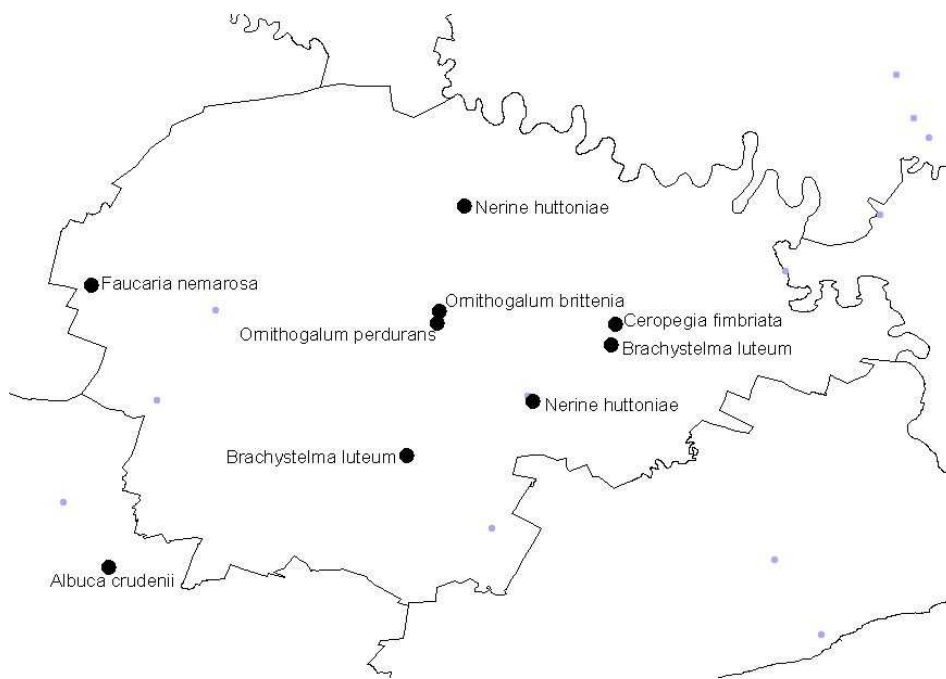
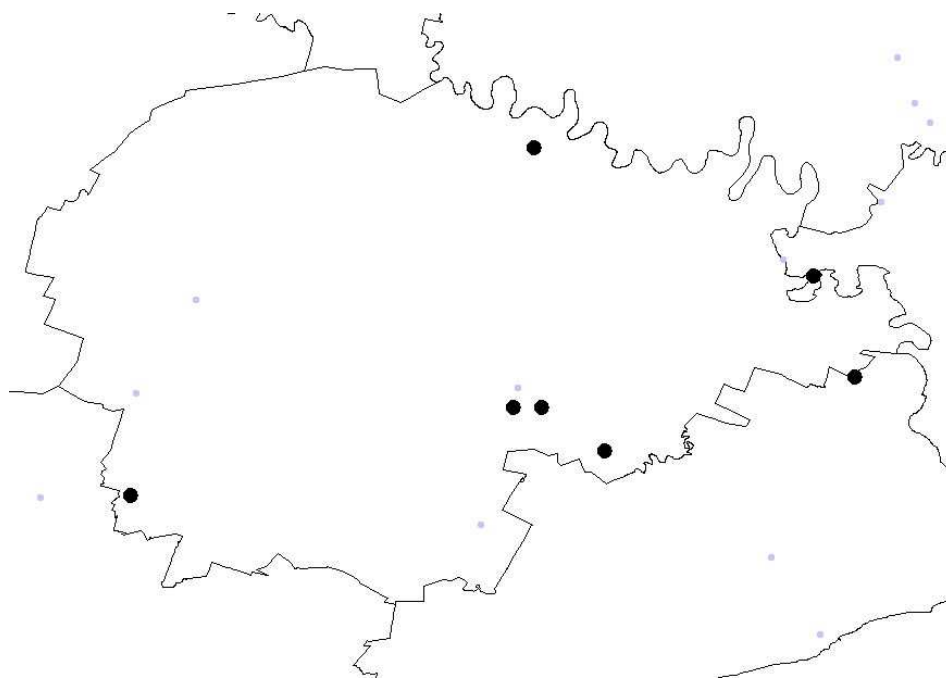Figure 5. Distribution of vulnerable plant species in Makana

Figure 6. Distribution of the vulnerable *Clivia nobilis* in Makana
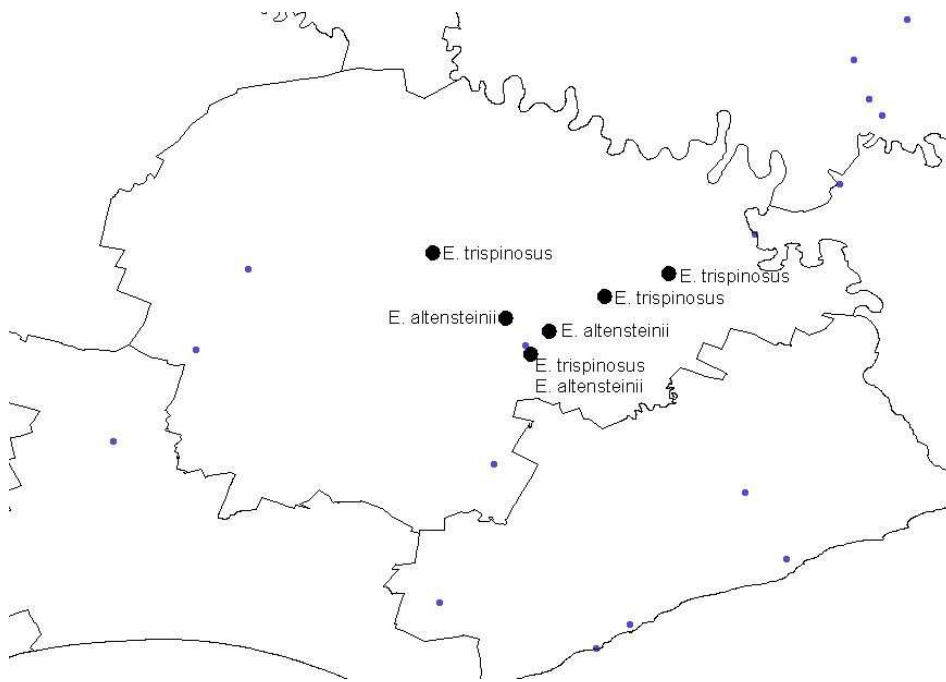
Figure 5. Distribution of vulnerable *Encephalartos* plant species in Makana

2.4.2 Threats to species
2.4.2.1 Rural land transformation
We identified rural land transformation to be one major threat to endemic and endangered species in the Makana municipality. This includes commercial, subsistence and game farming. Pineapple and game farming are two large-scale farming activities that occur in this region. Both have a detrimental effect on the environment in some way. With pineapple farming, a soil sterilant (Hyvar X) is added to the soil. Once the sterilant has been added, pineapples are one of only a few plant species that are able to grow in the soil. And it takes many years after pineapple farming for the natural vegetation to recover.

With game farming, non indigenous animals are introduced for their aesthetic appeal, as well as for hunting. These extra-limital species may compete with endemic species for food leading to added pressure on these endemic species.

2.4.2.2 Transformed Land - Agriculture
Loss of habitat through land-use practices (see Figure 8) has been recognised as the major threat to biodiversity (Rouget *et al*., 2001). Agriculture is by far the most significant agent of transformation, in both area and severity of species loss (Latimer et al., 2004). Exponential human population growth has led to a vast expansion of cropland and pastureland, transforming many natural habitats and reducing their biodiversity (BirdLife International, 2004). The greatest impacts are evident on lowland habitats, especially those which have level topography, fertile soils and where rainfall is sufficient for agriculture (Rouget et al, 2001).

Cultivation for agriculture has transformed 4.83% of the surface area of the Succulent Thicket region. Makana contains a large portion of this thicket. Similar threats have been reported in the Cape Floristic Region, which is also a biodiversity hotspot (Rouget et al., 2001). Furthermore, land degradation due to over-grazing by domestic herbivores is another threat.

Poor agricultural practices have resulted in soil erosion (DEAT, 2004). Grazing by domestic livestock is common in the Makana area, and as it is not controlled, it often leads to deterioration of the environment (Castley *et al.*, 1998). Pesticides and herbicides carried in the run-off from agricultural lands have negative effects and contaminate water resources (DEAT, 2004). Amphibians are key indicators of ecosystem health. Scientists have found that commonly used agro-chemicals such as pesticides, herbicides and fertilizers are reducing amphibian populations (David Suzuki Foundation, 2004).

Fragmentation of natural habitats leads to more predation pressure and deterioration of habitat integrity, which may lead to the extinction of habitat specialists. Invasive alien vegetation can also negatively affect habitat quality by resulting in uniform stands of alien vegetation and loss of biodiversity (Paxton, 2000).
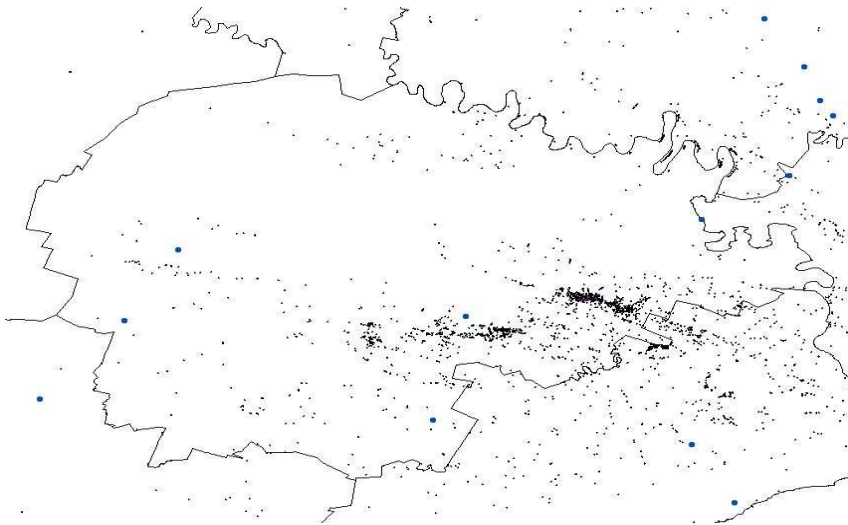
Figure 8: Map showing locations of commercial plantations in the Makana region (Palmer, 2004)

2.4.2.3   *Uncontrolled urbanisation*

There is high unemployment in the Makana region. Low levels of employment and high levels of poverty are associated with a high dependency on natural resources (DEAT 2004). Unsustainable use of these resources can lead to overexploitation of fuelwood, bushmeat, indigenous trees and shrubs for building materials and medicinal plants, habitat fragmentation and the loss of biodiversity (DEAT 2004). Population stabilisation is a fundamental requirement of sustainable development, as the capacity of the environment to supply the necessary resources will be exceeded if populations continue to expand at uncontrolled rates (Byers, 1997). Excessive population growth is often associated with poverty, and a measure of reducing population growth rates is by improving standards of living. However, some poverty alleviation measures contribute to land degradation, as they subsidise natural resource use (Byers, 1997).

Uncontrolled urbanisation can lead to a lack of housing, and the rise of informal settlements with associated problems of a lack of basic services. Problems include inadequate waste disposal and sanitation, which can create serious threats for the environment and subsequently biodiversity (DEAT 2004). The most common forms of waste disposal include the bucket system and pit latrines, both of which are used in the informal settlements in the Makana region. These can result in human and domestic waste seeping into the underground water supply, endangering plant and animal populations and aquatic ecosystems (DEAT 2004).

2.4.2.4 Tourism

Tourism development in the area is resulting in a movement of people from rural to urban areas in search of jobs, exacerbating the problems associated with informal settlements (DEAT 2004). Eco-tourism with a strong focus on the production of traditional arts and crafts is a growing component of the tourism industry, which is dependent on the natural environment. It must therefore be emphasised that the protection of the natural environment and the preservation of the aesthetic value, which attracts tourists, are essential if tourism and associated economic growth is to increase.

2.4.2.5 Fires

In fire-adapted natural habitats, such as fynbos, fire can be to the advantage of reptiles, as habitat quality is enhanced and more diverse habitat is maintained (Paxton, 2000). However, if fires are too frequent, species may be negatively affected and young killed before they are able to reproduce (Bond and van Wilgen, 1996). Species such as chameleons, tortoises, and some terrestrial lizards and snakes may be affected. Many reptiles in fire-prone habitats, however, are adapted to this threat and survive fires by sheltering in rock crevices or in underground holes (Paxton, 2000).

2.4.2.6 Alien species

Alien species are a major threat to biodiversity within the Makana municipality. The following alien species occur within the Eastern Cape: *Acacia mearnsii* (Black wattle), *Acacia dealbata* (Silver wattle), *Acacia saligna* (Port Jackson), *Acacia longifolia* (Long leaf wattle), Pine and *Eucalyptus* (Gum tree) (Working for Water, 2004).

The alien plants remove much of the nutrients in the soil and they also out-compete the natural vegetation for sunlight. Many of these invasive alien species consume vast quantities of water. They also fuel devastating fires, which can destroy indigenous species (Masitha, 2004). At the moment South Africa has 161 alien trees and other plant species that have become invasive. It has been said that if these alien species go uncontrolled the problems they cause will double within fifteen years (The Water Page, 2004).

In many of the streams and dams in the Makana Municipality, Black bass and trout are a huge problem as they out-compete the endemic fish such as the *Sandelia bainsii* (Eastern Cape Rocky), which is considered to be critically endangered (Cambray, 2004). These alien fish species have been introduced to the area as they are a popular angling species. There is also a great demand for them amongst local anglers. These alien species are often illegally introduced into the Municipalities' rivers and dams (Cambray, 2004).

2.4.2.7 Poaching for trade

Another huge threat to the endemic and endangered species of the Makana municipality is poaching for trade. This illegal trade is both for the national market as well as the international market. Examples of species that are under threat include the African Potato (*Hypoxis hemerocallidea*). The African Potato has diverse medicinal properties that include: slowing down cancer growth, boosting the immune system and alleviating arthritis (Drewes et al., 2004). The species heavily traded in an unsustainable manner.

Another species that is under the threat of poaching is the black rhino. This species is poached for its horns. The biggest market for these horns is in the Far East where it is believed that the horns have medicinal and spiritual values. The horns of the black rhino are traded on the black market for a huge price, making it a valuable species for poachers (Pickrell, 2004). This is believed to be the reason for a 90% decline in the population of this species in Africa over the past 60 years

(Coghlan, 2003). As a result, poaching must always be regarded as a threat to the black rhinoceros populations in Kwandwe, Shamwari and the Great Fish River Reserve, although none of these reserves have experienced a poaching incident in many years (Bernard, 2004).

2.4.2.8   Problems with resource use
At present, 6% of South Africa is under conservation. Access to most natural resource-rich areas is free and easy and thus resulting in massive exploitation. However, there have been cases where conservation areas have proved counter-productive, and have jeopardized cultural rituals due to the no access policy of the parks (Bernard, 2004). There needs therefore to be a fine balance between access policies and conservation enforcement. This balance might influence the numbers of people harvesting resources, as access into the conserved areas would be monitored.

2.4.2.9   Threats to birds
Habitat loss is the key threat to the majority of bird species, particularly through clearance of vegetation for agriculture or urban sprawl, alien plant invasions, and the drainage of wetlands. Many species rely on specific environmental conditions and habitat types. The rapid rate of habitat loss has severe implications for numerous species. Collision with power lines is another significant factor related to the mortality rates of many of the larger bird species. Additionally, numerous bird species are under threat from poison, whether it be deliberate or through the consumption of contaminated insect prey and/or other food sources. Persecution and deliberate shooting contributes to increasing mortality rates of many threatened bird species within the Makana Municipality (Craig, 2004. pers comm.).

2.4.2.10   River pollution
The Bloukrans River which runs near Grahamstown is being continuously polluted (see report on water resources). It has been found that the river is exposed to direct surface run-off of pollutants every time it rains. There is also a continuous flow of treated sewerage effluent from the sewage farm (de Moor *et al*, 2002). Another source of pollution of the river is untreated sewerage and waste from informal areas. The pollution of the river has two adverse effects. First, people rely on the water for drinking as well as irrigation. And second, it may reduce the number of indigenous fish species in the river such as *Sandelia Bainsii* (de Moor et al., 2002).

2.4.2.11   Decrease in genetic pool
Cheetah and wild dog have recently been re-introduced to the Makana Municipality after disappearing due to hunting and habitat loss. Both species have been introduced into Kwandwe and Shamwari while Amakhala has also introduced cheetah (Bernard, 2004). However, if these reserves do not introduce new genetic material into these populations on a regular basis, the genetic pool may decrease due to inbreeding. This may result in genetic diseases and other illnesses (Kelly, 2001; Girman et al., 2001).

2.4.2.12   Insufficient range
Both cheetah and wild dog require large home ranges to maintain viable populations. However, while wild dogs can require a range of up to 2000 km², Shamwari and Kwandwe each only cover 200 km² (Girman et al., 2001; CC Africa, 2004; Shamwari, 2004). While cheetah require at most 195 km², this area must be suitable for their needs, i.e. savanna and woodland. These biomes are not abundant in the reserves, therefore limiting the range of the animals (Broomhall, 2003). A decrease in range size may impact on the population's ability to breed and hunt effectively.

There are reported cases of lions posing a threat to wild dog and cheetah populations either through competition for prey or the active killing of young (Bernard, 2004). This is a potential threat in Makana due to lions being introduced into the same reserves as cheetah and wild dog.

2.4.2.13 Predation and unsuitable habitat

Oribi are susceptible to large carnivores as prey. This threat is minimized by these antelope not being kept on reserves with carnivores and therefore are only threatened by occasional predation by free ranging leopards (Bernard, 2004).

Oribi require specific habitat, namely large areas of short grass for grazing as well as diversity of foliage at a suitable height (van Teylingen & Kerley, 1995). However, this habitat is not available on some of the farms on which these antelope are kept, resulting in decreasing populations (van Teylingen & Kerley, 1995).

2.4.3   Current conservation measures

Within Makana Municipality there are many national, provincial and private game reserves which all help toward conserving biodiversity. These areas are shown in Figure 9.

South Africa is rich in biological diversity, but measures to conserve this heritage are under-funded and are of relatively low priority at the national level (Turpie, 2003). Fabricius and Burger (1997, cited in Castley et al., 1998) and Noss (1999) have noted the contribution local communities could make in the management of protected areas, as they have an extensive knowledge of the indigenous plants and animals.
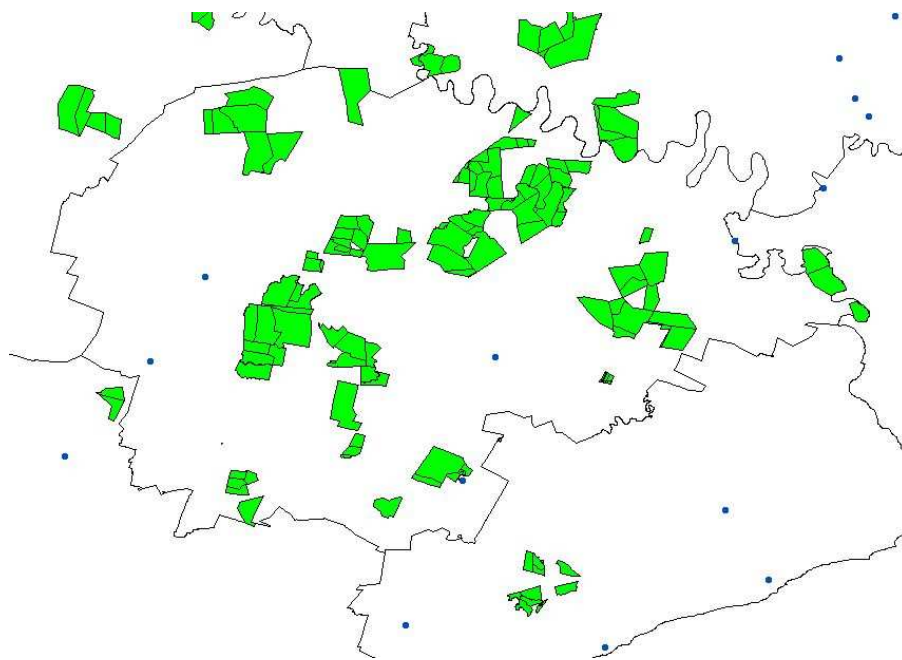

Figure 9: Map of conserved areas in the Makana region

2.4.4   Legislation

South African national and provincial legislation related to the conservation of biodiversity is extensive. However, only certain laws are applicable to the Makana Municipality. These are highlighted below.

2.4.4.1   The Constitution

The Constitution is the supreme law of the land and establishes everyone's right to use and protect the natural environment. All natural resource management laws and policies must comply with the Constitution. The Constitution states that everyone has the right to:

a) An environment that is not harmful to their health or well-being.
b) Have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:
      i. Prevent pollution and ecological degradation
      ii. Promote conservation
      iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

2.4.4.2   National Environmental Management: Biodiversity Act (10 of 2004)

This Act makes provision for the establishment of a National Biodiversity Institute for research and planning. It highlights the need for the protection of threatened or endangered species by prohibiting the use of these species without a permit. According to this Act, the Minister through Members of the Executive Council (MEC) of Environmental Affairs is responsible for the provision of a national or provincial list of invasive species. Additionally, this Act calls for the regulation of bio-prospecting of indigenous biological resources, to ensure equal benefit sharing arising from the commercial use of these resources. Special consideration is given to the traditional use of these resources by local communities in South Africa.

2.4.4.3   National Environmental Management: Protected Areas Act (3 of 2003)

This Act makes provision for:
      i. Declaration of a system of protected areas (e.g., special nature reserves, national parks, nature reserves and protected environments).
      ii. Management of the protected areas in accordance with national norms and standards.
      iii. Intergovernmental co-operation and public consultation on matters concerning protected areas.
      iv. Continued existence, governance and function of South African National Parks.

2.4.4.4   White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity (Biodiversity Policy and Strategy for South Africa) (1997)

The White Paper provides a policy framework and guidelines for the conservation and sustainable use of biological diversity in SA. The Biodiversity Policy has six objectives:

a) Conserve the diversity of landscapes, ecosystems, habitats, communities, populations, species and genes in South Africa. This entails:
      i. Promotion of environmentally sound and sustainable development in areas adjacent to, or within protected areas.
      ii. Control over the introduction of potentially harmful alien species, and the eradication of alien species that threaten South Africa's ecosystems, habitats and/or species.
      iii. Regulation of the transfer, handling, use and release of genetically modified organisms to minimise the potential risks to biodiversity.
b) Use biological resources sustainably and minimise adverse impacts on biological diversity. This goal includes:
      i. Land use planning and Environmental Assessment.
      ii. Adoption of sustainable lifestyles.
c) Ensure that benefits derived from the use and development of South Africa's genetic resources serve national interests. These genetic resources have the potential to be used in scientific and technological research, and in a range of commercial and environmental applications.

d) Expand the human capacity to sustainably use, manage and conserve biodiversity in South Africa. This goal can be achieved through:
   i. Environmental education and awareness of biodiversity
   ii. Research
   iii. Inventories
   iv. Monitoring and evaluation
   v. Traditional knowledge
e) Create conditions and incentives that support the conservation and sustainable use of biodiversity in South Africa.
f) Promote the conservation and sustainable use of biodiversity at the International level.

2.4.4.5   National Environmental Management Act (NEMA) (1998)

NEMA provides national environmental management principles and procedures for co-operative governance of the environment, and ecologically sustainable development and use of natural resources, through environmental management and implementation plans. According to NEMA, environmental management must be integrated, acknowledging that all components of the environment are linked and interrelated, and that management decisions should be made in light of their social, economic and environmental impacts. All interested and affected parties are encouraged to participate in environmental governance.

2.4.4.6   Environmental Conservation Act (No. 73 of 1989)

This Act promotes the protection and controlled use of the environment by allowing for the declaration of protected natural environments and special nature reserves. This Act assists the control of environmental pollution through the prohibition of littering, and by providing for waste management. Additionally, this Act allows for the declaration of limited development areas where development is prohibited unless it is authorised by a competent authority, and an Environmental Impact Assessment is conducted prior to implementation.

2.4.4.7   Legislation related to local government

Local government: Municipal Structures Act (No 117 of 1998)
This Act provides for the core principles, mechanisms and processes necessary to enable municipalities to move towards social and economic upliftment of local communities and ensure access to essential services that are affordable to all. This Act creates the need for Integrated Development Plans (IDPs) at the local government level. IDPs aim to implement sustainable municipal development, sound environmental management, and to reduce poverty.

Eastern Cape Environmental Conservation Bill, 2001
This Bill allows for the establishment of provincial nature reserves and wilderness areas, government and private nature reserves and conservancies.

It is clear that South Africa has numerous laws and policies associated with the protection, conservation, management and development of biodiversity. Unfortunately, there is a lack of cooperation between the departments concerned and in many instances the departments do not have the ability to implement policy objectives (DEAT, 2004).

2.4.5   Recommendations
2.4.5.1   Data availability

The Makana Municipality needs to improve its data on endangered species, with respect to maps and location. This would be advantageous to the municipality, as they would then be clearly informed and knowledgeable about areas of importance within the municipality, in terms of

endangered species. This would also mean that developments and projects would not be allowed to be undertaken in areas which are of great concern and importance to the Makana Municipality.

A research team needs to be established to ensure that data on endangered species are comprehensive and continuously updated. The team would then travel around the Municipality at regular intervals, checking on the location of the various endangered species.

2.4.5.2   Effective enforcement of legislation

Increased manpower and financial resources should be dedicated to the enforcement of legislation at the grassroots level. We are aware that the government has many issues such as housing, education and health to deal with. Support for local government is necessary to ensure improved cooperation at all levels of government. The provinces are at different stages of phasing out old laws and there is a need to ensure that provincial and municipal legislation is consistent with national legislation (DEAT newsletter, 2004).

There is also a need to strengthen conservation and monitoring initiatives via policy and local guidelines. Efforts by the municipality to build the capacity and draw on the knowledge of local communities and volunteers is key, as valuable information can be generated through the incorporation of interested and affected parties. The Municipality should explore the possibility of establishing assessment panels or monitoring committees, consisting of non-governmental organizations, community groups, industry, the scientific community and government (Republic of South Africa, 1997).

Human resource development and subsequent training and development of skills, for biodiversity management is vital. Training is recognized as important not only for managers, but also for senior decision-makers, industrialists and local communities (Republic of South Africa, 1997). It is only through effecting training and knowledge of biodiversity that enforcement of legislation can be achieved.

2.4.5.3   Planning and provision of housing

The threat of uncontrolled urban sprawl, particularly in the rural areas can be controlled by the provision of housing. This will reduce the rise of squatter settlements, which pose a severe threat to biodiversity. Planners can identify areas for development and effective zoning can be enforced. It is evident in the integrated development plan that Makana Municipality has made the provision of houses one of its top priorities and it is evident that this aspect is being successfully implemented.

2.4.5.4   Fire management

Fire is a threat to many fauna and flora therefore effective fire management is important. This can be achieved through firebreaks, preventing fires from spreading over large areas. Educating farmers about fire and providing guidance on effective control measures will assist in the management of fire. Makana Municipality should provide these guidelines and establish seasonal burning periods, when climatic conditions are not favourable for the spread of fires.

2.4.5.5   Control of alien species

Working for Water is removing alien vegetation within the Makana Municipality. The Municipality needs to identify areas that are of major importance using the GIS maps provided. The Makana municipality then needs to communicate with Working for Water and ensure that alien vegetation within these areas is cleared.

Stricter controls on what fish species are released into the rivers and dams are needed. Some dams should be protected so that only indigenous and endemic species are allowed in them. The municipality needs to contact Dr Jim Cambray regarding the protection of the critically endangered *Sandelia bainsii* (Eastern Cape Rocky). He is an expert on this fish species.

2.4.5.6   Education
Stakeholders and different levels of government need to be educated on the importance of preserving endemic and endangered species. They should also be informed of which species are endemic and endangered, as well as where they are found. Funds need to be allocated to environmental education programmes.

2.4.5.7   Permit system
Permits should be allocated to registered users, who would only harvest in a demarcated area during the harvesting season. The permit should be valid for the entire harvesting season. A permit could be issued to an individual or a group. In the case of a group, all the harvesters' names need to be supplied. Sustainable harvesting methods must be used (Cole, 2000).

2.5 Conclusion
Endangered species within the Makana Municipality have been identified. A list of both fauna and flora has been produced. It is important to recognise the locations of these species to ensure sustainability of their habitats. The importance of endangered species cannot be underestimated. It is necessary to do all in our power to ensure their survival for the benefit of both present and future generations.

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3. Wildlife management

Bennett, L., Downsborough, L., Exelby, S., Langerman, D., Olsen, A. and Stonier T.

3.1   Executive summary

South Africa is an exceptionally rich and diverse country in terms of both its flora and fauna and the Eastern Cape is no exception. In fact it is fast becoming one of the prime game and wildlife areas in the country (Makana.gov). There is a growing need for greater awareness of the current situation of the wildlife industry within the Makana Municipality. This sector is one of the largest contributors to the local economy and covers a vast area of land.

With the recent and rapid growth of the wildlife sector within the Makana Municipality, greater control and government involvement is needed. Due to the large number of farms in the Makana District converting to game, it is important to be aware of management issues as well as concerns surrounding conservation. Both eco-tourism and hunting activities take place in the area, and wildlife areas can be divided into government run parks and privately owned land.

Government parks are set aside for conservation whereas many privately owned areas are used for hunting and/or eco-tourism activities. Some of the main government-run parks include Thomas Baines, Beggars Bush and the Great Fish River Complex, which includes Andries Vosloo and Sam Knott. The larger, better known privately owned parks include Kwandwe, Coombs View, Shamwari, Burchell Game Reserve and Bushman Sands Game Reserve. There are numerous smaller privately owned farms that have naturally occurring game or game that they have introduced to the land. With regards to management, the private farm owners are able to do as they please with their game as long as they have a certificate of adequate enclosure, and are not subject to intervention by government officials. Government parks are subject to far more complex management strategies and there are often many levels of influence on management decisions. Our study investigated wildlife management in the government and private sectors within the Makana Municipality.

Questionnaire surveys and key informant group discussions with private game farmers, professional hunters, government reserve managers and other relevant authorities were used to obtain data on wildlife management. We found that private game farmers (based on hunting and ecotourism) were fairly well established in the running, up keep and overall management of their reserves. Meanwhile, government reserves face more problems (such as poaching and lack of employees) than private reserves. Amongst numerous concerns, one of the main points raised was that communication between private landowners and government officials hindered effective reserve management.

3.2   Introduction

South Africa is an exceptionally rich and diverse country in terms of both its flora and fauna and the Eastern Cape is no exception. In fact it is fast becoming one of the prime game and wildlife areas in the country (Makana.gov). There is a growing need for greater awareness of the current situation of the wildlife industry within the Makana Municipality. This sector is fast becoming one of the largest contributors to the local economy and covers a vast area of land. For example, during 1996 an estimated 2.5 million foreign and domestic tourists visited the Eastern Cape and spent about R3 billion in the area (Rudder 2000). This is vital for the provinces economy, especially since the Eastern Cape has been rated as the second poorest of South Africa's nine

provinces. With the recent and rapid growth of this sector within the Municipality, greater control and government involvement is needed.

The Makana municipality is one of the many municipalities in the Eastern Cape Province. Due to the large number of farms in the Makana District converting to game, it is important to be aware of management issues as well as concerns surrounding conservation. Both eco-tourism and hunting activities take place in the area. Wildlife areas can be divided into government run parks and privately owned land.

Government parks are set aside for conservation whereas many privately owned areas are used for hunting and/or eco-tourism activities. Some of the main government run parks include Thomas Baines, Beggars Bush and the Great Fish River Complex, which includes Andries Vosloo and Sam Knott. The larger, better known privately owned parks include Kwandwe, Coombs View, Shamwari, Burchell Game Reserve and Bushman Sands Game Reserve. There are numerous smaller privately owned farms that have naturally occurring game and/or game that they have introduced to the land. With regards to management the private farm owners are able to do as they please with their game as long as they have a certificate of adequate enclosure, and are not subject to intervention by government officials. Government parks are subject to far more complex management strategies and there are often many levels of influence on management decisions.

It is these different wildlife areas that we will be looking at, as well as their various management strategies and factors surrounding conservation. Firstly it is important to know the difference between a protected area and non protected area. A "protected area" is defined as "a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives" (White paper 2001). It is estimated that there are currently 422 formally protected areas that cover about 6% of the land surface area in South Africa (White paper 2001). The first National Parks Act was introduced in 1926 (White paper 2001). From the 1860s, however, many private landowners saw the need to protect wildlife from hunting, and established reserves on their farms. Large areas of privately owned land have reverted to bushveld and now there is over twice the area under private wildlife management than in all the National Parks combined (Marshall 2004). This has created many benefits, not only for wildlife, but also for eco-tourism, hunting and local communities.

For many years, conservation remained a government function and the public was largely left out of its conservation efforts. This gradually changed as people became more directly involved through various initiatives and soon public-private partnerships sprang up. At the same time, the conservation of wildlife on private land also started to grow as farmers realised that they could achieve a number of desirable goals through sustainable utilisation of their game (Marshall 2004). It is estimated that there are now more than 9000 privately owned game farms and ranches, covering some 17 million hectares of land in South Africa (Marshall 2004). The objectives of our study were to:

- identify government and private wildlife areas in the Makana Municipality;
- assess current wildlife management (controls, protection, conservation, maintenance and rehabilitation – as defined in ECEC Bill 2003), and to
- highlight current issues and trends in the wildlife sector.

3.3   Methods

3.3.1   Key informant interviews
We identified individuals within the sector who we felt could provide us with information. We conducted personal interviews with these individuals using a questionnaire as a guide. The

interviews were, however, informal in nature and the interviewees were able to add as much as they felt relevant to our questions. We interviewed Mr Zack Pieterse from Eastern Cape Game Traders. Mr Pieterse also provided us with his customer list of over a hundred email addresses. It was to these email addresses that we sent questionnaires.

We also interviewed Mr Quintas Hahndyck the Eastern Cape Nature Conservation official. He provided us with essential information and literature on legislation relating to wildlife. He also was provided us with GIS maps of the area.

3.3.2 Questionnaire surveys

We identified three main groups within the wildlife industry, namely: (1) private land owners, (2) professional hunters and (3) government reserve managers. We then formulated three different questionnaires that were aimed at the different groups. As there are many factors involved in the wildlife industry, we had to ensure that we asked as few questions as possible, while obtaining the core outcomes. We sent out a hundred questionnaires to the email addresses provided by Mr Pieterse. The questionnaires were sent only to private owners and professional hunters due to the fact that there are only a few government reserves in Makana. We interviewed the managers of the government run reserves.

3.3.3 Interviews and site visits

As mentioned above, we decided to conduct site visits and interviews with managers of the government reserves rather than emailing them the questionnaires. We felt we would gather far more valuable data in this manner and would also be able to freely discuss issues which either we or the managers may raise. We visited the Andries Vosloo nature reserve, were we spoke to Mr Brad Fike, the present manager. We also visited Thomas Baines and Beggars Bush and interviewed the manager Mr Quintas Hahndyck. These interviews were carried out on the reserves which gave us important opportunities to be shown around and to make our own mental notes of the sites we visited.

We also conducted site visits and interviews with the managers of private wildlife ventures. These included Mr Andrew Hutchinson of Coombs view, and Mr Angus-Sholto Douglas of Kwandwe Private Nature Reserve. These site visits and interviews were essential to providing us with information that we may not have covered in our questionnaires.

3.3.4 Study site

The Makana Municipality is situated in the Eastern Cape Province of South Africa. The area includes the towns of Grahamstown, Riebeck East, Alicedale, Salem and Sidbury. Within the Makana Municipality there are three levels of wildlife management; government run reserves, private reserves and private hunting ventures. The government reserves are managed for conservation purposes, whereas the private reserves are managed for ecotourism and the private game farms are managed for hunting purposes.

The government-run parks include Thomas Baines, Beggars Bush and the Great Fish River Complex, which includes Andries Vosloo and Sam Knott. The larger, better known privately owned parks include Kwandwe, Coombs View, Shamwari, Burchell Game Reserve and Bushman Sands Game Reserve.
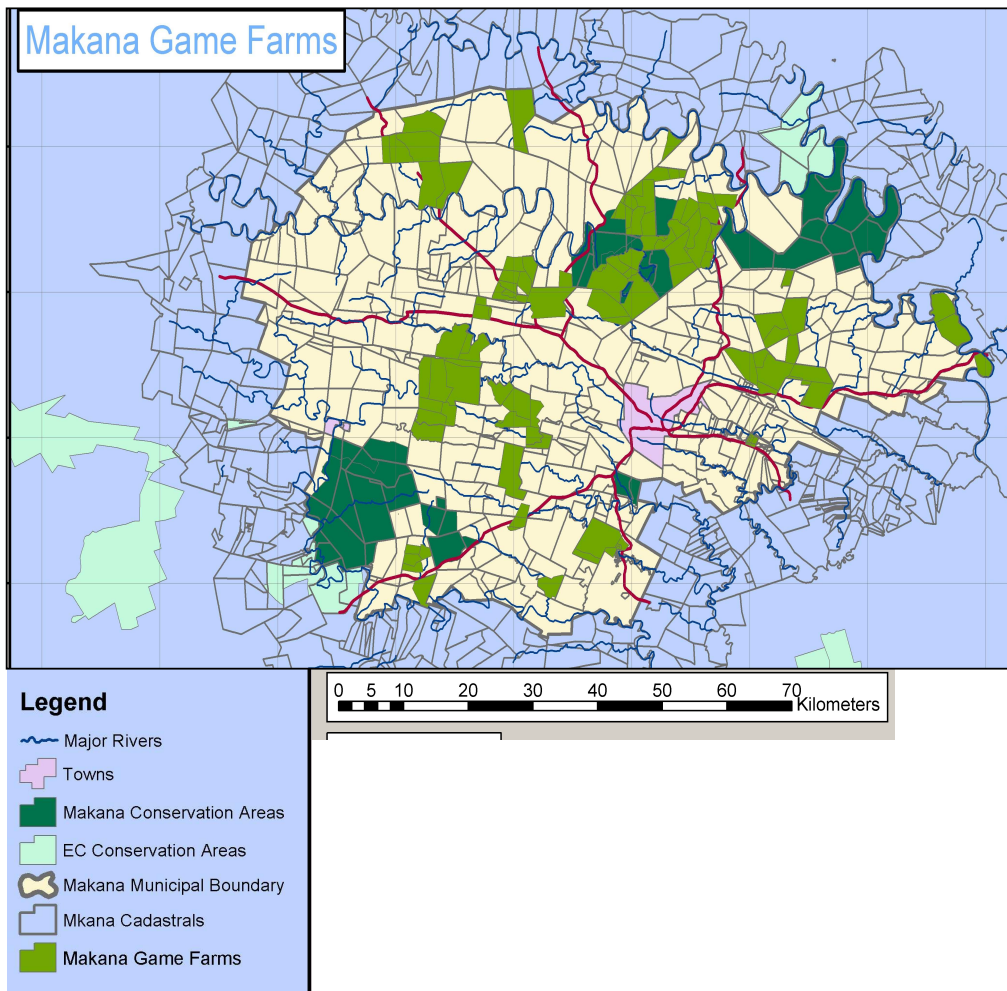
Figure.1. GIS map of study site (Source: CSS, 2004)

3.4   Results

3.4.1   Significant legislation
The following legislation appeared to be significant from a management view point.

3.4.1.1   *Bag limits and hunting quotas*
This information is supplied in a Provincial Gazette 2004 - hunting seasons and bag limits. It describes the species of mammals and birds that may be hunted and the numbers that may be shot (Godongwana, 2004). The gazette permits all naturally occurring game in the Eastern Cape as well as extralimital species to be hunted. Naturally occurring species (i.e., those with a historical range in this area) are limited, and daily bag limits include 1 kudu, 1 bush buck, 1 common duiker, 1 Grey Rhebuck and 1 Grysbok (Godongwana, 2004). However, two mountain reed bucks may be shot on a daily basis. The hunting of these species is also restricted to three months of the year, from 29 May to 31August. The quota system is different for extralimital species. Extralimital species are those which do not have a natural historic range in the Eastern Cape (although they may be indigenous nationally) and are therefore introduced (Godongwana, 2004). These include species such as impala, warthog, nyala, lechwe, waterbuck and wildebeest to name a few. The hunting season for these species is also extended, with hunters permitted to shoot

these animals all year round. Pest species such as jackals, baboons and caracal are shot all year round and there are no restrictions on numbers shot (Godongwana, 2004).

3.4.1.2   Fencing requirements

Fencing requirements for the Eastern Cape, supplied by the Chief Directorate of Environmental Affairs (Anon 1, 2004; Anon 2, 2004), are detailed and include how the fences should be constructed and of what material they should be made of. The fencing requirements also explain what a certificate of adequate enclosure (CAE) is, how one goes about obtaining one and what it entitles you to do. It also provides stipulations and responsibilities incumbent on a holder of a CAE (Anon 1, 2004; Anon 2, 2004)). Furthermore, fencing requirements explain the conditions for specific species. For example, there are different fence classes according to what species of animal is being kept (Anon 1, 2004; Anon 2, 2004). See general specifications below.

- Class 1: fence of 2.4 m, with 17 strands, electrification recommended (4 strands). For kudu, impala, giraffe, eland and waterbuck.
- Class 2: fence of 1.4 m, standard wire netted stock proof fence. Electrification recommended. For gemsbok, blue and black wildebeest, blesbok, bonebok, sable, reedbuck, steenbuck, roan, mountain reedbuck, springbok, duiker, zebra, klipspringer, buffalo, bushbuck, grey rhebuk, red hartebeest and grysbok.
- Dangerous game: for lion, leopard, hippopotamus, elephant, cheetah, wild dog, black and white rhino, hyena and serval. A 2.4 m fence, electrified, breakout plan, wire netting and public signposting to the effect that dangerous game is present.
- Small species: duiker and grysbok. Electrification compulsory.

3.4.1.3   Game trading

There are certain specifications and regulations that managers have to follow when buying or selling game (Hahndeik, 2004). Specifications are varied and include the requirement that managers obtain Certificates of Adequate Enclosure (CAE) before they are allowed to keep game on their farms. This is especially true for those wishing to keep extralimital species. Figure 2 shows game farms with CAE.

There is also a set of rules for those wishing to keep wildlife of a more demanding nature (Hahndeik, 2004). For example, blue wildebeest are not allowed to be mixed with black wildebeest, and letters of consent have to be procured from neighbours if one wishes to keep them. The game trading regulations also state that no zebra species may be mixed either. Furthermore, managers must have the correct fencing as specified by the fencing regulations from the Department of the Chief Directorate of Environmental Affairs (Hahndeik, 2004).

3.4.1.4   Eastern Cape Environmental Conservation Bill (2003)

This document outlines the responsibilities of the Member of the Executive Council of Economic Affairs, Environment and Tourism. The document highlights that the minister plays an integral part in some aspects of management of the ecotourism industry.
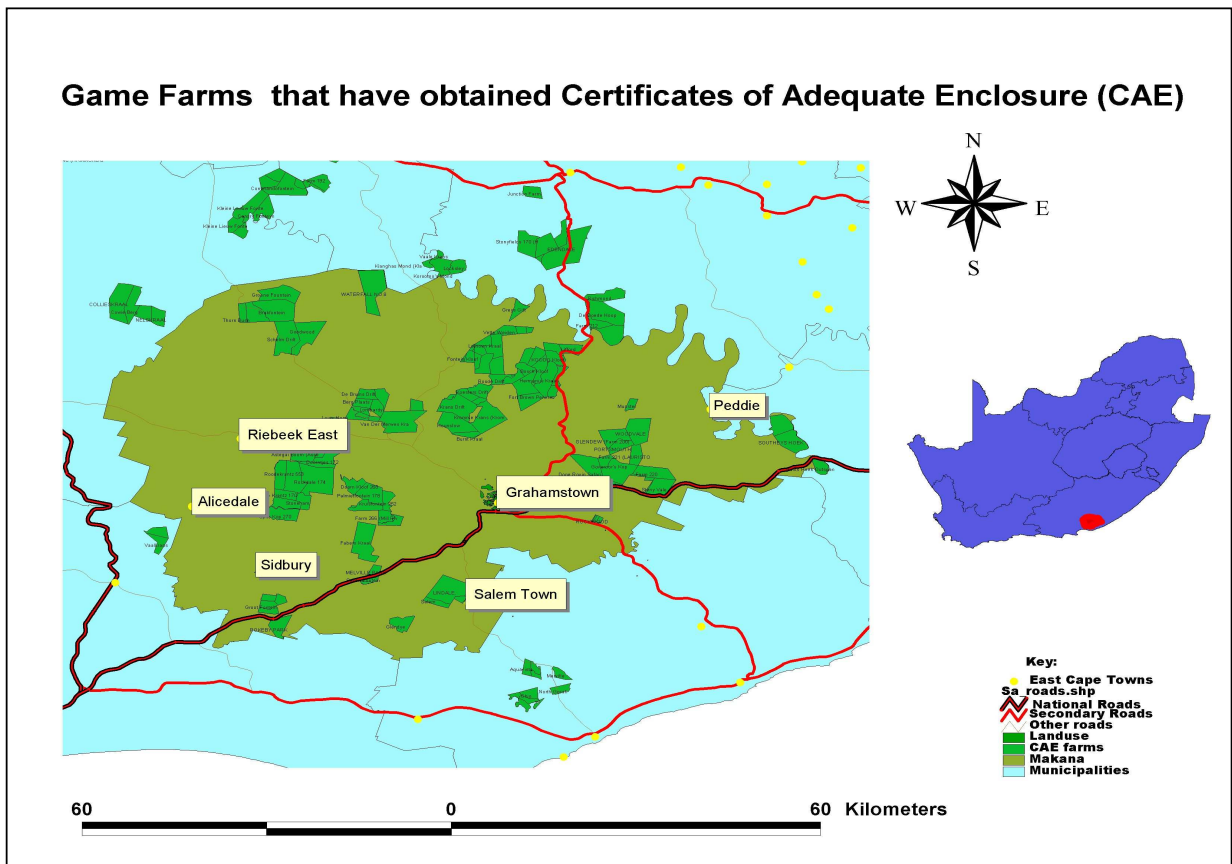
Figure.2. GIS map showing the farms with Certificates of Adequate Enclosure

3.4.2 Private game reserves

All the game farmers owned the land on which they were farming. On most farms, game occurred naturally, although farmers bought some. Game was bought from game auctions, national parks, other parks such as Thomas Baines as well as from recognised game traders from around the country. Most game farmers felt that the process of buying and selling game is a relatively simple process and that there is not much red tape involved. It was, however, mentioned that a lot of game movement within the municipality was done illegally.

Most game farmers thought that government should be more flexible in facilitating the acquisition of new genetic stock from other areas (e.g., Namibia) as there is relative concern about the genetic health of the area's wildlife. For example, cheetah are going through a tremendous bottleneck currently.

Sixty seven percent of the game farmers supported the introduction of extralimital game. The removal of such species would have a serious negative impact on the game industry as these are often either good trophy species or popular game viewing species.

Again, 67% of game farms had ecotourism activities and carried out hunting on their farms. Kwandwe and Shamwari did not allow any form of hunting on their properties. Only 33% of the farmers focused purely on hunting activities. Hunting quotas were influenced by the carrying capacity of the land, availability of species and the demand for species. There was a fairly equal

mix of hunters mainly from USA and Europe. Other hunters were locals. Most farmers advertised in magazines, brochures and over the internet.

Disease was apparently not a problem amongst the majority of private game farmers in this region. There were, however, a few problems associated with pest animals such as jackal, lynx and monkeys that were occasionally shot. One farmer used dogs as a means of controlling the animals. Poaching was reported to be a major problem. Some farms such as Kwandwe have armed guards who patrol the fence line and have also used the dog unit of the South African Police force.

None of the farmers supplement the feed of their animals during winter. About 50% of game farmers have used consultants in setting up or helping with management issues. For example, Kwandwe employed specialists from the University of Natal to give advice on their lion-breeding programme.

None of the respondents currently receive financial support from the government or private organisations except for Kwandwe that received financial support from an unnamed non governmental organisation.

All the game farmers stated that the government did not provide any useful guidelines or documents on successful management of a game farm or effective wildlife management practices. About 50% of the farmers were unaware of any legislation concerning stocking densities and game management. Most of the management information game farmers possessed and implemented was self-taught or acquired from research or publications.

All respondents were aware of the carrying capacity of their farms. Sixty seven percent of the game farmers currently use burning as a management strategy and some will be implementing it soon as a management tool. Other farmers felt that burning was not needed due to the nature of the vegetation.

Eighty three percent of the farmers indicated that they encouraged breeding programs on their land as a means of preservation and management. More than 50% of the respondents culled animals based on carrying capacity and personal judgement. In terms of priorities for management, 67% said that they managed primarily for ecotourism activities whilst 33% managed purely for hunting activities.

Eighty three percent of the farmers took appropriate measures to prevent soil erosion, 67% took measures to control fire and a further 83% took measures to control alien vegetation. Most farmers felt that the government should provide financial assistance for alien plant control.

Thirty three percent of the farmers were aware of some form of wildlife related legislation. Most of the farmers thought that current legislation on wildlife was relevant and purposeful. However 83% of the farmers felt that there was a need for some of the laws to be updated and or re-evaluated. For, example they expressed the need to review the law on certificate of enclosure. We were informed that recent updates have been made and will be released soon.

A number of problems were highlighted. The majority of farmers felt that there was a need for more support and communication from the local government regarding game farming. Other problems included:
- the change in exchange rates (Rand: Dollar exchange rate). This was of great concern to those ventures that focussed primarily on hunting.

- the flooding of the market by hunting operations was also mentioned. Certain ventures had to decrease their prices due to the increasing competition.
- difficulties for foreigners to buy land.
- the fact that game animals are not considered as a stock asset by banks.
- lack of government officials to process requests/issues as required.
- lack of financial support of the agricultural industry. Other countries offer subsidies for farmers and have large support systems in place.
- current landuse regulations (squatting) make it difficult to commit to long-term tenant workers, and
- lack of recognition and incentives for employment creation.

3.4.3 Professional hunters

Most hunters did not feel that too many farms were converting to game as opposed to other farming activities. Profit margins have not been negatively affected by rising competition from increases in game farms and hunting. However hunters were aware of the potential problem of over-saturation of hunting/ecotourism activities. Hunts were carried out on farms that are designated for both hunting and ecotourism activities. There was an ethical code of conduct and behaviour for hunters although adhering to this depends on the individual. The hunting ability of clients often compromised whether or not his code was adhered to.

Most hunters thought hunting was being carried out sustainably. However, the quality of trophy animals was decreasing. For example, kudu trophy availability has diminished in the last few years. This was attributed to problems relating to inbreeding. The number/type/sex and age of animals hunted are recorded annually.

Most farmers felt that more communication was needed between the municipality and the hunting community. However, some individuals stated that local government involvement should remain minimal. Government is currently trying to prevent extralimital species from being brought in for hunting. Most hunters did not agree with this and felt that it would have a negative effect on the industry. They also thought it would be a negative step in wildlife management.

Clients were both foreign and local. Most foreign clients stayed in the area for approximately one week. Lack of road signs and poor road maintenance caused problems for the visitors.

3.4.4 Government reserves

There are 10 government run game reserves in the Makana municipality. These are Blaukrantz NR, Beggars Bush NR, Thomas Baines NR, Ecca Pass NR, Sam Knott NR, Cycad NR and Andries Vosloo to name a few. For the purpose of this study it was decided to visit and interview two game managers of two government run ventures to narrow our focus. The two managers were Mr. Quintas Hahndeik of Thomas Baines (Acting manager) and Mr. Brad Fike of Andries Vosloo Nature Reserve. The following results are based on discussion with these two parties.

Mr Fike felt that more communication is needed between local government institutions for better management. However Mr Hahndeik expressed satisfaction at the level of communication he had with higher authority, stating that numerous meetings take place.

There were three main problems facing the government reserves. First, political appointees and decision makers in many cases were not suited for the job. The managers expressed concern that people running the venture should be employed on credentials and not merely be given the post by government. In some cases, decision makers did not have any scientific or ecological training or background. Second, poaching was a major problem. In Andries Vosloo, poachers used

firearms, snares and in some cases dogs. Poaching in this park was prevalent along the border with the old Ciskei, and reached its peak just before the end of the month (i.e. payday). To combat this problem, field rangers patrol the park. The park also used the services of the Stock theft unit when necessary. Mr Fike estimated that R150 000 worth of game was lost every year due to poaching. Thomas Baines also experienced poaching. Third, lack of staff and financial resources was a major problem. Thomas Baines has 70% of the park positions vacant and an inadequate budget. In 2003 the budget was R132000 and was increased to R187000 in 2004. Thomas Baines requires trained staff including an education officer and a manager to run the park (Hahndeik, 2004).

The reserve managers felt that the current laws were relevant but felt that some of these needed to be updated and in many cases effectively implemented. Mr Quintas Hahndeik is also the current Eastern Cape Nature Conservation official assigned to the Makana Municipality, and he has confirmed that this request has been addressed and a revised and new edition of the Eastern Cape Environmental Conservation Bill has been completed. The trading of game within the municipality has also raised some concerns. Some feel that there is too much red tape involved in the buying and selling of game, while others are perfectly happy with the current system in place. One thing that was agreed upon by all the reserve managers interviewed was the extent of illegal game trading taking place. There is an estimate that up to 40-50% of game trading is illegal in Makana (Fike, 2004; Hahndeik, 2004).

Management activities at Andries Vosloo and Thomas Baines included the control of alien plants, erosion and animal diseases. Thomas Baines also used fire as a management strategy to maintain grazing lands for the parks grazers whereas Andries Vosloo has only used burning in specialized cases (Fike, 2004; Hahndeik, 2004).

Both reserves culled animals. Warthog were culled in both Andries Vosloo and Thomas Baines, whereas impala and reedbuck were only culled in Thomas Baines. Both reserve managers also stated that they also translocated excess game. Mr Fike stated that the number of male black rhinos was too high and the animals were now causing problems.

The two reserve managers interviewed felt that extralimital game should not be introduced to the government reserves as these places should be for the habitation, conservation and viewing of indigenous Eastern Cape species (Fike, 2004; Hahndeik, 2004). However, both managers also understood the importance of these species to the hunting and private ecotourism industries, and that they are major money spinners and tourist draw cards.

Both reserves have recreational facilities in the form of lodges cabins or camp sites (Fike, 2004; Hahndeik, 2004). Thomas Baines has accommodation for 60 people at a time and has picnic, boating, and game viewing opportunities. Only 5% (per annum) of the visitors here were foreign, and only 10-15% actually went to see any game. Thomas Baines also has an education centre which draws between 2500-3000 visitors a year (Hahndeik, 2004).

Both reserves have received outside assistance. Andries Vosloo has hired consultants in the past, as has Thomas Baines. Mr Fike of Andries Vosloo stated that Scandinavian, Dutch and Fort Hare researchers have contributed to management. US Fish and Wildlife Service, as well as the Rhino and Tiger Conservation Fund assisted the reserve too. Scientists aided in the construction of Thomas Baines' Management plan. The reserve also received assistance from "the Friends of Thomas Baines" association (Hahndeik, 2004).

3.5   Discussion

3.5.1   Private game farms
All the farmers owned the land on which they were established and were responsible for the management of their own property and its activities. A certificate of adequate enclosure must first be obtained and then the land must be managed according to that certificate. A 5-year management plan also has to be submitted and approved by the minister. Apart from this, management is largely left to the individual landowner. Most farmers have invested heavily in their properties and wildlife. For example, Kwandwe have about R20 million worth of animals in their reserve (Sholto-Douglas, 2004). All private game farmers are in the tourism industry in some way and are therefore not about to compromise their integrity by falling short on management.

It has been mentioned that 67% of private game farmers managed primarily for ecotourism activities whilst 33% managed purely for hunting. Eighty three percent of the farmers took measures to prevent and control soil erosion and alien vegetation whilst 67% took measures to control fire. It was interesting to note that those farmers who did not engage in such management activities were the ones who managed purely for hunting activities. This might imply that they have less of an ecological approach to management and more of a financial, economic gain approach.

Higginbottom et al. (2003) found that wildlife tourism contributed to conservation. However, it can also have a number of negative consequences on the wildlife such as the direct killing of animals in the form of hunting or habitat degradation. Wildlife tourism and nature-based tourism are one of the fastest growing industries in South Africa (Hanks 1996). Sustainable wildlife management is therefore crucial.

Clear management objectives are needed that include a statement about the desired state of the wildlife and the habitat. A suitable monitoring programme with an effective feedback system needs to be put in place and finally stakeholder participation is needed (Higginbottom et al. 2003). According to Hanks (1996), the wildlife tourism industry is a strong economic system which is commercially driven and has the potential to contribute towards the funds needed for the conservation and management of protected areas. However, Rasker et al. (1992) argue that wildlife management is for profit and thus has lost its ecological motivation for conservation.

3.5.2   Professional hunters
Hunting is a large and growing industry in the Makana Municipality. All of the hunting in Makana is carried out on privately owned land and both indigenous and non-indigenous species are hunted for trophies. In Makana, professional hunters do not necessarily own the land on which they hunt, but hunt on a number of privately owned farms. Clients are both foreign and local.

From the interviews conducted with hunters, it was clear that economic gain is the foremost goal of hunting in Makana and general conservation issues fall secondary to producing enough animals to meet the demand for trophies (Bothma 1989). While all the hunters interviewed were aware of conservation issues such as soil preservation and alien plant encroachment, these issues are left up to the private land owners on whose land they hunt. In the case of hunters on their own land, these issues are dealt with only if they affect the number and quality of trophies the land is able to produce.

All of the hunters we interviewed believe that there is an ethical code of conduct and behaviour for hunters, and all said that this code was known and adhered to whenever possible. Fifty percent of the hunters admitted that the hunting ability of the client dictates how the hunt goes and may compromise the ability of the hunter to follow this code strictly (African Conservation Forums 2003). The strong economic drive behind hunting in Makana means that there is a lot of pressure on the professional hunter to ensure his client's satisfaction and this may lead to unethical hunting practices being employed. All of the hunters we interviewed did not feel that too many farms are converting to game as opposed to other farming activities within the Makana municipality. The rapid growth of the industry in recent years is not seen as an issue and profit margins have not been negatively affected by rising competition. All of the hunters were, however, aware of the potential problem of saturation of the market for hunting or ecotourism in Makana, but feel that this is not a current concern. Despite the large size of the hunting industry and the high level at which hunting is being carried out in Makana, all of the hunters interviewed believed that hunting is still being carried out sustainably although a few admitted that the quality of trophy animals is decreasing in Makana. This problem was believed not to be purely a result of high hunting pressure but also due to inbreeding as a result of the small sizes of properties.

The government is currently trying to prevent extralimital species from being brought in for hunting. All the hunters we interviewed disagreed with this and felt that it would have a negative effect on the industry. This is because many extralimital species are brought onto farms specifically for hunting, examples being gemsbok, nyala, roan and sable. The average foreign hunter may spend up to US$ 6000 on a single trip excluding trophy fees. This is a significant economic incentive for the hunting industry, and as local and extralimital species are hunted equally, it is believed that a restriction on extralimital species will result in a loss of revenue (African Conservation Forums 2003).

All the respondents believed the municipality was indirectly involved in the industry through provision and maintenance of infrastructure. Fifty percent of the hunters stated that there was a potential for more clients in Makana but that lack of road signs and poor road maintenance caused problems for visitors and limited numbers. Hunting-based activities are an important part of the overall contribution of wildlife to Makana, providing employment and economic gain either directly or indirectly.

3.5.3 Government reserves

Results from our interviews with the managers of the two reserves, are consistent to a certain degree with what Ferrar (1983) suggests protected areas should be doing. He advises that such reserves should provide recreational and educational facilities to both local and foreign tourists. Thomas Baines provides picnic sites, boating opportunities as well as game viewing and educational visits. Thomas Baines receives 2500-3000 people every year to their educational centre and therefore are providing a valuable service to the local community in the form of increased environmental awareness (Hahndeik, 2004). Andries Vosloo also provides lodges and camps for civic use as well. These reserves are also maintaining local genetic diversity, preventing the loss of species and are conserving samples of biological regions. This is all in line with what Ferrar (1983) recommends for protected areas. He also mentions that soil erosion control should be implemented and monitored. However, in Thomas Baines this was only done in the past and is now discontinued and in Andries Vosloo there was no mention of it.

Burning has shown to be a good management tool for an area. It provides high quality food, pre-empts wildfire and controls bush encroachment. However, before one burns there is a need to determine the fire regime of that particular area (Ferrar, 2004; Hardy et al. 1999). In the case of

Thomas Baines, fire is used only to maintain small grazing lands, and in Andries Vosloo, it is seldom done.

The problems faced by Thomas Baines and Andries Vosloo are also experienced by a large number of parks world wide, those being poaching, under funding and lack of staff. In a recent study, Jamison (2003) found that poaching affected more than 80% of a sample of 201 parks from 16 tropical countries across three continents (Africa and more specifically Kwazulu Natal was included in this study). Measures taken to counter this problem in our study area are similar to those applied in other protected areas elsewhere (Hahndeik, 2004). Jamison (2003) also found that under funding was a common problem, especially in Africa. Protected areas in Africa on average are managed on less than US$150 per square kilometre which is far less than the accepted norm of US$250 per km². This problem then has a knock on effect on staffing (Jamison, 2003). These are problems experienced by both Thomas Baines and Andries Vosloo.

Management of animals is an important part of protected area management. Sick animals that are not as valuable as say for example, a disease-free buffalo or black rhino are shot to prevent the spreading of disease. McCombie, (2004) calls this "management by eradication". Recently this approach has been implemented in Wisconsin where managers had to shoot large numbers of deer to stop the spread of the chronic wasting disease (McCombie, 2004).

Animal culling is done to ensure that habitat degradation does not take place due to high herbivore densities or to reduce competition with rarer species of ungulates (Walker et al. 1987). Warthogs in both reserves are prolific breeders and therefore need to be culled annually. Furthermore they do not fetch high prices at auctions, and therefore the cost of catching and translocation is not worth the effort (Fike, 2004; Hahndeik, 2004).

3.5.4 Limitations of our study

We sent out over a hundred questionnaires via e-mail. However, we only received 20 back. This was very disappointing as it meant that the sample size was small.

The wildlife industry is comprised of three different components, namely the social, ecological and economic components. For one to fully explore these components in sufficient detail, one cannot combine them into a single research project. Each component should rather be addressed individually and later a comprehensive report integrating the findings should be compiled. We focused on the ecological issues surrounding the management of wildlife in Makana due to time constraints.

Lack of co-operation from various authorities placed further constraints on the outcome of our project. We also felt that many participants were not completely open with us on their managerial practices. It was obvious that many of the participants were more interested in the financial benefits of the wildlife industry than in the actual conservation of wildlife.

3.5.5 Recommendations

We identified a number of pressing issues relating to management of wildlife and preservation of government reserves. We propose some recommendations that Makana Municipality could consider implementing.

South Africa's past conservation policies often meant that people were driven off their lands to create conservation areas. It is important for the government to ensure that local people are benefiting from wildlife as a natural resource, and not just a few wealthy landowners.

Government conservation parks also need to ensure that they empower people through education and allow local people to benefit more from the resources.

Education, training, awareness raising and benefit-sharing are the doorways to effective stakeholder participation and empowerment in wildlife conservation and management.

Foreigners should be encouraged to buy land within Makana. Although this goes against the government's land redistribution policy, it brings foreign exchange and provides an opportunity for employment of local residents.

3.6　Conclusion

Our research showed that private operations were apparently well managed and contribute significantly to conservation in the Makana district (even if some people are only in the industry for monetary profit). For example, Kwandwe has an extensive rhino breeding programme in which they have invested over R4 million. The wildlife industry is also vital for sustaining economic development in Makana Municipality and the Eastern Cape as a whole.

Government reserves need greater financial assistance and more skilled and unskilled staff to fill current vacancies. For example, Thomas Baines is 70% under staffed, and has no reserve manager.

3.7　References

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