

TOWARDS DEVELOPING AN UNDERSTANDING OF BIODIVERSITY STEWARDSHIP IN THE CITY OF CAPE TOWN

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Abstract

Together with the prospect of global environmental change, biodiversity loss is arguably the most pressing environmental issue of our time. Conserving biodiversity is a complex issue and effectively engaging people in conserving biodiversity, although challenging, is crucial. Various conservation initiatives exist that incentivise landowners to participate in restrictive conservation agreements such as the stewardship programme. From an environmental perspective, stewardship is simply people taking care of the earth and the stewardship programme is an innovative conservation initiative that aims to assist private or communal landowners by making biodiversity conservation more attractive through incentives and providing them with the necessary skills and know-how. In South Africa, landowners can enter into biodiversity stewardship agreements in the following options: A Biodiversity Management Agreement (under National Environmental Management Biodiversity Act No. 10 of 2004), a Protected Environment (under Protected Areas Act No. 57 of 2003) or a Nature Reserve or National Park (under PAA) with the latter two agreements requiring formal declaration and restrictions on the land. The time frames and management requirements are aligned with the degree of conservation protection.

Understanding landowner perceptions and motivations is critical for the successful implementation of the Biodiversity Stewardship Programme. The aim of this study was to determine how new participatory conservation systems, such as the Biodiversity Stewardship Programme, can assist in biodiversity conservation on private land within the City of Cape Town. This research made use of a case study methodology with the main research tool being semi-structured face-to-face interviews conducted with landowners and managers. This was supplemented with documentation and participant and direct observations. It was evident that predicting pro-environmental behaviour based on characteristics and perceptions is complex and varies from individual to individual. It emerged that certain characteristics can possibly indicate pro-environmental behaviour however pro-environmental behaviour does not necessarily indicate a willingness to participate in restrictive conservation measures such as the Stewardship Programme. Despite a lack of resources and capacity amongst conservation institutions, the research discovered a well-coordinated well-structured conservation system built around constructive partnerships in particular amongst the official conservation organisations. Biodiversity stewardship forms a crucial component of a set of tools to consolidate the protected area network in the City of Cape Town and is playing an increasingly important role in conserving the unique biodiversity within the City.

Declaration

I, André Steyn Rossouw declare that

- (i) The research reported in this dissertation, except where otherwise indicated, is my original work.
- (ii) This dissertation has not been submitted for any degree or examination at any other university.
- (iii) This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other researchers.
- (iv) This dissertation does not contain other persons' writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then:
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Signed:

Date:

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List of Abbreviations

BSSA	Biodiversity Stewardship South Africa Programme
CAPE	Cape Action for People and the Environment
CapeNature	Western Cape Nature Conservation Board
CARA	Conservation of Agricultural Resources Act
CBD	Convention on Biological Diversity
CBNRM	Community Based Natural Resource Management
CCT	City of Cape Town
CFR	Cape Floristic Region
CITES	Convention on International Trade in Endangered Species
CSP	Conservation Stewardship Programme
CWCBR	Cape West Coast Biosphere Reserve
DEAT	Department of Environmental Affairs and Tourism
EIA	Environmental Impact Assessment
EMCA	Environmental Management Cooperation Agreement
IUCN	International Union for Conservation of Nature
MEC	Member of Executive Council
NBF	National Biodiversity Framework
NEMA	National Environmental Management Act
NEMBA	National Environmental Management Biodiversity Act
NEMPA	National Environmental Management Protected Areas Act
OSY/MSY	Optimal Sustainable Yield/Maximum Sustainable Yield
PAA	Protected Areas Act
RoD	Record of Decision
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SDF	Spatial Development Framework
UN	United Nations
UNPF	United Nations Populations Fund
USA	United States of America
WWF	World Wide Fund for Nature

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CHAPTER ONE

Introduction

1.1 Introduction

Approximately 40% of terrestrial and 35% of the ocean's net primary productivity is appropriated by humans, whilst 83% of the planet's land surface and 100% of the oceans are directly or indirectly affected by human utilisation (Mora and Sale, 2011). Relentless population growth is undoubtedly the main driver of biodiversity loss (Schwartz, 2006) and with the world population having reached (on 31 October 2011) 7 billion (UNFPA, 2011) the threats to biodiversity will be halted with much difficulty. As a consequence of this continued extraction and consumption of resources, the number of species threatened by extinction is ever increasing (Mora and Sale, 2011) and together with the prospect of global environmental change, this loss in biodiversity is arguably the most pressing environmental issue of our time (Gillomee, 2003). This continued destruction of biodiversity is occurring despite our knowledge of the value and importance of biodiversity in terms of goods and services to sustain human life with ecosystems services globally valued at between 16 and 54 trillion US dollars annually with an average of US\$33 trillion (Costanza *et al*, 1997). In the face of this biodiversity collapse, the value of biodiversity and the need to maintain or restore it has prompted a concerted effort to develop alternative conservation strategies.

Conserving biodiversity is a complex issue and effectively engaging people in the process of conserving biodiversity, although challenging, is crucial. Conservation can no longer view people separate from nature in today's human-dominated world and it is crucial to incorporate the dynamic interactions between societies and natural systems and move towards an interdisciplinary conservation science (Berkes, 2004). Schwartz (2006) and Berkes (2004) suggest that conservation should move from an expert-based approach to participatory conservation and management and that the implementation of biodiversity conservation will be determined by private contributions and requires conservationists to engage people in conservation solutions. Schwartz (2006) is of the opinion that setting aside habitat for biodiversity conservation requires building and maintaining social capital and needs to be creative in finding ways to meld conservation with people's interests and daily existence.

1.2 Biodiversity

The Secretariat of the Convention on Biological Diversity (CBD, 2010:15) describes biodiversity as “the variability amongst living organisms from all sources including *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems”. Biodiversity is measured in three ways; genetic diversity, species diversity and ecosystems diversity (DEAT, 2001; van Niekerk, 2008). Genetic diversity refers to the variation within a species, species diversity refers to the variety of species within a region and ecosystems diversity the spatial scale and habitat pattern and species combinations (van Niekerk, 2008). Biodiversity supports an extensive variety of ecosystem goods and services that humans depend upon, for example providing an invaluable source of harvestable goods including food, medicines and building material (CBD, 2010; IAIA, 2005), furthermore, it is essential for the regulation of natural processes such as carbon sequestration, purification of water and soil formation. In addition, biodiversity plays a significant role in pollination services, biological control of pests and disease and as a source of spiritual enrichment and well-being (WWF, 2010). More importantly, biodiversity forms the basis for adaption to changing environments making it indispensable for the survival of life (CBD, 2010; IAIA, 2005). South Africa is fortunate in that the unique topography, geology and climate make it one of the most biologically diverse countries in the world with high levels of endemism and diverse ecosystems (DEAT, 2009).

Unfortunately humans have had an increasingly negative impact on biodiversity since they developed the ability to modify and transform land that was previously deemed unsuitable (Oosthoek, 2009). From approximately 10 000 years BP when agriculture was introduced during the Neolithic period, it has caused a split between human culture and nature, and Oelschlager (1991) is of the opinion that it is this ability and the industrial advancement that followed, that has led to the deterioration of the natural environment.

By the 17th century the influences of mankind's action was very evident as is shown by the much cited text by John Evelyn (in Oosthoek, 2009:10) who noted the impacts on the environment by describing the air pollution in London; “This pestilent smoak, which corrodes the very yron, and spoils all the movables, leaving a soot upon all things that it lights: and so fatally seizing the lungs of the inhabitants, that the cough and the consumption spare no man”. Since Evelyn published *Silva: or a Discourse of Forest Trees* in 1664, in which he describes the destruction of England's last indigenous forests there has been a significant increase and consciousness of the scale and extent of biodiversity loss.

According to the CBD (2010) the principal drivers of biodiversity loss are habitat transformation, over-exploitation, pollution, invasive alien species and climate change. Habitat transformation and degradation (habitat loss) is the greatest driver of biodiversity loss worldwide and is predominantly a consequence of agricultural expansion which now accounts for 30% of the world's land surface (CBD, 2010). Climate change is already having a negative impact on biodiversity and is predicted to become a progressively more significant threat in the future.

The loss of Arctic sea ice and the related pressure of ocean acidification due to an increase in carbon dioxide in the atmosphere are a reality (CBD, 2010). Whilst the pollution caused by nutrients (predominantly nitrogen and phosphorous), is increasing due to the burning of fossil fuels and agricultural practices (particularly the use of fertilizers and herbicides) and is a threat to terrestrial and inland water and coastal ecosystems (CBD, 2010). Over-exploitation is the principal driver of biodiversity loss on marine ecosystems with no significant reduction in this pressure evident over time. The marine fisheries industry has quadrupled in size from the early 1950s to the mid-1990s and, despite a significant increase in conservation and management effort, show a decline in total biomass per catch (CBD, 2010). In addition invasive alien species continue to be a threat to all ecosystems and species. With 57 countries sampled, over 542 alien species including vascular plants, marine and fresh water fish, mammals, birds and amphibians with a demonstrated impact on biodiversity have been documented (CBD, 2010).

The number of vertebrate species has declined globally by almost a third (31%), whilst 42% of all amphibians and 40% of birds between 1970 and 2006 share a similar fate (CBD, 2010). Species of bird and mammals used for food and medicine are, on average, facing a greater extinction risk than those species that are not used for such purposes, illustrating mankind's unsustainable consumption patterns. Furthermore, preliminary findings suggest that 23% of global plant species are threatened with extinction. According to the IUCN (2010) Red List Index (in the CBD's Global Biodiversity Outlook 2010), which tracks the overall extinction risk of a species over time, all species that have been comprehensively assessed are becoming more threatened. Approximately 80% of the world's marine fish stocks for which assessments have been done are overexploited with a decline in total global biomass and average size. A considerable concern are amphibians and warm water reef building corals that are under the greatest threat, due to habitat destruction and rising sea temperatures respectively, according to the Convention of Biological Diversity (2010).

A hundred and thirty thousand (130 000) square kilometres of forest have been transformed annually between 2000 and 2010 (CBD, 2010). Forests currently occupy approximately 31% of the planet's land surface and contain more than half the global terrestrial animal and plant species and accounts for more than two-thirds of the planet's net primary production on land. It is estimated that more than 95% of North American grasslands have been lost and cropland and pasture have replaced approximately 50% of the Cerrado, the woodland-savannah biome of central Brazil known for its exceptionally high level of endemism. Between 2002 and 2008, it is estimated that the Cerrado lost approximately 0.7% of its original extent or 14 000 square kilometres annually (CBD, 2010).

Although the above mentioned factors have a significant impact on biodiversity as individual drivers, it is the combined impacts that create multiple complex and compounded pressure on biodiversity. The ever increasing human population (7 billion on the 31st of October 2011) and consumer culture is continually driving the demand for new resources with the result that the ecological footprint of humanity already exceeds the biological capacity of the earth by 40% (CBD, 2010) and negatively impacts upon habitats, biomes, ecosystems and other species that share the planet with us.

Thus, it is clear that we are experiencing a drastic and increasing rate of species loss. Ecosystems are rapidly declining, fragmented and degraded, protected areas alone cannot cope or respond to the challenge, therefore radical new conservation strategies are required to curb the loss (Mora and Sale, 2011).

1.3 Conservation

Traditionally nature conservation exclusively focused on the conservation of water, soil and fisheries, and wildlife management and ecological forestry. The modern conservation movement however has widened its focus from sustainable harvesting of natural resources and preservation of wilderness areas to include biodiversity conservation through a more inclusive people and community conservation approach (Olver *et al*, 1995; Redford and Richter, 1999).

The conservation movement is often perceived as part of the broader and arguably more influential environmental movement. However, some environmentalists, especially within North America, argue that conservation and environmentalism differ in ideology and practice. By way of example, conservation in the United States is perceived as different from environmentalism in that it aims to preserve natural resources exclusively for the sustainable use by humans. However, in other parts of the world, including South Africa, the term

conservation is used more broadly to include the conservation of natural areas and actively protect fauna and flora for their inherent value as much as for any value they may have for humans (Olver *et al*, 1995).

Although conservation ideology has existed for thousands of years, Barton (2002), Hayes (1959) and Pinchot (1937) argue that the contemporary conservation movement can trace its origins to the 19th century starting in the scientific forestry techniques, pioneered in Prussia and France during the 17th and 18th centuries. According to Barton (2002) the foresters in India were often of German origin and used to manage the forests by applying fire protection and climate change theories developed by Alexander von Humboldt during the 19th century. The ecological basis of this idea was to preserve the growth of delicate teak trees. The same German Foresters who headed the forest service in India travelled back to Europe and taught at forestry schools in England and brought with them the scientific and legislative knowledge of forest conservation from where it spread to the United States (Barton, 2002).

While the scientific methods used for forest conservation originated in mainland Europe, the United States are generally credited with starting the conservation movement (Olver *et al*, 1995). Jepson and Canney (2003) support this idea and suggest that the modern conservation movement emerged in the 19th century in response to fundamental changes in the worldview concerning the human-nature relationship. Oosthoek (2009) and Wellock (2009) suggest that the modern conservation movement emerged from the world's response to industrial expansion and political modernisation. Whilst, Wellock (2009) argues that initially conservation was focused predominantly on protection and management of natural resources. Individuals such as the forester Gifford Pinchot and politician Theodore Roosevelt focused on preservation and conservation of nature for sustainable use or to manage for the 'greater good' (Wellock, 2009). They had an anthropocentric view of nature focusing on economic sustainability (Little, 2007). Others during this time such as David Thoreau and John Muir's ethics were derived from a more spiritual appreciation and they advocated conservation of nature for its inherent value (Little, 2007).

The 1920s saw influences from people such as Aldo Leopold who challenged the utilitarian game management systems and predator control giving rise to the mainstreaming of the concept of ecology and a shift in how conservationists managed natural resources and a more inclusive ecosystems approaches (Wellock, 2009). James Stevenson-Hamilton, the first warden of the renowned Kruger National Park, shared these views and according to Carruthers (2005) had a more holistic approach to wildlife management with controversial

ideas for the time. He advocated the protection of 'vermin' (lion, wild dog, hyena, leopard, cheetah and crocodile) that at the time were actively persecuted for allegedly decreasing the numbers of more desirable species (mainly antelope) and was one of the first conservationists in Africa to advocate protected areas as a common, natural, national heritage.

After the Second World War a significant paradigm shift occurred and a mass environmental movement emerged in response to social change, economic affluence and suburban growth (Oosthoek, 2009; Wellock, 2009). The growth of the consumer society in North America and Europe during this time significantly increased the pressure on the environment (Oosthoek, 2009). The new affluence enabled many people to focus more energy on clean suburbs, good health and permitted more leisure time (Oosthoek, 2009; Wellock, 2009). In the 1950s the environmental movement in North America had a political awakening stemming from the debate regarding the building of Echo Park Dam and thereby potentially destroying Dinosaur Park Monument (Wellock, 2009). As a result of the campaign against Echo Park Dam, older more established conservation organisations, such as the Sierra Club, grew in stature.

Wellock (2009) suggests that nuclear weapon testing led to the mass environmental movement that emerged in the 1960s in response to an increased awareness of the inherent dangers of pollutants and pesticides. Many of these activist groups were led by people who protested against the indiscriminate use of chemicals and pesticides and were fuelled by publications such as Rachel Carson's *Silent Spring* in 1962 and subsequently, the environment has been more prominent on the political agenda (Oosthoek, 2009).

The conservation movement continued to grow during the 1970s with encouragement from publications such as the Report for the club of Rome, *Limits to Growth* (Wellock, 2009). The 1970s also saw the establishment of the Greenpeace movement amongst others, along with the signing of the Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES) (Dickson, 2002; Oosthoek, 2009). However, Wellock (2009) points out that the 1970s was a decade of economic decline, with oil shortages and rising fuel prices that forced people to choose between the economy and the environment. In addition, as with other civil rights movements in the 1960s, environmentalism attracted a radical following. These diverse groups frequently clashed with more conservative conservationist groups. This, along with the institutionalisation of the conservation movement during this period and the reaction to radical fringes and minority environmental groups against corporate America, led to the division and ineffectiveness of the environmental/conservation movements which led to a decline in environmental activism (Wellock, 2009).

In 1984 the World Commission on Environment and Development was constituted by the United Nations General Assembly to assess the state of the environment, culminating in a report *Our Common Future: A Global Agenda for Change*. The commission focused on sustainable development and was chaired by Gro Harlem Brundtland. The Brundtland report (Oosthoek, 2009), as it is known, was followed by the Convention on Biological Diversity, an international treaty adopted at the Earth Summit in Rio de Janeiro in 1992. The convention has three main goals; the conservation of biodiversity, sustainable use of its components and fair and equitable sharing of benefits arising from genetic resources. The convention recognized for the first time in international law that the conservation of biological diversity is 'a common concern of humankind' and is an integral part of the development process (DEAT, 1997). The agreement covers all ecosystems, species, and genetic resources and links (but does not integrate) traditional conservation efforts to the economic goal of using biological resources sustainably.

Contemporary nature conservation has developed from a protectionist-preservation movement to a social science working to develop certain values in society concerning the human-nature relationship (Jepson and Canney, 2003). Gartlan (undated) however argues that the orthodox conservation sector is increasingly dominated by social scientists concerned with conservation of human welfare and thereby marginalising biological science.

Conservation is integrated with social, political and economic spheres and will continue to adapt along with these spheres and should therefore strive for a balanced approach to the challenges of the day (Brechin *et al*, 2002). Berkes (2004) concurs and argues that conservation success is dependent on social and economic factors, therefore a more inclusive, people and community orientated approach to conservation is needed. Schwartz (2006:1550) calls this "the rallying of conservation social-capital" and suggests a shift in emphasis that is not entirely based on ecosystem targets and wild lands objections. To achieve this, Schwartz (2006) suggests personalising nature for humanity and engaging the public in biodiversity conservation by striving to achieve three goals, to market biodiversity, adjusting the public's perception on biodiversity and increasing public participation in biodiversity conservation.

Schwartz (2006) argues that conservationists can help increase public participation by creating opportunities for cooperative science and stewardship. In South Africa for example, 80% of the country's most scarce and threatened habitats are privately owned (Fourie and Muller, 2011) therefore stewardship is a fundamental mechanism to assist the public to

engage in biodiversity conservation. Furthermore, stewardship allows conservation to bring the community pro-actively into the biodiversity conservation management process (Berkes, 2004).

1.4 The South African Context

South Africa is the third most biologically diverse country in the world with a diverse array of ecosystems and landscapes ranging from semi-deserts through savannas and woodland to sub-tropical coastlines and coastal and sub-alpine forests (Crane, 2006; DEAT, 2009; van Niekerk, 2008; Wynberg, 2002). South Africa has high levels of endemism (65% of the 23 000 plant species are endemic) and is home to 10% of the world's plant species and 7% of the mammal, bird and reptile species (DEAT, 2009). Furthermore, the country accounts for 16% (approximately 10 000 species) of the world's marine species (DEAT, 2009; van Niekerk, 2008) of which 25% are endemic (DEAT, 2009) and 5.8% of the world's known insect species (van Niekerk, 2008).

Unfortunately South Africa is no different to the global trend and the country's unique biodiversity is highly threatened (DEAT, 2009; Wynberg, 2002) with the majority of ecosystems being modified (van Niekerk, 2008) despite these resources supporting the livelihoods of millions of people and contributing extensively to the economy (Mora and Sale, 2011; Wynberg, 2002). In 2000 South Africa's tourism industry, predominantly based on wildlife and natural open areas, was estimated at US\$ 3.6 billion (CBD, 2010) and the value of ecosystem services (provisioning, regulating and cultural) at approximately R73 billion (approximately US\$9 billion as per exchange rate December 2011) per annum, excluding marine resources and the value generated from extracting water (DEAT, 2009).

South Africa's National Red List, which is an assessment of the status of the country's species, records that 13% of the plants, 20% of mammals and 10% of birds and frogs are threatened (DEAT, 2009). Currently 6.5% of the country's land surface is under legal conservation protection (DEAT, 2009), although a national protected area expansion strategy has been drafted that aims to guide protected area expansion and increases the protected area network to 8.8% by 2013 and 12% by 2030 (DEAT, 2009).

1.4.1 Conservation pre- 1994

Although not well documented, natural resource management and conservation has a long history in South Africa and was practised by indigenous people such as the San, Khoi and Nguni people during the pre-colonisation period (DEAT, 1997; Fabricius, 2004). Their

governing systems included a set of rules and procedures to regulate the use of these natural resources, examples of these include the setting aside of hunting areas for Zulu royalty, soil conservation methods of the BaTswana and protection of symbolic/spiritual areas by the BaSotho (DEAT, 1997; Fabricius, 2004). This environmental ethic was mostly enforced through traditions with strong links to spiritual and cultural activities (DEAT, 1997).

After colonisation, the ethnic governing systems of the indigenous people changed significantly in particular with the dramatic increase in hunting by European settlers, the increase in the number of guns owned by local people and agricultural development and expansion (DEAT, 1997). Carruthers (1989) notes, that both the settlers and indigenous people utilised the wildlife for various reasons including sport, subsistence and profit.

With the decline in resources, in particular wood, shortly after colonisation, a number of areas were promulgated by Jan van Riebeeck to protect natural resources, especially trees (for wood), but also gardens and lands (DEAT, 1997; Holmes-Watts and Watts, 2008). The game protection legislation of 1846 and 1858 were set with the intention of limiting the access to diminishing resources to a privileged few instead of considering long term sustainability and ecosystem renewal (Fabricius, 2004). However, this conservation strategy largely failed and led to the more extreme preservation measure of protected areas (Carruthers, 1989).

The first official protected areas in South Africa were the forest reserves in Knysna and Tsitsikamma that were proclaimed under the Cape Forest Act of 1888 (DEAT, 1997). This was followed by a number of statutory game reserves, including Pongola in 1894, Hluhluwe, Umfolozi and St Lucia Game Reserves in 1895, Sabie Game Reserve in 1898 and Giant's Castle in 1903. Generally the purpose of these reserves was to preserve certain game species (mostly antelope) and increase their numbers. After South Africa became a Union in 1910 the central government took responsibility for the conservation of forestry, inland waters, islands and the sea-shore and by 1926 the first National Parks Act was promulgated (Carruthers, 1989). The four different provinces were however responsible for fish and game conservation, which led to the establishment of provincial conservation agencies that dealt with the increasing administration and management of natural resources (DEAT, 1997).

There was a general decline in support for game protection during this time due to an obligation towards economic development and modernisation in the newly formed national state (Carruthers, 1989). Increasing mining activities paved the way for secondary industry along with a significant increase in large scale commercial farming that was changing South

Africa from an agricultural economy to an agro-industrial state. This gave rise to the de-proclamation of the Rustenberg Nature Reserve in 1914, the Pongola Game reserve in 1921 and parts of the Sabie Game Reserve in 1923 to make place for expanding agricultural and mining activities (Carruthers, 1989).

Even though South Africa's efforts to protect endangered species and the development of a system of protected areas earned global recognition (Wynberg, 2002), the value of biodiversity conservation in South Africa is often overshadowed by the exclusive preservation approach of the past (Wynberg, 2002). Fabricius (2004) points out that this preservation approach was enforced through paramilitary conservation methods that largely ignored local opinions and often led to the forceful removal of people from protected areas. This exclusion of the intricate people-nature relationship from natural resource legislation is responsible for many failures of previous conservation strategies (Fabricius, 2004).

1.4.2 Conservation Post-1994

After the first World Summit on Environment and Development in Rio de Janeiro (Earth Summit) in 1992 there was a global paradigm shift in conservation. Up until that period biodiversity conservation was mostly viewed in isolation and exclusively an issue for conservationists and scientists (IAIA, 2005; Wynberg, 2002). Since the Rio Earth Summit, it has become more common to acknowledge that biodiversity is the basis of life and encompasses the fields of politics, culture and economics (IAIA, 2005; Wynberg, 2002).

This global shift affected South Africa and since the early 1990s conservation has moved from a protectionist approach into a socio-political arena that includes human rights, access to natural resources, equity and sustainability (Faasen, 2006; IAIA, 2005; Wynberg, 2002). The political changes in South Africa in 1994 brought fundamental changes to the legislative, policy and institutional framework for biodiversity management in South Africa (Wynberg, 2002). In 1995 South Africa ratified the Convention on Biological Diversity (CBD), in which signatories need to integrate sustainable development and biodiversity conservation into regional plans, programmes and policies (Crane, 2006). The government was obliged to pass national laws to give effect to the provision of the convention, which led to the establishment of the White Paper on Conservation and the Sustainable Use of Biological Diversity (van Niekerk, 2008; Wynberg, 2002). The White Paper acknowledged the failures of the past and recognised that significant policy changes were necessary, including innovative conservation processes that recognise property right systems and incentive instruments. These new processes were introduced by way of new environmental biodiversity policies and are a powerful mechanism for the protection of biodiversity on

private land and for government to achieve its target of increasing the conservation estate (van Niekerk, 2008).

The White Paper on Conservation and Sustainable Use of Biodiversity was followed by the National Environmental Management: Biodiversity Act No.10 of 2004. The Biodiversity Act (No. 10 of 2004) has helped to reform biodiversity conservation within South Africa and move towards a conservation system that recognises people as part of the ecosystem with a new realisation that the complex environmental issues require a unique participatory approach (Berkes, 2004). The best way to achieve this participatory approach to biodiversity conservation is through economic interventions ranging from taxes to discourage over-exploitation to direct payments for conservation activities carried out by private landowners (McNeely, 2006). This led to the establishment of the Biodiversity Stewardship Programme, which is an initiative that aims to explore the wide range of approaches that are available to reward landowners for biodiversity conservation activities.

1.5 Aim and Objectives

The aim of the research was to determine how new participatory conservation systems such as the Biodiversity Stewardship Programme can assist in biodiversity conservation on private land within the City of Cape Town. To achieve this, the specific objectives were to:

1. Describe and critically assess the participatory conservation systems and the legislative structure that regulates them.
2. Understand landowner's perceptions towards conservation and conservation authorities including knowledge of biodiversity, interest in biodiversity, financial benefits of conservation and willingness to conserve.
3. Identify limitations to biodiversity conservation on private land.

1.6 Methods

To address the research objectives, the research design and methodology made use of a case study approach. The enquiry of past initiatives that investigated landowner's perceptions of conservation included the use of literature, participant and direct observations. The main research mechanism used to collect baseline data was semi-structured face-to-face interviews conducted with landowners and managers within the City of Cape Town.

1.7 Conclusion

The conservation of biodiversity is a complex interdisciplinary science that has moved from an exclusive, expert, preservationist approach to a more inclusive, people orientated approach. Since South Africa became a democracy in 1994 the environmental legislation has become more progressive and acknowledges the human-nature relationship, allowing for exciting new participatory conservation mechanisms such as the Biodiversity Stewardship Programme. This programme acknowledges that biodiversity conservation in South Africa is in the hands of communities and private landowners and provides the necessary policy processes to engage with these landowners in a positive manner and cost-effectively contribute to biodiversity conservation. This research investigates how these new conservation mechanisms, such as the Stewardship Programme can contribute to the conservation of Cape Town's unique biodiversity.

CHAPTER TWO

Literature Review

2.1 Introduction

Biodiversity loss is occurring at an accelerating rate that has not been experienced before and is of concern not only due to species loss but also the resultant impact on functioning ecosystems and ecosystem services and on human well-being (Biggs, *et al*, 2008). This increase in biodiversity loss is due to the increasing population growth and over consumption that drives the need for increased agricultural development, urbanisation and the influence of climate change and the spread of invasive alien species (CBD, 2010; WWF, 2010). The situation is of global concern leading to international policies over the last 30 years, most notably the Convention on Biological Diversity (CBD) adopting targets to significantly reducing biodiversity loss (Biggs *et al*, 2008; Naughton-Treves *et al*, 2005). These policies acknowledge that humans are not separate from the environment, with large natural areas owned and/or managed by local communities and although the current network of protected areas play an important role in conservation, the future of biodiversity conservation is outside of the current system of protected areas (Scherr and McNeely, 2007; Terborgh, 2000; Toledo, 2001; Winter *et al*, 2007).

New conservation strategies are being developed engaging local people in conservation decisions and expanding the conservation estate on private land through environmental stewardship (Brown and Mitchell, 2000). Environmental stewardship refers to the wise use of resources for current and future generations (Hockett *et al*, 2004), with the onus on private landowners to conserve and manage natural resources (Cumming, 2009). Governments acknowledge the expenses incurred by individual landowners with regards to biodiversity conservation for public benefit and have developed incentive based strategies to encourage landowners to participate in environmental stewardship. These incentive strategies can broadly be divided into two groups; voluntary and regulatory (van Niekerk, 2008). Within South Africa the change in legislation paved the way for the development of the Conservation Stewardship Project that was initiated as a pilot project in 2002 with the aim of cost effective biodiversity conservation on priority private land (von Hase, 2010). This chapter outlines biodiversity loss and the changes in international policies that have led to new conservation strategies that recognise the importance of off-reserve conservation and mechanisms that make it possible.

2.2 Biodiversity loss

All life is dependent on the ecosystem goods and services that a healthy planet provide (CBD, 2010; WWF, 2010). WWF (2010) divide these goods and services into four general groups; provisioning services (food, medicine, timber, fibre, biofuel), regulating services (water filtration, waste decomposition, climate regulation, crop pollination), supporting services (nutrient cycling, photosynthesis, soil formation) and cultural services (recreational, spiritual and aesthetic). Costanza (2008) and Costanza *et al* (1997), estimate that on a global scale, these ecosystem services are worth 33 trillion US dollars annually. Yet, despite the value of, and man's dependants on functioning ecosystem services, humans continue to destroy the environment at an alarming rate. The CBD (2010) points out that amphibians, widely recognised as valuable indicator species for ecosystem health (Sheridan and Olsen, 2003), are at risk of becoming extinct, coral reefs are rapidly deteriorating and almost a quarter of all plant species are facing extinction. Based on assessed populations, the abundance of vertebrate species has declined by 33% between 1970 and 2006 and continues to do so in particular in the tropics and fresh water systems (CBD, 2010). The CBD (2010) notes that globally natural habitat is declining in extent and integrity. Fresh water wetlands, sea ice habitats, salt marshes, coral reefs, sea grass beds and shellfish reefs are showing significant decline. Furthermore there are extensive fragmentation and degradation of forests and rivers, all leading to extensive biodiversity loss and associated impact on ecosystem services (CBD, 2010).

2.3 Ecological Footprint

WWF (2010) state that the current ecological footprint of humanity exceeds the biological carrying capacity of the earth by one and a half, in other words, humans need one and a half planets to sustain their consumption needs. Rees (2010) agrees by stating that the global average citizen has an eco-footprint of 2.7 global average hectars (gha) however, there are only approximately 2gha of bio-productive land/water per capita. Humans have become the dominant macro-consumer of biomass in all terrestrial and accessible marine ecosystems and their demand on the ecosystem dwarf that of any other species (Rees, 2010). Costanza (2008) states that the modern global civilization is addicted to fossil fuels, over-consumption and the conventional development model. Dubos (1973) notes that technological man uses all types of natural resources for selfish short term economic gain. Andrew Nikiforuk probably sums it up the best in Rees (2010:13); "Let's face it: *Homo economicus* is one hell of an over-achiever. He has invaded more than three-quarters of the globe's surface and monopolised nearly half of all plant life to help make dinner. He has netted most of the ocean's fish and will soon eat his way through the world's last great apes. For good measure, he has fouled most of the world's rivers. And his gluttonous appetites have started

a wave of extinctions that could trigger the demise of 25 percent of the world's creatures within 50 years. The more godlike he becomes the less godly *Homo economicus* behaves.”

The increasing negative impact on ecosystems owing to human consumption is unquestionable and it is increasingly apparent that there is a need for drastic change to the human-nature relationship (Chapin *et al*, 2009). Chapin *et al* (2009) point out that the western civilisation's resource management models have evolved from exploitation without consideration for sustainability to steady-state resource management, aiming at optimal (maximum) sustainable yield (OSY/MSY) and efficient production of single resources such as trees or fish, to ecosystem management. In addition, there is a global consensus on the value of biodiversity and the importance of conservation is the driving force for the accelerated increase of protected areas in the last three decades.

2.4 International Policy

To better understand the forces driving the global expansion of protected areas, it is necessary to trace vital events in the development of international environmental policy. During the early 1980s there was international consensus on the importance of protected areas for biodiversity conservation and agreement that protected areas must address local communities' concerns and sustainable economic development (Naughton-Treves *et al*, 2005).

The World Parks Congress in Bali (1982) encouraged the expansion of protected areas by recommending that all nations should strive to conserve 10% of their land surface. Ten years later at the 1992 United Nations (UN) Conference on Environment and Development or the Rio Summit, protected areas were again promoted when 167 countries signed the Convention on Biological Diversity (CBD) and pledged to create a system of protected areas to conserve *in situ* biodiversity (Naughton-Treves *et al*, 2005). Naughton-Treves *et al*, (2005) record that increased funding for protected area management was an incentive for protected area expansion and that several US Foundations increased their funding for biodiversity conservation during the late 1980s. Between 1990 and 1997 NGOs, private companies and U.S. government agencies invested US\$ 3.26 billion in biodiversity in Latin America alone, of which 35% of the total was dedicated to protected area management. Naughton-Treves *et al*, (2005) point out that the number and area of protected areas have tripled over the last two decades with many countries having met or surpassed the proposed target of 10% as set by the IUCN. However, Mora and Sale (2011); Rebelo *et al* (2011) and Scherr and McNeely (2007) highlight, that this expansion has been highly variable amongst regions and not representative of biodiversity. Gallo *et al* (2009) argue that even though 11.5% of the

world's land surface is legally conserved, this area is strongly biased towards certain topographies and habitats. Rebelo *et al* (2011) point to a similar situation within the Western Cape Province of South Africa and in particular the City of Cape Town in which they argue that although 17% of the City of Cape Town is formally conserved, well above the national target of 10%, this is not representative of the biodiversity and mainly includes the rugged Table Mountain chain. This is a worldwide trend and globally the current system of protected areas is primarily situated in the least productive landscapes such as rugged mountain ranges and/or infertile and therefore inexpensive and agriculturally unproductive lands (Gallo *et al*, 2009; Mora and Sale, 2011; Rebelo *et al*, 2011; Scherr and McNeely, 2007). Furthermore rain forests have received a disproportionate emphasis owing to extensive conservation campaigns such as the 'hotspots approach', due to their significant species richness, and although important, they feel that other goals may have been neglected (Naughton-Treves *et al*, 2005).

The 'biodiversity hotspots' approach was originally promoted by ecologist Norman Myers in the mid-1980s as a conservation planning strategy to prioritize limited conservation resources based on significant habitat threats and exceptionally high levels of endemism. There are 34 global hotspots (including the Cape Floristic Region) that support more than 40% of the world's plant, bird, mammal, reptile and amphibian species with exceptional high levels of endemism on only 2.4% of the global land surface (Mittermeier *et al*, 2011). However, Naughton-Treves *et al*, (2005) argue that if conservation effort should focus on land transformation instead of species loss, the concern would shift from rain forest to Mediterranean forest or temperate grassland. Only a fraction of the original extent of these biomes is under protection and almost 50% have been irreversibly transformed. In addition, mangroves and tropical dry forests are under protected. Furthermore, Naughton-Treves *et al*, (2005) argue that the hotspot approach tends to neglect areas that are less species rich but still important providers of ecosystem services.

Despite this dispute regarding the geographical priorities, all conservationists agree that more land needs to be protected. Naughton-Treves *et al*, (2005) note that the majority of parks are less than 10 000 hectares and therefore not big enough to support adequate populations of rare or far reaching species or to maintain ecosystem processes (natural fire regime) to sustain biodiversity. Furthermore they point out that many areas with high endemism and/or species richness have no legal conservation protection and globally pressure to transform land (especially for agriculture) is increasing. Based on this and other findings, delegates at the 2003 World Parks Congress (entitled Benefits Beyond Boundaries) in Durban, South Africa came to the conclusion that the global protected area network must

be expanded if further extinctions are to be avoided and that conserving biodiversity should move beyond protected areas and promote biodiversity at a landscape scale (Scherr and McNeely, 2007).

2.5 Community conservation

At the 1982 World Parks Congress in Bali a consensus was reached that protected areas in developing countries will survive only insofar as they address human concerns. The integration of biodiversity conservation with sustainable economic development was reiterated again in 1987 in a report issued by the World Commission on Environment and Development (Brundtland commission). At the 1992 World Parks Congress delegates were urged to explore mutually beneficial circumstances of conservation and development in which both human use of natural resources and preservation could occur concurrently. In an attempt to address the loss of biodiversity and develop funding mechanisms, the UN Conference on Environment and Development known as the Rio Earth Summit was forged in 1992 as a formal international commitment to address the set goals. The CBD has been ratified by 179 governments' more than most international environmental agreements with the conspicuous absence of the United States of America. These treaties, with a strong focus on biodiversity conservation, paved the way for campaigns to establish new protected areas. Developed countries through bilateral and multilateral organisations, restructured some of their development assistance to finance protected area expansion, however recent shifts have motivated for funding to incorporate conservation and economic development (Naughton-Treves *et al*, 2005).

Globally, conservationists were confronted with the challenge of rapidly expanding protected areas, often in difficult socio-political conditions and varying institutional situations in different areas (Naughton-Treves *et al*, 2005). The World Commission on Protected Areas recognized that different types of protected areas are better suited to different settings and that biodiversity conservation is not always the emphasis in all the areas. Six management categories with two sub-categories were developed; a) areas managed primarily for biodiversity conservation (categories 1 and 2) and b) areas managed mainly for sustainable use of resources (3-6). In the same report the IUCN echoes the change in conservation strategies defining protected areas to reflect the expansion and diversification of the original protected area model; "An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means" (Dudley and Stolton, 2008:9). Almost 85% (84.5%) of global protected areas assigned with IUCN status are open to some form of human use (Naughton-Treves *et al*, 2005).

It is evident that an alternative approach to contemporary conservation is needed (Egoh *et al*, 2010) and that the current network of protected areas, although crucial for biodiversity conservation (Brown and Mitchell, 2000), is not going to adequately conserve biodiversity and functioning ecosystems (Jenkins *et al*, 2004). Jenkins *et al* (2004) and Scherr and McNeely (2007) point out that cost effective ways for biodiversity management and protected area expansion need to be explored due to limited resources, especially outside of protected areas.

Terborgh (2000) and Winter *et al* (2007) are of the opinion that the fate of biodiversity lies outside of protected areas. This is in all likelihood true, seeing that indigenous people control substantial areas of natural resources (Scherr and McNeely, 2007; Toledo, 2001), for example large forest areas (420 million ha) under community ownership and/or management are being conserved outside the formal protected area network (Scherr and McNeely, 2007; Toledo, 2001). Toledo (2001) points out that the Inuit people govern 222 million hectares of Canada, and in Papua New Guinea, community land constitutes 97% of the national territory. In South Africa the private agricultural community owns approximately 80% (in area) of the most important and threatened habitats (Ashwell *et al*, 2006; CapeNature, 2007; Fourie and Muller, 2011; Winter *et al*, 2007), and on a global scale it is estimated that the total area under indigenous community control is between 12% and 20% of the earth's land surface. This is a far reaching fundamental shift in biodiversity conservation and, with modest financial and other support, could be increasingly effective in biodiversity conservation (Scherr and McNeely, 2007). Gallo *et al* (2009) highlight that in a recent study it was shown that the state can save up to 80% of the acquisition costs for biodiversity conservation if private conservation areas are used in conjunction with statutory conservation areas and that numerous landowners have demonstrated a willingness and capacity to conserve several million hectares of land. In general, private conservation areas have been left out of conservation statistics and national conservation planning frameworks (Gallo *et al*, 2009).

Since the 1970s international approaches to conservation have evolved to include sustainable use of natural resources, the preservation of ecosystem services and the integration of broader social development processes including the need to incorporate local communities in management decisions affecting themselves (Brown and Mitchell, 2000; Faasen, 2006; Stoll-Kleemann and O'Riordan, 2002). This new model of conservation management and protected area expansion acknowledges the importance of interaction between people and nature and engaging people in the stewardship of biodiversity (Brown

and Mitchell, 2002). These new strategies are setting the stage for new approaches to engage with local people and expand the conservation estate on private land (Shafer, 1999) through stewardship of the environment (Brown and Mitchell, 2000).

2.6 Environmental Stewardship

Stewardship is a frequently used term suggesting sustainable or wise use. Traditionally the term has been used to describe agricultural practices, monetary issues and religious obligation, with some definitions including an ethical or moral component (Hockett *et al*, 2004). There are however differing opinions regarding the reason for the moral obligation. Some definitions state the moral or ethical obligation towards God while others imply a personal obligation to future generations. Many definitions convey the concept that a steward is caring for a resource for someone else, be it society, future generations, nature itself or God (Hockett *et al*, 2004). These different stewardship definitions are grounded in different value systems such as religious, economics, anthropocentric and bio-centric. Hockett *et al* (2004) point out that this can potentially be problematic in terms of encouraging the use of stewardship for the promotion of pro-environmental behaviour on a broader scale, as it influences the interpretation of stewardship.

Even though it seems likely that different individuals will perceive stewardship differently, Hockett *et al* (2004) argue that it is unclear whether the different meanings of the word would lead to different environmental attitudes. Hockett *et al* (2004) argue that there is some evidence to support the idea that different values may lead to similar pro-environmental attitudes and behaviour. He points to a study by Kempton *et al* (1995) that shows that groups from vastly different environmental backgrounds (Sierra Club vs. sawmill workers) with completely different concepts of environment (e.g. spiritual vs. utilitarian) responded similarly to a variety of attitude questions regarding the environment. Another study (Negra and Manning, 1997 in Hockett *et al*, 2004) exhibited some level of environmental concern even though the basic reason for concern was significantly different. For example, one person may want to preserve the environment because God created it and feels it is a moral obligation. Another person however may want to preserve the environment so that it can be utilised (for example natural resources or recreational activities) by humans and yet another person may think it has intrinsic value and is therefore not subordinate to man's interest. Minter and Manning (2000) concur, stating that both anthropocentric and non-anthropocentric strategies will endorse similar environmental policies under certain conditions, referring to Norton's theory of convergence (Norton 1986; 1991; 1995a; 1995b; 1996; 1997 in Minter and Manning, 2000).

Although commonly used by contemporary environmental professionals, the term is deeply rooted in Christianity (Bugg, 1991; Hockett *et al*, 2004) and it is only more modern definitions that include an ethical obligation to look after the environment. Hockett *et al* (2004) go on to suggest a significant relationship between religion and environmental values. In a study in the US, 69% of the respondents that did not belong to an organised religion still agreed with the statement 'Because God created the natural world, it is wrong to abuse it', furthermore in an open ended question, God was listed as a major source of environmental values. Bugg (1991) and McNeill (2000) concur by stating that religious doctrines include various commands about Nature and that the biblical worldview to stewardship can be defined as: "Utilising and managing all resources God provides for the glory of God and the betterment of His creation." (Holman Bible Dictionary, 2010:583) The essential core of biblical worldview stewardship is managing everything God brings into the believers' life in a manner that honours God and impacts eternity (Bugg, 1999). This is further evident as Dubos (1973) points out that the first chapter in Genesis speaks of man's domination over nature in passages such as Genesis 1:26 -29. "Be fruitful and multiply, and fill the earth and subdue it; and rule over the fish of the sea and the birds of the air, over the livestock, over all the earth and over all the creatures that move along the ground."

This, and other biblical passages, are often used as an argument that Christianity or the Judeo-Christian traditions encourage environmental degradation. However McNeill (2000) argue that evidence of environmental destruction, even among followers of Buddhism, Taoism and Hinduism (often seen as more respectful of nature) suggest otherwise. A variation on the Judeo-Christian theme is the notion that western humanism, rationalism or the scientific revolution encouraged environmental degradation by depriving nature of its sacred character.

However, from an environmental perspective, Brown and Mitchell (2000) state that stewardship is simply about people taking care of the earth and explain that environmental stewardship refers to the essential role individuals and communities play in the careful management of our common nature and cultural wealth both now and for future generations. In more specific terms, Brown and Mitchell (2000: 71) define environmental stewardship as "efforts to create, nurture, and enable responsibility in landowners and resource users to manage and protect land and its natural and cultural heritage". Brown and Mitchell (2000) argue that the stewardship approach fosters individual and community responsibility and places conservation in the hands of the people it affects the most.

Experience in private land stewardship in North America and increasingly in other parts of the world, including South Africa, offers a wide range of tools to conserve biodiversity. Many countries use mechanisms whereby private land can legally be proclaimed. However this is often limited to land that is a conservation priority and with high levels of biodiversity. Great success of conservation has been achieved through this mechanism, most notably in Costa Rica where there are approximately 250 private nature reserves conserving 63 832 ha or 1.2% of the national territory (van Niekerk, 2008). In South Africa, the National Environmental Management; Protected Areas Act (Act 57 of 2003) enables the Minister (the Cabinet member responsible for national environmental management) to declare an area a special nature reserve, nature reserve or protected environment. This has helped to establish successful stewardship projects in various parts of the country. Brown and Mitchell (2000) state that in recent times, environmental stewardship opportunities have increased in Latin America, Caribbean and North America and that in many Latin American countries (Costa Rica, Colombia, Ecuador, Chile and Brazil) an increase in private nature reserves are playing an increasingly significant role in biodiversity and heritage conservation highlighting the important role of the stewardship approach (Brown and Mitchell 2000).

According to Brown and Mitchell (2000) the specific stewardship tools vary according to social, legal, institutional and ecological constraints however all operate to encourage and enable responsible management. Some of these tools include; environmental education, technical information, demonstration projects, recognition of achievement, certification, voluntary management agreements, subsidised management, title deed restrictions, public-private partnership in protected area management and outright acquisition of property by private organisations. Van Wyk (2010) categorises these conservation tools on private land as motivational, voluntary, fiscal and economic, property based and regulatory. Van Niekerk (2008) broadly divides these tools employed to promote biodiversity conservation on private land into two groups; voluntary and regulatory methods.

All these tools represent a spectrum of options beginning with those with little or no formal commitment or involvement with little per capita investment to perpetuity and more specific conservation protection and increased incentives (Brown and Mitchell, 2000).

2.6.1 Voluntary Incentives

Van Wyk (2010) argues that voluntary schemes are non-regulatory, non-compulsory programmes that encourage conservation but have no direct incentive for landowners. With incentives being described as measures that positively influence the way people think and behave in respect of a certain issue, in this case biodiversity conservation. These schemes

are based on acknowledgement for conservation effort and serve as an advert for conservation but lack legal backing and participants can withdraw or change their behaviour at any point (van Wyk, 2010). However, van Wyk (2010) goes on to argue that motivational incentives are the cornerstone on which all other incentives are built, arguing that if people are positively influenced and persuaded to be pro-biodiversity conservation, they are more likely to participate in other incentive schemes. Motivational incentives focus on the core values of people and include education and motivating people to become more environmentally sensitive. In the US these incentives are also termed 'facilitative incentives' and include technical and management advice, focusing on the transfer of conservation information to assist landowners to make more informed conservation decisions (van Wyk, 2010). One of the most significant aspects of motivational incentives is that it provides a platform for communication between conservation officials and landowners and is generally perceived as impartial, non-interventionist and socially acceptable. However, a lack of resources and capacity in South Africa are a challenge for implementation and although crucial for a change in attitude and behaviour, cannot expect to protect biodiversity in isolation (van Wyk, 2010).

Van Niekerk (2008) points out that 'fee simple' land acquisition is an easy voluntary conservation strategy where properties are bought by NGOs or government organisations dedicated to land conservation. Although this method has the potential to secure land for long term biodiversity conservation, purchasing and subsequent management is costly.

Van Niekerk (2008) goes on to explain that many landowners informally protect their land through a personal commitment to conservation and, although this commitment could create a platform for formal conservation in the future, the lack of a legal agreement questions the durability of the commitment. In South Africa, the Department of Environmental Affairs and Tourism operate the National Heritage Programme for sites of natural significance based on certain criteria. Although no management directive has been issued for these sites, they could lose their 'status' if the site was not correctly managed. Some sites, although worthy of recognition, did not qualify for the natural heritage programme and therefore the Sites of Conservation Significance (SOC) programme was established. However, very few landowners have signed up to this programme (van Niekerk, 2008).

In Australia the 'Land for Wildlife' programme is a good example of a voluntary programme aimed at fostering change in landowner behaviour (van Wyk, 2010), whilst in South Africa an example is the conservancy programme. Landowners can have their land declared a conservancy but no formal or minimal restrictions are placed on them (van Niekerk, 2008;

van Wyk, 2010). Conservancies and other voluntary schemes often act as a stepping stone for landowners to enter into formal agreements in the future with the further benefit of combined management and resources sharing (van Niekerk, 2008; van Wyk, 2010). According to van Wyk (2010) the conservancies in the Western Cape make up approximately 20 024 ha and although they do provide some conscious commitment on the part of the landowner they unfortunately do not provide any tangible benefits for conservation due to the lack of any contractual agreement (van Wyk, 2010).

In addition, there are a number of Community Conservation Areas in South Africa that play a role in biodiversity conservation. These are generally informal agreements where the community chooses to employ an alternative land use such as a nature reserve on communal land (van Niekerk, 2008). Although voluntary programmes have minimal administration costs, high community acceptability and low equity implications while promoting an ethic of custodianship, they are not necessarily based on biodiversity and conservation priority and lack legislative backing placing limitations on these incentives (van Wyk, 2010).

Although all the above mentioned incentive schemes contribute towards biodiversity conservation and recognise the efforts of landowners and serve as an advertisement for conservation, they provide very little legal protection of biodiversity as there is no binding contract or legal arrangement and the landowners can withdraw at any stage highlighting the importance of regulating incentive schemes (van Niekerk, 2008).

2.6.2 Regulatory incentives

Regulatory conservation mechanisms are implemented through government procedures regulating human action and are used when people are unwilling to cooperate in pro-conservation action or where other incentives have been ineffective, one can be used to exert pressure and compel people towards biodiversity conservation (Van Niekerk, 2008; van Wyk, 2010). This is achieved through legislation that restricts certain activities to protect fauna, flora and natural resources (van Niekerk 2008; van Wyk, 2010) and was the favoured approach in South Africa pre-1994. For example the Conservation of Agricultural Resources Act No. 43 of 1983 sanctions the Minister of Agriculture to impose mandatory control measures with which all landowners must conform; the Mountain Catchment Areas Act No. 63 of 1970 entitles the Minister of Water Affairs and Forestry to pronounce any area to be a mountain catchment area and to define its boundary by way of a notice in the government gazette, and the Environment Conservation Act No 73 of 1989 authorises a competent

authority to declare any area as defined by the Minister, privately or state owned, as a protected natural environment or special nature reserve.

This suite of statutes prescribe certain behaviour and often serves as sufficient motivation to create moral inhibition to adversely affect the environment, however, regulatory incentives are often criticized as being intrusive, inefficient and expensive (van Wyk, 2010).

Fiscal and economic incentives are a regulatory mechanism that includes the granting of financial payments to landowners for providing a conservation service. The USA successfully uses compensation strategies and cost sharing initiatives for new conservation technologies (van Wyk, 2010). Compensation or subsidy schemes consist of direct payments to landowners in return for conservation actions and the success of these payments depends on a predetermined level of proactive or preventative action from the landowner. Subsidies or compensation schemes are often preferred by institutions as an incentive, as they can be budgeted for, audited and directly controlled, however, the lack of available funding for subsidies can have significant negative impacts on the organisational-private landowner relationship undoing valuable conservation work (van Wyk, 2010).

Transfer of development rights is a further regulatory fiscal device by which the rights to develop are severed from the land title and made available to transfer to another area. In other words, the landowner retains ownership but relinquishes the right to develop. Ownership of land normally comes with a host of rights including the right to use, modify, develop, lease or sell. Purchase of development rights involves the sale of the right to develop a portion of the land while leaving the remaining rights in place (van Niekerk, 2008). The advantage of these mechanisms is a financial benefit to the owner, however this can be a disadvantage as most conservation organisations cannot afford the significant cost associated with this form of compensation and in general their use is restricted due to their complexity and high administration cost (van Niekerk, 2008).

Property based incentives are contractual agreements that effect ownership or habitat use rights, such as conservation easements, covenants, deed restrictions and stewardship exchange agreements (van Wyk, 2010). Landowners commit land to conservation for a specified period with certain development restrictions placed on the owner or land. In return, landowners are granted incentives and assistance for conservation effort. Tax incentives are usually associated with these types of agreements (van Wyk, 2010), for example South Africa tax incentives can be granted with section 37C (Appendix A) of the Income Tax Act No. 58 of 1962 for land that is committed to conservation. Van Wyk (2010) argues that tax

incentives can play a significant role in incentivising landowners for conservation commitment but are dependent on institutional mechanisms to develop, review and enforce these incentives.

Conservation covenants are used successfully in Australia as a mechanism to conserve biodiversity on private land. A conservation covenant is a legal agreement between two or more parties in which a burden is placed on the landowner's property. A covenant is usually in the form of a written agreement and can be registered against the title deeds of the property and thereby binding current and future owners. Landowners enter into these agreements voluntarily with the primary incentive for participation being tax relief or conservation subsidies. Covenants were received into South African law from English law in the 19th century and were used to regulate density on erven in newly developing towns and not for conservation purposes. Within South Africa the nature of covenants has remained unclear since their introduction and are not frequently used, generally they are regarded as servitudes *praedial* if in favour of an erven and personal if in favour of a specific person (van Niekerk, 2008).

2.6.3 Limitations

Van Niekerk (2008) argues that the voluntary nature of these agreements raises issues of their relative effectiveness, maintaining that those landowners who practice poor management which impact negatively on biodiversity, are less likely to volunteer. Furthermore, without a variety of incentives, conservation agreements are likely to be ineffective. Incentives mostly include tax benefits and occasionally the payment to landowners to restrict usage of the land, however there is generally no adverse effect imposed on the value of the property. On the contrary, the value of the property often increases which raises social equity concerns. Van Niekerk (2008) furthermore states that the nature of these agreements privatises decisions regarding national assets that should arguably be of public interest. Rural communities will inevitably be affected by placing the onus of biodiversity conservation on the private landowner although most of the support for these programmes comes from urban dwellers (van Niekerk, 2008).

Arguably the two most important aspects of these agreements are their cost and duration. The cost of implementing and maintaining these agreements is high and the extent to which the private sector should carry the cost for social benefit is debatable (van Niekerk, 2008). Even though perpetuity conservation is the primary objective, such agreements could be problematic with changing social, economic and ecological conditions. There is some

criticism that perpetuity agreements will bind future generations by decisions made by their predecessors based on ecological decisions of the time (van Niekerk, 2008).

2.7 Environmental Stewardship in South Africa

Prior to democracy, conservation agreements were mostly overlooked as a means to aid for biodiversity conservation on private land in South Africa (van Niekerk, 2008). Traditionally conservation mechanisms in South Africa have primarily focused on protected areas and protected area expansion and conservation on private land have been underutilised or left to the individual (Holmes-Watts and Watts, 2008; van Niekerk 2008).

Post-apartheid there has been an increase in the awareness that without the willingness of the landowners themselves, the concept of long-term biodiversity conservation on private land will fail (van Niekerk, 2008). Winter *et al*, (2007) concur pointing out that during the last decade, limited budgets, lack of capacity and competing socio-economic priorities, encouraged conservation strategies in South Africa to shift towards initiatives on private land. At present 6.5% of South Africa's land surface is under legal conservation protection, and government has committed to increase this to 8.8% by 2013 and 12% by 2030 (DEAT, 2009). Purchasing the land is not economically viable or socially acceptable and does not allow for the sharing of biodiversity conservation costs (van Niekerk, 2008).

To address this issue, South Africa began major policy changes which included the use of conservation tools previously lacking in the country, furthermore property rights instruments and incentive mechanisms were introduced by way of new environmental biodiversity policies and legislative framework (Holmes-Watts and Watts, 2008; van Niekerk, 2008).

2.7.1 The legislative framework

2.7.1.1 The South African Constitution 106 of 1996

The Constitution of the Republic of South Africa is the highest law in the land covering all economic activities and decisions including access to environmental resources (Holmes-Watts and Watts, 2008). The environmental clause contained in the Bill of Rights makes the Constitution vital in terms of biodiversity conservation, and sets out the managerial context and recommendations for the functions with which national, provincial and local spheres of government are tasked (Holmes-Watts and Watts, 2008; van Niekerk 2008). Section 24 of the constitution grants right to environmental security for every person including people's well-being and rights to participate and enjoy the benefits of a healthy and well protected environment (Holmes-Watts and Watts, 2008).

Section 24 of the Constitution states that

“Everyone has the right –

- (a) to an environment which is not harmful to their health or well-being; and
- (b) to 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” (RSA, 1996).”

Section 24 of the Constitution consists of two components. Subsection (a) grants everyone the right to an environment that is not harmful to their health and well-being. Part (b), however, imposes a duty on the State to protect the environment from ecological degradation and promote conservation through reasonable legislative and other measures. The term 'other measures' would include guidelines, plans and policies (Holmes-Watts and Watts, 2008; van Niekerk, 2008).

Schedule 4 and 5 of the Constitution provides simultaneous legislative capability to national and provincial government for most tasks applicable to biodiversity conservation. With the exception of national parks, national botanical gardens and marine resources (which are exclusively a national competence), both national and provincial spheres of government have designated authority to administer laws and create mechanisms which promote and regulate biodiversity conservation (van Niekerk, 2008).

2.7.1.2 The National Environmental Management Act 107 of 1998

The National Environmental Management Act (No. 107 of 1998) (NEMA) was passed in November of 1998 and came into force in January 1999. The Act is supported by a set of environmental principles which cements the environmental right contained in the Constitution. The 18 principles and 8 sub-principles cover a wide spectrum of aspects and many of them have relevance to biodiversity conservation including the following:

- That the disturbance of ecosystems and loss of biological diversity be avoided, or, where they cannot be altogether avoided, be minimised and remedied;
- That the use and exploitation of non-renewable natural resources be responsible and equitable, and take into account the consequences of the depletion of the resource;

- That negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, be minimised and remedied;
- That the environment is held in public trust for the people. Therefore the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage; and
- That sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.

The Act provides mechanisms with which to achieve its objectives including Environmental Management Cooperation Agreements (EMCA). Section 35 of NEMA makes provision for the Minister and every MEC and municipality to enter into EMCA's with any person or community to promote compliance with National Environmental Management principals listed in the Act. An EMCA may relate to an undertaking by an individual or community to improve environmental standards and set measurable targets to protect the environment. The agreements may also provide for periodic monitoring and reporting, independent verification of reports, independent monitoring and inspections, and prescribe targets, norms and standards, penalties for non-compliance, and incentives to individuals or communities who enter into an EMCA (Holmes-Watts and Watts, 2008; van Niekerk 2008).

The Minister may prescribe requirements for Environmental Management Co-operation Agreements by way of regulations. Such regulations may set out procedures for the establishment of EMCAs, the duration of the agreements, general conditions and prohibitions, procedures for reporting and monitoring and inspection. These regulations have not been published to date. Although the underlying purpose of EMCAs relates to environmental management rather than biodiversity conservation, these agreements could be used as a vehicle to encourage individuals, communities and organisations to adopt sustainable land use practices on their land or contract their land to a protected area (van Niekerk, 2008).

2.7.1.3 National Environmental Management: Protected Areas Act, No 57 of 2003

The Protected Areas Act (No. 57 of 2003) makes provision for the protection and conservation of ecologically viable areas on state, private or communal land, which is

representative of South Africa's unique biological diversity (van Niekerk, 2008). The Act assigns the Government as the guardian of South Africa's protected areas and allows for the proclamation of a protected area (Section 17) under various categories: Special Nature Reserves (Section 18), National Parks (Section 20), Nature Reserves (Section 23) and Protected Environments (Section 28). Furthermore, the Act makes provision to retain the legitimacy of several other forms of protected areas including; world heritage sites (declared in terms of the World Heritage Convention Act [Act No. 49 of 1999]), mountain catchment areas (declared in terms of the Mountain Catchment Areas Act [Act No. 63 of 1970]), specially protected forest areas, forest nature reserves and forest wilderness areas (declared in terms of the National Forests Act [Act No. 84 of 1998]), and Marine protected areas (in terms of the Marine Living Resources Act [Act No.18 of 1998]).

Private land may be declared a special nature reserve, national park, nature reserve or protected environment if it fulfils the necessary criteria/requirements (as in Section 17) and with written consent from the landowner in the form of an agreement with the National Minister (Minister responsible for national environmental management) or Member of Executive Council (MEC) (RSA, 2003). This process can be initiated by the Minister or MEC or the landowner of the land in question, acting individually or collectively (Section 35). In terms of the Act (Section 35), any written agreement entered into between the Minister or MEC and the owner of the private land must be registered against the title deeds of the property and is binding on the owner and any successors in title (RSA, 2003).

The management of these protected areas is assigned by the minister or MEC to a management authority (Section 38). This can include a suitable individual, organisation or organ of state. A management plan (Section 41) including planning measures, controls, performance criteria and a programme for the implementation of the plan and its costing. The management authority may enter into an agreement with another organ of state, local community or any other party for the co-management of the area or for the regulation of human activities that affect the environment in the area. The management authority must monitor the area against the indicators and annually report its findings to the Minister or MEC (Section 43). The Minister or MEC may appoint external auditors to monitor the management authority's compliance with the overall objectives of the management plan. If the management authority of a protected area is underperforming its duties in terms of the management plan the Minister or MEC must notify, in writing, the management authority of its failure and direct the management authority to take corrective steps as set out in the notice within a given time period (RSA, 2003).

2.7.1.4 The National Environmental Management: Biodiversity Act No 10 of 2004

The Biodiversity Act (No. 10 of 2004) has helped reform biodiversity conservation within South Africa. The Act provides for the management of South Africa's biodiversity within the framework of the National Environmental Management Act (No. 107 of 1998) and applies to any human activity that affects the biodiversity within the country. The Act appoints the state as the trustee of South Africa's biodiversity and binds all national, provincial and local spheres of government.

The Act highlights three main planning instruments.

1. *The National Biodiversity Framework (Section 38)*

The Minister is required to prepare and adopt a national biodiversity framework. The framework should provide for an integrated, co-ordinated and uniform approach to biodiversity management by all spheres of government, non-governmental organisations, the private sector, local communities, other stakeholders and the public.

In addition, the framework should reflect regional co-operation on issues concerning the management of biodiversity, identify priority areas for conservation action and the establishment of protected areas, and determine norms and standards for provincial and municipal environmental conservation plans.

2. *Bioregional Plans (Section 40)*

The Minister or provincial MEC for Environmental Affairs is required to determine particular geographic areas as bioregions and publish bioregional plans for the management of biodiversity in these regions. A bioregional plan must contain measures for the effective management of biodiversity and provide for monitoring of the plan within the national biodiversity framework. The Minister or the MEC must review a bioregional plan at least every five years, assess compliance with the plan and the extent to which its objectives are being met, and where necessary amend a bioregional plan or the boundaries of the bioregion.

3. *Biodiversity Management Plans (Section 43)*

Any person, organisation or organ of state wishing to contribute to biodiversity management may submit to the Minister for his approval a draft management plan for an ecosystem, indigenous species or migratory species. The Minister must identify a suitable person, organisation or organ of state which is willing to be responsible for the implementation of the

plan and determine the manner in which the plan will be implemented. Responsibility for the implementation of the plan is then assigned by way of a notice to this individual, organisation or organ of state. The Minister may enter into a biodiversity management agreement with the individual, organisation or organ of state or any other suitable person, organisation or organ of state, regarding the implementation of a biodiversity management plan. A biodiversity management plan must be aimed at ensuring the long-term survival in nature of the species or ecosystem to which the plan relates and provide for the responsible party to monitor and report on progress with implementation of the plan in accordance with the national biodiversity framework and any applicable bioregional plan. The Minister must review a biodiversity management plan at least every five years, assess compliance with the plan and where necessary, either of his own initiative or at the request of interested person, organisation or organ of state, amend a biodiversity management plan.

The Act also establishes the South African National Biodiversity Institute (SANBI) and sets out the functions which the institute is obligated to perform (see section 10).

2.7.1.5 Servitudes

According to Van Niekerk (2008) common law in South Africa provides for three varieties of servitudes; praedial, personal and public. Servitudes granted for conservation will not be considered as a praedial servitude as this is generally used to impose certain rights on neighbouring properties for example, the right to travel over property A to reach B. A personal servitude is done in favour of a particular individual with regards to a specific property. This can potentially be used as a means for conservation servitude, however, such servitude is in favour of a person and will terminate when the property changes ownership. The best option for conservation is to establish a public servitude where the servitude is granted in favour of the public. For conservation purposes this may imply that the encumbered land or part thereof be conserved in its original state. Under the Deeds Registries Act 47 of 1937, the servitude is registered on the title deeds of the property thereby binding the current owner and any successors in title. However, the state may in terms of the Expropriation Act 63 of 1975, expropriate servitude.

2.7.1.6 Income tax

Tax legislation plays a crucial role in the conservation of natural resources and biodiversity as it makes provisions for incentives that might encourage or hamper activities relating to conservation. Before the Revenue Laws Amendment Act 60 of 2008 (effective from January 2009) the legislation provided for minimal tax relief in respect of private landowners' efforts to encourage biodiversity conservation and management. However, donations to certain

organisations were deductible for income tax purposes in terms of section 18A of the Income Tax Act 58 of 1962. Natural and non-natural persons could claim as an income tax deduction, any donation made to a qualified Public Benefit Organisation (PBO) limited to 10% of the taxable income before this deduction and the medical deduction of section 18, the latter applicable to natural persons. This tax benefit is subject to a certificate from the PBO to which the donation was made (van Wyk, 2010). The Income Tax Act also makes provision for income tax deduction to landowners for expenditure incurred in respect of the prevention of soil erosion, the eradication of noxious plants and invasive alien vegetation and for erecting fencing (van Wyk, 2010). Furthermore the Act allows for additional tax incentives to farmers/landowners that may have a negative impact on biodiversity conservation. These incentives include income tax deductions for expenditure incurred for the planting of trees, shrubs or perennial plants, for the production of grapes or other fruit, nuts, tea, coffee, hops, sugar, vegetable oils or fibres and the establishment of the land used for cultivating such vegetation (First Schedule to the Income Tax Act 58 of 1962). While these deductions are beneficial to the promotion of farming operations, they do not encourage biodiversity conservation. They effectively promote the transformation of natural vegetation, and boost agricultural development (van Wyk, 2010). Van Wyk (2010) labels this 'perverse incentives' as they inspire inappropriate conservation behaviour. These provisions have not been removed and are still available to tax payers. However, new incentives have been included in the Act under section 37C. A deduction is granted in terms of expenditure incurred by the landowner for developing an approved conservation management plan. The conservation management plan is facilitated in terms of the National Environment Management: Biodiversity Act (No. 10 of 2004) or the National Environmental Management; Protected Areas Act (No. 57 of 2003) to promote biodiversity conservation on private land (van Wyk, 2010).

The Revenue Laws Amendment Act 60 of 2008 provides for the framework for PBOs to be reviewed for irregularities regarding tax deductions. Where property is donated to a PBO or parastatal conservation agencies and is declared a nature reserve or national park under the National Environmental Management: Protected Areas Act (No. 57 of 2003), an income tax deduction is granted in terms of section 18A of the Income Tax Act 58 of 1962 (van Wyk, 2010; National Treasury, 2008). Consequently, the new legislation does not replace the current legislation, but broadens its realm. The new section contained in the Act is attached as appendix A.

2.7.1.7 Property tax

Property tax has played a crucial role in influencing land use and impacting on biodiversity. Legislative reform has resulted in property rates encompassing both urban and rural environments. Even though property tax is still administrated under provincial legislation the Constitution has sanctioned the Government to regulate property tax at a national level through the Property Rates Act (No. 6 of 2004).

The Act aims to regulate the power of local government to enforce rates on property, exclude rates on certain properties if it is in national interest, and to make the necessary requirements for municipalities to implement a reasonable and transparent system of reductions, rebates and exemptions through their rating policies. Although the Act provides for opportunities for biodiversity conservation, it does not impose a mandatory mechanism for local government to ensure that the property rates system promotes biodiversity conservation. However, the Act does allow for different property taxes to be levied on protected areas and properties owned by public benefit organisations. In addition, the Act allows for private land that is formally conserved under the National Environmental Management Protected Areas Act (Act 57 of 2003) to be exempt from municipal rates.

Within the City of Cape Town section 5.8.1 of the rates policy, provides for a 100% rates rebate for any private property that is contracted into the Table Mountain National Park from the year that it is contracted into the park and for the duration of the contract. Furthermore section 5.8.3 provides for a 100% rates rebate on any portion of private land that is of high biodiversity value that is either leased to the City for conservation purposes or where there is a written agreement approved by the City for the conservation management of the relevant portion. This is only applicable for perpetuity agreements and therefore voluntary title deed restrictions are required. Section 5.8.5 of the rates policy allows for any property larger than 10 ha with formal perpetuity conservation agreements, may apply for an additional rebate equal to the portion of land that is under conservation up to 90% of the remainder of the property if it is used for residential or conservation management purposes (CCT, 2010). Section 5.8 of the City of Cape Town's rate policy is attached as appendix B.

2.8 Development of Stewardship in South Africa

With these policy shifts two research projects, led by the Botanical Society of South Africa, a conservation planning project for the Cape Lowlands and a project investigating incentives for landowners to conserve these lowland areas (Ashwell *et al*, 2006) formed the basis for the development of an experimental stewardship project. In November 2002, CapeNature

and the Botanical Society of South Africa piloted a two-year partnership project funded through the Critical Ecosystems Partnership Fund (von Hase *et al*, 2010; Ashwell *et al*, 2006). The project aimed to develop skilled conservation extension officers within CapeNature, develop various stewardship options for private landowners and test the implementation of these options in trial areas using appropriate incentive measures (CapeNature, 2007a).

The pilot project evolved into a conservation stewardship project (CSP) instigated by the Cape Action for People and Environment (C.A.P.E.) initiative. The C.A.P.E. project was launched in 1998 and tasked to protect the biodiversity of the Cape Floristic Region (CFR) (Lochner *et al*, 2003) and provides the broad conservation context for the CSP and contributes to C.A.P.E.'s strategic objective 4; "securing biodiversity through protected areas including biodiversity stewardship" (C.A.P.E., 2011, Draft CAPE Strategy for 2011-2020:3-4). CSP is implemented through the Western Cape Nature Conservation Board (CapeNature) the provincial conservation authority, whose mandate is biodiversity conservation in the Western Cape Province (CapeNature, 2007a). The aim of CSP is to cost effectively conserve threatened species and ecosystems in priority conservation areas through conservation agreements with willing landowners (von Hase *et al*, 2010). Landowners can choose between legally nonbinding (informal) and legally binding (contractual) agreements (von Hase, *et al*, 2010). Legally binding agreements institute a formal conservation easement on the land and are considered a more secure conservation measure (von Hase *et al*, 2010).

Landowners can enter into these agreements in the following options: A Biodiversity Management Agreement (under NEMBA), a Protected Environment (under PAA) or a Nature Reserve or National Park under (PAA) with the latter two agreements requiring formal declaration and restrictions on the land (Cumming, 2009). These declarations and agreements are implemented with additional contracts which outline agreed upon management plans for the property and specified time frames, which are aligned with the degree of conservation protection (Cumming, 2009). These agreements are implemented through organised stewardship programmes within the different provincial conservation agencies. These programmes target priority biodiversity areas and provide an extensive service for participating landowners, draw up and manage the contracts, assist with the declaration and audit the agreements. Treasury recognise the commitments of landowners towards biodiversity conservation by giving up certain use rights that have inherent value and that landowners often suffer considerable expenses in managing their land for

conservation (Cumming, 2009). Therefore various fiscal incentives have been developed to support landowners for the cost incurred for the public good.

Van Wyk (2010) points out that tax incentives to landowners for conservation expenses incurred are often viewed as discriminatory as tax impartiality may not be achieved. Tax impartiality can only be achieved if tax incentives are consistent, administratively simple and have an equitable impact on all tax payers (van Wyk, 2010). Meeting this requirement has proved problematic in applying tax incentives for conservation in South Africa due to the perception that these incentives will favour the predominately white, relatively wealthy, private landowners (van Wyk, 2010).

However during the 2008 budget review, the National Treasury of South Africa proposed the introduction of certain conservation tax incentives. These tax incentives were promulgated as part of the Revenue Law Amendment Act (Act 60 of 2008) and became effective in January 2009 (van Wyk, 2010). Tax incentives are a form of indirect compensation provided in the form of a tax relief, in other words, people do not receive a direct payment as is the case with subsidy payment but rather receive a reduction in taxable income and therefore pay less tax.

It is important to note that no one incentive will be effective if used in isolation and for all situations. The complexity of biodiversity conservation on private land relies on a combination of incentives to achieve conservation goals.

2.8.1 Biodiversity Management Agreement

Biodiversity Management Agreements are signed for a minimum of five years and all conservation and management expenses incurred in terms of this agreement are to be treated as expenses acquired for the production of income and for purposes of trade (Cumming, 2009). These expenses could include; the burning of fire breaks, alien vegetation clearing or rehabilitation costs but are only deductible if the activity is reflected in the management plan (drawn up by a conservation organisation in collaboration with the owner) for the Biodiversity Management Agreement. Furthermore, these deductions can only be made from income generated from the land subjected to the agreement or land within the immediate vicinity.

2.8.2 Protected Environment, Nature Reserve and National Park

For agreements signed for a minimum of 30 years, conservation and maintenance expenses are considered section 18A deductible donations. This means that management

expenditures as stipulated in the management plan can be deducted from the taxpayer's taxable income. An '18A deduction' refers to deductions from taxable income allowable under Section 18A of the Income Tax Act 58 of 1962 (Chapter II, Part I, Section 18A). This Section allows the taxpayer to deduct from their taxable income donations made in cash or of property made in kind to specified Public Benefit Organisations, which includes Government Departments. However an 18A deduction may not exceed 10% of the taxpayer's taxable income (Cumming, 2009).

For Nature Reserves and National Parks that have signed agreements for a minimum period of 99 years, the value of the land are deemed section 18A deductible donations therefore the taxpayer may deduct the value of the land from their taxable income and conservation management and maintenance expenses as outlined above (Cumming, 2009). If the landowner relinquishes any right of use on the property under declaration, the landowner may deduct 10% per annum of the lesser of the cost to purchase the land or the market value. However, if the landowner retains some user rights on the property the landowner can still deduct the 10% as above but this 10% amount must then be multiplied by the ratio of the market value of the declared land reduced by the right of use as that amount bears to the value of the declared land as if that declared land had been donated in full (Cumming, 2009).

2.9 National Implementation of Stewardship

In 2005 the Biodiversity Stewardship South Africa Programme (BSSA) was initiated by the National Department of Environmental Affairs and Tourism (DEAT) in partnership with key conservation organisations. The BSSA acts as an umbrella programme for environmental stewardship to assist provincial and national government to fulfil its mandate of biodiversity conservation outside of state owned protected areas in terms of the National Environmental Management: Protected Areas Act (Act 57 of 2003) and the National Environmental Management: Biodiversity Act (Act 10 of 2004). The programme aims to implement provincial conservation plans through a national landscape-scale approach to stewardship to assist government in reaching the targets set out by the National Spatial Biodiversity Assessment and the National Biodiversity Framework (NBF). The BSSA's objectives are guided by the National Protected Area Expansion Strategy and the Community Based Natural Resource Management (CBNRM) programme. The BSSA is rolling out stewardship programmes throughout the country with the Western Cape and KwaZulu-Natal being the most advanced.

2.10 Conclusion

The Stewardship Programme was initiated to make provision for procedures and mechanisms to facilitate cooperative environmental governance and to complement environmental plans, policies, programmes and decision making (Fourie and Muller, 2011). The Programme allows for landowners to enter into agreements with conservation agencies to conserve a portion of, or the entire property, and has a threefold vision; to secure priority conservation areas with high biodiversity value and establishing linkages with other conservation areas, to ensure that landowners enjoy tangible benefits for their conservation efforts and, to increase biodiversity through adequate management thereby encouraging landowners to become responsible decision makers with regards to the environment (Fourie and Muller, 2011).

Van Niekerk (2008) argues that these programmes are severely hampered by the traditional notion of landownership and property rights. Biodiversity conservation is of national interest therefore landowners should be compensated, at least in part, for their conservation efforts (van Niekerk, 2008). If these conservation mechanisms are to be effective it is vital that government create a host of incentives that will encourage landowners to participate in biodiversity conservation and to accept certain restrictions on their rights. The successes of these agreements are dependent on complex interactions between effective policy, supporting institutional agreements and sufficient institutional capacity. These conservation agreements are only one component for biodiversity conservation and are dependent on the interest and willingness of landowners along with financial incentives.

CHAPTER THREE

Methods

3.1 Introduction

To address the research objectives, the research design and methodology made use of a case study approach. The enquiry of past initiatives that investigated landowner's perceptions of conservation included the use of literature, participant and direct observations. The main research tool used to collect baseline data was semi-structured face-to-face interviews conducted with landowners and managers within the City of Cape Town. These interviews provided the basis for identifying landowner's knowledge, interest, economics, willingness and perceptions towards biodiversity stewardship and conservation. The questionnaire (Appendix C) consisted of predetermined Likert-type questions and was supplemented with documentation such as institutional reports.

3.2 Research design

The research design is the plan that needs to be followed to achieve the objectives of the study and stipulates the methods and procedures for collecting and analysing the required information (de Jager, 2009). This study made use of a case study research design that is outlined below.

3.2.1 Case study research

A case study is a scholarly inquiry and exploration with the underlying purpose to create new knowledge (Dooley, 2002). Eisenhardt (1989) describes the case study approach as a research strategy that focuses on understanding the dynamics present in a specific situation. As a research strategy, case study methodology attempts to examine a modern phenomenon and the associated context that is not clearly evident and, like all other forms of research, must be concerned with issues such as methodological rigor, validity and reliability (Dooley, 2002). Dooley (2002) goes on to describe a case study as a comprehensive account regarding a specific situation in the workplace describing who, what, where, when and how. Darke *et al* (1998) and Yin (1981) describe a case study as an experimental investigation of a current occurrence within its natural context particularly when the margins between occurrence and context are not clearly apparent and depend on multiple sources of evidence. The focus is therefore on in-depth understanding of an occurrence and its context. The aim of a case study is to investigate a specific phenomenon with the objective to understand it completely, not by controlling variables but rather by observing all of the variables and their interacting relationships (Dooley, 2002).

Consequently, case studies allow for the exploration of complexity and uniqueness, something that is often impossible using other research methods (Yin, 1994).

Skate (1978) states, that case studies are beneficial in the study of human relationships and use numerous methods of data collection to gather information from one or many objects (people, groups or organisations) (Benbasat *et al*, 1987; Darke *et al*, 1998). Benbasat *et al* (1987), Darke (1998) and Yin (1994) point out that this multiple data collection method typically include, documentation (newspaper clippings, formal reports), archival records (personal or financial records), interviews (open ended or focused), direct observation (absorbing and noting details) and physical artefacts (devices, outputs, tools).

The power of case study research is the ability to use various methodologies within the data-collection process (including qualitative, quantitative or a combination of both) and to compare within case and across case for research validity (Dooley, 2002; Eisenhardt, 1989). The objective is to gather data surrounding a specific research issue and capture the contextual reality (Benbasat *et al*, 1987). Case study is thus an ideal methodology when a holistic in-depth investigation is required, and it is important to learn as much as possible about the case, rather than being concerned with representativeness (Stake, 1994). Yin (1994) emphasises the importance of using multiple sources of evidence when conducting case study research, to achieve data convergence.

Case studies may be descriptive, explanatory or comparative, and they often use a narrative approach (Tellis, 1997b; Yin, 1994). The purpose of qualitative data is to identify specific groups of people who either pose characteristics or live in circumstances relevant to the social phenomenon being studied (Mayes and Pope, 1995).

This exploratory case study took the form of a descriptive investigation into the perceptions, knowledge, interest, financial benefits of conservation and willingness to conserve, affecting, and affected by, biodiversity stewardship in the City of Cape Town.

3.2.2 Setting

The City of Cape Town (CCT) is the capital and economic hub of the Western Cape Province of South Africa and accounts for 76% of the province's economic activity (City of Cape Town, 2008). Cape Town has a Mediterranean climate and covers an area of 2 460km² extending from Silverstroom strand in the northwest to Kogelberg in the southeast (Figure 3.1) and is situated in the heart of the Cape Floristic Region (CFR) (Rebelo *et al*, 2011). The CFR is renowned for its rich plant diversity and high endemism and comprise the

smallest of the world's six floral kingdoms and the only one confined to a single country (Holmes *et al*, in press; Rebelo *et al*, 2011). Despite being one of 25 global biodiversity hotspots (Myers *et al*, 2000) with approximately 70% of the vascular plants being endemic, the protected areas network in the CFR does not adequately conserve the regions biodiversity (Dures and Cumming, 2010) and demonstrates a strong bias towards the rugged mountainous areas with nutrient poor soils (Rebelo *et al*, 2011).

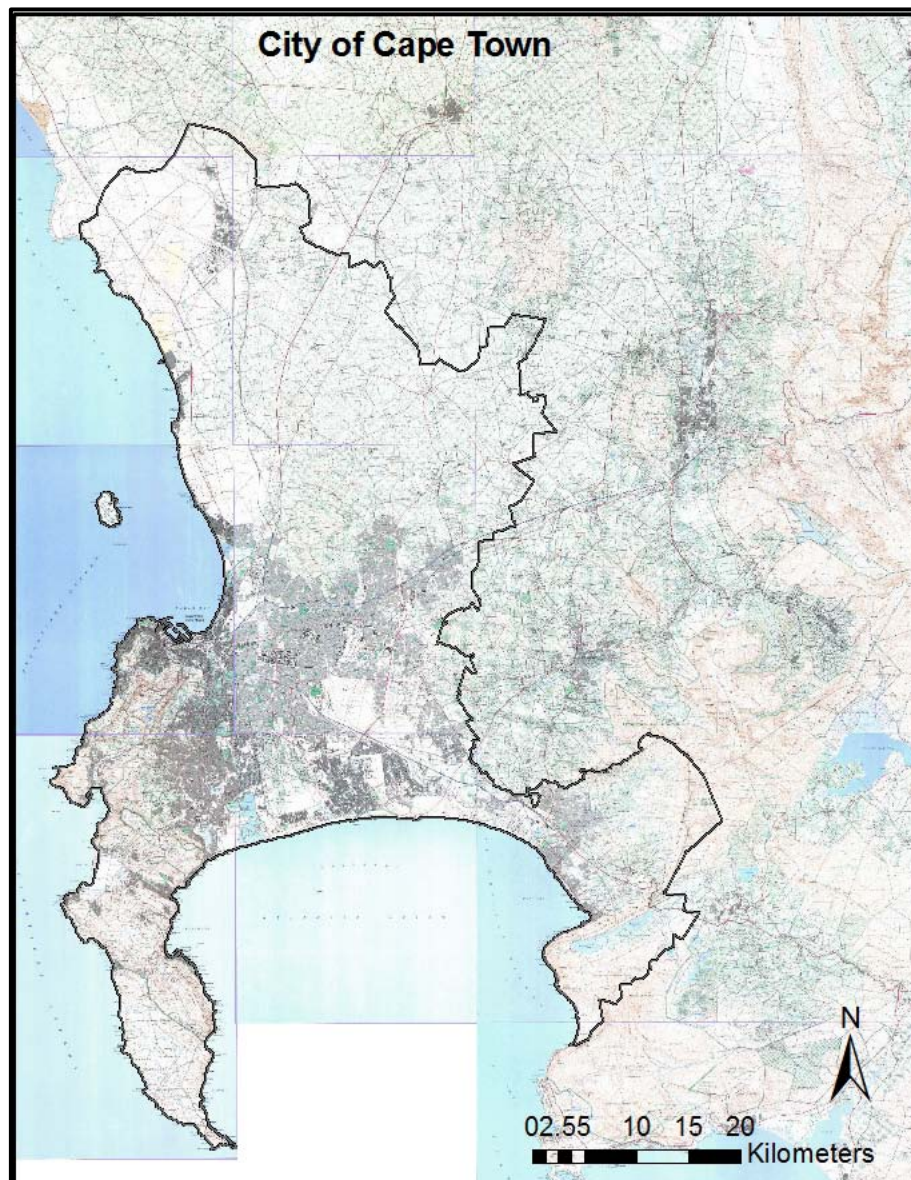


Figure 3.1: Municipal boundary of the City of Cape Town (City of Cape Town, 2011)

The City of Cape Town's biodiversity mirrors that of the CFR and while many parts of Cape Town enjoy conservation status, such as the iconic Table Mountain National Park, there are large areas that have been neglected including much of the low lying (lowlands) areas. The Table Mountain National Park consists of the rugged Table Mountain chain. The nutrient

poor soils of the predominant vegetation type, Cape Peninsula Sandstone Fynbos are not suited to cultivation. As a result, transformation of this vegetation type has been limited and it is therefore well conserved. Regrettably this area is not representative of the biodiversity and ecosystems in the lowlands of the City. The lowland areas are subjected to ever increasing development pressure and have experienced massive urban sprawl and agriculture development (Dorse, *pers com.*, 2011).

Historically the City was restricted to Table Bay on the northern slopes of Table Mountain. By the turn of the 20th century development was apparent along the major routes, significantly expanding after the Second World War (Rebelo *et al*, 2011). Since the 1960s Cape Town's urban planners have favoured low density housing developments leading to the proliferation of urban sprawl (Dures and Cumming, 2010; Rebelo *et al*, 2011) and by the late 1970s the City had doubled in size compared to 1946. By 2002 the City doubled again and it is predicted to double again by 2020 (Rebelo *et al*, 2011).

In 2010 the population of CCT was estimated at 3.7 million people, from a diverse mix of cultural and economic backgrounds (Dures and Cumming, 2010), with an annual growth rate of 55 000 mainly due to immigration, contributing to Cape Town having the highest per capita population growth rate in the country (Holmes *et al*, in press). This steady increase in population leads to the transformation of approximately 6.5 km² of natural and agricultural land per annum with the developed urban area covering 644 km² or 26% of the city, agriculture and forestry covering 849 km² (35%) and the remaining 39% (963 km²) being natural remnants (Holmes *et al*, in press).

The City of Cape Town's Biodiversity Report (2008) highlights that land use change is especially prolific in the lowlands with only a few isolated remnants of natural vegetation formally conserved. Holmes *et al* (2008) point out the lowland vegetation types are amongst the most poorly conserved in the country. Holmes *et al* (in press) and Rebelo *et al* (2010) argue that many vegetation types located outside of the mountain catchment areas are poorly protected and vastly transformed due to urbanisation, agricultural expansion and invasive alien vegetation, most notably Port Jackson (*Acacia saligna*) and Rooikrans (*Acacia cyclops*). Dures and Cumming (2010) record that *Acacia saligna* is especially problematic due to two characteristics, it is adapted to a Mediterranean climate and nutrient poor soils and second it produces approximately 10 000 seeds per 1m² of canopy cover per annum. Dense stands are therefore readily established that regenerate very quickly after fire due to the tendency to coppice, shading out the indigenous flora and altering the soil composition thus radically increasing the soil nitrogen load and negatively impacting on biodiversity

(Dures and Cumming, 2010; Holmes *et al*, 2008). The National Spatial Biodiversity Assessment 2004 (2005) suggests that almost 50% of vegetation types are threatened as a result of habitat transformation and the draft National Ecosystem Assessment show that 21 out of 23 national Critically Endangered vegetation types occur within the CFR, of which eleven occur within the boundaries of the City of Cape Town (Holmes *et al*, in press).

The City can broadly be divided into four distinct landscapes. The centre consists of the sandy Cape Flats that is bordered on the western and southern edges by strandveld dominated by dunes. Inland from the flats are the low shale and granite hills which have been converted to farmland, predominantly wheat in the drier lower areas and vineyards on the wetter slopes. In the southwest and east are the Table Mountain chain and the Hottentots Holland and Kogelberg ranges respectively (Rebelo *et al*, 2011). This large diversity of landscapes within the City with the various topographical and climatic gradients that the Cape Peninsula, Kogelberg and Hottentots Holland mountains create, along with the sandy Cape flats and inland granite and shale hills, give rise to the unique biodiversity of the area. The vegetation is strongly associated with this diverse geology and, along with the deviations in rainfall, is the driving forces of the high diversity in vegetation types and plant communities (Holmes *et al*, in press). Nineteen vegetation types (Figure 3.2) occur within the City's boundaries of which six are endemic and eleven are classified as Critically Endangered (Holmes *et al*, undated). This unique natural environment includes 308 km of coastline and is arguably one of CCT's best assets (Dures and Cumming, 2010; Holmes *et al*, in press).

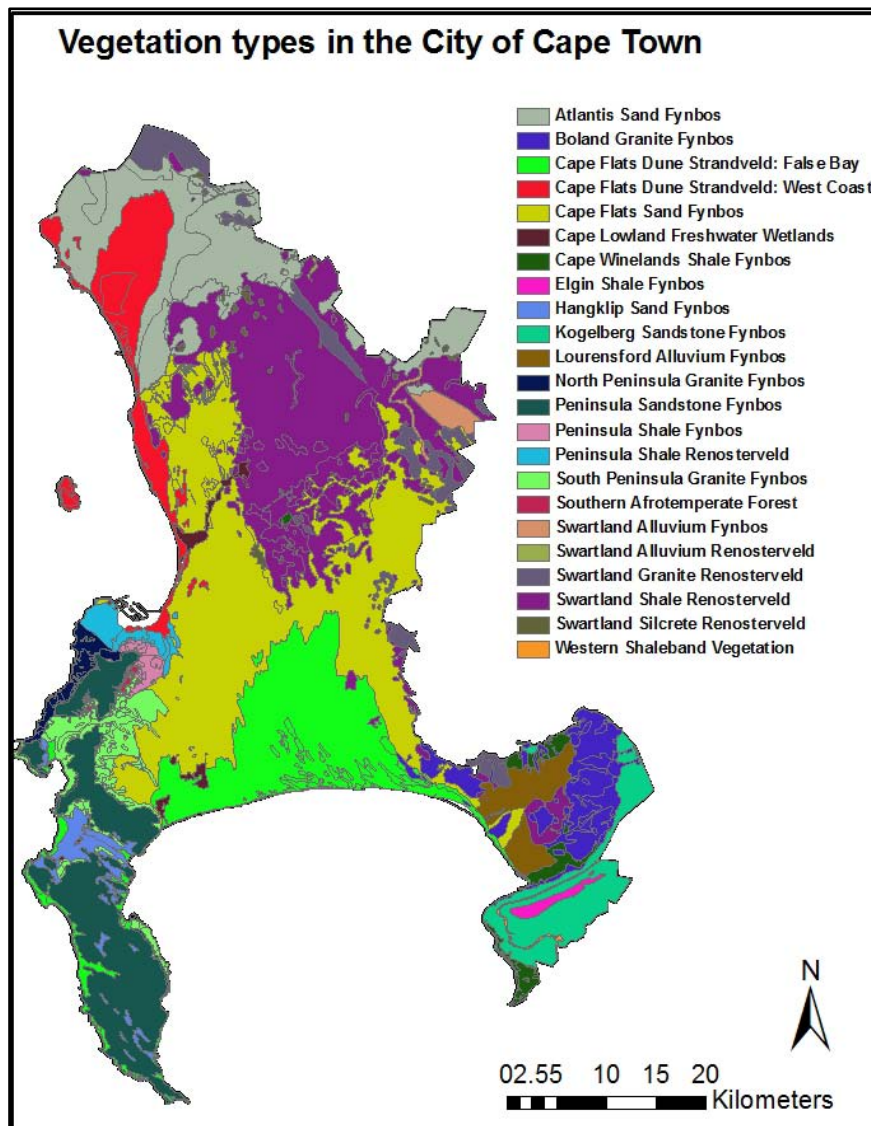


Figure 3.2: Original extent of the vegetation types within the City of Cape Town (City of Cape Town, 2011)

Furthermore, Cape Town is rich in fresh and marine water ecosystems. Many small rivers traverse the city and large areas of the Cape Flats were historically seasonal wetlands. A large proportion of the lowland wetland systems have been modified or lost as a result of urbanisation (Holmes *et al*, in press). At a species level Cape Town is rich in vertebrate fauna although larger mammals such as Black Rhinoceros were hunted out by 1700. Although not well documented, there is evidence that the invertebrate fauna is high in abundance and diversity, for example on the Cape Peninsula alone, endemics include 21 spider and scorpion, 21 millipede and centipede, 18 crustacean, 16 beetle and 12 earthworm species (Holmes *et al*, in press).

It is evident that Cape Town is exceptionally rich in biodiversity at a species and ecosystems level. Holmes *et al* (in press) point out that the Cape Flats and neighbouring lowland areas are host to the highest concentration of threatened plants in South Africa and although this area is recognised as a global biodiversity conservation priority area, conservation prioritisation has not always been a guarantee for conservation success (Knight *et al*, 2007; Holmes *et al*, in press). Currently 61% of the City's natural vegetation is transformed with an unequal amount of transformation in the lowlands (74%) compared to the higher lying areas (19%) (Holmes *et al*, in press).

The City of Cape Town's Biodiversity Management Branch, along with its conservation partners, use various tools to secure the unique biodiversity within the City's boundaries, including spatial planning, education, communication, awareness, securing public land of high biodiversity value and biodiversity stewardship (Holmes *et al*, undated). Holmes *et al* (in press) point out that the CCT has been the frontrunner amongst South African municipalities in using systematic conservation assessments to analyse the minimum requirements necessary to conserve a representative sample of the terrestrial biodiversity. This assessment is displayed visually in the form of the Biodiversity Network (Bionet), a comprehensive systematic fine scale conservation plan that was first developed in 2004 (Appendix D). The Bionet is continuously updated to incorporate the latest information and to align with national requirements (Holmes *et al*, in press; Rebelo *et al*, 2010).

While all levels of government are involved in NEMA under section 28, 'duty of care', the biodiversity legislation is primarily implemented at provincial level. In Cape Town the primary strategic tool for management and execution of projects is the Integrated Development Plan (IDP, 2007-2012), predominantly the business plan for the City. Unfortunately not a single one of the seven focus areas of the IDP include management or conservation of the natural environment as a crucial component (Holmes *et al*, in press).

Other than the IDP, the Spatial Development Framework (SDF) is the strongest policy tool influencing the biodiversity sector at municipal level. During 2010 the City's Biodiversity Management Branch initiated a process to publish a Bioregional Plan for the City in accordance with the National Biodiversity Framework (NBF) as legislated under the Biodiversity Act. This plan cannot be in conflict with the SDF, but provides some legal status to the Biodiversity Network (Holmes, *et al*, in press).

Biodiversity Stewardship in the City is currently being implemented through the Bionet Alliance Project; a three year partnership project funded through the Table Mountain Fund

(TMF) an associated Trust of the World Wide Fund for Nature - South Africa (WWF-SA). The project is implemented through the Wilderness Foundation partnering with the Cape West Coast Biosphere Reserve (CWCBR), CapeNature and SANParks coordinating and exploring the tool of stewardship within the City of Cape Town. For the purposes of the project the City was divided into five priority nodes; the Cape Peninsula Protected Natural Environment, West Coast, False Bay Coastline, Central and the Eastern areas. All public land on the Bionet is handled separately as the sixth focal area. Each focal area comprises of several priority nodes and individuals and organisations are listed as being responsible for proactively engaging with the landowners of each specific node.

3.3 Research Methodology

Social research such as this research focuses on the study of people and society and mostly uses qualitative methodology such as interviews and participant observation and is defined by Babbie (1989) as a systematic observation of social life for the purpose of finding and understanding patterns amongst what is observed. This research made use of an interpretivist research approach (Darke *et al*, 1998), to investigate the subjective interpretation of landowner's attitude towards conservation, in particular biodiversity stewardship, based on their beliefs and value systems. Interpretivist research aim to, "understand phenomena through accessing the meanings that participants assign to them and focusses on the cultural and historical context" (Darke *et al*, 1998: 276).

The data were collected using a multi-method approach (Morrison *et al*, 2009) including semi-structured face-to-face interviews conducted with landowners and managers within the City of Cape Town. Interviews are a crucial source of information for case study research and arguably the primary data source where interpretive case study research is undertaken. The interviews afford the researcher the opportunity to access participant's views, perceptions and interpretations of actions and events (Darke *et al*, 1998).

These interviews provided the basis for identifying landowner's knowledge, interest, financial benefits (if any), willingness and perceptions with regards to biodiversity stewardship and conservation. The questionnaire consisted of predetermined Likert-type questions (Babbie, 1989; Knight *et al*, 2010).

3.3.1 Sample selection

This case study was limited to in-depth interviews with a small sample of 17 landowners within the City of Cape Town. It should be noted that the purpose of this research was not to establish a representative sample but rather to identify specific groups of people that either

possess characteristics or live in circumstances relevant to the social phenomenon being studied (Mays and Pope, 1995). This method of sampling allows the researcher to deliberately include a wide range of participants and to select crucial contributors with access to important sources of information. Participants were identified based on their ability to enable the exploration of a particular aspect of behaviour (Mays and Pope, 1995). This included commercial farmers, corporate landowners, land managers, lifestyle farmers, and commercial mines. While all interviews were conducted with individuals, many were consciously representing the perspective of a larger group, be it their community, company or agency.

3.3.2 Research Techniques

Various techniques were used to carry out this study as suggested by Stake (1994) and Yin (1994). This research drew on four main sources of data (Table 3.1). The first data source was semi-structured interviews conducted with participants. Second, documentation such as institutional reports and analyses by other scholars were reviewed and used to establish a better understanding of biodiversity stewardship, international and national policies along with conservation organisations views on biodiversity, stewardship and conservation. Third, participants' actions were observed and information documented to obtain an understanding of their perceptions towards biodiversity and conservation. Lastly, personal observation and experiences during meetings and discussion groups were documented.

Table 3.1: Techniques used and evidence collected to address research objectives

Technique	Source of Evidence	Objectives Addressed
Semi-structured interview	Selected Landowners/managers	<ul style="list-style-type: none"> • analysing and understanding landowner perceptions towards biodiversity stewardship • understanding stakeholders' views in terms of biodiversity knowledge, interest, financial benefits of conservation and willingness to conserve • identify limitations to biodiversity conservation on private land • identifying potential barriers
Documentation	Institutional reports	<ul style="list-style-type: none"> • analysing past initiatives • identifying barriers • describe and critically assess the participatory conservation systems and the legislative structure that regulates them
Participant observation	Interaction with stakeholders (landowners and conservation officials)	<ul style="list-style-type: none"> • understanding stakeholders' perceptions • identifying potential barriers
Direct observation	Attendance at meetings among conservation institutions that conduct stewardship within CCT (CapeNature, SANParks and CCT)	<ul style="list-style-type: none"> • understanding conservation officials perceptions • identifying potential barriers • identify limitations to biodiversity conservation on private land.

The primary technique of data collection was semi-structured face-to-face interviews consisting of pre-determined Likert-type questions. The choice of personal interviews as opposed to electronic, postal or telephonic surveys was made to discuss concepts (if necessary) with the interviewee that he/she might be unacquainted with and also to develop an understanding with the participant and encourage trust (Cumming, 2007; Jankowics, 2005). Rapport between the interviewer and interviewee is critical and dependent on race, gender, ethnicity, dress code, age, hairstyle, manner of speech and general demeanour. Caution was therefore taken to dress appropriately and act professionally. Personal

interviews was furthermore favoured owing to Cumming (2007) and Winter (2003) pointing out that landowners tend to dislike mail surveys. In addition, personal interviews enable the researcher to construct a picture not only of the participants but also the group they represent (Cumming, 2007).

All the interviewees were initially contacted telephonically and/or by email as an introduction to explain the rationale of the research and to set-up an appointment. The interviews were conducted at a place of the interviewee's preference, most often their residence, and the duration of the interviews varied depending on the interviewee's willingness to share knowledge and fluency of the interview but on average lasted between 30 to 60 minutes. Before the interview the research was again explained to the interviewees. The interviewees were asked questions specifically related to biodiversity conservation enabling the interviewer to develop a better understanding of the interviewee's perceptions towards biodiversity conservation and the environment in which they operate.

The questions were predominantly Likert or sliding statements where 1 represented 'strongly disagree' with the statement and 5 'strongly agree'. The 5 point scale is shown to provide an effective measure of intensity, extremity and direction (Greiner *et al*, 2008), and according to de Jager (2009), Likert statements are an effective method to measure an interviewee's attitude and is user friendly as it minimizes confusion. The survey was designed to gather information on landowner's attitude and perception towards conservation, their willingness to conserve, basic knowledge of biodiversity, interest in conservation, their perception of the financial benefits of conservation, education and whether they considered themselves religious. Although landowners income could potentially influence attitude towards conservation this was not considered for this study as it was felt that it could be a sensitive issue (Cumming, 2007).

3.3.3 Measuring Instrument

As this was a descriptive case study, the measuring instrument was aimed at determining participant's perspectives and motivations, rather than proving or disproving a research hypothesis. In this case, a semi-structured interview method was used to achieve a better understanding of landowners and managers views, experiences and perceptions towards biodiversity conservation. Though interviews are time-consuming and are criticised for researcher bias in interpreting reactions (Darke *et al*, 1998), they offer far greater control and flexibility in terms of gathering the necessary information (Neysmith, 2008). Furthermore interviews are not only ideally suited to uncovering what Stake (1994) terms the 'multiple realities' of how an issue is perceived by the different participants, they also offer an

opportunity for social interaction, which can add to the researcher's understanding. Darke *et al* (1998) caution that the researcher's culture, experience and history can influence the research and suggest that personal values and biases should be controlled and managed.

While the interviews followed a structured set of questions, they were unstructured to the extent that follow-up questions were asked to encourage participants to expand on particular topics to deepen the researcher's understanding. The intention was to provoke information regarding both obvious and more hidden motivations and barriers to partaking in conservation by asking both direct and open-ended questions. Open-ended questions are most useful when there are many possible responses and the researcher does not wish to restrict the subject's answer (Neysmith, 2008), which was indeed the case in this study; furthermore, it was hoped that the use of open-ended questions would draw out the inherent reasoning behind participants thought-processes and uncover deeper meaning.

3.4 Data Interpretation and Analysis

Yin (1994) describes data analysis as, scrutinising, classifying, tabulating, or otherwise recombining the confirmation to address the initial research question and suggests that every study should have a general analytic strategy, to guide the decision regarding what will be analysed and for what reason. Tellis (1997a) proposes three possible analytic techniques; pattern-matching, explanation-building, and time-series analysis and states that, in general, the analysis will rely on the theoretical proposals that led to the case study.

Bazeley (2009) points out that data interpretation is the starting point for meaningful data analysis while Soy (2006) argues that the raw data should be examined using various analyses so as to highlight associations between the research objectives and the outcomes, referring to the original research question. Tellis (1997b) however cautions that the analysis of case study is one of the least developed aspects of the case study methodology and points out that it is important to have an analytic strategy that will lead to conclusions. Tellis (1997a) offered two strategies for general use; one is to rely on theoretical proposals of the study, and then to analyse the evidence based on those propositions. The other is to develop a case description, which would be a framework for organizing the case study.

According to Dooley (2002) the two most frequently used types of analysis in case study research is structural analysis and reflective analysis. Structural analysis refers to the process of examining case study data for the purpose of identifying patterns that is characteristic in dialogue, text, events, or other phenomena and is used in conversation analysis, ethno-science, and other qualitative research methods. Eisenhardt (1989) and Soy

(2006) refer to this method as 'cross-case search for patterns' or pattern matching (Tellis, 1997b), that requires the researchers to look at the data in various ways and thereby preventing premature conclusions on limited data. Reflective analysis is associated with several other qualitative methods such as critical science and phenomenology and is used in case studies to draw on other qualitative research traditions. The researcher therefore relies on intuition and personal judgment to analyse the data rather than on technical measures comprising clear classification systems (Dooley, 2002). This research made use of a reflective analysis strategy although some aspects of structural analysis were incorporated.

It is widely recognised that the researcher has a significant influence in case study research, more so than for most other research approaches (Tellis, 1997b; Yin, 1994). To reduce the bias characteristic in such studies, the researcher must approach each task with great thoroughness focussing on the research questions. In addition, Yin (1994) lists a number of requirements for a researcher to be successful in carrying out case study research, including: extensive background knowledge of the issues, an unbiased and flexible approach, and the ability to ask the right questions, and correctly interpret the answers. Once data collection is underway, it is critical for the researcher to make clear and concise descriptions of all observations which may prove significant during later interpretation and the drawing of conclusions (Mays and Pope, 1995). Certain aspects of the study need to be thoroughly reviewed to ensure that the analysis will be of high quality, including; showing that all relevant evidence was used, that all rival explanations were used, that the analysis addressed the most significant aspect of the case study, and that the researchers knowledge and experience are used to maximum advantage in the study (Tellis, 1997a).

Tellis (1997a) points out that the researcher needs to rely on experience and the literature to present the evidence in various ways, using various interpretations. This becomes necessary as statistical analysis is not necessarily used in all case studies. The overall aim of this research was not to determine trends or disprove a hypothesis but to develop an understanding of the phenomena being studied using a descriptive analysis.

One of the difficulties of case study analysis is dealing with the amount and variety of data especially as strategies and techniques for analysis of case study are generally not well defined (Darke *et al*, 1998). For the case study researcher it is important to develop a general data analysis strategy. Darke *et al* (1998) point out that data analysis have three simultaneous activities; data reduction is the process of selecting, simplifying abstracting and transforming the raw case data. Data display is the organised assembly of information to enable the drawing of conclusions and include narratives, graphs, tables, charts.

Conclusion drawing/verification involve extracting meaning from data and building a logical chain of evidence. This research adopted this approach to analyse the data and display findings.

3.5 Validity and Reliability

Case study research methodology does not lend itself well to generalisation or prediction and needs to be well constructed. The researcher needs to pay attention to the design, processes used to collect data, analysis of data and the reporting of the findings to ensure validity and reliability (Dooley, 2002). Dooley (2002) goes on to point out that it is vital for the researcher to establish a credible line of evidence that can be followed to the conclusions and explains that validity determines whether the findings can be generalised beyond the case being studied and that reliability refers to how well the procedures are documented to ensure that the research can be replicated.

Dooley (2002), Tellis (1997b) and Yin (1994) note that it is important to address construct internal and external validity, along with reliability. Construct validity requires the researcher to select the correct tool or method for the concept being studied (Dooley, 2002). Tellis (1997a) points out that construct validity are often problematic in case study research due to potential investigator subjectivity and suggests using multiple sources of data, as this research have done, to ensure construct validity. Internal validity demonstrates that the conditions being observed will inevitably lead to other conditions and is exposed by triangulating various pieces of evidence (Darke *et al*, 1998; Dooley, 2002). According to Yin (1994) internal validity is not a key concern for descriptive case studies as the aim is not determining relationships.

External validity determines whether the findings can be generalised. As case studies focus on analytical rather than statistical generalisation, it is difficult to demonstrate external validity in single case studies (Yin, 1994). Participatory research is not focused on objectivity and external validity, but rather on the applicability of the research in assisting those under study, and therefore on the wide distribution of the results among the subjects. So while the external validity of this research may not be high, it is nonetheless hoped that the research results will contribute towards biodiversity conservation on private/communal land in the City of Cape Town.

Case study research is generally less concerned with repeatability however reliability is still fundamental. In case study research, one of the approaches to ensuring reliability is the use of several different sources of data (Dooley, 1998; Yin, 1994). Mays and Pope (1995) agree,

stating that to ensure thoroughness, case study research requires a systematic self-conscious research design, data collection, interpretation and communication. Furthermore, case study researchers should aim to create an account of method and data which can stand independently so that another researcher can analyse the same data and come to the same conclusion and to produce a plausible and coherent explanation of the phenomenon under study. Often, as was the case in this research, case study research uses a multi-method data collection strategy. Mays and Pope (1995) highlight that it is crucial for the case study researcher to keep meticulous records of interviews and observations and to document the process of analysis, so as to ensure reliability. Darke *et al*, (1998) argue that regardless of the researchers' methods, to establish credibility the researcher must describe in detail how the research results were arrived at and, to establish validity, must present a coherent convincingly argued point of view.

3.6 Conclusion

The methods described in this chapter are detailed to justify the approach taken to research the aims of the research as described in chapter one. As this is a social study the researcher made use of a qualitative case study research methodology to investigate the subjective interpretation of conservation organisations and landowner's (within the City of Cape Town) perceptions towards conservation, in particular biodiversity stewardship, based on their beliefs and value systems. This research used multiple sources of evidence as suggested by Tellis (1997b). Data were collected through semi-structured interviews, enhanced by the use of documentation, participant observation and direct observation.

CHAPTER FOUR

Results and Discussion

4.1 Introduction

To gain an understanding of landowner's perceptions towards conservation McMillan and Leitch (2008) argue that it is beneficial to have a basic understanding of history, law, conservation biology, culture, politics and economics as landowner's perceptions surpasses these disciplines and knowledge regimes. To better understand these multidisciplinary regimes that motivate landowners, this research investigated the potential influence of landowner characteristics and perceptions on pro-environmental behaviour and willingness to enter into restrictive conservation agreements, such as the stewardship programme. For purposes of clarity the results and discussion for this research was combined into a single chapter.

This chapter describes the findings of this study, explores the main trends and patterns, summarizes, and discusses the conclusions that emerged. This is achieved through examination of the data in terms of the respondent's scores and descriptive analysis from documentation, participant observation and direct observation.

4.2 Informants

A study in the United States of America has found evidence that landowner characteristics influence attitude and behaviour and therefore land use decisions (Brimlow, 2008). Therefore the first section of the questionnaire focused on demographic information of the interviewees which included age, size of property, size of remnant, current use of land, length of time the property has been in the family, education, home language and whether the interviewees considered themselves as religious.

4.2.1 Age

It was anticipated that the age of interviewees would influence their decision to participate in pro-environmental activities such as the stewardship programme. The majority of interviewees were over the age of 40 and a significant proportion was over 60 years. Only one participant was between 20 and 30 years of age.

Durpoix (2010) argues that age of landowners' play a vital role in landowner's adoption of conservation initiatives as the potential property sale often serves as retirement security and that the landowner will be reluctant to enter into any restrictive conservation agreement that could impact on the value of the property. In addition, landowners would like to pass on land that is at least just as prosperous as when they obtained it and are therefore more concerned with the protection of the long-term productivity than biodiversity conservation. Yu (2009) and Long (2003) point out that land with conservation restrictions depreciates the selling value due to the reduced flexibility for the buyer regarding land use. Since older landowners may be more concerned with maximizing the selling price of land, they may choose not to enter into conservation agreements. On the other hand, older landowners may be more prone to adopt the programme because of reduced workloads and stable annual income (Yu, 2009; Long, 2003). Yu (2009) points out that empirical studies have reported both positive (Amigues *et al*, 2002; Kline *et al*, 2000; Shaikh *et al*, 2007) and negative (Gedikoglu and McCann, 2007; Kingsbury and Boggess, 1999; Lynch *et al*, 2002) relationships between age and participation in pro-environmental initiatives.

Even though age could have an impact on landowner behaviour there was no significant association between age and landowners perceptions and willingness to conserve in this study. However, two interviewees (P2 and P5, both between 40 – 50 years of age) were reluctant to enter into restrictive agreements such as the stewardship programme as they felt it would limit their future options. Even though participant two (P2) was still relative young (40-50 years of age) he emphasised the importance of the property as a retirement insurance and had more of an egoistic view, concerned with maximizing the selling price and therefore hesitant to enter into any agreement.

4.2.2 Size of property and size of indigenous vegetation remnant

The relationship between farm size and pro-environmental attitude is well documented Durpoix (2010). The theory is that farm size is typically related to farm income and according to the post-materialistic hypothesis (Inglehart, 1977 in Durpoix, 2010: 48) larger farms are associated with pro-environmental behaviour, however results remain contradictory. With this in mind, information on farm size and size for indigenous vegetation remnant was collected. Property size varied from 1 ha to 1 300 ha with the majority of properties under 50 ha. Remnant (of the nineteen natural vegetation types within CCT) size varied from 0.5 ha to 900 ha with the majority of remnants under 30 ha. A site assessment was not conducted as part of this research, however a basic assessment of the condition of the natural vegetation

was possible through observation and desktop studies (fine scale maps, vegetation maps and aerial photographs). The condition of the natural vegetation remnants range from high (in very good condition) to low (low condition but restorable) however the condition of the vegetation was not necessarily related to size. This research did not specifically investigate the fauna component as it can be expected that an intact flora component will include a relatively healthy fauna element. This was evident from the smallest remnant in the research where evidence of porcupine (*Hystrix africaeaustralis*) activity (quills, diggings and sightings by the owner) and small antelope (dung mittens), Duiker (*Sylvicapra grimmia*) or Steenbok (*Raphicerus campestris*) was observed. However, the spatial location of the remnant in relation to suitable habitat is expected to play an important role but was not taken into consideration. As was the case in this research, Winter *et al* (2005) found no connection between farm size and pro-environmental attitude.

What did emerge is that the landscape of large family owned agricultural lands within the study area (CCT) is shifting, with farm size decreasing and urbanisation expansion occurring. Marginal agricultural land combined with a younger generation uninterested in farming, and increased demand for limited land (significantly inflating the value) for development, leads to a significant increase in subdivision applications and a continuous upsurge in small holdings and lifestyle properties towards the periphery of the city. Although subdivision in itself does not necessarily negatively impact on biodiversity, the accumulative impact and increased edge effect does encroach on biodiversity (Dorse, *pers com.*, 2011). Furthermore, subdivisions for residential properties complicate the management of fire and control of invasive alien vegetation. The consequence of this is that biodiversity is no longer only found on large agricultural lands, but now exist across a variety of landscapes, including small residential properties. This correlated with the present research where high levels of biodiversity and endemism was found on small properties. For example, participant two's (P2) property is one hectare in extent with half the property under natural vegetation. The vegetation on this property is the Critically Endangered veld type, Swartland Silcrete Renosterveld (Holmes, 2008). Only 1 % (100 ha) of the original extent is protected. The national conservation target for this vegetation type is 26% (Holmes, 2008). This is unfortunately unattainable making the conservation of every last remnant, irrespective of size, critical.

The research concludes that within CCT it will be inadequate for biodiversity conservation and the stewardship programme to only focus on large commercial farms, highlighting the importance of engaging with a multitude of landowners.

Jackson-Smith *et al* (2004) point out that the values of people living on small holdings will be different from people making a living from the land and that conservation officials should interact with all landowners regardless of property size. As the landscape within the outskirts of the CCT is changing from a conventional agricultural environment to an urban setting it is important to note that various studies indicate a difference between urban and rural people's views on the environment. For example, in a study by Durpoix (2010) rural people were more concerned with conservation matters while urban dwellers were more concerned about pollution. Furthermore, Berenguer *et al* (2005 in Durpoix, 2010) found that rural dwellers were more positive towards environmentally responsible behaviour than urban people. Conservation officials within Cape Town should take cognisance of the fact that they are dealing with a complex multi-dimensional environment consisting of less and less conventional farmers and more urban-like lifestyle landowners.

Dures and Cumming (2010) highlight that conservation in an urban environment such as Cape Town should not focus on size, shape and location of land but rather on identifying factors that allow the persistence of biodiversity in such a diverse landscape. Bond *et al* (1988) is of the opinion that isolated fynbos remnants need to be 300-600 ha in extent to be viable for conservation. However, Cowling *et al* (2003) argue that even though larger areas are preferred, smaller remnants should not be discarded as various subset ecological process can still be maintained within smaller areas. Plant and invertebrate diversity can be maintained in habitat fragments as small as five ha provided they are managed ecologically i.e. subject to appropriate fire regimes and kept free of invasive plants (Dorse, *pers com.*, 2011).

Cowling *et al* (2003) point out that at least 1 000 plant species in the CFR are naturally rare and many of these have global populations confined to areas of one to a few hectares, the implication is that viable populations can be maintained in very small areas and can play an important role in conserving some crucial ecological processes. This research concurs showing that a property as small as one ha (P1) although not ideal, can still make a significant contribution towards biodiversity conservation and should not be discarded based on size. However, to accommodate larger ecological components (such as edaphic interfaces, upland-lowland interfaces, sand movement) larger areas are preferred and it is critical to incorporate spatial considerations such as location in terms of other conservation areas for the formation of connectivity.

4.2.3 Current land use

Different activities (land uses) require different modes of management and are expected to have varied impacts on the environment and influence landowner attitude and behaviour towards pro-environmental activities (Durpoix, 2010). This research investigated the current land use activities of the interviewees. This information was collected to determine whether there is a connection between land use and participant's willingness to partake in pro-environmental activities. Land use activities ranged from lifestyle farmers, commercial farmers (chicken, vineyard, cash crops, livestock and wheat), corporate farmers (chicken), mines (quarry), commercial enterprises, state owned (managed by SADF) and residential properties.

Winter *et al* (2005) found that farmer's environmental attitudes are correlated to the type of farming practice. However Cocklin and Doorman (1994, in Durpoix, 2010) found no significant correlation between pro-environmental attitude and farming practice similar to the present research.

Different land use activities are expected to have different impacts on the environment (dairy farming versus beef farming for example), however this research did not investigate the impact of the farming activity on the environment but rather attempted to gauge whether the type of land use activity could influence landowner willingness to partake in pro-environmental activities.

It was expected that 'lifestyle farmers' would be more willing to enter into conservation agreements as they are not reliant on the land for an income. Even though lifestyle farmers showed pro-environmental attitude and behaviour (interest in natural vegetation, recycled etc.) there was no evidence that landowner activity (farming method or type) influence willingness to enter into a restrictive conservation agreement such as the Stewardship Programme. This research highlights that pro-environmental attitude and behaviour (such as belonging to an environmental organisation, recycling or regularly participating in outdoor activities) was no guarantee that landowners will enter into the Stewardship Programme.

4.2.4 Property ownership

How long properties have been in a particular family ranged from less than five years to between 50 to 100 years. The majority of properties were in the family for less than 50 years. Winter *et al* (2005) argue that landowners will have more of a 'relationship' with the land the longer the property has been in the family and will be more inclined to partake in activities that will have a positive impact on the land. Studies (Durpoix, 2010; Winter *et al*,

2005) show that having land in one family for several generations was positively associated with pro-environmental attitude and behaviour. It was therefore expected that there would be a positive relationship between the length the property has been in the family and willingness to partake in pro-environmental activities such as the stewardship programme. In this research the majority of properties were in the current family for less than 50 years. Only two interviewees (P 3 and P12) owned their properties for longer than 50 years (between 50-100 years). No association between landowner's attitude towards conservation and the length the property has been in the family was observed.

4.2.5 Education

It was expected that interviewees with a higher level of education will be better informed and more knowledgeable with regards to biodiversity conservation and therefore more inclined to participate in pro-environmental activities. Research has shown that the relationship between education level and participation in pro-environmental activities is uncertain (Gedikoglu and McCann, 2007; Kingsbury and Boggess, 1999; Upadhyay *et al*, 2002). Some studies (Kline *et al*, 2000; Traoré *et al*, 2000) found a correlation between education and landowner's willingness to participate in pro-environmental initiatives while Amiques (2002) and Winter (2003) found no correlation. The education levels of the interviewees in this research ranged from senior certificate (matric) to post-degree studies, however no correlation between participant's education and pro-conservation activities was evident.

4.2.6 Home language

There was an even distribution of Afrikaans and English speaking interviewees in this research and although language per se was not expected to impact on participant's willingness to participate in pro-environmental activities, cultural differences associated with languages could influence landowner perceptions. A study in New Zealand has shown that an individual's attitude and behaviour is influenced by their social surroundings and social norms can operate through observation and communication and is an instrumental influence on landowners management decisions (Durpoix, 2010). Brook *et al*, (2003 in Durpoix, 2010) found that the more information landowners received regarding endangered species from family, friends and/or neighbours the more likely they were to protect those species. Furthermore Durpoix (2010) points out that in a study in France, landowner's motivations to partake in pro-environmental activities were driven more by social approval than out of environmental concern.

However, in this research it was unclear whether the home language and therefore the cultural differences associated with language, of the interviewees influenced their willingness to partake in pro-environmental behaviour.

4.2.7 Religion

There are strong connotations between environmental stewardship and religion, in particular Christianity (Bugg, 1991; Hockett *et al*, 2004). This research did not fully explore this relationship but did investigate whether interviewees considered themselves religious in an attempt to establish whether there was a positive association between religion and pro-environmental attitude and behaviour. Question 1 (Q1) was a Likert-scale question asking, "Do you consider yourself religious". The mean for the interviewees in this study was 2.6 indicating that there was neutrality amongst interviewees towards religion. However, it is evident that interviewees either considered themselves religious or not religious (Figure 4.1). Only two interviewees (P10 and P12) gave a three to the Likert statement saying they were religious but not actively religious (not going to church regularly). Almost all the interviewees that stated that they were not religious emphasized however that they consider themselves as spiritual. Owen and Videras (2007) suggest that it is advisable to treat beliefs, affiliation, and participation in pro-environmental behaviour separately and explain that there are differences between minimal religious association and theological involvement and conviction. Among individuals of different religions there will be different levels of engagement with the theological principles of the particular religion and different degrees to which those principles shape a person's environmental behaviour. Furthermore, there can be substantial variability regarding values within specific religions. For example, some individuals might choose to focus on a set of values of Christianity that promote an attitude of stewardship toward the environment while similarly convinced believers might ascribe to aspects of Christianity that encourage an attitude of dominance towards nature.

Owen and Videras (2007) found that individuals who have belief systems that could be characterized as being more spiritual, as was the case in this research, incorporating a belief of the soul but not necessarily a belief in God, are more likely to engage in pro-environment activities and have pro-environment attitudes. This corresponds with this research showing an association between spirituality and pro-environmental behaviour. However, there was no association between spirituality, religion and willingness to enter into the Stewardship Programme.

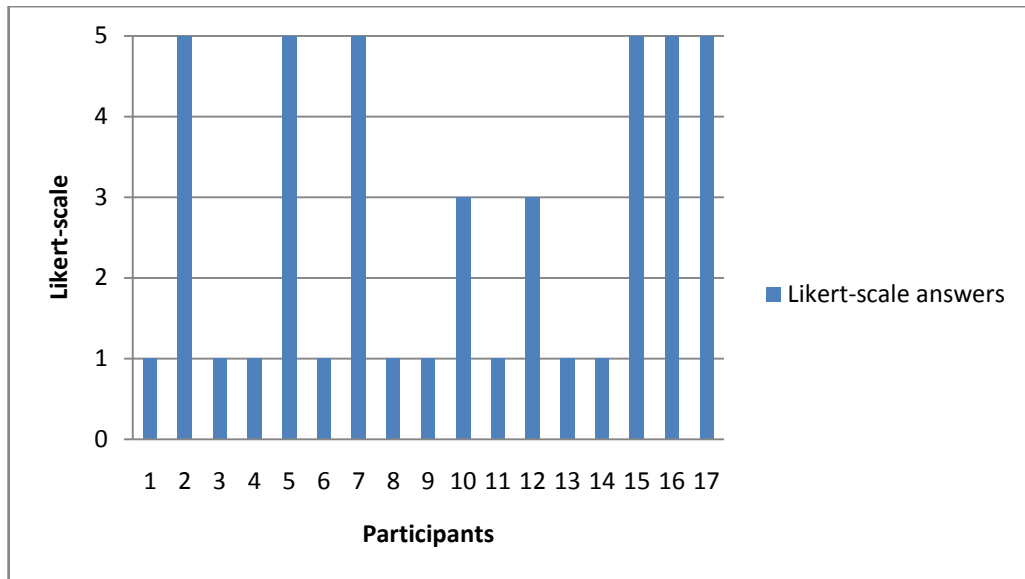


Figure 4.1: Likert-scale answers (1 – strongly disagree and 5 – strongly agree) to question 1 “do you consider yourself religious”

4.3 Knowledge

The objective was to determine the participant’s knowledge of biodiversity conservation and consisted of eleven Likert-scale questions. Question two (Q2) and Question three (Q3) focused on biodiversity and consisted of the following statements, Q2 - “Biodiversity refers to the amount of different plant and animals in a given area” and Q3 - “A plantation (Gum, pine, wattle) has high levels of biodiversity”.

The mean for the first statement (Q2) was 4.4 (Figure 4.2) with the majority of the participant strongly agreeing (Table 4.1). Two interviewees (P8 and P9) strongly disagreed with the statement. For the second statement the mean was 1.6 (Figure 4.2) with the majority of interviewees strongly disagreeing (Table 4.1) with the statement demonstrating some understanding of biodiversity. Participant 1 (P1) was neutral towards this statement and three interviewees (P10, P12 and P14) agreed with Q3. It was expected that some understanding of biodiversity would reduce landowner’s uncertainty towards conservation and would therefore be more inclined to take action and participate in pro-environmental activities. However Kaiser and Fuhrer (2003, in Durpoix, 2010) argue that basic knowledge of biodiversity only serves as a moderate predictor of pro-environmental attitude and behaviour.

Questions four and five (Q4 and Q5) in this section alluded to participant’s knowledge with regards to biodiversity stewardship and the stewardship programme asking; Q4 - “I am familiar with the concept of Biodiversity Stewardship” and Q5 - “I am familiar with the

stewardship programme". The mean for these two statements were 3.6 and 3.2 respectively (Figure 4.2). What is evident is that many landowners are not familiar with the stewardship programme and, in general, interviewees familiar with the concept were landowners that have had previous interaction with conservation officials.

Questions six to nine (Q6, Q7, Q8 and Q9) dealt with interviewees knowledge with regards to the indigenous vegetation by asking the following questions; Q6 - "The indigenous vegetation on my property is very unique", Q7 - "Are you aware that indigenous vegetation is protected by national law", Q8 - "Alien plants are a huge threat to biodiversity" and Q9 - "The indigenous vegetation of the Western Cape occur nowhere else in the world". The mean for these four statements were 4.4, 4.4, 4.9, and 4.8 respectively (Figure 4.2) showing high levels of agreement amongst the interviewees and some basic knowledge of the natural vegetation on their properties.

Although all the interviewees understood that the natural vegetation on their properties was unique to some extent, only two (P3 and P6) seem to fully appreciate the true significance of the vegetation on a global scale.

The majority of interviewees were aware that the natural vegetation on their properties is protected by national legislation and that alien vegetation needs to be cleared. Although the majority of the interviewees felt strongly about compliance, some interviewees showed apathy. As one participant noted "*they can't enforce me to comply with CARA (Conservation of Agricultural Resources Act) if compliance cost me money*" referring to the clearing of alien vegetation as stipulated under CARA. However, threat of punishment does seem to act as some deterrence, with most interviewees acknowledging that laws have sanctions, and while they may not know the exact details, they expect that breaking a law has consequences. However, the fear of punishment, or the possibility of shame and embarrassment are not the central motivating factors behind landowner compliance. The majority of landowners are willing to comply with the environmental legislation believing it is moral and legitimate, as participant 4 (P4) stated "*the lawlessness in this country is due to a moral decline and it is up to the individual to take responsibility for his actions and generate a culture of integrity by doing the right thing, because it is the right thing to do*".

The last three questions in this section Question ten (Q10), Question eleven (Q11) and Question twelve (Q12) queried the interviewees knowledge with regards to management of the natural vegetation; Q10 - "Fire and the management of Alien plants are the most important tool for the management of the natural vegetation of the Cape", Q11 - "Natural

vegetation infested with alien plants is readily restorable”, and Q12 - “Alien vegetation poses a threat to fresh water supplies”. The participant’s responses to these questions indicate some understanding of the management of natural vegetation with means of 4.8, 3.7 and 4.5 respectively (Figure 4.2).

Table 4.1: Summary of Likert-scale (1 – strongly disagree and 5 – strongly agree) questions two to question twelve

Participant	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
P1	5	3	1	1	5	5	5	4	4	1	5
P2	5	1	1	1	5	1	5	5	4	1	5
P3	5	1	4	4	3	5	5	5	4	3	5
P4	5	1	1	1	5	5	5	5	5	3	1
P5	5	1	5	1	3	1	5	5	5	5	5
P6	5	1	5	4	5	5	5	5	5	5	5
P7	5	1	5	5	5	5	5	5	5	4	5
P8	1	1	5	5	2	5	5	5	5	5	5
P9	1	1	5	5	2	5	5	5	5	5	5
P10	5	4	1	1	5	5	4	3	5	4	4
P11	4	2	5	5	5	5	5	5	4	3	5
P12	3	4	5	5	5	3	5	5	5	3	4
P13	5	1	3	2	5	5	5	5	5	4	5
P14	5	4	5	5	5	5	5	5	5	5	5
P15	5	1	5	5	5	5	5	5	5	5	5
P16	5	1	1	1	5	5	4	5	5	3	3
P17	5	2	1	1	3	4	4	4	4	3	5
<i>Mean</i>	<i>4.4</i>	<i>1.8</i>	<i>3.4</i>	<i>3.1</i>	<i>4.3</i>	<i>4.4</i>	<i>4.8</i>	<i>4.8</i>	<i>4.7</i>	<i>3.6</i>	<i>4.5</i>

4.4 Landowner awareness

This section focused on the interest and awareness of landowners towards biodiversity and conservation and consisted of five Likert-scale questions and two yes/no questions.

The first two questions in this section were yes/no questions stating; Q13 - “Do you belong to any environmental groups/organisations (e.g. Friends, EWT, WWF)” and Q14 - “Do you recycle”. The hypothesis being that interviewees that answer yes to these questions will be more likely to partake in pro-environmental activities such as the stewardship programme. Approximately half the interviewees did belong to environmental organisations but were not active members, paying membership fees but not attending any meetings or functions. The majority of interviewees recycled and even though this indicated some pro-environmental behaviour and awareness it was not indicative of landowner’s willingness to partake in the stewardship programme.

Question fifteen (Q15) attempted to establish whether the interviewees regularly take part in outdoor recreational activities, Q15 - “Do you regularly partake in recreational outdoor

activities (e.g., birding, hunting, fishing, MTB etc.)". The mean for this question was 4.3 (Figure 4.2) showing that the majority of interviewees indicated that they did regularly partake in outdoor recreational activities (Table 4.2). It was expected that this will be positively associated with willingness to enter into stewardship as Durpoix (2010) have shown that outdoor recreational activities were a priority for landowners with conserved land on their property. It was expected that participation in outdoor activities will positively affect environmental attitude and behaviour. Durpoix (2010) argue that contemplative recreational activities (e.g. hiking) are expected to reflect more of a preservationist conservation ethic and therefore a stronger pro-environmental relationship than extractive outdoor activities (e.g. hunting) that are associated with more of a utilitarian perspective (Durpoix, 2010). In a study on farmer's perceptions of biodiversity on their farms in Estonia and Finland, Herzon and Mikk (2007, in Durpoix, 2010) found a positive correlation between pro-environmental behaviour and interest in wildlife and positive attitude towards birds. In addition, landowners who understood the links between vegetation and wildlife, displayed stronger intentions of restoring or preserving natural habitat.

Although this research did not distinguish between contemplative (e.g. hiking, birding) and extractive (e.g. hunting, fishing) outdoor activities, it was to some degree possible to establish what sort of activities the interviewees were referring to through follow-up questions. The activities ranged from horse riding to walking the dogs. None of the interviewees were particularly interested in ornithology however the majority of interviewees did understand the basic link between vegetation and wildlife. It was not possible to establish a connection between participant's interest in outdoor recreational activities and willingness to conserve and enter into the Stewardship Programme.

Question sixteen (Q16) asked interviewees to rate their interest in the natural vegetation out of five. The mean for this question was 4.5 (Figure 4.2) with the interviewees showing high levels of interest in the natural vegetation however only four interviewees (P3, P7, P11 and P13) were able to correctly identify some of the dominant plant species on their properties.

The last three questions in this section, questions seventeen (Q17), eighteen (Q18) and nineteen (Q19) aimed to determine interviewees interest and perception towards conservation stating; Q17 - "I enjoy going to the Kruger NP, Kgalagadi etc. (I consider this conservation)", Q18 - "I enjoy going to the Cederberg, Kogelberg, de Hoop (I consider this conservation)" and Q19 - "I enjoy going to Helderberg NR, Tygerberg NR, BCA (I consider this conservation)". The mean for these three questions were 4.8, 4.7 and 3.4 (Figure 4.2) respectively. This indicated interviewees were more interested in bigger well-known

conservation areas with a clear focus on the protection of animals and were more inclined to perceive that as conservation.

Table 4.2: Summary of Likert-scale (1 – strongly disagree and 5 – strongly agree) questions fifteen to nineteen

Interviewees	Q15	Q16	Q17	Q18	Q19
P1	5	3	5	5	3
P2	3	5	5	4	5
P3	5	4	4	4	3
P4	3	4	4	5	2
P5	5	5	5	5	4
P6	3	5	4	4	4
P7	5	4	5	5	1
P8	5	5	5	5	5
P9	5	5	5	5	5
P10	4	4	5	4	3
P11	5	5	5	5	5
P12	4	4	5	4	1
P13	5	5	4	5	5
P14	5	5	5	5	5
P15	1	3	5	5	1
P16	5	5	5	5	3
P17	4	3	5	3	1
Mean	4.2	4.4	4.8	4.6	3.3

4.5 Financial benefits of conservation

It is argued that conventional farmers are economically dependent on exploiting the natural environment and are stereotyped as being driven by profit maximisation (Chouinard *et al*, 2008). This section explored participant’s perceptions towards financial benefits of conservation and consisted of six Likert-scale statements. It was expected that landowners will enter into pro-environmental conservation activities, such as the stewardship programme, if it is beneficial towards their business/farming operation. Furthermore, it was anticipated that the willingness to conserve natural vegetation will increase if landowners perceive and receive tangible benefits from biodiversity conservation.

Question twenty (Q20) stated, “Having natural vegetation on my property increase the financial value of the property”. The mean for this question was 3.2 (Figure 4.2) indicating an overall neutrality amongst the interviewees to this statement. Question twenty-one (Q21) stated, “The conservation of natural vegetation leads to other benefits (eco-tourism, functioning ecosystems, ecosystem services)” and had a mean of 4.7 (Figure 4.2) indicating that the majority of interviewees strongly agreed with this statement recognising secondary benefits of biodiversity conservation (Table 4.3). Question twenty-two (Q22), “The conservation of natural vegetation is not beneficial to my business/activities” is linked to Q20

and had a mean of 2.1 (Figure 4.2) showing that the interviewees did not agree with this statement, indicating that having natural vegetation on the property was beneficial to most participant's business or activities.

Question twenty-three (Q23) explored whether interviewees would only conserve biodiversity if it was financially beneficial to them stating, Q23 - "I will conserve natural vegetation if it is economically beneficial to me". The mean for this statement was 2.1 (Figure 4.2) showing that the majority of interviewees did not agree with this statement and indicating some level of bio-centric value towards biodiversity conservation. This is in contrast to Durpoix (2010) who argued that due to the volatile economics of farming, landowner's value economic growth over the protection of natural areas. As was the case in this research, others have shown (Chouinard *et al*, 2008) that landowner's practices are not solely driven by profitability and often have emotional attachments and ethical values of the land along with a utilitarian approach. The present research concurs with Durpoix (2010) that change in worldview with regards to the environment has occurred within the farming community resulting in landowners adopting more environmentally friendly farming practices.

Question twenty-four (Q24), "The conservation of natural vegetation is important for current and future generations" had a mean of 5 (Figure 4.2) showing that all the interviewees strongly agreed with this statement. This is in agreement with the literature that suggests that farm/land succession is a significant influence in landowners' management orientations (Gilg, 2009). The last question in this section, question twenty-five (Q25) stated, "Natural vegetation is useless to me" aimed at verifying whether interviewees saw value in the natural vegetation. This question had a mean of 1.3 (Figure 4.2) showing that interviewees strongly disagreed with the statement verifying that the interviewees placed some bio-spheric value on the natural vegetation.

Table 4.3: Summary of Likert-scale (1 – strongly disagree and 5 – strongly agree) questions twenty to twenty-five

Interviewees	Q20	Q21	Q22	Q23	Q24	Q25
P1	3	5	1	1	5	3
P2	5	5	3	1	5	1
P3	3	3	3	4	5	1
P4	3	5	1	1	5	1
P5	5	5	3	1	5	1
P6	5	5	1	1	5	1
P7	1	3	5	3	5	1
P8	3	5	1	2	5	1
P9	4	5	1	1	5	1
P10	4	5	4	5	5	4
P11	1	5	1	2	5	1
P12	1	5	1	4	5	1
P13	5	5	1	1	5	1
P14	1	4	5	1	5	1
P15	2	5	2	1	5	1
P16	5	5	1	5	5	1
P17	3	4	3	5	5	3
Mean	3.2	4.7	2.2	2.3	5	1.4

4.6 Willingness to conserve

Durpoix (2010) suggest that attitude has the biggest influence on decision making and behaviour and is more important than any other variable, such as financial constraints. It was expected that attitude would influence landowner’s willingness to conserve. This section of the questionnaire explored participant’s willingness to conserve biodiversity and consisted of six Likert-scale statements. It allowed the interviewer the opportunity to gain a more in-depth understanding of the participant’s attitude towards conservation.

The first question, question twenty-six (Q26) was set to determine interviewees short to medium term plans for the natural vegetation on the property by asking, “I have other plans for the natural vegetation on this property in the next 5 years”. The mean for this question was 1.6 (Figure 4.2) showing that the majority of interviewees strongly disagreed with the statement and did not have alternative plans for the natural vegetation on their property in the medium term (Table 4.4). Questions twenty-seven (Q27) and twenty-eight (Q28) relate to the previous section on financial benefits of conservation and stated, Q27 - “I will only conserve land that I am not able to use productively” and Q28 - “If I can make money from the land I will not conserve it”. The mean for these two questions were 1.9 and 1.8 (Figure 4.2) respectively showing that the majority of interviewees did not agree with these two statements again showing some bio-spheric values towards the environment (Table 4.4).

Question twenty-nine (Q29) stated, “Conservation is the responsibility of the government” and had a mean of 2.4 (Figure 4.2) showing that the interviewees mostly disagreed. The majority of the interviewees elaborated that the government do have some responsibility but that it was a shared responsibility. As one participant explained “*conservation is a partnership between government and civil society where government provide the tools for society to conserve*”.

Question thirty (Q30) explored the morality of conservation stating, Q30 - “Conservation is a moral obligation”. The mean for this statement was 4.8 (Figure 4.2) showing that the majority of interviewees strongly agreed with this statement indicating that the majority of interviewees feel that biodiversity conservation is a moral obligation (Table 4.4). This corresponds with Jackson-Smith *et al* (2004) who found that landowners feel a stewardship obligation based on a desire to care for the land and leave it in better shape than when they acquired it. This kind of standard might foster positive motivation for compliance whereby landowners comply out of moral obligation and a genuine sense that the law is legitimate. Morality is closely linked to values. Studies tend to distinguish egoistic (focus on self-interest), humanistic (focus on other humans), and bio-centric (focus on nature) values (Schultz 2001; Stern and Dietz, 1994) that influence landowners pro-environmental behaviour. Humanistic and bio-centric values are both related to environmentalism, and the conditions under which these values are expressed continue to be explored.

The last question in this section, question thirty-one (Q31) explored whether the interviewees thought that the incentives offered for conservation was significant, Q31 - “To your knowledge the incentives offered for conservation is significant”. This question had a mean of 2.6 (Figure 4.2) showing that the interviewees did not view the current incentives as significant or was unaware of any incentives offered.

Table 4.4: Summary of Likert-scale (1 – strongly disagree and 5 – strongly agree) questions twenty-six to thirty-one

Interviewees	Q26	Q27	Q28	Q29	Q30	Q31
P1	3	3	2	5	5	1
P2	1	2	1	1	3	1
P3	1	3	3	3	4	4
P4	5	1	1	3	5	4
P5	1	1	3	1	5	1
P6	1	1	1	1	5	2
P7	1	1	1	1	5	1
P8	1	1	1	1	5	3
P9	1	1	1	1	5	3
P10	1	5	3	5	5	4
P11	1	1	1	5	5	2
P12	1	3	3	3	4	4
P13	1	1	1	1	5	1
P14	1	1	1	5	5	1
P15	1	1	1	1	5	5
P16	5	5	5	1	5	4
P17	1	5	5	5	3	3
<i>Mean</i>	<i>1.6</i>	<i>2.1</i>	<i>2</i>	<i>2.5</i>	<i>4.6</i>	<i>2.6</i>

4.7 Perceptions on conservation matters

The last section of the questionnaire explored participant's perceptions towards conservation and consisted of six Likert-scale questions and one close ended yes/no question that was followed up by a seventh Likert-scale question if the answer was yes.

The first question queried interviewees perceptions towards conservation organisations, Q32 - "Conservation agencies are doing a great job with the resources that are available to them" and had a mean of 3.8 (Figure 4.2) indicating interviewees response to this statement was neutral leaning towards agreeing. Some interviewees felt strongly that conservation organisations did not do a good job while others thought they were (Table 4.5). This perception was generally linked to previous experience. Many felt that the conservation organisations had altered dramatically in recent times from an owner-friendly organisation to one which is influenced by a conservation agenda. This change in approach coincided with a change in staff and landowners felt that there were fewer familiar faces among the extension staff with a high turnover.

The second question in this section, question thirty-three (Q33) explored participant's perceptions towards conservation officials asking, Q33 - "Conservationists are just a bunch of bunny hugger vegetarians". The mean for this question was 1.2 (Figure 4.2) showing that the majority of interviewees strongly disagreed with this statement.

Question thirty-four (Q34) explored participant's perceptions towards conservation advice and stated, Q34 - "Conservationists should not tell me what and how to manage my land".

The mean for this question was 2.6 (Figure 4.2) showing that the majority of participant's response to this statement was neutral leaning towards disagreeing. It emerged from the study that restrictions on land use are often perceived by landowners as an affront on their rights with the majority of landowners viewing their rights to property as 'absolute' and should not be constrained or dictated by society and/or government (especially government or conservation agencies!). The majority of interviewees emphasised the value they placed on their independents and felt that institutional interventions, such as the stewardship programme, interfere with their freedom. As participant five (P5) stated, "*this (stewardship) programme is a way of regulating my activities and restricting my rights...*".

The majority of interviewees have strong personal attachment to their land, and the need for personal enjoyment and privacy came through strongly. Owners often described their feelings for their land in terms of a love affair, using words like 'passion', 'love' and 'emotion' throughout the interviews. The majority of interviewees felt that they had a role and responsibility as custodians of the land they owned as was evident from interviewees five (P5) who stated, "*We've done everything to protect this place, on sound ecological grounds and we have spent thousands on alien clearing.*" Another owner (P4) stated "*we aim to keep a very natural and healthy balance here*". However, they felt that biodiversity conservation was a mutually beneficial partnership and was willing to accept advice and engage in discussion but did not want to be told what and how to manage their land. As one participant (P1) stated "*we are happy to discuss conservation issues and would welcome more input from conservationists but it should be a two-way discussion and not a dictatorship*". In general, owners did not feel that they were particularly well-qualified to manage the environment but had a good understanding of the management requirements due to their expertise and intimate knowledge of the land that they own. It is evident that landowners will partake in conservation programmes such as the stewardship programme, if they understand it well, have confidence in the programme, it is easy to implement and it is in line with their views and objectives for the land.

The next question, question thirty-five followed on from the previous statement asking, Q35 - "Landowners knows what is best for biodiversity and the land". The mean for this question was 1.3 (Figure 4.2) again the majority of interviewees did not agree with the statement and welcomed advice.

The next two questions, Q36 and Q37 explored whether interviewees would prefer more or less contact with conservation officials stating, Q36 - "I would prefer never to be contacted by a conservation officer" and Q37 - "I would like more interaction with conservation officials".

The mean for these two questions were 1.1 and 4.7 (Figure 4.2) respectively showing that the majority of interviewees would like more interaction with conservation officials.

Table 4.5: Summary of Likert-scale (1 – strongly disagree and 5 – strongly agree) questions thirty-two to thirty-seven

Interviewees	Q32	Q33	Q34	Q35	Q36	Q37
P1	5	2	5	1	1	5
P2	4	1	1	1	1	5
P3	4	1	4	1	1	5
P4	3	1	2	1	1	5
P5	1	1	2	1	1	5
P6	1	3	5	1	1	5
P7	5	1	1	1	1	5
P8	3	1	5	3	1	5
P9	3	1	5	1	1	3
P10	4	1	1	3	3	3
P11	4	1	1	1	1	5
P12	5	1	3	1	1	5
P13	3	1	4	1	1	5
P14	5	1	1	1	1	5
P15	5	1	1	1	1	5
P16	5	1	1	1	1	5
P17	4	2	2	3	1	5
Mean	3.8	1.2	2.6	1.4	1.1	4.8

The last question was a yes/no question and explored whether the participant had been in regular contact with conservation officials. If yes, it was followed up by a Likert-scale statement to determine whether the interviewees experienced with regards to this interaction was positive. The majority of the interviewees had had some form of contact with conservation officials ranging for permit applications to site visits. The mean for the Likert-scale question was 4.2 showing that predominantly the interviewees indicated that this interaction was positive. One participant (P6) indicated that the interaction was negative and felt frustrated due to lack of response and assistance.

The questionnaire was concluded with an open ended question on what interviewees want from conservation agencies allowing for a basic needs-analysis. The prevailing theme from this open question was that the interviewees would prefer more interaction from conservation officials specifically with regards to management advice of the natural vegetation. This correlated with Q37 with a number of interviewees suggesting an increase in extension staff and landowner interaction. All the interviewees felt that conservation officials should 'involve them more' and showed a yearning 'to belong'. It was apparent that the majority of interviewees would like more interaction with 'likeminded' landowners and expected conservation officials to create a platform for knowledge sharing. One participant (P14) suggested more frequent updates or 'snippets' with regards to biodiversity

conservation in Cape Town and recommended a biodiversity newsletter. The 'traditional farmers' day' was suggested however Oettle and Koelle (2003) caution against events in which specialists address the farming community and tell them what they should or should not do, corresponding with the interviewees response to Q34 in this study. Oettle and Koelle (2003) suggest an interactive farmer/ researcher workshop designed as an effective learning event, and if followed by a social event allows for more informal interaction often preferred by landowners. It became apparent during the research that it is crucial for the conservation organisations to communicate and translate their priorities and policies to landowners and it is critical to maintain an effective interface via extension services, as Oettle and Koelle (2003) point out, extension can exercise great influence and can be a catalyst for positive change and pro-environmental behaviour.

Another prominent theme amongst all the interviewees was assistance with alien clearing trees with one participant (P5) recommending an incentives scheme for alien clearing and suggesting that government and conservation officials should do more to promote indigenous trees (note that this particular participant is the owner of a wholesale nursery). The majority of interviewees agreed and felt that they should be rewarded for keeping their properties clear of aliens and that neighbours who do not clear should be fined. Although landowners are obliged by national law (Conservation of Agricultural Resources Act 43 of 1983) to clear alien vegetation on their land the enforcement, as with all other (environmental) legislation, is problematic causing frustration with those landowners that do comply.

The major emerging issue with alien vegetation clearing is the cost implications. This correlated with Cumming's (2007) study in the Eastern Cape who found that a reduction in state compensation and new remuneration laws have led to a decrease in permanent labour, increasing the cost of clearing. A cost that most of the interviewees are reluctant to incur.

In addition, the following concerns emerged from the research. The majority of the interviewees felt that smaller conservation areas were neglected in favour of large protected areas and would like to see more resources and input on smaller conservation areas.

Two interviewees (P2 and P14) suggested a dedicated complaints system (for example a dedicated phone line) for complaints that would result in immediate action. Illegal harvesting of plants and poaching was highlighted as a problem by some of the interviewees.

Linked to the above suggestion, participant fourteen (P14) suggested "*more action and less talk*" recommending that conservation officials embark on a learning exchange programmes

with different countries such as Australia, suggesting that South Africa is outdated when it comes to extension services.

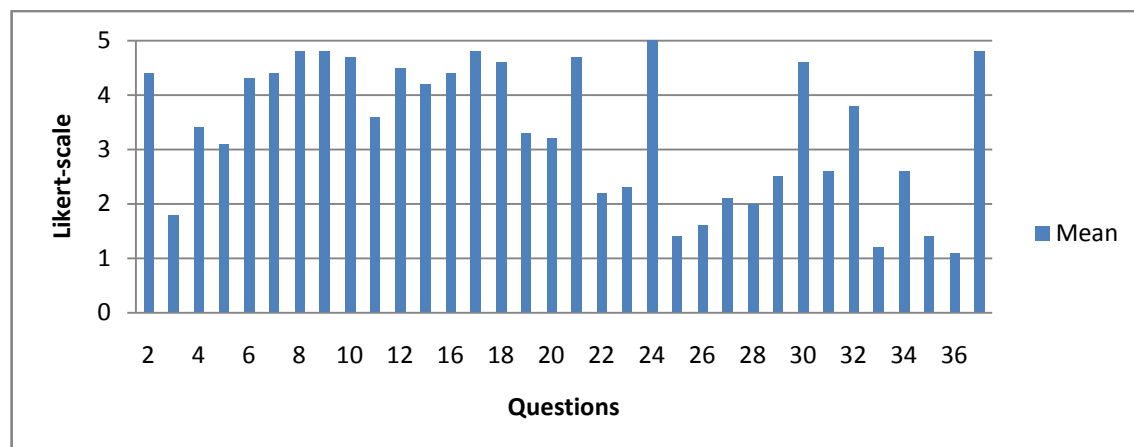


Figure 4.2: The mean for the 34 Likert-scale questions (1 – strongly disagree and 5 – strongly agree)

4.8 Institutional perspective

The information on institutional perspectives was collected through direct and personal observation with conservation officials and/or during meetings and workshops. This was supplemented with institutional documentation. It was anticipated that biodiversity management within the City of Cape Town would be a disjointed, ad hoc arrangement due to the number and diversity of institutions ranging from government departments, local authority, parastatal, Non-Governmental Organisations and private institutions responsible for biodiversity conservation. However, the research found a well-coordinated well-structured conservation system build around constructive partnerships, especially amongst the official conservation organisations. This well-functioning partnership is critical for the success of the Stewardship Programme in Cape Town and supported by von Hase (2009) who highlights that it is critical for the multifaceted issues of conservation to be addressed through interdisciplinary collaboration that promotes the sharing of expertise amongst specialists.

There are three government conservation organisations within Cape Town namely; South African National Parks (SANParks), responsible for the management of the Table Mountain National Park situated on the Cape Peninsula, The Western Cape Nature Conservation Board (CapeNature), the provincial conservation authority, responsible for the implementation of biodiversity conservation in the Western Cape Province and the management of provincial nature reserves of which there are two within CCT, and The City of Cape Town’s Biodiversity Management Branch placed under the Environmental Resource Management Department, responsible for the management of 31 City owned nature reserves scattered throughout the City and biodiversity management across the City.

Stewardship agreements or conservation agreements within the City can be signed with CapeNature, SANParks or the City of Cape Town. Although this can be beneficial in cases where landowners have developed negative perceptions regarding a specific conservation body allowing for another conservation organisation to take over potential negotiations, it can also be problematic. It emerged that landowners occasionally will play different conservation organisations off against one another in an attempt to '*get a better deal*' (Slain, *pers com.*, 2011). This has a number of implications for the conservation authorities, for example logistically it is impractical from a management perspective for a landowner to sign an agreement with CapeNature or the City on the peninsula unless the landowner is willing to have a tripartite management agreement including SANParks. In other words, the contractual agreement to conserve the land is with CapeNature or the City with SANParks as the management authority. This however leads to additional administration and costs in an already bottleneck bureaucratic process and is not favoured by any of the organisations. The reverse also holds true, as it will not be possible for a landowner in the north of the City to sign an agreement with SANParks. However, as evident from the research, the conservation authorities have a good 'on the ground' working relationship with the City's Biodiversity Management Branch playing a critical role in the consolidation of conservation planning and management within the City. The City was catalytic in the development of the Bionet Alliance Initiative, a partnership consisting of the City of Cape Town, CapeNature, SANParks, Wilderness Foundation, and the Cape West Coast Biosphere Reserve and aim to guide the stewardship activities within the CCT. This initiative provides a platform for the different partners to synchronize activities and actions, and thereby avoiding situations as mentioned above.

This said, it emerged from the research, that SANParks is mainly concerned with issues surrounding the Table Mountain National Park and reluctant to become involved in any other conservation issues within the City. This is understandable if SANParks mandate and history within Cape Town is understood and placed in context.

SANParks took over the management of the Cape Peninsula Protected Natural Environment (CPPNE) in 1998 when the Cape Peninsula National Park was proclaimed and subsequently changed its name to Table Mountain National Park in 2004 (SANParks, 2008). Prior to the Park's establishment, numerous organisations, government departments and private landowners were responsible for the management of the CPPNE. As part of the Park's consolidation strategy the Parks launched its private land consolidated strategy in 2001. This strategy allowed for a number of options for private land to be incorporated into the Park including, donation of the land, contract agreement, acquisition of the land and cooperative management. Initially significant progress was made to incorporate private land into the

Park. However, with a significant increase in the value of properties on the peninsula and limited progress, the private land consolidated strategy was revised to allow for greater flexibility to align with landowner's needs (SANParks, 2008). SANParks now follow aspects of the stewardship model, proclaiming conservation worthy land as National Park under the Protected Areas Act where the landowner retains ownership and ultimate responsibility. Although the park has entered into medium term agreements (30 years) the Park now encourages perpetuity contracts. As SANParks' core mandate is biodiversity conservation within National Parks, they do not involve themselves with off-reserve conservation. Incorporating private land into the conservation estate for SANParks is solely to consolidate TMNP and is referred to as the 'buffer zone policy'.

Another trend that emerged during the research is the rapid increase in 'reactive stewardship'. This is linked to the change in the agricultural landscape as explained in section 4.2.2. Reactive stewardship refers to land that has to be placed under conservation through the stewardship programme as part of the Record of Decision (RoD) of an Environmental Impact Assessment (EIA). Although reactive stewardship allows for a cost effective opportunity to expand the conservation estate (as the landowner is responsible for all the costs) it is often problematic as reactive stewardship is not always favoured by the conservation authorities for various reasons. First, these areas are not always conservation priorities as stipulated by CapeNature's Provincial Protected Area Expansion Strategy and the Biodiversity Network. Furthermore, the ad hoc nature of reactive stewardship depletes the under resourced stewardship/extension officers that now have to deal with an unwilling (often difficult) landowner that is not entering the programme on a voluntary basis. This often leads to a tenuous relationship from the start, which often never improves. A further issue that become apparent is that the stewardship officers are often the people that have to report landowners for noncompliance leading to a further breakdown in the relationship.

A central theme within all the conservation organisations was limited resources and lack of capacity, making the partnerships all the more important. Large workloads and limited budgets are a definite barrier restricting vital extension services. This is well captured by a stewardship officer, "*we are only allocated 1 500 km a month....with attending compulsory organisational meetings it leaves very little kilometres for doing our work*" This corresponds with Oettle and Koelle (2003) who found that in recent years there has been significant cut-back in budgets and down-sizing of extension services.

4.9 Conclusion

This chapter outlined the findings of this research and while some of the findings conformed to expectations based on recent literature, others did not. It was evident that predicting pro-environmental behaviour based on characteristics and perceptions is complex and varies from individual to individual. Although the research found that some characteristics are positively related to pro-environmental behaviour this was not a surety for willingness to participate in the Stewardship Programme. The central ideas described in this chapter are explored in Chapter five and conclusions are drawn from the research.

Chapter Five

Conclusion

5.1 Introduction

The aim of this research was to determine how new participatory conservation systems such as the stewardship programme can assist biodiversity conservation on private land within the urban environment of the City of Cape Town. To achieve this, the specific objectives were to;

- Analyse the new participatory conservation systems and the legislative structure that regulates them.
- Understand landowner's perceptions towards conservation and conservation authorities including knowledge of biodiversity, interest in biodiversity, financial benefits of conservation and willingness to conserve.
- Identify limitations to biodiversity conservation on private land.

To answer the research aim the key findings are presented and discussed in chapter four. In this chapter conclusions are drawn with regards to participatory conservation systems, specifically focusing on the stewardship programme within the City of Cape Town.

5.2 Summary of Research

The research emphasised that global biodiversity is being lost at an unprecedented rate. This biodiversity loss not only leads to rapid species loss but also negatively impacts on functioning ecosystems and ecosystem services with a resulting impact on human well-being. This biodiversity loss is mainly due to human actions. The growing human population and over consumption is the main drivers for the need for agricultural expansion and urbanisation. The problem is of global concern and has led to various international treaties and policies over the last 30 years, most notably the Convention on Biological Diversity (CBD). These policies acknowledge that humans are not separate from the environment and that the future of biodiversity conservation lies outside the current network of protected areas.

The research examined the international policies to gain a better understanding of the powers driving protected area expansion, and highlight the World Parks Congress that was held in Bali in 1982 and the Rio Summit in 1992 where 167 countries signed the Convention on Biological Diversity. This led to a significant increase in funding for protected area expansion and a dramatic increase in protected areas. Even though numerous countries met

the proposed 10% target as set by the IUCN, studies highlight that this expansion has been highly variable and not representative of the biodiversity (Gallo *et al*, 2011; Mora and Sale, 2011; Rebelo *et al*, 2011). This research found a similar trend within the Western Cape Province of South Africa and in particular the City of Cape Town (CCT).

Even though 17% of CCT is formally conserved, it is not representative of the unique biodiversity of the area and mainly includes the rugged Table Mountain Chain. The research highlighted the unique biodiversity of the Cape Floristic Region and the CCT. It was recognised that without the willingness of private landowners, long-term conservation of this unique biodiversity will fail. The literature review came to the conclusion that South Africa has some of the most progressive environmental legislation in the world and that this legal framework, along with incentive schemes, can play a significant role in the protection of biodiversity conservation on private land. The changes in the legal framework post-1994 allowed for the development of a stewardship programme that aims to cost effectively conserve priority conservation areas on private land. The research highlighted that landowners can choose between legally nonbinding (informal) and legally binding (contractual) agreements and that legally binding agreements institute a formal conservation easement on the land and are considered a more secure conservation measure. Landowners can enter into these agreements in the following options: A Biodiversity Management Agreement (under NEMBA), a Protected Environment (under PAA) or a Nature Reserve or National Park under (PAA) with the latter two agreements requiring formal declaration and restrictions on the land. Treasury recognise the commitments of landowners towards biodiversity conservation by giving up certain use rights that have inherent value and that landowners often suffer considerable expenses in managing their land for conservation (Cumming, 2009). Therefore various fiscal incentives have been developed to support landowners for the cost incurred for the public good. This research revealed that the complexity of biodiversity conservation on private land relies on a combination of incentives to achieve conservation goals.

5.3 Summary of key findings

5.3.1 Landowners

It is apparent that landowner characteristics play an important role in attitude and behaviour and could assist conservation officials in stewardship negotiations. Although no significant relationship was recognized between age and landowner's willingness to enter into conservation stewardship it became evident that certain landowners, regardless of age, are hesitant to enter into restrictive conservation agreements as they feel it will limit future options for the land.

There was no correlation between size of property and pro-environmental behaviour. However, it became apparent that the agricultural landscape within the City of Cape Town is changing with a decrease in farm size and an increase in urbanisation. The research nonetheless concluded that small properties with small isolated remnants (as small as one ha) of natural vegetation, although not ideal can still make a significant contribution towards biodiversity conservation and should not be discarded based on size. It will therefore be incorrect for biodiversity conservation and the stewardship programme within the CCT to only focus on traditional large scale farmers, highlighting the importance of engaging with a multitude of landowners.

Different land uses are associated with different management practises and it was expected to have different impacts on the environment and influence landowner's attitude towards pro-environmental activities. Interviewees were involved in a multitude of land uses ranging from commercial farming (including livestock, wheat, and vineyards), mines (quarry), and commercial enterprise (nursery) to lifestyle farmers. Although it was evident (personal observation) that different land uses impacted the environment differently no significant correlation between land use and pro-environmental attitude was found. According to Jackson-Smith *et al*, (2004), lifestyle farmers are expected to have more of a pro-environmental attitude as they are not dependant on the land for subsistence. Although the lifestyle farmers within the research demonstrated a pro-environmental attitude by recycling, taking part in outdoor recreational activities and belonging to environmental organisation this was however no guarantee that the landowner will enter into restrictive conservation agreements such as the stewardship programme.

The majority of the properties were in the participant's families for less than 50 years. There was no association evident between the length the property was in the family and pro-environmental behaviour as is suggested by Durpoix (2010) and Winter *et al*, (2005). Furthermore, the education level of interviewees ranged from senior certificate to post degree studies with the majority of interviewees having a degree or diploma. Research in the USA (Gedikoglu and McCann, 2007; Kingsbury and Boggess, 1999; Upadhyay *et al*, 2002) is inconclusive whether there is a correlation between education level and pro-environmental behaviour. This research could find no relationship between education and pro-environmental behaviour.

There was an even spread between Afrikaans and English speaking interviewees. The associated cultural differences between languages were expected to influence landowner's

attitude and behaviour towards the environment. Research in New Zealand (Durpoix, 2010) has shown that culture has a significant influence on behaviour, however there was no evidence to suggest that home language and the associated culture will have an influence on interviewees' attitude and pro-environmental behaviour.

Although the present research did not fully explore the relationship between religion and environmental stewardship it did enquire whether the interviewees considered themselves as religious. The majority of the interviewees either felt strongly that they were religious or felt strongly that they were not. Almost all the interviewees that stated that they did not consider themselves as religious however emphasised that they were spiritual. Even though there was some indication that spirituality leads to pro-environmental attitude and behaviour (such as caring and recycling) there was no evidence to suggest a link between religion, spirituality and willingness to enter into conservation stewardship.

The interviewees demonstrated a fundamental understanding and knowledge of biodiversity, natural vegetation, conservation and national environmental legislation however, a large portion of the interviewees were unfamiliar with the stewardship programme. It became apparent that the majority of landowners are willing to comply with the relevant legislation believing it is morally the right thing to do and showed some understanding of the management requirements of the natural vegetation. Even though the literature (Kaiser and Fuhrer, 2003 in Durpoix, 2010) states that basic knowledge of the environment is only a moderate indicator of pro-environmental behaviour, it was expected that an understanding and knowledge would reduce landowner's uncertainty and therefore will be more inclined to participate in pro-environmental activities such as the stewardship programme. However no link could be established between knowledge and willingness to partake in the stewardship programme.

The research discovered that the majority of interviewees displayed some interest in pro-environmental behaviour (half the interviewees) by indicating that they belonged to some environmental organisation, recycle, regularly partake in outdoor recreational activities and enjoyed going to the bigger (well known) conservation areas. Although this indicated some pro-environmental attitude and behaviour, no connection could be established between interviewees' interest along with some form of pro-environmental behaviour and willingness to partake in the stewardship programme.

It was apparent that the majority of interviewees showed some bio-centric values and were not exclusively driven by profit maximisation. Furthermore, it was evident that land

succession plays a significant role in landowner's management decisions. It was clear the interviewees was not aware or did not perceive the current incentives for conservation as significant or sufficient. Although there was no significant association between the financial benefits of conservation and willingness to partake in restrictive conservation agreements, it is the researcher's opinion that an increase in willingness to conserve and partake in the stewardship programme can be expected with an increase in tangible incentives.

The survey indicated that the majority of the interviewees showed a certain willingness to conserve the natural vegetation on their property. However, the interviewees viewed conservation as a mutual responsibility between government and individuals.

The interviewees indicated a positive perception towards conservationists and conservation organisations, however many felt that conservation organisations have changed significantly in recent years and had a perception of high staff turnover, especially extension staff. The majority of landowners were open and positive towards conservation advice but the way in which this advice is delivered is crucial. It emerged that the landowners did not like to be told what to do! It also became apparent that the interviewees had a strong attachment to their land and felt strongly about their independence, with some interviewees viewing institutional interventions such as the stewardship programme as interfering with their freedom and rights. The majority of the interviewees indicated that they would like more interaction with conservation officials, and stated that previous interactions with conservation officials had been a positive experience. This highlights the importance of a pro-active approach to extension and stewardship.

The interviewees interested in stewardship would like conservation officials to provide a platform for regular interaction between likeminded landowners and with conservation officials. A prominent theme amongst all the interviewees was assistance with the clearing of alien invasive vegetation.

5.3.2 Institutions

The researcher experienced a well-coordinated well-structured conservation system within the City of Cape Town despite numerous institutions being responsible for biodiversity conservation.

Stewardship agreements within the City can be signed with the three official conservation organisations operating within the City, the City of Cape Town's Biodiversity Management Branch, CapeNature and SANParks. It became apparent that the City's Biodiversity

Management Branch plays a critical role in consolidating the conservation planning and management within the City. The City was a catalyst in the development of the Bionet Alliance Initiative, a partnership consisting of the City of Cape Town, CapeNature, SANParks, Wilderness Foundation, and the Cape West Coast Biosphere Reserve that aim to guide the stewardship activities within the CCT.

A prevalent theme amongst all the conservation organisations is the increase in reactive stewardship. Reactive stewardship refers to landowners required to enter into compulsory restrictive conservation agreements as part of the Record of Decision (RoD) from an Environmental Impact Assessment. All were in agreement that reactive stewardship will play an increasingly important role in biodiversity conservation and will require a dedicated team to deal with this issue. However, it emerged that current reactive stewardship is perceived as problematic due to the ad hoc nature of reactive stewardship. Furthermore, these sites often fall outside priority conservation areas, have unwilling/uninterested landowners and increase the already under resourced stewardship officer's workloads.

Limited resources and lack of capacity was a central theme amongst all the conservation organisations. It is clear that South Africa have progressive environmental legislation enabling and encouraging biodiversity conservation however the implementation and enforcement of the legislation is wanting.

5.4 Limitations

The main limitation of the research was the small sample size, which could bias the findings. As the research was conducted by a single researcher it is anticipated that the researcher's cultural background and opinions could have influenced the analysis of the study. Cognizance was taken of the possible errors associated with interviews, these include errors in recording the answers and the interviewees biased towards choosing the perceived 'right answer'.

5.5 Conclusions

Cape Town's unique biodiversity is under threat even though 17% of Cape Town is under formal conservation protection. Unfortunately, the conserved area is not representative of CCT's rich biodiversity and mainly includes the rugged mountain areas. Biodiversity conservation on the private land especially on the lowlands is playing an increasingly important role in the long term conservation of biodiversity. Therefore understanding landowner's perceptions and sources of motivation are critical to implementing a programme such as the Stewardship Programme. This research revealed that landowner's perceptions

and motivations concerning biodiversity conservation and stewardship are driven by multiple variables. It emerged that certain characteristics could possibly indicate pro-environmental behaviour however pro-environmental behaviour does not necessarily indicate a willingness to participate in restrictive conservation measures such as the Stewardship Programme. It also emerged that landowners are generally unaware of any incentives for conservation. However, it was evident that landowners are not solely driven by profit maximisation with the majority of interviewees showing some bio-centric characteristics and moral obligations towards conservation. This said, it was clear that policy may need to intervene to establish a higher potential for pro-environment outcomes rather than rely on the values of individuals to create action.

Furthermore it emerged that landowner succession plays a fundamental role in landowner management orientations and is expected to influence landowner's willingness to participate in the Stewardship Programme. The agricultural landscape in Cape Town is changing with an increase in small holdings and lifestyle landowners and a decrease in large conventional farms. The consequence of this is that biodiversity no longer occurs on large agricultural lands, but now exist across a variety of landscapes, including small single residential properties. The research therefore concludes that within CCT it will be inadequate for biodiversity conservation and the stewardship programme to focus only on commercial farmers, highlighting the importance of engaging with a multitude of landowners, and that small properties with small remnants of natural vegetation, although not ideal can still make a significant contribution towards biodiversity conservation and should not be discarded based on size.

Despite a lack of resources and capacity, the research discovered a well-coordinated well-structured conservation system build around constructive partnerships especially amongst the official conservation organisations. The City of Cape Town's Biodiversity Management Branch was fundamental in consolidating the conservation efforts within the City especially the Stewardship activities through the Bionet Alliance Partnership. This well-functioning partnership is critical for the success of the Stewardship Programme in Cape Town. Reactive stewardship (as explained on pg. 74) is playing an increasingly important role in biodiversity conservation but is problematic due to a lack of prioritisation, limited resources and capacity, and reluctant landowners. These issues need to be addressed as reactive stewardship has the potential to cost effectively play a significant contribution towards biodiversity conservation on private land.

The research concludes that landowners will enter into programmes that are easy to understand, uncomplicated and professionally managed with a proven track record. The programme should therefore have a systems-thinking approach looking beyond the individual components of the conservation process, to understand how the activities are connected and affect each other and considering the economic and associated political and legal systems within which conservation and the stewardship programme operates. Biodiversity stewardship should aim to strike a balance between social science concerned with human welfare and biological science concerned with biodiversity conservation. It is critical to consider a variety of strategies for successful interventions and protected area consolidation. It is essential for the stewardship programme to take a long-term view, as the process is often time consuming and this should be well communicated with potential participants. Stewardship is a commitment to learning, adapting, improving, and ultimately conserving biodiversity.

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Appendices

Appendix A: Section 37C (1) to (7) of the Income Tax Act 58 of 1962

(1) Expenditure actually incurred by a taxpayer to conserve or maintain land is deemed to be expenditure incurred in the production of income and for purposes of a trade carried on by that taxpayer, if—(a) the conservation or maintenance is carried out in terms of a biodiversity management agreement that has a duration of at least five years entered into by the taxpayer in terms of section 44 of the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004); and (b) The land utilised by the taxpayer for the production of income consists of, includes or is in the immediate proximity of the land that is the subject of the agreement contemplated in paragraph (a).

(2)(a) Any deduction of expenditure contemplated in subsection (1) must not be allowed to the extent that the expenditure exceeds the income of the taxpayer derived from trade carried on by the taxpayer on the land in any year of assessment. (b) The amount by which the deduction exceeds the income of the taxpayer so derived must be deemed to be expenditure incurred by the taxpayer in the following year of assessment.

(3) An amount equal to the expenditure actually incurred by a taxpayer to conserve or maintain land owned by the taxpayer is for purposes of section 18A deemed to be a donation by the taxpayer actually paid or transferred during the year to the Government for which a receipt has been issued in terms of section 18A(2), if the conservation or maintenance is carried out in terms of a declaration that has a duration of at least 30 years in terms of section 20, 23 or 28 of the National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003).

(4) If during the current or any previous year of assessment a deduction is or was allowed to the taxpayer in terms of subsection (1) or (3) in respect of expenditure incurred to conserve or maintain land in terms of an agreement or declaration contemplated in those subsections, and the taxpayer subsequently is in breach of that agreement or violates that declaration, an amount equal to the deductions allowed in respect of expenditure incurred within the period of five years preceding the breach or violation must be included in the income of the taxpayer for the current year of assessment.

(5) If— (a) land (or a portion thereof) is declared a national park or nature reserve in terms of an agreement under section 20(3) or 23(3) of the National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003); and (b) the declaration is endorsed on the title deed of the land and has a duration of at least 99 years, an amount equal to ten percent of the lesser of the cost or market value of the land or portion is for purposes of section 18A and paragraph 62 of the Eighth Schedule deemed to be a donation paid or transferred to the Government for which a receipt has been issued in terms of section 18A(2), in the year of assessment in

which the land is so declared and each of the succeeding nine years of assessment. (6) If a taxpayer retains a right of use of land contemplated in subsection (5), the amount deemed to be a donation in terms of that subsection is an amount that bears to the amount determined in terms of that subsection the same ratio as the market value of the land bears to the market value of the land had that land not been subject to the right of use. (7) If during the current or any previous year of assessment a deduction is or was allowed to the taxpayer in terms of subsection (5) in respect of a deemed donation in terms of a declaration contemplated in that subsection, and the taxpayer subsequently violates that declaration, an amount equal to the deduction allowed in respect of the deemed donation within the period of five years preceding the violation must be included in the income of the taxpayer for the current year of assessment.

Appendix B: Section 5.8 of the City of Cape Town's Rates Policy

5.8.1 Private property contracted into the Table Mountain National Park in terms of the National Environmental Management: Protected Areas Act, 57 of 2003 ("Protected Areas Act"), will be granted a 100% rebate of rates for the year in which an agreement is concluded between the owner of the property and SANParks and for each year that the owner foregoes beneficial occupation/use of the land.

5.8.2 Section 17(1) (e) of the MPRA precludes Council from levying rates on those parts of a special nature reserve, national park or nature reserve within the meaning of the Protected Areas Act, or of a national botanical garden within the meaning of the National Environmental Management: Biodiversity Act, 10 of 2004, which are not developed or used for commercial, business, farming or residential purposes. The apportioned value of any portion of such properties utilised for any purpose other than such conservation purposes will be rated accordingly.

5.8.3 Private property exhibiting sensitive ecological areas/features, identified by the City's Environmental Management Resources Department as such, may be granted a 100% rates rebate for that portion of land exhibiting these sensitive features, provided that the land is either leased to the City for nature conservation purposes or there is a written agreement, approved by the City, for the conservation management of the relevant portion of land.

5.8.4 Any rate rebate will only be applicable to conservation agreements where the land is conserved in perpetuity. This would require a voluntary title deed restriction.

5.8.5 Owners of properties over 10 hectares with formal in perpetuity conservation agreements may apply for a rebate on that portion of the remainder of the land used for residential and/or conservation management purposes. This rebate will be equal to the percentage of the land included in the conservation agreement to the total area of the property with a maximum rebate of 90%.

5.8.6 The City's Environmental Management Resources Department will annually inspect every property receiving a rebate in terms of this paragraph 5.8 of the Rates Policy and certify that the conservation agreement is being honoured.

5.8.7 This rebate is as a result of the perpetuity nature of these conservation agreements and the fact that the costs incurred for sound conservation management will always exceed the rebate granted. The land subject to such perpetuity agreements is of immense ecological importance and the securing of these areas is of paramount importance. Private landowners who conserve land through voluntary conservation stewardship ease the burden on the City and other conservation organisations as the land is added to the overall conservation estate but it need not be purchased. In addition, the costly ecological management of these sites, in particular alien and fire management are conducted by the landowner as per an approved Environmental Management Plan. 13

5.8.8 Should privately-owned property receiving the Conservation Land rebate be utilised in a manner that is detrimental to conservation purposes, all rebates granted in terms of paragraphs 5.8.1 to 5.8.7 above during the current and previous GV's will become repayable as provided for in section 17(2)(a) to (c) of the MPRA.

Appendix C: Questionnaire

Personal information:

Age:						
Size of Property(ha)						
Size of remnant (ha)						
Current use of land						
How long has this property been in your family:	Less than 5 years	5 – 10 years	10-20 years	20-50years	50-100 years	Over 100years
Education:						
Primary School	Matric	Diploma	University Degree	Post degree studies		
Religion:						
Do you consider yourself very religious	1	2	3	4	5	
Home language:						

1	2	3	4	5
Strongly disagree				Strongly agree

Knowledge:	1	2	3	4	5
Biodiversity refers to the amount of different plant and animals in a given area					
A plantation (Gum, pine, wattle) has high levels of biodiversity					
I am familiar with the concept of Biodiversity Stewardship					
I am familiar with the stewardship programme					
The indigenous vegetation on my property is very unique					
Are you aware that indigenous vegetation is protected by national law					
Alien plants are a huge threat to biodiversity					
The indigenous vegetation of the Western Cape occur nowhere else in the world					
Fire and the management of Alien plants are the most important tool for the management of the natural vegetation of the Cape					
Natural vegetation infested with alien plants is readily restorable					
Alien vegetation poses a threat to fresh water supplies					
Interest					
Do you belong to any environmental groups/organisations (eg. Friends, EWT, WWF)	yes		no		
Do you recycle	yes		no		
Do you regularly partake in recreational outdoor activities (eg, birding, hunting, fishing, MTB etc.)					
Rate your interest in the natural vegetation of the area					
I enjoy going to the Kruger NP, Kgalagadi etc. (I consider this conservation)					
I enjoy going to the Cederberg, Kogelberg, de Hoop (I consider this conservation)					

I enjoy going to Helderberg NR, Tygerberg NR, BCA (I consider this conservation)					
Financial Benefits of Conservation					
Having natural vegetation on my property increase the financial value of the property					
The conservation of natural vegetation leads to other benefits (eco tourism, functioning ecosystems, ecosystem services)					
The conservation of natural vegetation is not beneficial to my business/activities					
I will conserve natural vegetation if it is economically beneficial to me					
The conservation of natural vegetation is important for current and future generations					
Natural vegetation is useless to me					
Willingness to conserve					
I have other plans for the natural vegetation on this property in the next 5 years					
I will only conserve land that I am not able to use productively					
If I can make money from the land I will not conserve it					
Conservation is the responsibility of the government					
Conservation is a moral obligation					
To your knowledge the incentives offered for conservation is significant					
Perceptions					
Conservation agencies are doing a great job with the resources that are available to them					
Conservationists are just a bunch of bunny hugger vegetarians					
I have been in regular contact with environmental/ conservation agencies	yes		no		
If yes, was this positive					

Conservationists should not tell me what and how to manage my land					
Landowners knows what is best for biodiversity and the land					
I would prefer never to be contacted by a conservation officer					
I would like more interaction with conservation officials					
If so, what do you want from conservation agencies.					

Appendix D: Fine Scale Conservation map (Bionet) for the City of Cape Town

