Privately-owned lands and biodiversity conservation: analysing the role of Private Conservation Areas in the Little Karoo, South Africa

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Abstract

The number of privately-owned parks has dramatically risen in recent decades across the world. Increasingly, these areas are attracting the attention of academia, government and non-governmental organisations because of their potential to combine biodiversity conservation with sustainable development, which is of particular relevance in developing countries. Little comprehensive information on private reserves, however, exists. This thesis investigates the role that private conservation areas fulfil in the Little Karoo region of South Africa, exploring the politico-economic and socio-cultural reality of private reserves, as well as their contribution towards protecting key elements of biodiversity. An interdisciplinary, political ecology-based research framework was adopted, combining questionnaire surveys, GIS-analyses and interviews. Key findings revealed that the private protected area sector is substantially contributing to the representation of key elements of biodiversity patterns and processes in the region. Private reserves show high variability and are closely tied to the changeable circumstances of their owners. However, they are principally used for personal leisure, and further, profit does not constitute a primary driver to their establishment. Rather, complex networks of human and environmental processes interact across different levels of analysis to drive the growth in private reserves. Landowners perceive themselves to fill a legitimate role in the conservation landscape and increasingly demand recognition from conservation authorities. Successful strategies and policies for optimising the valuable contribution that private reserves make to conservation need, first, to be sensitive to both the ecological and social dimensions of conservation areas. Second, they should focus on raising social capital between landowners, and providing recognition for the conservation role they fulfil, through the provision of extension services. Private conservation areas worldwide are likely to continue increasing in years to come; their potential to provide positive and long-lasting contributions to biodiversity protection warrants increasing interest and support from the wider conservation community.

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List of Acronyms and Abbreviations

CAE	Certificate of Adequate Enclosure
CAPE	Cape Action Plan for the Environment
CBD	Convention on Biological Diversity
CNC	Cape Nature Conservation
DEM	Digital Elevation Model
ELK	Eastern Little Karoo
ESA	Endangered Species Act
GIS	Geographical Information Systems
IUCN	World Conservation Union
LK	Little Karoo
NASA	National Aeronautics and Space Administration
NGO	Non-Governmental Organisation
PA	Protected Area
PCA	Private Conservation Area
PE	Political Ecology
PNR	Private Nature Reserve
S. Karoo	Succulent Karoo
SKEP	Succulent Karoo Ecosystem Plan
SPA	Statutory Protected Area
SRTM	Shuttle Radar Topography Mission
STEP	Subtropical Thicket Ecosystem Plan
Thicket	Subtropical Thicket
UN	United Nations
WLK	Western Little Karoo

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CHAPTER ONE

General introduction

1.1 Background and motivation for the research

Traditionally, strategies for the protection of wildlife and plants are envisioned in terms of the systems of protected areas established and maintained by governments worldwide, termed the 'classic' approach to nature conservation (Blaikie & Jeanrenaud 1997). Throughout most of the twentieth century, nature has been considered 'safest' in an area formally declared under legislation and managed by a statutory body (Figgis 2004, Spiteri & Nepal 2005). However, the greatest proportion of biodiversity falls outside the network of statutory parks, lying instead on private, non-urban land (e.g. Knight 1999, Hilty & Merenlender 2003). In 2003, the total extent of protected areas was estimated to occupy roughly 11% of the World's land area (Chape *et al.* 2003). Hence, with nearly 90% of the World's surface lying outside the systems of government-protected areas, it is clear that this conservation tool of the twentieth century is inadequate to compensate for the increasingly dramatic rates of biodiversity loss worldwide (e.g. Pimm *et al.* 1995). Although public protected areas remain a critical component of conservation efforts in general, it is now widely acknowledged that they will not conserve all or even most biodiversity within a region (e.g. Soulé & Sanjayan 1998, Fitzsimons & Wescott 2004: 480, Figgis *et al.* 2005). This recognition has led government, scientific, academic and non-government sectors in the last few decades to turn to exploring alternative conservation tools with which to fight biodiversity loss.

This search for new mechanisms has become a major driver towards conservation on private lands, regarded as a potential alternative to public control (Quintana & Morse 2005). A truly representative regional reserve system has to include the most threatened portions of the landscape, which usually means the most productive and largely privately-owned areas (e.g. Maestas *et al.* 2001, Scott *et al.* 2001). Further, many of the best-preserved and biodiversity-rich areas in general are in private hands (e.g. ELI 2003, Hilty & Merenlender 2003). Privately conserved areas can form important components of broader landscape-conservation approaches, especially in developing countries where there is even less potential for governments to proclaim additional, formally-protected areas, given the economic opportunity costs of putting land under conservation status and the potentially significant negative impacts of this on local people (e.g. Inamdar *et al.* 1999, ELI 2003, Kepe *et al.* 2004, Jones *et al.* 2005, Spiteri & Nepal 2005).

There are three major reasons why conservation on private lands is critical for the conservation of biodiversity and ecosystem functions at all scales:

(i) To enlarge the overall proportion of land dedicated to conservation: the fraction of land protected under state-ownership is limited, and further expansion is constrained by both economic and political factors, e.g. the expense of acquiring new land for conservation.

(ii) To maximise the economic potential of conservation management: there is potential scope for Private Conservation Areas (PCAs) to provide conservation outcomes that benefit both people and nature alike, by acting as cost-effective means of conserving biodiversity (e.g. Kramer *et al.* 2002, Chacon 2004). This potential is of particular importance in developing countries where park authorities are often seriously under-funded (e.g. James *et al.* 1999). Further, in some cases, the most productive use of land is some form of sustainable biodiversity-based business, such as ecotourism or hunting (e.g. Kerley *et al.* 1995, Smith & Wilson 2002, Sims-Castley *et al.* 2005), ventures which the private sector can often run more efficiently than the public sector (e.g. Kramer *et al.* 2002).

(iii) To provide corridors and networks in the wider landscape matrix that will allow movement of species, and aid the occurrence of large-scale processes (e.g. Chacon 2004).

These three reasons thus make PCA conservation an important research issue within the society-environment nexus of conservation, particularly in the more biodiversity-rich, less developed countries.

Biodiversity conservation on private lands is a relatively new phenomenon and there remain many gaps in knowledge about the private protected areas system, such as their distribution, their representation of habitats and species, their property and management regimes, as well as the drivers behind the growth of this new sector, and its effects. The degree of protection afforded to private nature reserves varies widely, from none to very high; so too does the degree of permanence of protection vary widely (e.g. Mitchell

2005). Many private reserves are entirely dependent on the changing circumstances and attitudes of their owners. This variability, and the independence of non-statutory reserves, has for a long time kept privately-conserved land out of conservation statistics, out of national conservation-planning frameworks, and indeed, until recently, generally out of the academic research focus (chapter 2).

However, recent decades have witnessed a dramatic increase in the number of private landholders protecting biodiversity on their properties, land purchase for the creation of private nature reserves, and conservation management agreements with indigenous landowners (e.g. Bowers 1999, Thackway & Olsson 1999, Stephens 2001, Doremus 2003, Figgis 2004, Bernstein & Mitchell 2005, Chacon 2005, Rafa 2005). Specifically, PCAs autonomously established by private individuals or corporations have dramatically increased in number, size and geographic reach in recent decades (e.g. Langholz 2002, Mitchell 2005, Sims-Castley *et al.* 2005). This change in land-use trends has drawn the attention of scientists, policy-makers and protected-area managers worldwide, and the conservation sector is rapidly adjusting to this reality, recognising that PCAs are likely to become increasingly important. The current extent of conservation initiatives on private lands requires involvement from decision-makers to ensure wise resource use and to strategically plan around future constraints. The rise of privately protected areas needs to be understood by all role players in order to facilitate the sustainable development and growth of this trend. Information gaps need to be filled in order to appropriately integrate private lands into national reserve systems and global conservation strategies, and act to harness more private initiatives. These actions are especially important in countries where conservation by private practitioners is a relatively common occurrence, such as is the case for South Africa, where private conservation ventures range from game farms to major game reserves bordering national parks (e.g. Beinart & Coates 1995, Adams 2004; chapter 2).

1.1.1 Choice of study site

South Africa provides a highly relevant base for studying private protected areas, for a number of reasons, not least the high level of global biodiversity present in the region (e.g. Sandwith 2002, Wynberg 2002) and particularly the tensions between livelihood of local inhabitants and the need for conservation (e.g. Kepe *et al.* 2004, Crane 2006). While the phenomenon of private conservation is set to increase globally in coming years, this increase is especially important in the context of a country with high inequality in land ownership and heavy pressure over land. Further, approximately 80% of the country's most scarce and threatened natural habitats is privately owned by the agricultural community (Botha 2001). There is therefore a growing national realisation that the future conservation or destruction of threatened ecosystems lies predominantly in the hands of private landholders (Winter 2003, Winter *et al.* 2007), in common with this recognition worldwide (section 1.1).

1.2 Research aim and objectives

Quantitative and qualitative data on private conservation land-use trends are limited. The rapid increase in PCAs worldwide in recent decades raises two questions: (i) what politico-economic and socio-cultural forces are behind this growth, and (ii) what are the potential consequences of such growth for biodiversity conservation? In order to address these questions, the overall aim of this thesis is to gain a deeper understanding of the complex forces driving the establishment and management of PCAs within politico-economic and socio-cultural landscapes, and of the potential impact that such forces have for multiple aspects of biodiversity conservation. This thesis will therefore present the results of research designed to fill numerous gaps in knowledge regarding the implications of private conservation for landscape management, biodiversity conservation and conservation planning and policies. Research focused on the Little Karoo region of South Africa as a particular case study. In this thesis private conservation is defined as the efforts by private practitioners (e.g. non-governmental organisations (NGOs), research centres, companies, corporations, individuals) to preserve the land and its biodiversity values. Though many different kinds of private protected areas exist, from the extremely formal to the informal, from those owned by NGOs to those owned by farmers or community groups, etc. (Langholz 2002; chapter 2), this thesis focuses on areas owned and protected by individuals or private companies, with (at most) limited institutional recognition (the definition of a PCA adopted for the purposes of this research will be presented in chapter 3).

1.2.1 Research objectives and targeted outcomes

In order to address the aims of the research, the specific objectives of this study employ the Little Karoo as a case study to:

1. Investigate the potential importance of PCAs for biodiversity conservation in terms of their spatial configuration and biodiversity composition;
2. Evaluate the composition of the PCA sector in terms of ownership, land-use activities, finance, management goals and strategies;
3. Explore and understand the motivations and drivers behind the establishment and management of PCAs;
4. Explore and understand the nature of the conservation values and management science of different PCA landowners, as well as their preferred incentives and relationship with conservation authorities in the region.

Based on these specific objectives, the project will then:

5. Integrate findings from objectives 1-4 to provide input to help design more effective conservation-planning strategies, and more appropriate conservation policies and incentive measures;
6. Integrate findings from objectives 1-4 to generate outcomes that inform wider debates and understandings about the nature, appropriateness and effectiveness of the emerging role of the private sector in biodiversity conservation.

The rationale behind the objectives will be discussed in chapter 2. This thesis will thus integrate both natural and social science approaches and methods in its investigation of the human-environment issues in private lands conservation. The outcomes are expected to contribute to real-world conservation applications by (i) assisting realistic decisions about how best to make use of the increasing presence of the PCA sector, allowing improved coordination between public and private conservation efforts, and (ii) providing direct suggestions for more effective conservation policies and conservation planning strategies.

1.3 Thesis Structure

Scientific assessments of biodiversity need to be contextualised within broader perspectives, and therefore interdisciplinary research is essential for careful analysis of the mode of operation of PCAs. This thesis represents an interdisciplinary investigation of private conservation in the Little Karoo, within a broad framework of political ecology, although a range of different disciplines (and research tools) are drawn on, including geography, social science, natural and environmental sciences. This study therefore takes a route between natural and social research, often advocated (e.g. Batterbury *et al.* 1997, Turner 2002a, Balmford & Cowling 2006) yet not frequently realised. This chapter has presented an introduction to the topic of private conservation areas, and has outlined the background to the research. Chapter 2 first reviews the literature on political ecology, paying particular attention to its treatment of the fields of biodiversity conservation and protected area management, and identifying gaps within its current research mandates. Second, it reviews the topic of private lands conservation, situating it within the broad context of biodiversity conservation and narrowing down to focus on South Africa, detailing the particular history and issues surrounding private conservation within the country. Finally, the chapter demonstrates how private lands conservation (in particular private protected areas) constitutes a suitable topic for investigation using a political ecology approach. Key research issues, which will be returned to throughout the thesis, are presented. Chapter 3 introduces the social and environmental characteristics of the Little Karoo study site, scaling down to provide information on the vegetation of the region. Thereafter, it outlines and provides a justification for the three-phase research design adopted, as well as detailing the fieldwork and desk methods and analyses used within each particular research phase. Issues of positionality and ethics are additionally considered.

In order to achieve objective 1, chapter 4 uses a natural science assessment to establish the relative contribution of the private protected area network, compared to the statutory network, to biodiversity conservation in the Little Karoo. The assessment is conducted in terms of examining the extent, reservation bias and representation of vegetation types and biodiversity processes of the two different systems of protected areas. Thereafter, chapter 4 addresses objective 2 by providing a broad, comprehensive overview of the sectoral characteristics of PCAs. Further, initial insight into the motivations of landowners and their preferred incentives is provided. The chapter reveals the presence of a developing PCA niche in the Little Karoo that appears to be significantly complementing the action of statutory protected areas in the region. It thus brings together social and ecological characteristics of private reserves to provide a detailed, comprehensive picture of their role in conservation, establishing with precision 'what' are the private conservation areas that form the focus of this thesis. This kind of analysis is especially useful to address criticisms that political ecology research lacks proper engagement with ecological science.

Debates within political ecology are particularly useful for understanding the new forms of politics that surround the creation, maintenance and management of PCAs. Chapter 5 thus addresses objective 3, integrating social, political, economic and environmental aspects of private conservation by analysing the drivers behind land-use change in the Little Karoo, to understand how conservation has become a dominant activity over space and time in the region. Multiple scales of analysis are taken into consideration, tracing the roots of the PCA phenomenon between global, national and local-scale processes and factors. The analysis is sensitive to the roles of both structure and agency, and to the complex interrelationships between the human and environmental dimensions. Chapter 2 flags up the insistence of political ecology on a conventional number of areas of investigation; the analysis undertaken in chapter 5 provides an example of the benefit of expanding the focus of political ecology to cover new aspects of its traditional topics of inquiry. The chapter thus determines the 'why' of private conservation areas, i.e. the mechanisms by which the dramatic phenomenon of private conservation has come to develop in a particular landscape. Chapter 6 covers the 'how' of PCAs, i.e. the beliefs, knowledge and practices of landowners regarding nature, conservation, their role in the landscape and that of others (thus addressing objective 4). Following the post-structural turn in political ecology, the focus is on the understandings of PCA actors. Effectively understanding the management of a landscape requires analysis at a number of different scales. Recognition of the effect of wider political, economic and social processes on the local scale, and of the inter-connections between scales, is covered in chapter 5. Chapter 6 concentrates instead on the local-level, to analyse in depth the manner in which the behaviour and perceptions of local agents modify the landscape and the expression of conservation within it. In private conservation, it is critical that landholder attitudes are adequately understood because their attitudes can either provide important opportunities or constraints for implementing conservation efforts.

Political ecology offers an excellent research framework with which to integrate social and natural issues, and the case-study of private conservation areas provides an excellent example of the advantages of doing so, through the specific case of conservation planning examined in Chapter 7. Chapter 7 thus contributes to objective 5 by exploring the real-world usefulness of systematic conservation planning as an approach for selecting land for inclusion in a conservation plan. For all its popularity, systematic conservation planning does not engage non-equilibrium ecosystem theories, nor generally consider the interaction of the environmental and human dimensions of ecosystems. These oversights are likely to greatly complicate implementation. The chapter, drawing on results of previous chapters to make its case, introduces and discusses a new methodology for expanding the current remit of systematic conservation planning to include social and non-equilibrial elements of ecosystems. In Chapter 8 objective 5 is additionally covered through consideration of the broader implications of the research outcomes, including the implications for the design of more appropriate private lands conservation policies and strategies, both for the Little Karoo and more generally worldwide. Chapter 8 also contributes to objective 4 by examining the preferred incentive strategies of landowners. In this chapter, the exploration of policy implications of private conservation territories demonstrates a direct engagement of political ecology with policy. The thesis concludes, in Chapter 9, by synthesising the overall research outcomes and presenting avenues for further research based on the outcomes of this study, thus addressing objective 6.

CHAPTER TWO

Literature review: approaching the study of private conservation areas with political ecology

2.1 Chapter introduction, aims and definitions

In the last four decades, statutory conservation areas have undergone a major expansion worldwide, and are estimated to have increased more than ten-fold in area (e.g. Chape *et al.* 2003). The research field of political ecology is developing a variety of interdisciplinary perspectives to offer fresh insights into this global expansion (Zimmerer 2006). These novel perspectives could also usefully be applied to investigating one of the latest trends in the conservation arena: the dramatic growth in privately conserved lands (chapter 1). Political ecologists have held a long interest in conservation issues (see for example the discussion of Robbins 2004); however, no efforts have been made to shown how private conservation is written into the landscape and how it alters local environments, communities and ecologies. Political ecology (PE) scholarship has so far overlooked the crucial complexities and opportunities in the private protected area sector, a research field that is still in large part unexplored even by the more 'traditional' conservation sciences (chapter 1).

The aim of this chapter is to provide, first, a review of past and current trends in political ecology research, especially as it applies to the fields of biodiversity conservation and protected areas. The strengths and weaknesses of the research field, and its applicability to the current research, are discussed. The appropriateness of employing political ecology to deal with the objectives of this thesis is further discussed in terms of its need to expand its current research remit beyond its traditional themes (within the subject of conservation). Second, it traces the origins of the phenomenon of private conservation, and summarises existing knowledge with regards to privately protected areas, focusing especially on southern Africa. The need for scholarship to tackle rigorously the topic of privately conserved lands, and the future directions for this task, are highlighted. The literature review concludes by examining the implications of private conservation areas in relation to concepts of political ecology research. Throughout the thesis, the terms 'park', 'reserve', 'protected area' and 'conservation area' are used to refer to protected areas in general: areas where land use is restricted mostly to wildlife and the preservation of 'natural' existing habitat.

2.2 Political Ecology

2.2.1 Introduction: the definition of political ecology, and its historical development

The first use of the term 'political ecology' is usually attributed to Wolf (1972), who called for a need to "combine our enquiries into multiple local ecological contexts with greater knowledge of social and political history, the study of inter-group relations in wider structural fields" (Wolf 1972: 204-5). Blaikie & Brookfield (1987: 17) state that "the phrase 'political ecology' combines the concerns of ecology and a broadly defined political economy". Essentially, political ecologists seek to improve understanding of human-environment relationships by insisting on the links between ecological change and political (as well as social and cultural) processes (Nightingale 2003). Research in the field attempts to link understandings of local-level (micro-) processes with broader structural, political and ideological processes (Scoones 1999).

The field has its origins in critiques of ecological anthropology and cultural ecology in the 1970s and '80s (Brown 1998), when research linking environmental change to political and economic marginalisation first emerged. Hence, the engagement of PE with the concepts of political economy (e.g. Robbins 2004): in the 1980s, political ecologists were influenced by the political-economic literature in general, and Marxist thought in particular (e.g. Bryant 1998). Political and environmental explanations thus centre on who controls resources and how the rules and conditions of production and exchange are set in political struggle. However, this political economy is defined very broadly to encompass a range of fields in which power is exerted, whether it is control of labour, land or ideas. To an extent, the roots of political ecology lie in an effort to move beyond the perceived limitations of cultural ecology (the study of the dynamic interactions between human societies within their ecosystems: culture is viewed as the primary mechanism by which human societies adapt to their environment), which was criticised for considering only the local scale and treating it as a closed system. Early political ecologists called for more attention to how local human ecologies were embedded in a set of wider political-economic processes that greatly influenced local outcomes (e.g. Blaikie 1985, Blaikie & Brookfield 1987, Peet & Watts 1996, Zimmerer 1996).

For example, a landmark study by Hecht & Cockburn (1989) linked the causal factors of rapid deforestation in Eastern Amazonia with large-scale political and economic forces. Factors such as rents and subsidies generated by the Brazilian junta and successive democratic governments created conditions of high profitability that influenced various social forces acting on the environment, including ranchers, peasants, workers and transnational companies. Such politico-economic influences motivated forest clearance for the creation of pasture for cattle ranching that was both economically inefficient and environmentally destructive. This example highlights the value of examining political economic relations and systems in the study of environmental change: in this manner, political ecologists can bring into the analysis social relations and causes that are not necessarily proximal to ecological symptoms, and which might otherwise have been ignored (Paulson *et al.* 2003).

From its early engagement with political economy, PE research has taken a turn over the past 15 years or so towards post-structural, post-colonial and postmodern perspectives, concerned with the 'deconstruction' of concepts of nature (e.g. Robbins 2004). Under the post-structural influence, political ecologists assume that environments and landscapes are socially mediated, symbolic constructs (e.g. Blaikie 1995, 1996, Escobar 1998). Although this conception does not deny nature in itself, it does emphasise a 'nature-as-experience', nature filtered through human expectations and ideas of what is appropriate, right, and wrong (Rikoon 2006). Human beings thus provide meaning to nature, and this meaning changes constantly to reflect a variety of factors, such as the different values placed on specific aspects of nature, or variable statutory policies with regards to management of the environment (Rikoon 2006). To understand these constructions of nature it therefore becomes necessary to examine systems of cultural knowledge (e.g. Fairhead & Leach 1994, Cronon 1996a,b, Neumann 1997).

It is apparent that, rather than referring to a unitary body of theory, political ecology covers a wide spectrum of research efforts (e.g. Brown & Purcell 2005), and because the field is so vast, definitions abound. PE may be viewed as "an academic sub-discipline, as an undisciplined `toolkit' of methods and theories, or as an explicitly normative approach to recurrent questions in the nature-society tradition" (McCarthy 2005: 953). Nevertheless, studies from a PE perspective generally share a number of common elements. First, research in the field presents its accounts, such as the failure of state conservation models, as explicit alternatives to apolitical perspectives of ecology. The most common 'apolitical' (in terms of presenting themselves as such, rather than being inherently apolitical) approaches to environmental explanation are (i) 'ecoscarcity', which places increasing human population growth and limits to environmental resources as the basis of social/ecological crises, and (ii) 'modernisation', which argues that ecological problems are the result of inadequate adoption/implementation of 'modern' economic techniques of management, use and conservation, such as market systems (Robbins 2004).

Second, PE works from a common set of assumptions: the most basic premise is that environmental change and conditions are the products of political process (Bryant & Bailey 1997). This idea rests on three linked assumptions: that costs and benefits associated with environmental change are distributed among actors unequally; that this reinforces or reduces existing social and economic inequalities; and that this holds political implications in terms of the altered power relations between actors (Bryant & Bailey 1997: 28-29). Third, PE research forces certain central questions (e.g. what causes regional forest loss) to be asked in a particular fashion, employing a reasonably consistent mode of explanation in answering them. The explanation process involves examining the influence of variables acting at a number of scales, from the local outwards to the regional, national and global; this explicit attention to scalar influences distinguishes PE research (e.g. Vayda 1983, Blaikie & Brookfield 1987). Political ecology is also capable of looking at networks and connections that operate outside of these conventional scales (Robbins 2004).

In sum, political ecology, at a general level, describes empirical, research-based investigations to explain linkages in the condition and change of social/environmental systems, with explicit consideration of relations of power. The field is characterised by a wide range of research themes, but all depend on defining, identifying, and measuring ecologies and environments (Robbins 2004). Research, therefore, either determines the material condition of the environment (e.g. soil conditions, land-cover types, groundwater levels) or its imaginary status (e.g. perceptions, ideas, or concern about the state of nature), or both. In broadest terms PE has so far had as its main aim the exposure of flaws in dominant, state, corporate and international approaches to the environment; it has addressed the undesirable impacts of policies and market conditions, especially on 'local' people and marginal/vulnerable groups; it has shown social and environmental conditions to be outcomes of power and politics and not inevitable. It is a research approach characterised by great diversity and yet grouped around a few key areas of inquiry (e.g. Bryant 1992, Robbins 2004): (i) the contextual sources of environmental change, and the effects of social/ecological change on 'local' people and practices; (ii) conflict over access to resources; (iii) the political ramifications of environmental change; and (iv) the control of the landscape in the name of 'conservation', and its effects on 'local' people and practices.

2.2.2 Political ecology as a research approach: potential and pitfalls

Compared to other, dominant, approaches to the study of environmental relations and conflicts, political ecology can provide additional (even superior) insights into such topics because it asks different questions and maintains different normative commitments. The difference between PE and more traditional ways of viewing environmental issues lies in a difference between political and apolitical ecology, between searching for broader causes of explanation rather than limiting oneself to proximate and local causes, and between taking an explicitly normative rather than supposedly 'objective' approach (Robbins 2004). Dominant approaches to the study of environmental relations and conflicts, especially in many industrialised countries, often appeal to formal legal structures, rational choice models or environmental science (McCarthy 2005). Many analyses proceed from the premise that there are definite, knowable answers to the questions posed, and that finding those answers does not necessarily require talking to the people whose actions are in question (McCarthy 2005). Further, the dominant narratives of ecological crisis and change (ecoscarcity and modernisation) tend to ignore the significant influence of political economic forces, whilst PE is more explicit in its normative goals and about the assumptions from which research is conducted.

Political ecology assumes a much more complex terrain of relations and conflicts. At more 'local' scales, it assumes that informal property relations, micro-politics, attachments to particular livelihoods, unjust exclusions from protected natural areas and many such factors are likely to be central to the dynamics of human-environment relations (e.g. Bryant 1992, Broad & Cavanagh 1993, Kothari *et al.* 1995). Such factors are usually difficult to model, and are best investigated through intensive qualitative research. PE is further characterised by a wider-ranging consideration of cause and effect than many competing approaches, going beyond regional or national boundaries to the structural contexts and transnational interests, networks, and discourses that shape many 'local' cases (e.g. Robbins 2002). Hence, by gathering more and different data, it is possible to move towards a more comprehensive understanding of particular cases. PE analyses can cross scale and consider global institutions as easily as individual farmers, as well as bring a problem orientation that is immediate, practical, and designed to show flaws and propose alternatives to existing policy measures (Robbins 2004).

Political ecology has however been subject to numerous criticisms over the years. Peet & Watts (1996) suggested that PE research lacked a clear and coherent theory to account for environmental change, not concerned enough with the relative and constructed nature of environmental dynamics. By contrast, Vayda & Walters (1999) criticised the field for being too 'political', arguing that PE research had moved too far from apolitical human ecologies, leading to a situation where political economic forces are always considered to determine ecological outcomes. To solve the apparent conundrum, Robbins (2004) argues that political ecology research has highlighted the occurrence of key patterns and forces, which together form a "coherent, if somewhat eclectic, theory of political ecology" (Robbins 2004: 206), even though most political ecologists will refrain from predicting a single set of structural forces under which environmental change must happen. Indeed, various research (e.g. Naveh 1995, Nightingale 2003, Walker *et al.* 2003, Seabrook *et al.* 2006) has shown that complex networks of factors and events organise over time to produce new environments, rebutting Vayda & Walter's (1999) claims that political ecology insists on attributing special causal significance to political events, to the detriment of other factors, especially without due regard to environmental events or changes.

There is no universally agreed-upon answer to the questions of what PE is and what it does. As the field has grown, it has expanded in so many directions simultaneously that advocates and critics alike have questioned whether political ecology retains any coherence at all (Walker 2006: 391). However, the size of the field makes it a discipline that is enormously vibrant and replete with intellectual drive, and therefore able to provide numerous and unique contributions to understanding the very real environmental problems that in many cases threaten both people and ecosystems (Forsyth 2003). Some of the greatest contributions to knowledge in political ecology derive from the success of the field in combining the strengths of social and natural sciences (Walker 2005). Hence, one of the greatest strengths of PE is that it is ideally placed to conduct interdisciplinary research (e.g. Batterbury *et al.* 1997, Scoones 1999) and to investigate human-environment relations, the study of which is increasingly ascendant in contemporary geography (Turner 2002a). Research needs to mix qualitative and quantitative, social and natural data in order to appreciate and distinguish between the biophysical reality of environmental processes, and the constructed nature of environmental change.

One of the recurrent criticisms of the discipline is whether it has become "politics without ecology" (Bassett & Zimmerer 2004: 103), a censure initiated by Vayda & Walters (1999). A recent review by Walker (2005) shows that such a conclusion is premature, with much political ecology research still engaging with biophysical ecology, although the direction the field is taking (towards greater engagement with the social sciences, Bassett & Zimmerer 2004) makes its future engagement with ecology questionable. However, the research carried out in this thesis is very much in the tradition of political ecology insofar as ecological issues remain key to the research project. It consists of political ecology that cannot be accused of failing to engage with the environmental sciences.

Finally, there are also concerns (e.g. Walker 2006) that the field is marginalised in terms of its recognition outside academic geography, through its inability to contribute to policy and to provide solutions to environmental problems, in part because of the decreasing emphasis in political ecology on the interface between the social and natural sciences. Once again, the present research explicitly addresses this question by offering an approach with which to integrate social and natural issues in the specific case of conservation planning (chapter 7) and discussing the policy implications of private conservation areas, both specifically for the study site and more generally (chapter 8). To conclude, explicit adoption of a PE framework situates this conservation research in a tradition where both environmental and social issues are central, and connects it with an excellent set of tools to identify, investigate and theorise such factors. However, as will be made apparent in subsequent sections, there is a need within PE to investigate new groups and themes of research; for these reasons, this study turns to analysing the hitherto unexplored phenomenon of private conservation.

2.2.3 Biodiversity conservation and conservation territories from a political ecology perspective

The control of the landscape in the name of conservation, and its effects on 'local' people, has been one of the main areas of inquiry in political ecology (Robbins 2004). This line of research assumes that control of resources and landscapes has been wrested away from local producers or producer groups, through the implementation of conservation efforts by official and global interests seeking to conserve the 'environment' (e.g. Ghimire 1994, Neumann 1997, 1998, 2001). Related work in the field has shown that local production practices have been characterised as unsustainable by state authorities or other players in the struggle to control resources (e.g. Neumann 1998, Bryant 2000). This argument is premised upon four basic theoretical foundations: first, that conservation reflects a form of 'hegemonic governmentality'. Following Bryant (2002), the term 'governmentality' defines a condition where consent of the governed is obtained through social technologies (e.g. conservation reserves) and rules are self-imposed by individuals through methods of social institutions; these define what people can do (the rules), what goals and behaviours are socially desirable (norms and expectations) and what ecological outcomes are appropriate (aesthetics and ethics). The second basic theoretical premise is that traditional resource management strategies constitute institutional systems (e.g. Bryant 1992, Nightingale 2003); the third, that 'wilderness' is a social construct, specifically taking the form of nature without people (e.g. Cronon 1995, Neumann 1996, Adams 2003). Finally, that conservation territories (where bounded and regular polygons) are ecologically and socially problematic, achieving neither the goals of conservation or development. As bounded and regular parcels of the landscape, protected areas are unsuited for dealing with an unstable, unpredictable natural world, characterised by fluxes in both time and space (e.g. Zimmerer 2000, Naughton-Treves 2002).

Critics of 'conservation territories', the "human-designated spaces of nature protection and resource management that are a cornerstone of globalisation-related changes in this arena" (Daniels & Bassett 2002, Neumann 2004, Zimmerer 2006: 65), view them as new forms of controlling space and its local inhabitants, with political ecologists the defenders of traditional spaces and uses of the landscape. In this field of research, conservation programmes are not examined for what they may accomplish for protecting ecosystems and species, but to see which human groups suffer and which benefit (Clapp 2004). A well-known example of this type of research is offered by Neumann (1998) with his detailed examination of the loss of traditional rights (and the criminalisation of traditional land uses) resulting from the establishment of some African parks. Another common critique is levelled at the concept of 'wilderness', with political ecologists insisting on viewing 'wilderness' as little more than a myth, and a misplaced attempt to wipe people out of the scenery in search of a human-free, 'natural' environment (e.g. Cronon 1995). In this field of research, attempts by conservationists to preserve what is left of pristine nature are read as attempts to remove people from the landscape for what is essentially a 'flawed' vision of nature, that views nature as separate from humans, when in reality humans have influenced and been a part of most ecosystems (e.g. Neumann 1998).

The research outlined above, insisting as it does on the degree to which conservation objectives have historically and are currently being poorly realised, inevitably can contribute to making political ecologists lose sight of the principal reason for which conservation areas are established. Political ecology has therefore almost entirely neglected examination of what protected areas may actually accomplish for the preservation of ecosystems and biodiversity, leaving this topic to the province of natural scientists. However, as Clapp (2004: 840) argues, conservation territories can and do represent justifiable attempts to restrict the impact of large-scale and significantly damaging human disturbance, such as industrial resource extraction. Protected areas free from significant loss of ecosystem function act as benchmarks for vital ecological processes (e.g. Arcese & Sinclair 1997, Dearden 1997); benchmark reserve areas separate biodiversity elements from interventions that may threaten them (Margules & Pressey 2000); they represent insurance against unexpected consequences of industrial resource use (e.g. Leopold 1953, Wood 2000), and ultimately, emergency reserves of resource materials (Clapp 2004); finally, from the point of view of metapopulation theory, they can provide essential population sources (e.g. Woodroffe & Ginsburg 1998), as well as an essential mechanism for regional adaptation to environmental change, such as global warming. Although conservation areas may only provide a temporary solution for environmental problems, they potentially allow human stewards to develop the greater adaptability required by non-equilibrium ecology (Noss 2001).

Additionally, political ecologists ought not concentrate on a conception of 'wilderness' areas as bounded spaces for nature: in this manner, a false dichotomy of 'natural' wilderness areas vs. remaining 'unnatural' landscapes is set up and entrenched. Insistence on the view of wilderness areas as wildlife preserves (whether by their advocates or their critics) only serves to perpetuate the connotations of stasis associated with them. Wilderness areas, and conservation territories more generally, should be viewed as dynamic biodiversity reservoirs, a function possible to them because they are usually the least accessible and last industrialized regions of the world, at least as far as the global economy is concerned (Clapp 2004). Wilderness and wilderness designations are compatible with a "co-evolutionary model of humans-in-nature" (Clapp 2004: 844), and nature itself is due an ethical regard, with the right of not having the current extinction crisis categorised as simply another environmental narrative (Clapp 2004). The 'success' of protected areas as a safety measure against the unprecedented scale of industrial disturbance, and the intricacies of this role, are therefore long overdue as subjects of inquiry by political ecologists.

Further, it is noteworthy that the dramatic increase in privately-owned conservation areas, and the questions that this increase raises (section 2.3) has also been entirely overlooked. Command-and-control and colonial legacies of development, backed by environmental 'crisis' narratives, clearly persist in contemporary conservation, leading to both inequity and failure of conservation goals (e.g. Brockington & Schmidt-Soltau 2004, Robbins 2004). However, it is recognised that these arguments often neglect crucial complexities and opportunities nested within conservation efforts (Robbins 2004); yet, where recognition of internal divisions and contradictions has occurred, these have been limited to examining the complex internal divisions of conservation agencies (e.g. Sivaramakrishnan 1996, 2000). Political ecology has not considered the opportunities nested within conservation efforts carried out by private actors and/or institutions, as opposed to those carried out by state or NGO institutions.

2.2.4 Beyond the mainstream agendas of political ecology in conservation research

Current trends in political ecology (e.g. McCarthy 2002, 2005, Walker 2003, Robbins 2006), call into question a series of dualisms present in geography, including: rural/urban, capitalist/non-capitalist, and First/Third World. There are reasons for adoption of these categories: drawing parallels between, for example, conflicts over resource use in rural Africa and rural Europe would risk obscuring the vast differences between the communities in those places (such as in wealth and so forth). However, analytical assumptions, research methods and normative commitments follow from such dualisms, such that many political ecologists would argue that by definition, political ecology should study the Third World (Bryant & Bailey 1997). Inevitably, this leaves many gaps in the study of environmental issues, such as conservation efforts, that can instead be profitably addressed by political ecology. For example, much attention is given to 'local' claimants excluded from protected natural areas (McCarthy 2005), yet the strongest claims to a landscape would belong to many of the thousands of species constituting the regional ecosystem, were longevity at the root of being 'local' (Clapp 2004). Similarly, non-traditional, affluent, and/or capitalist communities and groups, and regional, national and international claims also have a stake, and the ethical priority or order of these interests is not as obvious as political ecologists would have believed.

New developments in the field, such as 'First World' political ecology, demonstrate that it is possible to go beyond accepted dualisms and accepted places in the study of political ecology's central issues. 'First World' political ecologists call for the extension of research to 'Northern' and 'developed world' contexts, seeking to extend the critical investigation of conservation politics from traditional concerns in rural Africa, South Asia, and Latin America to areas in the US, UK, and Europe (e.g. McCarthy 1998, 2002, St. Martin 2001, Schroeder *et al.* 2006). For example, St. Martin (2005) aims to overcome accepted conceptualisations of fisheries management, under which 'capitalist' fisheries of the 'First World' require fully privatised property rights, whereas 'artisanal' fisheries of the 'Third World' operate under communal and other 'alternative' property regimes. St. Martin thus identifies overlooked non-capitalist relations of property and production in industrialised country fisheries. Such work is critical in its empiric demonstration of what can be learnt by recognising and researching relations typically not assumed to exist in industrialised countries. However, despite the insistence of First World political ecology on going global to explore new settings for research, what has been lacking is a comparable focus on new groups and themes of research. Research in First World political ecology (e.g. Emery & Pierce 2005, St. Martin 2005, Rikoon 2006, Robbins 2006) treats a range of issues that are very familiar to readers of Third World political ecology, insisting on manufacturing continuities across geographical boundaries. In this way, the very real opportunity to raise new and distinctive theoretical and empirical issues for exploration is missed, and it is somewhat unlikely that by following this approach "political ecologists will continue to mine First World case materials for rich new insights that are likely to shape the field in profound ways for years to come", as Schroeder *et al.* (2006: 167) contend.

Robbins (2004) goes part of the way towards highlighting this deficiency with his calls for new groups and themes of research. In particular, he argues that the analysis of systems of ecological production should be extended to all kinds of players and actors, treating them all as producers. In his view, though, this implies investigating settings such as soil science laboratories, ministry offices, forestry departments and so forth. Dove (1994) and Robbins (2000a) have both made the point that research had ignored 'oppressor' state agencies and civil servants responsible for enacting resource use and management programmes, in favour of studying members of the 'oppressed' producer communities (peasants, farmers, herders, etc.).

This call for new groups of research only captures part of the gap within political ecology's current research mandate, however. It expands the focus from 'local', 'indigenous' and 'marginalised' communities but only as far as the 'official' parties traditionally seen as working against them, thereby insisting on a dualism between 'oppressed' and 'oppressor' producer groups. Many more parties and groups are, however, involved in the production, control and contestation of landscapes and environments. In similar vein, it is possible to go beyond re-articulation of the same questions in different, yet still taken-for-granted, spaces and places, taking the opportunity to create new issues for study (i.e. not just new 'places'). The recent calls to turn the research focus of political ecology away from its long-held disciplinary habits of investigating the struggle of producer communities and traditional knowledges in 'far away' places have missed the opportunity to concomitantly shift its focus away from these traditional issues of inquiry. For example, most PE research tends to focus on the forces that lead to the destruction of equitable and sustainable socio-ecological outcomes, concentrating on processes of marginalisation and degradation, unsuccessful conservation efforts, and divided ecological politics (e.g. Nightingale 2003, Robbins 2004, West *et al.* 2006, Reed 2007). Even where human-environment issues have been examined more strictly in terms of biodiversity conservation and protected area management, political ecology has remained firmly fixed on issues of access and control to natural resources, the Third World, and more recently, to post-structural examinations of the meanings of conservation, biodiversity and so forth (e.g. Herrold-Menzies 2006, West *et al.* 2006, Zimmerer 2006).

In fact, there are three issues pertinent to the discussion at hand that are still seen as among those central to the 'third wave' of conservation (Zimmerer 2006); the 'third wave' refers to the shift to sustainability as one of the defining goals of conservation worldwide, and emerged in the late 1980s and early 1990s (Zimmerer 2006). The first is that of conservation territories, which are still reduced to mere spatial categorisation efforts on behalf of the 'global' environmental sciences, thus ignoring consideration of their actual roles as protected areas, as discussed in section 2.2.3. Furthermore, the increase in protected areas worldwide is viewed in terms of an extension of existing types of conservation territories, and as the 'rapid evolution' of novel management spaces (Zimmerer 2006). Yet, the novel management spaces taken into account consist of territories such as community conservation areas, watershed-based projects, and buffer zones of biosphere reserves (e.g. Wells & Brandon 1993, Brown 2002, Daniels & Bassett 2002, Zimmerer 2006). Consideration of various models of private-land conservation has been ignored by political ecologists. The second issue is concerned with the trend towards decentralisation of governance of conservation territories towards the local level, towards 'local' communities, municipalities, and conservation units (e.g. Myers 2002, Ribot & Larson 2005). The idea of devolvement of control over conservation territories implies that all such spaces arise as a result of global forces, and thus overlooks instances in which control of the landscape in the name of conservation arises independently, and on behalf of actors that are neither allied to 'official' interests to preserve the environment, nor are representative of 'marginalised', 'indigenous' communities. Political ecologists, cultural ecologists and related researchers see the global conservation expansion as dependent on the active role of national governments (in direct contrast to evidence discussed in section 2.3 below).

The third issue is that research is still principally concerned with scrutinising how the continued establishment of new conservation territories is incorporated into the lives of 'marginal', 'indigenous' people living in and around them, and contested due to disagreements over the location, extent and management of these areas (e.g. Peluso 1993, Neumann 1998, 2004, Escobar 1999, Turner 1999, 2004, Hodgson & Schroeder 2002, Paulson & Gezon 2004). What is necessary, however, is a wider examination of what a 'local' community group consists of, how strongly rights are linked to place, and whose rights are affected by conservation territories (Clapp 2004). Not all communities are coherent, united, or strongly attached to place (Bradshaw 2003). Neither are all 'local' communities involved in conservation territories made up of 'traditional' and 'indigenous' peoples. Further, non-human elements of conservation ecology are sometimes lost in conservation and control research. Political ecology in this area proceeds from an anthropocentric perspective and underplays the role of animals, plants and soil in delimiting and directing conservation histories, although these players can produce profound effects on the ecology of a system (e.g. Crosby 1986, Robbins 2001). All of the research foci outlined above can only provide a biased vision of processes and outcomes of conservation efforts. In general, greater attention to the political ecology of success stories has been called for (Robbins 2004). Research in the field tends to reveal winners and losers, hidden costs, and the differential power that produces social and environmental outcomes; social and environmental change is explored with the assumption that there are likely better, less coercive, less exploitative and more sustainable ways of doing things (Robbins 2004). Such insistence, however, misses the opportunity to reveal diversity, complexity and difference, and to celebrate local agency in many conservation settings. In treating conservation territories, PE has given no consideration to the manner in which both human and environmental changes can combine to lead to outcomes that benefit both people (for example, where power is held by local agents in the landscape who voluntarily move towards forms of conservation territories) and nature (such as the increase in the proportion of degraded land placed under conservation status).

2.2.5 Summary: future directions in the treatment of conservation territories by political ecology

There is little in the broad themes of the treatment of conservation areas by PE that is unique to 'traditional', 'indigenous' or 'marginalised' communities, as First World PE has demonstrated, in similar fashion, in its treatment of different-yet-similar 'places' of research. Nor is the exercise of conservation and the formulation and expression of its narratives limited to either state, NGO, global or official actors. Political ecology could therefore both contribute to, and benefit from, research on environmental processes, relations and conflicts among non-traditional (e.g. 'affluent', 'capitalist') communities, both within industrialised and non-industrialised countries, including cases centred on private conservation areas (as is the case for the current research). Political ecologists have neglected to consider the opportunities nested within conservation efforts carried out by private actors and/or institutions, as opposed to those carried out by state or NGO institutions. Political ecology analyses have, so far, failed to theorise the mechanisms and conditions under which conservation arises as a voluntary, non-institutional and agent-led presence in the landscape. Without such theorisation and relative studies, political ecology cannot demonstrate how relations of production, politics and economics also lead to environmental conservation rather than degradation of the landscape. As Robbins (2004) suggests, PE can provide a means of moving away from a view of the environment just in terms of the destruction of nature or the social construction of environments. Similarly, PE has therefore neglected examination of what protected areas may actually accomplish for the preservation of ecosystems and biodiversity, leaving this topic to the domain of inquiry of natural scientists. This thesis therefore adopts a political ecology framework in its examination of the role and characteristics of private protected areas and landowners.

2.3 Private conservation territories

2.3.1 Introduction: situating the importance of private lands within the global context of biodiversity conservation

Since about the mid-1980s, biodiversity protection has become an important goal for societies across the globe; concurrently, it has become the topic of several, often bitter, arguments (Doremus 2003). On the one hand, government agencies responsible for biodiversity conservation in the developing world hold large land assets, expensive to maintain but in some cases able to create the majority of their earned revenues through tourism; on the other hand, the actual and perceived costs of Protected Areas (PAs) have resulted in their almost universal unpopularity with local people (e.g. Inamdar *et al.* 1999). Further, a high percentage of parks in the tropics are under-protected 'paper parks', that exist only as lines drawn on maps (e.g. Brandon *et al.* 1998, Hockings *et al.* 2000). Even if public parks were well protected, they still leave almost 90% of the World's land area and most of its biodiversity unprotected (Chape *et al.* 2003).

In explicit recognition of the limitations of the PA approach to conservation, the Convention on Biological Diversity (CBD) was presented in 1992 at the Earth Summit in Rio de Janeiro, Brazil (Inamdar *et al.* 1999). The CBD has three objectives: the conservation of biodiversity, the sustainable use of natural resources, and the equitable sharing of benefits that arise from activities such as bioprospecting or ecotourism (CBD 1992). This shift in conservation goals has led to the development of various initiatives, such as Community-Based Conservation and Integrated Community and Development Projects (e.g. Inamdar *et al.* 1999). However, these activities are expensive, their conservation benefits are ambiguous, and they have little prospect of generating income to cover their costs (e.g. Ferraro 2001). The result has been more or less uniform: statutory and non-governmental conservation agencies throughout the developing world remain financially strained (e.g. James *et al.* 1999), and current approaches to biodiversity protection are less successful than was originally hoped (Langholz *et al.* 2000a), as realisation has set in that the global coverage of protected areas will not prove nearly enough to conserve all or most biodiversity within a region (see chapter 1).

Concomitantly to the CBD, The United Nations Conference on Environment and Development of 1992, held in Rio de Janeiro, resulted in the development of an action plan for the 1990s and the 21st century, commonly known as Agenda 21 (UNCED 1992). This action plan is a collection of global programmes formulated around achieving the goal of international sustainable development. In addressing the issues identified in Agenda 21, a shift in focus from public to private land has been prevalent (e.g. Duhme *et al.* 1997, Smith & Wilson 2002). This change in perspective has more recently been re-emphasised during the Vth Worlds Parks Congress of 2003, held in Durban, South Africa, which resulted in the creation of the Private Protected Area Action Plan (section 2.3.3). The shift towards private lands follows the reasoning that public land, such as national protected areas, only partially contributes to achieving realistic targets for the conservation and sustainable development of ecosystems (chapter 1). Some experts (e.g. Shaffer & Stein 2001, Parkhurst *et al.* 2002) estimate that 15-30% of the land in each ecoregion will need to be specially managed for conservation in order to effectively protect biodiversity. Inevitably, a substantial proportion of that land will have to come from the private sector. In the United States, for example, although the federal government owns nearly one-third of the land area, more than 90% of species listed as endangered or threatened have at least some part of their habitat on private lands, and about two-thirds of those species depend upon private lands for the majority of their habitat (e.g. Knight 1999, Groves *et al.* 2000).

A further dimension to the management of protected areas has been added with the rise of the neo-liberal economic wave of the eighties following the Washington Consensus (Gore 2000, Quintana & Morse 2005). This offered new solutions for the conservation of natural resources to society, especially as the costs of conservation are high for governments, who often perceive there to be little tangible compensation for their efforts (Quintana & Morse 2005). Free-market approaches to conservation include the creation of markets for genetic resources and ecological products, the promotion of land trusts and conservation easements, and the establishment of private protected areas, which have been increasingly discussed, globally, since the early nineties (Koziell & Swingland 2002).

In conclusion, there is a sea change in how conservation is financed and implemented all over the world. Decades ago, conservation was exclusively a public-sector responsibility. However, it is now clear that the conservation tools of the twentieth century, particularly legislated public national parks, while critically important, are inadequate to meet the scale of the biodiversity protection challenge (Figgis 2004: 1, Figgis *et al.* 2005). Increasingly, in a trend that has been gathering momentum for several decades, the private sector has been playing a larger role, in financing, in management, and even in land acquisition. Every indication is that this trend will continue to gather strength into the future. Although its ultimate development is uncertain, "it is enormously encouraging that the private sector is taking the initiative where governments are lagging behind or defaulting on their responsibilities to the future" (Van Schaik *et al.* 2002: 475-476).

2.3.2 Some models of conservation on private lands

Conservation on private lands represents an essential and expanding complement to public conservation efforts (e.g. Thackway & Olsson 1999, Langholz *et al.* 2000b) because these lands can protect corridors, buffer zones and in-holdings, areas which are often underrepresented in public park systems. They can also often support valuable ecosystem processes. However, biodiversity protection on privately-owned lands has sometimes been especially problematic, because conservation requirements can interfere with the economic productivity of land or conflict with an established way of life, thus arousing opposition (e.g. Polarsky & Doremus 1998, Doremus 2003, Tikka & Kauppi 2003, Langpap & Wu 2004). Conservationists need to increasingly explore strategies that integrate ecological protection with economic development (Knight 1999, Norton 2000), or consider instances where conservation on private lands arises as a voluntary, agent-led event.

Conservation on private lands is increasing worldwide, and several programmes for private lands exist. For example, within Australia, the number and variety of private conservation mechanisms, and the number of properties involved, has risen dramatically in all jurisdictions in the last decade (Figgis 2003, 2004, Figgis *et al.* 2005). The US offers numerous examples of private lands conservation (e.g. Merenlender *et al.* 2004, Shafer 2004, Bernstein & Mitchell 2005). Regulatory approaches were initially favoured because they allowed scientific targeting of habitat and had low budgetary costs (Michael 2003). In the US, for example, the Endangered Species Act (ESA) of 1973 exemplifies the private lands-public good challenge (Shogren *et al.* 2003). The ESA protects species on public and private lands, but has lost popularity as economists and others have illustrated that regulations have high and inequitable costs, and are frequently ineffective at habitat preservation (Michael 2003).

Today, policymakers in various countries often address the issue by offering up voluntary incentive programmes to landowners to increase the occurrence of private species protection and biodiversity conservation (e.g. Shogren *et al.* 2003). Mechanisms include conservation easements, tradable development rights, leases, habitat banking, habitat conservation planning, safe harbours, candidate conservation agreements, and the 'no surprises' policy (e.g. Innes *et al.* 1998, Parkhurst *et al.* 2002, Smith & Shogren 2002, Doremus 2003). The idea is to transform an environmental liability into a marketable asset (Shogren *et al.* 2003). In a world influenced by market economies and where state budgets for conservation efforts remain strained (e.g. Inamdar *et al.* 1999, James *et al.* 1999), incentive-based conservation is likely to continue increasing in importance (Langholz *et al.* 2000a); however, it is a relatively new approach, and Ferraro & Kramer (1997) note that there are few good examples from the field of the successful use of incentives. Nor has the economics literature clearly discussed when a particular incentive policy is most effective (Michael 2003).

2.3.3 Private conservation areas

An increasingly significant component of private conservation efforts, and hence another tool for biodiversity conservation, is provided by the growth of non-statutory protected areas created by private practitioners (e.g. Thackway & Olsson 1999, Figgis *et al.* 2005). Though private PAs are believed to have existed in various forms for centuries (Langholz 2002), the first scholarly reference to them occurred in 1962, when the First World Congress on National Parks acknowledged the contribution that many privately-owned nature reserves make to the conservation of wildlife and natural resources (Adams 1962: 379). However, there still remains very little systematic information on the number or location of private parks. The most recent UN list of the world's protected areas, for example, includes some privately-owned parks (where these are considered to meet the IUCN protected-area definition), but notes that "many sites are undoubtedly missing from this classification" (Chape *et al.* 2003: 19).

Efforts to conserve nature through private reserves are gaining momentum in many countries, as was predicted over a decade ago by the 1993 UN list of protected areas, particularly for tropical countries where state resources are very limited (WCMC 1994). In Africa, for example, the developing markets for wildlife, wildlife products and nature tourism have prompted widespread creation of nature reserves and game ranches (e.g. Jones *et al.* 2005; refer to section 2.3.4 for discussion on South Africa). Research in Costa Rica (Langholz *et al.* 2000a,b, Langholz 2002, Chacon 2005) has revealed the existence of numerous private reserves of varying types and sizes, suggesting a sizeable private nature reserve niche in the country. Across Central America over 350,000 ha of land are captured by private protected areas (Chacon 2005). In a celebrated South American example, a rich American acquired 289,000 ha of forests near Puerto Montt, Chile, to create the Pumalin Natural Reserve (e.g. Dourojeanni 2002, The Conservation Land Trust 2007). Currently, there are some 500,000 ha of strictly protected areas in Brazil under the regime of private natural reserves (Dourojeanni 2002, Rambaldi *et al.* 2005).

Private conservation is not limited to the developing countries, either: in Australia, for example, private reserves are increasingly established by a range of organisations such as the Australian Bush Heritage Fund, the Australian Koala Fund, the Wildlife Land Trust, Earth Sanctuaries and others (Bennett 1995, Figgis 2004, Figgis *et al.* 2005), as well as by a number of individual landowners (Figgis 2004, Figgis *et al.* 2005). In the UK, the National Trust and the Royal Society for the Protection of Birds have extensive networks of protected areas (e.g. Alexander 1995, Hawes 1995). In the US, the Nature Conservancy has a system of more than 1,300 reserves, ranging in size from 1.3 to 130,000 hectares, protecting well over half-a-million hectares and 1,725 rare species and communities (Murray 1995 cited in Langholz & Lassoie 2001a). To conclude, "in much of the world, private reserve systems are growing, and growing fast" (Mitchell 2005: 4).

It is apparent from the discussion above that the label of private protected area can be applied to a wide and diverse range of private territory types (e.g. Langholz & Lassoie 2001a). Private conservation can take place in either privately or publicly-owned lands, in the second case normally under agreement with the related government units. The former case represents instead what are commonly thought of as private protected areas, for which numerous definitions exist. For example, the 2003 IUCN World Parks Congress defined them as "a land parcel of any size that is 1) predominantly managed for biodiversity conservation; 2) protected with or without formal government recognition; and 3) is owned or otherwise secured by individuals, communities, corporations or non-governmental organisations" (IUCN 2005: 275). However, the latter four kinds of governance are not as distinct as the simple listing implies, and are further very different from one another. This thesis considers community conservation to differ from (and therefore not fall under the label of) private conservation. Additionally, though many examples of private protected areas are represented by NGO-owned areas (e.g. Chacon 2004), this thesis focuses on individual- (or small company-) owned territories, of which less is known (section 2.3.5). Chapter 3 covers the definition of a private conservation area for the purposes of this thesis.

The same three broad factors that are shifting attention from conservation on public to private land in general (section 2.3.1) are likely to be driving the growth in private reserves. These are, first, government inability to fulfil biodiversity conservation goals. For example, public parks have proved inadequate in terms of quantity and quality of protection, especially in the tropics (e.g. Brandon *et al.* 1998). Second, the rising societal interest in biodiversity conservation, as exemplified by the CBD. Growing interest in private reserves in particular was epitomised by the creation of the Private Protected Area Action Plan at the Vth Worlds Parks Congress of 2003 (Langholz &

Krug 2004, IUCN 2005). This was rapidly followed by a United Nations Programme of Work on Protected Areas (United Nations 2004), which included specific measures to improve and expand private protected areas. In line with the rise of free-market approaches to conservation, the third probable factor behind the growth of private reserves is the development of ecotourism. Supporters of various different models of PAs argue that they have economic rationale through the development of ecotourism (e.g. Duffy 2006), and its role in the growth of private conservation efforts has been discussed (e.g. Langholz & Brandon 2001).

2.3.4 Private conservation within South Africa

Conservation areas in southern Africa developed during the colonial era, in response to the realisation that over-hunting, rinderpest and tsetse-fly-control methods were resulting in the loss of animal species (Anderson & Grove 1987); the focus was the preservation of large animal species (Pringle 1982) without much importance attributed to preservation of the flora or ecosystems, or to social issues (Rebelo 1997). The reserves thus established at the end of the nineteenth century were located in marginal areas, thought to be unsuitable for agriculture and mining (Rebelo 1997). During the twentieth century, ecosystem-level approaches began to influence conservation action. The requirement to adequately represent all ecosystems, species and processes led to the realisation that areas outside of the formal conservation estate would also need to be managed for conservation.

The Republic of South Africa has seen, in particular, extensive attempts to combine biodiversity protection with financial profit on areas outside of legislated parks. The shift in land use from pastoralism to game farming has been identified since the 1980s as a fast-growing trend in the country (e.g. Grossman *et al.* 1999, Jolliffe 2001 cited in Smith & Wilson 2002). The availability of land, and the presence of diverse and readily observable wildlife, have led South Africans to establish about 5,000 game ranches and more than 4,000 mixed game and livestock farms in South Africa. These game/livestock farms cover some 13% of the country's total land area, against 6% for all officially declared conservation areas (e.g. Wells 1997, Hearne & Mackenzie 2000, ABSA 2003). During the past 30 years, the wildlife industry in South Africa has developed into a multi-million Rand industry (Van der Waal & Dekker 2000) and has become a major earner of foreign currency with positive benefits for employment creation, eco-tourism and biodiversity (Eloff 1996, Van der Waal & Dekker 2000, Sims-Castley *et al.* 2005). The country has proved to be a key area for the rise of private conservation initiatives, not only in the form of game ranches, but also in the form of private nature reserves (e.g. Sims-Castley *et al.* 2005).

These land-use changes are by no means unique to South Africa, however, but are more generally representative of the Southern African context (e.g. Jones *et al.* 2005). Indeed, numerous interesting parallels can be drawn with the case of Zimbabwe, documented in some detail by Wolmer (2005). In the Zimbabwe lowveld (a geographical and botanical descriptor for pasture land of south-eastern Zimbabwe), the manufacturing and marketing of wilderness has been particularly evident on private game ranches and conservancies (amalgamations of privately-owned ranches, see chapter 3), where former cattle ranchers have gone to new lengths in the creation of a wilderness spectacle. The large-scale move by former cattle ranchers into game ranching (whether 'pure' or mixed with cattle), mirrored in South Africa, contains an inherently political subtext: that of the dispute over appropriate land use, and ways of seeing the landscape. Due to a number of factors (e.g. the development of safari hunting, the decentralisation of authority over wildlife to landowners, the relative decline in beef prices) the fortunes of the emergent game industry rose from the 1970s onwards, changing the attitudes of many ranchers, who now perceived wildlife as an economic asset. Indeed, in a similar fashion to South Africa, by 1994 wildlife ranching was one of the fastest growing land uses in Zimbabwe, with 21% of white commercial farms under some sort of wildlife utilisation (Hill 1994). Cattle ranching, previously the officially recommended land use in the lowveld, is now being cast as ecologically destructive in this 'fragile' environment. The same process is occurring in the Little Karoo region of South Africa, with livestock farming held responsible for 'abuse' and degradation of the land (chapter 5).

Although the motives and conservation track record of private game ranches and reserves are sometimes questioned, their contribution towards wildlife conservation in South Africa has been acknowledged (e.g. Wells 1997, Kramer *et al.* 2002, Jones *et al.* 2005, Sims-Castley *et al.* 2005). South African park officials, for example, have removed the fences once separating Kruger National Park from Ngala and other private reserves, thus expanding the effective size of Kruger and simultaneously augmenting the tourism value of Ngala's 14,000 ha private reserve, and others (Kramer *et al.* 2002).

In the Kwa-Zulu Natal province, the shift in land use from marginal agriculture to game-based ventures (game viewing or hunting) is reported to be resulting in net biodiversity gains: an additional 10% of the surface area has been converted to pure wildlife management (Hughes 2002: 77). Wildlife utilisation on private land "has the potential to contribute significantly to the conservation of biodiversity from the broad ecosystem and landscape level down to the genetic level" (Goodman *et al.* 2002: 27). The private sector can further bring increased success, compared to the public sector, to providing the marketing and operational expertise necessary to compete in the highly competitive international nature tourism industry (Kramer *et al.* 2002: 335).

However, the contribution of game-based ventures to biodiversity conservation and development will depend on a number of factors, such as: the geographical position of the land, the position of the property in relation to formal protected areas, the size of the property, the management philosophy and the quality of management (Goodman *et al.* 2002: 27). Another pertinent example, reported in Privett *et al.* (2002), is offered by the case of Grootbos Nature Reserve (South Africa), which invested heavily by devoting large amounts of capital to developing sound environmental practices, conservation commitment and involvement of the local communities. Consequently, the Grootbos tourism initiative has resulted in the conservation of 1,050 ha of previously threatened habitat, with a concomitant increase in its conservation profile and in its influence on conservation in the surrounding area. Additional benefits have included: the creation of employment and training opportunities, increased environmental awareness among local and foreign visitors, increased visitation to the area and hence increased business opportunities for a variety of secondary businesses and other nature-based tourism operators.

Although these approaches have advantages in theory, it is important to consider under what conditions they may actually result in improved conservation of biodiversity. The process of developing our understanding of these conditions ultimately requires various research efforts to analyse many different examples of private-sector conservation, for comparative purposes: this thesis therefore contributes to that process (section 2.4).

2.3.5 Potential and future directions of Private Conservation Areas

Comprehensive information on privately-owned nature reserves is still lacking, despite their increasing presence throughout the world and initial efforts to research them (e.g. Langholz *et al.* 2000a,b, Chacon 2005, Figgis *et al.* 2005, Jones *et al.* 2005, Sims-Castley *et al.* 2005). There have been a few case studies of specific aspects of determined reserves (e.g. Horwich 1990, Alyward *et al.* 1996, Wearing & Larsen 1996, Castley-Sims *et al.* 2005), and a few attempts to conduct large-scale overviews to reveal private parks' activities, problems, economics, and other attributes (e.g. Alderman 1994, Langholz 1996, 2002, Mesquita 1999, Langholz *et al.* 2000b, Chacon 2005). With few exceptions, no systematic attention has been given to the role private reserves play in promoting international conservation. The few studies performed imply that private reserves are a flexible and substantial complement to the conservation strategies of national governments, suggesting that private parks number in the thousands, protect several million hectares of biologically important habitat, and have demonstrated a willingness and capacity to conserve (e.g. Alderman 1994, Langholz 1996, Wearing & Larsen 1996, Richardson 1998, Langholz *et al.* 2000b, Langholz 2002, Powell *et al.* 2002, Jones *et al.* 2005, Rambaldi *et al.* 2005, Sims-Castley *et al.* 2005). Further, park owners have been shown to place an especially high 'bequest value' on their reserve, an important non-market value (Langholz 2000b). It would appear that private reserves operate to a high degree of independence, neither expecting nor receiving much government support, providing public goods in conserving biodiversity and natural resources at comparatively low cost to society (e.g. Langholz 1996, Tikka 2003, Mitchell 2005).

Private conservation areas vary greatly in terms of their management objectives and activities, and the levels and types of protection they confer (IUCN 2005). However, as mentioned in section 2.3.3, although many public parks are managed by private organisations, truly private nature reserves are owned completely by nongovernmental entities, and many are protected informally, with no legal sanctioning or other involvement by the state (Langholz *et al.* 2000a, Chacon 2004, 2005). They are a form of voluntary conservation strategy, which as discussed above, are thought to have the significant advantage of increased political and social acceptability when compared to public protected areas (Parkhurst *et al.* 2002, Chacon 2004). The importance of private conservation values in minimising the cost of protection has been recognised, and conservation-oriented landowners are the greatest asset to protecting nature on private lands (Michael 2003). Policies/strategies for nature conservation need to maximise the value of this scarce resource.

Policies for conserving private lands need to take ecological, economic and social dimensions of protection into account. Hence, comparative studies need to evaluate the relative effectiveness of different conservation strategies along all of these three dimensions (e.g. Tikka 2003). However, despite their increase, private parks remain mostly a mystery, from many aspects, such as their conservation 'value', their origins, characteristics, the motivations of their landowners or their future directions. Given the limited public resources available for conservation and the growing interest in private sector initiatives, it is important that a systematic examination of this conservation phenomenon begin. This study contributes to that process, examining each aspect of PCAs highlighted above. Thus far, the private reserve literature has relied primarily upon individual case studies and international surveys. The former have been too specific, and the latter too broad, to provide a detailed assessment of the role of private reserves in a national conservation strategy. Rather, of key importance are region- and country-level assessments, such as the one undertaken in this thesis, analysing their overall conservation niche. In other words, studies combining breadth and depth, as well as the natural and social dimensions of private conservation. Langholz (2002) has attempted to characterise the conservation role played by private nature reserves in Costa Rica, answering several key questions (for example, the number and type of reserves in the country, the amount of land they protect, the activities taking place within them, their ownership characteristics, etc.). However, as far as the ecological aspect is concerned, what is lacking is direct and quantitative assessment, employing natural science methodologies, of their potential to contribute to biodiversity conservation. Such an assessment has instead been undertaken in this study (chapter 4), with the regional scale of investigation adopted complementing the resolution of the ecological data employed.

Systematic examination of private reserves will increase understanding of their attributes and of their potential contribution to national conservation strategies. The number of private parks continues to grow, mostly independently of the conservation community. The challenge for academia and practitioners alike is to engage this trend and help direct its growth in a way that satisfies both ecological and social outcomes in the long run. More careful analysis is needed to identify the conditions under which private conservation areas evolve and under which they can most effectively contribute to conservation. A crucial step in developing a conceptual framework for the private reserve niche involves determining these conditions by indicating specific assumptions that can be tested and developed into general and yet nontrivial guiding principles. Research needs to examine real-world cases of PCAs and develop a comprehensive set of assumptions or hypotheses that can be tested in different scenarios and contexts.

2.4 Conclusion: approaching the study of Private Conservation Areas with political ecology

Given limited public resources available for conservation (e.g. Inamdar *et al.* 1999, James *et al.* 1999), and growing interest in private sector initiatives (e.g. Langholz *et al.* 2000b, Tikka & Kauppi 2003), it is imperative that we explore key ecological, social and policy issues surrounding PCAs. There is an urgent need to examine the opportunity provided by private lands for significant expansion of the World's system of protected natural areas. PCAs are a conservation tool that warrants greater attention, and possibly support, as a model of sustainable development and conservation (e.g. Langholz 1996, Figgis 2004). However, any system of protected areas needs to be suitably designed and adequately implemented if it is to contribute to meeting national and international biodiversity conservation objectives. Hence, the design of PCA systems warrants detailed scrutiny to assess its conservation 'performance'; successful design entails issues such as adequate representation of habitats and the ecological processes that maintain them, viable populations of all native species, and connections to other protected areas (e.g. Noss & Cooperrider 1994, Powell *et al.* 2002).

In terms of the social and policy issues surrounding PCAs, political ecology is an especially useful framework for examining the complex politics surrounding private conservation strategies. An important and defining characteristics of conservation is the large number of stakeholders with diverse interests willing and able to involve themselves in decision-making by setting and negotiating the goals of conservation (Robertson & Hull 2001). Changing political and economic conditions alter the decision-making context in which landowners operate, by setting the terms for their use of the environment (Robbins 2004). Work adopting a political ecology approach is premised on the assumption that explaining social/ecological processes and change requires attention to political economy, broadly defined (Robbins 2004). Political ecology research into the concepts of biodiversity conservation and protected area establishment and management in the developing world (e.g. Brown 1998, Neumann 1998, Bryant 2000) has been highly influential in challenging the view that conservation is a non-political activity. However, such research has so far focused on state-owned protected areas, on official and/or NGO actions in relation to these, and on impacts on adjacent local communities (e.g. Bryant 2000, Robbins 2004). Consequently, the complex divisions and contradictions within the conservation sector itself have been overlooked (Robbins 2004). In particular, PCA conservation, and the crucial complexities and opportunities within the sector, has remained largely unexplored. In treating conservation territories, political ecology has thus given no consideration to the manner in which both human and environmental changes can combine to lead to outcomes that benefit both people (for example, where power is held by local agents in the landscape who voluntarily move towards forms of conservation territories, cf. chapter 5) and nature alike (such as the increase of private land placed under conservation status, cf. chapter 4). This is the case not only within political ecology, but within the broader conservation literature as well (e.g. Langholz 2002).

The importance of interdisciplinary research for understanding how particular land management regimes take form over time and space through the intersection of a variety of scale-, place- and time-dependent factors (society, culture and ecology), and the implications of their dominance, has been stressed (e.g. Nightingale 2003). Within this thesis, the arguments will be derived through the investigation of the example of PCA conservation, as it is expected to offer a rich insight into the interactions between the political economy of land use and the ecological effects (conservation outcomes) of natural resource management. The manner in which this thesis will use a broad political ecology framework to address the aims and components of research in an interdisciplinary, multi-scale manner is presented in the following chapter.

CHAPTER THREE

Methodology

3.1 Introduction and chapter aims

The nature of this research is problem-centred and interdisciplinary (chapter 1). For these reasons, this study employs a multi-strategy research design that involves collecting data iteratively to best understand the research problem. Research methods are mixed and result in the collection and analysis of data that are both qualitative and quantitative, and relate to both the natural and social environments. Hence, the outcomes of the project are expected both to promote wider understandings of human-environment issues in PCA conservation, and to result in real-word conservation applications. The aim of this chapter is first to provide details of the Little Karoo study site and vegetation, to provide background for understanding the results, in particular the natural science analyses. Second, to present the research methodology adopted within the project, making reference both to the overall research design and to the specific methodologies employed in each stage of research. The chapter ends with a consideration of the positionality and ethical issues of research, before presenting a brief overall summary of the research methods.

3.2 Study site

In recent years several internationally-funded bioregional programmes have been initiated to conserve the major ecological processes of the Cape Floristic Region, South Africa, within which the Little Karoo is situated, and prevent further loss of biodiversity. The Succulent Karoo Ecosystem Plan (SKEP) was launched in 2002, resulting in the identification of the Little Karoo (LK) as one of nine geographic priority areas in the Succulent Karoo biome (Driver *et al.* 2003, Frazee *et al.* 2003). The LK planning domain of this project (section 3.6.1.1) contains the full extent of the central Little Karoo priority area identified by SKEP (Lombard & Wolf 2004; Figure 3.1). This area is a global biodiversity hotspot (Driver *et al.* 2003), defined as an area extraordinarily rich in biodiversity that contains more than 0.5% of the World's endemic plants and has more than

70% of its original areas transformed (Myers *et al.* 2000). The Cape Action Plan for the Environment (CAPE), launched in 1998, further emphasised the need to establish a Gouritz-Little Karoo Mega Reserve as one of three priority mega-reserves (Cowling *et al.* 1999). The Subtropical Thicket Ecosystem Plan (STEP) reinforced this conclusion (Cowling *et al.* 2003, Cupido 2005). The ultimate aim of these projects is the development and use of a strategic and flexible conservation plan for the protection of globally important biodiversity within the vegetation biomes of the planning domains. Central to attaining these conservation goals is an understanding of current land-use trends and landowner characteristics and motivations within the various biomes, and hence within the Little Karoo as well. The floristic importance of the Little Karoo, and the recent trend towards conservation land uses in the region (see below), make the area an especially suitable site for the study of private conservation initiatives and hence justify its choice for the purposes of this project.

Geographically, the Little Karoo (Western Cape, South Africa) is a narrow tableland, which lies roughly between 33° 15′ S and 34° 00′ S and between 20° 30′ E and 23° 40′ E. The region is separated from the Coastal Belt by the Langeberg and Outeniqua mountains, which forms its southern boundary and is separated from the Great Karoo by the Swartberg mountain range, which forms its northern boundary. The region is under the jurisdiction of the Eden District Municipality, which controls the local Kannaland and Oudtshoorn municipalities. The region consists of valleys, up to 50 km wide and 200 km in length, between 400 and 600 m above sea level (Watkeys 1999). These typical valleys are characteristic of the Touw-Ladismith and Olifants River-Gamka regions with hills in between varying in slope from 6 to 18%. In the regions that border the mountain ranges the topography varies from 650 to 900 m above sea level in the Kammanassie, Bo-Langkloof and Kango regions, to as high as 1,200 m in the Uniondale region (Cupido 2005). The Little Karoo is bisected in a North-South direction by the Gouritz River drainage basin and is thus conventionally subdivided into Western Little Karoo (WLK) and Eastern Little Karoo (ELK) on either side of the river catchment area (Figure 3.1; e.g. Lombard & Wolf 2004).

With the exception of the Kango, Bo-Langkloof and Kammanasie agricultural regions, the Little Karoo region is an arid to semi-arid area (following the UNEP (1992) classification of drylands, which are areas susceptible to experiencing full desert conditions if mismanaged, and defined on climatic principles using an aridity index). With the seasonal rainfall fluctuating within the region (Venter *et al.* 1986, Hoffman & Cowling 1987, Cupido 2005), occasional droughts are common. Mean annual rainfall decreases as one moves towards the west of the region, as suggested by Venter *et al.* (1986). Rainfall seasonality also changes across the east-west gradient, from summer-rainfall (from early November) in the east, to cyclonic winter-rainfall (from May to September) in the western side of the region (Hoffman 1996, Van Wyk & Smith 2001). The annual rainfall varies from as low as 125 - 300 mm to as high as 400 mm according to Van Wyk & Smith (2001), but can be higher than 500 mm closer to the northern and southern boundaries. The rain-shadow effects of the mountain ranges forming the southerly boundaries, which diminish the ability of cold fronts to bring more rain from the south, mainly cause the predominant arid conditions within the region (Cupido 2005).

Understanding the socio-economic context in a biodiversity hotspot is important for identifying the root causes of biodiversity loss and for developing effective conservation strategies. It is commonly accepted that a significant vegetation change has occurred on the southern African continent since it was colonised by Europeans and that large areas of rangelands have become less productive than they were in the past (e.g. Dean & Macdonald 1994, Dean *et al.* 1995). Although much of Southern Africa is too arid for intensive transformation (Shulze 1997), many arid systems have been subject to extensive alteration (Rebelo 1997), such as the Succulent Karoo biome (Milton *et al.* 1997; refer to Appendix A: The vegetation of the Little Karoo). In the Karoo environments generally, changes in land-use practices over time reveal a shift from hunter-gatherer economies to localised nomadic pastoralism and finally, from the 1730s, to the present, prevalent small-stock industry (based on sedentary agricultural practices of white, large-scale commercial farmers) (Hoffman 1997, Hoffman *et al.* 1999, Archer 2004, Cupido 2005, Thompson *et al.* in review). Settled farming practices were initially confined to areas centred on perennial springs (van der Merwe 1938). However modern technologies, in particular the drilling of boreholes in the late 19th century, allowed farmers to establish in previously inhospitable areas (Talbot 1961).

The first written records of the degradation of the Karoo environment date from this time (e.g. Shaw 1875 cited in Hoffman 1997). Even with the presence of perennial water sources provided by boreholes, the extremely arid summers make much of the Succulent Karoo unsuitable for settled pastoralism: between 1800 and 1980, stocking rates for domestic livestock declined further in the Succulent Karoo than in any other arid or semi-arid region of South Africa (Dean & MacDonald 1994, Milton *et al.* 1997). This dramatic drop in stocking rates is taken to provide evidence for the degradation of the Karoo environment (Dean & MacDonald 1994, Dean *et al.* 1995) though the debate regarding vegetation change of the Karoo has shifted to consideration of the relative roles of stocking practices and variable precipitation on quality of the veld (a Southern African word meaning 'pasture' e.g. Wolmer 2005) (e.g. Milton & Hoffmann 1994, Hoffmann *et al.* 1999, Archer 2004). However, it is widely accepted that the long-term productivity of virtually the entire Karoo region has been substantially reduced due to overgrazing (Pelser & Kherehloa 2000, Hoffman & Ashwell 2001; cf. chapter 5), and a recent study has provided evidence that stocking strategies are important in vegetation-cover change, once rainfall variability has been accounted for (Archer 2004). Milton & Dean (1995) consider as possible motivations for the overexploitation of the natural vegetation the overestimation of carrying capacity, and market forces: in the past the state provided interest-free loans for land acquisition and subsidies for supplementary feeds, boreholes, fencing, labour and stock. These financial aid schemes discriminated against conservation farmers and worked to the advantage of those farmers who overstocked (Du Toit *et al.* 1991).

Because the soils of the Little Succulent Karoo biome (section 3.2.1) are generally deep and fertile, where irrigation is possible (especially near water sources such as rivers and wetter mountains) most of the vegetation of the lowlands has been cleared for cropping; grapes, lucerne and grains (wheat and oats, the latter as summer fodder for ostriches) are the main agricultural crops (Hoffman 1996). Although the Little Karoo is at the heart of the ostrich industry, small stock and cattle are also farmed. The impact of ostriches on lowland vegetation has been severe (Beinart 2003), due to the artificially high numbers sustained by summer feeding (Hoffman 1996). In the Kannaland region of the LK tourism and agriculture are the main sources of income, whilst the economy of the Oudtshoorn Municipal region depends almost entirely on the ostrich industry (Cupido 2005). Overall, then, the Little Karoo economy is largely dependent on tourism and agriculture (which are estimated to account for

90% of the gross geographical product of the region, R. Cowling 2005, pers. comm., 2 Aug), therefore the sustainable utilisation of the natural resources is of utmost importance.

Most of the Little Karoo is subjected to severe overgrazing (Lombard & Wolf 2004), and the magisterial commercial farming districts of Oudtshoorn and Calitzdorp are considered the most transformed areas in the Western Cape (Hoffman & Ashwell 2001, DEADP 2004). The extensive levels of habitat transformation in the Little Karoo are confirmed by recently-developed transformation maps for the region (Thompson *et al.* in review; section 3.6.1.2). Overall, the conservation status of the Little Karoo is poor, a situation compounded by the fact that most reserves are on higher lands, surrounding the Fynbos and Renosterveld vegetation types (Hoffman 1996). However, the trend away from conventional livestock production and ostrich farming towards game production, ecotourism and conservation in the Little Karoo is increasingly recognised (e.g. Cowling *et al.* 2003a, Cupido 2005; R. Cowling 2005, pers. comm., 15 Jun; J. Vlok 2005, pers. comm., 10 Jun; chapters 4 and 5), especially in the western half of the region (R. Cowling 2005, pers. comm., 15 Jun). This trend mirrors the recent increases in game and ecotourism activities for the Karoo biome at large (Hoffman *et al.* 1999, Archer 2004). Up to the present day the majority of agricultural land is still in the hands of white commercial farmers (Cupido 2005) or PCA owners (chapters 4 and 5).

3.2.1 Vegetation of the Little Karoo: overview

The geographical and rainfall variability makes the Little Karoo a unique landscape in South Africa because four of the seven biomes as described by Low and Rebelo (1996) fall within its boundaries: the Fynbos, Succulent Karoo, Thicket and Forest biomes. It is, consequently, an area rich in botanical diversity that can potentially sustain a variety of livestock such as sheep, goats, cattle, ostriches and game (Cupido 2005). The Fynbos and Succulent Karoo biomes are two of the world's 25 recognised biodiversity hotspots (Myers *et al.* 2000). For example, within the central Little Karoo alone there are more than 1,325 species, which include 182 endemics of especially Mesembryanthemacea, bulbs and other succulents with extremely small ranges of less than 50 km^2 (Cupido 2005). Brief descriptions of each of the LK biomes follow, with the exception of the Forest biome (of which only small pockets occur in the region). Renosterveld, despite being considered by

Low & Rebelo (1996) as one of the major vegetation types of the Fynbos biome, is here described separately (in accordance with being treated as a separate biome for the purposes of this project, refer to Appendix B: Little Karoo vegetation map hierarchy). Fynbos is the main vegetation type of the fynbos biome: an evergreen, fire-prone shrubland, with over 7,000 plant species, and very high endemicity: over 80% of plant species are confined to the Cape Floral Kingdom and Fynbos Biome (Cowling *et al.* 1997). Much of the vegetation type is conserved as water catchment areas, with woody alien plants the major threat in this vegetation type (e.g. Richardson *et al.* 1997). Renosterveld is another fire-prone evergreen shrubland that occurs on moderately fertile substrata (Cowling & Holmes 1992), in contrast to the Fynbos biome, which occurs on nutrient-poor soils (e.g. Campbell 1986). Renosterveld is extremely species-rich, though not as much as the Fynbos biome (Cowling 1990). Renosterveld is a major conservation priority in South Africa (Kemper *et al.* 1999) because the vegetation type has been extensively cleared for agriculture and its conservation status is poor (e.g. Hoffman 1997).

The Succulent Karoo biome has the highest species richness recorded for semi-arid vegetation, comprising 6,356 plant species, 40% of which are endemic and 17% of which are on the Red Data List (Driver *et al.* 2003). Most of the Succulent Karoo vegetation of the LK lowlands has been cleared for cropping or has been over-grazed (Hoffman 1996), which makes conservation of the biome of great concern to ecologists and agriculturalists (e.g. Cupido 2005). Subtropical Thicket is a closed shrubland that is generally short, dense and spinescent (e.g. Low & Rebelo 1996). Levels of rarity and endemism are low, with the exception of geophytes and dwarf to low succulent shrubs in the Euphorbiaceae and Mesembryanthemaceae (e.g. Moolman & Cowling 1994). Thicket has its own ecotonal species, *Portulacaria afra*, which generates the vegetation unit known as Spekboomveld when locally dominant (Acocks 1988). Grazing by goats constitutes the main economic use of Thicket, and due to its high palatability, Spekboomveld has suffered the greatest extent of transformation in the Thicket biome (Vlok *et al.* 2003). For additional details regarding the vegetation of the Little Karoo, refer to Appendix A.

For the purposes of this project, another two biomes are recognised in the Little Karoo, according to the vegetation map classification developed by Vlok *et al.* (2005) (section 3.6.1.2, Appendix B). All those vegetation units that are highly water-dependent and that occur in or alongside permanent or seasonal water drainage zones were classified as aquatic vegetation types, and they were further subdivided into two major aquatic biome types: the 'Drain' biome, indicating that the available water is brackish (containing fair amounts of salt and other solutes), and the 'Source' biome, indicating that the available water is fresh.

3.3 Definitions

The classification of a Private Conservation Area (PCA) lies on a sliding scale, hence, for the purposes of this research, a PCA is here defined as any parcel of land that (i) is owned by freehold or long-term leasehold by a private investor or syndicate; (ii) is funded and/or run by a private investor or syndicate; (iii) has no formal institutional (governmental) support as a protected area; (iv) is managed for the primary purposes of nature tourism, game-based ventures (e.g. game farming for hunting) or leisure; and (v) is owned with the intent of preserving the land in a predominantly undeveloped state (i.e. conservation forms one of the land uses). Although the term 'private conservation area' is the more accurate term for the purposes of this thesis, the terms 'private protected area', 'private nature reserve', 'private reserve' or 'private park' are sometimes used to refer generally to privately-conserved areas.

In South Africa, the term 'game farm', in the current colloquial sense, is used to describe private land from which domestic stock have been removed and replaced with game (Smith & Wilson 2002). Game farms are generally characterised by a lack of internal fences and the presence of game-proof boundary fencing; in this thesis the term 'game ranches' is used to highlight more specifically the occurrence of large-scale, free-ranging, non-intensive game management. A conservancy is a group of adjacent farms whose owners manage the land according to a mutual management plan and goals, and are committed to co-operative biodiversity conservation (in various combinations with other, compatible land-uses) (e.g. Smith & Wilson 2002, ABSA 2003, Wolmer 2005). Conservancies are usually registered with provincial conservation agencies, but do not generally involve any formal management, regulations or long-term security for the biodiversity they contain.

Certificates of Adequate Enclosures (CAEs) are certificates provided by the provincial conservation authority to landowners in respect of adequate game-proof boundary fencing. A CAE essentially confers landowners with ownership of the game on their land: they are not forced to have a CAE to be able to keep game on the land, however, in such a case, they cannot claim ownership (A. Wheeler 2005, pers. comm., 8 Jul). A CAE further confers use-rights over game to landowners, giving them the right to responsibly manage their game e.g. hunt anytime of day or year, exceed bag limits, etc. (Province of Western Cape 2000, CNC 2006a; A. Wheeler 2005, pers. comm., 8 Jul). Private Nature Reserves (PNRs) are registered with provincial conservation authorities. In the Western Cape they were established and administered by Cape Nature Conservation (previously Western Cape Nature Conservation Board) until 2003, when the Stewardship Programme was introduced (refer to Appendix C: The Stewardship Programme), although existing PNRs remain classified as such. PNRs were established with the objective of protecting and conserving the natural environment, with owners undertaking not to pursue ecologically degrading activities, and basing all activities on sound ecological principles (Privett *et al.* 2002). Financial support is not provided by the conservation board, although expertise on managing natural systems is made available on request. There is no legal commitment binding the landowner to conservation activities, i.e. there are no specific regulations to which landowners must adhere, and therefore a PNR provides no long-term security: the designation can further be abolished by the landowner at any time. A summary table of the various terms introduced in this section is provided below (Table 3.1).

Landowners of PNRs and Conservancies both require CAE for formal ownership of game on their land (although they are not compelled). Thus, conservancies or PNRs (or any other PCA) adjoining other private or public reserves are not necessarily undivided by fence lines. As will be made apparent in both chapters 4 and 7, most PCAs are in fact fenced in, with consequent implications for their connectivity.

Table 3.1. Summary table defining various terms used to denote private land for which conservation forms one of the main land-uses.

Term	Definition	Reference
Private conservation area Private protected area Private nature reserve Private reserve Private park	General terms used to denote various privately-owned lands for which conservation forms the primary land-use. A representative definition of 'private protected area' is offered by: "A land parcel of any size that is 1) predominantly managed for biodiversity conservation; 2) protected with or without formal government recognition; and 3) is owned or otherwise secured by individuals, communities, corporations or non-governmental organisations".	IUCN (2005)
Game farm/ Game ranch	In the South African context, the terms are used to describe private land from which domestic stock have been removed and there is commercial intent to acquire, keep and dispose of wildlife through breeding, tourism and hunting. Such farms are characterised by a lack of internal fences and the presence of game-proof boundary fencing. Game ranch is more properly used to describe farms characterised by the occurrence of large-scale, free-ranging, non-intensive game management.	E.g. Smith & Wilson (2002), Joubert *et al.* (2007)
Conservancy	The term refers to a cooperation agreement between two or more neighbouring landowners to manage the land with the ultimate aim of conserving all or part of the biodiversity in that particular area. The formality of the agreement for the mutual management of the consolidated sections of land varies.	E.g. ABSA (2003)
PNR (Private Nature Reserve)	In the Western Cape Province of South Africa, the term denotes privately-owned areas established with the objective of protecting and conserving the natural environment, which are registered with the provincial conservation authority.	E.g. Privett *et al.* (2002)

3.4 Research design

As previously discussed in chapter 2, political ecologists have expanded understanding of human-environment issues by investigating social influences on the environment (e.g. Robbins 2004). Political ecology constitutes a good theoretical field for integrated research methods (chapter 2): scholarship has stressed the importance of interdisciplinary research for understanding how particular land-management regimes develop over time and space through the intersection of society, culture and ecology, and the implications of their dominance (e.g. Batterbury *et al.* 1997, Scoones 1999, Nightingale 2003). However, few theoretical models and corresponding methodological approaches have been able to view and understand these factors as integrated and variable over time, space, scale and specific context (Nightingale 2003). This project aims to bring together both natural science and social science scholarship in its investigation of aspects of human-environment issues in PCA conservation. The framework employed to analyse the relationships between politico-economic and socio-cultural processes, and ecological outcomes, will allow an interdisciplinary, integrated and complex assessment of social and environmental phenomena and outcomes. In this manner, research seeks to avoid the production of ecological solutions that are neither socially tenable nor ecologically sustainable (often a result of natural or social research pursued in isolation, Nightingale 2003).

A range of methodological issues follows from an interdisciplinary structure to research. Interdisciplinarity describes the approach that combines understandings of ecological change, processes and outcomes with historical analyses and/or more qualitative interpretative methodologies (Scoones 1999). The need to go beyond a restrictive nature-culture divide encourages greater integration of the natural and the social in exploring environmental change and outcomes (Scoones 1999), for example looking at scientific and local knowledge together. The social/environmental nature of this study required the use of interdisciplinary research methods. Hence, this research adopted a multi-strategy research design (i.e. it made use of a mixed method approach, combining both qualitative and quantitative information from several sources) and was split into three phases, each built around a specific research design and entailing specific methodologies, as follows:

(a) Phase 1 (section 3.5): cross-sectional field research involving the use of a survey questionnaire; the field study took place from June to September 2005, and data collected were aimed at generating descriptive information on PCAs (in terms of social characteristics; see chapter 4 for results).

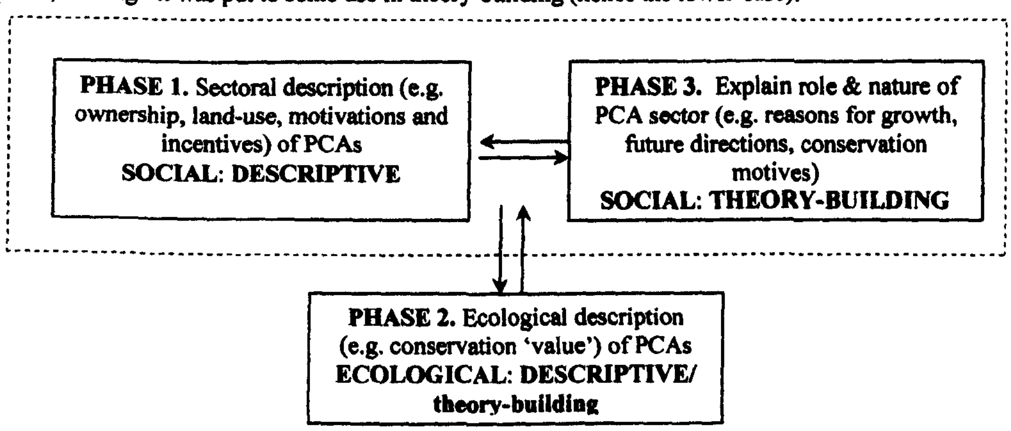
(b) Phase 2 (section 3.6): desk-based Geographical Information Systems (GIS) research, entailing collection and analysis of GIS-format maps for the Little Karoo planning domain: protected areas, transformation, Digital Elevation Model (DEM) and vegetation. Data collected and generated were aimed at providing ecological information on PCAs for descriptive purposes (chapter 4) and theory-building purposes (chapter 7).

(c) Phase 3 (section 3.7): multiple case-study field research employing semi-structured interviews conducted between March and May 2006. The aim was to generate explanatory data for theory-building purposes, regarding the drivers behind the growth of PCAs, the conservation knowledge of landowners, the integration of social and natural science data in conservation planning and the future policy directions of PCAs (chapters 5, 6, 7 and 8). Additionally, data was noted in a field diary, coded and interpreted in analysis.

Results from all three phases are integrated to meet the 6 objectives of research (chapter 1 and Box 3.1 below). Integration of qualitative and quantitative data (i.e. the 'mixing' of data), and of social and natural science data occurred during data analysis and interpretation.

The focus of this thesis was on the specific relationship that landowners (intended as the title deed owners) hold with the land, given the aim of understanding how PCAs have developed in the landscape and the implications of their growth for conservation. However, it is important to note here that there are other parties that hold important relationships with PCA lands, such as farm labourers and their territorial connections. Although these relationships fall outside the scope of this thesis, they should be addressed by future research into private conservation, for reasons that will be explicated in chapter 9.

Box 3.1. The three-phase research design, showing the relationship between different phases of research and between social and natural aspects of research. The principal aim of each phase (i.e. descriptive/ theory-building) is additionally highlighted; in Phase 2, ecological data was mainly collected for descriptive purposes, although it was put to some use in theory-building (hence the lower-case).



3.5 Phase 1 Research: method

3.5.1 Questionnaire design

Background information on PCAs in the Little Karoo was determined via a questionnaire, which in the majority of cases was completed by means of a personal telephone interview with the owners or (in a minority of cases) the managers. Due to the original nature of the study, a novel questionnaire (refer to Appendix D) was developed for investigation, although reference was made to a questionnaire used by Langholz (1999) in his study of Costa Rican private reserves. Questions were grouped into the following categories: (a) sectoral characteristics of PCAs (ownership and management structures, land-use practices, permanence and financial data); (b) motivations and desired incentives of landowners; (c) management goals and structures of reserves (size of areas, conservation management goals, conservation management interventions). The questionnaire mostly consisted of closed-ended, multiple-response questions, many of which included an 'Other' category so that respondents would not be limited to choices predetermined by the questionnaire design. A few open-ended questions were added to encourage free and spontaneous answers. In some instances closed questions were combined with open-ended questions; a number of scoring exercises were further included.

The questionnaire was developed making reference to the methods outlined in Bryman (2001) and de Vaus (2002). A survey design provides a quantitative description of trends, attitudes, or opinions of a population by studying a sample of it, and is particularly well suited to the investigation of large-scale phenomena, as required by the first phase of research. The questionnaire survey was the chosen method because of its economy of design, provision of a structured data set, and rapid turnaround in data collection. Questionnaires are not generally considered suitable for exploratory, theory-generating purposes, which were therefore dealt with using appropriate methodologies in Phase 3 of research (section 3.7), but they are ideally placed for the descriptive purpose of Phase 1.

The questionnaire was administered in English, with the option of translating it into Afrikaans (although this did not prove necessary). After the concept questionnaire had been circulated to specialists for comments and recommendation, it was tested in three pilot interviews; no modifications were required, therefore the questionnaire was distributed to respondents. The questionnaire was presented to all the respondents by means of an introductory statement that included the following topics (as suggested by Bryman 2001): (i) the identity of the interviewer and the auspices under which the research was being conducted; (ii) the purpose of the study and its importance; (iii) why and how the respondent was selected, (iv) the duration of the questionnaire. It further assured the landowners regarding the confidentiality of the questionnaire and that the respondent would not be identified/identifiable under any circumstances. Where the questionnaire was sent out electronically, the same information was outlined at the start by means of a covering letter.

3.5.2 Sample size and selection

At the outset, a list of PCAs in the Little Karoo domain was compiled from a variety of sources. These included telephone directories, Internet advertisements and various Tourist Information offices of the study area. These sources provided information on 'commercial' game ranches (i.e. properties advertised to local or national tourists and hunters). To supplement this list, the provincial nature conservation department (Cape Nature Conservation, CNC) was consulted for assistance. Provincial nature conservation departments have lists of properties to which they have issued Certificates of Adequate Enclosures, as well as information on Private Nature Reserves and on Conservancies.

Previous studies have employed CAE lists to draw up samples of game farms (e.g. van der Waal & Dekker 2000, Smith & Wilson 2002). However, it is important to note that in issuing such certificates, nature conservation officers do not distinguish between specific land-uses, but only whether the property or paddock is adequately enclosed or not. As a result, CAE lists were only considered as a preliminary information source; landowners were queried about the land-uses of their properties before they were deemed adequate cases for inclusion in the study (a check performed with all PCAs). Various private organisations, specialists and consultants were asked for references to landowners who were running game ranches or private nature reserves, but that had not advertised commercially. The list was expanded during the course of the study by inviting landowners, at the end of each completed interview, to supply details of any known PCA. Contact details of areas with CAEs in the Eastern Little Karoo were inaccessible due to a confidentiality agreement between the conservation board and the landowners. Personal communication was thus the primary means of acquiring information.

The final database included 90 confirmed PCAs (when counting the individual farms making up a conservancy as individual reserves), with an additional, unknown proportion of landowners belonging to a conservancy whose chairman refused to participate or supply contact details for the study; it is estimated, based on the knowledge of average conservancy sizes in the region, that the number of landowners in this conservancy is in the order of ten. It is worth noting that the figures obtained are almost surely under-representative of the true number of PCAs in the study area, as not all game ranches will possess a CAE, nor will all areas run as private nature reserves seek formal recognition as such, nor will all leisure retreats advertise commercially. This study alone identified a further 20 properties whose status was given as PCAs. However, the status of these additional areas could not be verified within the duration of research, due to an absence of contact details for the landowners. It is hence necessary to bear in mind that outcomes of analyses performed (e.g. conservation 'performance') are likely to underestimate real values for the PCA sector in the Little Karoo. The final sample comprised 18 PNRs (one located in the ELK, the remainder in the WLK), three Conservancies comprising 20 farms (one Conservancy located in the ELK, and two in the WLK), and 52 game ranches and/or nature reserves and/or personal leisure retreats (of which four were located in the ELK).

3.5.3 Questionnaire administration, response rate and statistical analysis

Landowners in the sample were initially contacted by telephone where such details were available, and given the introductory statement. Where landowners were willing to participate the questionnaire was either conducted immediately, or a telephone appointment was made. Telephone calls to respondents were made at any time between 07:00 and 21:00 throughout the week, as no single most convenient time slot for PCA owners was identified, due to the variability and unpredictability of their work situations. In a few cases landowners requested that the questionnaire to be sent in electronic format. Where telephone contact details were unavailable, landowners were initially contacted via fax/email, and all these participants preferred to receive the questionnaire in those formats. One and two weeks after distribution those that had not yet responded were reminded via email to return the completed questionnaire. Three weeks after distribution non-respondents were telephonically reminded. The number of interviews completed in one day varied widely, from none to a maximum of six, depending on the availability of respondents, but on average one to two could normally be conducted per day.

Contact details were not known for 33 of the confirmed PCAs; all the remaining 57 landowners were contacted, with only five declining to participate. Hence, 52 questionnaires were completed (38 by personal interview and 14 by electronic mail/fax), comprising 91% of the sample of PCAs for which contact details were available, and 58% of the total number of confirmed private reserves identified in the Little Karoo.

Data were captured in Microsoft Excel® spreadsheet format in order to generate descriptive statistics and put data into frequency tables and graphs. Descriptive statistics were used to describe results from the quantitative items in the survey, for instance PCA sizes, frequency of occurrence of different land uses, gross incomes and losses of PCAs, and so forth. SPSS® v. 12.0 was used to analyse data for descriptive purposes. Non-parametric statistics were used because data tended to be qualitative and non-normally distributed. Binomial tests were employed for the hypothesis of no difference in number between PCAs categorised by their profit-making status (for-profit vs. not-for-profit) and length of ownership. Chi-square analysis was used to test the hypothesis of no association of columns and rows in tabular data, between the formality of status of a PCA ('formal' and 'informal' areas) and numerous variables in the dataset (e.g. business status, conservation motivations). In order to determine what explanatory variables were related to capacity to conserve, cross-tabulations were performed with SPSS between the presence of a management plan, and of conservation goals, and two other variables within the dataset (formality of status and a business orientation). Differences between scores attributed to different motivations for establishing a PCA were analysed with Mann-Whitney tests. Phase 1 of research (questionnaire survey and analysis) was followed by the desk-based GIS analyses of Phase 2, which are considered in detail in the next section.

3.6 Phase 2 Research: method

3.6.1 Desktop data: collection and creation of GIS-format maps

3.6.1.1 Little Karoo planning domain and protected areas digital layers

The term planning domain is here used to refer to the area for which the ecological analyses are being performed. Planning units, which consist of *a priori* subdivisions of the landscape, are spatial (mapped) boundaries used in conservation planning (e.g. Pressey & Logan 1998) and act as building blocks to assess the contribution of different parcels of land towards conservation goals or targets. Planning units are usually either uniform squares (e.g. 10 x 10 km) or cadastral boundaries (normally used in finer-scale planning). The spatial resolution of data collection, habitat classification, and/or the size of planning units can greatly affect the outcomes of conservation planning (Pressey & Logan 1998). The need for fine-scale information is constantly reiterated by all land-use decision-makers (Lombard & Wolf 2004). Implementation can benefit greatly from fine-scale data and from using cadastral boundaries as planning units (Privett *et al.* 2002, Cowling & Pressey 2003) because they are more appropriate for realistic implementation strategies than arbitrary squares (Lombard & Wolf 2004, Knight *et al.* 2006a): land-use planners usually require information for actual land-management units (Pierce *et al.* 2005). Landscape boundaries in ecological studies often coincide with social/political ones and are frequently being defined according to management imperatives; cadastres provide information concerning economic, social and cultural factors, which can be used to develop explanations of changes in landscape patterns (Bender *et al.* 2005). Hence, the use of cadastral data facilitates the production of results relevant to natural resource management.

It is worth noting, however, that using cadastral data is not entirely advantageous, mainly because the spatial resolution of data is uneven: there are changes in resolution due to further subdivision, or combination, of land holdings (that is not shown by the cadastral data). This imposes some restriction on the precision of results. The cadastral spatial data and outputs for the Little Karoo are at the 1:50,000 scale. They will hence enable decision-making about individual pieces of land at the local scale and indicate fine-scale priority areas for conservation action with sufficient precision for the current project, given that the vegetation and transformation layers are both intended for use up to the 1:50,000 scale (section 3.6.1.2).

The Little Karoo planning domain was based on a cadastral map developed for the Gouritz Initiative project of the Cape Nature Conservation Board (a project for developing a biosphere reserve in the Little Karoo). The map was developed in digital (GIS ArcView 3.2) format by Lombard & Wolf (2004). The final extent of the Gouritz Initiative planning domain, divided into management sectors, is shown in Figure 3.1. The Western and Eastern Little Karoo management sectors of the Gouritz Initiative correspond to the study site of the current project, and hence were those used to develop a LK cadastral map for the current research. For the purposes of this study, the Gourits River management sector was considered part of the Little Karoo, except the southern half, beyond the southern boundaries of the Eastern and Western Little Karoo. The cadastral (farm) boundaries within the LK planning domain were used as planning units. Figure 3.2 shows the 9,189 planning units and domain boundary for the LK planning domain. The planning domain covers an area of 22,535 km^2.

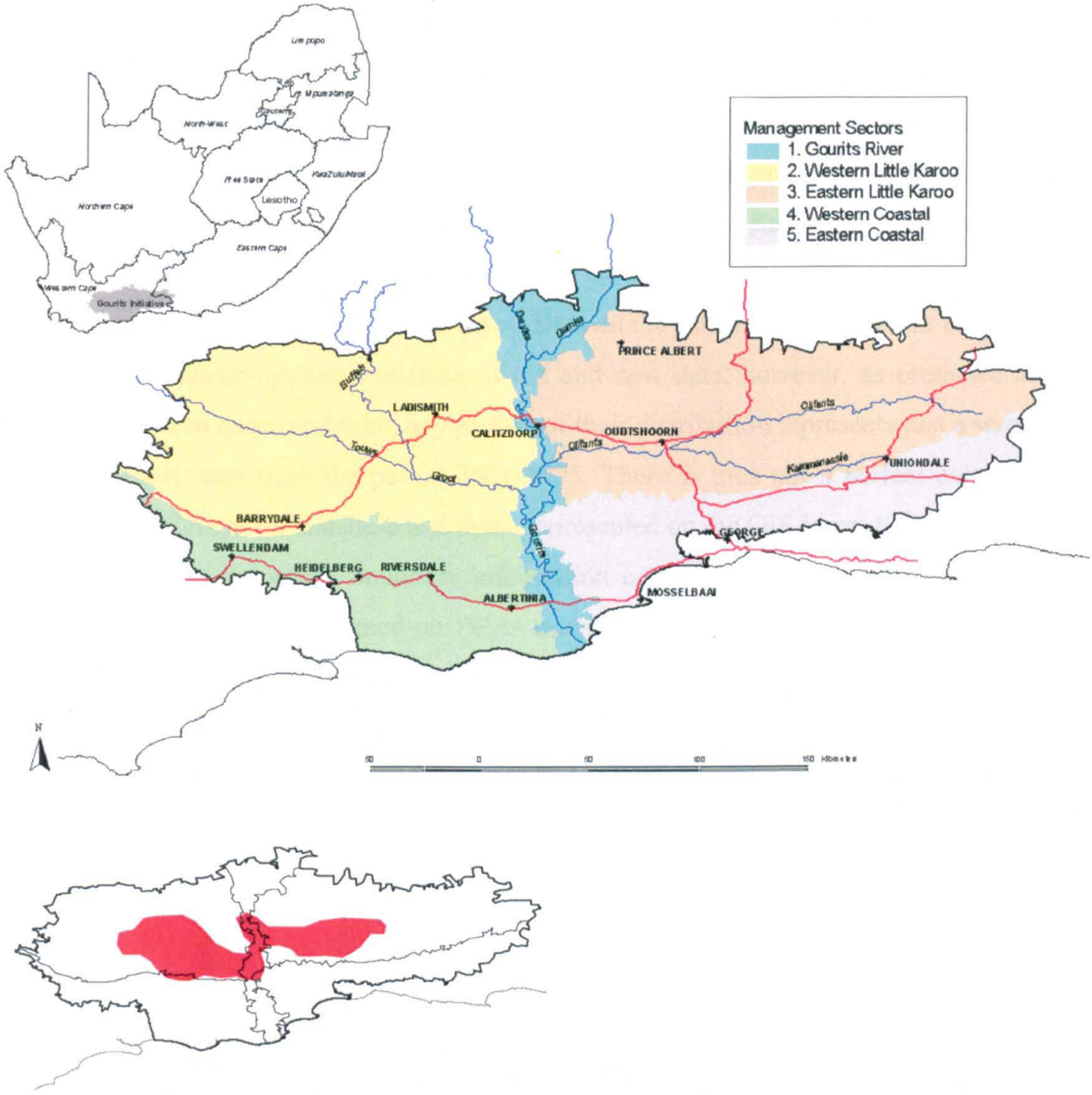


Figure 3.1. The Gouritz Initiative planning domain. The domain is subdivided by Management Sectors, showing the extent of the Little Karoo planning domain. In the last figure, the area in red represents the extent of the central Little Karoo priority area identified by SKEP (reproduced from Lombard & Wolf 2004).

A GIS (ArcView 3.2) layer of statutory and non-statutory conservation areas in the Gouritz Initiative region (developed by Lombard & Wolf 2004) was sourced from the provincial nature-conservation department. This layer was edited (by removing conservation areas falling outside of the LK, and/or not relevant to the present research) and combined with the LK planning domain layer to produce a single layer of planning units and conservation areas within the Little Karoo: cadastres were thus additionally coded for the presence of protected areas, and protected area boundaries were built from the planning units layer

(Figure 3.2). Once PCAs had been identified in the study domain, updated PCA boundary information (in both digital and non-digital formats) was obtained by consulting with CNC (different sources were cross-referenced for accuracy verification). Landowners were additionally consulted, where they were familiar with their property details and could provide their cadastral codes or maps of their properties; this further served to verify the accuracy of the information supplied by CNC. Updated boundary information was then incorporated into the planning domain layer. Data on the extent of conservation areas in the Little Karoo thus comprises a mixture of old and new data; however, as protected areas vary somewhat in space and time, any picture of their distribution represents just a snapshot in time, in this case from the period 2004-2005. There is thus not a perfect coincidence between the PCAs in the database and those represented on the GIS layer: the map does not capture 14 PCAs for which boundary information could not be obtained. Consequently, results of any analyses performed on PCAs utilising the GIS map (chapter 4) will under-estimate actual values. The total area of the Gamma Conservancy (whose landowners could not be identified) is however captured on the GIS map. The location of PCAs was ground-truthed by conducting a personal visit to a sample of 18 properties during the course of the interviews phase of research (section 3.7).

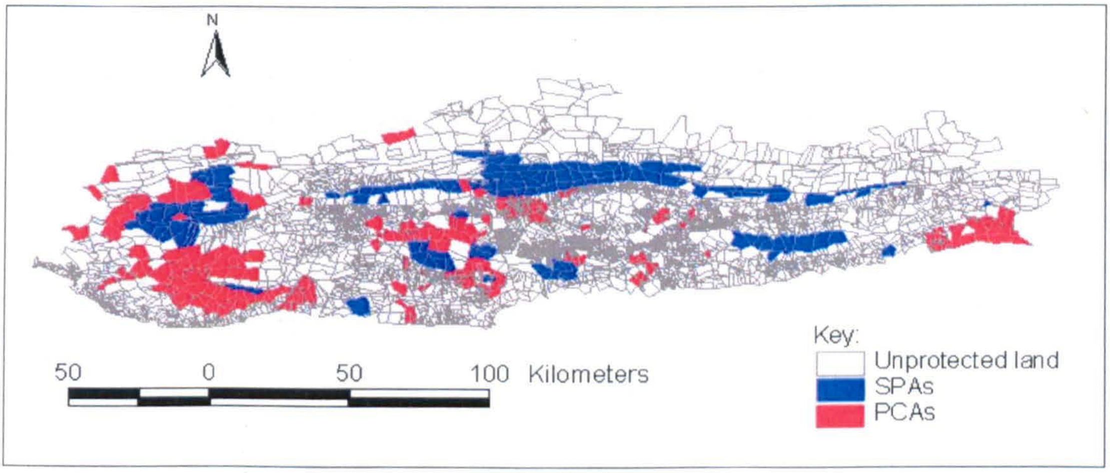


Figure 3.2. The Little Karoo planning domain. The domain is subdivided into its constituent planning units, which are coded in red for the presence of Private Conservation Areas (PCAs) and in blue for the presence of Statutory Protected Areas (SPAs).

Two major classes of conservation area were distinguished, namely:

(1) Statutory protected areas (SPAs): in the Little Karoo, these consist of areas recognised by the Cape Nature Conservation Board, e.g. provincial nature reserves, and by the Department of Environmental Affairs and Tourism; and
(2) Non-statutory, private conservation areas: these consist of game ranches, Conservancies, National Heritage Sites (registered by the South African Heritage Resources Agency: places of national significance including places that contain rare or endangered aspects of South Africa's natural or cultural heritage, SAHRA 2007), Private Nature Reserves, and various leisure/conservation farms.

Statutory conservation areas are owned and run by the State, Province or Local Authority (mainly by the Province within the Little Karoo) and are supported by strong legal and institutional structures. Non-statutory conservation areas represent various degrees of protection, institutional capacity and defensibility considered consistently weaker than statutory conservation areas (Rebelo 1992). A major exclusion to the conservation areas map for the region consists of the Mountain Catchment Areas on private land and State Forests. Mountain Catchment Areas are declared as such under the Act of the same name (MCA Act, No. 63 of 1970); these have been severely neglected over the years: regulations were never passed under the Act, promised incentives and assistance have not been forthcoming, and their responsibility has been shunted between different departments for many years (Botha 2004). State Forests, consisting of state land managed by the Department of Water Affairs and Forestry, are a complex group: some areas are proclaimed as nature reserves, some as sustainable production forests and some are just parcels of land purchased for afforestation but not planted owing to poor soils, low rainfall, etc. (R. Cowling 2005, pers. comm., 21 Oct) Owing to the uncertainty of their status, these two groups of areas were hence considered unsuitable for inclusion within the present study.

3.6.1.2 Vegetation, transformation and DEM digital layers

A 1:50,000 vegetation map of the Little Karoo region (c. 20,000 km^2) prepared by Vlok *et al.* (2005) was employed for analyses. The rationale for the production of the map, a project supported by the Critical Ecosystem Partnership Fund (Grant Code 1064410304), was to provide detailed baseline information to enable informed decision-making on conservation, sustainable commercial farming and land-use planning in the region. With regards to the methods used to sample the vegetation, record the data and map the vegetation, a hierarchy was initially developed to identify vegetation units rapidly in the field (Vlok *et al.* 2005). The hierarchy (comprising four different levels, aquatic-terrestrial level, biome, habitat and vegetation unit levels) was developed from known information on vegetation in the region (e.g. Low & Rebelo 1996). The study area was then ground-truthed systematically (by the same researcher) during April to September 2004, from the northwestern boundary in a southerly and thereafter easterly direction. Both structure and floristic component were used as indicators of changes in the vegetation units. Wherever a change in vegetation units occurred, each unit was sampled by walking at least 200 metres into the unit, noting the species dominant in the unit and where possible, the occurrence of localised endemic species. Public roads were followed to access the areas, and wherever possible, private properties were also accessed to sample the vegetation. Areas were further surveyed by climbing up a high hill or mountain slope to get an overview of the area. Unit boundaries were then mapped on a hard copy of a LANDSAT image printed at a scale of 1:50,000. Each of these mapped polygons was coded with a unique number and the vegetation unit data recorded according to the hypothetical classification system. Where vegetation units that were not expected on the basis of the theoretical vegetation hierarchy were encountered, the hierarchy was adjusted to accommodate these new units. The polygon boundaries were digitised from the hard copy maps to capture the data in a GIS (ArcView 3.2). Field mapping accuracy is estimated to be within 100 m either side of the exact position (2 mm error at a mapping scale of 1:50,000) (Vlok *et al.* 2005) and the map is thus intended for use up to a scale of 1:50,000.

The final map of vegetation types identified and mapped in the Little Karoo region can be used at different hierarchical levels: aquatic-terrestrial map, biome map (showing four different terrestrial biomes and two aquatic), habitat map indicating 56 different habitat types and vegetation unit map indicating 369 different vegetation units (see Figure 3.3). Additional details on the classification and description of the major vegetation hierarchies (ecosystems and biomes) are provided in Appendix B. Vlok *et al.* (2005) mapped the extent of the Little Karoo as the land between the coastal mountain range (Langeberg-Outeniqua to Tsitsikamma mountains) and the inland mountain range (Witteberg-Swartberg to Baviaanskloof mountains), from Montagu in the west to Uniondale in the east. All vegetation types that occurred within the Little Karoo region thus defined were included in the mapping exercise. The spatial extent of the Little Karoo vegetation map of Vlok *et al.* (2005) differed slightly from that of the LK planning domain and protected areas developed within this project (section 3.6.1.1). The two layers were therefore overlaid to result in a 'LK vegetation planning domain' for the purpose of conducting the vegetation analyses (section 3.6.2 and chapter 4). The LK vegetation planning domain was somewhat smaller than either of the two constituent areas (16,603 km^2).

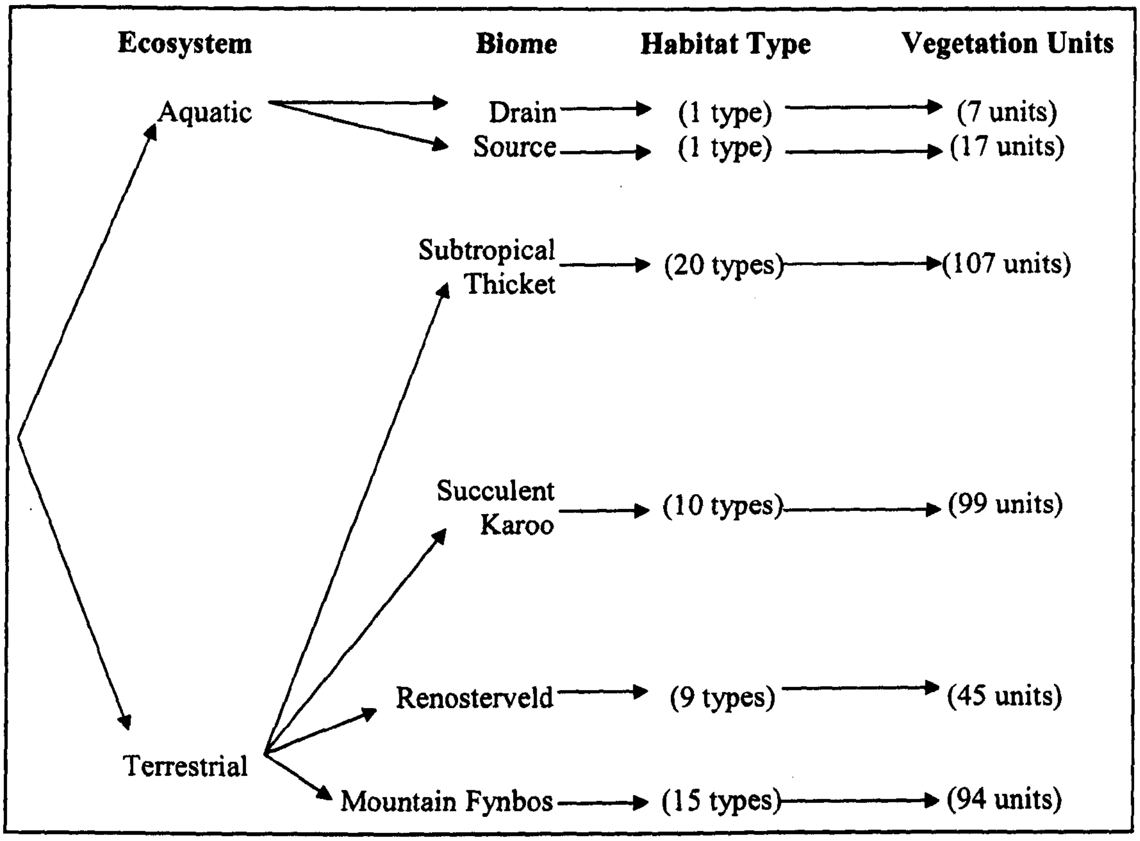


Figure 3.3. The final hierarchy of vegetation types identified and mapped in the Little Karoo region by Vlok *et al.* (2005).

The extent of loss of natural habitat, or transformation, associated with urbanisation, agricultural and forestry cultivation, and overgrazing by domestic livestock has been quantified using a novel technique, based on intra-annual variance in Normalised Difference Vegetation Index values, calibrated for different vegetation units mapped at 1:50,000 scale, and ground-truthed via expert assessment (Thompson *et al.* 2005, Rouget *et al.* 2006a, Thompson *et al.* in review). These land-use pressures overwhelmingly account for the loss of natural habitat in the planning domain (Thompson *et al.* in review).

Conceptual transformation models were developed for each of the key vegetation biomes in the Little Karoo (Aquatic, Subtropical Thicket, Succulent Karoo, Renosterveld and Fynbos, the latter two sharing the same basic transformation model), which were translatable into image-based spectral models. To model and delineate the various transformation classes a combination of multi-seasonal and multi-year Landsat and MODIS satellite imagery was employed. Details on the methods of mapping and their extent across vegetation types is provided in Thompson *et al.* (2005, in review).

Transformation levels are described in terms of three classes of transformation due to grazing pressure, i.e. 'severe', 'moderate' and 'pristine', with additional 'severe' categories associated with total vegetation loss as a result of cultivation, settlement development and/or water resource retention land-uses. The label 'pristine' indicates essentially non-transformed sites, where the natural biodiversity patterns have not been altered; although critical ecological processes may have been slightly impacted, they are still operative. 'Moderate' areas of transformation are those where the natural vegetation communities have been altered by domestic stock, but not to such a degree that removal of grazing pressure would not return them to their original conditions. Critical ecological processes may require some restorative action. Severely transformed sites are those where the natural vegetation has been affected by domestic stock to such an extent that the removal of grazing pressure alone would not return the plant communities to their original conditions. Critical ecological process will require serious restorative actions.

The Little Karoo DEM was cut from SRTM (Shuttle Radar Topography Mission) Digital Elevation Data, produced by NASA originally, which is a major breakthrough in digital mapping of the world, and provides a major advance in the accessibility of high-quality elevation data for large portions of the tropics and other areas of the developing world (CGIAR-CSI 2004, NASA 2006). The SRTM 90 m DEMs have a resolution of 90 m at the equator, and are provided in mosaiced 5° x 5° tiles (CGIAR-CSI 2004).

3.6.2 GIS analyses

3.6.2.1 Analyses rationale: habitat fragmentation and the preservation of biodiversity patterns and processes

Habitat loss represents the major cause of endangerment to biodiversity in terrestrial systems (e.g. Saunders *et al.* 1991, Wilcove *et al.* 1998, Fahrig 2003). Protected areas should conserve nature by protecting species of interest, preserving entire ecosystems, and maintaining maximum biological diversity (e.g. Soulé & Simberloff 1986, Leader-Williams *et al.* 1990, Salomon *et al.* 2006), and conservation biologists have paid much attention to the design and selection of protected areas to satisfy these objectives (Salomon *et al.* 2006). The degree to which reserves are able to achieve the regional goals of ensuring the persistence of biodiversity and the processes that maintain it depends on how well they meet two objectives. The first is that of representation, their ability to capture the full extent of biodiversity, conserving a representative sample of all ecosystems and species i.e. biodiversity patterns (e.g. Margules & Pressey 2000, Possingham *et al.* 2000, Pressey & Cowling 2001). The second objective is that of persistence, the extent to which they support the long-term survival of species (Margules & Pressey 2000). The reserve systems evaluated in terms of their conservation effectiveness by this project (chapter 4) will be appraised on the basis of the biodiversity patterns they represent (section 3.6.2.2). This will additionally require consideration of the extent of transformation affecting the integrity of reserves in the planning domain (section 3.6.2.2).

However, both habitat abundance and integrity may be inadequate to explain species presence or abundance; recent advances in the field of landscape ecology have provided other avenues for considering the relationship between landscape pattern and biodiversity (e.g. Turner *et al.* 2001, de Blois *et al.* 2002, Turner 2005), such as the characteristics of the surrounding landscape, i.e. landscape context (e.g. Miller *et al.* 1997, Mazerolle & Villard 1999, Atauri & deLucio 2001, Ricketts 2001, Murphy & Lovett-Doust 2004). For plant species, the degradation of habitat quality both within and outside of fragments are paramount in explaining changes in species composition and dynamics in fragmented landscapes (de Blois *et al.* 2002). Therefore, another step in the analyses will consist of assessing the extent of transformation of different habitat types across the planning domain (section 3.6.2.2).

Though terrestrial reserve design has traditionally focused on the representation of biodiversity to address habitat loss (Salomon *et al.* 2006), there is increasing recognition that this focus does not guarantee the persistence of populations or ecological processes that maintain biodiversity (e.g. Araújo & Williams 2000, Cabeza & Moilanen 2001, Moritz 2002, Kareiva & Marvier 2003). Many conservation biologists now recognise the need to design reserve networks in which species have high probabilities of persisting (Margules & Pressey 2000, Roberts *et al.* 2003), which in itself is not a trivial task (Balmford *et al.* 1998), given that this dynamic perspective is difficult to achieve in practice (Salomon *et al.* 2006). Given the paucity of data currently available for the Little Karoo, this study adopts the use of two generic reserve-design criteria to assess the representation of biodiversity processes between different systems of conservation areas: size and connectivity of reserves (section 3.6.2.2). Generic reserve-design criteria are those applied as preferences, such as 'a larger reserve is better', but without setting explicit parameters, such as 'a reserve should be at least 10,000 ha'. The approach is among those advocated by Pressey *et al.* (2003, in press) for considering biodiversity processes, and has a long history (e.g. Diamond 1975, Lovejoy *et al.* 1986, Shafer 1990, Noss *et al.* 1997). This step in the analysis rests on the assumption that large reserves protect species, ecosystems and biodiversity with greater certainty than smaller ones (e.g. Soulé & Simberloff 1986, Schwartz 1999, Williams *et al.* 2006), an assumption supported by theories of island biogeography, minimum viable populations, source-pool effects and successional pathways, which are used to predict consequences of large vs. small protected areas (e.g. MacArthur & Wilson 1967, Holt 1993, Burkey 1995, Lindenmayer & Possingham 1995, Newmark 1995, 1996, Woodroffe & Ginsberg 1998, Gurd & Nudds 1999, Wiersma & Nudds 2001).

With regards to connectivity, both island biogeography and metapopulation theory (e.g. Levins 1969, Gilpin & Hanski 1991, Hanski 1999) suggest that landscape linkages are necessary to aid the dispersal of species, and the exchange of individuals between sub-populations (e.g. Bennett 1998). Research has emphasised the need to improve the connectivity of protected areas through the use of corridors or other linkages (e.g. Noss &

Harris 1986, Beier & Noss 1998, Groves 2003), and a review on the subject by Beier & Noss (1998) concluded that it is safe to assume that a connected landscape is preferable to a fragmented one (Beier & Noss 1998: 1250). Although the specific mechanisms to re-establish or maintain connectivity have come under considerable scrutiny and debate (e.g. Simberloff *et al.* 1992, Mann & Plummer 1995), it is generally accepted that larger and more connected reserves are preferable (Schwartz 1999). Landscape connectivity is currently viewed both structurally, where connectivity is entirely based on landscape structure (usually habitat contiguity), or functionally, where behavioural responses to the landscape elements (patches and edges) are considered along with the spatial structure of the landscape (i.e. connectivity becomes a function of how easily plants and animals can move among island or habitat patches) (e.g. Tischendorf & Fahrig 2000, Hess & Fischer 2001, Goodwin 2003). Functional connectivity essentially depends on the movement of organisms, which can vary with factors such as habitat type, habitat heterogeneity, edge-crossing behaviour, perceptual ability, and density (e.g. Goodwin 2003); functional connectivity is thus inherently species-, site- and scale-dependent (e.g. Tischendorf & Fahrig 2000, Vos *et al.* 2001, Goodwin & Fahrig 2002). Tischendorf & Fahrig (2000) argue that in order to include both structural and biological components of landscape connectivity, both fine-scale responses of individuals to landscape features and the configuration of those features in the landscape must be determined explicitly. In the absence of detailed biological data for the Little Karoo, structural measures represent the safest option for measuring connectivity in the landscape.

In this study, the evaluation of the connectivity of the two reserve systems relied on a simple, generic index of structural connectivity, on the assumption that a landscape containing a single contiguous habitat patch should have higher connectivity than a landscape with the same amount of habitat occurring in many disjoint patches. However, it is important to acknowledge that landscape structure is not a direct measure of connectivity (e.g. Tischendorf & Fahrig 2000, Hess & Fischer 2001, Goodwin 2003), although it is potentially related to connectivity (e.g. Tischendorf & Fahrig 2000, Goodwin 2003). Therefore, this research does not provide a direct measure of patch connectivity because it does not incorporate movement of organisms in the landscape. It is expected to provide a surrogate for connectivity by relying on the measurement of spatial configuration of habitats (contiguity), which is related to the movement of populations in the landscape (e.g. Tischendorf & Fahrig 2000).

The optimal geometry of a nature reserve will always depend on variables unique to the set of species, habitats and ecosystems being protected; therefore, in the absence of information on these variables, general patterns for reserve networks that result from simple optimisation criteria can be usefully adopted in many cases (Pelletier 2000). Thus, in the absence of specific information regarding the dynamics of the Little Karoo, it becomes practical and prudent to adhere to the generic design criteria that have been outlined.

3.6.2.2 Analyses overview and methods

All analyses relied on the use of GIS methods: the ESRI suite of GIS products (ArcView 3.2) was employed, and statistical tests were run using SPSS® v. 12. The extent and distribution of statutory and non-statutory reserves across the planning domain was assessed first. The distribution of reserves in each category of protection was assessed by comparing the extent present in the East against the extent present in the West of the planning domain. The Little Karoo was subdivided into an Eastern and Western section along the North-South axis of the Gouritz river drainage system (Figure 3.1), which naturally splits the region in half. The distribution of protected areas across different altitudinal gradients was determined by overlaying the protected areas layer with the LK DEM. The representation of biodiversity pattern was analysed second, using vectorised data sets. Analyses consisted of an assessment of the representation of vegetation pattern between the two networks of protected areas present in the planning domain (SPAs vs. PCAs, see chapter 4 for the rationale). To this end, the percentage extent of the six biomes occurring in the planning domain that falls into each of the two systems of protected areas was calculated by overlaying the vegetation layer with the protected areas layer.

Vegetation maps are viewed as reasonable surrogates for biodiversity at a range of taxonomic and ecological spatial and hierarchical scales (e.g. Noss *et al.* 1997, Driver *et al.* 2003). Therefore, this study made use of the LK vegetation map as a reasonable approach for measuring biodiversity pattern representation. Although much unmapped and unknown biodiversity is thus not included, the paucity of distributional and phylogeographic data for most taxa in the region, and the constraints on accumulating additional data, make the use of vegetation types a practical and realistic option. Third, the possible variation in representation of different biomes within the private reserve network was examined by masking the contribution of the SPA network, and comparing the percentage of each biome type falling within the private reserve network, against the percentage present in the planning domain. The same analysis was performed to determine whether there is variation in biome type representation of private reserves between the Eastern and Western sections of the region.

Fourth, habitat quality was addressed by calculating the extent of natural habitat transformation within the two systems of protected areas. This was achieved by overlaying the transformation, vegetation and protected areas layers, and examining, within each biome, the extent of pristine, moderately transformed and severely transformed habitat captured by public and private reserves. Fifth, the level of transformation undergone by each biome across the entire domain was ascertained, by qualitatively ordering the biomes according to the percentage of their extent that was severely transformed.

Finally, the representation of biodiversity processes between statutory and private protected areas was addressed by analysing their spatial configuration: size and connectivity. Standard procedures in ArcView and SPSS® v. 12 were employed to generate size distributions for reserves in the two networks, as well as a measure of their connectivity. Within the context of this project, connectivity refers to contiguity of habitat patches, wherein a habitat patch is represented by a single conservation area, whether private or statutory (protected areas can be viewed as very large islands in a mixed matrix: Donald & Evans 2006). Measuring the extent to which conservation areas are adjacent to other protected areas therefore involved a form of nearest neighbour analysis (e.g. Tischendorf & Fahrig 2001). The analysis in this research differed from more traditional nearest neighbour analyses because the landscape was not rendered into a grid of cells. Conservation areas were treated as the landscape 'cells', or habitat patches, and therefore connectivity was not measured through the extent to which cells share a border, but by the extent to which cadastral patches shared a border. Thus, the perimeter of each conservation area was calculated using standard procedures in ArcView, as was the amount of the boundary that was shared with one or more conservation areas. The percentage of a reserve's boundary that was shared with other conservation areas (i.e. the proportion of the total 'shared' boundary over the total perimeter length) provided a measure of the extent to which the reserve was adjacent to other protected areas, and thus determined its level of connectivity. Areas with higher connectivity might thus, for example, share more than 50% of their boundary with other conservation areas; areas of 'low' connectivity, for example, might share less than 10% of their boundary. This second GIS-based phase of research was followed by Phase 3 of research, another fieldwork session, to which the chapter turns next.

3.7 Phase 3 research: method

3.7.1 Sample size and selection, data collection and analysis

In order to explore the motivations, conservation attitudes and knowledge of PCA owners, qualitative interviews were conducted with 25 landowners (representing 25 different PCAs). To gain additional insights, in three cases interviews were conducted with the managers of the area as well, and one interview with a local specialist in the Little Karoo was also carried out. Cases were selected strategically, to differ in the aspects of size (large vs. small PCAs), geographical location (Western LK vs. Eastern LK), business status (for-profit vs. not-for-profit PCAs), 'official' status (formal vs. informal PCAs, with a further distinction made between PNRs, Conservancies and 'other' reserves), duration (recent vs. long-standing PCAs) and management strength (high, medium, low). Personal semi-structured interviews were used to collect data, and in 17 cases, interviews were conducted on the PCA. On arrival, or after the interview, an attempt was made to view the reserve, as this enabled a more meaningful discussion and/or understanding of the issues covered in the interview, and provided landholders with an opportunity to give background or additional information. The duration of interviews varied between three-quarters of an hour to an hour and a half.

All interviews were taped and transcribed, and coding and analysis of the transcripts was based on methods outlined in Kitchin & Tate (2000) (for an example of a coded transcript, refer to Appendix E). Qualitative methodologies are characterised by an in-depth, intensive approach rather than an extensive or numerical approach. Thus they cannot provide statistical description or generalisable predictions. Rather, they are employed to seek subjective understanding of social reality (e.g. Dwyer & Limb 2001, Valentine 2001), which is consistent with the research aim of Phase 3, which is to produce theoretical generalisation. Throughout the thesis, all names used to refer to respondents, PCAs or conservancies consist of pseudonyms. A summary table of quoted respondents' characteristics is presented in Appendix F.

3.7.2 Interview guide structure

An interview guide was developed with the general aim of covering all of the questions and to adopt a similar wording with all participants (without, however, negating the possibility for departures, omissions and/or modifications of the interview schedule). The results of Phase 1 research provided departure points for devising the content of the interview guide (Appendix G), which was submitted for expert review prior to implementation. The interview schedule was structured into three main sections as follows:

(A) Motivations and permanence: to explore in depth, and understand, the motivations of private landowners for establishing and maintaining a PCA, and further gain insight into the drivers behind the rapid growth in the sector. Questions were included to assess the likely permanence of private protected areas, although this section did not yield interesting results and is therefore not included in the presentation of results.

(B) Incentives: this section considered possible incentive measures that could realistically be offered to landholders. PCA owners were informed (or reminded) about the benefits and restrictions of the Conservation Stewardship voluntary incentive programme of CNC. The opinions of landowners regarding the Stewardship scheme were solicited in order to understand their preferences for conservation incentives and restrictions, both in the specific case examined, and in general terms. This is deemed necessary for the successful implementation of any incentive programme. Suggestions for improvements (or alternatives) that could be made to the Stewardship scheme were discussed with interviewees.

(C) Conservation understandings and management science: the aim of the section was to assess the sources of the conservation knowledge and expertise of respondents, and the basis of the management 'science' of PCAs. This included consideration of the attitudes of respondents towards collaboration for the purpose of conservation, their interpretation of the meanings of conservation, biodiversity and nature, and the management goals and strategies for their PCAs.

3.8 Positionality and ethical issues of research

A reflexive approach to fieldwork, in any research that involves people, demands that consideration be given to the researcher's positionality and to the 'experiences' of 'others' (e.g. McDowell 1992a, Desmond 2004). Reflecting on positionality means recognising one's place within the social relations studied, and considering how the relationships of power between oneself and one's informants may influence the production, interpretation and representation of knowledge (e.g. Mather 1996, Mullings 1999, Desmond 2004). Positionality is influenced by variables such as gender, age, race, sexual identity, class and insider/outsider status (e.g. England 1994, Mullings 1999). England (1994) suggests that testimonies must be read and interpreted in the context of when, where and how they were produced. However, the researcher nearly always selects the quotations and voices included in the final text (e.g. McLafferty 1995) and is therefore ultimately responsible for avoiding misinterpretation (Smith 1996).

There are differences between the researcher's perception of his/her own positionality, and the perception of those researched (Herod 1999, Mullings 1999), and a researcher's positionality can change over time (Mullings 1999). Researchers often make single visits, which limits the opportunity for building rapport with respondents or providing them with feedback (Twyman *et al.* 1999). In this study, in-depth interviews (Phase 3 of research) were only conducted with respondents that had participated in the initial survey questionnaire (Phase 1 of research). Further, between the two fieldwork phases of research, all respondents were provided with extensive feedback on the results of the survey questionnaire, which creates greater empathy and stronger relationships of trust between the researcher and the researched (Twyman *et al.* 1999). Building these relationships changed my positionality, from being totally 'outside' to a more 'inside' position, more integrated with the local situation of the respondents.

Positionality can further be modified by the researcher, by emphasising particular attributes and playing down others (Mullings 1999). During interviews, I presented myself as a young, white, female researcher from a British University; this positionality will have shaped the research, the responses given and the reception I was given. I further portrayed myself as a non-threatening, non-partisan student in South Africa to collect data for a PhD research project, and, importantly, not for the local conservation board. A perceived alliance with the conservation authority would have been likely to distort the information supplied, even created difficulties for conducting interviews, given the sensitive and often conflictual relationship between landowners and the conservation board (chapter 6). Non-partisan status was also highlighted during the course of interviews, by stressing that respondents would retain anonymity at all times. These aspects were voluntarily emphasised in order to encourage respondents to state their own opinions freely. All of the points above highlight the need for a reflexive approach to interpretation (Rose 1997, Herod 1999). The social context in research is highly important (Rose 1997, Herod 1999), yet fortunately the particular social context of this research did not make it difficult to go from being a total 'outsider' to a partial 'insider', given that the target population were all white, mostly middle-class, and educated. Many of the respondents were highly-placed, high-income, middle- to late-middle-aged men, constituting an elite group of sorts. In the presence of such respondents the relationship between researcher and researched is invariably somewhat asymmetrical, and feminists usual favour the researcher being a 'supplicant' (McDowell 1992b, 1998, Desmond 2004). Accordingly I took on a subordinate, 'supplicant' role, which usually led to the forthright disclosure of significant amounts of information, not to mention numerous acts of generosity (for example being offered meals and/or hospitality). This was probably due in part to my being perceived as 'unthreatening' and 'unofficial' by the interviewees (McDowell 1992b), and in part to attempts by the respondents to induce me to 'take their side' (Desmond 2004).

Research was conducted in an ethical manner (e.g. seeking informed consent and respecting respondents' rights) with specific and explicit attention given to modes of conduct and 'positionality' within all the different research contexts (from interaction with private landowners to contact with provincial authorities, consultants, academics, etc.). Honesty regarding the use of data and the purpose of research was maintained at all times. Throughout the research, it was emphasised to landowners that the results would be fed back also to the conservation board and government officials, but that direct changes as a result of the research could not be guaranteed. Respondents were always given the opportunity to withdraw at any time, and the identities of all participants have remained anonymous: all names of respondents, conservancies and PCAs used in this thesis are fictitious. Research findings were consistently fed back to participants at all levels (from provincial authorities to PCA owners) through networks established through the course of the research. Finally, participants were not remunerated for the information supplied, although interviewees who sacrificed a significant proportion of their time in order to take part in the research were supplied with an appropriate gift, normally a bottle of wine, after completion of the interview.

Finally, it is important to note my intellectual positionality with respect to the discipline of political ecology. My discipline background and research training fits well within the interdisciplinary framework of political ecology. Initially, it consisted of undergraduate training in natural sciences (Zoology), moving on to graduate research in both natural and social sciences. Graduate research was undertaken through a Master's degree that was split between a natural sciences department (Biology) and an interdisciplinary (Environment) department. Further knowledge and experience of social science approaches was derived from conducting this thesis within a Geography department. Thus, from an initial natural-sciences background I increasingly moved towards the social sciences, finally locating my intellectual home between the two realms. For this reason, I adopted the field of political ecology for this thesis, in order to maximise the strengths of my mixed research background, and to refine my interdisciplinary skills at the same time.

3.9 Summary

To summarise, this thesis made use of an interdisciplinary research framework to collect and analyse both social and natural science data, in order to meet the objectives of research. The first phase of research used a survey questionnaire to gather quantitative data on PCA social characteristics for descriptive purposes; the results are presented in the next chapter. The second phase of research collected and analysed quantitative data in GIS form to answer questions on the ecological characteristics of PCAs: these descriptive results are also presented in the following chapter, in addition to being utilised for the theory-building analysis in chapter 7. The third phase of research collected qualitative data on PCA social features for various theory-building exercises presented in chapters 5, 6, 7 and 8.

CHAPTER FOUR

PCAs in the Little Karoo: ecological and social patterns and features

4.1 Introduction

4.1.1 The issue of privately-owned land and its potential contribution to conservation

One of the most important goals in conservation biology is the protection of biodiversity within a given geographic area (Cantú *et al.* 2004). Nature reserves play a vital role in achieving this goal (e.g. Salomon *et al.* 2006), and because statutory protected areas do not cover all ecological areas, complete representation will require privately-owned lands. The notion of Private Conservation Areas (PCAs) as valuable new tools in the conservation toolbox and of their potential importance for achieving conservation goals (e.g. Langholz & Lassoie 2001a, Figgis *et al.* 2005) has been espoused through reference to the need of establishing off-statutory-reserve conservation mechanisms (e.g. Hale & Lamb 1997). The important point, however, is not how many protected areas there are nor even who owns them, but how well they represent critical elements of biodiversity and how well they are managed for ecological and other public benefits (Mitchell 2005: 4). Private reserves are as susceptible as government areas to being inadequately sited in the landscape and to being 'paper parks', i.e. areas designated as protected, but for which conservation objectives and actions have never been implemented (e.g. Carey *et al.* 2000). One of the first steps in assessing how well reserves achieve their goal of preserving biodiversity, is to investigate the extent to which specific resources are being protected within the existing reserve system (Scott & Csuti 1997), a process known as 'gap analysis' (Scott *et al.* 1993).

A second essential step for accurate and informed conservation planning is the ability to identify and account for those parts of the landscape that are being managed for biodiversity conservation, the mechanisms under which they are being managed, and by whom. In conservation planning and policy, the protection of biodiversity is often complicated by the fragmentation of habitats and land ownership, and further by the varied application of different protection mechanisms (Fizsimons & Wescott 2004).

Thus, in order to determine how effective PCAs are at achieving conservation goals, and in order to identify mechanisms for strengthening their effectiveness, two kinds of quantitative study are required. The first is a biological gap analysis, i.e. the assessment of the representation in private reserves of biological features. The second is a social assessment of the private conservation community, i.e. the assessment of the management practices and motives of landowners, of their needs and preferences, and so forth. Thus far, quantitative studies that directly address the former issue are lacking, and that address the latter, scarce (for an example, see Langholz 2002); yet they are necessary for the development of more targeted strategies for the protection of biodiversity, and for developing appropriate future conservation policies and/or incentive instruments.

In the Little Karoo (LK), the trend away from conventional livestock production and ostrich farming towards game production, ecotourism and conservation is increasingly recognised (e.g. Cupido 2005) but no quantitative data are available on the extent and characteristics of these private nature-based ventures. Available indicators suggest that the sector is still spatially expanding and economically developing. If this is the case, the trend should be understood in order to facilitate its sustainable development and growth. This chapter provides one of the first analyses of private protected areas that includes both types of quantitative study outlined above.

4.1.2 Chapter objectives

The aim of the first section of this chapter is to evaluate the 'effectiveness' of the private reserve network in conserving biodiversity, in comparison to the statutory reserve network. To achieve this aim, first a gap analysis of private and public reserves in the Little Karoo is performed, evaluating the distribution and ecological representation of the current statutory and non-statutory networks. Efforts to identify gaps in networks of nature reserves have been conducted using biological (e.g. Scott *et al.* 1993) and enduring physical features (e.g. Hunter *et al.* 1988). This thesis uses both, by determining how well the statutory and non-statutory protected areas capture different elevation zones and vegetation types of the region. Second, some additional metrics are considered, to characterise more fully the 'value' of private reserves: their configuration (size and connectivity) and integrity of the vegetation types they represent. Section 4.1.3 discusses the rationale behind the methods and metrics chosen.

The aim of the second section of the chapter is to provide a comprehensive overview of PCA social features, establishing in particular certain sectoral characteristics of private reserves (ownership, tenure, land uses, financial conditions), the conservation management goals and practices of PCAs, the preliminary motivations of the landowners, and potentially applicable incentives measures. Definitions for the terminology employed in this section of the chapter are presented in section 4.1.3.

4.1.3 Rationale and definitions

To be effective, reserves should represent the full range of ecological values and community and ecosystem processes through time on the management area (Scott & Csuti 1997, Montigny & MacLean 2005). The degree to which either public or private reserves in the Little Karoo serve to protect important elements of biodiversity in the region is unknown. Statutory Protected Areas (SPAs) are normally viewed as constituting the cornerstone of conservation efforts (e.g. Redford & Richter 1999, Bruner *et al.* 2001, Sinclair *et al.* 2002, Rodrigues *et al.* 2004, Burgess *et al.* 2005, Chape *et al.* 2005, Pierce *et al.* 2005), irrespective of their actual performance in protecting biodiversity and the processes that sustain it. 'Off-reserve' strategies are usually aimed at extending or 'filling the gaps' in the coverage of statutory reserves (e.g. TNC 1997, Stein *et al.* 2000).

Hence, comparison with the public reserves will provide an ideal 'baseline' against which to judge the attributes and conservation 'performance' of PCAs. However, the conservation 'effectiveness' or 'value' of reserves and reserve systems is not a fixed, objective criterion: sites appear to have different qualities for conservation depending on which metrics are considered (Harris *et al.* 2005, Salomon *et al.* 2006). To achieve conservation goals through a network of reserves, the first step is to evaluate potential sites; the outcome clearly depends on which site characteristics are taken into account. In each case, explicit criteria must be established, and the conservation value of reserve sites must be characterised against these criteria (e.g. Scott *et al.* 1993, Salomon *et al.* 2006). Thus, for the purposes of the current study, the conservation 'value' of candidate reserve networks (SPAs vs. PCAs) will be evaluated on the basis of the following multiple metrics (refer to 3, section 3.6.2.1 for the rationale to analyses):

(a) Their ecological representation of biodiversity patterns through a gap analysis, including consideration of habitat integrity within reserves; the assumption is that greater diversity and less transformation within reserves in a protected area network increase its effectiveness in achieving the conservation of biodiversity patterns.

(b) Their ecological representation of biodiversity processes, through consideration of the sizes and connectivity of reserves; the assumption is that larger and more connected areas are increasingly valuable, being more effective in achieving the conservation of the ecological processes that generate and maintain biodiversity.

Finally, private parks are here considered to fall into two categories (for the purposes of the social analyses, section 4.4): 'formal' areas that have some recognition as a private conservation area, and 'informal' conservation areas with no such official recognition. Private Nature Reserves and Conservancies are considered to fall into the former category, whilst parcels of land such as game ranches and others make up the latter.

4.2 Ecological characteristics of PCAs: results

4.2.1 Extent, and reservation bias, of protected area networks in the Little Karoo

Figure 4.1 shows the distribution of protected areas in the Little Karoo vegetation-planning domain[1] (all statistics for the following section will refer to the LK vegetation planning domain, even though this may be referred to as 'LK planning domain' for simplicity). The total area of the planning domain is 16,603 km^2. What is immediately apparent from consideration of Figure 1 is that a considerable proportion of the planning domain is under some form of protection (5,116 km^2 or approximately 30%). However, what is noteworthy is that PCAs account for more area protected than SPAs do (17% vs. 13%, i.e. 2,893 vs. 2,223 km^2).

[1] The Little Karoo vegetation planning domain results from the overlay of the Little Karoo planning domain and the vegetation layer: chapter 3, section 3.6.1.2.

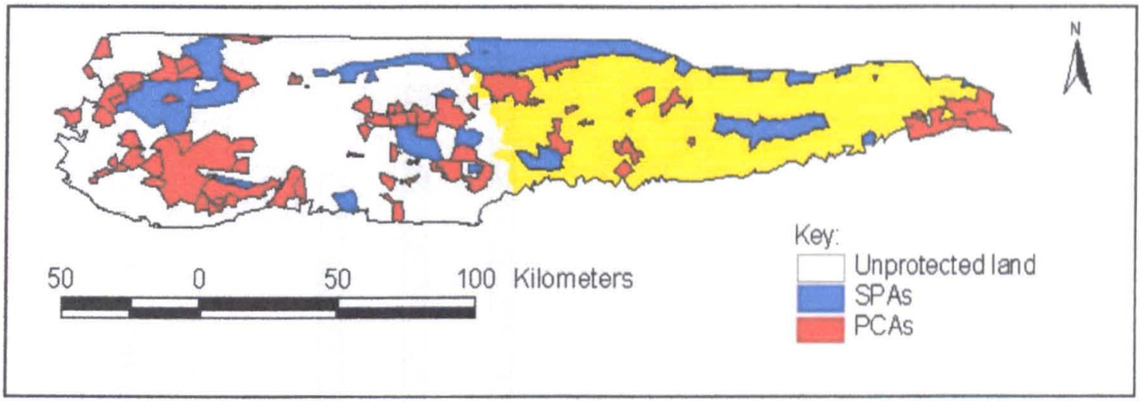


Figure 4.1. The distribution of protected areas in the Little Karoo planning domain. The area shaded in yellow demarcates the Eastern Little Karoo (and is unprotected land outside of the SPAs and PCAs). SPAs = statutory protected areas; PCAs = private conservation areas.

With regards to the configuration of the two reserve systems, there is no longitudinal bias in the distribution of statutory protected areas. SPAs cover an approximately equal extent in both the East and West of the planning domain (15% vs. 12.2%; Binomial test[2], $p = 0.25$, two-tailed; for this and all other statistical tables, refer to Appendix H). However, they disproportionately represent mountainous areas: areas of the planning domain at elevations above c. 1,300 m asl mostly occur within statutory protected areas, whilst very little land under c. 700 m asl is included (Figures 4.2, 4.3 and 4.4). The vast majority of the Little Karoo falls in a belt between c. 230 and 1,000 m asl (Figures 4.2 and 4.4; chapter 3, section 3.2). A binomial test revealed that the proportion of domain above c. 1,000 m asl that falls within the statutory network (34.9%) is significantly greater than the proportion of the domain below c. 1,000 m that is captured by SPAs (6.6%) ($p < 0.0001$, two-tailed). The most striking pattern in the distribution of PCAs consists of their marked bias towards the Western sector of the planning domain (Figure 4.1), where they cover a far greater proportion of the land area (22%) compared to the East (10.8%) (Binomial test, $p = 0.01$, two-tailed). PCAs instead show no marked increase with altitude, with the proportion of domain above c. 1,000 m asl that occurs within private reserves (10.9%) being roughly equal to the proportion of domain below c. 1,000 m asl that occurs within PCAs (13.5%) (Binomial test, $p = 0.24$, two-tailed). Private reserves are mostly found at elevations between c. 230 and 1,000m, which, as discussed, form the majority of the LK domain. Compared to the statutory reserve network, they represent a far greater proportion of the lowlands (Figures 4.2, 4.3 and 4.4).

[2] Although use of the Binomial test in this and other instances in the thesis may introduce a potential bias (because of spatial autocorrelation), this is not deemed to significantly affect the results or their interpretation.

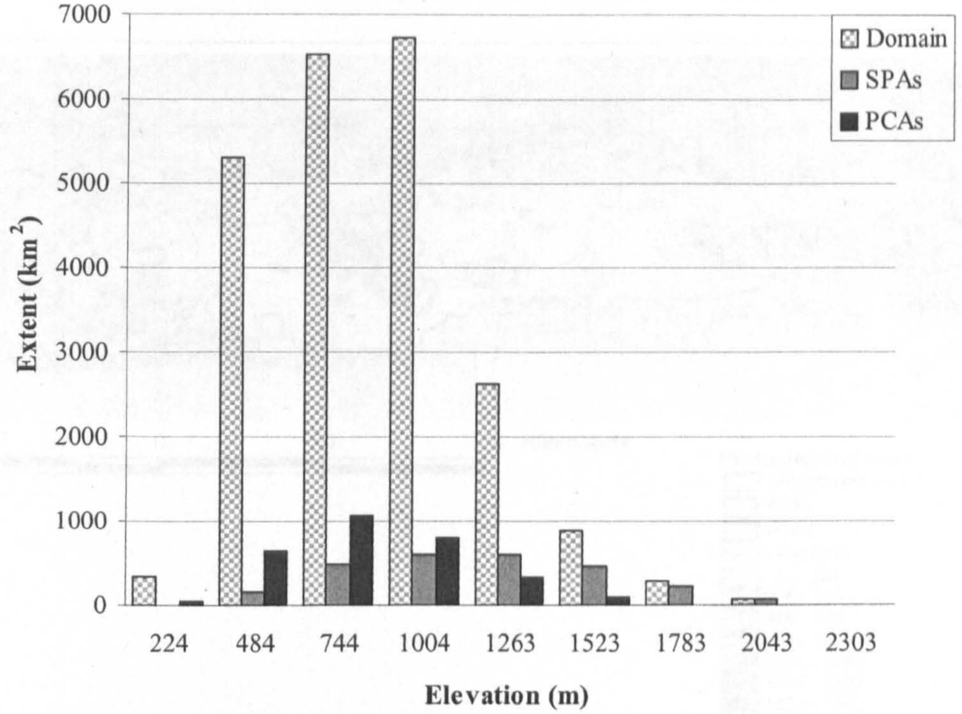


Figure 4.2. Distribution of different altitudinal belts within the Little Karoo. The extent of each altitudinal belt within the domain is shown against the extent that falls within SPAs and PCAs. Value labels for elevation are expressed in metres, and range from the previous maximum elevation value, to the value shown. E.g. 'Elevation 484' represents areas of elevation 225 to 483 m; 'Elevation = 744' represents areas of elevation 485 to 743 m, etc.

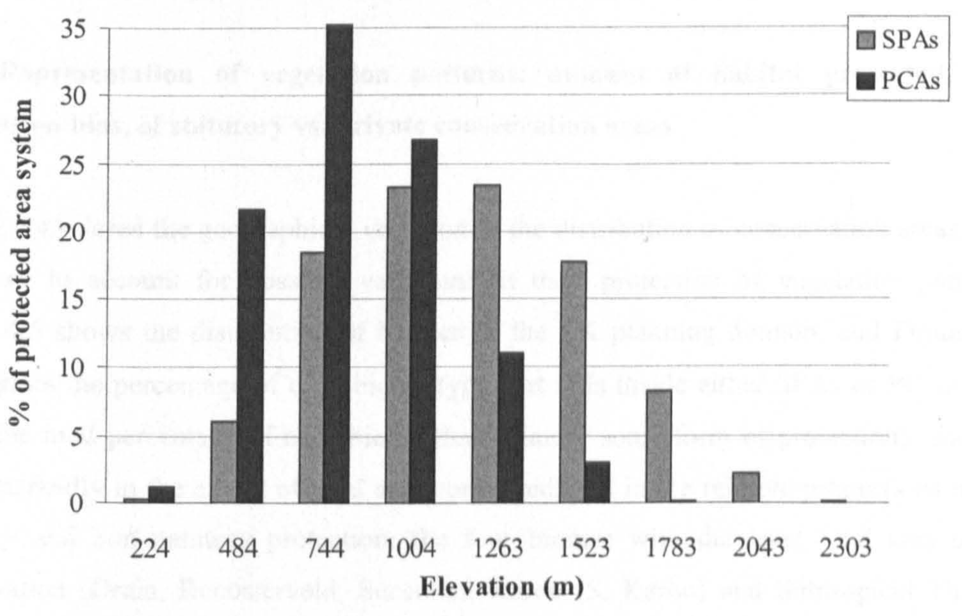


Figure 4.3. Distribution of different altitudinal belts within the SPA and PCA networks. Value labels for elevation are expressed in metres, and range from the previous maximum elevation value to the value shown. E.g. 'Elevation 484' represents areas of elevation 225 to 483 m, etc.

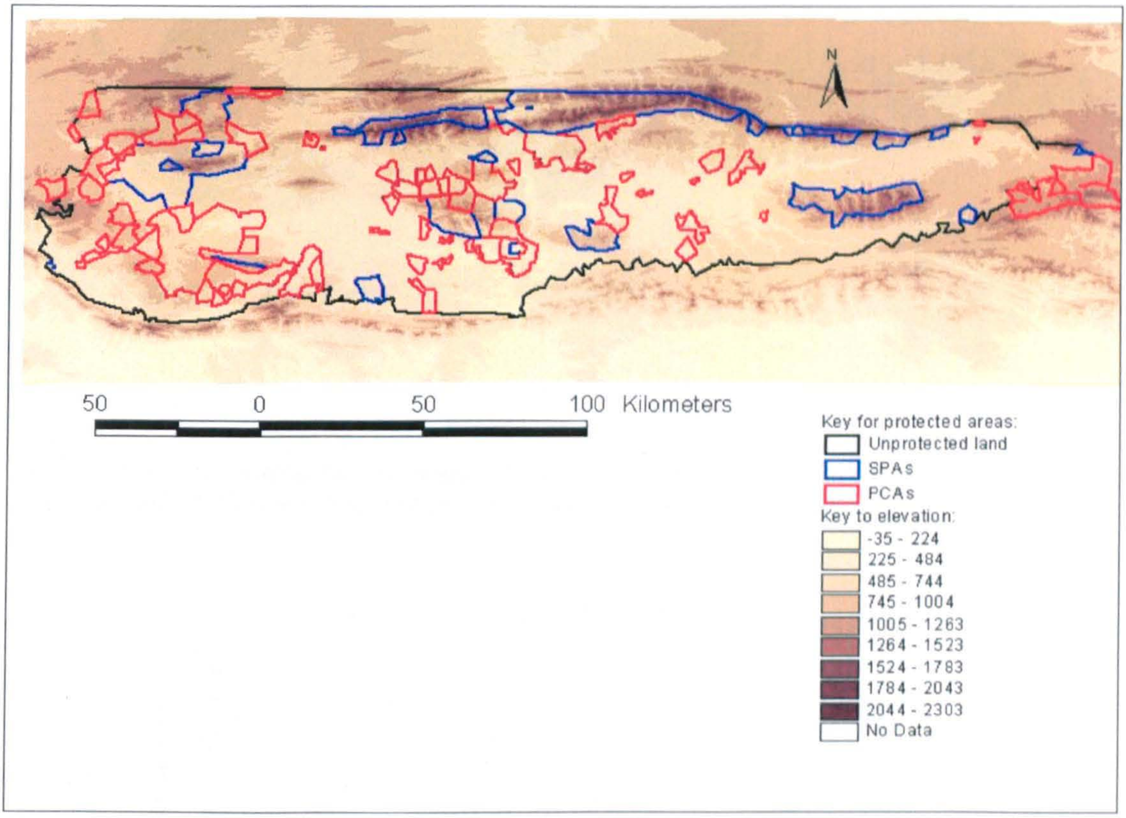


Figure 4.4. The distribution of protected areas in the Little Karoo against elevation (expressed in metres). SPAs = statutory protected areas, PCAs = private conservation areas.

4.2.2 Representation of vegetation patterns: amount of habitat protected, and reservation bias, of statutory vs. private conservation areas

Having considered the geographical variation in the distribution of conservation areas, it is necessary to account for possible variations in their protection of vegetation patterns. Figure 4.5 shows the distribution of biomes in the LK planning domain, and Figure 4.6 summarises the percentage of each biome type that falls inside either SPAs or PCAs (and hence the total percentage of each biome that is under some form of protection). Biomes differ markedly in the extent of total area conserved, and in the relative proportions under statutory and non-statutory protection: the four biomes with the least total area under conservation (Drain, Renosterveld, Succulent Karoo (S. Karoo) and Subtropical Thicket (Thicket)) are also those with the greatest proportion falling under private conservation, whilst the opposite is true for the remaining two biomes (Figure 4.6).

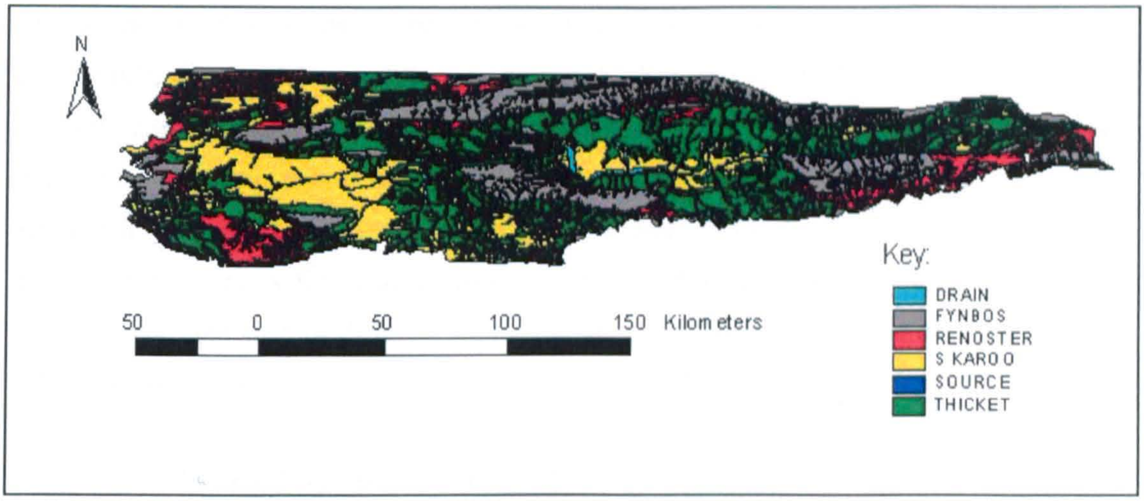


Figure 4.5. The distribution of biomes within the Little Karoo planning domain. 'Renoster'= Renosterveld; 'S Karoo' = Succulent Karoo; 'Thicket' = Subtropical Thicket.

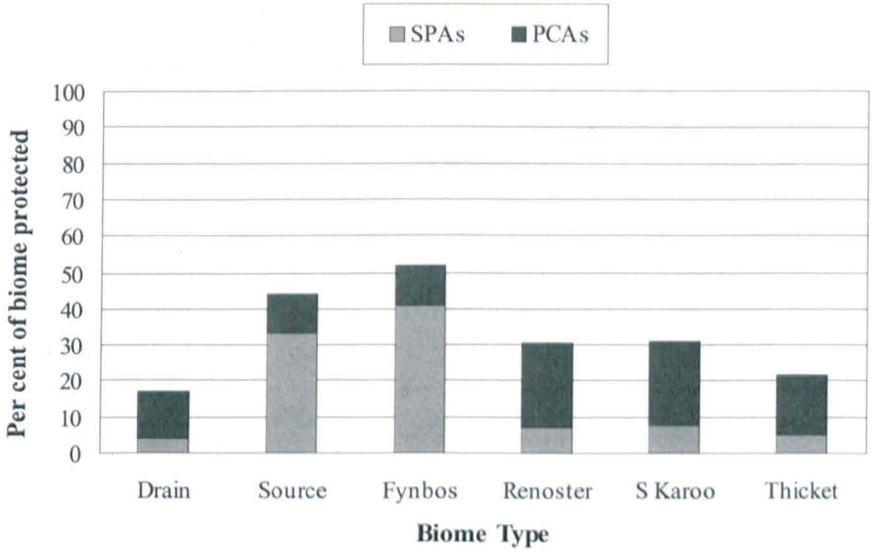


Figure 4.6. Percentage extent of biomes in the two categories of protection, Statutory Protected Areas vs. Private Conservation Areas.

SPAs protect significantly more of the Fynbos and Source biomes than do PCAs (Binomial test for Fynbos, $p < 0.0001$; Binomial test for Source, $p < 0.0001$; two-tailed), whilst the opposite is true for the other four biomes (Binomial test for Drain, $p < 0.0001$; Binomial test for Renosterveld, $p < 0.0001$; Binomial test for S. Karoo, $p < 0.0001$; Binomial test for Thicket, $p < 0.0001$; two-tailed). Given the bias of the statutory reserve network towards the former two vegetation types, the contribution of SPAs was masked from analyses in order to more objectively assess the variability in vegetation pattern representation of

PCAs. The extent of biomes in the planning domain varies significantly ($\chi^2 = 68.7$, d.f. = 5, $p < 0.0001$; Figure 4.5 and Table 4.1), with S. Karoo and Thicket the most abundant biomes, and the aquatic Drain and Source biomes far less abundant. However, the proportion of each biome captured by the private reserve network does not differ significantly from the proportion of that biome present in the domain ($\chi^2 = 0.28$, d.f. = 5, $p = 0.1$; Table 4.1). A Kolmogorov-Smirnov test failed to reveal any significant difference in PCA representation of different biomes among the East and West of the Little Karoo ($D = 0.06$, $p > 0.05$).

Table 4.1. Variability in biome representation of Private Conservation Areas. The table shows the extent of each biome type in the planning domain (contribution of statutory protected areas masked), against the extent conserved within PCAs. The percentage extent of each biome against the total amount of habitat in the domain, and the percentage extent of each biome against the total amount of habitat conserved by PCAs, is shown in brackets.

		Extent (ha)	
Biome		**In domain [%]**	**In PCAs [%]**
Source		252 [1.8]	41 [1.4]
Drain		986 [6.9]	137 [4.7]
Renosterveld		1831 [12.7]	464 [16]
Fynbos		1910 [13.3]	353 [12.2]
Succulent Karoo		3001 [20.8]	755 [26.1]
Subtropical Thicket		6400 [44.5]	1143 [39.6]
	Total	14,380	2893

4.2.3 Transformation: integrity of reserves and biomes

In addition to establishing the variation in the representation of biome types between the two systems of conservation areas, it is necessary to determine the extent to which the proportions under conservation are either severely transformed, moderately transformed, or untransformed (refer to chapter 3, section 3.6.1.2, for a definition of the different transformation categories). Chi-square tests revealed that the proportions of severely transformed, moderately transformed and pristine vegetation found within both the PCA and SPA networks did not differ significantly from the proportions found within the domain (chi-square test for PCA network: $\chi^2 = 0.2$, d.f. = 2, $p = 0.9$; for SPA network:

$\chi^2 = 2.31$, d.f. = 2, $p = 0.31$). However, SPAs and PCAs differ in relation to the integrity of the vegetation they protect: 7.6% of the SPA network is made up of severely transformed habitat, 48.4% of moderately transformed habitat, and 44% of pristine; for PCAs, the relevant proportions, respectively, are 16.8%, 68.2% and 15%. Overall, the integrity of habitat protected by statutory reserves is significantly higher than that of the private reserves: the proportion of severely transformed habitat within the PCA network is significantly more than that found within the SPA network (Binomial test, $p = 0.002$, two-tailed), and the proportion pristine significantly less (Binomial test, $p < 0.0001$, two-tailed). When the proportions of severe, moderate or non-altered habitat are broken down between biome types, it is apparent that for each biome (except Thicket) SPAs protect a greater proportion of pristine habitat than PCAs do, and generally a smaller proportion of severely transformed habitat (Figure 4.7a,b). However, there are no significant differences, for any of the biomes, between the proportions conserved by the two types of protected areas across different transformation categories (chi-square test for Fynbos: $\chi^2 = 0.33$, d.f. = 2, $p = 0.85$; for Renosterveld: $\chi^2 = 0.90$, d.f. = 2, $p = 0.63$; for Thicket: $\chi^2 = 0.24$, d.f. = 2, $p = 0.89$; for S. Karoo: $\chi^2 = 1.04$, d.f. = 2, $p = 0.59$; for Drain: $\chi^2 = 0.58$, d.f. = 2, $p = 0.75$; for Source: $\chi^2 = 1.54$, d.f. = 2, $p = 0.46$).

To place the representation of protected areas within the context of the landscape, the degradation patterns of biomes across the entire domain were qualitatively assessed, in order to ascertain those most transformed. The Drain biome is the most transformed in the domain (in terms of being the biome with the highest percentage of its extent severely transformed), followed by the Succulent Karoo, Subtropical Thicket, Source, Renosterveld and Fynbos (Table 4.2). The Drain and Succulent Karoo biomes are also those with the smallest percentage of their extent in an untransformed state. As noted above, these two most highly-transformed biomes are both captured to a greater extent by the private conservation area network than by the statutory network, and with no significant difference between the extents protected across different transformation categories.

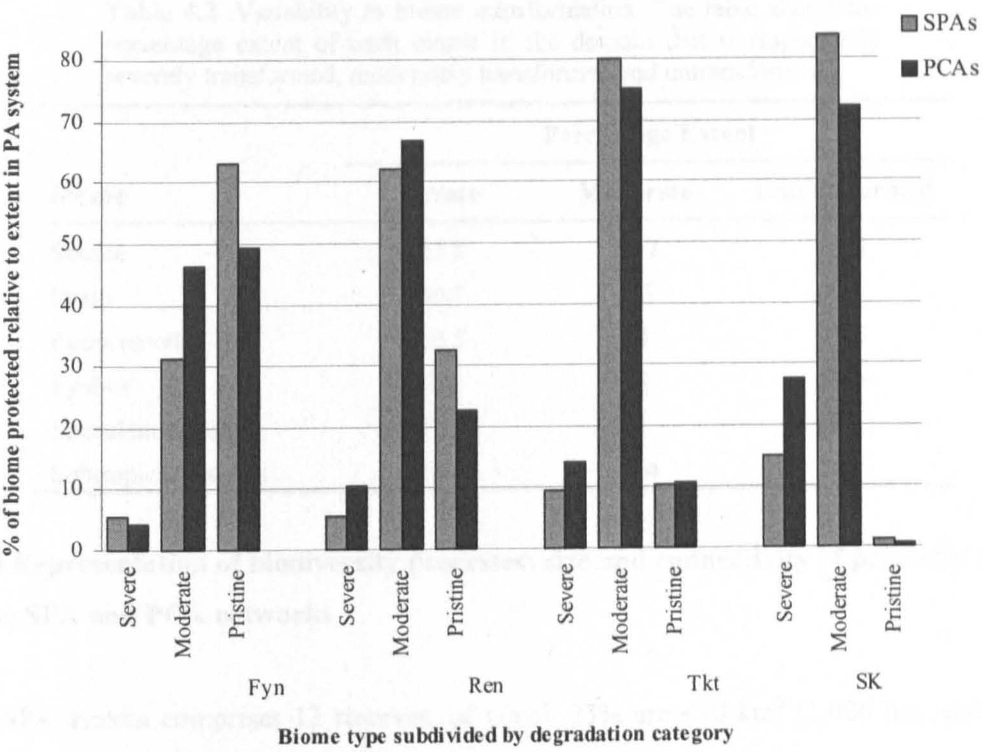


Figure 4.7a. Percentage extent of terrestrial biomes in different degradation categories captured by the two systems of protected areas (Statutory Protected Areas vs. Private Conservation Areas).

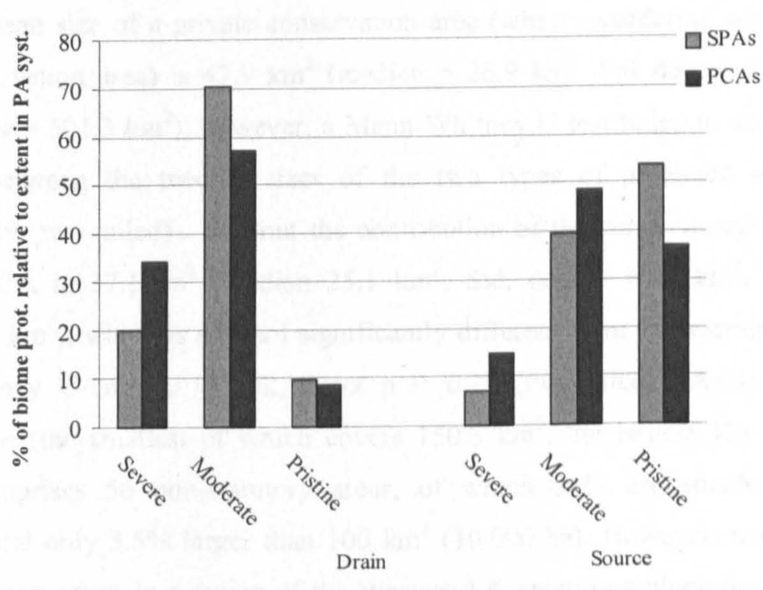


Figure 4.7b. Percentage extent of aquatic biomes in different degradation categories captured by the two systems of protected areas (Statutory Protected Areas vs. Private Conservation Areas).

Table 4.2. Variability in biome transformation. The table shows the percentage extent of each biome in the domain that is respectively severely transformed, moderately transformed and untransformed.

	Percentage Extent		
Biome	**Severe**	**Moderate**	**Untransformed**
Source	23.5	39.7	36.5
Drain	49.7	43.9	6.4
Renosterveld	20.5	54	25.5
Fynbos	7.6	38	54.5
Succulent Karoo	37.5	61	1.5
Subtropical Thicket	25.4	65.4	9.2

4.2.4 Representation of biodiversity processes: size and connectivity of protected areas in the SPA and PCA networks

The SPA system comprises 13 reserves, of which 23% are <10 km^2 (1,000 ha), and 30% are >100 km^2 (10,000 ha). Figure 4.8 compares the size distributions of reserves within each of the two systems of protected areas. The mean size of a statutory protected area is 164.6 km^2 (median = 29.3 km^2, Std. dev. = 247.9 km^2, min = 0.1 km^2, max = 730 km^2), whilst the mean size of a private conservation area (when considering conservancies as a single conservation area) is 47.9 km^2 (median = 26.9 km^2, Std. dev. = 81.7 km^2, min = 1.7 km^2, max = 501.3 km^2); however, a Mann-Whitney U test failed to show a significant difference between the median sizes of the two types of protected area (U = 329, exact p = 0.39 (two-tailed)). Without the contribution of the conservancy areas, the mean size of a PCA is 37.1 km^2 (median 25.1 km^2, Std. dev. = 67.7 km^2, min =1.7 km^2, max = 501.3 km^2), which is still not significantly different from the average size of a SPA (Mann-Whitney U test, U = 292, exact p = 0.28 (two-tailed)). Aside from the four conservancies (the smallest of which covers 150.3 km^2, the largest 323 km^2), the PCA network comprises 56 non-statutory areas, of which 26% are smaller than 10 km^2 (1,000 ha), and only 3.5% larger than 100 km^2 (10,000 ha). However, many of these are adjacent to each other, in a region of the Western LK creating a block in the landscape of 1025.4 km^2 (involving 18 non-conservancy PCAs in total; refer to Figure 4.1). In many cases these PCAs are adjacent to statutory conservation areas, thereby increasing the total extent of habitat under protection, and/or potentially providing corridors in the landscape (refer to Figure 4.1).

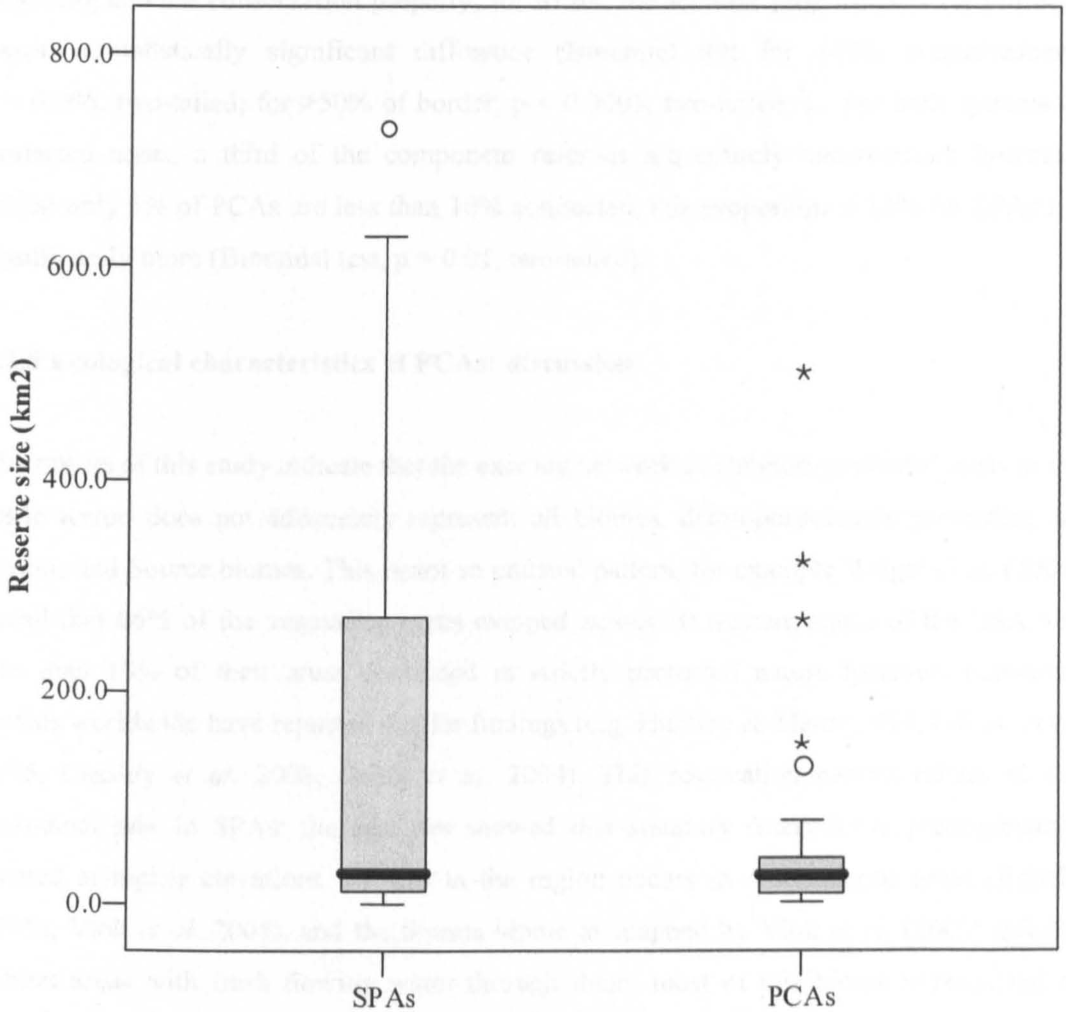


Figure 4.8. Size distribution of reserves within each type of protected area system occurring in the planning domain. The Private Conservation Areas boxplot includes the conservancies, each classed as a single area.

With regards to the connectedness of the protected area networks (evaluated using the simple structural connectivity measure discussed in chapter 3), it is apparent that PCAs are more connected than SPAs (refer also to Figure 4.1). On average, private reserves adjoin another protected area (whether statutory or non-statutory) for 30% of their boundary (calculated using standard procedures in ArcView for measuring the perimeter of protected area polygons), whilst public reserves share a significantly smaller proportion of their border, 19% (Binomial test, $p = 0.005$, two-tailed). 7% of PCAs share their entire boundary with other protected areas, and another 17% have more than half of their boundary adjoining another conservation property; for SPAs, the relevant proportion is zero in both cases, a statistically significant difference (Binomial test for 100% connectedness, $p = 0.006$, two-tailed; for >50% of border, $p < 0.0001$, two-tailed [2]). For both systems of protected areas, a third of the component reserves are entirely unconnected; however, whilst only 3% of PCAs are less than 10% connected, this proportion is 12% for SPAs i.e. significantly more (Binomial test, $p = 0.01$, two-tailed).

4.2.5 Ecological characteristics of PCAs: discussion

The results of this study indicate that the existing network of statutory protected areas in the Little Karoo does not adequately represent all biomes, disproportionately protecting the Fynbos and Source biomes. This is not an unusual pattern, for example Wright *et al.* (2001) found that 66% of the vegetation types mapped across 10 western states of the USA had less than 10% of their areas contained in strictly protected nature reserves; numerous studies worldwide have reported similar findings (e.g. Huntley & Matos 1994, Caicco *et al.* 1995, Cassidy *et al.* 2001, Cantú *et al.* 2004). This reservation pattern relates to the altitudinal bias in SPAs: the analyses showed that statutory reserves are predominantly located at higher elevations. Fynbos in the region occurs in mountainous areas (Rebelo 1996a, Vlok *et al.* 2005), and the Source biome as mapped by Vlok *et al.* (2005) reflects habitat areas with fresh flowing water through them; most of this biome is restricted to areas located within the Cape sandstone mountains (Vlok *et al.* 2005). Thus this study provides quantitative support for Hoffman's (1996) unsubstantiated characterisation of the statutory conservation status of the Little Karoo as 'poor', on the basis of the observation that most statutory reserves are located on higher lands.

There are two probable underlying reasons for the particular reservation pattern of the statutory network. The first relates to the utilisation patterns of different biomes. Fynbos vegetation types occur on infertile soils (refer to Appendix A) and are little utilised for

[2] In both cases when running the test in SPSS the proportion of SPAs was set at 1%: it is assumed that the finding of a statistical difference will hold for the observed frequency of 0%.

agriculture; the major use of fynbos is for recreation, water catchment and flower harvesting (Rebelo 1996a,b), and accordingly, much of the vegetation type is conserved as water catchment areas (Rebelo 1996a). Most of the Source biome is "vital for humans, as it delivers clean fresh water to agriculture and communities at the base of mountains" (Vlok *et al.* 2005: 36) and hence it is not surprising that it should fall in large part under statutory reservation. The second factor, related to the first, concerns altitude: at higher elevations land tends to be marginal and unsuitable for agriculture. This reservation bias mirrors reservation biases across the entire Cape Floristic Region (of which the Little Karoo is part) (Rouget *et al.* 2003a). As such, it probably reflects historical decisions on the establishment of conservation areas half a century ago in the Cape Floristic Region (Rouget *et al.* 2003a): emphasis was placed on mountains, and, because it is practically easier to manage one block than several scattered blocks, conservation areas have been expanded in the region by purchasing adjacent areas and thus increasing the proportion of mountainous areas already conserved (Rebelo 1997). Additionally, after mid-1980, conservation authorities inherited the state-owned Mountain Catchment Areas, which were the result of initiatives from a very early stage to protect the mountain catchments for water delivery: for example, the Swartberg Catchment was proclaimed in the 1870s (R. Cowling 2005, pers. comm., 21 Oct). Thus only about a century after establishment were Mountain Catchment Areas proclaimed as reserves; their primary role was for water production and thus there was no explicit consideration given to their conservation value (Rouget *et al.* 2003a). Throughout southern Africa nature reserves have historically not been established with biodiversity criteria under consideration (e.g. Balmford *et al.* 1992, Preston *et al.* 1995, Pfab 2002).

The patterns encountered within the Little Karoo and southern Africa are by no means unique: statutory networks worldwide tend to over-represent highland areas, and other regions with low agricultural potential (e.g. Fearnside & Ferraz 1995, Powell *et al.* 2000, Scott *et al.* 2001, Oldfield *et al.* 2004, Maiorano *et al.* 2006). Seldom have protected areas been designed with the conservation of biodiversity in mind; rather, spectacular scenery and/or the lack of alternative land uses have been major determinants (e.g. Scott *et al.* 1987, Pressey *et al.* 1996). The geographic bias of statutory reserves affects their effectiveness in conserving biodiversity patterns and processes. The gaps identified in the SPA network tend to be located in lower-lying regions with more fertile land (chapter 3, section 3.2.), as has been the case within the Cape Floristic Region (Rouget *et al.* 2003a) and elsewhere (e.g. Burgess *et al.* 2005). Thus, the statutory network leaves the majority of biomes vulnerable to future transformation, as the largest gaps are located within the more densely-settled and farmed lowlands, where threats of future habitat loss are high (Rouget *et al.* 2003b). Completing the protected area system to ensure adequate representation of all biomes would seem to be the most logical action to take. The development of additional large government-protected reserves in the lowlands would be difficult, given that socio-economic realities constrain the viability of this kind of option (Cantú *et al.* 2004). In this context, an important role could be played by the PCAs, which have here been shown partially to fill the SPA gaps, accounting for the greatest proportion of biome protected in four of the six biomes occurring in the LK. Additionally, no gaps within the PCA network's coverage of biomes have been shown, nor a bias in relation to altitude, which has positive implications for achieving the conservation of a more representative biodiversity pattern.

In relation to the integrity of biomes and protected area systems, though statutory reserves in total protect less severely transformed land, it has also been shown that when broken down between biomes, the differences across transformation categories between public and private reserves are not significant. The quality of habitat protected by PCAs needs to be improved upon, but is not significantly worse than the quality of habitat protected by SPAs. Across the domain, it has been qualitatively shown that the Drain and Succulent Karoo biomes are those most at risk from transformation. The high proportion of Drain biome that is severely transformed may be related to its distribution within the lowest points in the landscape, where water draining from the upper catchment areas is transported to the sea (Vlok *et al.* 2005). Vlok *et al.* (2005) note that the upper floodplain embankments have in many cases been transformed to establish intensive agricultural crops, such as lucerne. Habitat types of this biome may be extensively used for agriculture.

As discussed in chapter 3 (and Appendix A), the relatively high fertility of the Little Succulent Karoo soils has led to clearance of most of the vegetation for farming. Herbivory alters the vegetation composition (e.g. Stokes 1994, Owen-Smith & Danckwerts 1997), such that it cannot easily be brought back to a more palatable plant population by resting: for example, overgrazed and eroded sites at Worcester (slightly West of the westernmost extent of the LK domain) were not yet completely restored after 45 years (Smitheman & Perry 1990). No rapid, reliable or economically feasible way to restore function and species diversity to S. Karoo has yet been identified (Milton *et al.* 1997), which makes the alteration of this biome of particular concern. The formal conservation status of the S. Karoo is poor (Rebelo 1997), and characterised by public apathy (MacDonald *et al.* 1993). Therefore, 'conservation of this rich succulent flora ... rests in the hands of landowners' (Milton *et al.* 1997: 161). Accordingly, it is positive that at least some of the Drain and Succulent Karoo biomes are conserved by PCAs, given their low representation within the statutory network.

Bias in private conservation areas is greatest in relation to longitude. There are two suggested reasons for this pattern: the first, that it reflects an increasing distance from Cape Town, found to be an important factor guiding the motivations and location choices of PCA owners in the Little Karoo, who prefer to acquire private reserves closer to Cape Town (cf. chapter 5, section 5.2.4.3). The second, that it reflects suggested trends in farming activity across the region, according to which farming activity is still occurring in the Eastern sector of the planning domain, but declining in the West (J. Vlok 2005, pers. comm., 10 Jun). The difference is ascribed to rainfall patterns, thought to decrease along an East to West gradient in the planning domain, and further to the availability of irrigation opportunities: owing to lower rainfall in the West and a stronger winter fraction, the West is thought to have lower primary production indices and, hence, lower farming potential (J. Vlok 2005, pers. comm., 10 Jun; R. Cowling 2007, pers. comm., 15 Jul). Certainly summer rainfall increases towards the East (Midgley *et al.* 2005).

Although SPAs can reach much larger sizes than PCAs, and therefore are presumed to better guarantee the conservation of biodiversity process, the median size of reserves in the two networks is found not to differ significantly. Thus, private reserves can be expected to contribute to the conservation of biodiversity processes, given a number of considerations. First, small reserves have been recognised as potentially significant for conservation (e.g. Chape *et al.* 2003): even small and isolated protected areas can effectively maintain biodiversity that has limited spatial and temporal needs, which is especially the case for centres of plant diversity where seed dispersal is limited, such as South Africa's Cape Floristic Province (e.g. Cowling & Bond 1991, Kemper *et al.* 1999, Sims-Castley *et al.* 2005). Thus size need not be a constraint on the potential contribution of PCAs to process representation. Second, PCAs have also been shown to vastly outnumber the statutory conservation areas (being over four times as numerous), and to capture more land area in the planning domain (17% of domain vs. 13% for the SPAs). Third, they have also been shown to be significantly more (potentially) connected and (potentially) to provide linkages with statutory conservation areas. A reserve network should consider linkages among individual areas (Groves 2003): the potential threats posed by fragmentation to conservation of biological diversity were recognised from island biogeography theory (MacArthur & Wilson 1967), and led to efforts to improve the connectivity of landscapes (e.g. Bennett 1998; chapter 3, section 3.6.2.1). The negative effects of fragmentation on biodiversity loss suggest that all but the largest protected areas need to consider their proximity to other parks; the need for landscape linkages is likely to be especially relevant to private reserves, because of their generally small size (Langholz 2002: 183-184). The proximity of PCAs to each other can potentially improve their representation of biodiversity processes; their proximity to SPAs can potentially enhance the latter by adding to the amount of contiguous land under protection, at least for some species. With the widespread practice of fencing PCAs in the Little Karoo (section 4.3.3) future conservation policies will need to address this issue to allow for the full range of movement of species (chapter 8).

4.2.5.1 Ecological characteristics of PCAs: conclusions

Though private reserves in the Little Karoo are on average smaller than statutory reserves, they have been shown to be more representative of vegetation patterns and more connected in the landscape, though this connectivity will not be realised for the subset of species whose movement patterns are impeded by the presence of fencing (such as wide-ranging antelope species). PCAs in the Little Karoo are already partially filling the gaps in the coverage of the statutory reserve network; thus it is suggested that private reserves are essential for achieving a more complete representation of vegetation types and the maintenance of biodiversity processes in the region. The only apparent bias in the distribution of PCAs was encountered in relation to longitude, and thus future conservation policies ought to address the lack of private reserves in the East of the planning domain. Supporting private reserves may also prove to be the best way to protect the biomes most transformed across the landscape (Drain and Succulent Karoo). The value of engaging with private landowners to counter gaps in the representation of statutory reserves has also been noted elsewhere (e.g. Oldfield *et al.* 2004).

Quantitative assessments as undertaken by the present study are useful for appreciating the magnitude and direction of bias, and in turn allow for improved planning of more representative systems. The contribution of non-statutory conservation areas to pattern and process representation has been shown to be substantive, and thus efforts to increase the security of their long-term protection are justified. This research adopted 'coarse-filter' values in its assessment of the value of different systems of protected areas. 'Coarse-filter' approaches assess the conservation value of broad-scale ecosystems and landscapes throughout a bioregion (e.g. Noss 1987, Hunter 1991). The concept suggests that systematic protection of representative ecosystems should conserve the vast majority of species within that bioregion without the necessity of considering each species individually (e.g. Schulte *et al.* 2006). In contrast, 'fine-filter' approaches deal directly with the individual species that are assumed not to be adequately protected by coarse filter conservation, for example uncommon species or those threatened by over-exploitation (Noss 1987). Knowledge of ecological systems and conservation of their biodiversity can be gained in a hierarchical manner, using 'coarse-filter' methodologies such as gap analysis to capture community types and processes (Noss 1987). Decisions regarding the appropriate scale(s) of investigation should reflect project objectives and specific hypotheses (Beever *et al.* 2006). Selecting a broad scale was appropriate for the broad focus of this study, which was to provide an initial assessment of the 'value' of PCAs and take a first step in evaluating different reserve systems in the Little Karoo. The outputs are further more relevant and comprehensible to land-owners and land-use planners than fine-scale ecological data.

Within this phase of research, use of GIS supported the use of the 'coarse-filter' approach adopted. GIS methods were highly useful for the purposes of this study, allowing for an ecological description of the PCA sector through their ease of visual representation, and through their ability to integrate visualisation with method. Thus, GIS methodologies suited the aim of generating and interpreting broad patterns and trends. Their functionality allowed for easier, more rapid and accurate extraction of information.

There are however many situations in which spatial information provides only part of the answer, as is the case for this research. GIS allow for mechanistic appreciation of processes, but not causal. Within the scope of this project, GIS tools proved a useful aid to research: as a quantitative method, they were properly applied in a descriptive mode, as a way of untangling a complex of material without implying causation. There are further limitations to the results presented here. As in any gap analysis, and for any research project utilising GIS, the results depend heavily on the quality and availability of the datasets used (e.g. Maiorano *et al.* 2006). In such conservation planning exercises it is necessary to identify a suitable surrogate for biodiversity (Margules & Pressey 2000). Often the choice has to be based on expediency, as mapping the distribution of biodiversity elements is expensive and time-consuming, forcing many conservation planners to use any available data (Oldfield *et al.* 2004). The vegetation database used accurately represents the distribution of vegetation types in the Little Karoo, but does not account for remaining biodiversity, which is still unmapped.

Additionally, GIS mapping of the Little Karoo constitutes a static representation that on its own runs the risk of obscuring the dynamic properties of the system. GIS systems usually deal with static information, i.e. with geographic objects that do not change over a short time period (e.g. Asproth *et al.* 1995). Environmental systems are typically dynamic, i.e. the conditions of the system are the result of the past history of the system, and influence its subsequent behaviour (e.g. Asproth *et al.* 1995). The properties of the system examined by this analysis, however, mainly relate to the current distribution and configuration of protected areas within the Little Karoo. Changes in this type of geographical information are more likely to be expressed in years and months, rather than minutes and seconds. Thus, although it is important to note that the results of analyses reflect an interval in time, they are considered an acceptable representation of the system for the purposes of this thesis.

It is further necessary to note that a focus on a single spatial scale reduces the ability to understand the roles of spatial (or temporal) heterogeneity and context that are important in determining the outcomes of disturbance, restoration, and many other phenomena (e.g. Beever *et al.* 2006). Much research investigating heterogeneity at multiple spatial or temporal scales concludes that patterns or dynamics of the component of interest would be incompletely understood if only one or few scales were examined (Beever *et al.* 2006).

Thus, analysis at a species-by-species level is required to maintain habitats for threatened or endangered species (Scott & Csuti 1997, Jennings 2000). This was not the aim of this research, and thus fine-filter objectives were not addressed. Future research should address first the lack of fine-scale (species distributions) data for the Little Karoo, and second evaluate protected area systems in the Little Karoo based on fine-filter objectives, given that reserves are most beneficial when they contribute to conservation value at multiple scales (Montigny & MacLean 2005).

Despite the mentioned limitations, the results are predicted to show some of the broad patterns of protected area gaps and characteristics across the Little Karoo. The limitations apply equally to all reserves, hence they do not distort the comparison of the performance of the two protected area networks, which remains a valid evaluation.

4.3 Social characteristics of PCAs: results and discussion

4.3.1 Ownership and land-use patterns

It would appear that the growth in the PCA sector is a phenomenon taking up a significant part of previously agricultural (Hoffman 1996) land in the Little Karoo, with the number of confirmed PCAs in the region of one hundred (chapter 3; refer to Appendix I for the raw questionnaire data). These areas span a wide range of sizes (min. = 12 ha, max. = 54,000 ha), with the majority not exceeding 5,000 ha, although a fifth of the sample are larger (Table 4.3). The biggest are comparable to many of the state-owned conservation areas in the Little Karoo. This expansion appears to be in line with similar trends in the rest of South Africa and other parts of the world (chapter 2). For example, Van der Waal & Dekker (2000), in their survey of game ranching in the Northern Province, South Africa, calculated that game ranches covered approximately 26% of the total surface area of the Province by August 1998; by comparison, Provincial Nature Reserves represented 2.4% of the surface area. For an example outside of South Africa, Langholz (2002) calculated that private reserves in Costa Rica protected a total of 34,668 ha, ranging in size from 20 to 22,000 ha.

Table 4.3. Private Conservation Area land sizes. The table displays the percentage of PCAs falling within determined size ranges.

PCA size (ha)	Percentage
<999	24.5
1,000 - 3,000	29
3,000 - 5,000	26.5
5,000 - 15,000	16
15,000+	4

With regards to land uses of PCAs, great variability was encountered, with 13 different land uses reported across the sample (ranging from low-intensity land uses, e.g. personal enjoyment, to higher intensity land uses, e.g. game ranching, each of which can occur at a range of frequencies: occasionally, regularly and all the time). Ecotourism was also an extremely common activity, with more than half of all reserves engaging in it on some level. Individual areas varied from being managed simply for conservation, to being subject to three or more different land-uses concurrently. Table 4.4 shows the overall percentage of PCAs on which a determined land-use takes place, against the percentage on which the land-use takes place all of the time. No general trends are apparent, except that the prevalent land use of these areas appears to be based around personal leisure (a suggestion reinforced by a majority of landowners selecting conservation/leisure/non-use of the land as the main use of their reserve; further, by the fact that half of PCAs are not run for profit, section 4.4.2).

These findings need not come as surprising: as far back as the 1980s, 38% of South African game ranchers derived no income at all from their game (Benson 1989, cited in Smith & Wilson 2002). They are also consistent with the development of a conservation-centred ethic in the Little Karoo (section 4.4.4; chapters 5 and 6). Comparable results were also found by Langholz's (1999, 2002) study in Costa Rica, where owners use their reserves for a wide variety of activities, the most common of which was 'personal enjoyment'. Low intensity of land-uses has, naturally, potentially positive implications for conservation. Landowners however can and do use their reserves for a variety of other land-use activities, both within and across the sample. Future studies could attempt to distinguish between, and quantify rigorously, number, type, extent and intensity of different land-use activities, in order to develop an accurate understanding of the overall intensity of land-use in the Little Karoo. As a first analysis, it appears that the majority of areas are under non- or low-use.

Various analyses have highlighted that the rapid increase in game ranching and number of private nature reserves in Southern Africa is, in large part, for the purpose of conducting ecotourism and/or hunting (e.g. Smith & Wilson 2002, ABSA 2003; chapter 2). Within the LK, tourism occurs in half of PCAs, although just 38.5% of these areas run tourism all of the time: for most, tourism is only an occasional activity, and, although this aspect was not specifically investigated, it would appear that many visitors are currently friends, family and business acquaintances, and thus not necessarily tourists in the rigorous sense of the term. There is clearly scope for tourism in the LK to increase. To some extent, it would appear that this is already being addressed by landowners: looking ahead to the future, half (46%) of respondents anticipated a change in land use within the next five years, with the anticipated changes generally involving the creation or increase of tourism (68% of those reporting a change in land-use activities). Hence, marketing of tourism might prove a helpful incentive in the future, given the market still has room for development (Lombard & Wolf 2004). On the other hand, it is interesting to note that 40% of reserves in Langholz's (1999, 2002) Costa Rican study conducted ecotourism 'rarely' or 'never'. According to Langholz (2002: 182) this result may contradict the common perception that all private reserves are involved in the ecotourism industry, and may indicate that PCAs can operate independent of a well-established tourism market.

Table 4.4. Private Conservation Area land uses. The table shows the frequency of occurrence of different land-uses within PCAs. The 'Any frequency' column represents the proportion of areas reporting the occurrence of a determined land-use at any frequency. The 'Constantly' column represents the proportion of areas in which a determined land-use takes place all the time.

	Cases (% of total)	
Land Use	**Any frequency**	**Constantly**
Personal enjoyment of landowner	94	46
Wildlife-viewing or other tourism activities (daytime visitors)	52	20
Wildlife-viewing or other tourism activities (overnight visitors)	40	18
Crop-growing	40	32
Hunting	34	6
Livestock farming	28	16
Game Ranching	22	10
Harvesting wild plants	8	2
Mining or quarrying	4	0
Other	4	4

PCAs in the Little Karoo are mainly under an individual or family ownership structure, with only a third registered as private companies. Further, the majority are directly under the care of their owners, with just 29% falling under the care of an employed manager. No reserves were owned by non-profit organisations (e.g. land trusts), as commonly occurs elsewhere (e.g. Bernstein & Mitchell 2005, Figgis *et al.* 2005, Cowell & Williams 2006). Their future is thus likely to be closely dependent on the variable circumstances and attitudes of their owners (with obvious implications for their permanence and vulnerability), their management strongly subject to the landowners' individual level of expertise and 'expert knowledge'. It therefore becomes necessary, when thinking of potential assistance to offer to landowners, to (a) develop a general, flexible package of incentives that can work regardless of individual circumstances, and (b) tailor any management advice to suit the 'gaps' in the management strategies and knowledge of landowners (cf. chapter 8 for a detailed discussion of incentive strategies for PCAs).

Land ownership trends indicate that PCAs are particularly a phenomenon of recent years, especially since 2000 onwards: twice as many respondents as expected ($\chi^2 = 13.36$, d.f. = 5, $p = 0.02$) acquired their land between 2000 and 2002 (Figure 4.9). This agrees with previously untested observations from South African researchers that private conservation areas have undergone dramatic increases in recent years in the LK (e.g. R. Cowling 2005, pers. comm., 15 Jun). Relatively few landowners in the sample (36%) have been on the land for a considerable length of time (over nine years; Figure 4.9). This rapid turnover generates questions regarding the nature of the drivers to this change in land-use patterns. There is widespread feeling that it is tied to the decrease in productivity of the Little Karoo and to the fact that farming is becoming economically unsustainable in the area (J. Vlok 2005, pers. comm., 10 Jun) and chapter 5 further shows how the PCA growth is related to the global increase in conservation awareness and interest of recent years, among other factors. There is an obvious question as to the likelihood of the permanence of PCAs. However, significantly more respondents (76.6%) expected to keep their PCA operating for a period of 20 years or longer compared to those who intended to maintain it for a shorter time span or who were unsure (Binomial test, $p < 0.0001$), suggesting strong continuity in the present land-use patterns, other things being equal.

Although information on previous uses of the land was not specifically collected, many owners (26%) mentioned that, prior to their arrival, the land was used for various forms of livestock farming, with some adding that the veld had been in a 'terrible state' and/or was 'currently recovering'. Those landowners converting their PCA from a prior land use (20%), as opposed to starting up the reserve on arrival, had previously been engaged in some form of livestock farming as well. Therefore, in at least 46% of cases, it would appear that private conservation territories in the Little Karoo have been established in place of much more intensive land-uses. Although this ultimately depends on the intensity with which they are used for game ranching/hunting or tourism, it conforms to the untested observations that biodiversity-based ventures and private conservation areas are replacing farming activities in the Little Karoo (e.g. Cupido 2005). Overall, these changes in land-ownership and land-use support the contention, made in chapters 5 and 6, that traditional Afrikaans farmers are being replaced by mainly affluent, leisure-oriented people from the cities.

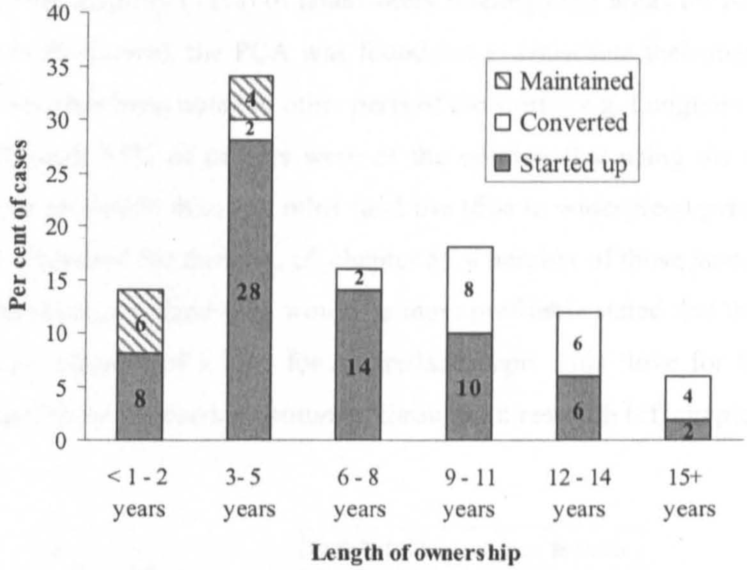


Figure 4.9. Length of ownership of Private Conservation Areas in the Little Karoo (up to 2005), sub-categorised by their time of establishment as a conservation area. 'Started up' represents those PCAs established from the moment the land was acquired by the present landowner; 'Converted' those established in place of a prior land-use by the same landowner (i.e. no change of ownership); and 'Maintained' those that were a PCA prior to the arrival of the current landowner, and that were maintained in that capacity.

4.3.2 Financial aspects of PCAs

The financial analysis suggests that economic considerations are not necessarily fundamental to the establishment of PCAs in the Little Karoo, given that:

(a) There is no significant difference between the number of reserves currently run for profit, and those not (binomial test, $p = 0.67$; Figure 4.10), i.e. as many areas are not for profit as those that are.

(b) In half of PCAs the total gross outgoings exceed the total gross income (Figure 4.11). This is not surprising given that only half of areas are currently for profit. However, it means that half of these natural areas are run at a financial loss to their owners, and therefore that private landowners are potentially delivering conservation benefits to society to their financial disadvantage.

(c) For the majority (71%) of landowners running their areas for business (or intending to in the future), the PCA was found not to constitute their main source of income (which has been noted in other parts of the world, e.g. Langholz *et al.* 2000b); and

(d) Although 65% of owners were of the opinion that using the land as a PCA was more profitable than any other land use (due to widespread perception of the LK as too degraded for farming, cf. chapter 5), a number of those landowners who thought that alternative land-uses would be more profitable stated that they ran their areas as PCAs because of a love for nature/landscape. This 'love for the land/nature' was found to be a recurring sentiment throughout research (cf. chapters 5 and 6).

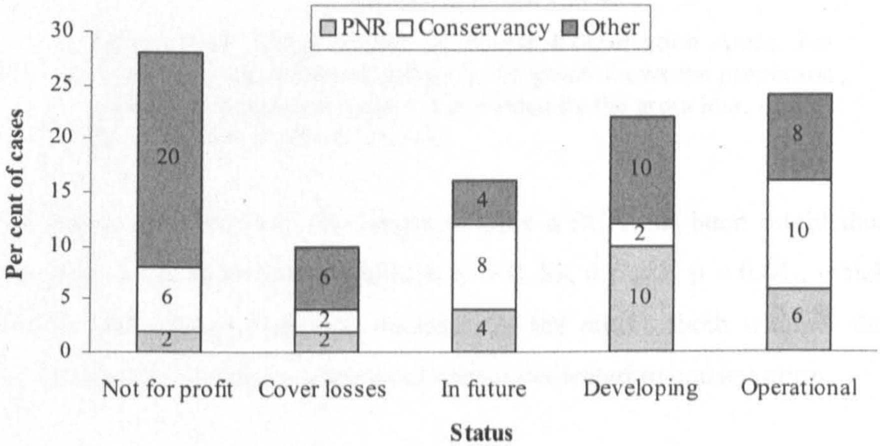


Figure 4.10. Private Conservation Area status. The graph shows the percentage of PCAs falling into different profit-making categories, subdivided by type of PCA (Private Nature Reserve, Conservancy parcel, or other). 'Cover losses' = is run to generate income just to cover losses; 'In future' = will be run for profit in future. These latter two categories are included in the general 'Not for profit' category, whilst 'Developing' and 'Operational' areas both fall within a 'For profit' category.

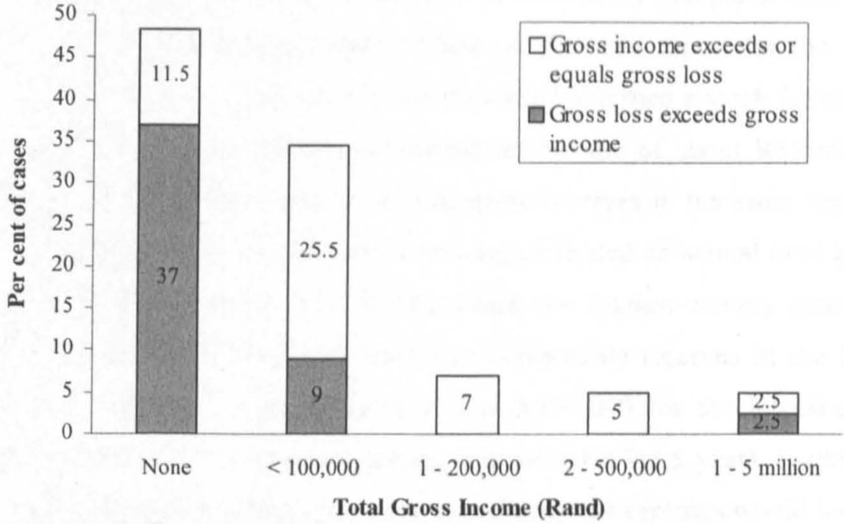


Figure 4.11. Gross income of Private Conservation Areas. For each yearly gross income category, the graph shows the proportion of areas in which this income is exceeded by the gross loss, against the proportion in which it is not.

There is no relationship between the length of time a PCA has been established for, and whether it is run for profit or not (chi-square, $\chi^2 = 0.89$, d.f. = 2, p = 0.64), which suggests that landowners may make conscious decisions at the outset about whether their area is going to be a source of income or a personal retreat dedicated to conservation.

In the majority of cases (83%), it appears that profit-driven areas make their business entirely or wholly out of the sustainable use of biodiversity (i.e. they rely on activities such as tourism to generate the entirety or majority of their income). The financial analysis shows that most PCAs are not profitable, and hence may be in a precarious position: the majority (70%) of reserves run for business did not realise a profit over the last financial year. This is hardly surprising considering that half (48%) of these private business ventures are still in a development stage; nevertheless, it is still a minority (42%) of the fully operational areas that have realised a profit over the past year. The reasons given are mostly related to the cost of infrastructure maintenance and development, hence low profitability of LK PCAs might be related to the relatively 'young' age of the industry. Other financial analyses have highlighted the lengthy and extremely costly development period involved in setting up a typical private game reserve/ranch, prior to any revenues being earned (e.g. ABSA 2003, Sims-Castley *et al.* 2004).

On the other hand, the PCA sector in the Little Karoo hardly compares to similar sectors such as that of the neighbouring Eastern Cape. A financial report for the latter region indicates that, for example, a private ecotourism initiative turned a stock farming operation into a successful ecotourism venture generating an income of about R35 million a year (Sims-Castley 2002). Another study of private game reserves in the same region revealed that of three profitable reserves, the lowest-earning generated an annual total gross income of R1.5 million (Sims-Castley *et al.* 2004), whilst the highest-earning generated R12.5 million (for the 2002/2003 financial year). For comparable reserves in the Little Karoo sample, these figures are, respectively, less than R100,000 for the lowest-earning, and between R1-5 million for the highest-earning (for the 2004/2005 year). Looking ahead to the next financial year, most respondents were confident that earnings would increase, often by substantial amounts (with the remainder expecting them to stay the same; none expected them to decrease). Such confidence on part of the landowners, if justified, may imply that these biodiversity business ventures can 'take-off' in the Little Karoo as in other areas. On the other hand, most landowners do not (or will not) depend on their PCA as their main source of revenue, suggesting they may recognise the low productivity of the Little Karoo, or view its tourism potential as limited. In conclusion, though the 'biodiversity industry' within the LK may differ from other regions due to being in an early stage of development, it appears unlikely that the sector will ever fully compare in terms of profitability.

4.3.3 Management planning and practices

Only a third of respondents had an explicit conservation management plan formulated for the reserve, which is recognised as a cornerstone of good protected-areas management (e.g. Goodman 2003); of the remaining majority, only half (48%) anticipated having formal management plans in the future, and many were vague with respect to this possibility ('yes, I expect so'). Officially-recognised conservation areas (Private Nature Reserves and Conservancies) were no more likely to have developed a formal conservation management plan than unrecognised areas (Chi-square, $\chi^2 = 0.004$, d.f. = 1, p = 0.95), nor were business-minded PCAs over non-profit areas (Chi-square, $\chi^2 = 0.44$, d.f. = 1, p = 0.5). Hence, neither formality of status nor a business orientation are correlated with an increased likelihood of possessing a management plan, which must relate to the personal motives and characteristics of landowners, highlighting again the variability and diversity of PCA features.

Half of respondents reported having specific conservation goals in mind for the flora and fauna of the PCA, a third had goals for the landscape/scenery, and hardly any had given consideration to other natural resources of the land. The different conservation goals reported tend to be accounted for by the same cases, hence a substantial proportion of landowners (45%) have not formulated any objectives for their reserves at all. In general, respondents did not have very specific management goals in mind; for the flora, these most often involved the general desire to protect and/or recover the natural veld. Management goals for the fauna ranged from very general ('protect and increase') to slightly more specific (e.g. 're-introduce game historically present' or 'not to overstock'). Landscape goals also generally involved the desire to see the scenery restored to a more 'natural' appearance (cf. chapter 6). Once again, formally-recognised reserves were no more likely to have developed goals than informal areas (Chi-square, $\chi^2 = 1.34$, d.f. = 1, $p = 0.25$), nor were business PCAs compared to non-business PCAs (Chi-square, $\chi^2 = 0.08$, d.f. = 1, $p = 0.78$).

Finally, a slight majority of landowners (55%) reported having given consideration to policies for the introduction of non-indigenous wildlife. Although most had a policy of keeping non-indigenous species off the land, in seven cases (14%) participants declared themselves willing to maintain non-indigenous species on their land, so long as 'the natural habitat could support them' and 'following professional advice'. Stocking non-indigenous species is a common practice among private reserves, especially for the purpose of maximising the eco-tourism potential of the property (Sims-Castley *et al.* 2004). However, it is a contentious issue in terms of biodiversity conservation because of its potentially detrimental impact on the ecosystem (Castley *et al.* 2001; chapter 7). From a purely conservation-oriented perspective it is therefore reassuring that a majority of landowners in the Little Karoo have given explicit consideration to this aspect, and that, overall, they are against the introduction of extra-limital wildlife. In sum, it appears that the main vision of the landowners is the long-term ecological sustainability of their reserve, expressed through the somewhat undefined desire to 'protect and increase' the natural biodiversity, elimination of exotic and extra-limital fauna and flora (for some cases), and the preservation or rehabilitation of the natural scenery.

Referring to a country-wide survey of the game industry in South Africa, Benson (1986) indicated that veld and game management on game ranches are neglected, but attributed this to the novelty of the industry at the time. However, van der Waal & Dekker (2000: 154) suggested that more than a decade later the situation had not improved: they reported that veld and game condition are rarely scientifically monitored on game ranches. This research shows that much remains to be improved with regards to suitable conservation planning and active management on PCAs in the Little Karoo. Respondents were asked 12 questions regarding the occurrence of different management practices and interventions in their reserves. Six of these questions asked the landowner to indicate the frequency of determined management practices (Figure 4.12). Across the sample, the management interventions undertaken most frequently are monitoring (of flora or fauna) and alien vegetation removal. The latter reflects a concern with 'practical' management, and further with the legislative pressure and concerns of the Conservation Board with regards to control of alien plants (chapter 6). Very little scientific research takes place in PCAs, and few landowners make use of scientific information (from any source – consultants, publications, conservation board, etc.) to assist them in the management of their land, which reflects their low use of scientific sources of knowledge (chapter 6).

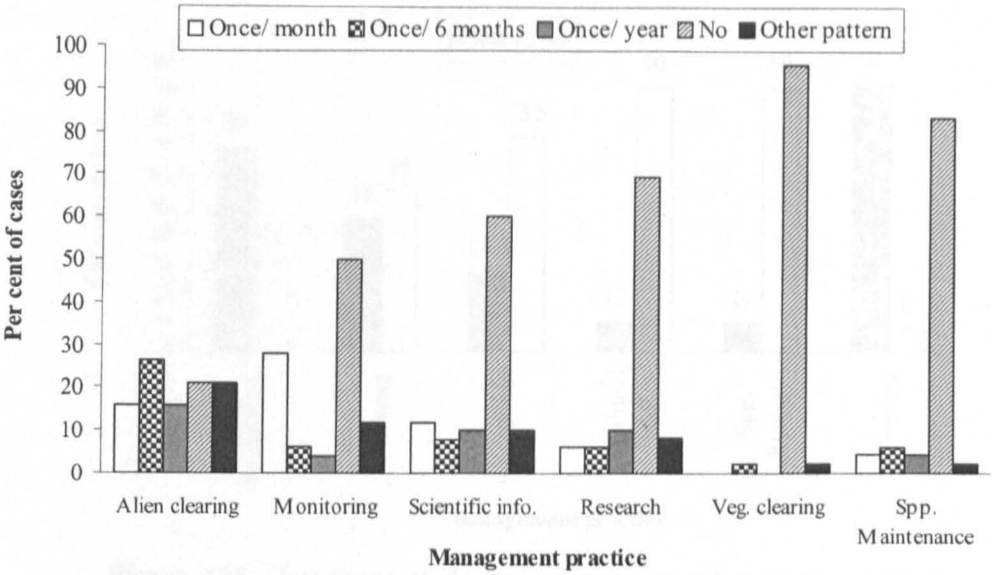


Figure 4.12. Frequency of determined management practices in Private Conservation Areas. 'Alien clearing' = alien vegetation clearing; 'Scientific info.' = use of scientific information; 'Veg. clearing' = natural vegetation clearing; 'Spp. maintenance' = species maintenance (i.e. feeding/sheltering wildife). The management intervention categories are ordered along the x-axis by increasing proportion of 'No' responses, except for the last two categories. These are considered 'negative' management interventions (in the sense that they do not correspond to conservation of natural processes) and are hence ordered by decreasing proportion of 'No' responses. Note that the frequency of occurrence labels stand for *at least* once a month, *at least* once every 6 months, and *at least* once a year.

The remaining six questions required simple 'yes-no' answers to the occurrence of determined management practices (Figure 4.13). Across the sample the two interventions occurring in a substantial proportion of PCAs are restoration of the natural habitat (reflecting their management visions) and anti-poaching patrols. A very small number of respondents (5 cases: 10%) employ qualified (in conservation or biology) staff in their reserves. Practically all private conservation territories in the Little Karoo are entirely fenced in, which is viewed as a potentially negative management intervention, due to its implications for the connectivity of PCAs. However, the private conservation sector in the Little Karoo is still mainly in its infancy: in this respect, it is noteworthy that at least some management practices are being addressed.

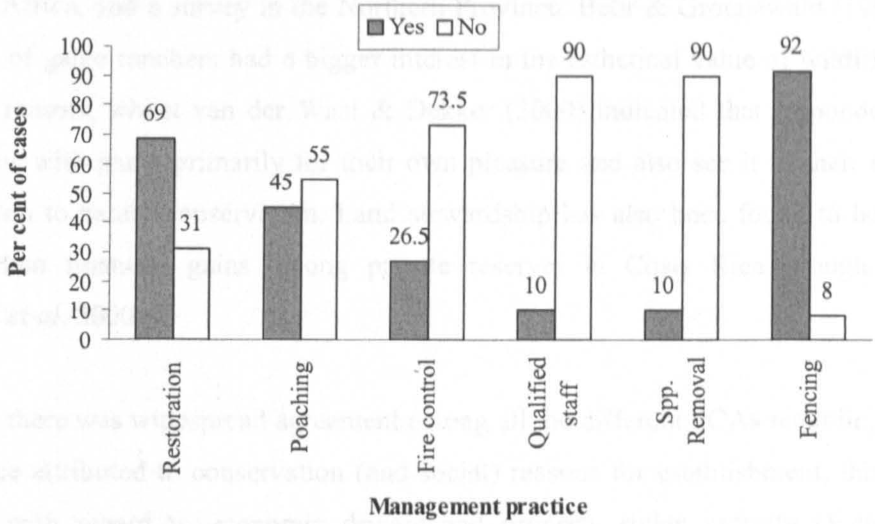


Figure 4.13. Occurrence of determined management practices in Private Conservation Areas. 'Yes' = management practice occurs; 'No' = management practice does not occur; 'Poaching'= anti-poaching patrols; 'Qualified staff' = employment of qualified staff; 'Spp. removal' = species removal. The management intervention categories are ordered along the x-axis by increasing proportion of 'No' responses, except for the last two categories. These are considered 'negative' management interventions and are hence ordered by decreasing proportion of 'No' responses.

4.3.4 Landowner motivations

Participants were asked to attribute scores (from nought to five) to different possible reasons for establishing a PCA, grouped into the following main categories: economic (to generate revenue through game ranching, hunting, wildlife-viewing or tourism), conservation-driven (to protect the natural flora/fauna or scenery), social (to help the local economy or community) and security-driven (to increase the security of property rights to the land). The vast majority of respondents put conservation motivations ahead of financial or other reasons for establishing a PA (Figure 4.14). These answers might be due to social desirability effects. However, the consistent ranking of conservation motivations as primary reasons for PCA establishment, coupled with the lack of any other consistently highly-ranked factor and the finding that half of reserves are not managed for profit, lends credence to the theory that the increase of private reserves in the Little Karoo has a strong conservation ethic as a background driver. The finding of strong landowner conservation motivations is a result comparable to those of Behr & Groenewald (1990) and van der Waal & Dekker (2000), who respectively reported on a country-wide survey of the game industry in South Africa, and a survey in the Northern Province. Behr & Groenewald (1990) found that 52% of game ranchers had a bigger interest in the esthetical value of wildlife than its financial returns, whilst van der Waal & Dekker (2000) indicated that respondents stock their farms with game primarily for their own pleasure and also see it as their individual contribution to nature conservation. Land stewardship has also been found to be a higher priority than financial gains among private reserves in Costa Rica (Langholz 1999, Langholz *et al.* 2000b).

Although there was widespread agreement among all the different PCAs regarding the high importance attributed to conservation (and social) reasons for establishment, this was not the case with regard to economic drivers and property rights security (Figure 4.14). Although most respondents are not motivated by either economic or tenure concerns, a smaller but noticeable proportion of landowners rate these factors quite strongly. For economic factors, this difference appears to be driven by the profit-making status of PCAs (as would be expected): landowners running their areas for profit rate economic motivations much more strongly than their non-profit-making counterparts (linear-by-linear association = 13.99, d.f. = 1, $p < 0.001$, phi = 0.56). No characteristic of the sample examined (profit-making status of landowners, rating of economic motivations, length of establishment of the PCA) appears to explain the difference between landowners in their rating of the importance of propety rights security, except for their formality of status. The mean score attributed by formal conservation areas to property-rights security is significantly higher than that of informal conservation areas (Mann-Whitney test: M_{FORMAL}= 3.13, SD = 1.92, $M_{INFORMAL}$ = 1.71, SD = 1.65, U = 144, exact p = 0.011 (two-tailed)). This suggests that landowners may place their land under conservation status in part because of the greater security they feel this designation confers upon them; the issue of land-tenure security is discussed further in chapter 5.

Land security and economic motivations have, on average, the same importance to respondents that have been on the land a long time as to landowners that have only recently acquired their land. This would imply that landowners are not becoming either more or less concerned about security of land tenure or finance than in previous decades. Hence, neither of these reasons is likely to be the main driver behind the sudden increase in PCAs. Rather, as will be discussed in chapter 5, numerous factors are intersecting across multiple scales to drive the growth of PCAs in the LK. The consistent rating of economic motivations across time reinforces the suggestion that landowners make conscious decisions about whether they wish to set up and operate a PCA for profit or other reasons, and that profitability does not necessarily come at the expense of conservation (as even profit-driven landowners report strong conservation motivations).

Respondents were further given the opportunity to mention and score their own individual reasons for establishing a private reserve. A substantial proportion (22%) mentioned the need for a retreat for personal leisure. This is easily explained by noting that all of these cases are located in the Western Little Karoo, where an 'absentee leisure-game rancher' pattern is prevalent: 86% of PCA owners in the Western LK only live part-time on their reserves, 68% use them mainly for leisure/non-use, 65% don't run them for profit, and 79% of those running them as a business venture do not rely on them as their main source of income. Only 13 areas (25%) in the questionnaire sample are located in the Eastern Little Karoo; although they are too few to generalise, it is interesting to note that the relevant proportion for each factor above is: 77% of landowners live on their PCA, 31% use it mainly for leisure/non-use, 77% run it for profit, and 42% of those running it for business rely on it as their main source of income. These patterns in Western vs. Eastern LK reserves lend further support to the idea that the Eastern LK is used for more productive land-uses, given that even PCAs in the sub-region appear to be utilised for more commercial purposes.

To gain further insight into the drivers behind the establishment of private conservation areas, landowners were asked about the factors governing their choice of location. Across the sample, the factor most often ranked as the first reason for choosing a particular location to set up a PCA was the presence of a particular flora, fauna or landscape (38% of cases). However, a quarter (25%) of landowners reported the principal reason to be proximity of their private reserve's location to their place of residence. These findings parallel some of the factors that emerged from later discussions with landowners concerning the drivers behind the establishment of PCAs: namely, a 'love for nature', and further the availability of land for purchase close to Cape Town, the main place of residence of landowners (refer to chapter 5).

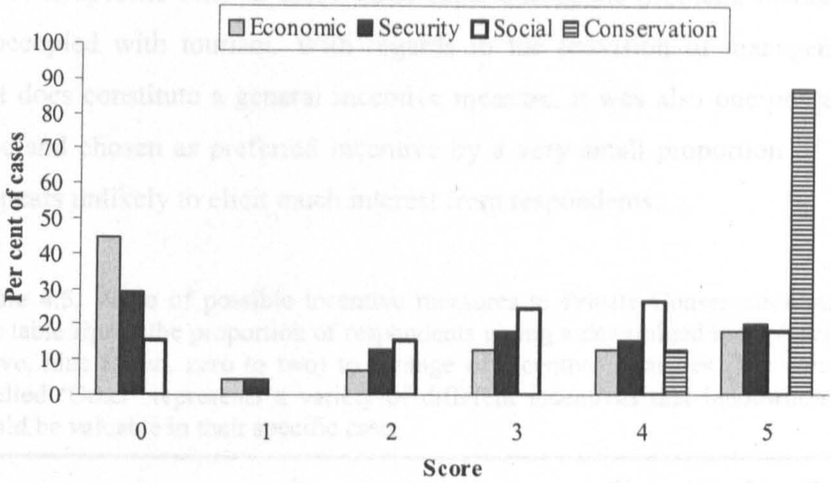


Figure 4.14. Distribution of scores for Private Conservation Area establishment motivations. The graph shows the percentage of owners attributing scores from nought to five to a variety of possible reasons for PCA establishment. The label 'Community development' stands for 'To help the local economy or community', whilst the category 'Security' stands for 'To increase the security of your property rights to the land'. 'Tourism' and 'Ranching/ Hunting' indicate 'To make money from Tourism (or Game Ranching/ Hunting)', whilst 'Leisure' signifies 'To have a retreat for personal leisure'.

4.3.5 Desired incentives of landowners

To gain insight into the potential incentives that could be offered to PCA owners, respondents were asked to imagine the existence of a government programme that gave assistance to landowners in exchange for agreements to protect the land and wildlife. They were then required to indicate how valuable they considered each of a number of possible incentive measures (Table 4.5): preferred measures included formal recognition as a protected area, receiving financial help, and assistance with alien plant control. When invited to choose 'the single most valuable incentive' out of those discussed, landowners evinced little consensus (Figure 4.15). Although almost all measures possessed high mean scores, many would be unlikely to constitute suitable incentives, lacking the flexibility to be advantageous to all reserves. For instance, landowners were divided in the strength of their preference for assistance with alien plant control, marketing, and management activities, hence these measures would not be of value to all private parks. This likely reflects the variable individual circumstances of PCAs: for example, assistance with alien plant control is specific only to those areas experiencing the problem, marketing only to those preoccupied with tourism. With regards to the provision of management advice, although it does constitute a general incentive measure, it was also one possessing a low mean score and chosen as preferred incentive by a very small proportion of landowners. Thus, it appears unlikely to elicit much interest from respondents.

Table 4.5. Value of possible incentive measures to Private Conservation Areas. The table shows the proportion of respondents giving a determined score (seven or above, nine to ten, zero to two) to a range of incentive measures. The category labelled 'Other' represents a variety of different incentives that landowners felt would be valuable in their specific case.

	Cases (% of total)		
		Score	
Incentive	**0 - 2**	**9 - 10**	**7+**
Being formally recognised as a protected area	6	65	83
Financial help	13	52	75
Help with alien plant control	23	54	75
Direct help with management activities	15	44	60
Help with marketing tourism	29	38	54
Management advice	8	33	50
Extra development and/or use-rights to the land	44	10	31
Other	0	29	35

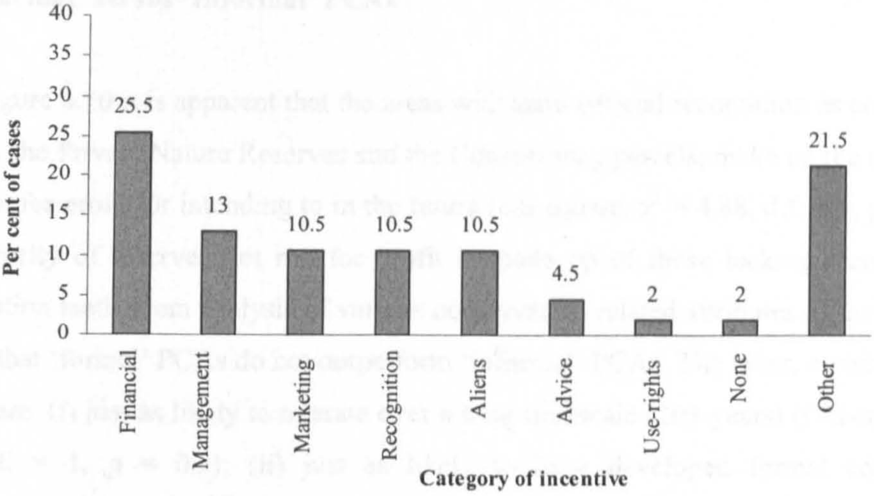


Figure 4.15. Most valuable incentive to Private Conservation Area landholders. 'Management' = assistance with management activities; 'Recognition' = formal recognition as a protected area; 'Aliens' = assistance with alien plant control; 'Use-rights' = extra development and/or use-rights to land.

It is likely that having suitable incentives on offer would better safeguard the permanence of PCAs. From those outlined above, the most suitable incentive measures were determined from consideration of the mean scores attributed by respondents, the relative proportions of landowners deeming those measures as highly desirable versus those not, and their responses when asked to indicate a single most preferred measure. It was concluded that the incentive instruments with the most general appeal across the sample consist of financial assistance, and formal recognition as a protected area. These possess the highest mean scores, with the least variability around the mean (hence, they are expected to have wider appeal than any other incentive measure). Financial assistance was also chosen as the single preferred incentive by a relative majority (25.5%) of respondents, whilst the appeal of formal recognition is backed by the finding that formal legal status was indicated as desirable by a majority of respondents (71%, with a further 15% specifying that it would depend on the exact conditions attached).

4.3.6 'Formal' versus 'Informal' PCAs

From Figure 4.10 it is apparent that the areas with semi-official recognition as conservation land, i.e. the Private Nature Reserves and the Conservancy parcels, make up the majority of those run for profit, or intending to in the future (chi-square, $\chi^2 = 4.88$, d.f. = 1, $p < 0.027$). The majority of reserves not run for profit is made up of those lacking recognition as conservation land. From analysis of various conservation-related attributes of these areas, it appears that 'formal' PCAs do not outperform 'informal' PCAs. The latter, compared to the former, are: (i) just as likely to operate over a long timescale (20+ years) (Chi-square, $\chi^2 = 2.70$, d.f. = 1, $p = 0.1$); (ii) just as likely to have developed formal conservation management plans, and management goals (section 4.4.3); (iii) just as strongly driven by conservation motivations (all PCAs, whether formal or informal, attributed top scores to conservation motivations); and (iv) no different in terms of their rating of formal recognition (as a protected area) as a valuable incentive measure (Mann-Whitney test: $M_{FORMAL} = 8.42$, SD = 2.78; $M_{INFORMAL} = 8.29$, SD = 2.67; U = 245, exact $p = 0.67$, two-tailed).

Therefore, 'informal' PCAs appear to be managed for conservation in a similar fashion to their more formal counterparts from a variety of viewpoints. Lack of formal status does not necessarily imply a lack of conservation behaviour: in the present case, it would appear to suggest the exact opposite, given that 'informal' areas are less likely to be profit-driven. Hence, informal PCAs deserve to be recognised in analyses of the contribution of the private estate to conservation, and captured in possible future conservation plans. PNRs and Conservancies have thus far been more likely to be included in conservation analyses to determine priorities for conservation projects in the region (e.g. Lombard & Wolf 2004). For example, past conservation plans for various areas of the Cape Floristic Region have evaluated the contribution of the private protected area network (for example, in terms of representation of vegetation types) by considering primarily the PNRs and Conservancies present (e.g. Driver *et al.* 2003, Rouget *et al.* 2003a, Lombard & Wolf 2004). However, given that just for the Little Karoo half of the areas examined are 'informal' PCAs (contributing 35% of the total land area covered by the private network), their exclusion would risk not making use of the full potential of the private estate for conservation planning.

4.3.7 Social characteristics of PCAs: conclusions

It is apparent that within the Little Karoo, there is a fast-growing trend towards conservation, a trend already proving to be of significant magnitude. This growth parallels similar developments in other parts of South Africa (e.g. Sims-Castley *et al.* 2005), Southern and Eastern Africa (e.g. Jones *et al.* 2005) and the world (e.g. Langholz 2002, Chacon 2005). It is further apparent that the trend is still in its initial phase(s): considering the land-tenure statistics, it is evident that land in the Little Karoo has recently changed hands dramatically, especially since 2000 onwards. The young age of the PCA sector may also explain why the 'biodiversity industry' within the domain appears so different from other regions. Future analyses could investigate in more detail the future and sustainability of the biodiversity 'industry' in the Little Karoo. As has been discussed, it may be that private reserves in the Little Karoo have a future independent of the tourism industry: though tourism is often cited as a primary motivation of private reserve owners, it may be the primary motivation in fewer cases than imagined (Mitchell 2005). In other parts of Africa, though developing markets for wildlife, wildlife products and nature tourism have supported the establishment of private parks (e.g. Bond *et al.* 2004, Wolmer 2005), conservation objectives have also been important, largely driving, for example, the establishment of conservancies on freehold land in Kenya and several countries in southern Africa (Jones *et al.* 2005: 68). Certainly within the LK, the driving force behind the sudden impetus in conservation areas does not appear strongly linked to economics, and, as will become clear in chapter 5, is tied to multiple factors operating across various scales of influence. The possible independence of private reserves from the tourism industry is an important consideration for policymakers (Langholz & Lassoie 2001b, Langholz 2002).

Given the sector is in its early development, and has an uncertain management and future, it would be wise to rapidly secure the status of this significant proportion of land that is currently informally conserved. Considerable variability was encountered within the PCA sector. Private parks in the Little Karoo as elsewhere (e.g. Langholz & Lassoie 2001a,b, Chacon 2005, Jones *et al.* 2005, Sims-Castley *et al.* 2005) were found to be highly individual in their scope of operation, closely dependent on the variable personal attitudes, circumstances and requirements of their landowners. So for example, it is impossible to generalise in terms of the land-uses of these areas: different activities take place on different reserves, in different combinations, frequencies and intensities. Some PCAs are run purely for conservation, others have farming, game ranching, ecotourism and crops run concurrently on the land. Private reserves are also established for different reasons, and there is a wide variety in the level of conservation management applied to these areas, mirroring general trends worldwide (Mitchell 2005).

However, despite their variety, it is still possible to discern a number of commonalities between private reserves. The prevalent land-use of the PCA network is based around personal leisure, with 94% of landowners using their area for personal enjoyment at some time or other. This result ties in with the lack of importance that the role of economics was found to play in the growth and operation of these areas; rather, the desire for a personal retreat and more environmentally-conscious behaviour appear far more important motivators. Privately-conserved areas are found to have mixed management objectives and to combine conservation desires with profit motivators in other locations too, such as in Namibia (Ashley & Barnes 1996, Jones 2005 cited in Jones *et al.* 2005). The potential of PCAs in the Little Karoo to be appropriately managed for biodiversity conservation may therefore be substantial, as found elsewhere (e.g. Chacon 2005, Jones *et al.* 2005, Rambaldi *et al.* 2005). However, the management performance of PCAs in the Little Karoo tends to be poor, with suitable conservation planning and active management interventions still lacking. More generally, poor management performance of PCAs, as well as the lack of a guarantee that areas managed primarily for profit will lead to successful conservation of biodiversity, mean that not all privately-conserved lands may be considered 'private protected areas' in a rigorous sense of the term. Thus, the potential of PCAs to conserve biodiversity needs to be rigorously quantified. The World Conservation Union sets out accepted definitions of what a protected area is, and what are the protected area management categories (IUCN 1994). Where it is desirable for PCAs to be considered as 'protected areas' in some rigorous sense, such as according to IUCN categorisations, the issue of developing a set of standards for good management practice on privately-conserved lands will need to be addressed (Mitchell 2005). Thus, future policy directions may wish to provide guidelines for permitted land-use activities and necessary conservation-management activities on PCAs.

In conclusion, when considering possible incentive strategies for implementation in the Little Karoo, the first criterion to be satisfied is that any policy instrument or incentive measure should be both general and flexible, in order for it to be widely-applicable. Second, any assistance measure should relate to the few commonalities evident among private protected areas. Results of the questionnaire analysis have suggested that financial assistance and formal recognition as a protected area might constitute appropriate incentive measures. However, as briefly mentioned, marketing could prove useful in the future, depending on the development of the eco-tourism industry in the Little Karoo. More detailed consideration of appropriate incentive or policy instruments for PCAs will be undertaken in chapter 8, following consideration and integration of results from other phases of research.

4.4 The PCA sector in the Little Karoo: chapter conclusions

Although private approaches to conservation have advantages in theory, it is important to consider under what conditions they may actually result in improved conservation of biodiversity (chapter 2). This study has begun the process of developing our understanding of these conditions, building a base of systematic, comprehensive information on privately-owned nature reserves which has been lacking, despite initial efforts to research them (e.g. Langholz *et al.* 2000a, b, Chacon 2005, Figgis *et al.* 2005).

It is unlikely that biodiversity patterns and processes will be conserved in strict, statutory conservation areas alone (e.g. Scott *et al.* 2001, Merenlender *et al.* 2004, Bhagwat *et al.* 2005, Figgis *et al.* 2005). More realistically, the contribution of non-statutory conservation areas will be needed, and instruments that enable landowners to contribute land that will achieve conservation targets are essential (e.g. Pence *et al.* 2003). Arguments for off-reserve conservation mechanisms are premised on the basis that they will probably be the most cost-effective approach (Pence *et al.* 2003). This assumes that off-reserve mechanisms are or can be as effective as protected areas in promoting the persistence of biodiversity; although this may not always be true, the present study has demonstrated this to be the case for the Little Karoo. With significant amounts of biomes conserved, and sizeable tracts of land and (potential) connectivity, it is clear that private reserves can protect ecologically valuable habitat and biodiversity processes. There is unlikely to be much point to expanding existing statutory reserves, unless it were to conserve different vegetation types. Conservation planning in the region may benefit from allocating resources towards non-statutory conservation areas. The importance of considering also truly informal conservation areas in sustainable land-use planning decisions, and when determining priorities for conservation projects in the region, has further been demonstrated.

Although a strong case for the positive contribution of private reserves to biodiversity conservation has often been made (e.g. Kramer *et al.* 2002, Jones *et al.* 2005, Rambaldi *et al.* 2005), research has thus far relied on preliminary evidence, and has not quantitatively and rigorously demonstrated this contention (chapter 2). For example, Jones *et al.* (2005: 73) note that "many privately conserved areas have viable populations of species such as elephant and large predators. Many protect a variety of natural habitats that would otherwise be converted to other forms of land use, and many are trying to restore degraded land". Rigorous analysis of the contribution of privately-protected areas to conservation of ecological patterns (especially in plant diversity) and processes is an area requiring research (Jones *et al.* 2005); this chapter provides one of the first studies to address this information gap.

Worldwide and within regions, private conservation areas vary greatly in terms of their management objectives and activities (e.g. WPC 2003), and thus policies for conserving private lands need to take ecological, economic and social dimensions of protection into account (chapter 2). A comprehensive overview of PCA social features has here been provided. The urgent need for incentives and other instruments to secure the protection status of PCAs has been highlighted. Policy-makers need to target incentive programmes to the characteristics and requirements of privately-owned lands, as well as to the 'gaps' in ecological representation. With regards to the latter, although PCAs already 'make up' for the poor representation of lowland biomes in SPAs, they do not provide long-term security, and therefore potential incentive instruments could address this aspect. Policymakers can improve upon the contribution of PCAs by targeting incentive programmes to ecologically important or vulnerable areas. As has already been stated, conservation efforts in the Little Karoo should be targeted in the first instance towards the most-transformed Drain and S. Karoo vegetation types. The latter is potentially particularly at risk given its long-term recovery period: focusing on long-term policy/incentive instruments may prove especially beneficial for the protection of this biome. Finally, it is important to find ways with which to encourage the removal of fencing between PCAs, and between statutory and private protected areas, given that virtually all Little Karoo PCAs are fenced in, and yet have high potential connectivity. In the numerous instances where privately-conserved areas have been established next to public parks (e.g. Langholz 2002, Jones *et al.* 2005) and have been unfenced, they have provided seasonal dispersal ranges and/or corridors for wildlife from the statutory reserves (Jones *et al.* 2005).

In conclusion, this chapter has demonstrated the presence of a developing, expanding PCA niche in the Little Karoo that is significantly complementing the presence of statutory protected areas in the region. Some insight into the motivations of landowners and the mode of operation of PCAs has been gained. The region-wide assessment undertaken has analysed the overall conservation niche of PCAs, examining both natural and social dimensions of private conservation. However, this broad study needs to be supported by more in-depth, intensive analyses to identify the background drivers to the development of the sector, and to identify the current conservation practices and views of landowners. The effects of juxtaposing social and ecological features of PCAs further require investigation. More detailed consideration of the most appropriate incentive measures and policies with which to encourage the conservation performance of PCAs is necessary, and the PCA sector in the Little Karoo needs to be located within its international context. It is to these topics that subsequent chapters turn, starting, in the next chapter, with the question of the underlying reasons for the dramatic increase in private reserves.

CHAPTER FIVE

Socio-political, economic and environmental processes behind the increase in Private Conservation Areas

5. 1 Introduction

Private Conservation Areas (PCAs) have become a new and important theme in environmental conservation (e.g. Figgis *et al.* 2005), but one that still remains systematically under-researched and under-theorised (chapter 2). By virtue of their novelty and their differences from other kinds of conservation models (e.g. community-based management), private reserves provide a rich and fascinating topic ripe for exploration with a political ecology framework. Specifically within the Little Karoo, as a result of their rapidly increasing numbers, PCAs have become an important dimension of environmental protection (chapter 4). Land use in the region has become increasingly dynamic and complex over the past few decades. Land-management regimes have moved from primarily subsistence farming to commercial agricultural production, through to various forms of nature-based ventures, non-use and conservation of the land (e.g. Cowling *et al.* 2003, Cupido 2005; chapters 3 and 4). The region is thus proving a key area for the rise of private conservation initiatives, in the form of PCAs. However, the complex drivers leading to these land-use changes remain unknown. An analysis that is sensitive to the social, political, economic and environmental factors involved in the rise of private conservation requires the adoption of a political ecology framework. Within political ecology, the importance of issues of scale, agency, structure, and environmental and human processes has been highlighted by numerous researchers (e.g. Nightingale 2003, Robbins 2004, Brown & Purcell 2005, Chowdury & Turner 2006) but rarely have all these issues been addressed within the context of one study, as is the case for this analysis.

5.1.1 Chapter aims

The aim of this chapter is to examine the political ecology of PCA development in the Little Karoo, in terms of providing a framework with which to theorise the development of private conservation efforts in the landscape. The ultimate goal of analysis is to understand how the particular land use of conservation has become dominant over space and time in the region.

The theoretical framework will present the relationship between complex networks of human and environmental processes that operate and interweave at a range of scales. The chapter will analyse the development of PCAs starting at the global scale, examining the political, economic and social processes driving land-use and land-ownership change, and favouring land-use changes towards conservation activities. Thereafter it will scale down to consider the human and ecological factors that have favoured the rise of conservation in the specific locality of the Little Karoo. Thus the emphasis is on (i) capturing the interactions between the local and global scales, and analysing the importance of scale effects; (ii) examining and reconciling the role of agency vs. structure; and (iii) capturing the complexity and dynamic interactions between environmental and social changes.

5.2 Results and discussion

It is apparent that the rapid increase in PCAs within the Little Karoo in the last decade (chapters 3 and 4) is a phenomenon mirroring wider trends occurring in South Africa (e.g. ABSA 2003, Sims-Castley *et al.* 2005) and elsewhere (e.g. Langholz *et al.* 2001a,b, Figgis *et al.* 2005, Jones *et al.* 2005). Thus, the case study of the development of PCAs in the Little Karoo necessitates attention to the wider context in which this process takes place, as well as to its local-scale dynamics. Although each of the following sections creates distinctions between structure and agency, global and local, and human and environmental, it is important to remember that the boundaries between each and all of these are by no means clear-cut. However, it is nevertheless useful to separate them for the purposes of analysis: their complexity warrants independent consideration in order to build an overall framework showing how ecological and human (political, economic, and social) processes interweave across global and local scales, and are situated with regards to structure and agency. Especially with regards to scale, the interconnections will be highlighted wherever appropriate.

5.2.1 The drivers behind land-use change: structural factors at the global scale

5.2.1.1 Politics, economics and land-use change

The proliferation of PCAs within the Little Karoo can, at a first level, be traced back to global and national events and processes facilitating the acquisition and conversion of land to conservation-friendly uses. Political changes in South Africa since the advent of democracy in 1994 have resulted in dramatic knock-on effects for the socio-economic conditions of the country. In economic terms, agriculture in South Africa has suffered a decline (ABSA 2003), as almost half of respondents noted. The following respondent draws attention to the adverse effects of these economic changes on the livelihoods of farmers:

> "*... with the economic times moving on it's been more and more difficult for the farmers to actually exist*" (Gareth)

Gareth is referring to the sweeping structural challenges that farmers in South Africa have been facing for over a decade, with the most obvious change mentioned by respondents being the deregulation of the agricultural sector, in line with world trends towards liberalising markets (see also, for example, Van Zyl *et al.* 1996, Vink & Kirsten 2000, Mather & Greenberg 2003, Archer 2004, OECD 2006). This has resulted in lower prices for South African products, and increased competition from the global market. The South African government has clearly responded to the increased pressure worldwide for agricultural sectors to become less dependent on government support (e.g. ABSA 2003), by reducing or withdrawing agricultural subsidies (e.g. Archer 2004). Jolliffe (2001 cited in Smith & Wilson 2002) observed that the de-regulation of the agricultural sector by the World Trade Organisation, as well as the agricultural sector's loss of political leverage in parliament, have played an important role in promoting the switch from stock farming to game farming. Democracy has also brought about fundamental changes in traditional labour relations (e.g. Mather & Greenberg 2003). When one considers that "the socio-economic position of the non-white farm labourer hovered between outright slavery and a sub-economic existence" (ABSA 2003: 3), it becomes clear how the reduction in this cheap farm labour has contributed to making commercial farming for white farmers less viable than in the past, as is expressed by the respondent below:

> "... *laws that are being implemented on your minimum wages, what's happening is every time they up the minimum wage, you lose that percentage of labour,* [...] *the same work has to be done by less people, is the bottom line*" (John)

John is referring to recently changed labour legislation stipulating increased wages for workers on farms. Generally, this change is leading to a decreased demand for agricultural labour (e.g. Mather & Greenberg 2003), and has been identified as a factor driving landowners to consider game farming as an alternative to stock farming in the neighbouring Eastern Cape, because the former land-use is considered to be potentially less labour intensive than the latter (Smith & Wilson 2002). Almost half of landowners discussed how all these factors have led to increased input costs required for farming and therefore to a decline in productivity of farming. This decline is exacerbated by the negative effects of the increased costs of living, equipment and infrastructure, as the following respondent explains:

> "... *with the ever-increasing cost of living, and infrastructure, you know, the resources that you need, the fuel, the capital expenditure, it's just too difficult, you cannot* [farm profitably]" (Jim)

Structural changes mean that the commercial, white agricultural sector has had to reconsider its production methods, at the very least, if not seriously weigh up alternatives to farming (e.g. ABSA 2003). The conversion to land-uses involving wildlife as a result of market forces has been generally noted for southern Africa (e.g. Bond *et al.* 2004, Wolmer 2005). In Namibia, South Africa and Zimbabwe, livestock ranching was heavily subsidised by the state in order to support white farmers. With independence and political change, the subsidies were removed (e.g. Archer 2004, Jones *et al.* 2005). As a result the beef industry has been declining, and farmers have used favourable policy and legal environments to develop wildlife as a complementary and sometimes alternative form of profitable land use. Thus market forces have created an opening for the rise of alternative land uses, though on their own they do not fully explain the rapid rise of private conservation: additional global processes are considered next.

5.2.1.2 The new socio-political landscape

The political changes of the early 1990s have also brought about, unsurprisingly, dramatic changes within the social fabric of South Africa; these changes are straightforwardly summed up in one respondent's sentence, which gives voice to the feelings of a quarter of respondents.

> " *... the whole issue in South Africa at the moment is land*" (David)

David is referring to South Africa's land-reform programme under the new constitution, which aims to redistribute land to previously dispossessed, black South Africans (e.g. DLA 1997, ABSA 2003, Archer 2004, Hall 2004). David and other respondents believe that land claims, coupled with the troublesome example offered by neighbouring Zimbabwe in very recent years (e.g. Potts 2006, Peta 2007), are leading to widespread fears for political stability and security and hence to a desire for increased security of land tenure. Respondents see the escalation in poverty and crime (e.g. Beall *et al.* 2005), especially within the cities (e.g. Lemanski 2004), leading to the desire for increased personal security and an 'escape' from the city (e.g. McIntosh 2004). These changes, especially with regards to the land claims, are more prevalent in the North of the country (e.g. McGreal 2007), and are thus perceived by at least a quarter of landowners to be resulting in movement of people across the country, as the extracts below indicate.

> "*Because we* [are] *in the Western Cape and people are running away from the Northern Provinces to get to what they see as a safer area*" (John)
> "*There is a movement, we almost call it the great trek, of white people moving back into the Southern provinces, definitely*" (Philip)

Thus, according to respondents, social changes are resulting in a flow of people to the Southern and Western parts of the country, deemed to be 'safer' from both land claims and crime, a change that so far does not appear to have been discussed in the literature. These fairly sudden movements of people inevitably imply fairly sudden fluxes in land ownership in different parts of the country. Hence, the land-use change discussed above now has the potential to be coupled with land-ownership changes. In other words, different uses of land can be coupled with different owners of the land. The section below explores how the connection between these structural processes and human choice leads to environmental conservation.

5.2.2 The role of choice in mediating land-use change at the global scale

Globally, people's environmental awareness is generally dramatically increasing (e.g. Adler 2006, Hartman 2006, Kuchment 2007), a trend expressed by a variety of both public and private stakeholders, NGOs, corporations, governments, investors, individuals and the like (e.g. Sanderson & Bird 1998, EIA 2003, Duffy 2006). In South Africa, this environmental interest manifests itself as a consciousness that one of South Africa's greatest assets is its biodiversity, that such biodiversity is unique, and that it should be protected, whether for its own sake or for the purposes of tourism. Landowners talk of their 'love for nature', or 'the land', and their desires to 'conserve' or 'restore' it. In a fifth of cases, these sentiments were found to interrelate with the land insecurities that have become prevalent since democracy, as is well expressed in the following quote:

> " ... *you know you want your own patch of Africa, like every African man*" (David)

David's statement shows how heightened environmental consciousness and land security issues are resulting in a desire for one's 'own patch of Africa', even where the feeling is implied, rather than stated as explicitly. There is also talk of 're-connecting' to nature, a desire intimately related to the oft-quoted need to 'escape' from the increasing stress and danger of city life, in search of 'space', 'peace' and 'quiet'. More than half of landowners espouse these sentiments, in one form or the other, as these examples illustrate:

> "*I call it a lifestyle investment, not for profit*" (Karl)
> "*I think it's a getaway, many of us like the Karoo, the quietness*" (Richard)

Thus all the factors above combine to drive lifestyle changes within society, resulting in people buying land as a form of 'lifestyle investment', or, variously, as a lifestyle 'project', hobby or personal retreat (whether for leisure or retirement). This is not a unique trend: there are other regions worldwide where large-scale migration of urban people to rural places has been primarily attributed to quality-of-life values rather than economic opportunities (e.g. Walker *et al.* 2003). For the Little Karoo in particular, Gelderblom (2006) notes that a major factor drawing repeat visitors to the area is its 'peace and tranquillity'.

It is clear, though, that the buying of land for quality-of-life reasons is a luxury, only affordable to those whose personal financial circumstances can withstand the financial costs (given the losses involved in PCA management, cf. chapter 4). In socio-economic terms, the analysis showed that affluence plays a key part in enabling people to buy land for less productive uses, with landowners often in a financial position that allows them to buy land comfortably. About a third of interviewees directly commented on these circumstances, as shown below.

> "*… But eventually if one wants that lifestyle, then there must be an income to support that lifestyle*" (Jenny)
> "*… people are becoming more affluent and can realise their dreams to own a weekend-type place*" (Jeremy)

These two respondents are among those from the wealthiest socio-economic background in the sample, and the link they are highlighting, between affluence and the luxury of maintaining land under non-use, has received mention elsewhere. McDowell (1986), working in the West Coast (Western Cape), noted that the most conservation-oriented farmers were also those farming at a slight loss (or breaking even); this minority of landowners possessed additional profitable enterprises and investments, however, which allowed them to fulfil their motivations to conserve. An analysis of private game reserves in the neighbouring Eastern Cape (Sims-Castley *et al.* 2005) highlighted that these too tend to be owned by typically more affluent, large landholders, as is generally the case world-wide (Sims-Castley *et al.* 2005). In the Little Karoo, the vast majority of PCA owners interviewed (c. 70%) were from more affluent socio-economic backgrounds, typically holding high-profile and high-income jobs, or managing their own businesses, and maintaining their PCAs as second homes. There are, naturally, less affluent respondents acquiring PCAs in the Little Karoo (for example, those retiring on the PCA and scaling down their living costs), although these formed the minority of the sample. Related to affluence is age: the acquisition of PCAs is not only a pursuit of the wealthy (or at least, the well-off) but a pursuit of the middle-to-older aged sections of society (the mean age of landowners was 54). This result is hardly surprising, given that older people are likely to be wealthier than younger people.

A last socio-cultural factor playing a role is the global view of conservation as the new 'in thing' (e.g. Kuchment 2007). In South Africa, buying up land to dedicate to more conservation-friendly uses is a pursuit that is increasingly popular, especially considering that the coast, for various reasons (e.g. over-development, the increased property prices) has gone 'out of fashion'. Further, there is no shortage of examples from other areas of South Africa to inspire conservation in any remaining applicable localities (such as the Little Karoo), as the following respondent notes:

> "*... it happened a little before, in Gauteng, then* [in the] *Transvaal, it started happening in the late '60s already, so the Little Karoo is maybe a little slow*" (Matt)

Matt is remarking upon well-known conversions to game farming and other biodiversity ventures that have already occurred in other provinces (e.g. Smith & Wilson 2002). The Little Karoo has been 'slow' to convert to the biodiversity industry, in comparison to other areas in Southern Africa, due to the low economic carrying capacity of Karoo environments (e.g. ABSA 2003) and the low levels of tourism it has experienced. However, the land-use change drivers explored in this chapter have combined to alter the prevalent land use of the Little Karoo within the last decade, as will be discussed later. Examples of land-use change towards conservation are not lacking worldwide either, as Matt goes on to point out:

> "*I've seen a fairly great shift towards reserve-type businesses,* [...] *you know I think the place has been discovered,* [...] *I saw it happening in New Mexico in America in the '80s, and there's definitely a trend at the moment*"

Once again, Matt is correct in identifying a trend that is rapidly gaining momentum in many countries across the globe (e.g. Langholz & Lassoie 2001a, Chacon 2005, Figgis *et al.* 2005, Wolmer 2005; chapter 2).

There is another side to global environmental consciousness in South Africa: the desire to own a piece of land and manage it in a conservation-friendly fashion is not necessarily unrelated to profit. Ecotourism has been, worldwide, dramatically increasing in popularity (e.g. Lew 1998, Wood 2002, TIES 2005), and certainly this is the case in South Africa, with more nature-based ventures following the trend (e.g. Smith & Wilson 2002, Jones *et al.* 2005, Sims-Castley *et al.* 2005). There are numerous instances of PCA establishment unrelated to profit in the Little Karoo (chapter 4); however, for the half of landowners concerned with profit it is a logical option to turn to when considering alternatives to farming and ways of diversifying land-use. Compared to conventional farming, ecotourism and/or game farming are likely to be one of the better economic performers in years to come, as well as potentially large earners of foreign exchange; wildlife is better adapted than livestock to the African environment; wildlife promotion is politically and socially attractive in that it supports the international goal of achieving a 'sustainable living planet'; and eco-tourism creates more job opportunities for skilled and semi-skilled labourers, and relies less on unskilled labour, which, although more costly for PCAs, can allow them to meet important social goals (Smith & Wilson 2002, Wood 2002, ABSA 2003, TIES 2005, Duffy 2006). The appeal that eco-tourism exerts on profit-motivated landowners is summed up concisely in the following extract:

> "*I think if there wasn't the* [...] *option to make money from tourism, then people would continue to farm. But if they see, just like all the places around us,* [...] *if they see that they can actually make money from tourism or eco-tourism, they consider that option and they scale down their farming*" (Philip)

Philip neatly outlines how landowners perceive ecotourism as a possible alternative to farming and thus as a means to maintain the productivity of their land. Importantly, he goes on to point out that move towards ecotourism is not inconsistent with personal desires to manage a parcel of land in an ecologically sustainable fashion:

> "*...firstly it's financial* [the motivation]. *We'd like to make a profit. And in my particular case because this area is so incredibly beautiful, I'd love it to go back to its natural form, and* [...] *to optimise the land from a commercial point of view, but also to give joy to people, who visit the place*" (Philip)

Philip thus perceives little or no contradiction between profit motives and conservation motives, as is the case for a few other landowners, especially where the latter constitute the primary driver. Therefore, market forces come back into play to affect the rise of conservation-friendly uses of the land - not just by making one land-use more unsustainable, but by offering a more viable option. The socio-cultural factor of increasing global environmental awareness meshes with the political-economic factor of the farming sector's decreasing sustainability.

5.2.3 Reconsidering the role of structure in land-use change, and its relationship to agency

At its roots, political ecology envisioned a need to place further attention on how local human ecologies are embedded within wider political-economic processes that have great influence on local outcomes (e.g. Blaikie 1985, Blaikie & Brookfield 1987, Peet & Watts 1996, Zimmerer 1996; chapter 2). Despite this, political ecology has moved away over the past ten years or so from its engagement with political economy (Brown & Purcell 2005). Further, much of the distinction between agent and structural interests in human-environment geography has been characterised by the distinction made between individual decision-making (choice) vs. socio-economic and political structures (usually portrayed as constraints on choice) (Chowdury & Turner 2006). More recently, research has recognised the importance of attempting to reconcile the roles of agency and structure (e.g. Turner *et al.* 2003, Vasquez-Leon & Liverman 2004, Zimmerer 2004), although little attention has gone into demonstrating what understanding may be revealed by this reconciliation (Chowdury & Turner 2006).

Structural arguments focus on factors largely external to and beyond the management of individuals or communities, those factors that control the larger economy of the landscape (access to capital, land and resources) or that differentially empower and constrain land-users' decisions (e.g. Blaikie & Brookfield 1987, Bassett 1988, Zimmerer & Bassett 2003, Robbins 2004). Such factors tend to reside in political-economic structures, and attention is given to their origins and consequences. In the Little Karoo, such broad-scale structures are twofold, comprising political-economic shifts in South African agricultural policy on the one hand, and changes in the socio-political fabric of the country as a consequence of political regime change on the other. As has been demonstrated, these factors have contrived to favour a change in land uses and land ownership. Thus, the circumstances empowering the conversion of land to conservation-friendly uses are captured by structural variables alone, highlighting the importance of broad-scale socio-political forces in favouring the rise to dominance of new land-management regimes.

This research on PCAs in the Little Karoo therefore provides a direct demonstration of the importance of structure in promoting land-use change, of the value of situating the local-scale within the global scale, and of the need for political ecology to re-engage with political economy. Contrary to general trends in recent political ecology but as highlighted by a few other authors (e.g. Brown & Purcell 2005, Darling 2005) it is emphasised that meanings, local-level actions and micro-politics often take place in environments strongly shaped and constrained by actors and forces nearly unaffected by local politics. Further, this research highlights the benefit of viewing structure as allowing choice, as opposed to seeing it as constraining choice, as is more customary (Chowdury & Turner 2006). Rather, whether structure constrains the actions of land users depends on the viewpoint of different types of land users: farmers would probably view the action of structural processes in this case study as limiting to their activities; conservationists will be 'empowered' by changes that allow them to own and place land under non-use.

Though structural processes favour the conversion of land towards more conservation-friendly uses in the first instance, by providing the opportunity for land-use changes to take place, a specific move towards conservation is only realised through the actions and decisions of landowners, and the complex network of factors that combine to influence such conservation choices. Thus the political ecology of private conservation efforts needs not only to be situated within the broader political economy, but further within the broader socio-cultural forces influencing landowners' decision-making. The following sections will turn to explore why the global-scale drive towards conservation manifests within the specific locality of the Little Karoo and how such global processes and factors filter down and are modified by their encounter with processes and actors working at the local scale.

5.2.4 The growth of PCAs in the Little Karoo: the local scale

5.2.4.1 Farming and the environment

There is universal acknowledgement among landowners that farming is no longer an economically viable or sustainable option in the Little Karoo, apart from the quarter of respondents who felt they did not possess enough knowledge about farming to discuss the issue. Gelderblom (2006: 1) reports: "agriculture, traditionally the main economic activity in this arid landscape, is becoming more difficult". This, naturally, is a local reflection of the general, country-wide decline of the agricultural sector. The rising input costs of farming (e.g. fuel) play a particular role at this local, Little Karoo scale, by combining with the inaccessibility of the area (characterised by an inadequate road network) to make the transport of farming produce especially costly and difficult. The reason why the agricultural decline has affected the Little Karoo itself so dramatically is tied to the environmental characteristics of the region. The area is a 'marginal' landscape whose environment is not suited to modern, intensive, large-scale commercial crop farming methods, in like fashion to much of South Africa (e.g. Shulze 1997, Tainton 1999, ABSA 2003, Smet & Ward 2006). Factors such as the topography and soils of the area are felt to play a role, but overwhelmingly the main limiting factor is reported to be water. The extracts reported below are just a few examples of sentiments expressed by all of the landowners discussing farming in the Little Karoo.

> "*... water is the* [prohibiting] *factor, and droughts like this year, really, there's no ways you can run that land profitably*" (Philip)
> "*... the water supply on this farm isn't great, we've only got a couple of boreholes, so that's precluding agriculture*" (Beth)
> "*... my land hasn't, in any case, got enough water to run a commercial farm, commercial agricultural farm*" (George)

In the view of these respondents, water availability constitutes then the single biggest constraining factor for production in the Little Karoo, as it does in most of the wider Western Cape province (Midgley *et al.* 2005). Landholders feel that the level of the water table has dropped considerably through the extensive and indiscriminate use of boreholes; in this, they resonate with the view of researchers that water exploitation is unsustainable (Midgley *et al.* 2005). Respondents feel that climate change is resulting in decreasing rainfall and increased aridity; some support to these experiences is provided by recent climate analyses for the Western Cape. Though rainfall trends for the province are not clearly identifiable, temperature trends have shown a significant warming of the region over the last three decades (Midgley *et al.* 2005). According to a number of current model projections, the future climate of the Western Cape is likely to be both warmer and drier (Midgley *et al.* 2005).

These factors have been compounded by past 'over-use' of the veld, particularly through 'over-grazing'. As one landowner engaged in small-scale agriculture reports, these prior levels of use have resulted in 'abuse' and 'degradation' of the land at the hands of the previous white commercial farmers who owned it:

> "*... this land has been abused by farmers* [...] *in the areas that have been destroyed, the plant life has been destroyed, it's becoming a big issue*" (Steve)

This 'abuse' of the natural environment was found to be a 'big issue' for over half of PCA owners. Therefore, the 'marginal' nature of the area and the 'degradation' it has incurred are felt to be major environmental processes that, combined with all the global market forces previously mentioned, are causing the decline in agricultural productivity of the area. Archer (2004) notes a similar 'political/cultural ecology' at work within the Grassy Karoo sub-biome in the neighbouring Eastern Cape Province. By 1998 over 10% of farms in the region had experienced bankruptcy, and "the change to another type of land use altogether is commonplace today throughout the district" (Archer 2004: 386).

Another major factor affecting land-use change in the Little Karoo has been the shift, over the past century, from subsistence and small-scale farming towards large-scale, intensive, commercial farming practices. Although this does mirror a general change in the nature of farming and society worldwide, in the Little Karoo this socio-economic change is particularly relevant. It has fairly rapidly exacerbated the decline in the viability of farming due to the low productivity of the landscape. An example of this view, shared by a quarter of respondents, is given below.

> "*What people call sustainable,* [...] *what people now deem necessary, years ago would have been an unheard-of luxury! In the old days--the man I bought this farm from, lived with his teenage son in the first cottage, in fact to call it a shack, it would be to flatter it* [...]. *He had a 40-year-old truck, and they lived on white flour, roosterbrood* [bread rolls], *that's what they lived on,* [...] *and that's how they lived. Well people today want a radio, they want television, all these things are considered necessary! They want a motorcar, they want decent clothing, they want education for the kids, you cannot possibly do it on 500 goats. If you had more goats, your land will degrade more quickly, in the old days,* [...] *you went to town once a month and you bought soap, salt and coffee and tobacco, that was okay. But that doesn't work anymore, so then people will work the land more, they'll over-use their water resources,* [...] *so on a piece of land this size, man could not possibly make what we call a living!*" (William)

William's comments hint at the occurrence of a 'vicious spiral' whereby increasing human demands on the environment lead to smaller and smaller returns, resulting simply in greater resource use or extraction ('will work the land more') and thus accelerating transformation of the environment ('your land will degrade more quickly'). The same process has been highlighted elsewhere numerous times in the context of resource use and/or degradation (e.g. Barbier 1997, 2000, Reardon *et al.* 1999). Changes in the practices and nature of society are felt to be behind this process. Such socio-economic changes in people's lifestyles and farming practices, and their effects on the land, have probably been further exacerbated by land subdivision due to socio-cultural forces, as one interviewee reports:

> "*... these farms* [...] *were subdivided among sons, years ago, so large viable farms were subdivided among the progeny and this is another problem*" (Beth)

In Beth's view, farms have been successively 'split-up' over the years among the progeny of farmers, to ensure that each descendant received his or her portion of inheritance; this subdivision of land would have contributed to the decline in agricultural sustainability of the Little Karoo, as previously large and therefore viable tracts of land have become progressively smaller and therefore increasingly less productive, because of the 'marginal' nature of the landscape. Certainly the Karoo environments have the lowest economic carrying capacity in Southern Africa: to support, for example, 150 large stock units (which constitute a small farm), 16,500 ha of land are necessary. Yet, 96% of PCAs (which previously had usually been farms, chapter 4) are smaller than 15,000 ha (chapter 4, Table 4.3).

In temporal terms, the apparently 'spiralling' 'degradation' of the natural resources, especially over the 20th century, coupled with the relatively recent shifts in climate, appears to explain the sudden rise of PCAs in the region (chapter 4), especially when one considers all the other factors that have 'suddenly' come into play since the advent of democracy just over a decade ago.

5.2.4.2 Reconsidering the role of the environment in land-use change

The preceding section made evident that the rise of conservation as a management regime in the Little Karoo owes much to the particular (local-scale) environmental conditions and ecological change of the region, which intersect with the global-level, structural changes in the agricultural sector to drive patterns of land-use change. The environmental conditions limiting the viability of farming are by no means unique to the landscape of the Little Karoo: much of Southern Africa is too arid for intensive transformation (e.g. Shulze 1997), and already 20 years ago only one-third of white-owned farms in South Africa could be classified as commercially viable (Cooper 1988). Increasing aridity in the region and in South Africa will also reflect the globally-occurring processes of climate change and desertification (e.g. Archer 2004, Midgley *et al.* 2005, Wessels *et al.* 2007).

Respondents view ecological change in the Little Karoo in terms of the progressive 'degradation' of the environmental resources, as a result of the 'abuse' of land and veld by previous farmers in the area; some support for this theory is provided by wide acceptance of the notion that the productivity of virtually the entire Karoo region has substantially declined from the late 19th century onwards (e.g. Dean & MacDonald 1994, Dean *et al.* 1995, Pelser & Kherehloa 2000, Hoffman & Ashwell 2001). How to account for human-induced ecological change is difficult, because environmental changes are a result of a complex mix of dynamic socio-economic and socio-cultural processes and of ecological processes (e.g. Nightingale 2003, Burgi *et al.* 2004, Seabrook *et al.* 2006). Some ecological change will occur regardless of human practices and impacts, simply by virtue of ecological processes (Dodson 1999): current understandings of ecology have shown that ecosystems are in a dynamic, constant state of change (e.g. O'Neill 2001). Work by Scoones (1997, 1999) in particular emphasises the importance of investigating ecological changes over time to understand patterns in transformation of the environment. Nightingale (2003) has criticised political ecology for insisting on the view of ecological changes as a consequence of socio-political processes, and has argued for greater attention to be paid to the role of ecological conditions in determining resource-use practices and management organisations in particular places. The emphasis is placed on the role of ecological conditions in mediating which beliefs about nature and ecology, and hence which cultural practices, become dominant over time.

For example, Nightingale (2003) provides the example of community forestry programmes in Nepal, initially based on ecological change: large-scale forest clearing and the consequent landslides led to an international outcry for forest preservation. This study provides evidence for a similar interpretation in the Little Karoo. The marginal nature of the landscape has led to now widely-held beliefs regarding the 'degradation' and 'over-use' of the Little Karoo, and its 'unsuitability' for commercial farming. These emergent beliefs are shaping the actions of landowners in relation to the management practices they carry out on the land. For example, in addition to those landholders placing all of their land under non-use, analyses showed that a nucleus of new, organically-minded and small-scale farmers has emerged in the region (section 5.2.4.3). The concern of these small-scale farmers for the state of the Little Karoo is leading to a return to more 'natural', less intensive and more 'conservation-friendly' farming practices.

The role of the environment does not only lie in mediating which beliefs about nature and thus which land-use practices become dominant over time. The role of ecological conditions should also be interpreted in terms of structuring and constraining which land-use practices can actually take place in the landscape. Land settlement and land use are constrained by biophysical properties of the regional landscape such as soil types, topography, vegetation and climatic conditions (e.g. Pan *et al.* 1999, Sheridan 2001). The environment of the Little Karoo has always played a fundamentally limiting role, by virtue of the 'marginal' nature of its landscape, unsuited to intensive uses of the land (Dean & MacDonald 1994, Milton *et al.* 1997). Though it is difficult to determine the extent to which human practices alone have affected the ecological condition of the Little Karoo, there appears to be little doubt that some environmental change has taken place. Thus, ecological change (in terms of 'degradation') and *a priori* environmental conditions (in terms of 'marginality') can be viewed as structural forces, in that they constrain the choices of the landowners with regard to their use of the land. These 'eco-structural' processes thus play their own part in driving land-management regimes. There appears to be a feeback loop between the environment and the human dimension of resource management, by which accelerating degradation of the ecological system shifts human practices from degrading towards conserving.

This should be contrasted to the 'vicious circle' between the increasing degradation of resources and their increasing use, an idea that was summed up by one of the interviewees (William). Thus human practices, from the outset partially predetermined by the particular landscape in which they are located, can drive, contribute to or accelerate environmental changes. However, landscape change in turn impacts on regional biota, soils and hydrology (e.g. Tilman 1999). Thus, once the environment is unable to continue supporting determined human practices, they must perforce change. In other words, landscape change has subsequent feedbacks to biophysical properties, production systems and land use (e.g. Seabrook *et al.* 2006).

As a final point, as the role of agency was found to be important when considering the structural role of socio-political and political-economic processes, so too is the role of agency important when considering the structural role of the environment. Ecological conditions may limit the choices of landowners with respect to the practices they can perform on the land, but if PCAs are to arise in the landscape, it is still necessary for its agents to be more conservation-oriented. Otherwise, the 'traditional' farmers might have stayed on the land and attempted to diversify their business, or all the 'new' landowners moving into the region could have operated their areas for profit, as eco-tourism ventures or mixed stock and game farms. Significantly, instead, many of these landowners operate their PCAs independently of financial motives (chapter 4), and for those using their PCA for business, profit is not necessarily the overriding priority. To understand why conservation itself should have proven such a popular land use it is necessary to turn to consider the role of agency at the local scale.

5.2.4.3 The role of choice in mediating land-use change at the local scale

The local-scale factors guiding the decisions of landowners towards purchase and conversion of land within the Little Karoo have mainly filtered down from the global socio-cultural and socio-economic processes mentioned above. The general increase in environmental awareness and conservation motivations has affected the Little Karoo as elsewhere (e.g. the desire to 're-connect to nature, to 'restore' the land, etc.). Specifically for the region, these motivations manifest as an appreciation of its 'particular' environment, both in terms of its 'unique' biodiversity (floristic hotspot) as in terms of its distinctive landscape (rugged, dry and desolate). Interestingly, the 'lifestyle' changes in society find an additional, particular expression in the Little Karoo through the emergence of a new sector in the farming community, characterised by mainly small-scale (if not entirely subsistence-based) and strongly organically-minded farmers, of which Jenny offers an excellent example:

> " ... *we started farming organically and we've* [...] *slowly been* [...] *talking to and encouraging all the neighbouring farms, and there are five certified organic farms in the area. I then formed an organisation* [...] *which is like a cooperative of farmers in the area, where our constitution basically says that we will farm naturally, looking after the biodiversity, and we probably cover about ten Klein* [Little] *Karoo farms* [...] *the traditional farming methods are very, very bad for biodiversity, it goes against all the conservation principles, because they overgraze,* [...] *they don't use natural methods in their actual farming, they use chemicals, and so first of all we overgraze, then we create large areas of bad conditions*" (Jenny)

Jenny's testimony clearly illustrates the recent surge of interest in organic farming within the Little Karoo, and the link between organic farming ideals and conservation. As she points out, the rise of this organic community is no doubt also assisted by the widespread views of the previous 'over-use' of the area, and by the limits that the environment is placing on large-scale, commercial farming practices. The rising popularity of conservation as the 'in-thing' is also evinced in the Little Karoo: landowners constitute an attractive example to others of the benefits of buying land in the area. Significantly, as the following landowner explains, it is felt that the rising popularity of conservation within the region can, in part, be attributed to the presence of a few 'catalyst' PCAs:

> " ... *if we didn't have a single man in the form of* [Matt] *who bought up all that ground, the farmers still would have gone bankrupt and we would have had a multiple of other people, but the beauty of what has happened is that it's actually given direction to the area, 'cause before it was so many people deciding each on their own individual part which direction to go. Now we have one man that bought up the majority of the ground and has put a definite* slant *on conservation on to the whole area*" (Gareth)

Thus, as in the example that Gareth discusses, there are a few PCAs serving as noteworthy instances of private conservation in the Little Karoo. These have been stimulating landowners to 'copy' the example offered and create other private reserves. The presence of such 'catalysts' thus helps avoid a situation in which a large number of people with different visions for the land (a 'multiple of other people') end up buying the available properties.

Particularly importantly, the general flow of people 'escaping' the cities (for the same reasons discussed above, e.g. in search of 'space', 'peace', etc.) finds an outlet in the region because of its proximity to Cape Town (South Africa's third largest metropolis, Lemanski 2004). This distance factor plays a considerable role for those landowners buying property in the Little Karoo as a second home or get-away (69%) (cf. chapter 4), often with a view to retiring there. The distance factor is felt to be so important that it leads to the perception of a 'three-hour distance rule' (J. Vlok 2005, pers. comm., 10 Jun) by which is meant the practice of Cape Town residents of looking for land within a three-hour driving radius of the city, considered an acceptable travel time by those landowners maintaining a base in Cape Town. Most of the Western Little Karoo falls squarely within this radius. This factor, especially when combined with the low land prices of the region (see below), therefore makes this area a very attractive option for landowners, as the following testimony sums up:

> " ... *first of all, where we are we're within striking distance to Cape Town, the 2-3 hour time limit is a very strong determinant,* [...] *because I can drive there, you know, for a day trip, and certainly every second weekend, like we do at the moment,* [...] *three hours is a fairly good time limit for travel distance, I think that's a major determinant*" (Peter)

Another noteworthy instance of distance effects is provided by the 40% of respondents engaged in eco-tourism, as in the following case:

> " ... *the tourists who visit South Africa go to Cape Town, so* [...] *then I thought if I can get a game reserve there that's of* any *consequence whatsoever, I've got the best market in any part of the country* [...]. *So that was the reason for* [the PCA], *I'm close to the biggest market* [...]*! You haven't got time to go up to the Kruger, just go there!*" (David)

David highlights the preference of PCA owners engaged in nature-based ventures to be accessible from major tourist routes and destinations. As such, the Little Karoo is an ideal location, within 45-60 minutes of the Garden Route (a popular and scenic stretch of the southern coast of South Africa) and two-three hours from Cape Town. Another demonstration of global effects filtering down to find particular expression at local levels is offered by the opinions of 40% of landowners regarding the safety of the Little Karoo. The area is perceived to be both safer from land claims and exposed to much lower rates of crime, as in words of the two respondents quoted here:

> " ...*we needed to have an area where there are no land claims* [...] *this is true of the more arid areas of the country, there are very few land claims. So we landed up here*!" (Beth)

> "*...it's a nice place to live, we like it* [...] *and it's* safe, *which is a major thing in this country, we like it here*" (Alice)

Beth's comments highlight the Little Karoo's comparative safety from land claims by virtue of its history, characterised by an absence of black ownership of land, and its 'marginal' status, which makes it less suitable for production (and therefore of less interest to potential land claimants anyway). Alice exemplifies the preference of landowners for the region because it is one of the areas of the country safest from crime. As such, the Little Karoo is the perfect outlet for the increasing numbers of people moving 'outwards' – away from the cities – as well as 'southwards' – away from the North of the country. The analyses undertaken in chapter 4 suggested that some landowners may place their land under conservation status in part because of the greater security they feel this designation confers upon them. Researchers have documented a phenomenon in South Africa (and possibly elsewhere, e.g. Langholz *et al.* 2000a) whereby wealthy landowners place lands into conservation status as a means to avoid land-redistribution schemes designed to assist the black majority (e.g. Cohen 1995). Though these fears may play a part in convincing landowners in the Little Karoo to place conservation designations on their land to increase their feelings of security, they are not considered to constitute a major driver. Land insecurity plays a greater part in pushing people towards the region than it does in motivating them towards conservation uses of the land, given that in the Little Karoo itself, there is not much need to fear land redistribution.

It is worth noting, additionally, that the region constitutes an 'enclave' within the South-West of the country for the Afrikaans culture. Historically, it has been a predominantly Afrikaans area, characterised by a large 'coloured' (but not 'black') population. Some respondents believe this makes it a culturally more appealing choice for the people moving down from the North (another predominantly Afrikaans region of the country), especially from the safety and security angle: interviewees reported white Afrikaners to have had a historically better living and working relationship with 'coloured' people than with 'black' people.

Finally, as elsewhere, PCAs in the Little Karoo are also found to be mainly the preserve of the 'old' and the 'wealthy' in society. The acquisition of PCAs as 'luxury' items is especially facilitated in the region by virtue of its land values. Close to half of respondents mention the comparatively low land prices of the Little Karoo as a major determinant for buying in the area; the following comment expresses this point with feeling:

> "*I think because there are more and richer people,* [...] *and they can come up here and for a fraction, literally for a fraction* [of prices elsewhere], *they can buy a sizeable piece of* [land]" (William)

Landowners are thus not passive respondents to developments originating from broad-scale, structural changes. At the local scale, the ascendancy of a specific, new land-management regime in the Little Karoo has come to be mediated mainly through the choices and actions of the agents in the landscape. Elsewhere in South Africa, structural change (at least as regards the change in the agricultural sector) is considered to have favoured the rise of more conservation-friendly uses of the land by virtue of 'forcing' farmers to diversify or change their traditional business to find economic alternatives to farming (e.g. Jolliffe 2001 cited in Smith & Wilson 2002, ABSA 2003, Archer 2004), with the adoption of more 'sustainable' practices by farmers aimed at reshaping and exploring income alternatives.

However, what makes the Little Karoo so different from other regions in South and Southern Africa is that conservation has not arisen as a constraint imposed on the 'traditional' farmers, the majority of which have sold their land and 'moved on' (Chapters 4 and 6), but as a free choice of the incoming landowners: it therefore offers an excellent example of the role of agency in shaping the ultimate manifestation of land-use change driven by structural processes. Structure may have provided the raw material for conservation efforts, but the decisions of landowners has given them form. Thus, a contemporary analysis of the role of both structure and agency has greatly enriched our understanding of the manner in which conservation can arise and dominate in the landscape.

Agents in the Little Karoo landscape move towards conservation primarily by choice. Their decisions are guided by a variety of societal factors, the majority of which, as has been highlighted, cannot be seen as predominantly local-scale factors. For example, the strong interest in nature and conservation of landowners in the Little Karoo is entwined with the global-scale internationalisation and intensification of societal interest in conservation. However, at the local-scale, it finds expression in the appreciation of landowners for the particular environment of the region, in terms of the landscape and/or its biodiversity. The same can be seen with the issue of land security and personal safety: this broad-level issue arising from political regime change has filtered down to render the Little Karoo a particularly attractive option for agents moving into the landscape, by virtue of the area's socio-cultural characteristics: higher land security, lower crime and 'similar' culture. The point is that creating distinctions between processes operating at 'different' scales is an artificial exercise: the numerous and complex array of actors and factors involved in PCAs are located both at the local and global levels, and act and interact on multiple levels and scales. Trying to isolate one factor can seldom fully explain landscape change as drivers can either reinforce or constrain each other (Seabrook *et al.* 2006).

5.3 Conclusions

There are a number of general principles relevant to theories of landscape change. First, landscape change is almost always due to multiple drivers acting in synergy (e.g. Liu 2001, Lambin *et al.* 2003). Studies show that environmental, socio-economic, political and technological factors, and cultural values all contribute to landscape change (e.g. Lambin *et al.* 2001, Burgi *et al.* 2004). Second, the drivers of landscape change operate at multiple levels. The actions of individuals, who carry out the process of landscape change, are influenced by local, regional, national, and international/global processes (e.g. Lambin *et al.* 2001). Third, a historical context is critical, both for informing future landscape planning and natural resource management (e.g. Foster 2000, Marcucci 2000, Bowman 2001) and in explaining present-day landscapes patterns and land-use practices (Wardell *et al.* 2003, Lunt & Spooner 2005). These principles hold true for the case of PCAs in the Little Karoo; thus, even land-use change in terms of conservation conforms to the broader theories of land-use change, normally explored in the context of resource use, not protection.

Case studies of land-use change should isolate and characterise the various drivers of change, rather than search for the key, independent driver (Archer 2004). Behind the rise of conservation as a dominant land-use regime in the LK lies first a set of structural variables that place 'guidelines' on the land-management practices that can take place. Structural processes are both human and environmental. Broad-scale economic and socio-political processes on their own have been shown not to explain why the geographic locality of the Little Karoo in particular should have experienced a rise of conservation-friendly patterns of land management. For this, it has been necessary to consider the role of ecological conditions in mediating land-use change at the local level (e.g. Nightingale 2003). Biophysical properties have constrained landscape change within the region, with the most obvious constraints to agricultural development being the marginality and climate of the area. The variability of rainfall and overstocking have both been linked to land degradation in the wider region (e.g. Archer 2004). Rainfall is outside the control of landholders and governments, and will continue to affect the sustainability of agriculture in the region, as it does elsewhere (e.g. Sheridan 2001, Vasquez-Leon & Liverman 2004, Ziervogel *et al.* 2006). Thus the environmental factors at work in the system can operate across multiple scales, and are not necessarily restricted to the local.

Within the guidelines imposed by structural human and environmental processes, there is scope for individual decision-making, influenced by both broad- and local-level societal and cultural factors, to determine what land uses will eventually result. The shift in land-use within the Little Karoo was facilitated through broad-scale human crises (the farming sector's decline, political instability) and through global/local environmental changes. These processes provoked changes in land-use and land-ownership at the time of a search for a new 'environmental' identity at both the global and local levels. Thus this examination of private conservation in South Africa provides a critical insight into the political ecology of conservation efforts, presenting the changing nature of land-uses as a dynamic interaction of both human and ecological factors. These factors cross multiple scales, and thus theories of private conservation highlight the complex interactions between the national, the global and the local, and question the usefulness of focusing solely upon one scale or the other. This chapter makes clear that one level cannot be effectively discussed without reference to the others, and highlights the need for examining the interactions between the different scales.

Distinguishing between the environmental and the human dimension is further a somewhat artificial process. Societies and environments are mutually co-constitutive (e.g. Nightingale 2003), though analysing the two separately can help determine how they are linked, and possibly identify any environmental changes that may be driven more by human practices or by ecological processes. Further, as Chowdury & Turner (2006) contend, pursuing agent or structural models alone would miss much of their sometimes reinforcing and sometimes opposing dynamics on land use and land-use change. Within this case study, both agency and structure have been found to lend insights into land-use change and thus into conservation vs. production. This study therefore provides a valuable demonstration of the importance of joining the roles of agency and structure.

In general, it is necessary to go beyond traditional dualisms such as structure or agency, nature or society, local or global, as exemplified by actor-network theory (e.g. Burgess *et al.* 2000). Actor-network theory asserts that relationships between all kinds of entities, both the human and the non-human, are fundamental to understanding action (e.g. Murdoch 1997). Thus the natural and the social are to be explained together (e.g. Murdoch 1997), and actors and processes can join together across conceptual divisions such as the local/global, or the cultural/natural (e.g. Burgess *et al.* 2000). In political ecology research, the 'chain of explanation', whereby events are explained 'upwards' from environments, through producers, and on to increasing scales of interaction (e.g. the community, the state and the global), forces a causal direction on the explanation of political ecological problems, and implies little interaction between actors at different scales (Robbins 2004). This research on PCAs, however, made clear that drivers to land-use change interact across different scales and across the human/nature dimensions. A chain of explanation cannot therefore adequately explain the relationships between different producers of nature or aid understanding of the role of non-human actors in landscape creation and change. For example, it could not explain the complex relationship that exists between the role of ecological conditions (e.g. the 'marginality' of the area), the action of structural processes (e.g. the decrease in profitability of farming), and the effects of landowners' personal preferences (e.g. their increasing environmental interest), which all together intersect to lead to conservation of the Little Karoo landscape, rather than increasing resource extraction and degradation.

Hence, a shift is required towards the use of networks, which Robbins (2004: 212) defines as entities which: "organise and are organised by a range of human and non-human actors, through systems of accumulation, extraction, investment, growth, reproduction, exchange, cooperation and coercion". The shift towards networks of interaction, alongside production of nature and producer politics (a 'more-than-human-geography') is occurring throughout the social sciences (Whatmore 2003), and political ecology research will benefit from the perspectives it offers. Network theory provides an opportunity to develop a human-in-ecosystem concept as dynamic, social-ecological networks consisting of individual actors linked through relationships and processes (e.g. Ingold 2000, Capra 2002, Davidson-Hunt & Berkes 2003). The network approach can be applied to different scales of organisation (actors can consist of a human person, an enterprise, a government, an agency, a non-human entity, etc). Importantly, organisational scale becomes an attribute of an individual actor since an actor can be active at multiple organisational scales (Davidson-Hunt 2006: 599), which has led some researchers to consider networks as 'scaleless' (Capra 2002, Barabási 2003). Thus, analyses of land-use change need to allow investigation of the full diversity of actors and of the interactions and relations between them, as has been the case in this chapter: the acquisition of PCAs in the Little Karoo has been examined against both its local and the broad-scale context, considering the role of landowner choice at both these levels, the action of various structural processes and the effects of environmental characteristics, as well as the complex interrelationships between all these factors.

Another particularly important aspect of the results on PCAs presented here is the evidence they offer towards the need for political ecology to expand its research remit (chapter 2). For instance, in human-environment issues, the negative influence of capitalist development on the landscape has often been examined (Nightingale 2003, Hurley & Walker 2004). For example, affluence has been investigated as a determinant of environmental degradation, as in the case of wealthy ranchers seeking to clear rainforest land in Brazil for cattle grazing (Hecht 1985). In contrast, this study has demonstrated affluence to be a fundamental factor in promoting the rise of environmental conservation in the Little Karoo, and thus potentially limiting the occurrence of further negative ecological transformation. Affluence is likely to prove a key determinant in other cases of private conservation: for example, one of the most noteworthy instances of private protection in recent years has been the establishment of the 289,000 ha Pumalin Park by millionaire

Doug Tompkins (Tompkins 1998, The Conservation Land Trust 2007). At the opposite end of the scale, some positive ecological changes (tree cover and riparian areas recovery from historic mining, ranching and timber harvesting) have been noted in the case of large-scale migration of 'well-to-do' urban dwellers to the countryside (e.g. Walker *et al.* 2003).

This chapter, and other examples of structural factors and affluence resulting in 'positive' ecological changes, rather than in further resource extraction and 'degradation', highlight political ecology's entrenchment in certain views, for example that capitalism negatively impacts on the environment (e.g. Nightingale 2003, Hurley & Walker 2004). Thus the real need for political ecology to expand its traditional arenas of enquiry (chapter 2) has been demonstrated. Political ecology analyses have, so far, failed to examine the mechanisms and conditions under which conservation can arise as a voluntary, non-institutional and agent-led presence in the landscape (chapter 2). This chapter has therefore used political ecology, for the first time, to demonstrate how structural processes and relations of production, politics and economics can ultimately lead to environmental conservation rather than degradation of the landscape.

To summarise, this chapter focused on PCAs in the Little Karoo as a prime example of the political ecology of conservation in practice. A conceptual framework of regional landscape change has here been derived from an empirical case study of the drivers behind the rise of private conservation areas in the Little Karoo. A political ecology approach applied to theories of private conservation shows the changing trends in land use as a dynamic interaction of both human and ecological factors acting through networks that cross a variety of scales. Emphasis has been placed on the complexity of interactions between drivers, rather than prioritising the political over the ecological or vice versa. The political ecology framework adopted can help to better understand conservation management and derive useful insights for policy. Finding practical strategies to optimise conservation in the Little Karoo (as elsewhere) requires an empirically-formed understanding of how social and environmental drivers interact at the local level and across scales, and how landowners respond and adapt to complex political ecologies.

In distinguishing proximate and underlying causes to patterns in land-use change, this analysis has demonstrated that the rise of private conservation is due to the interaction of numerous factors of different nature and at numerous scales. Thus, the analysis suggests that appropriate conservation planning, incentive measures and environmental policies that are reasonable and will work over the long-term need to recognise and account for this complexity. For instance, the usefulness of focusing only on one scale of analysis is questioned: this case study provides compelling evidence for the value of examining the wider scalar context in which local-scale processes take place, and of analysing the interactions between scales. From here it is therefore necessary to consider the conservation implications of the rise of PCAs to dominance in the landscape from the local to the global scale. Answering this question requires, first, knowing more about the conservation knowledge, understandings and attitudes that the local private reserve owners hold. These topics are explored in the following chapter.

CHAPTER SIX

Environmental knowledge and power of private conservation actors in the Little Karoo

6.1 Introduction

Private conservation areas (PCAs) will have associated a varied set of beliefs and knowledge, on behalf of the owners, about nature, conservation, their role in the landscape and that of other stakeholders (such as farmers or conservation officials). Given the increasing role of PCAs in the Little Karoo (chapters 4 and 5), the attitudes of their owners will have significance in terms of the perception, control and conservation of the landscape, and thus also in terms of power, conflict and collaboration with other stakeholders involved in its management. Consequently, developing more sustainable, integrated and collaborative efforts to manage and conserve the landscape will require that the attitudes, knowledge, beliefs and social structures of landowners are understood (e.g. Van Zyl 1999, Winter 2003, Johnston & Soulsby 2006, Winter *et al.* 2007).

To understand the constructions of nature of PCA owners, it becomes necessary to employ the more discursive approaches in political ecology, which are primarily concerned with the social construction of environmental knowledge (e.g. Bryant 2000). Discursive political ecology centres on contested social and environmental representation, highlighting that conservation efforts are not just the product of contextual human and environmental forces operating at a variety of scales (as discussed in chapter 5), but also reveal a particular way of thinking about nature, social relations, morality and place creation. The role of political ecology is thus to map methodically not only the politics of material ecological change (Robbins 2004: 126), as has been done in chapter 5, but also the politics of environmental ideas. Through these latter efforts it becomes possible to discern the socio-political origins, ramifications and connotations of environmental systems, which are far from being 'value free' and politically inert. This is because the multiple explanations and interpretations of how ecosystems work, what factors affect them, and how conservation should take place, are invested with political, social and economic meanings (e.g. Blaikie & Brookfield 1987, Hempel 1996: 6, Peet & Watts 1996, Robbins 2004: 5).

6.1.1 Chapter aims

The aim of this chapter is to examine the origins and ramifications of the environmental knowledge systems and conservation attitudes of PCA owners in the Little Karoo, adopting a more discursive framework of political ecology. In particular, this chapter seeks to examine: (i) the conservation motivations of landowners; (ii) the origin and implications of their systems of environmental knowledge, particularly in comparison to more 'official' environmental discourses; (iii) the effect of social structure and social capital on the development of conservation attitudes, behaviour and knowledge; and (iv) the relationships of conflict and cooperation between different groups of actors involved in conservation and management of the landscape, particularly PCA owners, conservation 'authorities' and local Afrikaans farmers. More generally, this research is attentive to the relationships between knowledge, power and control over the landscape.

6.2 Results and discussion

6.2.1 Landowner conservation motivations and the role of nostalgia in environmental constructions

Discussion of landowner motivations in owning a PCA reveals their desire to conserve the land, game and veld of the Little Karoo. In over two-thirds of cases, this general desire takes particular expression in terms of restoring the land 'as it was', to its 'original' condition, or in other similarly nostalgic/romantic ambitions such as: '*it's quite nice to have I suppose a bit of a sanctuary* [for wildlife] [...] *it's quite nice to know that the animals are safe in this environment*' (Jeremy). The few landowners not invoking a nostalgic aspect to their motivations in owning a PCA expressed their conservation motivations in very general terms, such as a desire to 'maintain the natural habitat'.

Landowner views of nature also tend to reflect romantic and idealised attitudes. For example, nostalgia for an 'original' state of being occurs in the context of landowners' definitions of 'natural': in over a third of cases, it is either directly synonymous with 'original' or is framed in historical terms, by reference to how the land/veld was one or two hundred years ago. 'Natural' is further viewed by three-quarters of respondents in terms of 'untainted' nature, with many making statements such as '*natural means* *almost everything* [where] *a human being hasn't intervened*' (George). Thus, as George's quote exemplifies, the landscape is often one from which all signs of humanity have been erased, characterised by a binary vision of nature and people. This particular ideal of wilderness has often been reasonably criticised, for example by environmental historians or geographers, for separating humans from nature, when in reality humans have influenced and been a part of most ecosystems (e.g. Cronon 2000, Neumann 2002, Clapp 2004). The perceptions of landowners are thus not necessarily very realistic, given the massive contradictions within their visions: for example, the 'wild', 'natural' landscape they envisage has in reality been inhabited, cultivated and modified throughout the past century, and still is, also through their own presence.

For the most part, popular representations of the landscape of the Little Karoo today are characterised by an undercurrent of symbolism drawn from 'wild', romanticised nature: '*a mystical aura about it*' (Matt). This way of seeing African landscape derives in large part from the colonial encounters with Africa and is of course not confined to the Little Karoo. Indeed, one of the most powerful narratives colonialists brought to bear on African landscapes generally, with close parallels to the romantic visions of American wilderness (e.g. Cronon 1995) is that of Africa as an idyllic and timeless wild landscape, supposedly untouched by people, where Europeans could rediscover a harmony with nature no longer available in their home landscapes (e.g. Anderson & Grove 1987, Beinart 1989, 2000, Adams & McShane 1992). Thus the Little Karoo is currently symbolising wild Africa in a microcosm.

The conservation motivations of landowners arise from the general increase in environmental awareness discussed in chapter 5, and from their 'love of the land/nature'. However, the past experiences and general lifestyle of respondents appear to play an equally strong role, in terms of growing up on farms, owning farms or game ranches in the past, and leading 'outdoors' lifestyles, as in the example below.

> " *... when we lived in Johannesburg, we used to go to the northern parks very often, for weekends, and we had friends who owned farms there, and we used to have great fun there*" (Richard)

This previous involvement in conservation areas (shared by over half of respondents), through which Richard has often been exposed to nature, has played a role in motivating his decision to acquire his own private reserve. The desire to return to the experiences of their upbringing, the desire to return land to an antecedent state, their 'love' for this land

and their visions of it as a primitive, wild and unsullied landscape, are all themes heightening the feeling that a strong undercurrent of nostalgia runs through the motivations of landowners. However, rarely do landowners express this in words as tellingly as the following respondent does:

> "*I used to* dream *about being a farmer, not where there's green fields and machinery, my idea of a farm was in the Karoo, me on horseback, with my bull-terriers, and riding through the thing looking after my sheep, you know? Nice mud floors and reed ceilings and none of the straightness, these plastic walls. Sort of like, a little bit rough, you know? ...a little bit rough*" (Kevin)

Other landowners may not dream of returning to such a 'rough' lifestyle to quite the same extent. However, Kevin paints a clear picture of the kind of romantic ideal which probably underlies the consciousness of many other respondents, and that is bound up in South Africa's colonisation and conservation history. For instance, Carruthers (1988) maintains that many earlier writers of the history of game parks have romanticised the past, casting early conservationists in the role of moral crusaders and noble defenders of wildlife. The figure of the game ranger, for example, became a popular, even heroic figure among white South Africans (Draper 1998). One interviewee noted South African landowners' "*need to defend the romantic idea of them being outdoorsmen, close to nature, living off the land, descendents of people who tamed a wild continent*" (Thomas). The Little Karoo perhaps represents to landowners a 'relict' of the past, providing them with an opportunity to experience the romanticised, idealised 'conservation man' lifestyle.

Carruthers (1988, 1994) further argues that the proclamation of the Kruger National Park in 1926 depended, among other factors, on attempts to construct a new common white South Africa identity, fusing the interests of English and Afrikaners to the exclusion of black Africans. Thus game conservation became a central feature of the way in which white South Africa projected itself. White privilege, power and possession, as extensions of the colonial paradigm, formed the foundation of the conservation ideology then being forged (Khan 1994: 503). Environmental protection was even more strongly endorsed after the Second World War, as a means to establish some international respectability for South Africa in a global community that was increasingly isolating the country on account of its racial policies (Carruthers 1994). Thus, efforts to conserve the Little Karoo may also be constituting a renewed expression of this 'white' South Africa identity, an identity that has been disrupted by the political revolution of 1994 (e.g. Dolby 2001, Korf & Malan 2002). For example, Khan (1994) draws attention to the fact that conflict over land is inextricable from conservation history, and as was discussed in chapter 5, the 'land question' has become especially pertinent in South Africa since independence.

Thus, a nostalgic theme appears to be characterising the motivations of PCA owners, leading them to cast themselves in the role of 'protectors' of nature, a role that worldwide has traditionally and most often been taken up by 'state', 'global', and 'official' actors, such as conservation authorities, NGOs, and conservation scientists (e.g. Robbins 2004). Visions of wild and exotic Africa traditionally took physical expression in the attempts made (and being made) to establish protected areas for the safeguarding of 'natural' elements of the landscape (e.g. Neumann 1995, Neumann 1998). These attempts at preservation formerly enshrined in statutory conservation areas are increasingly being played out on privately-owned lands (e.g. Wolmer 2005; chapter 2). In fact, a quarter of landowners expressed positive sentiments regarding their function in the landscape, stating they have important roles to play in conservation, or, somewhat less directly, presenting themselves as 'protectors' of nature, in the guise of 'caretakers' and 'stewards' of the land. Though it is true that landowners do have the potential to play an important role in biodiversity conservation, greater efforts on their behalf would be required at present to fully attain their image of active 'caretakers' and 'protectors' of their areas (cf. with the low incidence of management activities on PCAs, chapter 4).

There are no landowners who do not invoke nostalgic themes, whether directly or indirectly, though they express them to varying degrees. The only other major theme running through the motivations of landowners is the strong commercial intent present in a few cases: questionnaire results highlighted that roughly half of PCAs are managed for revenue, and of the 25 PCAs investigated during the interview stage, profit-making activities constituted a significant component of the reserve's current or future operation in almost half of cases. There is a recognition by those landowners engaged in tourism (the majority of those managing their areas for revenue) that 'wilderness' is as much artifice as 'natural' (though it is mostly an implicit recognition). 'Natural' areas are being actively and self-consciously created and then managed in an image of 'wilderness', in order to attract tourists: 'nature' is being progressively commodified. Wolmer (2005) reports strikingly similar results in the case of Zimbabwe's southeast lowveld landscape, where attempts to manufacture 'wilderness' are particularly evident in conservancies and game ranches, with their efforts to restore 'pristine' habitats, stock up on appropriate fauna and reintroduce hunted-out species. Overall, then, deliberate choices are made about which 'wilderness' should be constructed and preserved. 'Wilderness' is not a fixed category standing 'out of time' but a political, aesthetic (and recently economic) decision about what constitutes an appropriate landscape (Wolmer 2005: 266).

6.2.2 Environmental knowledge and attitudes: PCA management, conservation and nature

6.2.2.1 Environmental knowledge at the source and in practice

Two-thirds of respondents feel that the source(s) of much of their knowledge of conservation and the environment reflect their practical experience, "*I think it is just practical experience*" (George), and their past experiences and general lifestyle factors, "*it's upbringing I think*" (William) and "*So ... it's a lifetime of living in South Africa!*" (Philip). The great majority (over four-fifths) mentioned 'talking to people' as a means of receiving information, with a strong preference evinced for consulting knowledgeable yet 'practical' people. These two main sources account for the environmental knowledge of all landowners with whom the issue was discussed. The important role that 'talking' can have in spreading conservation knowledge among landowners is exemplified by the case of the Alpha Conservancy, which offers an excellent example of the role that social capital can play in conservation (section 6.2.3). An example given later in this chapter will show how members of the Conservancy, interviewed separately, nevertheless appear to quote each other (at times almost verbatim) on a range of issues; this point will be returned to for further discussion.

Overall, a major component of the knowledge of landowners is then perceived as 'lived' rather than 'taught' knowledge, which may in part explain the distrust for 'academics', 'book-learned' and 'scientific' knowledge that surfaces from interviews, as in the example below.

> "*... you meet interesting people, many of them are less academic and more practical people, those are generally the people who interest me*" (Richard)

From Richard's view of 'practical' people as more 'interesting' than 'academic' people, the feeling emerges that 'practical' knowledge is considered superior to 'scientific' knowledge by landowners. This feeling is reinforced by the finding that only a third of respondents (of those who get their knowledge from interaction with people) reported regularly talking to scientific 'experts' and/or conservation staff. The following statement conveys a possible reason for this lack of interaction with 'academic' people:

> " ... *you see they* [are] *not close to it enough, I feel that even the guys that are involved in government with conservation as such, they've done all the courses and they've done all the theory, but they've never lived on the farm* [...] *So they basically look at the whole situation and say 'from the textbook this is what we should be doing', but they actually have never had the experience. This is the problem with a lot of situations with really academically-minded people*" (Maria)

Maria's opinions show that the distrust for academic knowledge is due to a perception of it as being uncoupled from 'practical' experience in the 'real' world, and as has been already discussed, 'practical' knowledge forms an important component of the landowners' learning process. This mirrors wider research showing a growing public distrust of science and expertise (e.g. Carr & Tait 1991, Beck 1992, Harrison *et al.* 1998, Johnston & Soulsby 2006). In particular, research has shown landowner criticism of conservation officials, with the latter perceived as having little practical experience of land management, and/or a belief that conservationists are detached from local realities (e.g. Mather 1993, Johnston & Soulsby 2006).

These knowledge sources often lead landowners to possess a semi-scientific knowledge of environmental issues and management. For example, numerous respondents have some awareness of the 'special' conservation status of the Little Karoo, some being explicitly aware that it constitutes one of the world's biodiversity hotspots (e.g. Driver *et al.* 2003; chapter 3). Interestingly, all of these landowners again belonged to the Alpha Conservancy, which has importance in terms of the effect that social capital has on conservation attitudes in this community (section 6.2.3). Others are aware of the diversity and richness of the flora, and of the fragility of the environment, in a less explicit fashion. In terms of landowner knowledge of environmental issues, only two, closely-related themes were of concern to a sizeable proportion (over two-thirds) of respondents. One consisted of sensitivity to the need for large areas for effective conservation. The other regarded the issue of fencing, with a widely-held feeling that fencing is bad for conservation and impedes the migration of game. These concerns are related to commonly-held desires of landowners to remove fences and see larger areas established for conservation. The latter finding is encouraging, when viewed against the need to find ways of encouraging landowners to remove fences (cf. chapter 8) to improve the connectivity of their reserves (cf. chapter 4).

Concerns with space and fencing reflect an interest with issues of practical concern, relating to landowners' everyday lives and actions on their property, as do their views of what constitutes conservation on their land. Conservation management is most often considered to entail a set of management 'actions', foremost among these combating erosion, restoring habitats and removing alien plants. These actions reflect a greater interest in practical and applied matters than in any more 'scientific' concerns, such as conducting research, regularly monitoring wildlife, or establishing and updating management plans for the land. As one landowner stated when explaining the lack of a management plan: "*just do it, is my motto*" (William).

Furthermore, combating erosion and habitat restoration reflect the feeling that land has been 'abused' in the past (chapter 5) and reflect landowners' nostalgic concern to counter such 'abuse' by 'restoring' the land to an 'original' condition. Removing alien plants is instead related to the widely-advertised concern of conservation authorities and research bodies, within the Cape Floristic Region, for the threat of alien plant infestation (e.g. CNC 2006b), with the consequent legal obligation for landowners to clear alien plants from their land as a result of various laws (for example, regulations in terms of the *Conservation of Agricultural Resources Act 43* of 1983; see also Pence *et al.* 2003). A little under half of landowners also talked about conservation in terms of management 'inactions', mainly in terms of letting the veld 'rest' or letting nature 'take its course', views that are again ultimately related to the idea of 'restoring' the land to an 'original' condition. However, respondents expressing these views also talked of conservation in terms of practical activities: there were no landowners for whom conservation consisted solely of a lack of actions in relation to the land.

Commonly, official and scientific managers dismiss local environmental knowledge as politically interested, not objective, and poorly informed, even in the first world (Robbins 2004: 120). In its rethinking of environmental 'knowledge', political ecology has insisted on exploring ecological information in context (Seager 1996), rather than conceiving of local ecological understandings as 'right' or 'wrong'. Knowledge is not necessarily something that individuals or certain types of individuals have 'more' or 'less' of, but reflects the specific practices that are undertaken in daily life, being more abundant regarding certain topics, less abundant for others (Robbins 2000a,b, 2006). Hence, although respondents' knowledge and views of conservation, and the management of their PCAs, may appear 'poor' when measured from a 'scientific' conservation-management yardstick (chapter 4), their concerns reflect their interest with practical issues. Their systems of knowledge, and their concomitant actions, relate to their everyday lives on and off their property, which for the most part are not embedded in any explicitly 'scientific' or 'academic' context.

6.2.2.2 Landowner views in comparison to institutional knowledge

Notions of nature tend also to be couched in more 'traditional' views of the dynamics of ecosystems, with almost half of landowners referring to the 'balance of nature', and talking about the need to 'preserve' or 'maintain' the environment, reflecting the dominant views advanced by the provincial conservation authority, Cape Nature Conservation (CNC). The approach of the conservation authorities and scientists in the Little Karoo and wider region is marked by ecosystem preservation ideas and by the science of ecology (e.g. Cowling & Pressey 2003, Cowling *et al.* 2003, Driver *et al.* 2003, Lombard & Wolf 2004, CNC 2006b), as occurs elsewhere: in general, nature conservation is often seen as requiring a clear scientific foundation (e.g. Yearley 1991, Harrison 1993, Johnston & Soulsby 2006). In such a system, the authorities are the ecologists, biologists, and other scientists who determine the nature of native habitats (e.g. Zimmerer 1996). From this perspective, the world is understood through laws and principles developed in the institutional and research contexts of the natural sciences, not in the local social or cultural contexts in which habitats are located (e.g. Watts 2000). Preservationist thinking, in its simplest terms, entails a 'natural' ecosystem narrative whereby ecosystems devoid of human contamination are 'good', and where conservation professionals become nature's 'protectors' and 'managers' (e.g. Johnston & Soulsby 2006). The themes of 'natural' landscapes where nature is separate from people, and of landowners as nature's 'protectors', have already been shown to underlie landowners' perceptions in section 6.2.1.

Another example of the preservationist principles of conservation authorities in the region is provided by CNC's concern with the removal of non-indigenous species, whether these consist of 'alien' flora or fauna (CNC 2006b). Respondents follow suit by commonly viewing non-indigenous species in a negative fashion, and indigenous species positively (classified as such by CNC). Various research (Campbell 2000, Bryant 2002, Robbins 2002, 2004, Hayter 2003) highlights that institutional knowledge at all scales is an important part of most stories, and that the conservation power of the state can go beyond enforcing conservation rules, by causing individuals and social groups to 'internalise' the conservation mission of the Government.

There are, however, instances of respondents rejecting CNC's narratives (roughly a fifth of the total), in similar fashion to their rejection of 'academic' knowledge. Mostly, landowners depart from CNC's narratives by attributing a value to non-indigenous species, whether due to personal preferences for certain species, or on economic grounds e.g. "*they* [CNC] *tell me I've got to remove all alien trees from my property, okay? So now we cut down all these trees that are really making everything beautiful!*" (John). In later discussions, John made apparent that his appreciation of the non-indigenous trees was not based only on personal aesthetic preferences, but further on financial reasons: the trees are visually pleasing to tourists as well as useful (for shade). In a very few cases, landowners will refuse the categorisations (and hence knowledge systems) offered by the conservation board: "*whether it be indigenous wildlife or so-called 'marginal' animals*" (David). David's use of the words 'so-called' highlights his distrust and rejection of CNC's classification of what are and are not indigenous animals in the Little Karoo. This rejection is further underlined by his attempts to stock his PCA with 'so-called marginal animals' to attract tourists.

Further examples of non-preservationist views are demonstrated by the fact that this fifth of landowners couch the importance of nature and/or conservation in economic terms, as the following does: "*because the kind of tourist we attract here like to* [...] *walk in unspoiled nature*" (Linda). Linda is attributing an economic value to keeping the PCA as 'natural' ('unspoilt') as possible, because of the attraction this exerts on tourists, as is also the case for John's trees. A few landholders highlight that financial sustainability is important, if not fundamental, for achieving adequate conservation: "*obviously it doesn't help bringing in animals and getting the environment sorted out and you can't afford to sustain it! So you have to bring in your tourism side then to* *sustain what you* [are] *doing*" (John). John's point is that the achievement of conservation goals entails financial expenditure; for a PCA owner, that financial expenditure must sometimes be met by generating an income from the land, as can be done through tourism. In general, respondents most often depart from CNC's narratives where tourism constitutes a significant aspect of the operation of their PCA (it is important to note that this bore no relation to the value they attributed to conservation as a motivation in itself). The findings discussed here relate to those of section 6.2.1, in which it has already been noted how some landowners 'manage' the image of what is 'natural' and 'wild' towards an ideal that will satisfy tourists. Further, the more enterprising landowners in the Little Karoo are also found to be those most likely to feel constrained by CNC's directives (section 6.2.4), so it is not surprising that they should also be the most likely to depart from traditional narratives of the conservation authorities.

6.2.3 Social capital and conservation

6.2.3.1 The roles of social networks, trust and learning in promoting conservation attitudes and behaviour

The majority of landowners for whom conservation has meaning beyond the individual responsibility (over two-thirds), and who thus see it as a 'group activity' or a process that should take place at both individual and collective levels, belong to the Alpha Conservancy. Further, of the respondents interviewed, only those belonging to this conservancy envision a relationship between unity of people and 'power' for conservation, as the following extracts highlight:

> "*Because a conservancy is a whole lot of people who believe the same thing, we create an area that is under conservation,* [...] *and then the energy of that is that you can monitor it, you can police it, you can take down all the fences in that conservancy area, and then you can speak with one voice, which means that* [...] *it gives you a power-base*" (Jenny)

> "*The more people that stay together* [in a conservancy], *in terms of formalising ideas, and giving direction to it, the more likely* [it is] *that it will actually take place! Because it's an alignment of ideas, and it's alignment of energies, and everybody's talking the same thing and it's not a conservation idea with a hundred different directions, it's a conservation idea with one direction. So it's going to be able to be brought into expression much easier than if you got everybody sitting at home saying 'I would like to do'. This is a case of everybody getting together and saying 'okay, let's do'.*" (Gareth)

A number of important themes emerge from these statements. Broadly, the causal links between the ideas expressed by Gareth and Jenny follow the order: creating unity among people means that ideas about conservation are arranged into shared goals; such an alignment channels people's energies into a common effort to achieving those goals; the energy saved through this process leads to a more certain and easier achievement of the shared conservation vision. Though one might suppose that conservancy landowners would believe in conservation as a 'group activity' almost by definition, this does not necessarily occur, as is the case for another conservancy in the region, the Beta Conservancy (discussed in further detail below). Of importance here, as was initially mentioned in section 6.2.2.1, is that the views of these and other respondents in the conservancy are worded with striking similarity to each other, highlighting the role that talking among neighbours has in stimulating and promoting the conservation knowledge and motivations of landowners. Conservancy members were found to mirror each other in other instances as well, for example when talking about the need to establish 'peace' between humans and nature. Overall, Alpha Conservancy respondents were found to possess some of the strongest conservation attitudes, and knowledge, of all PCA owners. For example, it was noted above how all landowners who were aware of the 'special' conservation status of the Little Karoo belong to this conservancy. Further, members exhibit great concern with issues of sustainable resource use, with a majority preoccupied with organic, small-scale and/or self-sufficient methods of farming. In fact, the Alpha Conservancy forms the nucleus of the emergent Little Karoo organic community that was discussed within chapter 5 (section 5.2.4.3).

These findings are important in the context of social capital, and its role in favouring some people's views of conservation as a 'group activity' and hence further cooperation between them. Social capital can be defined as the relationships of trust and expectations built up between community members through the investment of time and face-to-face interactions over long periods (Robbins 2004: 151). Social capital has emerged in recent literature as a complex concept involving multiple forms of social relations, including trust, reciprocal arrangements, local networks and institutions, formal and informal organisations, and ties within and between communities or between communities and external structures (e.g. Fox 1996, Bebbington & Perrault 1999, Mohan & Mohan 2002). The importance of local institutions has long been understood in the common-property literature but has only recently come to be recognised as important for environmental conservation and sustainable development (Ostrom 1990, Pretty & Ward 2001, O'Riordan & Stoll-Kleeman 2002, Pretty 2003, Jones 2005, Westermann *et al.* 2005). Social capital implies that there are aspects of social structure and organisation that act as resources for individuals, lowering the costs of working together and hence furthering cooperation (Pretty & Smith 2004, Westermann *et al.* 2005). Trust makes social life predictable, it creates a sense of community, and it makes it easier for people to work together (Shannon 1990, Cook 2003).

Interactions between members of the Alpha Conservancy point to the importance that networks of people can have for the realisation of conservation and natural resource management efforts (e.g. Tompkins & Adger 2004, Newman & Dale 2005, Davidson-Hunt 2006). Some 40% of respondents directly mentioned cooperating with their neighbours for the purposes of conservation: it is instructive that two-thirds of these collaborative landowners belonged to the Alpha Conservancy. One such respondent, in the context of discussing why the conservancy appeared to 'work' better than others in the region, indirectly points to the role of social capital as the basis for their successful implementation of conservation efforts:

> "*... the base of that is a community identity* [...] *I would say that perhaps we are more cohesive* [...] *there's definitely a sense of identity*" (Gareth)

Gareth's views of the Alpha Conservancy's strong 'community identity' suggests that this particular community is evincing bonding social capital, which describes the links between people with similar outlooks and objectives (Pretty & Smith 2004). Other members of the conservancy, whether explicitly or implicitly, shared this feeling of a 'community spirit'. For the Alpha Conservancy, the establishment of new social relations that bond individuals together appears to have enabled more sustainable land-use practices and conservation behaviours to spread in the community, as evinced by the group's strong conservation attitudes, and by Jenny and Gareth's quotes reported at the beginning of this section: a unitary 'conservation idea' is able to be realised through the 'alignment' of different people's ideas and 'energies'. The consensus views members have reached on nature and environmental management are illustrated by the close similarity in the wording and nature of the ideas they expressed throughout the course of separate interviews.

6.2.3.2 The role of leadership in promoting conservation attitudes and behaviour

Collaboration in governance networks has been shown to require effective leadership: leaders can provide key functions for adaptive governance, such as building trust, making sense, managing conflict, linking actors, initiating partnership among actor groups, compiling and generating knowledge, and mobilising broad support for change (Folke *et al.* 2005: 451). Key individuals also develop and communicate visions of ecosystem management that frame self-organising processes (Westley 1995). Key individuals with strong leadership (such as Jenny in the case of the Alpha Conservancy) may catalyse opinion shifts (e.g. Scheffer *et al.* 2003), and creative teams and actor groups may emerge into a large connected community of practitioners who prepare a social-ecological system for change (e.g. Guimerà *et al.* 2005) and transform it into a new state. In the example of the Alpha Conservancy, two landowners were instrumental in getting people together to initiate the conservancy and keep it going. Jenny talks abour her adopted role as 'activist' and 'example' to her community:

> "*I've been proactive in getting the conservancy active, and going,* [I've] *slowly been* [...] *talking to and encouraging all the neighbouring farms* [...] *I suppose it's just a passion of mine, to spread my love for Mother Earth, in that area*"
> "*Beth spoke to me about the conservancy, which was doing nothing at that stage, and because I'm a reasonably strong character, I then started to bully all the farmers to come to meetings, because nobody would came to meetings, and encouraged them, but also bullied some of them, to say you have a responsibility here, and so we have a vibrant conservancy, the Alpha conservancy*"
> "*... it's to even get the landowners who are still using the bad farming practices, to even agree to come to meetings, so the only way that we have done it and continue to do it is by example, is that eventually you live amongst them and eventually they come and see,* [...] *and then they start asking questions, so it's to convert as many farms as you can*"

Jenny plays an active, self-recognised and 'bullying' role, loudly promoting and championing cooperation between landowners. Single individuals have also been found to play key functions in the context of learning and knowledge generation (e.g. Cash *et al.* 2003), a role that Beth fulfils in the Alpha Conservancy. Compared to Jenny, Beth plays a much quieter but nevertheless key role in furthering the conservation knowledge of other members, a fact that comes across clearly from their comments.

> "*... she* [Beth] *is* amazing, *and if I really want to know something I call her, I* really *trust her* [...] *and because she lives in the area, and she's experienced it, and she knows the biodiversity, and she has an* amazing *knowledge about the area*" (Maria)
> "*I think Beth is a source of information and encouragement*" (Alice)

The quotes demonstrate how knowledge can spread relatively easily due to the presence of relationships of trust, and to the effect of key individuals in the community. The process of learning, if it is socially embedded and jointly engaged upon, provokes changes in behaviour (e.g. Habermas 1987) and 'can lead to a new world' (Pretty & Smith 2004: 637), which certainly appears to be the case for the Alpha Conservancy, when compared to another conservancy in the region (section 6.2.3.3), and more generally to other communities of PCA owners in the Little Karoo, who did not exhibit similar levels of connectedness. As a final point not only do Jenny's and Beth's actions show the important function that key individuals and leaders fulfil, but their gender may also be playing a role. For example, the presence of women in natural resource management groups has been shown to increase their effectiveness (Westermann *et al.* 2005). Findings by these authors revealed that collaboration, solidarity and conflict resolution all increase in groups where women are present, as does the capacity for self-sustaining collective action. This chapter's findings, viewed in the light of those of Westermann *et al.* (2005), suggest that women can have an important role for collaboration and sustainability of groups involved in the management of natural resources.

6.2.3.3 The interactions between social capital, culture and conservation

The examples discussed so far show how the existence of good social capital, with the presence of key individuals, and with the relationships of trust and social learning, can promote cooperation between PCA owners for the purposes of conservation and further their conservation motivations and knowledge. Thus, in the wider context, these factors can lead to changes in the attitudes of other community members or communities, as a few respondents note:

> "*... the last few that are in the village I would say that they've mellowed out*" (Gareth)
> "*... we've converted a lot of them and so they're believers*" (Jenny)

Gareth is referring to the active 'anti-nature' views of long-term resident farming elements of the community, which over time are becoming less passionate and intense. Jenny is instead talking of 'converting' the beliefs of her neighbours towards conservation. Attitudes are changing as farmers come to appreciate the importance of adequate conservation of the veld. As has been demonstrated in other studies (e.g. McNeely & Scherr 2003, Pretty & Smith 2004), changes in local values emerging from new social relations offer hope that stewardship and protection of local capital can occur over the long term. Such a level of social linking is not in evidence in another conservancy of the region, the Beta Conservancy, as is made apparent by one of its members:

> "...[I] *felt that most of our members had joined for the wrong reasons, and there were so* few *of us that were actually* interested *in conserving this area* [...] [My husband and I]*can't handle these big landowners who aren't interested,* [...] [who] *joined for the wrong reasons*" (Linda)

Linda talks of the difficulties she and her husband find in dealing with their neighbours and establishing working relationships, due to the differences in conservation motivations among the different parties. The other conservancy members are perceived to be far less interested in conservation *per se*, and the negative implications of these differences for the conservancy itself are evident from further discussion with the same respondent: "*the conservancy is becoming smaller because our members are resigning or losing interest*".

The reason for the differences between these two conservancies was found, in the first instance, to be down to chance events leading to the establishment of good social capital within a community. In the case of the Alpha Conservancy it is felt that its particular isolation favoured the emergence of strong community ties. The success of the Alpha Conservancy also has had much to do with the arrival (and continuing arrival) of a set of 'like-minded people' from the cities, as Jenny notes: "*it's very easy to convince* [them] *because* [...] *they are people who've moved out into the country because* [...] *they care about nature*". Jenny is referring to her efforts in changing the behaviour of her neighbouring landowners, who are more easily 'converted' because of holding similar values and beliefs to each other. Second, differences between conservancies have also much to do with culture. The Alpha Conservancy, as noted, is composed of a majority of 'newcomers' to the area, some of 'English' descent, others of 'Afrikaans', but all immigrants from an urban environment. The long-term residents of the Little Karoo consist instead of rural, isolated Afrikaans communities that have farmed the veld for decades without relinquishing their 'traditional' ways, as expressed through this statement:

> "*The farmers who remain here, as opposed to the newcomers, are bound up in tradition, they do things the way their forefathers have always done them, and 'if it's good enough for them it's good enough for me', and that doesn't really work very well*" (Alice)

Not only, as Alice makes clear, is the Afrikaans community viewed by the newcomers as 'outdated' and 'attached to their ways', but these ways are typically seen as 'anti-nature'. The Afrikaans farmers are viewed as responsible for 'destruction of nature' in the region, not to mention shooting and poisoning of wildlife, and hence as failing to 'find ways to minimise the conflict with nature'. Hence, Afrikaans-dominated conservancies (and areas and communities, more generally) such as the Beta Conservancy are viewed as being 'no good' at conservation, due to their anti-nature attitudes and lack of interest. This is seen to be in contrast to the newcomers' own attitudes towards nature and conservation, perceived as positive and beneficial. Although the new urban immigrants to the Little Karoo will not necessarily always possess greater environmental knowledge and/or concern than the traditional inhabitants, it is true that they are more influenced by the current rise in global environmental awareness (chapter 5) than the latter. It is also true that traditional farmers in the Little Karoo appear more concerned with their farming activities and with optimising the profitability of their land, than with nature or conservation: for example, incidents of baboon and/or leopard shooting/poisoning encountered during field-work had all occurred at the hands of traditional Afrikaans farmers.

In concluding, is necessary to highlight that the Alpha Conservancy is not the only place in the Little Karoo where cooperation occurs; it just offers an example of one of the strongest instances of collaboration for the purpose of conservation and natural resource management encountered between respondents in the area, and of the role of social capital within this. This chapter has focused on results from the Alpha Conservancy for these reasons. Although landowners from another one of the conservancies in the region, the Beta Conservancy, were among those selected for the interviews phase, discussions with them did not bring out any especially noteworthy results, except for comparative purposes with the Alpha Conservancy, as discussed above.

6.2.4 Conflict and cooperation with conservation authorities

The presence or absence of cooperation between stakeholders in the landscape also relates to the relationship between PCA owners and the conservation authorities in the region, whom landowners most commonly feel are represented by Cape Nature Conservation. Where respondents commented regarding their relationship with the conservation board, it was frequently revealed as a contradictory, often conflictual rapport. In over half of interviews landowners expressed some negative judgement regarding CNC, usually in terms of viewing the organisation as 'out of touch' and characterised by a somewhat heavy-handed approach, unwilling to recognise landowners as valid and equal partners in the conservation landscape, insensitive to their needs and unable to meet them appropriately (feelings that some employees of CNC acknowledged as having a valid basis). The conservation authorities were also often seen as inefficient and weak with respect to both delivery and implementation capacity (which was certainly seen to be the case with respect to the Stewardship Programme, see chapter 8). Most landowners expressing these views are entrepreneurs, running their reserves for business, which may in part explain their particular irritation at the perceived constraints set by the conservation board. These landowners, who are actively managing their lands, are likely to feel strongly about their right to set the terms for the use of their environment; their 'free-spirit' syndrome may thus lead them to experience the greatest frustration with CNC's attitudes. Such feelings are epitomised by one of these landowners, a strongly-conservation motivated individual who is running his PCA for nature-based tourism:

> "... all *we saying to* [CNC], *is listen to our practical experience when it comes to sustainability!* [...] *I've had blue wildebeest here for the last five years* [...] [CNC] *want me to get rid of it, because they were not supposed to be here and yet my ecosystems are functioning 100%! Why do that? That's crazy. It's a different matter if I'm bringing in blue wildebeest so that people can shoot them on a 40-acre piece of property, that's not what I'm planning to do. That's the thing that makes it sad, because you've got some people that are being un-environmentally friendly, and doing strange things, everybody's classified the same. And I don't think it's necessary to be*" (John)

The quote provides just one example of John's evident frustration with regulations by the conservation board, which he feels are inadequate and illogical in nature. The particular example shows his belief that CNC's dictates regarding the species of wildebeest allowed on the reserve are arbitrary and do not take into account the sustainability of his reserve's environment. John clearly also feels that his particular contributions to conservation are not recognised, as his grievance at being 'lumped together' in the same category as less environmentally-friendly PCA owners demonstrates. In their frustration and desire for independent operation, landowners like John are disassociating themselves from models and solutions proposed by the conservation board. John, for example, has founded a 'tourism association' with neighbouring farmers. This is not a conservancy, but an association founded to increase the tourism potential of John's reserve, which by itself is not large enough to support, for example, the buffalo they wished to bring to the area. Thus John interested his neighbours in establishing a buffalo breeding programme, which he then brings his tourists to visit (paying a fee to his neighbour for this service). It is clear how John and entrepreneurial landowners similar to him will feel irked by what they perceive to be out-dated and unreasonable strictures imposed by the conservation authorities.

Yet, half of them were also able to express some positive feeling regarding their relationship with the conservation board, mainly in terms of recognising that within the organisation, though as a whole it may be viewed negatively, there exist likeable, helpful and 'good' individuals. In a few cases PCA owners cooperate, or expressed a willingness to cooperate, with the conservation authorities even where they viewed them negatively. Just over a third of landowners appeared to have a mainly positive relationship with CNC, at least in terms of being involved (or willing to be involved) with the conservation board, and not voicing any negative feelings towards them; again, particular individuals were sometimes highlighted in a positive light. In total, over two-thirds of the respondents who had positive comments to make regarding CNC (whether or not they also expressed some negative views) belonged to the Alpha Conservancy. This is highly interesting given the specific development and characteristics of this community. The relationships of trust that community members have built up, their pro-conservation attitudes, and their views of unity as a force for conservation, may be 'spilling over' to influence their relationship with conservation staff. More generally, they may be showing connectedness beyond their community, showing a 'linking' type of social capital, i.e. the ability to connect with external agencies, either to influence their policies or draw on useful resources (Pretty & Smith 2004). In this case, social capital may be proving key not just for improving conservation behaviours within the community, but also for aiding the cooperation of different groups involved in conservation.

On the other hand, it would appear that the Alpha Conservancy are also experiencing particularly high levels of contact from conservation staff, suggesting that the latter invest more effort in personal interactions with landowners in this community. For example, only half of respondents have some level of contact with the conservation board, and two-thirds of these were found to be members of the Alpha Conservancy. All the conservancy members (which constitute a third of the sample interviewed) had some level of awareness of 'official' conservation programmes or bodies in the region, such as the Stewardship Programme (chapter 8; Appendix C), or the Gouritz Initiative, a

CNC project for developing a biosphere reserve in the Little Karoo. This proportion was equal to the proportion of respondents who had no knowledge of any conservation initiatives in the region. This suggests that conservation staff should allocate more effort towards involving and communicating with a greater proportion of landowners in the landscape, and not target specific areas and/or communities, as appears to be the case. This is reinforced by the finding that specific CNC individuals were often singled out for praise, even by respondents criticising the institution overall; the finding suggests that where relationships have been characterised by personal contact, they have been, and are, much more positive. These points will be returned to in chapter 8, in the context of discussing possible environmental policies for the region.

6.3 Conclusions

One way of looking at landscape is as an inherently political category (Wolmer 2005: 261), and land occupation and conservation in the Little Karoo in the last decade by private practitioners reveals multiple ways of seeing and understanding this landscape, in comparison to both 'official' efforts to preserve the environment and visions of other user-groups on the land. Environmental conflicts are also issues about power, power to decide everything, from the definition of nature to access to natural resources (Rikoon 2006). All too often environmental conflicts have been explored with attention to the impact of the results on the protection of 'local' people (i.e. traditional, indigenous and/or marginalised communities), their livelihoods and beliefs (e.g. Peluso 1992, Neumann 1998, Schroeder 1999, Bryant 2000, Robbins 2004). The present research deviates from this norm to present a highly interesting investigation of the knowledge, values and beliefs of a group that represents neither 'official' nor 'scientific' interest, and that is however far from disempowered: private landowners are the decision-makers for their own conservation territories, and are hence dominant players in the current conservation landscape (see also chapters 4 and 5). More generally, private conservation areas offer an example of the politics of global environmental governance, specifically of the manner in which it is marked by an increase in structures of power, control and authority that increasingly lie outside national governments (e.g. Duffy 2006).

Blaikie (1995: 209) notes that current scientific and conservation thinking can only be 'brought down to earth' by acknowledging the multiple views of different actors, and understanding the politics of how they present their views and pursue their projects. The deeper context of conflicts between government/conservation authorities and private landholders represents a fundamental conflict about social and political power and who should hold it. CNC's imperatives to define and restore nature are naturally justifiable; however, when private landowners such as those of the Little Karoo create and manage their conservation areas without involvement, interest and above all understanding of the conservation authorities, there are costs involved, not only in terms of missed opportunities for establishing working partnerships, but also, ultimately, to conservation of these lands itself. When the knowledge and needs of local residents remain discounted by more powerful 'outsiders' who feel their knowledge to be superior, the very people whose support is crucial for the environment to be protected are alienated (e.g. Cronon 1996a,b). PCA owners in the Little Karoo, with good reason, call for a 'common sense' approach to conservation and interaction with private landowners on part of the authorities, based in the 'real world', and sensitive to the needs and opinions of landowners.

Thus the specific set of knowledge, attitudes, values and beliefs PCA owners hold are likely to drive much of the expression of conservation in the Little Karoo, and therefore the emerging dominance of private landowners in the conservation landscape has critical implications for the evolution of appropriate environmental policies for the region. Therefore, of interest is how PCA owner knowledge diverges or converges with that of state officials, environmentalists, and long-term rural residents of the Little Karoo, and to what effect on the landscape and its management?

Little Karoo PCA owners' knowledge does often converge with the dominant, preservationist environmental narratives that characterise the conservation authorities. For example, in a strictly preservationist narrative, a romantic, idealised view of nature is associated with the 'past', usually a pre-European immigration, non-black past, while culture and human activities have become associated with modernity and the present (e.g. Howell 1994, Rikoon 2006). As has been discussed, landowners in the Little Karoo are well habituated to such global narratives, which come through from many of their discussions of nature and conservation. For example, PCA owners often held the following preservationist notions: the 'good' indigenous species and 'bad' non-indigenous species dichotomy (established by the conservation authorities), the existence of a 'balance' of nature, or the view of conservation as 'restoration' of habitat to an 'original' state.

The extent of hegemonic narratives is thus further expressed through the nostalgic, romantic views of conservation that PCAs owners hold. Landowners' cultural constructions of the Little Karoo landscape and its nature, and their interpretations of conservation, for the most part reiterate dominant preservationist principles, presenting an idealised landscape of nature free from human intervention, 'as it was' a couple of hundred years ago, with its 'rightful' complement of 'indigenous' species. Such constructions, however, probably have more to do with a nostalgic dream of past colonial and environmental history than to a conscious affiliation with 'official' preservationist and conservationist agendas. Thus the present research argues that a powerful legacy of colonial encounter with South Africa is the notion of the veld as a wilderness. This logic underpins the attempts to preserve or rehabilitate parts of the Little Karoo landscape as pristine and glorious pieces of national heritage and, further, the attempts to sustainably exploit wildlife and 'wilderness'. Just as conservation professionals become nature's 'protectors' and 'managers', so too are PCA owners following this global narrative by taking up the role of the state before them, establishing themselves as the 'caretakers' of the land, with all the implications for dominance and control over the landscape that this position entails.

The perpetuation of dominant environmental narratives is not surprising: PCA owners' constructions of the landscape cannot be strongly embedded in a local social or cultural context, given their recent arrival in the area. They are more likely to reflect the 'global', 'official' environmental discourses spread among urban dwellers by the global media, which contribute to their desire to 'escape' the city in search of an Edenic nature to 're-connect' with (chapter 5), and of which they establish themselves as protectors. However, this chapter has shown that a 'rooting' of landowners' knowledge in their local context, and a divergence from hegemonic environmental discourses, is currently taking place. First, this is apparent from examination of the origins of landowners' environmental knowledges, which are grounded in informal, practical and 'lived', rather than 'taught', sources. Related to this is landowners' distrust for 'scientific' knowledge: landowners express contempt for 'book-learning' that is not backed up by experience in the 'real world', i.e. the local social, cultural and natural contexts in which they themselves live and operate.

Secondly, the progressive 'localisation' of newcomers to the Little Karoo is evinced by some emerging autonomous and contrasting visions of nature and the landscape, as a result of their personal experiences. For example, for some landowners certain non-indigenous species have clear cultural, emotive or economic value and connotations. These landowners express frustration with the set of standards held by the Conservation Board, which have been established through the cultural frameworks of biologists and ecologists, and do not allow room for their own personal experiences and perspectives. For example, a couple of landowners explicitly reject the current CNC classification of 'indigenous' and 'non-indigenous' species as incorrect and specious. A number of PCA owners hold the belief that nature needs be managed in connection with human needs and communities, whether explicitly (for example by highlighting the necessity of stocking non-indigenous, charismatic mega-fauna to attract tourists) or implicitly (more generally, by talking about the importance of nature conservation in economic terms).

Thirdly, cohesive communities of newcomers in the region are beginning to coalesce around and create dominant environmental discourses for their own groups, as is seen elsewhere (e.g. Robbins 2006) and in the Little Karoo is demonstrated best by the Alpha Conservancy. Unconnected management by long-term residents in the area was transformed by the arrival of a set of 'newcomers' who moved into a new configuration of collaborative ecosystem management within less than a decade. The process was triggered by perceived broader-scale crises, such as the threats to the landscape's sustainability ('degradation' of the Little Karoo, chapter 5) and by local-scale problems, such as the (perceived) passivity among the long-time residents. A few key individuals provided visionary leadership and knowledge generation to catalyse and direct change, with trust-building dialogues, coordination of ongoing activities, collaborative learning, and creating more environmental awareness all part of the process. Successful social-ecological transformations of this kind seem to be preceded by the emergence of informal networks, orchestrated by key individuals, that help facilitate information flows, identify knowledge gaps, and create sources of expertise for ecosystem management (Folke *et al.* 2005). Fundamental changes in social-ecological systems can occur rapidly (Scheffer *et al.* 2003), as the case of the Alpha Conservancy demonstrates.

Finally, political ecological actions at the local scale often represent dissent (Robbins 2004). Local actions (even if not 'movements' in themselves) provide an alternative vision of politics and decision-making: by disassociating themselves from models and solutions proposed by the conservation board, and by refusing its strictures, landowners also present an active face, challenging the homogenising and dominant forces of state conservation.

The attitudes and knowledges of PCA owners are further at odds with those of the long-term rural residents of the Little Karoo The private actors emerging in the region are wresting control over the landscape not only from the state, but also away from local producer groups, in this case the white, Afrikaner farming community. Much recent scholarship has gone into examining instances of environmental conflicts in the US west as a result of the movement of urban immigrants into rural areas (Beyers & Nelson 2000), focusing on conflict between resource development and environmental preservation (Walker & Fortmann 2003), values of newcomers versus long-established residents (Shumway & Otterstrom 2001) and rural vs. urban divisions (Alm & Witt 1997). A dominant narrative has emerged that posits that old economies of primary extraction (such as ranching and mining, in the US example) are increasingly becoming less productive, and giving way to economies of environmental consumption driven by a new generation of landowners (Robbins 2006), usually wealthier than the long-term residents (Shumway & Otterstrom 2001). The visions of newcomers enter immediately into conflict with those of the established residents, leading to more conservation-oriented practices (Robbins 2006), as the former are considered more environmentally concerned and knowledgeable than the latter (Jones *et al.* 2003). These changes bear striking parallels with the case of the Little Karoo, exemplified once again through the case of the Alpha Conservancy, whose members' consensus views on nature and many aspects of conservation are rapidly prevailing in the community and fly in the face of the 'local' Afrikaans culture, at whose door the blame for the 'abuse' of the Little Karoo is often laid. The Alpha Conservancy is an example of the collision of cultures discussed above, epitomising the replacement of Afrikaans farmers with urban newcomers with a heightened sense of conservation awareness, which appears to be generally occurring across the Little Karoo.

However, although economics and environmental attitudes are related (e.g. Franzen 2003, Robbins 2006, Gelissen 2007), greater affluence, participation in the leisure economy, and the desire for environmental amenities do not necessarily correlate to greater environmental knowledge and concerns (e.g. Morris & McBeth 2003, Robbins 2006). Similarly, for Walker & Fortmann (2003), changes in the rural US west are more a symptom of 'gentrification' of the rural neighbourhood, than a product of a greening of the landscape. The knowledge and values of urban landowners in the Little Karoo, which are likely to drive much of the future expression of conservation in the region, will possess a degree of arbitrariness, deriving from a rooting in cultural norms, social relationships and value-laden judgements, like the knowledge of scientific practitioners and 'experts' before them (e.g. Demeritt 2001). The failure of 'traditional', 'official' conservation methods has been primarily attributed to the disenfranchisement of traditional land managers, in favour of the interests of 'elite' communities with little or no investment or understanding of the landscape and its processes, thus producing unsustainable results (Robbins 2004). To avoid repeating this situation, the knowledge of new PCA owners moving into the Little Karoo must be not placed ahead of the knowledge of any other groups involved in the landscape. Rather, future policies for more sustainable environmental management in the region need to account for, and find ways to integrate, the multiple interests and viewpoints of the different stakeholders.

Given the rise to dominance of PCAs, what sorts of impacts does it hold for the development of more equitable and more sustainable policy prescriptions? How can the particular knowledge and beliefs of private landowners influence the way environmental policies are formulated? The self-establishment of PCA landholders as 'protectors' and 'custodians' of nature, as well as the entrepreneurship of some of these landowners, sees them establishing control over the conservation of their portions of the landscape. Though there is room for improvement in landowners' efforts as 'protectors' and 'managers' of nature, they are undoubtedly legitimate players in the conservation landscape and deserving of recognition as such. Thus conservation authorities need establish a more democratic relationship with PCA owners, viewing and treating them as equal partners in conservation of the landscape. Future environmental policies will need to account for the specific preferences of PCA owners where their narratives diverge from the hegemonic environmental discourses that reflect the conservation authorities' interests. If voluntary conservation is to prove successful, new strategies for negotiating, justifying and communicating conservation goals are required (e.g.

Johnston & Soulsby 2006). These objectives can be realised through increased personal contact between landowners and the conservation board, for example through the provision of conservation extension services, as was demonstrated in the discussion of conflict and cooperation between PCA owners and CNC. Raising social capital may also prove key, both for improving conservation attitudes and behaviour within communities, and further in aiding the cooperation of multiple stakeholders. Both these points will be returned to in the discussion of environmental policies for PCAs that is undertaken in more detail within chapter 8.

In summary, the Little Karoo is much more than a botanical descriptor or environmental bioregion; as this chapter has demonstrated, as a landscape it is invested with culture, history and politics, and thus falls firmly into the human realms of agency, construction and power. It is currently in the process of being appropriated and represented by a new set of actors who are making claims to control the land and define appropriate land uses. This chapter has focused especially on the development and effects of the conservation knowledge systems of those actors, the PCA owners. Next, the thesis scales up again to use the example of PCAs to consider ways with which to integrate social and natural science scholarship, specifically by formulating a more integrated conservation planning framework and methodology.

CHAPTER SEVEN

A case-study of conservation planning in the Little Karoo: Adaptive Conservation Planning

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7.1 Introduction

Systematic conservation planning is a common and extremely popular approach in conservation science for strategically designing more representative systems of protected areas (e.g. Malakoff 2002, Airame *et al.* 2003, Cowling & Pressey 2003, Groves 2003, Pressey *et al.* in press). PCAs are viewed as promising new tools in the conservation box (e.g. Langholz 2002, Figgis *et al.* 2005; chapters 1 and 2) and conservation is increasingly seen to require collaboration between public-private stakeholders and neighbours in the landscape (e.g. Bergmann & Bliss 2004, Figgis *et al.* 2005, Duffy 2006; chapter 6). Given that conservation planning is a tool designed to improve conservation efforts in the wider landscape, it is inevitable to ask what may be the scope for using systematic conservation planning in the context of optimising private conservation efforts. Several researchers have pointed out the need for conservation planners to focus more attention on private lands (e.g. Soulé & Terborgh 1999, Miller & Hobbs 2002, Newburn *et al.* 2005, Wallington *et al.* 2005).

The conservation of ecosystems (and of their constituent parts and function) can be seen as the result of a mix of factors: not only the preservation of critical ecological features and processes, but the presence of those socio-cultural features (such as attitudes, willingness to conserve) which combine to enable the development, implementation and duration of conservation visions and goals. Beliefs about nature, meanings attached to land, the institutions formed to manage land (cultural practices) influence the kind of land-management options and implementation strategies people will consider (Nightingale 2003: 537), not just in terms of resource use, but also in terms of conservation. The process of conservation is influenced by financial, social and politically based decisions made at multiple scales of control, including the willingness of private landowners to participate, desire of local interest groups, and short-lived government priorities (e.g. Hurley & Walker 2004, Newburn *et al.* 2005). If such features are not accounted for, conservation efforts based on ecological criteria are likely to fail: there are a large number of examples from both terrestrial and marine conservation that illustrate the potential danger of ignoring socio-economic and/or political factors in the earliest stages of protected area planning or design (e.g. Alphandery & Fortier 2001, Webb & Thiha 2002, Bergen & Carr 2003, Lundquist & Granek 2005, Richardson *et al.* 2006). Thus, an excessive focus on either the social or ecological dimension of ecosystems is unlikely to lead to outcomes resulting in the preservation and sustainable use of the environment: consideration of both is required.

Further, there is also a need for new forms of planning and managing for conservation, with a shift in perspective from the aspiration to 'preserve' the characteristics of ecosystems, assumed to be stable, towards conservation of systems that account for increased frequency of abrupt change and the dynamical nature of landscapes (where relevant to the system) (e.g. Holling 2001, Folke *et al.* 2004). There has been a call for science and policy to account for periods of gradual and abrupt change and their relations to resilience, and further to account for interactions across spatial and temporal scales, in order to secure the capacity of ecosystems to reorganise in the face of change (Folke *et al.* 2005: 443). Full appreciation of the human dimensions of conservation is not enough: comprehensive understanding of the natural environment is required (e.g. Lundquist & Granek 2005). Gaining this understanding will involve determining whether an ecosystem is characterised by equilibrium or non-equilibrium dynamics, and at what scales these might apply.

For all its popularity and influence, systematic conservation planning does not generally engage non-equilibrium ecosystem theories or consider the interactions between the environmental and human dimensions of ecosystems (e.g. Webb & Thila 2002). Current methods for conservation planning treat both biodiversity and human systems as static (Meir *et al.* 2004: 615). These oversights are likely to greatly complicate implementation.

7.1.1 Chapter aims

This chapter introduces a new methodology, here termed Adaptive Conservation Planning, which is able to deal with the complexity of social-ecological systems (a term used to stress that the distinction between social and ecological systems is artificial and arbitrary, Berkes & Folke 1998). The widespread development of systematic conservation planning procedures will be reviewed first, and their weaknesses in relation to accounting for the social dimension of ecosystem conservation will be identified. Thereafter, the Adaptive Conservation Planning framework will be presented, and the remainder of the chapter will discuss and demonstrate its significance in terms of the need for current systematic conservation planning procedures to expand their remit to include social and non-equilibrial elements of ecosystems. This discussion will be split into two parts: the first, drawing on results of previous chapters, will demonstrate the importance of expanding conservation-planning methodologies to account for the social features involved in the successful conservation of landscapes, as is achieved through Adaptive Conservation Planning. Thus, the case study of the system of Private Conservation Areas (PCAs) in the Little Karoo will be used to consider the role that social features can play in fulfilling the goals of conservation planning, alongside optimisation of the ecological criteria necessary for the conservation of ecosystems and their function. The discussion will show how Adaptive Conservation Planning is an improvement on systematic conservation planning procedures, by examining and contrasting determined ecological and social features of the case-study system. The criteria were selected from those that emerged as salient features of the PCA system on the basis of analyses conducted in chapters 4 (for the ecological criteria) and 6 (for the social criteria).

The second half of the discussion undertaken in this chapter will critically examine the usefulness and need for improvement of current notions of systematic conservation planning in the face of complex, adaptive and non-equilibrial ecosystems characterised by limited knowledge of their dynamics. This part of the chapter aims to provide a platform for debate on the implications of non-equilibrium theories for conservation planning. As such, core concepts in the equilibrium/non-equilibrium debate will be outlined, before going on to discuss the importance of gaining comprehensive understanding of an ecosystem's dynamics for conducting appropriate conservation planning, as can be achieved through Adaptive Conservation Planning. Lastly, suggestions will be made for priority topics that conservation planning methodologies should address when dealing with ecosystems characterised by non-equilibrium dynamics. The importance of explicitly considering what dynamics characterise an ecosystem, as Adaptive Conservation Planning highlights, will therefore be demonstrated.

7.2 Systematic conservation planning: history and current treatment of social dynamics

The history of the development of conservation planning approaches reveals their divisive nature, particularly in the case of systematic conservation planning. In essence, these approaches first arose as a means to counter the historic patterns of *ad hoc* reservation, by which conservation areas were commonly situated on the basis of their scenic beauty and/or unsuitability for more productive land-uses (e.g. Scott *et al.* 1987, Pressey 1994, Pressey *et al.* 1996, Rebelo 1997), producing many systems that have failed to comprehensively protect biodiversity (Pressey *et al.* 1993). Thus, they initially grew from a need to counter the (indirect) influence of social factors on conservation decisions and management, advocating the use of ecological criteria for selection of conservation areas (Margules & Pressey 2000). On the other had, research in the field now has an excessive focus on ecological dimensions as the basis for decision-making. Systematic conservation planning approaches normally involve the following stages (after Margules & Pressey 2000): (a) data on biodiversity pattern and process are compiled; (b) conservation goals are identified (quantitative conservation targets for the biodiversity features of the area, and for design criteria such as minimum size or connectivity); (c) existing conservation areas are assessed against targets for representation and design; (d) additional conservation areas are selected that achieve regional conservation goals; (e) conservation actions are implemented, and where new sites prove to be unexpectedly degraded or difficult to protect, Step (d) is returned to and alternative areas are identified; (f) conservation areas are managed and monitored.

However, focusing only on the ecological side as a basis for decision-making in conservation planning may lead to too narrow conclusions (e.g. Webb & Thila 2002). How conservation plans will be implemented and whether they will lead to improved conservation of the ecosystem is inextricably linked with social relations, cultural practices, political-economic processes and historical and geographical specificities. The reservation of a parcel of land contributing less to ecological targets than ideal, could still overall contribute more than other parcels towards the achievement of the conservation goals, if it possesses social characteristics that ensure its preservation over other sites more ecologically 'valuable'. Simple overarching solutions (conservation plans) based on the reservation of ecological features fail to capture the contextually rooted (social) causes of the success or failure of conservation efforts. Rather, the inclusion of socio-cultural features is long overdue within the field of conservation planning, especially that of systematic conservation planning (e.g. Newburn *et al.* 2005, Pierce *et al.* 2005, Knight *et al.* 2006).

This dominance of ecology in systematic conservation planning reflects wider concerns about the dominance of this science within environmental management, to the detriment of the human dimensions of ecosystems (Rikoon 2006). Several researchers have recently recommended that more social science research be used to inform conservation decision-making in general (e.g. Jacobson & McDuff 1998, Mascia *et al.* 2003, Thornhill 2003, Dalton 2005). Systematic conservation planning research presented in the academic literature is currently heavily weighted with perspectives from ecological theory, thus it is critical that the academic discussions centred on these methodologies be expanded to include perspectives from social science theory as well. This pattern may stem, in part, from deep-rooted traditions in conservation and ecology, which held people as separate from nature and viewed natural systems undisturbed by humans as 'balanced' (Miller & Hobbs 2002). In antithesis to this, fields such as political ecology originated to properly account for the role of humans in landscape ecology (e.g. Robbins 2004; chapter 2). Increasingly, natural scientists working in terrestrial systems are beginning to recognise that "conservation is primarily not about biology but about people and the choices they make" (Balmford & Cowling 2006: 692). Yet, socio-economic data are seldom considered alongside ecological data: the former are generally only considered following an initial design stage premised mostly on biological criteria (e.g. Stewart & Possingham 2005).

However, implementation strategies require consideration of socio-economic and political issues such as funding, incentives, willingness to participate and so forth (e.g. Vane-Wright 1996, Noss *et al.* 1999, Groves *et al.* 2000, Theobald *et al.* 2000, Faith *et al.* 2001, Miller & Hobbs 2002). Implementation is complicated by a variety of people, agencies and commercial interests with a stake in the planning region, and by the time needed to apply conservation management to particular areas (Margules & Pressey 2000: 250). Many conservation-planning studies either ignore these complex issues (Vane-Wright 1996) or defer them to another stage of the planning process (Noss *et al.* 1999). However, these issues ought to be integrated with all stages of the planning process (Pierce *et al.* 2005, Balmford & Cowling 2006). The failure to do so impairs implementation, as systematically selecting new conservation areas is not synonymous with their success on the ground (Balmford & Cowling 2006, Knight *et al.* 2006); for example, identifying priority sites for conservation action does not go hand-in-hand with developing collaboration between stakeholders, the individuals and/or agencies who would actually take a conservation plan forwards by attempting to secure and manage the priority areas.

It is not easy to bring together into one discussion traditionally distinct perspectives such as those of ecologists, economists or anthropologists (Dalton 2005), as geographers frequently do (e.g. Turner 2002b). However, such research is needed to ensure that conservation areas succeed biologically and socially. Therefore, the following section will introduce the Adaptive Conservation Planning framework and then demonstrate how, in contrast to systematic conservation planning, it is able to proceed through the optimisation of both ecological criteria and social features involved in the successful conservation of landscapes, despite the complex (and likely at times opposing) relationship between the two. This analysis will allow for a deeper understanding of the processes that shape successful conservation planning and implementation, and of the relationship between human and environmental factors more generally.

7.3 Adaptive Conservation Planning

This chapter presents a novel conceptual framework and methodology, here named 'Adaptive Conservation Planning', which describes a conservation planning approach in which ecological criteria are combined with social criteria to more fully and more rigorously account for the dynamical and integrated nature of social-ecological systems, using an innovative, strategic approach (Figure 7.1). Adaptive Conservation Planning thus fits in with the broader frameworks of Adaptive Management and Adaptive Governance that are increasingly viewed as ways to manage complex environmental issues and systems (e.g. Gunderson 1999, Folke *et al.* 2005, Gunderson & Light 2006). Guidelines are here provided, for the first time, to address the broader social contexts that enable conservation implementation. Adaptive Conservation Planning expands systematic conservation planning procedures through its ability to include the social features necessary for successful conservation of landscapes (steps 2-7 in Figure 7.1). The reasoning behind the development of these steps in the Adaptive Conservation Planning framework is explained through the discussion presented in the next section.

This discussion commences by considering the role of social features within Adaptive Conservation Planning by using the Little Karoo PCAs as a case study, and then concludes by explaining in detail the steps represented schematically in Figure 7.1.

Adaptive Conservation Planning further represents an improvement on systematic conservation planning procedures by explicitly querying the ecological dynamics of the ecosystem under investigation (step 1 in Figure 7.1). For the first time, a rationale is here provided for expanding the current vision of systematic conservation planning to recognise the non-equilibrium dynamics that characterise some natural systems, in particular semi-arid environments; discussion of the relevance of equilibrium/non-equilibrium dynamics to conservation planning procedures is however withheld until later in the chapter (section 7.4).

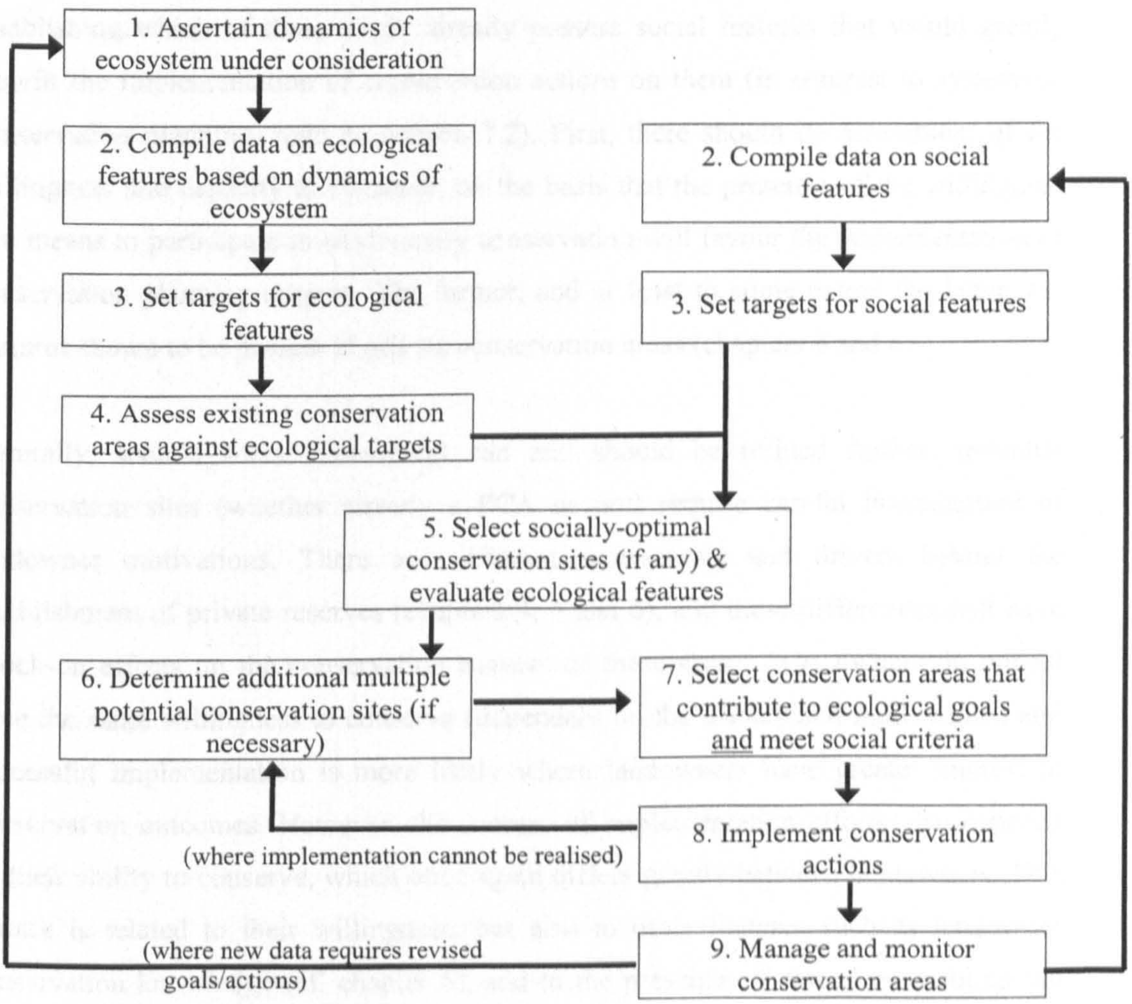

Figure 7.1. A conceptual and methodological framework for the inclusion of social features and non-equilibrium dynamics in systematic conservation planning: Adaptive Conservation Planning.

7.3.1 A case study of the role of social dynamics in Adaptive Conservation Planning: the Little Karoo

The following case-study analysis of PCAs in the Little Karoo shows the importance of in-depth consideration of social features, as is possible through Adaptive Conservation Planning, for successful conservation planning implementation. It further shows the importance of integrating both biological and social data in planning for conservation, and the implications that result from such dual consideration. In this case-study, the social features considered are those that emerged as most salient characteristics of the socio-cultural system of PCAs in the Little Karoo from analyses in chapters 4 and 6.

Prior to selecting additional conservation sites for the achievement of regional conservation goals (step 7 in Figure 7.1), Adaptive Conservation Planning proceeds by establishing which of these might already possess social features that would greatly benefit the implementation of conservation actions on them (in contrast to systematic conservation planning, refer to section 7.2). First, there should be assessment of the willingness and capacity to conserve, on the basis that the presence of the willingness and means to participate in biodiversity conservation will favour the implementation of conservation planning outputs. The former, and at least to some extent the latter, are features shown to be present in private conservation areas (chapters 4 and 6).

Naturally, such a social assessment can and should be refined further; potential conservation sites (whether already a PCA or not) require careful investigation of landowner motivations. There are different motivations and drivers behind the establishment of private reserves (chapters 4, 5 and 6), and these differences will have knock-on effects on the conservation success of these areas: PCA owners do not all have the same willingness to conserve (dependent on the drivers and motivations) and successful implementation is more likely where landowners have greater interest in conservation outcomes. However, the success of implementation efforts also depends on their ability to conserve, which once again differs greatly between landowners. This feature is related to their willingness, but also to other features such as landowner conservation knowledge (cf. chapter 6), and to the presence of resources enabling the reservation and management of land for conservation purposes, in much the same way that personal wealth allows elites from the cities to own PCAs primarily for leisure purposes (chapters 4 and 5). However, it is not possible to generalise whether profit-driven or leisure PCAs are those with the greatest capacity to conserve; this can only be established on a case-by-case basis, juxtaposing their different features.

To explore an example, landowners with a strong motivation to conserve may or may not possess the resources to establish necessary conservation management practices on their land. In the latter case, implementation may be realised more successfully on a profit-motivated PCA, with its vested interest in protecting the natural resources on which its financial sustainability depends. A reserve ran for profit is more likely to generate the financial resources required for conservation management: private sector entities have demonstrated the ability to capture the full economic value of biodiversity and then using those revenues to support conservation (e.g. Aretino *et al.* 2001, Krug 2001, Privett *et al.* 2002). In many cases, private reserve staff have better training and equipment than public park staff and are in a better position to conduct activities such as habitat restoration (Sims-Castley *et al.* 2005).

For a specific example in the Little Karoo, Bravo Nature Reserve (a pseudonym) is a PCA for which profit from nature-based tourism constituted the primary motivation for establishment. On one hand, this motivation presumably makes the reserve dependent on the future of the tourism market, and thus an asset that may be discarded when no longer productive. Due to its business orientation, it further strongly supports the introduction of charismatic mega-fauna that tourists expect to see in Africa, exemplified by the 'big five' (lion, leopard, elephant, rhinoceros and buffalo) (e.g. Goodwin & Leader-Williams 2000, Kerley *et al.* 2003). However, introducing species such as the 'big five' to the Little Karoo is a contentious issue (with the exception of the currently naturally-occurring leopard), and brings the risk of potentially negative transformations of the ecosystem (see for example Sims-Castley *et al.* 2005). The issue is contentious for a number of reasons, among them: vast areas of untransformed habitat are required to support such species naturally (typically far bigger and less transformed than provided by individual PCAs); although the 'big five' were historically present in the Little Karoo, populations will mostly have been migrant and not resident (PCAs do not allow large-scale movements); historically, the species will not have been distributed homogeneously across the landscape but will have utilised different portions of the diverse landscape of the Little Karoo (e.g. buffalo in the riparian habitats, leopards in the ravines and mountains; thus individual PCAs are unlikely to provide sufficient amounts of the required habitat types) (e.g. Boshoff & Kerley 2001, Boshoff *et al.* 2001, Castley *et al.* 2001, Boshoff *et al.* 2002; A. Boshoff 2007, pers. comm., 16 Jul). Private reserve owners also face pressures to 'cut conservation corners' by stocking unnaturally high numbers of charismatic species and creating false 'savanna-like' landscapes, all of which have adverse effects on ecosystem function and diversity (Sims-Castley *et al.* 2005: 12). On the other hand, Bravo is among the top 5% largest PCAs, among the top 5% generating the greatest annual gross income, and among the top 5% of PCAs with the 'strongest' conservation management (i.e. those carrying out a greater number of the conservation management activities identified in chapter 4, and at higher frequencies). It employs experienced and knowledgeable conservation staff (most reserves in the region do not employ staff), and finally, manifests great initiative working with the conservation board, making suggestions and proposing solutions for its 'non-purist' wildlife introduction schemes.

For the purposes of this demonstration, however, the straightforward assumption that PCAs have the willingness and at least some ability to conserve will be made, and aspects of the 'pure' ecological value of PCAs will now be compared and contrasted against the social features that might affect their ecological performance. Protected area size and connectivity were adopted as general indicators of biodiversity process representation in chapter 4 and are the chosen features for this example. Biodiversity process representation, rather than biodiversity pattern representation, requires more attention from conservation planners (e.g. Pressey *et al.* in press). Traditional systematic conservation planning methodologies in the Little Karoo might straightforwardly proceed through optimisation of protected area sizes and connectivity, when selecting sites to add to the existing statutory protected area system. Optimising size and connectivity means that conservancies would be among the first PCAs selected, being among the greatest conservation areas, when considering the whole conservancy as a reserve. The average size of a conservancy in the Little Karoo is 247 km^2, whilst the average size of a PCA is 37 km^2. Conservancies are often considered to offer advantages to conservation by virtue of their large size (e.g. Barnard *et al.* 1998, ABSA 2003, Lindsey *et al.* 2005). By definition, conservancies are also considered to be highly-connected, in terms of their constituent parcels of land (cf. chapter 3).

However, broad-scale questionnaire results highlighted how virtually all PCAs (including the conservancy parcels) in the Little Karoo are currently still fenced in (chapter 4). Thus, the presumed value of conservancies with regards to contiguity (and consequently, large size) is, at present, probably in large part negated for many mobile species, for example antelope. For such species, they are not likely to prove more connected than a series of adjacent (non-conservancy) PCAs in the landscape, as Figure 7.2 graphically illustrates. In conservancies as in other parcels of the landscape, the intent of landowners with regards to fencing (and in similar fashion, to other conservation management issues) should be explored *a priori*. Adaptive Conservation Planning, with the attention it pays to gathering and evaluating data on social features (Figure 7.1) is able to identify and therefore account for such social constraints on the ecological performance of potential conservation sites, whereas systematic conservation planning cannot.

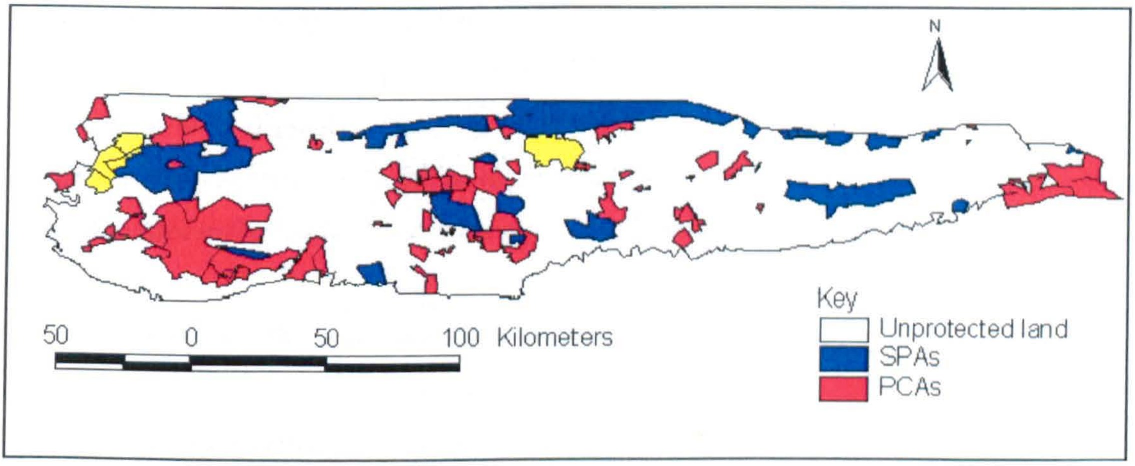

Figure 7.2. Contiguity of conservancy and non-conservancy protected areas in the Little Karoo planning domain. The area shaded in yellow in the western end of the domain shows a group of five adjacent, non-conservancy PCAs. The other (central) area shaded in yellow represents a conservancy (the fenced boundaries between the five constituent parcels of land making up the conservancy are not shown). SPAs = statutory protected areas; PCAs = private conservation areas.

Further, analyses undertaken in chapter 6 demonstrated how the specific development of conservancies, and success of their conservation efforts, is strongly tied to culture and the presence of social capital. Networks of knowledge and social learning, and the willingness to conserve and cooperate, are well-developed features among most landowners of the Alpha Conservancy (chapter 6). By contrast, the Beta Conservancy evinces apathy, lack of enthusiasm and conservation 'in name only' (chapter 6). Also in the neighbouring Eastern Cape, private game ranch owners identified the maintenance of good relation amongst owners in a relatively complex conservancy structure as an obstacle to the long-term development and success of the game ranches (Sims-Castley *et al.* 2005: 13).

Social capital, social learning, strong leadership and relationships of trust have been shown to be important components of conservation efforts more generally (e.g. Uphoff 2002, McNeely & Scherr 2003, Scheffer *et al.* 2003, Pretty & Smith 2004, Folke *et al.* 2005). Regulations and economic incentives, which are common features of conservation programmes at the implementation stage, aimed at encouraging the cooperation of private landowners (e.g. Michael 2003, Shogren *et al.* 2003), play an important role in changing behaviours (Nayar & Ong 1995) in the short term (Pretty & Smith 2004). However, they have no guaranteed effect on personal attitudes, and without change in social norms, over the long-term (when regulations/incentives no longer apply) practices can revert to what they were, with consequent effects on natural resource protection and management (Pretty & Smith 2004). Hence Adaptive Conservation Planning can again outperform systematic conservation planning through its ability to consider and include targets for the presence of social capital and related features (which allow for change in social norms) in its planning stage, well before implementation (Figure 7.1). Such consideration is naturally relevant also to parcels and communities in the landscape that are not already joined by a conservancy structure.

7.3.2 Conclusion: the Adaptive Conservation Planning framework

To summarise, Adaptive Conservation Planning can engage with the local socio-cultural context of conservation in the Little Karoo, by establishing which parcels in the landscape might be characterised by social features that would greatly benefit implementation of conservation actions: in particular, assessment of the willingness and capacity to conserve, such as are found in private conservation areas. These features warrant more detailed scrutiny, given the relationship between varying levels of willingness and ability to conserve. Assuming willingness and capacity to conserve, sites can be evaluated on the basis of their ecological criteria. The Little Karoo example has shown that optimisation of ecological targets is insufficient without detailed consideration of additional social criteria, such as the presence of good social capital and trust among neighbours. Even the assessment of simple features such as the presence or not of fencing between PCAs can have profound repercussions for the ecology of the system. Thus, the Little Karoo case study has demonstrated how including social data into reserve-design processes can constrain the location of additional protected areas into fewer options for simultaneously optimising biodiversity targets and their implementation, especially as the resolution of the data increases to account for local-scale specificities. This is because social data represent better the variability in the likelihood of implementing conservation actions. For this reason, detailed social data are as important to effective conservation planning procedures as detailed biodiversity data, and Adaptive Conservation Planning reflects this.

Beyond establishing what the relevant social features of a system are, as well as the ecological features (which in itself is complicated by understanding of uncertainty, change, and non-equilibrium dynamics, as dealt with next in the chapter), Adaptive Conservation Planning needs to establish procedures for integrating the two sets of features, and for how to proceed when the two come into conflict. Adaptive Conservation Planning therefore requires the following stages (which have already been represented schematically in Figure 7.1; however, note that step 1, 'ascertaining the dynamics of the ecosystem under consideration' is not relevant to the discussion at hand):

(a) Data on both biodiversity features and social features are compiled (step 2 in Figure 7.1). For example, generally-applicable social features highlighted as important by this thesis consist of: landowner motivations; landowner ability to conserve (to be matched against their motivations, as there will be trade-offs among the two); conservation management strategies of potential sites (which can constitute an indirect measure of landowner ability to conserve (chapter 4), and also provide information on landowner intentions with regards to fencing and similar issues); the presence of social capital (and attendant features such as relationships of trust, social learning, and leadership); and other features not discussed within this chapter but that constitute important social features of a conservation sector, such as landowner conservation knowledge and preferred incentives (cf. chapters 6 and 8).

(b) Conservation and social goals are identified (step 3 in Figure 7.1), consisting of quantitative conservation targets for the biodiversity patterns and processes of the area; social goals should be determined using a mix of qualitative and quantitative assessments.

(c) Existing conservation areas are assessed against targets for representation and design (step 4 in Figure 7.1);

(d) Additional conservation areas are selected that achieve regional conservation goals (steps 5, 6 and 7 in Figure 7.1); where sites show outstanding/promising social features for the implementation of conservation action, such as the PCAs in the example examined, they should be initially selected. These sites should then be evaluated according to ecological criteria, and any valuable ones should be discriminated among by examining their performance against social criteria. Where socially-optimal sites are not present in a planning domain, or are not known, or do not achieve the conservation goals on their own, additional potential sites should be determined and prioritised on the basis of their ecological criteria. Thereafter, final sites among the potential ones identified should be determined on the basis of their social characteristics. For example, where the social disadvantages of a potential conservation site could negate its ecological benefits, the social features of the next most valuable ecological site ought to be examined.

(e) Conservation actions are implemented (step 8 in Figure 7.1). Where new sites are evaluated and prove to be unexpectedly degraded or difficult to protect, for example due to unforeseen threats or constraints, point (d) is returned to and alternative areas are identified.

(f) Conservation areas are managed and monitored (step 9 in Figure 7.1). Through this process, new data on ecological and social patterns and processes might call for revised goals and actions.

In summary, ecological sustainability is embedded in the relationship between socio-political processes and ecological processes (Nightingale 2003). In like fashion, the successful conservation of ecosystem features and function is dependent on a balance between the reservation of critical ecological features alongside necessary social features. Adaptive Conservation Planning can provide a more detailed understanding of this balance and offer solutions to deal with its complexity. There will be differing opinions of the role and level of dominance that natural and social science should play in the conservation planning process. Nevertheless, this discussion of Adaptive Conservation Planning has shown that any approach requires adequate consideration of both; ecological criteria should determine multiple options for conservation sites, and socio-economic, cultural and other values should be used to pinpoint sites with the greatest likelihood of success. The relative importance of socio-economic, political and biological information in the decision-making process will vary somewhat on a case-by-case basis, and further according to the different objectives of the various stakeholders involved in the process, as well as to changes in environments, social structures and beliefs through time. In each case, however, the sites that will best satisfy both conservation and social objectives are likely to be selected through Adaptive Conservation Planning, with the explicit and unprecedented attention it gives to both sets of features, and further to discriminating between equilibrium and non-equilibrium dynamics (as is addressed in the next section).

7.4 Non-equilibrium dynamics and their significance for conservation planning

In addition to social science data, optimal conservation planning requires a substantial amount of biological information: successfully-established protected areas are characterised, among other things, by the inclusion of comprehensive ecological information in the planning process (e.g. Lundquist & Granek 2005). However, the biological information required to make well-informed choices for conservation planning is generally far in excess of the available data (Lundquist & Granek 2005). Thus, lack of available information on local biodiversity, habitat structure and other important ecosystem variables is a major obstacle in conservation planning.

Even where exhaustive baseline data and maps of habitats and ecosystems are compiled, as in the case of the Little Karoo (cf. chapter 3), complications can arise if the dynamics of the system are not fully understood and accounted for. Theories and approaches to resource management have often focused on single issues or resources and have been based on a steady-state view, interpreting change as gradual and incremental and disregarding interactions across scales (e.g. Zimmerer 2000, Folke *et al.* 2005: 442, Wallington *et al.* 2005). Traditional, dominant perspectives in ecology have assumed a stable environment where nature returns to an equilibrium state when stressors are removed from the system (e.g. Pimm 1984, Botkin 1990, Zimmerer 2000, Folke 2006). By trying to define some equilibrium conditions, attention has been called to the temporal and spatial scale-dependency of equilibrium concept (de Blois *et al.* 2002). Stochastic events such as disturbance alter system state and trajectory and are integral to the system; equilibrium is but one of several outcomes, and it may be apparent only at certain scales (e.g. Turner *et al.* 1993, Wallington *et al.* 2005). Research has shown (e.g. Wu & Loucks 1995, Perry 2002, Turner *et al.* 2003) that in certain contexts ecological processes are the result of dynamic patterns of non-equilibrial, unpredictable and continual change, dependency on historical processes, and complexity from local-level networks: the 'new ecology' (e.g. Zimmerer 1994, 2000, Scoones 1999). Drylands especially have become a focus of the debate over which types of dynamic behaviour drives ecological systems (e.g. Sullivan 1996, Scoones 1997, Kepe & Scoones 1999, Sullivan & Rohde 2002), because in these environments extreme and unpredictable variability in rainfall is considered to confer non-equilibrium dynamics by continually disrupting the tight consumer-resource relations otherwise considered to pull a system towards equilibrium (Sullivan & Rohde 2002: 1595).

Thus the 'new ecology' has challenged equilibrium models by exploring the variability and flux inherent in most ecological and social systems (e.g. Scoones 1999). Informed by non-equilibrium dynamics, resilience may be understood as the capacity of a system to absorb disturbance and reorganise while undergoing change so as to retain essentially the same function, structure, identity and feedbacks (Walker *et al.* 2004). Recent research premised on the resilience perspective points to the importance of assessing and actively managing resilience (e.g. Holling 2001, Folke *et al.* 2004). The resilience perspective shifts policies from those that aspire to control change in systems assumed to be stable, to managing the capacity of social-ecological systems to cope with, adapt to, and shape change (Berkes *et al.* 2003, Smit & Wandel 2006). This conceptual shift naturally requires in-depth understanding of ecosystem dynamics and of the patterns and processes of change in ecosystems. Attention should shift to determining the constructive role of instability in maintaining diversity and persistence (e.g. Wallington *et al.* 2005), as well as to planning for preserving the already built-in capacity of ecosystems to adapt to environmental perturbations (Loreau *et al.* 2002).

Current environmental policies and plans do not reflect the emerging scientific perspectives (Lubchenco 1998, Wallington *et al.* 2005). Most current approaches to biodiversity conservation, which rely primarily upon reserves to protect biodiversity *in situ*, are based on the 'classic' equilibrium view of ecosystems (Lister & Kay 1999, Zimmerer 2000, Wallington *et al.* 2005: 15). Although systematic reserve-selection techniques have improved many aspects of the planning process, through the use of algorithms that aim to meet quantitative conservation targets (Margules & Pressey 2000), the effectiveness of the resulting reserve networks will still depend on the accuracy of the data used in their design (Andelman & Willig 2002). Systematic conservation planning methodologies generally rely on a snapshot in time of the distribution and abundance of biodiversity (Meir *et al.* 2004), and are characterised by a lack of engagement with current notions of the dynamic, non-equilibrial nature of ecosystems, although some progress in considering the issue of conservation planning in relation to dynamic threats, as well as a call for greater focus on planning for the ecological processes that sustain biodiversity, has recently been made (e.g. Rouget *et al.* 2006b, Pressey *et al.* in press). Thus, systematic conservation planning approaches may lead to 'solutions' that will not satisfy the desired ecological conservation outcomes. For example, if one role of protected areas is to conserve ecosystem services, it becomes necessary to conserve ecosystem function; that goal cannot be realised if the dynamic ecological processes and patterns of change that maintain ecosystem function are not known, as they cannot therefore be planned for. For these reasons, Adaptive Conservation Planning explicitly highlights the importance of considering the dynamics of the system under consideration, prior to proceeding with the conservation planning process itself (step 1, Figure 7.1).

Some examples drawn from the Little Karoo scenario can serve to demonstrate this need to gain in-depth understanding of ecosystem dynamics within conservation planning frameworks. To start, there is limited knowledge regarding the ecological dynamics of the Little Karoo, its resilience, disturbances, overall trajectories of change, history and impacts of land-use and resource management, and of the processes that maintain biological diversity. Indeed, little consensus exists on the degree of coupling between animals, plants, climate variability, and the inherent resilience of arid-land ecosystems (such as that of the Little Karoo) in general (e.g. Illius & O'Connor 1999).

Further, although there are widespread perceptions of the region as significantly degraded (e.g. Hoffman & Ashwell 2001, Cupido 2005; chapters 3 and 5), and analyses have shown all biomes to have undergone some level of vegetation composition and function transformation (chapter 4), land 'degradation' has come to assume different meaning and significance in the context of non-equilibrium ecosystems, which as discussed above do not necessarily tend towards equilibrium and homeostasis. What may be viewed as ecosystem degradation may be better captured as systemic adjustments through multiple states, as indicated by work in rangeland ecology (e.g. Milton & Hoffman 1994, Kepe & Scoones 1999, Briske *et al.* 2003), or natural variability in the system (e.g. Wallington *et al.* 2005). Land degradation has therefore spatial, temporal and interpretative heterogeneity (e.g. Sullivan 1996, Archer 2004: 383, Vetter *et al.* 2005, Gillson & Hoffman 2007).

In the Succulent Karoo biome (which makes up a large part of the Little Karoo, chapter 4), spatial and temporal dynamics of vegetation change remain in dispute (e.g. Hoffman & Cowling 1990, Milton & Hoffman 1994, Milton *et al.* 1994, Dean *et al.* 1995, Hoffman 1995, Milton & Dean 1995, 1996, O'Connor & Roux 1995, Archer 2004), a debate kept alive by the continuing poor understanding of the relative roles of anthropogenic and climatic influence on Karoo vegetation composition and productivity (Hoffman 1995), not to mention the possible future impacts of climate change. Recent projected climatic changes for the Western Cape are for temperatures to rise everywhere; typical ranges to expect by 2050 are c. 1.5 °C on the coast, and 2-3 °C inland of the coastal mountains (Midgley *et al.* 2005). Rainfall projections until c. 2070 are for a drying trend from west to east, with a weakening of winter rainfall, possibly slightly more summer rainfall and a shift to more irregular rainfall of possibly greater intensity (Midgley *et al.* 2005). The Karoo biome, and southern Africa, are generally expected to experience both increasing aridity, increased frequency of extreme precipitation events and increasing mean annual temperatures according to various model projections of climate change to 2050 (e.g. Rutherford *et al.* 1999, Hoffman & Ashwell 2001, IPCC 2001, 2007). One scenario shows the conversion of large areas of the Karoo to desert (Hoffman & Ashwell 2001: 128). There are suggestions that the Little Karoo is already experiencing increasingly arid conditions (chapters 4 and 5).

In view of these projections of increasing external stress on the region and on Succulent Karoo ecosystems, it is necessary to question conservation planning methodologies that do not explicitly consider the role of change or disturbance regimes (as is instead highlighted by Adaptive Conservation Planning). Conservation planning strategies in the wider domain of the Cape Floristic Region have, for example, estimated targets for biodiversity pattern conservation on the basis of estimated 'original' extents of native vegetation, i.e. the extent of vegetation present in the planning domain prior to intensive land use (e.g. Pressey *et al.* 2003). Thus they have been aimed at 'preserving' 'original' characteristics of the system. However, the very notion of equilibrium raises the difficult question of defining 'normal' or initial conditions for the ecosystem under consideration (de Blois *et al.* 2002), as well as the question of whether returning the system to its 'original' conditions is possible or even appropriate.

In the specific case of the Little Karoo, there is an urgent need for a more scientifically rigorous investigation of ecosystem dynamics and environmental change, especially given the unique diverse botanical status of the area, encompassing four of the seven South African biomes (chapter 3). This need is reflected across other arid and semi-arid ecosystems. Monitoring and/or experimental studies of a range of environmental parameters are urgently needed to assess the nature, extent and rate of change of the system, more especially in the light of global change predictions. It is necessary to ascertain whether ecosystems are characterised by equilibrium or non-equilibrium dynamics. Present ecosystem conditions must be understood in the context of a trajectory of change that encompasses past land uses (in the case of the Little Karoo, this is especially pertinent in light of the claims of widespread 'degradation' of the region, cf. chapters 3 and 5), climate and natural disturbance, in addition to endogenous successional processes. For non-equilibrium systems, conservation planning should focus on maximising their ability to cope with the unpredictability of future changes.

7.4.1 Including non-equilibrium dynamics in conservation planning procedures

In semi-arid environments such as that of the Little Karoo, much evidence points towards the applicability of 'new' rather than 'climax' ecology (e.g. Fernandez-Gimenez & Allen-Diaz 1999, Sullivan & Rohde 2002, Hahn *et al.* 2005, Vetter *et al.* 2005), and thus the challenge for conservation planners is the development of planning methodologies for dealing with these unpredictably varying environments. For complex, dynamic ecosystems, changes in composition and structure can be expected over time, both as a result of gradual and rapid change (e.g. Folke 2006). In general, the structure, composition, and dynamics of an ecosystem in any particular place are contingent on its history (e.g. Wallington *et al.* 2005). The temporal dynamics of ecosystems have a number of implications for conservation planning procedures, including:

(i) Conservation reserves are likely to change over time, with different successional stages or alternative states likely. Targets for biodiversity patterns and processes (which in the Adaptive Conservation Planning process are developed in step 2, Figure 7.1) should consider whether attempting to perpetuate some historical condition of the system is possible or desirable.

(ii) Consideration must be given to the prevailing disturbance regimes when setting targets for biodiversity pattern and process representation (see also Pressey *et al.* in press), given that disturbance is an integral part of many ecosystems. Consideration of disturbance processes also implies knowledge of ecological processes and species' functional response and resilience to change (e.g. Hobbs & Huenneke 1992).

(iii) Land-use and disturbance legacies can play an important role in determining the current composition and structure of any determined ecosystem (e.g. Swetnam *et al.* 1999, Foster *et al.* 2003). Thus, it may not be possible to understand the distributions of species and ecosystems solely on the basis of local climate, geomorphology, and soil. This has important implications for setting conservation targets.

(iv) Rates of change can be highly variable, and there are further potential interactions between slow and fast change (e.g. Wallington *et al.* 2005). Therefore, it is essential that monitoring should take place to track and understand change (e.g. Noss 1990), and that the knowledge thus gained should feed back into the target-setting process (illustrated by step 9 of Figure 7.1). For example, impacts of climate change in the Little Karoo should be monitored to set new targets for the system as necessary.

Ecosystems are open, heterogeneous systems that are not only internally variable across space and time, but also interact with other ecosystems at the landscape level (e.g. Turner 1998). The structure and dynamics of an ecosystem in any particular place are thus contingent on its spatial context (e.g. Wallington *et al.* 2005). The implications for conservation planning are that landscape-scale dynamics have the potential to overwhelm the internal dynamics of local systems (e.g. Cramer & Hobbs 2002) such as those that prevail in small conservation reserves. Ideas such as conservation networks, buffer zones and biosphere reserves recognise this (e.g. Heijnis *et al.* 1999, Hobbs 2002) and these ideas are already being incorporated in the design of reserve networks at regional and continental scales (e.g. Soulé & Terborgh 1999). This is a trend that must increasingly be built on in conservation planning, and thus also in Adaptive Conservation Planning. Further, the landscape context has always been implicit in the design of nature reserves for biodiversity conservation, which recognised the need to provide links between reserves across fragmented natural landscapes. However, reserve selection procedures have mostly considered the representativeness and complementarity of individual remnants (Hobbs 1994). Recent advances in systematic conservation planning have begun to challenge this trend, by designing extensive conservation corridors (Rouget *et al.* 2006b) and calling for consideration of dynamic threats (Pressey *et al.* in press).

It is important to note that not in all arid environments, or other types, will the non-equilibrium paradigm apply. In these cases, conservation planning will benefit from reliance on more traditional ecological criteria, and this flexibility is accommodated into Adaptive Conservation Planning, which makes no *a priori* assumptions regarding the dynamics of a system. The non-equilibrium paradigm should not be uncritically adopted across all landscapes, in areas that are not experiencing non-equilibrium dynamics (e.g. Fernandez-Gimenez & Allen-Diaz 1999, Ilius & O'Connor 1999, Cowling 2000), such as the less drought-prone rangelands at the more mesic end of the spectrum (Vetter *et al.* 2005). Rather, it is necessary to recognise that, as Wiens (1984, 1989) noted two decades ago, non-equilibrium and equilibrium dynamics are not mutually exclusive states of communities but opposite poles of a spectrum of system states: conceptually, ecosystems exist across a gradient between these extremes, and may approach either end of the spectrum at some times and lie some distance away at others (see also for example Oba *et al.* 2000, Briske *et al.* 2003, Richardson *et al.* 2005, Gillson & Hoffman 2007). Some components of an ecosystem may exhibit equilibrium dynamics, others non-equilibrium.

Thus, the challenge for any conservation planning approach lies in understanding what dynamics characterise a system overall, as well as the various components for which targets are set, as is made clear in the Adaptive Conservation Planning framework (Figure 7.1). This task will need to explicitly account for the scale of investigation: the non-equilibrium or equilibrium 'state' of an environment is defined by the temporal and spatial scale of observation (e.g. Sullivan & Rohde 2002, Briske *et al.* 2003, Gillson & Hoffman 2007). Non-equilibrium dynamics are likely to be important at small spatial and temporal scales, with some sort of stability emerging at larger scales (e.g. Collins 1995, Ilius & O'Connor 1999); over the very long term, all phenomena exhibit non-equilibrial dynamics as a result of unpredictable events that effectively decouple system attributes and instigate system change (Sullivan & Rohde 2002, Wallington *et al.* 2005, Gillson & Hoffman 2007). Thus it is more important to attempt to understand the nature of these dynamics than to pigeonhole them into 'equilibrium' or 'non-equilibrium' categories, and to attempt to integrate the two paradigms (Briske *et al.* 2003).

Thus, many researchers consider both equilibrium and non-equilibrium concepts essential to understanding ecosystem dynamics (e.g. Sprugel 1991, Reice 1994, Holling & Gunderson 2002, Sullivan & Rohde 2002, Walker 2005, Wallington *et al.* 2005). Equilibrium ecology remains a useful concept, a fact sometimes ignored, often by political ecologists. The latter sometimes come under criticism by natural scientists for flawed and selective use of ecological theory (Walker 2005), for example criticised for using concepts of non-equilibrium ecology to give blanket justification to human disturbance (Soulé 1995). The debate on environmental dynamics has polarised around definitions of the terms 'equilibrium' and 'non-equilibrium', forgetting rather that these are conceptual ideals that help us to understand ecological processes. Therefore, attention should shift to employing these conceptual ideals to more completely understand ecological processes for the purposes of conducting more appropriate conservation planning (step 1 in the Adaptive Conservation Planning framework, Figure 7.1).

7.5 Conclusions

Given the impacts of social features on conservation planning efforts, and the increased uncertainty about processes and outcomes that accompanies non-equilibrium ecology, this chapter has shown the urgent need for conservation planners to improve their procedures when dealing with the complexity of social-ecological systems, and provided a framework to this end: Adaptive Conservation Planning (Figure 7.1).

In terms of the future of Adaptive Conservation Planning, there is a strong requirement for systematic compilation and comparison of case studies in order to tease out the general lessons learned, both methodological and substantive in kind. Recognition that each case is unique and that planning approaches may need to be adapted to fit the situation at hand is an important aspect of the design, planning, implementation and management processes. This adaptation becomes especially important in light of the case-by-case nature of both social systems, and dynamic ecosystems. However, it is important that the conservation toolbox should not be reinvented for each individual planning process; thus, knowledge should be transferred between individual cases, and processes employed and lessons learned should be amalgamated into best-practice guidelines for Adaptive Conservation Planning.

The analyses presented in this chapter have provided both a scientific and social underpinning for devising more sustainable conservation planning strategies. In large part, this chapter has drawn on results from analyses on private conservation areas (presented in previous chapters) and made reference to examples from the Little Karoo scenario. This chapter has thus integrated social and ecological data from various phases of research to contribute to the objective of designing more effective conservation planning strategies. The next chapter will continue with the objective of helping to design improved conservation strategies and policies by exploring the policy implications of private conservation areas, at both the local and global scales.

CHAPTER EIGHT

Private Conservation Areas: where to next?

8.1 Introduction

It is recognised that the conservation and sustainable development of natural resources worldwide is closely linked to the implementation of conservation activities on private lands (e.g. Langholz 2002, Chacon 2004, Figgis *et al.* 2005), given that in general, the most biodiversity-rich and threatened areas lie outside of statutory reserves and are under private ownership (e.g. Knight 1999, Scott *et al.* 2001; chapters 1 and 2). Further, private lands can form important components of broader landscape conservation approaches, especially in developing countries, where there is even less potential for governments to proclaim additional, formally-protected areas (e.g. Inamdar *et al.* 1999, Kepe *et al.* 2004, Jones *et al.* 2005). For these reasons, it is important to develop policies and legislation that promote the participation of the private sector in conservation efforts. Many landowners are already engaged in conservation activities (e.g. Mitchell 2005; chapter 2); however, to achieve the greatest potential of private conservation it is necessary to develop frameworks that support these types of activities.

In its early days, political ecology also engaged in examining policy issues (e.g. Abel & Blaikie 1986, Schmink & Wood 1987). However, Walker (2006) recently highlighted that, despite a professed interest in examining policy issues, the actual engagement of the field with these issues outside of academia has been limited. He draws attention to the lack of involvement of political ecology with major international research programmes dealing with environmental change and human-environmental relations, for example the Millennium Ecosystems Assessment (Walker 2006). To his list could be added programmes such as the World Commission on Protected Areas, or NGOs involved in private lands conservation in various ways, such as The Nature Conservancy, WWF (World Wildlife Fund), or Flora and Fauna International.

This thesis has demonstrated how the Little Karoo (LK) region of South Africa is experiencing a rapidly developing, significant trend towards the use of land for conservation/leisure purposes (chapters 4 and 5), and examined various social and ecological aspects associated with the development of Private Conservation Areas (PCAs) in the region. To achieve the greatest potential of these private lands it is necessary to consider their consequences for the landscape and to examine their policy implications. However, focusing solely on the local scale, with no comparative efforts, puts political ecology in a weak position to answer the important large-scale questions that increasingly characterise the field of conservation and integrated management strategies more generally (Walker 2003, 2006), which is going 'beyond boundaries' to focus ever-more on 'landscape' and more 'global', integrated conservation (e.g. Bennett 1998, Davey 1998, Stevens 2001, Figgis 2004). Moving outwards from the local-scale towards more integrated, regional or global analyses can also help overcome political ecology's problematic 'first-world'/'third-world' binaries (Walker 2003; cf. chapter 2) as well as re-focus attention on the engagement with larger-scale, more structural approaches, which characterised political ecology's early stages (e.g. Hecht 1985, Watts 1987; cf. chapter 5). Conservation on private lands is currently the new 'in thing' in the Little Karoo (chapter 5) and elsewhere (e.g. Langholz 2002, Chacon 2005, Jones *et al.* 2005, Cowell & Williams 2006; chapter 2); therefore, the policy implications of PCAs will be considered not only at the local scale, but further by placing them in their broader context.

8.1.1 Chapter aims

The aim of this chapter is initially to consider the effects and implications of PCAs in the landscape of the Little Karoo. It leads on from there to examine policies associated with conservation on private lands. The local scale is considered first, suggesting ways in which the current needs of PCA owners in the Little Karoo can be addressed by feasible strategies that concurrently maximise the potential contribution these private areas make to biodiversity protection. Thereafter, the focus shifts outwards and upwards to locate the conservation policy implications of Little Karoo PCAs within their global context. The role of different kinds of incentives in private lands conservation, and the issue of private lands security and permanence, will be discussed. The intent of this chapter is therefore to discuss more appropriate conservation policy and incentive measures for private lands, in addition to contributing to wider understandings of the nature and appropriateness of the role of private lands in conservation.

8.2 The effects and future directions of Private Conservation Areas in the Little Karoo

The dramatic land-use changes taking place in the LK (chapter 5) cannot fail to hold implications for both the ecological and social dimensions of the region, and to reverberate at multiple scales. Ecological and social changes have occurred amidst a rapid transition towards new land ownership in the region. New land-buyers are commonly non-residents, whose wealthier financial status allows them to maintain their properties with less concern towards profitability. Land-use change under new ownership has therefore commonly meant the removal of farming activities, but often also the decline of commercial activities in general, in favour of amenity ownership. The PCAs that are currently being established may potentially have a substantial, negative impact on the local economy (R. Cowling 2006, pers. comm., 17 Nov), because many are owned for the purposes of part-time, leisure game ranching/nature viewing (chapter 4), and hence do not create the significant capital flows that full-time private nature reserves can (e.g. Langholz & Brandon 2001, Langholz & Krug 2004, Sims-Castley *et al.* 2004, Sims-Castley *et al.* 2005). Hence, sectors dependent on agricultural farmers are under strain, and the region's economic losses are not currently offset by local gains in the tourism sector (R. Cowling 2006, pers. comm., 17 Nov).

The problem of economic losses in the region could be permanent, given that chapter 4 highlighted the weak profitability of the 'biodiversity industry' in the Little Karoo, which does not seem likely to compare to other regions such as the neighbouring Eastern Cape (e.g. Sims-Castley *et al.* 2005). In addition, the raised interest in the LK on behalf of wealthy amenity-owners from the cities (chapters 4 and 5) is leading to increased demand for land in the region, alongside dramatic increases in the land values, a fact acknowledged by virtually all respondents: "*land values have gone from a 100 Rand a hectare, to a thousand Rand a hectare!* [...] Only *the rich can buy here now*" (William). If 'only the rich' will be able to buy in the LK, as William thinks, then the current observed patterns in land-ownership and land-management are likely to persist for some time, as the more affluent, environmentally-conscious and amenity-owners continue to move into the region (it is worth noting that although land values have increased dramatically in recent years, land in the LK remains affordable in comparison to other areas of South Africa, e.g. ABSA 2003).

On the other hand, the independence of private reserves from financial considerations, and from the future of the tourism industry, can have positive implications for conservation (depending on continuity in the circumstances and attitudes of current and future landowners, below). These implications occur because (a) PCAs do not have to justify their existence by generating income, and (b) the well-being of reserves sustained by tourism is easily affected by global and local events, disasters and politics that might affect visitor numbers (e.g. Sims-Castley *et al.* 2004, Jones *et al.* 2005). As noted in chapter 4, Langholz's (2002) research on private reserves in Costa Rica offered a "signal to policy-makers that private reserves can thrive independent of a well-established tourism industry" (Langholz 2002: 182). However, although PCAs in the Little Karoo may be independent of the future of the tourism market, they might still represent a passing 'fad' in themselves. This is due to two reasons: (a) their status as a 'luxury' accessory (cf. chapters 4 and 5), which makes them more likely to be discarded if the financial circumstances of the owners should change, and (b) the view that conservation is the new 'in thing' (e.g. Kuchment 2007) and thus may 'go out of fashion' in the future.

Further, it was demonstrated how profit- and tourism-oriented nature reserves might possess more resources than 'purely' conservation-motivated areas to implement conservation-management activities, as a consequence of this orientation (chapter 7; Aretino *et al.* 2001). Moreover, in southern Africa as in many developing countries, conservation cannot divorce itself from the broader political issues such as poverty, population growth, land hunger, land reform and land redistribution (e.g. Adams *et al.* 2004, Kepe *et al.* 2004, Jones *et al.* 2005). Conservationists, NGOs and government conservation agencies have realised that conservation has to compete with other forms of more productive land use (e.g. Chan *et al.* 2007). Like government-protected areas, privately-conserved areas are better off meeting societal needs to retain political legitimacy and societal support: allocating land to protected status within parks and reserves is difficult to reconcile with the acute social and economic development needs of poor rural people with very limited access to any kind of resources (e.g. Wells 1996, Inamdar *et al.* 1999, Brockington & Schmidt-Soltau 2004). National and provincial governments have recognised that the long-term future of protected areas depends on taking effective steps to redress the local imbalance of benefits and costs to local communities (for example through Community-based Conservation, and Integrated Conservation and Development Projects; e.g. Ghimire & Pimbert 1997, Songorwa *et al.* 2000, Adams & Hulme 2001, Hulme & Murphree 2001), a task that private reserves should consider addressing as well. Private reserves can and do meet social objectives, for example through contributions to schools and other social welfare activities (Jones *et al.* 2005), though the greatest benefit is most often in the form of employment (e.g. Langholz 1996, Privett *et al.* 2002, Sims-Castley *et al.* 2004, Sims-Castley *et al.* 2005). Eco-tourism and game-ranching development has been shown to achieve job-creation successfully (e.g. Langholz 1996, Privett *et al.* 2002, Sims-Castley *et al.* 2005).

Given the needs to increase the weak economic gains from the biodiversity sector in the Little Karoo, to improve the likely permanence of the sector in the future, and to enhance the contribution of PCAs to broader political and social goals, it might prove opportune to market the Little Karoo as a tourism destination. Tying the future of the PCA sector more firmly to that of the tourism industry may bring disadvantages, such as rendering it vulnerable to changes in the tourism sector, in addition to the possibility that private reserve owners may conduct inappropriate management strategies to satisfy commercial needs: for example, they may stock unsustainably high numbers of charismatic species to meet tourists' expectations (e.g. Sims-Castley *et al.* 2005). However, marketing tourism is also likely to result in compensating benefits: many scholars have highlighted the potentially positive economic and ecological effects of joining development with environmental protection (e.g. Weaver 1998, Kerley & Boshoff 2002, Smith & Wilson 2002, Rosenzweig 2003). Biodiversity is seen to have economic value through tourism, and as such conservation can be justified in socio-economic development terms (e.g. Kerley & Boshoff 2002, Sims-Castley *et al.* 2005). In other words, markets for the aesthetic value of biodiversity, primarily represented by ecotourism, can encourage conservation by providing a substitute to at least some of the income that would come from consuming the natural resources (e.g. Doremus 2003). Establishing a viable tourism sector in the Little Karoo might offset the losses from the agricultural sector, as well as ensuring the permanence of private reserves (as least as long as the tourism sector lasts) and helping to satisfy their social and political legitimacy by boosting employment.

Tourism in the Little Karoo should be marketed especially domestically, given: (a) the unreliability of the international market, (b) the fact that South Africa is a long-haul destination and may experience a decrease in tourism due to the projected increases in the cost of global travel (R. Cowling 2005, pers. comm., 2 Aug; e.g. Easen 2004, BBC News 2005), (c) the possibility for eco-tourists to become more concerned with their carbon footprint and thus minimise their long-haul travel, and (d) high-profile and high-revenue ecotourism ventures do not necessarily result in local gains, as they bring staff and resources in from afar (R. Cowling 2005, pers. comm., 2 Aug; e.g. Walpole & Goodwin 2000). In fact, recent research has shown that tourism is already increasing in the Little Karoo and is being seen as key to development in the region (Gelderblom 2006). According to some commentators, tourism directed towards charismatic megafauna (exemplified by the 'big five' species) is on the way to becoming passé (R. Cowling 2005, pers. comm., 2 Aug). There is hence a need for opening up new niche markets; recent research has indicated that for tourists visiting the Little Karoo (outside of the popular Little Karoo National Arts Festival) the most valued feature by far is the beauty of the natural scenery and the undeveloped character of the landscape (Gelderblom 2006; compare this to PCA owners' choice of location, most commonly due to the presence of a particular flora, fauna and/or scenery, chapter 4). However, the rare and unique floral diversity of the area is not currently being marketed, and tourists for the most part do not experience these features and remain ignorant of the hotspot status of the Little Karoo (Gelderblom 2006). Therefore, challenges for future marketing consist of enhancing the exposure of tourists to the floral richness of the Little Karoo, as well as to its stunning scenery. Establishing the LK as a destination is of course facilitated by the flow of relatively wealthy people moving into the area from the cities, who are helping catalyse the conservation 'trend' (chapter 5).

However, to reiterate, linking PCAs to tourism is not an entirely positive connection, as it brings its own disadvantages. Policies for private lands conservation should be promoted in addition to marketing tourism, by considering possible incentives for landowners and the issue of permanence of PCAs. At this stage, the policy implications of private conservation areas in the Little Karoo are not clear, as they are not across the world. It is to these topics that this chapter turns to next, starting at the local-scale.

8.3 The policy implications of Private Conservation Areas within the Little Karoo

8.3.1 Existing incentives within the Little Karoo: the Stewardship Programme

Prior to 2003, conservation-minded landowners in the Little Karoo could register as Private Nature Reserves, or cooperatively under a conservancy structure (chapter 3). From 2003 onwards, the Stewardship programme was introduced by Cape Nature Conservation (CNC) in the Western Cape (CNC n.d.; for details refer to Appendix C: The Stewardship Programme). Essentially, the scheme provides three voluntary options for designating private lands as conservation areas, with an increase in the incentives and land-use limitations as the security of the designation increases. As was demonstrated within chapter 6, the relationship between PCA owners and the conservation authorities is often characterised by conflict and differences. These attitudes coloured the response of landowners, during interviews, to the topic of the Stewardship Programme.

One of the greatest drawbacks that landowners attributed to the Stewardship scheme was the political/institutional involvement associated with it. A third of interviewees reported this concern, which is expressed through the statement below.

> "*... to have a state organisation involved in your property, it always has a risk in terms of who the people are*" (Richard)

Richard's words convey the idea that landowners clearly do not like the idea of 'compromising' the security of their private ownership by allowing institutional involvement in their lands, as they cannot control who would be involved nor what their actions would be. This concern is obviously fairly strong and well-known, given that information leaflets on the Stewardship programme clearly state that none of the options involve ceding ownership rights to Cape Nature. This attitude will also relate to the poor relationship, and dislike, that exists between many landowners and the conservation board (chapter 6).

The other greatest perceived weakness of Stewardship involves doubts over its implementation (40% of respondents), i.e. the capacity of the conservation board to deliver on the undertakings made within the scheme.

> "*I think it's a wonderful scheme if they* [...] *have the back-up to do what their share of the contract is, which I think they* [...] *totally don't have*" (George).

George's comment highlights a lack of confidence in CNC's capacity to meet its commitments, 'wonderful' though the scheme may be on a theoretical level. More worryingly, this concern was shared even by respondents who had signed up to the programme and/or had some direct involvement with it. These landowners commented on delivery problems that had delayed implementation of the scheme on their or other lands for over two years since the owner had signed up. The implications for ultimate Stewardship success are profoundly disturbing, as landowner dissatisfaction is almost certainly unavoidable, as the following statement implies:

> " [While waiting to become a Contract Nature Reserve] *I've paid rates for two years on land that I shouldn't be paying, somebody* could *move on to the land, and I have taken my fences down, I have eradicated the* [alien] *plants, I have done all the conservancy work* [to get the] *carrots that were dangled before me*" (William)

William is clearly dissatisfied with delays in the implementation of the Stewardship process that have caused him costs without the promised and compensating benefits: he has 'done his bit' by removing fences on his land and eradicating alien plants, for example, and yet has not received exemption from tax payments and increased security against land seizure. Although William retained mainly positive feelings about Stewardship at the time of interview, not all landowners are likely to show such patience. Consequently, landowner fall-out is a real possibility, not to mention the negative exposure that very likely results from such poor delivery. Negative feedback becomes an issue when viewed in the light of findings such as those of Rambaldi *et al.* (2005). The authors note that after the first few government-recognised Private Natural Heritage Reserves were established in Brazil, "their owners became proponents of this instrument, and the interest among landowners began to grow with remarkable results" (Rambaldi *et al.* 2005: 35).

The implications for Stewardship success are particularly of concern in the case of landowners considering registering for the Contract Nature Reserve option (which provides for the highest security of conservation designation; refer to Appendix C). For example, one PCA owner was directly involved with the operation of the Stewardship scheme, in terms of working for the programme. Despite repeatedly expressing support for the initiative, she had not signed up for the Contract Nature Reserve option, because: "*there's a* huge *backlog for the contracting in* [...] *they've told us it's going to take at least a year or two*" (Jenny). This same respondent cast numerous doubts over implementation of Stewardship, and concluded thus:

> "*What I'm saying is, don't dangle a carrot that you can't deliver on, because it's a big promise, that is going to create a lot of anger later on*".

Jenny's statement clearly points to the possible participant dropout, and to the consequent negative impressions that would be created among landowners, that were outlined above.

However, perhaps the most telling point with regards to Stewardship consists simply of the lack of awareness regarding the scheme. Although this could be attributed to the programme's relative infancy (having been introduced in 2003), it is also possible to argue that the first and most crucial task for such an initiative is for it to be publicised to the landowners. For example, Langholz *et al.* (2000a), in their study of landowners participating and not participating in Costa Rica's Private Wildlife Refuge Programme, found that a substantial information gap existed, which if breached would lead to easy and quick uptake of the scheme. Even conservation programmes that include non-voluntary measures consider public education about the system a critical component (e.g. Platt & Delforge 2001). In general terms, stakeholders are likely to show more support for conservation policies if they understand the causes of the problem and consequences of policy decisions, than if they don't (e.g. Miller & Hobbs 2002, Stave 2003, Kabii & Horwitz 2006). In this regard, Stewardship does not appear to have had much success. Of the respondents, 40% had not heard of the Stewardship programme prior to interviews being conducted (in a couple of these cases, they had heard the term, but did not know what it meant). Out of the remaining interviewees, only a couple possessed detailed knowledge of the scheme, which was unsurprising given that in both cases the landowners had played an active role in the implementation process of the Stewardship programme: there is hence an information gap that needs to be addressed, using targeted education programmes to inform landowners of the scheme.

In the light of such comments and findings, it is hard to see how Stewardship can prove successful as it currently stands. Interviews found that many landholders were wary of the prospect of institutional involvement in their land; many also doubted the commitment of the Conservation Board and/or its ability to assist them. Those involved in the process noted that the time taken to establish covenants was excessive; currently, from the side of the landowners at least, the Stewardship process does not appear clear, efficient or timely. Generally, Chapter 6 has already shown widespread doubts and/or anger about Cape Nature's ability and effectiveness to deliver on conservation outputs, which do not appear to have improved at all in the case of Stewardship. The next section will consider what incentives are critically required in the region that are likely to stand a better chance of success.

8.3.2 Incentives for the Little Karoo: recommendations

The PCA sector in the Little Karoo is yet at an early stage of development, and is characterised by generally poor levels of management (chapter 4) and an uncertain future (section 8.2). Nevertheless, the network of private reserves captures a highly significant proportion of the land area and has been shown to contribute substantially to biodiversity pattern and process reservation (chapter 4); as a result, the question of how best to optimise the conservation efforts and success of these private lands naturally arises. As shown in chapter 4, PCAs evince considerable variability, here as elsewhere (e.g. Langholz & Lassoie 2001a,b, Chacon 2005, Jones *et al.* 2005, Sims-Castley *et al.* 2005). This variability highlights a need for any policy instrument or incentive measure to be widely-applicable and therefore both general and flexible, which would additionally benefit its applicability in other contexts. It was stressed further how any instrument should relate to the few commonalities evident among PCAs: their use for personal leisure, the low importance of economic drivers and their poor management.

Preliminary consideration of appropriate incentive instruments for landowners in the Little Karoo (chapter 4) highlighted the inherent complexity of the topic. The results of the questionnaire data and analysis suggested that financial assistance and formal recognition as a protected area might constitute appropriate incentive measures. A measure such as financial incentives might certainly fit the bill in terms of generality and flexibility. However, as demonstrated, economics do not appear to play a fundamental role in the existence and operation of PCAs (chapter 4). Analyses of the drivers behind the growth of private reserves further refute the suggestion that financial assistance would constitute a strongly persuasive incentive measure (chapter 5), as PCAs were shown to be mainly the preserve of the wealthy. It is less likely that financial assistance constitutes an attractive 'carrot' among relatively wealthy individuals. Finally, and most forcefully, interview data contradicted the questionnaire results: when landowners were directly queried regarding incentives, financial assistance hardly ever emerged as a desired incentive. In fact, in a few cases (about 20%) the direct opposite was found, e.g. "... *99% of the people who go into game farming in South Africa don't need their* [the conservation board's] *financial assistance, and thank heavens for that*" (George). George's fairly emphatic quote clearly illustrates the low opinion some PCA owners hold regarding financial assistance. Such incentives are therefore predicted not to have any great impact, and hence any efforts expended in finding the resources for such a measure might prove useless. This finding is extremely important as it runs counter to current received wisdom, across many countries, regarding the need for financial incentives to sustain private conservation efforts, as will be discussed in further detail in section 8.4.

Interview data supported instead the contention that landowners desire some acknowledgement of their role, as the following respondent discusses:

> "... *if they* [the conservation authorities] *would come around and clearly state that they accept that what we* [are] *doing as private conservationists, game farmers, enhances the principle of conservation, and that they accept that we play, and can play, an important role, in other words they must just acknowledge what we* [are] *doing* [...]. *As soon as they come and they accept that we have got a contribution,* [...] *they give us the opportunity to see ourselves on a long-term basis. I think that's the starting-point. As soon as we get that, we're off, we can calculate the future.*" (George)

George's statement points to three key issues: that landowners feel they make a worthwhile contribution to conservation, that they feel their efforts go unrecognised, and that such recognition would provide a good platform on which to base the future of the sector. Thus recognition would likely provide landowners with the motivation to increase their current conservation efforts. George speaks from a game farmer's perspective, but the same feelings were expressed, implicitly or explicitly, by a good third of PCA owners. In the Eastern Cape, where ecotourism-based reserves are prevalent, Sims-Castley *et al.* (2005) report similar findings: private game reserves in the region felt that national government needed to acknowledge them as valid role players in the regional economy and in biodiversity conservation. Thus landowners clearly desire some clear and formal acknowledgement of their role as 'private conservationists', and therefore acceptance of their status as legitimate actors in the landscape. Related to this desire for recognition is the widespread feeling of landowners that they are often 'left out in the cold' by the conservation authorities, and that appropriate interaction is lacking: more contact from conservation staff was identified as a desired event. In general terms, at least half of PCA owners think that the (currently unfulfilled) role of CNC ought to be to contact, involve and educate them, as John, the owner of an ecotourism-based reserve, discusses:

> "... *the reason that things don't work, is that ... for instance, the constitution guarantees an input* [from] *everybody, okay? But! They only guarantee the input! They don't guarantee that they'll utilise that input! So they write a document, the Biodiversity Bill,* [...] *they ask us for input, and then they scratch whatever input we put in it, because it doesn't fit in with their administrative plan for the environment. It's crazy!* [...] All *we saying to them, is listen to our practical experience when it comes to sustainability!*" (John)

In John's eyes, involving the land-holders would require the conservation authorities not only to recognise their valuable role, but to 'listen' to them: he suggests that the conservation authorities can even learn from the 'practical' experience of landowners like him. John's evident frustration at being sidelined underscores the reasonable belief of landowners that they are legitimate actors in the landscape, and as such, that they have a right to set the terms for their use of the environment (cf. chapter 6). The perceived inability of CNC to work in partnership with landowners clearly adds to the already difficult relationships they share (chapter 6). The desire for more support and dialogue with conservation authorities relates to two of the commonalities of PCAs: the good conservation motivations of landowners, and their use of the land for personal leisure (running non-intense activities). From a conservationist's perspective, these are important aspects, and the risk is that these attitudes may decay in time, without encouragement to the landowners. It is thus of concern that current literature worldwide on policies for private lands conservation focuses on the role of environmental regulations, legislative issues, or on various financial and technical incentives (e.g. Swift *et al.* 2004; Wilcove & Lee 2004). Consideration of the role of personal contact, recognition and more equitable, in-depth interaction with landowners is minimal (refer to section 8.4 for further discussion of these issues).

Additionally, despite conservation advice not having been identified as a particularly appealing incentive within the questionnaire survey (chapter 4), during the course of interviews over a third of landowners directly or indirectly intimated that they appreciated, or would appreciate, receiving management advice. This latter point relates to the last of the few commonalities that were identified among PCAs: their poor level of conservation management, and its need for improvement through training and educating of landowners. Hence, any management advice provided to landowners (which also constitutes a general incentive measure) should be tailored to address the main shortcomings in the conservation-management strategies (chapter 4) and knowledge (chapter 6) of landowners.

On these grounds, it is recommended that the best instrument that should currently be introduced within the Little Karoo consists of extension services from the local conservation board; in other words, dedicated local extension officers should be employed in the region. Such a measure would provide landowners with the recognition, support and management advice, training and education that have emerged as important aspects for maintaining their interest in conservation. While most landowners appear motivated by conservation intents, both in the Little Karoo (chapters 5 and 6) and elsewhere (e.g. Langholz *et al.* 2000b, Bernstein & Mitchell 2005, Chacon 2005), little guidance generally exists for them to make land-use decisions incorporating principles and knowledge from conservation biology (O'Connell & Noss 1992). Thus an effective extension service is required to communicate with landowners and provide them with necessary guidance. This idea is supported by a survey of the conservation attitudes of 36 farmers in the Western Cape Overberg (i.e. in the same province as the Little Karoo) towards the highly-transformed and critically-endangered Overberg Coastal Renosterveld habitat (Winter *et al.* 2007); results showed that advanced extension services are considered essential and cost-effective incentives for improving landholder cooperation and conservation behaviour (Winter et al. 2007: 57).

These ideas are neatly summed up in the following statement by Jenny, whose comments are especially instructive, given her close involvement with the Stewardship Programme and CNC:

> "*Cape Nature has* huge *amounts of information and best practice guides that are just sitting there! Nobody's using them, these beautiful papers that have been created* [...] *so what we* [are] *saying is, let's make it available, to the landowner, ... let's give them information. There are highly-qualified people with lots of knowledge that are employed by Cape Nature, but does the landowner get the benefit of those people? No. So what I'm saying is* [...] *do the job that we* [the Stewardship programme] *were actually created to do, and that is interact, between the landowner and the conservation agencies, be their assistance, we can advise them, we can consult with them, we can help them with issues, and assist them to be stewards of the Earth!*" (Jenny)

Thus, Jenny clearly identifies the need for CNC to provide information and guidance to landowners, not only through the provision of information leaflets and materials, but also through personal contact. It is this personal contact especially that, in Jenny's opinion, would provide landowners with the knowledge for managing their PCAs in a sustainable fashion ('stewards of the Earth'). As previously stated, the management advice provided to PCA owners should be tailored to address the main shortcomings in their conservation-management strategies and knowledge, such as, for example, discussing the importance of sound management plans and goals. Further, extension services, if properly applied, can allow for a two-way relationship between landowners and conservation bodies: chapter 6 highlighted how environmental policies should account for the views and knowledge of landowners where these differ from the interests and/or narratives of the dominant conservation authorities. Thus, conservation officials and organisations can also listen and learn from landowners, and react to their views and needs. Although Jenny is clearly more accepting of 'scientific' and 'official' knowledge than other landowners, the latter would probably be more receptive towards such knowledge if they experienced more personal contact and a more egalitarian attitude on behalf of the conservation board.

The potential for extensions officers to acquire first-hand and in-depth information about landowners can clearly also be of benefit for devising more effective conservation policies and strategies. This potential is not limited to devising more targeted incentives measures: collecting detailed social data on a social-ecological system would enable the implementation of Adaptive Conservation Planning procedures, which as demonstrated in chapter 7, dramatically increase the likelihood of successfully implementing conservation planning outputs. Providing landowners with extension services is a measure that is naturally not only applicable to PCAs in the Little Karoo: its flexibility can suit private reserves in many regions of the world, given that they are generally shown to be as variable worldwide as in the Little Karoo, and that the landowners are similarly as strongly conservation-motivated (e.g. Langholz *et al.* 2000b, Bernstein & Mitchell 2005, Chacon 2005, Mitchell 2005).

The discussion above accounts for the characteristics and requirements of privately-owned lands from a social viewpoint. However, policy-makers need to target incentive programmes also to the 'gaps' in ecological representation of biodiversity patterns and processes. As such, conservation efforts should perhaps focus on the biomes most transformed in the Little Karoo, the Drain and Succulent Karoo (chapter 4). Within the context of providing extension services, a way to account for this aspect might be for extension officers to advertise to landowners the importance of conserving these particular vegetation types, and provide advice on best methods for doing so. PCAs located entirely or for the most part within these biomes might require additional monitoring and contact. An extensive mail survey on different topics linked to conservation on private lands that was conducted among farmers in the Northern, Western and Eastern Capes showed that many of the responses were unique to the biome in which the farmers were situated (Van Zyl 1999). These results highlight the importance of tailoring conservation strategies according to the unique ecological characteristics of different regions (Van Zyl 1999). With regards to accounting for the conservation of biodiversity processes, finding ways with which to encourage the removal of fences among PCAs, and between PCAs and SPAs, was identified as a highly important aspect (chapters 4 and 7). Again, this could be a topic for extension officers to focus on, although future conservation regulations might need to address the current necessity for landowners to fence their properties to be assured ownership over their game (chapter 3, section 3.3).

Both chapters 6 and 7 highlighted the value of social capital for the realisation of conservation efforts (e.g. Pretty & Smith 2004). Hence, there is a need to think of ways in which social capital can be improved for biodiversity conservation on private lands. For this, the creation/improvement of bonds (the links between people with similar outlooks), bridges (the horizontal links between people with different outlooks, especially across communities) and links (the vertical connections established by groups with external agencies) in a community needs to be promoted (e.g. Pretty & Smith 2004, Wilcove & Lee 2004). These too are tasks that would fall under the preserve of an extension service. Government and non-government agencies have been shown to play a critical role in bringing people together to form groups (e.g. Malla 1997, Agarwal & Clark 1999, Pretty 2002, McNeely & Scherr 2003). If CNC were to mediate among landowners, help promote community forums, and provide environmental education, over time Conservancies characterised by environmental awareness, relations of trust, common rules and social learning (all features of social capital, Pretty & Smith 2004) might build up, with attendant positive implications for their success and long-term duration. These forms of intervention may prove a better focus than attempting to convince landowners to place their land under Contract Nature Reserve status, given the identified problems with Stewardship, and landowner dislikes of legal status (below). Further, if conservation authorities were implicated in raising social capital for conservation in the landscape, they would once again possess first-hand knowledge of social features that have been identified as important for the successful realisation and implementation of conservation planning efforts (chapter 7).

The first steps for bringing landowners together might consist of promoting the formation, among PCA owners, of groups and associations similar to the Game Ranchers Associations or the Farmers' Unions that exist in South Africa (e.g. the National African Farmers' Union, or the Northern Cape Game Ranchers Association: see NCGame 2003). Such local institutions might further satisfy, in part, the desire of landowners for more formal and explicit recognition of their position as valid role-players in the landscape. In support of this idea is the existence of networks of groups and individuals engaged in private conservation in different parts of the world: for example, the Laikipia Wildlife Forum, a non-profit organisation including large-scale ranches, community-group ranches, tour operators, individuals, government, NGOs and interest groups in Kenya (Laikipia Wildlife Forum 2007). In Latin America, the existence of networks among private protected area owners, often involving NGOs as well (e.g. Eco-Exchange 2001, Chacon 2004, 2005, Iniciativa para la Conservacion Privada y Comunal 2007), have been identified as critical to the success of private conservation efforts in the region (R. Troya 2007, pers. comm., 24 Apr). These findings highlight how raising social capital among PCAs in the Little Karoo is likely, once again, to prove a generally-applicable measure among private protected areas worldwide (refer to section 8.4).

Finally, to consider other incentive measures, assistance with marketing could prove a useful tool in the future, as briefly discussed (chapter 4 and section 8.2). Offering marketing assistance to PCA owners as an incentive measure might not only improve their conservation behaviour, but might also assist the development of a successful and sustainable eco-tourism industry in the Little Karoo. In the Eastern Cape, where an ecotourism industry has already started up, Sims-Castley *et al.* (2005) identified a number of constraints on the establishment of ecotourism-based private nature reserves. These included a lack of government and legislative support, excessive bureaucracy with regards to reserve establishment, a lack of information, marketing costs, and the need for government to make investment in the creation of private reserves more financially attractive for foreign and local investors. On the assumption that ecotourism provides strong financial returns and an environmentally sustainable form of land use (Sims-Castley *et al.* 2005) these aspects might be usefully considered within the Little Karoo. For example, extension services could educate PCA owners regarding the rich floral biodiversity of the Little Karoo, thus helping them to promote it in turn to tourists and establish a niche market for the region.

The final point with regards to incentives concerns the long-term status of PCAs. As discussed, incentives, legislation and other instruments are urgently required to secure the protection status of these lands, ideally into the future. On the other hand, perpetuity is a notion that does not hold much appeal for landowners: interviews revealed that the long-term duration of a Contract Nature Reserve (25-99 years) was by itself a disincentive for certain landowners (c. 40%) to choose that designation. Particularly in a country like South Africa, where land is an issue, making conservation status for 'perpetuity' (i.e. 99 years, presently) might prove especially difficult. Landowner backlash to institutional involvement in the Little Karoo, and disaffection with bureaucracy and poor delivery (see also chapter 6), reflects broader hostile responses to complex environmental regulations and distrust in government, affecting conservation on both private and public lands. These regulations and the agencies that enforce them are associated with high-cost bureaucracy, gridlocked public land-management and resource agencies, and insensitivity of regulatory authorities towards local communities (e.g. Stephens 2001, Merenlender *et al.* 2004: 66, Johnston & Soulsby 2006, Pincetl 2006). Thus private landowners who are defensive of their autonomy prefer incentive-based, voluntary conservation approaches to conservation on their lands (e.g. Doremus 2003, Merenlender *et al.* 2004, Kabii & Horwitz 2006, Langpap 2006), reflecting a new governance approach that relies upon cooperation rather than regulation (Pincetl 2006). These preferences have implications for the design of appropriate policies for conservation on private lands, and also for the permanence of private-lands protection, both in the Little Karoo as worldwide. These issues are considered next.

8.4 Policies and strategies for Private Conservation Areas worldwide

8.4.1 Incentives for private conservation

Compensation-based incentive strategies (whether through tax deductions or cash payments) are increasingly popular tools for conserving biodiversity on private lands (e.g. Merenlender *et al.* 2004, Bernstein & Mitchell 2005, Newburn *et al.* 2005). Voluntary contracts such as easements have been increasing (e.g. Doremus 2003, Parker 2004, Bernstein & Mitchell 2005, King & Fairfax 2005), which compensate landowners for restrictions placed on property rights, and offer a greater degree of permanence than environmental regulation or land-use zoning plans (Newburn *et al.* 2005: 1412). There is arguably an extent to which financial incentives are being perceived as a 'silver bullet' for improving the conservation behaviour of landowners, a necessary way to make the protection of private lands more attractive (e.g. McDowell 1986, Pence *et al.* 2003, Merenlender *et al.* 2004, Swift *et al.* 2004, Chacon 2005). This trend probably derives from US private-lands models, which are mainly based on conservation easements (e.g. Bernstein & Mitchell 2005). Indeed, at least eight countries of Latin America have used traditional easements for conservation purposes (ELI 2003). However, this use of financial incentives derives in part from the context-specific situation that prevails in the US, where the imposition of high property taxes forces landowners to develop land just to meet their tax obligations (Mitchell 2005); negative incentives for conservation thus exist in areas of high development pressure. Creating a private reserve, or granting an easement, provides landowners with an escape route from such perverse economic or regulatory conditions.

However, underlying structural economic or regulatory conditions will differ among and often within countries, and thus conservation of private land cannot be addressed solely through financial incentives. As for many conservation issues, appropriate strategies require consideration of the underlying structural processes at work, as well as consideration of important values and ethics (e.g. Kabii & Horwitz 2006). Economic incentives may not even be necessary in some cases: the results of this study have demonstrated that there are regions and circumstances in which financial incentives are unlikely to constitute a highly-persuasive measure, such as in the Little Karoo. In addition, millionaire environmental 'activists' interested in 'rescuing' habitats and species are increasingly buying land around the world for conservation and other environmental reasons (such as re-forestation to slow down global warming) (e.g. Moffett 2007). Examples include the Pumalin Park in Chile, founded by Doug Tompkins, US clothing entrepreneur (The Conservation Land Trust 2007), and wildlife sanctuaries totalling c. 90,000 ha purchased by the late TV personality Steve Irwin (Wildlife Warriors Worldwide n.d.). In Australia and New Zealand, covenants (equivalent to easements in the US) have proven successful with landowners, and unlike the US, they are mostly donated voluntarily, i.e. landowners do not receive compensation for the property rights they relinquish (e.g. Saunders 1996, Cowell & Williams 2006, TFN n.d.). Even in the US, the majority of private landowners who were asked to designate their lands as National Natural Landmarks under a little-known federal programme (which aimed to preserve rare, unique and outstanding natural areas) agreed to protect their lands in exchange for just the recognition afforded by a certificate and a plaque (Shafer 2004).

In the light of the current findings, it may be opportune to revisit the need and/or appropriateness of widespread introduction of financial mechanisms for off-reserve conservation. Resources for conservation are in short supply (e.g. James *et al.* 2001, Bruner *et al.* 2004, Naidoo *et al.* 2006, Turner & Wilcove 2006) and there is not, and probably never will be, enough money to protect all biologically valuable private land (Newburn *et al.* 2005). Further, widespread attempts to introduce financial incentives bring the risk that landowners may demand such incentives even where they would have been willing to protect their lands without. Thus it is necessary to identify those areas that can be served best, or as well, by different policy or incentive strategies, as has been discussed for the Little Karoo.

The case-study of PCAs in the Little Karoo has in fact highlighted how conservation outcomes on private lands might be best served by improving contact and social capital between landowners and others. This conclusion is reinforced by the existence of networks of groups and individuals that are successfully engaged in private conservation in different parts of the world, such as Kenya and Latin America (section 8.3.2). The important role that personal contact can play has also been highlighted by a few other scholars (e.g. Figgis 2004, Winter *et al.* 2007). For example, Figgis (2004) describes a scheme for conservation on private lands in Australia, *Land for Wildlife*. The scheme consists of a voluntary agreement between the conservation agency and the landholder for a specified time period, renewable on expiry or on change of ownership. As Figgis (2004: 15) states, the scheme "relies on goodwill of the landowner and personal contact". Contact is achieved through Government provision of extension officers, and is identified as 'crucial' for *Land for Wildlife's* success, together with the "ongoing support provided by the camaraderie of membership" (Figgis 2004: 16). Wilcove & Lee (2004: 644), in their discussion of incentive-based approaches, note that a "trusted intermediary should be used to contact landowners". They go on to suggest that "one of the most important factors in the success or failure of these programs appears to be the person or agency tasked with contacting landowners" (Wilcove & Lee 2004: 644).

Figgis (2004) additionally suggests that *Land for Wildlife* appears strongest where there are higher proportions of hobby farmers and landholders with off-farm incomes; this bears interesting parallels with the Little Karoo (chapter 4) and suggests that such initiatives may be effective in the region, as suggested above. Further, the programme appears strongest where there is a greater capacity for groups to get together, which reinforces the suggestion that social capital is important for the implementation of conservation efforts. Focusing on landowner goodwill, and focusing on improving social capital for the purposes of conservation, is especially pertinent in regions such as Europe, which are not characterised by the presence of large, private lands set aside for conservation (as is the case, for example, in Eastern and Southern Africa, e.g. Jones *et al.* 2005, or Australia, e.g. Figgis *et al.* 2005). This is because land in such regions is more fragmented and generally densely settled; hence the ecological need of connecting and protecting numerous parcels of private lands is correspondingly greater, as is the potential to get groups to come together. A related incentive measure to focusing on social capital consists of publicly recognising the contributions private protected areas and landowners make (Doremus 2003, Chacon 2004). The properties protected, as well as the names of the landowners, could be widely publicised (where the landholders are amenable), for example through country reports, media ads, web sites, publications, etc. People often desire approval and recognition from their communities, and this can be achieved through low-cost incentives such as awards: 'Landowners of the Year' awards, stewardship awards and 'green' certification of lands have all been used in the US (Doremus 2003). Recognition has motivated landowners in Costa Rica to participate in a private wildlife-refuge programme (Uphoff & Langholz 1998). In these ways, landowners can obtain the economical and spiritual benefits that this type of 'green image' recognition brings (Doremus 2003, Chacon 2004).

It is undeniable, of course, that cash or tax incentives may constitute an attractive measure to landowners and can play useful roles in private conservation (e.g. Doremus 2003, Shafer 2004, Wilcove & Lee 2004, Bernstein & Mitchell 2005, Chacon 2005, Mitchell 2005, Langpap 2006), however "the core of voluntary approaches to land conservation [...] is to encourage and enable a stewardship ethic on the part of the landowners" (Mitchell 2005: 4-5). Many landowners creating private nature reserves have been shown to possess a sense of stewardship as an important motivation (e.g. Langholz *et al.* 2000b, Mitchell 2005, chapters 4 and 6). The means to act on this motivation may be aided by economic and other incentives, but such incentives are unlikely to be effective without the inclination to conserve. For example, an identified weakness of conservation through easements is that it leads to a patchwork pattern of conservation (Michael 2003, Bernstein & Mitchell 2005). The few cases of large, contiguous areas protected by easements have occurred as a result of hard work by land trusts over many years, and in the presence of a conservation-minded landowner base (Bernstein & Mitchell 2005).

8.4.2 The issue of perpetuity in private lands conservation

Classically, the long-term duration of privately-conserved lands has been considered an issue (Privett *et al.* 2002, Chacon 2004, Figgis 2004, Figgis *et al.* 2005, Jones *et al.* 2005, Sims-Castley *et al.* 2005, Fitzsimons 2006). Degazettal of a legislated national park has traditionally been viewed as a complex process (e.g. Figgis *et al.* 2005, Jones *et al.* 2005) that is not matched by the security of private lands. For example, a change of ownership in the latter, or a change in market conditions could mean a change in land use, or changes in government policy could reduce the incentives to conserve land (Jones *et al.* 2005). On the other hand, recent developments worldwide are bringing into question the long-term security of legislated public parks. For example, 69,000 ha of the Cumbres de Monterrey National Park, adjacent to the city of Monterrey, Mexico, was recently taken out of park status because of the expansion of the city (Cantú *et al.* 2004). In the most extreme example, in 2005 Amboseli National Park in Kenya was downgraded to a national reserve and returned to a governing council of the Masaai people, its original inhabitants (e.g. Moss 2005, Quammen 2006). In the eyes of many this was an attempt to gain the support of the Maasai in the constitutional referendum of November 2005, whilst supporters thought the move would benefit the local Maasai community and encourage the involvement of local communities in wildlife conservation (e.g. Mynott 2005). Public protected areas are thus vulnerable to changes in governments, public policies and central budgets (e.g. Aiken 1994, Czech 2002, Mitchell 2005: 3).

There are also many instances in which private nature reserves are recognised by government. This is the case in the Little Karoo itself, under the Contract Nature Reserve designation provided through the Stewardship Programme (Appendix C; the former designation of Private Nature Reserve, though recognised, implied no legal commitments to conservation activities, and could be revoked by the landowner at any time: see chapter 3). Elsewhere many private protected area designations, such as conservation easements, go with the land and not the landowner, and many designations are at least theoretically forever and bound by law (e.g. Mitchell 2005, Sims-Castley *et al.* 2005). For example in Latin America there are many private reserves for which owners have obtained official recognition from the government, and this means their management must comply with certain rules; additionally, some must be maintained for a minimum number of years (e.g. Chacon 2004, 2005, Swift *et al.* 2004). In some countries, such as Guatemala or Brazil, the Private Reserve is a management category officially recognised by their governments within their formal, country system of protected areas (e.g. Chacon 2004). In Brazil particularly, these legally designated Private Natural Heritage Reserves (Reserva Particular do Patrimônio Natural) are a status that cannot be revoked (Rambaldi *et al.* 2005).

However, there are attendant difficulties with officially proclaiming and enforcing private reserves (Chacon 2004, Swift *et al.* 2004), mainly the cost and time it may take for landowners to comply with the requirements, and the government's ability to monitor such compliance; further, the government approval process can be burdensome and time-consuming (as in the Little Karoo). These disadvantages can discourage potential landowners (Chacon 2004, Swift *et al.* 2004). Too much emphasis on legal security may 'scare off' potential private landholders from managing land for conservation (Figgis 2004), as was outlined above for the Little Karoo. Landowner concerns about an increased burden of government regulations and loss of control over the management of the property (or attenuation of property rights by the State) under a formal conservation agreement for their lands, has been noted elsewhere (Kabii & Horwitz 2006). Swift *et al.* (2004: 112) suggest that private protected area laws should be reformed so that, instead of treating them as 'miniparks', government should establish terms and conditions for private reserves that recognise the independence and voluntary initiative of the landowners, provide more flexibility in management of the property and reduce procedures and paperwork to the minimum. They also suggest that different categories of private reserves could be established, providing different requirements and corresponding benefits to landowners. This suggestion will be discussed further in section 8.5.

For some countries, efforts to increase the long-term security of PCAs may not prove worth the cost in terms of time and resources, especially in view of the fact that protected areas exist also along the dimensions of politics and time: what has been done can be undone, and private reserves legislated in the present may be downgraded in the future. Further, the conservation 'gains' of some 'secure' mechanisms may change in time where any support from public agencies diminishes, or where funding sources dry up. Especially in view of forecasted climate changes and consequent changes in habitats and species distributions, one might question whether current efforts and resources to secure legislatively the status of current private protected areas (which may prove 'obsolete' in the future) might not be better directed towards 'marketing' and 'selling' the ideal of private conservation, providing education to landowners about the value of private conservation and to increase their capacity to engage in conservation.

8.5 Conclusions

The rise of conservation in the Little Karoo has consequences for both the ecological and social dimensions of the region. It is not yet possible to predict with certainty the ramifications of this land-use change. However, the promotion of domestic tourism is likely to enhance the long-term duration of the private conservation sector, as well as increase the economic gains deriving from the biodiversity industry and thus also improve the social and political legitimacy of PCAs. The latter points are especially important in the context of the developing countries: therefore, particular attention should be paid to exploring the economic potential of PCAs within these countries. However, the security of private reserves would be enhanced from ensuring that their existence is not entirely justified through tourism, and thus appropriate conservation policies for private lands are required.

Worldwide, much attention is paid to the role of financial incentives in private lands conservation, and to the issue of the security of the designation attached to private lands. This study has demonstrated that policies for the protection of private lands should focus on raising the social capital of private landowners and recognising their role as valid players in the conservation landscape. These objectives can be achieved, first, through the provision of extension services, which are best administered through local or regional conservation authorities (alternatively, through conservation NGOs). The provision of extension services is a highly flexible tool, which can be adapted to address both the varied requirements of landowners (within and between regions) and the different ecological contexts that prevail in different locations. Second, the formation of groups and associations between PCA owners and other interested stakeholders should be promoted. And third, recognition can be provided by publicly acknowledging the contributions private protected areas and landowners make. There is no short-cut to improving voluntary conservation by private landowners where it is lacking, not even by offering financial rewards. There is little that is likely to surpass personal co-operation within and between landowners through direct contact in order to overcome misunderstandings, communicate relevant information, determine ways of satisfying varied individual needs (a key element of PCAs) and improve conservation attitudes and behaviours. It is these aspects of private conservation that critically need to be addressed by policy, both within the Little Karoo and worldwide.

Regarding the permanence of privately-conserved lands, recognition is increasing that the best course of action is to establish different categories of private protected area within any one country (e.g. Langholz & Lassoie 2001b, Swift *et al.* 2004, Chacon 2005, Sims-Castley *et al.* 2005). One category should provide for absolute or near-absolute conservation in perpetuity, alongside other categories with differing levels of sustainable development taking place, for shorter lengths of time. Incentives would vary for each category, increasing with the increase in conservation activities (and corresponding decrease in productive land-uses) and the duration of protection (Chacon 2005). Sensible though these suggestions are, experience in the Little Karoo has shown that this approach will not necessarily prove successful without *a priori* contact and involvement of the landowners: the Stewardship Programme provides for just such a multi-tiered approach, and so far raises many doubts as to its success. Rather, extension services should be provided to landowners initially, and through this point of contact, their input should form a central component of the process of planning for Private

Conservation Area legislation and policy. In some countries, the option of creating a private reserve in perpetuity may never prove appealing to landowners; in others, it already has, for example in Brazil (e.g. Rambaldi *et al.* 2005). In some instances, as appears to be the case in the Little Karoo, the existence of the option of creating a Contract Nature Reserve for 99 years may render landowners suspicious of the government's intentions, even though there are other options that do not require such long-term commitment. The variability of PCAs implies that each country will need to assess what levels of legal stature will be politically acceptable to landowners, what incentives are required, and how many different categories of private reserve are necessary yet feasible. However, these tasks should not be attempted without prior and in-depth contact with landowners in order to improve their trust and conservation motivations beforehand.

In sum, the design of a set of private protected area types must be sensitive not only to conservation requirements, but also to the needs and viewpoints of private landowners. Assessing those needs and viewpoints is best done through programmes that increase personal contact between and within conservation authorities, landowners and other interested stakeholders. Such strategies can also maintain and enhance societal commitments to conservation, and increase both the capacity and the willingness of landowners to conserve. In themselves, these outcomes improve the potential of creating legal tools, for securing the perpetuity of private conservation areas, which will be acceptable to landowners. These strategies are both generally-applicable and flexible enough to deal with context-specific situations: thus, they are not only relevant to PCAs in the Little Karoo, but worldwide. For this reason, they should be considered wherever policies for private lands conservation are required. This chapter has therefore achieved a more regional approach in political ecology, moving upwards from the local-scale to locate events in their regional and/or global contexts. This move appears to be an important step, within political ecology, towards engaging with discussion of specific problems and policy issues (Walker 2006). The next chapter concludes this thesis by summarising the main results, providing overall conclusions regarding the private lands conservation sector in the Little Karoo and its implications for the global context.

CHAPTER NINE

Conclusion

The manner in which strategies for biodiversity conservation have been envisioned and applied in recent decades has undergone a significant change. New governance models have arisen, concomitant with the realisation that public protected areas alone are inadequate at fulfilling social and ecological objectives of conservation. Various models have been an outcome of the growing phenomenon of conservation on private lands: the last couple of decades have seen countries worldwide produce many initiatives to encourage biodiversity conservation by private landholders. Private conservation areas (PCAs) are one example of private conservation of land. They have been rapidly increasing worldwide, both in response to incentive programmes but also independent of them. Despite receiving increasing attention from academics and policy-makers, there exists very little comprehensive information in the literature regarding PCAs, from their tested ability to contribute to biodiversity conservation goals (as opposed to their potential), to the drivers behind their increase, to the characteristics of the landholders, and so on.

Protected areas have particular social, political and economic processes and implications embedded within them (Robbins 2004, Duffy 2006), in addition to the ecological implications. This is no less true for private protected areas, and thus comprehensive analyses of this sector need to be sensitive to the presence of all these multiple implications. Interdisciplinary methods are thus particularly relevant to the study of PCAs, among them political ecology. Political ecology research into biodiversity conservation and protected areas, though it has critically demonstrated conservation to be a strongly political process, has been limited to the topic of public protected areas and especially to their relationship with local communities. Complexities and opportunities within the conservation sector, such as those provided by private protected areas, have been largely overlooked by much previous work. This research on PCAs was built from this critique: it demonstrates the insights afforded by adopting a political ecology framework to study an example of voluntary conservation efforts in the Little Karoo region of South Africa. The interdisciplinary nature of political ecology enabled numerous questions regarding the PCA sector to be comprehensively answered, thus fulfilling the research objectives outlined in chapter 1 (this chapter covers objective 6). The questions answered ranged from the more social to the more strictly ecological, such as establishing the actual 'value' of PCAs in terms of biodiversity conservation.

Despite recognition that the potential of private protected areas to contribute to biodiversity conservation is substantial (e.g. Figgis *et al.* 2005, Jones *et al.* 2005, Rambaldi *et al.* 2005), because of the significant amounts of land and species captured, this potential has not been rigorously tested. Such a test has been provided for the first time in chapter 4, which has demonstrated that PCAs can substantially complement the performance of public protected areas by capturing significant amounts of ecologically valuable habitat and forming a more connected landscape (and thus achieves objective 1 of research; see chapter 1). This landscape is therefore closer to achieving the goal of 'landscape-wide' conservation (e.g. Figgis 2004). Analyses of the social characteristics of PCAs further undertaken in chapter 4, which fulfil objective 2 of research (chapter 1), show that landowners are providing valuable personal funds for conservation. This finding is of significance given that public resources for conservation are in short supply (e.g. Naidoo *et al.* 2006), especially in developing countries which have to balance their conservation and development goals (e.g. Kepe *et al.* 2004).

In addition, chapter 4 has shown that many PCAs are independent of, or not strongly dependent on, financial considerations. Landowners evince a strong sense of stewardship and believe that private land conservation is important, a result that has been encountered elsewhere (e.g. Langholz *et al.* 2000b, Bernstein & Mitchell 2005, Chacon 2005). There is a widely-held belief that profit (from tourism for example) is the main reason behind the establishment of PCAs in general (Mitchell 2005). However, this belief probably exists because ecotourism-based reserves are among the most common and profitable worldwide (Langholz & Brandon 2001, Langholz & Krug 2004) and especially, among those with the highest profile and thus most well-known (Sims-Castley *et al.* 2005). However, the motivation for individual private landowners to create protected areas is complex and not often due to a single reason (e.g. Langholz *et al* 2000b, Mitchell 2005), and a love of the land seems to be a primary motivator for private land conservation (Bernstein & Mitchell 2005). Finally, chapter 4 highlighted the essential variability of private reserves, a common feature of these areas both within and across countries (e.g. Langholz & Lassoie 2001, Chacon 2005, Jones *et al.* 2005).

This variability means that private reserves can work in numerous countries under different circumstances: it is simply necessary to ensure that the right type of PCA is supported under the right set of conditions and locality (e.g. Langholz & Lassoie 2001b, Sims-Castley *et al.* 2005). Variability of PCAs further has implications for designing general and flexible conservation strategies that can work regardless of the type of private reserve, as was investigated within chapter 8.

Understanding why private reserves have arisen as a voluntary conservation mechanism in the Little Karoo landscape was examined in chapter 5. The chapter has illustrated how the switch in land use from farming to conservation and nature-based ventures within the Little Karoo is driven by the action of multiple forces, accomplishing objective 3 of research (chapter 1). These forces range from the economic, such as market-driven processes, to the socio-political, such as changes arising from the introduction of political independence in South Africa in 1994, to various socio-cultural and ecological processes. These forces act and interact at multiple levels and thus effective investigation of land-use change requires analysis at a number of different scales. Chapter 5 has therefore highlighted the need to re-focus attention outwards and upwards from the local-scale, towards large-scale, structural factors at the regional and global levels. More generally, the chapter has shown the need to adopt a 'network' approach within political ecology and land-use change studies, in order to move beyond conceptual divisions such as local/global, or human/natural. This chapter has further reiterated the need for political ecology to expand its traditional areas of enquiry, by demonstrating how conservation can arise as a voluntary, non-institutional and agent-led presence in the landscape.

Globally, conservation policy is strongly influenced by different views about why and how we conserve nature and who are appropriate stewards of nature. The increase in different models of governance of protected areas has involved a much wider section of society in biodiversity conservation. Thus chapter 6 focused on exploring and understanding the attitudes and views of the PCA owners (meeting most of objective 4 of research; chapter 1), who are part of this new set of actors. The chapter showed that social capital can play a major and valuable role in shaping the conservation attitudes and behaviours of private landowners, which has important implications for conservation policies, as chapter 8 expanded upon. PCA landholders were further found to view themselves, reasonably, as strong, independent players in the conservation landscape, who are increasingly creating their own models for control of the land, sometimes in direct conflict with conservation authorities (represented by the Provincial conservation board). The independence and power of private landowners implies that conservation agencies need to recognise landholders as valuable players in the landscape, and work in partnership with them in a more egalitarian fashion, for the realisation of conservation efforts. In fact, chapter 8 demonstrated that PCA owners do indeed crave and demand recognition for their conservation efforts, with consequent implications for conservation policies.

Therefore, for conservation to succeed on the ground, it is necessary for conservation agencies and officials to recognise and include the attitudes, goals and knowledge of private landowners. This conclusion is representative of a more general concept: that the full spectrum of social data needs to be included in conservation decisions, strategies and management. This is particularly evident in systematic conservation planning, where conservation decisions are based on ecological criteria, mostly derived from equilibrium views of ecosystems. The example of PCAs was thus used in chapter 7 to demonstrate how the inclusion of social features, such as landowner willingness to conserve, is key for developing a conservation planning strategy that integrates both the environmental and human dimensions of ecosystems, and is thus more likely to lead to successful implementation of conservation efforts. This conservation-planning strategy has here been named Adaptive Conservation Planning, and has also been developed in a manner that can recognise and account for the non-equilibrium dynamics that characterise some natural ecosystems; this conceptual framework and methodology is thus able to deal with the complexity of social-ecological systems. Chapter 7 therefore partially fulfils objective 5 of research (see chapter 1).

The flexibility and adaptability of conservation policies and incentive measures also need to be improved for dealing with the variability and relative novelty of conservation on private areas: more generally, biodiversity conservation on private land is a rapidly developing policy area and information is constantly changing. Flexible and general strategies are required to deal with the variable circumstances of PCAs, in addition to meeting the two goals outlined above, of working more equably with landowners and providing the recognition they require. Chapter 8 discussed how these objectives can be satisfied first by providing extension services to landowners, an instrument that can be tailored to meet both the expectations of landowners and the requirements of conservation agencies. Second, by providing formal recognition of landowner conservation efforts through certificates and related strategies. Policies for private lands conservation need also focus on methods for raising and improving social capital among landholders engaged in private conservation, which was found to be an important aspect of the most 'conservation-friendly' conservancy in the Little Karoo. The remainder of objectives 4 and 5 of research (chapter 1) were therefore met in chapter 8.

Although uncertainty remains about the future and role of private parks, they will not address on their own the objective of conserving a representative sample of species and habitats. Like the other new forms of governance that have emerged in the conservation arena, such as community-conserved areas, transboundary parks, biosphere reserves or contractual national parks, they are one other 'tool' for conserving biodiversity. Private protected areas will work best in particular locations and under certain circumstances rather than others. Future work could usefully address the objective of systematically defining what those 'ideal' locations and circumstances are. For example, countries with legal tenures that support private ownership of land provide one essential requirement for establishing more secure private protected areas (e.g. ELI 2003, Mitchell 2005). This thesis has further pointed towards other topics that future research could valuably investigate, whether in the Little Karoo or elsewhere. For instance, in order to emphasise and develop the potential of PCAs, their conservation 'value' could be analysed at finer scales and for a wider variety of indicators. Certainly, it is necessary to determine the contribution of private reserves towards achieving conservation objectives in many other areas of the world. In many locations, PCAs also hold promise in terms of their financial viability; thus, for these locations, further research into their current and future economic potential and impacts is required. For the Little Karoo, a detailed analysis of the economics of the private reserves could evaluate the future sustainability of these biodiversity-based ventures.

Additionally, the 'sliding scale' upon which the definition of a PCA rests could be more rigorously defined. This involves establishing with precision what private reserves are used for and how different land-uses are combined, in addition to setting criteria for evaluating their management 'effectiveness'. Answers to these questions can allow the development of a system of management categories for private parks. These analyses could further include developing more objective measures of landowner willingness and capacity to conserve, and establishing procedures for 'trading-off' willingness versus capacity: such procedures can aid conservation planning and implementation efforts. In general, characterising in a more quantifiable manner the social attributes of private protected areas would enable mapping of these attributes, which can once again be of immense value in conservation planning and implementation.

Perhaps most critically, however, future work should investigate in detail the origins and effects of social capital among private landowners involved in conservation, and thus determine strategies for facilitating its development or improving its action. Thereafter, the means of formalising these strategies into conservation policies that can be applied more systemically should be examined. In addition, the most rapid and effective ways of providing sustained recognition to landowners should be determined. The most economic and effective (for both conservation agencies and landowners) services that extension officers should provide constitutes another key topic for future investigations.

As a final point, though the focus of this thesis was on private lands and their landowners, there are often other parties beyond the title deed owner(s) holding territorial attachments to the land, and who are thus affected by changes in land use. As mentioned briefly in chapter 3, one important set of stakeholders consists of farm labourers, who can also hold deep and abiding commitments to a landscape (e.g. Connor 2005, Luck 2005), sometimes more so than the title deed owner (Connor 2005). Although farm worker relationships with the land were outside of the scope of this thesis, this research holds important implications for farm labourers. Other research has shown that as land is converted towards increasingly conservation-friendly land-uses, farm labourers are dismissed: for example, in the Eastern Cape, Luck (2003) and Smith & Wilson (2002) showed that land-use change from farm-based enterprises towards game farming, ranching and/or hunting leads to a decrease in farm employment opportunities. Generally, across South Africa, the downsizing in agriculture (whether accompanied or not by an increase in game farming) and new tenure and labour legislation have led to decreases in employment rates among former farm labourers, as well as to their eviction from the land (McIntosh Xaba & Associates 2003, Luck 2005, Crane 2006, Atkinson 2007, Nkuzi Development Association n.d.). In turn, loss of employment and eviction can lead to losses in housing, rations, grazing, stock, access to gravesites and ancestral sites on particular properties, fragmentation of kinship and working alliances (Connor 2005, Atkinson 2007, Nkuzi Development Association n.d.).

Yet, other research in the Eastern Cape (Sims-Castley *et al.* 2005, Langholz & Kerley 2006) has shown that the move from agriculture to another type of conservation-friendly land-use, namely wildlife-viewing tourism, has led to much higher employment rates, wages and skills profiles for farm labourers than farm work, which is generally characterised by low wages, entrenched patterns of servility, labour paternalism and low levels of education (e.g. Connor 2005, Crane 2006, Atkinson 2007). Specifically, such research shows that when farms converted to private game reserves, employee numbers rose by up to a factor of 4.5 (with no significant evidence that original farm workers had been laid off and replaced), average wages by a factor of 4.8, and that numerous benefits are provided to employees, including food, housing, and staff training programmes in a range of topics (e.g. English, tracking, or hotel management skills) (Sims-Castley *et al.* 2005, Langholz & Kerley 2006). These results suggest the possible existence of a U-shaped employment curve, whereby as livestock farms transfer to game, the amount of labour initially declines, but as tourism activities take hold, the amount of labour increases, although it is of a different kind (D. Atkinson 2007, pers. comm., 05 Nov).

Because of the structure of this research, neither questionnaires nor interviews explicitly revealed any data regarding farm labourers in the Little Karoo, save for a couple of instances in which landowners mentioned running their PCA 'to cover losses' in order to provide 'enough work for the coloured families on the land'. This lack of data may simply reflect the structure of the questionnaire and interviews (which did not explicitly consider farm workers), or may reflect deeper processes at work. PCA landowners may be 'writing farm labourers out the landscape' by accident, unaware of all the implications that their manner of representing the landscape holds. Landholders may also be knowingly omitting the issue of farm workers: just as prior farmers on the land may have given up farming in part due to the increasing cost of labour, so too may the new PCA owners have chosen conservation as a land-use partly for this reason. On the other hand, the lack of data may reflect a genuine absence of farm workers due to the collapse of farming prior to land-use conversion towards PCAs: many agricultural jobs have been and continue to be lost as a result of wider forces in the agricultural economy independent of the relatively recent game farming and conservation trends (Crane 2006, Atkinson 2007). Uncovering which of these processes are at work, either singly or in combination, is an important topic for future research to address because of the implications these processes have for the well-being and future of farm labourers within new economic landscapes. The implications are expected to be negative where landowners in the Little Karoo are deliberately converting to conservation-friendly land-uses to avoid paying for extra labour, or unintentionally ignoring the problem of farm workers. On the other hand, a genuine absence of farm workers on the land would suggest that the Little Karoo differs from a U-shaped employment curve: due to a decrease in agricultural productivity, labourers might have suffered well in advance (and thus independently) of any change towards conservation. Therefore, any move towards conservation-friendly land-uses, whether these consist of game ranching or ecotourism, would signify more employment opportunities for ex-farm workers, especially if the latter land-use became prevalent.

Therefore, encouraging the development of tourism, especially domestically (as suggested in chapter 8), could not only bring positive implications for the permanence of PCAs, but further for ex-farm labourers. These kinds of effects could also manifest in areas outside of the Little Karoo, and where a U-shaped employment curve might be in operation: therefore, wherever traditional farming is changing to game, encouraging a further move towards nature-based tourism could prove of benefit to farm workers. Thus, it is apparent that there is a very real need for future work to address the issue of farm workers and PCAs, especially in areas such as the Little Karoo where different processes to those occurring elsewhere may be at work. As highlighted by Crane (2006), there are two aspects of employment impact that require urgent attention from future research: one is the difference in employment opportunities between farming and a biodiversity economy, with further distinctions to be made among different biodiversity industries, for example game ranching vs. wildlife-viewing. The other, the different skill profiles that biodiversity economies require: Crane (2006) speculates that the increase in tourism-related jobs may negatively affect ex-farm labourers by requiring more highly-skilled (and therefore different) employees to fill those positions, such as white middle-class individuals. On the other hand, Sims-Castley *et al.*'s (2005) and Langholz & Kerley's (2006) results appear to directly contradict such speculation, showing that many 'original' employees are provided with the training necessary to fulfil the new tourism-related roles. While the literature recognises that formal, statutory protected areas bring significant costs to the poor (e.g. Brockington & Schmidt-Soltau 2004), very little work has analysed how conservation efforts on private lands affect the tenure rights, employment opportunities, well-being and lives of poor people residing there (Crane 2006), and future research should therefore address this gap.

In conclusion, private reserves worldwide take many forms (e.g. Langholz & Lassoie 2001a, Mitchell 2005) and they will reflect the changing ecological, social, political and economic conditions in which they are found. However, given their relatively recent increase, the current disillusionment with public conservation efforts (e.g. Merenlender *et al.* 2004) and the continued search for alternative options to the latter, PCAs are likely to continue increasing for some time, especially if land tenure systems that allow private ownership increase around the world (e.g. Mitchell 2005). Thus, it is imperative for the conservation community to work more closely with PCA owners so as to be able to respond, in policy, to changes in information and circumstances as they arise. Although private conservation areas should not be seen as the only or the most important option in the 'toolbox' for biodiversity conservation, they hold the promise for positive and long-lasting results, and thus they warrant the continued interest and support of governments, conservation agencies, academics and conservationists at large.

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APPENDIX A:

The vegetation of the Little Karoo

Biomes are the highest-order entities in the hierarchy of vegetation units (followed by communities and other levels of detail) and are characterised in terms of climatic parameters and life-form mix (they represent major life zones extending over large natural areas) (Rutherford 1997). In other words, they are the fundamental units of which larger ecological systems are made up (Walter 1985). More specifically, biomes are seen as (a) the largest land community unit recognised at a continental or sub-continental level; (b) a unit mapped at a scale no larger than c. 1:10 million (i.e. broad-scale) (c) distinguished from other biomes firstly on the basis of dominant life form(s) and secondly on the basis of the major climatic features that most affect the biota; and (d) not as an anthropogenic system (after Rutherford 1997: 91). Descriptions follow of each of the biomes occurring in the Little Karoo (recognising Renosterveld as a biome, and omitting the Afromontane Forest): Fynbos, Renosterveld, Succulent Karoo and Thicket.

1. Fynbos

1.1 Description

Fynbos is used to distinguish the unique fynbos biome from other sclerophyllous shrublands on nutrient-poor soils elsewhere in Africa (Rutherford 1997). Fynbos also describes the main vegetation type of the Fynbos biome: an evergreen, fire-prone shrubland, confined largely to sandy, infertile soils, and characterised structurally by the universal presence of restioids (wiry, ever-green graminoids), a high cover of ericoid shrubs (especially Ericacea) and the common occurrence of overstorey proteoid shrubs (Cowling *et al.* 1997). Over 7,000 plant species occur in the Fynbos vegetation types, with endemicity very high: over 80% of plant species are confined to the Cape Floral Kingdom and Fynbos Biome.

Climatically, the Fynbos biome is characterised by having more than 40% of annual rain falling in the winter months (April-September) and a moderate to low index of summer aridity (Rutherford & Westfall 1986). Fynbos is further differentiated from adjacent biomes by occurring on nutrient-poor soils with significantly lower pH values, lower available phosphorous, lower base status and higher clay content (e.g. Campbell 1986). Intense and recurrent summer fire at intervals of 4-40 years (mostly 8-20 years), due to nutrient poverty and summer drought, is a unique feature of the biome and may be responsible for its persistence (Bond 1997): through the agency of fire, Fynbos seems to have displaced alternative non-flammable woody vegetation over much of its range (Cowling *et al.* 1997).

The most widespread vegetation type of the Fynbos biome (and the only one to occur in the Little Karoo) is Mountain Fynbos (Rebelo 1996a); this has not been rigorously defined, being merely Fynbos that occurs on the mountains of the Fynbos biome. Rainfall varies from 200 to over 2000 mm per year, occurring mainly in the winter months; summer drought has a major influence on this vegetation type and its ecosystem processes. Many species become dormant, and the vegetation becomes susceptible to hot fires (see above), which remove almost all above-ground fuel and burn off much of the available nutrients (Rebelo 1996a).

1.2 Conservation status

Habitat fragmentation is a major problem in the lowlands of the Fynbos biome (Rebelo 1992), with 43% of Fynbos biome reserves smaller than 500 ha, and 17% less than 50 ha (Cowling *et al.* 1997). Another major threat is presented by the numerous species of alien plants that have invaded natural vegetation over large parts of the biome (e.g. Richardson *et al.* 1997). Alien plants threaten many Fynbos taxa with extinction by suppressing the indigenous plant species (e.g. Richardson *et al.* 1989). Invasive alien plants disrupt the nutrient cycling process in many parts of the Fynbos biome and have marked effects on hydrology (Cowling *et al.* 1997). Runoff from catchments with dense stands of aliens is between 30% and 70% lower than for uninvaded Fynbos, with serious implications to the aquatic biota and to water production (Richardson *et al.* 1997). Mountain Fynbos, economically, is used for flower harvesting and water catchment (most of the major rivers are dammed), with recreation (hiking and mountaineering) extremely popular, making it a probable focus for a major ecotourism industry (Rebelo 1996a). Much of the vegetation type is conserved as water catchment areas.

2. Renosterveld

2.1 Description

Renosterveld is a fire-prone evergreen shrubland that occurs on moderately fertile substrata (Cowling & Holmes 1992). It is characterised by the dominance of members of the Daisy Family (Asteraceae), specifically one species, Renosterbos *Elytropappus rhinocerotis* (Campbell 1985, Rebelo 1996c). While not as rich in local endemics as Fynbos, Renosterveld is nonetheless extremely species-rich, especially in geophytes (Cowling 1990). Typically, Renosterveld is largely confined to fine-grained soils of the coastal forelands and inland valleys, mainly clays and silts, all of which are fertile (Rebelo 1996c).

Central Mountain Renosterveld (also called Mountain Renosterveld) occurs on the fringes of the Little Karoo basin, usually between Fynbos and Succulent Karoo vegetation types, where rainfall ranges between 250 and 400 mm per year, mainly in winter (Rebelo 1996d). Little is known about the ecology of this vegetation type; larger game no longer exists in the area (except where reintroduced) and the vegetation is mostly used for grazing (Rebelo 1996d). South and South-West Coast Renosterveld (also Coastal Renosterveld) occurs in the foothills and tablelands of the eastern Little Karoo, where rainfall tends to occur in the spring and autumn months, with an increasing summer component in the east (for this and the following section, refer to Rebelo 1996e). Nearer the mountains, where the rainfall approaches 600 mm per year, transition zones with Mountain Fynbos occur, whilst Thicket vegetation occurs where topography limits the spread of fires (e.g. valleys, dissected landscapes). This vegetation type differs from other Renosterveld types by the high proportion of grasses. Fire and grazing are crucial elements in the management of this vegetation type, influencing the relative abundance of shrubs and grasses; it is used extensively for grazing purposes in the east.

2.2 Conservation status

Typically, soils on which Renosterveld occurs are fertile (Rebelo 1996c). Hence over the past century Renosterveld has been extensively transformed by agriculture (Cowling *et al.* 1986, Hoffman 1997, Kemper 1997). Today, c.15% of this habitat remains as a series of small (median size 30 ha) fragments in a matrix of cereal and pasture lands that are subjected to grazing, trampling, crop spraying and frequent burning (Kemper 1997). Remnant patches of Renosterveld have high conservation value (*sensu* Pressey *et al.* 1994, Pressey *et al.* 1996), since almost all remaining habitat is required to meet a modest reservation goal of 10% of the pre-colonial extent of this vegetation type. Furthermore, the remaining fragments are vulnerable to clearance given the relatively high agricultural value of the soils (McDowell 1988). For these reasons, Renosterveld is a major conservation priority in South Africa (Kemper *et al.* 1998).

The conservation status of Mountain Renosterveld is poor, although it is the best conserved out of all Renosterveld types, and the least transformed in the Western Cape: c. 11% of its total extent is transformed, and 3.63% conserved (Rebelo 1996d). The Anysberg Nature Reserve is the principal conservation area of this vegetation type (Rebelo 1996d). Coastal Renosterveld is c. 32% transformed and 1.42% conserved (Rebelo 1996e).

3. Succulent Karoo

3.1 Description

The essential diagnostic feature of the Succulent Karoo biome is not succulence (succulents are water-storing species, Walter 1985) but the comparatively low abundance of the perennial grass form (Rutherford 1997). The Succulent Karoo biome, with 6,356 plant species, has the highest species richness recorded for semi-arid vegetation; 40% of species are endemic, of which 17% are Red Data Listed (Driver *et al.* 2003). Further, growth-form spectra for the Succulent Karoo are unusual for a semi-arid region, in the prevalence of chamaephytes and geophytes, scarcity of tall shrubs, trees and grasses, and the enormous concentration of leaf-succulent, low to dwarf shrubs (Milton *et al.* 1997).

Climatically, the biome is characterised by low (20-290 mm/yr) but fairly reliable annual rainfall, of which more than 40% falls in the winter half of the year, and by relatively high summer aridity (Milton *et al.* 1997). Geology and soils further distinguish the Succulent Karoo from Fynbos, with the biome occurring on intrusive igneous rock and on soils derived from fine-grained sedimentary rocks, and on recent alluvial deposits (Partridge 1997). These soils are finer-grained, less leached, with higher pH values (>7) and higher cation exchange capacities than Fynbos soils (Milton *et al.* 1997). Aspect strongly influences plant communities in broken terrain.

The Little Succulent Karoo occurs in the hot, dry valleys between the two parallel east-west trending mountains of the Cape Fold Belt: the Riviersonderend-Langeberg-Outeniqua in the south, and the Hex River-Witteberg-Swartberg in the north; the area is fairly hilly, at elevations between 300 and 600 m (Hoffman 1996). Mesophyllous, non-succulent shrubs and trees occur on shaded south-facing slopes in the Little Karoo, whereas succulents predominate on northern slopes (Levyns 1950). The Gouritz River is the major drainage system in the area (Low & Rebelo 1996), and rainfall is low, between 150 to 300 mm per year, occurring in the winter months in the west, but becoming more evenly spread throughout the year towards the more eastern parts; soils are generally deep and fertile (Hoffman 1996). The rainfall of the Little Succulent Karoo, being of cyclonic origin, is predictable, if low. The lack of summer rains results in a very low grass cover. Locally the vegetation may be lush and, where the rainfall is higher, grades into Central Mountain Renosterveld (Hoffman 1996). Succulent Karoo vegetation seldom burns (Bond 1997, Milton *et al.* 1997).

3.2 Conservation status

Less than 0.5% of the area of the Succulent Karoo biome has been formally conserved; the high species richness and unique global status of the biome require urgent conservation attention (Low & Rebelo 1996). The Little Karoo comprises 9,032 km^2 of Little Succulent Karoo, of which 2.34% is conserved (Hoffman 1996). Because the soils of the Little Succulent Karoo are generally deep and fertile, where irrigation is possible most of the vegetation of the lowlands has been cleared for cropping or over-grazed (Hoffman 1996). The extremely arid summers make much of the Succulent Karoo unsuitable for settled pastoralism: between 1800 and 1980, stocking rates for domestic livestock declined further in the Succulent Karoo than in any other arid or semi-arid region of South Africa (Dean & MacDonald 1994, Milton *et al.* 1997). This dramatic drop in stocking rates is taken to provide firm evidence for transformation of the Karoo environment (Dean & MacDonald 1994). The tendency for herbivory to alter the vegetation composition, such that it cannot easily be brought back to a more palatable plant population by resting, complicates ranching in this biome (Milton & Hoffman 1994). There appears to be no rapid, reliable or economically feasible way to restore function and species diversity to this rangeland (Milton *et al.* 1997: 160). Hence, transformation of the biome in the Little Karoo is of great concern for both ecologist and agriculturalists (Cupido 2005).

Major assets of the Succulent Karoo are the spring flower displays and succulent flora, which together with spectacular scenery, habitat diversity, proximity to major cities and well-developed infrastructure, provide potential for the development of a tourist industry (Milton *et al.* 1997: 160). The formal conservation status of the Succulent Karoo is poor (Rebelo 1997) and public apathy towards this arid region does not bode well for its future: an opinion survey of government and private conservation bodies revealed that Karoo conservation had the lowest priority rating (MacDonald *et al.* 1993). Conservation of this rich succulent flora therefore rests in the hands of landowners (Milton *et al.* 1997).

4. Subtropical Thicket

4.1 Description

No 'Thicket biome' is generally recognised as such in the literature, but vegetation that replaces Forest (where some fire protection is still evident, but rainfall is too low, and which lacks the necessary height and strata below the canopy to qualify as Forest) has been so identified and defined (e.g. Vlok & Euston-Brown 2002, Vlok *et al.* 2003). Subtropical Thicket is a closed shrubland which is floristically and structurally heterogenous: in general, it can be characterised as being short (1-5 m), dense and spinescent, often with a high cover of arborescent succulents and lianas (e.g. Everard 1987, Low & Rebelo 1996). Thicket has its own ecotonal species, *Portulacaria afra*, which when locally dominant, generates the vegetation unit generally known as Spekboomveld (Acocks 1988). Spekboomveld is always located in sites where the thicket vegetation abuts a fire-driven vegetation type, such as Fynbos (Vlok & Euston-Brown 2002). Levels of rarity and endemism are low in Subtropical Thicket, with the exception of geophytes and dwarf to low succulent shrubs in the Euphorbiaceae and Mesembryanthemaceae (e.g. Moolman & Cowling 1994). In the core of the Subtropical Thicket biome as mapped by Vlok *et al.* (2003), 1,558 plant species were recorded, a relatively rich flora; of these, 20% were endemic, an unexpectedly high figure (Vlok *et al.* 2003).

The selective environment that determines where the Thicket vegetation occurs consists mostly of four factors: rainfall, soil condition, temperature regime and fire (Vlok & Euston-Brown 2002, Vlok *et al.* 2003). Thicket units only occur in areas where the mean winter minimum is more than 0.9 °C, but these species can deal well with high summer temperatures (highest mean maximum temperature: 32.6 °C). The mean annual rainfall of the Thicket biome has a wide range (200-950 mm per annum), but the Thicket vegetation is restricted to sites where half the annual rain falls in winter (Apr-Sept). Most Subtropical Thicket species grow best on soils that are deep and rich in nutrients, although unfavourable soil conditions do not preclude the occurrence of the Thicket vegetation. Finally, local disturbance regimes play and have played a vital role in determining the vegetation patterns in the Thicket vegetation, with the two main selective disturbance regimes being fire and herbivory. Thicket is not fire-prone, although fire is undoubtedly required to periodically create gaps in extensive stands of the Thicket vegetation; without these gaps the full complement of faunal and floral diversity associated with the Thicket biome could not exist (Vlok & Euston-Brown 2002).

Succulent Thicket (a.k.a. Karroid Succulent Thicket), occurring in the Little Karoo, covers an area of 5,011 km^2 (the following section is drawn from Lubke 1996). It is a Thicket type of steep mountain slopes (which occurs in the eastern parts of the Western Cape) dominated by Spekboom *Portulacaria afra*, found on shallow soils in a belt c. 400 to 1060 m above sea level, with a rainfall of 250 to 300 mm per year. Locally Spekboom Succulent Thicket is confined to a narrow altitude range by temperature, rainfall and soil conditions.

4.2 Conservation status

Succulent Thicket has an unknown transformed proportion, and c. 1.76% is conserved (Lubke 1996). In some areas it is exploited by browsers such as goats, and this constitutes its main economic use. The Spekboomveld component in particular is adversely affected by heavy goat grazing on farmlands (e.g. Moolman & Cowling 1994): owing to the high palatability of most forms of *Portulacaria afra*, Spekboom-dominated vegetation has suffered the greatest extent of transformation in the Subtropical Thicket biome (Vlok *et al.* 2003).

APPENDIX B:

Little Karoo vegetation map hierarchy

The vegetation of the Little Karoo was classified hierarchically (with six levels) to ensure that information was captured from a local to a regional scale (all subsequent details are drawn from Vlok *et al.* (2005)). At the first tier, vegetation units were split between aquatic and terrestrial systems; at the second tier, the aquatic units were subdivided into those that have fresh water permanently available, and those that drain water seasonally or only have brackish water permanently available. At this level, the terrestrial units were subdivided into biomes. At the third tier, vegetation units were split by major habitat type (mostly representing structural characteristics of the vegetation). At the fourth, the floristic component of habitat types with regards to its regional bio-geographical context was taken into consideration. The fifth tier subdivided vegetation units by the floristics of the local endemic species and/or the specific combination of the species dominant in the unit. The sixth tier divided terrestrial habitat units into two structural types, those that occurred as solid, unfragmented units (i.e. elements of only one biome were present) and those that occurred as mosaic units (i.e. elements typical of more than one biome were present). Freshwater aquatic units were split between those occurring on north versus south facing slopes, with no further differentiation in brackish-water systems.

Further details on the first two tiers, of interest to this thesis, are as follows:

1. Ecosystem concept: the term aquatic is used to imply vegetation units that are highly water-dependent, and that occur in or alongside permanent or seasonal water drainage zones. Hence, the spatial extent of the mapped aquatic units indicates the boundaries of the water-dependent vegetation plant species. The mapped units indicate where at least subsurface water is permanently available within these areas (not necessarily the actual width of water drainage channels or the volume of water draining through an area). The subdivision in the two major aquatic biome types indicates whether the available water is brackish (containing fair amounts of salt and other solutes: 'drain' biome) or fresh ('source' biome). The term terrestrial is used for all vegetation units that do not occur within water drainage zones.
2. Biome concept: at the terrestrial biome level, the biome concepts of Low and Rebelo (1996) were mostly followed, with the exception of Renosterveld. This vegetation type is usually regarded as part of the Fynbos biome, but was here recognised at the biome level; the reason is that some Renosterveld types relate better with the Succulent Karoo and Subtropical Thicket biomes (although some Renosterveld units clearly relate closely to the Fynbos biome). Therefore, Renosterveld was viewed as a biome that represents a transition from Fynbos to the Succulent Karoo and Subtropical Thicket biomes. Descriptions of biome types occurring in the Little Karoo (Mountain Fynbos, Renosterveld, Succulent Karoo and Subtropical Thicket) have been provided in Appendix A. It is important to note that although small pockets of Afromontane Forest occur within the Little Karoo, they are largely restricted to narrow, fire-protected gorges in the Rooiberg and Swartberg mountains, usually with some permanent water stream running through them. Due to their limited spatial extent it was not possible to map both the stream and the forest, and, because it was considered more important to map an uninterrupted perennial stream, the Afromontane Forest biome was removed from the classification.

APPENDIX C:

The Stewardship Programme

The Stewardship Programme was introduced in 2003 by the Western Cape conservation authority, Cape Nature Conservation, with the intent of entering into conservation agreements with landowners that own areas worthy of conservation. Landowners are given the option of entering into one of three different types of agreement, depending on the conservation worthiness/sensitivity of their land, and their preferences. Each agreement is tailored to suit the individual landowner's needs while achieving, at the same time, Cape Nature Conservation's objectives in conserving the particular land parcel. The three types of Stewardship agreement are detailed below (ordered from that with the highest development restrictions to that with the lowest).

1. Contract Nature Reserve

Applicable to:

- Critically important and threatened sites
- Areas next to state-owned nature reserves, or large enough to be self-contained ecosystems
- Applicable to a portion of, or the entire property; size is not so much of a criterion as the ecological value of the site

Duration:

- Min: 25 years – Max: perpetuity

Benefits:

- Substantial assistance with habitat management i.e. deploying Working for Water or other government programmes/funds
- Increased recognition and marketing exposure
- CNC lobbies on behalf of landowners for incentives, for example rates rebates

Restrictions:

- No development rights are allowed (hard developments are to be excluded from the actual area covered by the agreement), but access and residence rights are unrestricted
- Only land-uses incompatible with maintaining biodiversity values on the site are restricted
- Requires re-zonation of the land and a servitude on the title deed; thus the same restrictions will apply to the new landowner, although a new contract will have to be negotiated with CNC

2. Co-operation Agreements

Applicable to:

- Any conservation-worthy land (especially wetlands and water catchments)
- Not excluding small and isolated fragments
- Applicable to a portion of, or the entire property; size is not so much of a criterion as the ecological value of the site

Duration:

- Min: 10 years – Max: perpetuity

Benefits:

- Specific agreements for fire, alien, plant and animal management
- Advanced extension services (e.g. alien clearing planning)

Restrictions:

- Land is to be managed in a way that supports the natural processes i.e. land-uses that are compatible with maintaining biodiversity or ecosystem function are not restricted. For example, grazing is allowed if it is well-managed
- N.B. does not require re-zonation of land

3. Conservation Areas

Applicable to:

- Any land suitable
- Not a good option for land with rare or endangered habitats
- Applicable to an entire property, or group of properties; size is not so much of a criterion as the ecological value of the site

Duration:

- Any length of time

Benefits:

- Advice and support through basic extension services
- Assistance with management plans and farm maps

Restrictions:

- Very few, but the area needs retain its natural character
- N.B. does not require re-zonation of land

APPENDIX D:

Questionnaire

Section A – General Sectoral Information

A1. Tenure

A1.1 Ownership: how is the land owned?

1. By an individual or family
   Individual/family name:
2. By a for-profit organisation (e.g. company) – Name:
   Details (e.g. listed company, private company):
3. Other – Please specify:

A1.2 Management Authority: who manages the PCA?

1. The owners
2. Another individual/family – Please specify (employees, rent the land, etc)
3. For-profit organisation (e.g. company) – Name:
4. Other – Please specify:

A2. Land use

A2.1 Land Use: natural areas like yours are useful to owners in many different ways. I'm going to mention some possible land-use activities that people can do in natural areas. Please tell me how often each of these activities take place on your land. The choices are "Never, Occasionally, Regularly, and All the Time"

	Land use	Nev.	Occ.	Reg.	All Time
1	Wildlife-viewing or other tourism activities (daytime visitors only)				
2	Wildlife-viewing or other tourism activities (overnight visitors)				
3	Game hunting – is this trophy, meat, culling				
4	Game ranching (for sale of animals, meat or parts)				
5	Livestock or game farming				
6	Agriculture - what kind?				
7	Harvesting plants (decorative/medicinal/wild food) for sale				
8	Mining or quarrying				
9	Use of area for personal enjoyment				
10	Other – Specify:				
11	Other – Specify:				

A2.2 Land-use Frequency: (if applicable) what are the two activities that you run most often on your land?

A2.3 Land-use Change: do you expect the land-use activities on your land to change in the next five years?

1. No → Go to Question A3.1
2. Yes → What are the main land-use changes you are expecting to make?

A3. Permanence

A3.1 Duration:
(a) How long have you owned the land? (To nearest year)
(b) How long ago did you start running it as a PCA? (To nearest year)

A3.2 Previous Land-use: what did you use the land for before you started running the PCA?

A3.3 Expected Duration: how long do you expect to keep the PCA running?

1. 5 years or less – Specify:
   → What are the two main reasons why you won't be continuing to keep your PCA?

2. 5 - 10 years
3. 11 - 15 years
4. 16 - 20 years
5. 20+ years
6. Don't know

A3.4 Factors Affecting Duration:

(a) I'm going to mention some possible factors that might affect how long you keep your PCA. Please tell me how important you think each of these factors is to the long-term success of your PCA, by giving it a score out of 10. A score of 0 would mean 'not at all important'; a score of 10 would be 'extremely important'.

	Factor	**Score**
1	Political stability	
2	Better government regulations or legislation	
3	Receiving help from the government or other organisations	
4	Strong economy (in terms of the demand on the services provided by your PCA)	
5	Better management or organisation of the PCA	
6	Good protection of the natural wildlife	
7	Good protection of the natural scenery	
8	Good relationships with third parties (e.g. industries)	
9	Good relationships with local communities	
10	Any other factor you feel is important – Please specify:	
11		
12		

(b) Of the factors we've just discussed, what do you think is the single most important factor for the long-term success of your PCA?

A4. Finance

A4.1 Status: do you run your PCA as a business, to make money?

1. No → Go to A4.6
2. No, but I want to → What kind of business? (Then go to A4.4)
3. Yes, but it's still in a development phase → Go to A4.2
4. Yes, and it's fully operational → Go to A4.2

A4.2 Profitability: Did the PCA show a profit over the last financial year?

1. Yes → Go to A4.3
2. No → What is the reason?

A4.3 Future Profit: do you expect your earnings over the next financial year to:

1. Decrease by as much as 100%
2. Decrease as much as 50%
3. Stay the same
4. Go up by as much as 50%
5. Go up by as much as 100%
6. Other
7. Don't know

A4.4 Source Of Income: is the PCA your main source of income (or, will it be your main source of income)?

1. Yes
2. No

A4.5 Relative Profit: is running the PCA a more profitable use of the land compared to any other land-use?

1. Yes → Go to A4.6
2. No → Why do you manage the land as a PCA rather than as something more profitable

A4.6 Total Gross Income: what was the total gross income of the PCA over the last financial year?

1. None
2. Less than R100, 000
3. R100, 000 – R200, 000
4. R200, 000 – R500, 000
5. R500, 000 – R1 million
6. R1 million – R5 million
7. More than R5 million

A4.7 Total Gross Loss: what was the total gross loss of the PCA over the last financial year?

1. None
2. Less than R100, 000
3. R100, 000 – R200, 000
4. R200, 000 – R500, 000
5. R500, 000 – R1 million
6. R1 million – R5 million
7. More than R5 million

Section B – Motivations and Incentives

B1. Motivations

B1.1 Establishment:

(a) I am going to read you a list of reasons for why you might have chosen to set up your PCA. Please tell me how important each reason is for you, by giving it a score out of 5. 0 means that it wasn't a reason for you, 5 that it was a very important reason.

	Reason	Score
1	To make money by game ranching and/or hunting	
2	To make money by wildlife viewing and/or other tourism activities	
3	To protect nature	
4	To protect the natural landscape or scenery	
5	To help the local economy or community	
6	To increase the security of your property rights to the land	
7	Any other reason that I haven't mentioned for why you set up your PCA	
8		
9		

(b) (If applicable) Rank the highest scoring reasons in order of importance:

1.
2.

B1.2 Location choice:

(a) I am going to read you a list of reasons for why you might have set up your PCA where you have it. Please tell me how important each reason was for you, by giving it a score out of 5. 0 means that it wasn't a reason for you, 5 that it was a very important reason.

	Reason	Score
1	You already owned the land	
2	Buying the land was easier and/or cheaper there	
3	There are particular wildlife or plants there	
4	There is a particular landscape or scenery there	
5	It was close to other nature reserves	
6	It was close to tourist destinations or services e.g. airport	
7	There are particular social or cultural features there	
8	Any other reason for choosing to set up your PCA where you have it	
9		

(b) (If applicable) Rank the highest scoring reasons in order of importance:

1.
2.

B1.3 Protected Status: would you like to have some kind of formal legal status as a protected area?

1. Yes
2. No

B2. Incentives

B2.1 Assistance: I am going to read you a list of agencies that can help people manage their PCA. Please tell me if you use any of these sectors to help you manage your PCA. Think of any type of help, for example financial help, management advice, technical services, and so on

1. National Government
2. Provincial Government
3. Local Government
4. External consultants
5. Universities
6. NGOs i.e. charities or societies like WESSA
7. Do you use the help of any other organisations to manage your land – Please specify:

B2.2 Desired Assistance: of the list of organisations we've just discussed, are there any which you wish were helping you with running your PCA?

B2.3 Incentives:

(a) For this question, I'd like you to imagine that a government program was available that gave help to PCA owners, in exchange for agreements to protect the land and wildlife. I am going to read you a list of ways in which a government program could help you manage your PCA. Please tell me how valuable each one would be to you, by giving it a score out of 10. A score of 0 would be 'not valuable at all', a score of 10 would be 'extremely valuable'.

	Incentive		Score
1	Help with marketing tourism:	To foreign visitors	
		To national visitors	
2	Financial help, and would you prefer it to be:		
		Direct (e.g. a cash grant)	
		Or indirect (e.g. a tax break)	
3	Management advice, for e.g. how to manage wildlife		
4	Direct help with management activities, for e.g. help with building lodges, roads, fences, etc.		
5	Extra development and/or use-rights to the land		
6	Being formally recognised as a protected area		
7	Help with alien plant control		
8	Are there any other ways that you would like to be helped – Please specify:		
9			
10			

(b) What would be the single most valuable way in which a government programme could help you manage your PCA?

Section C – Conservation Performance

C1. Size and threats

C1.1 Size: what is the size of the PCA? In ha if possible:

C1.2 Enlargement: do you have any plans to increase the size of your PCA?

1. No → Go to C1.3
2. Yes → Why?

C1.3 Cadastres: can you give me the farm boundaries of your PCA? Or the title deed number? Or your farm name, number, magisterial district and subdivision numbers (where applicable)?

C2. Management goals

C2.1 Management Plan: do you have a formal conservation management plan for the PCA?

1. No
2. Yes

C2.2 Management Goals: do you have a specific management goal for:

Goal for	No	Yes	Details
The plants in the PCA			
The wildlife in the PCA			
The landscape/scenery of the PCA			
Other resources of the natural area			

C2.3 Future Goals: (if no management goals formulated) do you think you will have formal management goals in the future for the wildlife, plants or landscape of your PCA?

1. No
2. Yes

C2.4 Non-indigenous Species: do you have any specific policies for non-indigenous wildlife? (I.e. alien species, that aren't natural to the area)

1. No → Do you expect to have any in the future? Details:
2. Yes → What are they?

C3. Management strategies

C3.1 Alien Vegetation: do you have any programmes for clearing invasive alien plants? Please choose between:

1. Yes, at least once a month
2. Yes, at least once every 6 months
3. Yes, at least once a year
4. No

C3.2 Restoration: do you have any programmes for restoring the natural habitat of the land? (E.g. veld restoration projects, restoration of degraded (eroded, overgrazed, etc) areas within the PCA)

1. Yes
2. No

C3.3 Fire Regime: do you have any kind of fire management programme? (I.e. use of fire)

1. Yes
2. No

C3.4 Poaching: do you have anti-poaching patrols in your PCA? Please choose between:

1. Yes → How often
2. No → Why not?

(If applicable) Do you use any other kind of anti-poaching measure?

C3.5 Monitoring: do any species monitoring programmes take place on your land? (Including fauna and flora surveys, radio tracking of endangered mammals) Please choose between:

1. Yes, at least once a month
2. Yes, at least once every 6 months
3. Yes, at least once a year
4. No

C3.6 Research: does any research take place on your land? Please choose between:

1. Yes, at least once a month
2. Yes, at least once every 6 months
3. Yes, at least once a year
4. No

C3.7 Use of Information: do you make use of scientific advice or information for managing your PCA, for example do you make use of consultants, governmental advice, scientific publications, etc?

1. Yes, at least once a month – Source of scientific information:
2. Yes, at least once every 6 months – Source:
3. Yes, at least once a year – Source:
4. No

C3.8 Qualified Staff: do you employ qualified biologists and/or conservationists for managing the PCA?

1. Yes
2. No

C3.9 Removal: have you removed any wildlife or plant species from the PCA? Apart from alien vegetation removal

1. No → Go to C3.10
2. Yes → What species?
   Reason(s):

C3.10 Fencing: is the PCA completely fenced in?

1. Yes
2. No – Details:

C3.11 Clearing: how often do you clear the natural vegetation? Please choose between:

1. At least once a month
2. At least once every 6 months
3. At least once a year
4. Never

C3.12 Species Maintenance: do you provide forage and/or shelter for any of the wildlife in your PCA? Please choose between:

1. Yes, at least once a month – Reason:
2. Yes, at least once every 6 months – Reason:
3. Yes, at least once a year – Reason:
4. No

C3.13 Species: can you tell me what the main ten wildlife species you have in your PCA are?

Species	**Species**
1.	**6.**
2.	**7.**
3.	**8.**
4.	**9.**
5.	**10.**

APPENDIX E:

Coded transcript example

The example provided below is a coded transcript for a respondent interviewed during Phase 3 of research. The transcript has been edited slightly: a few irrelevant sections have been removed, and where this has occurred it is indicated in the transcript by the symbol '{...}'. The annotations have also been removed. Passages in the transcript that have been coded are either *italicised* or highlighted in **bold**, occasionally ***both***. The relevant codes and category descriptors for each passage are listed in the 'category code' column and are formatted to match the passage to which they refer (*italics* or **bold** or ***both***). Category codes are placed on the same line as the beginning of each relevant passage where possible, otherwise they are placed as close as possible to the start of the passage to which they refer, in the same order in which the passages occur. An arrow placed next to a category code ('→') means that a category has been inferred from a certain passage (i.e. a passage is implying a certain idea, rather than explicitly stating it). The following symbols apply: 'INT' stands for 'interviewer', whilst the symbol 'RES' denotes 'respondent'; '(.)' indicates a pause, whilst '...' is used in exclamations such as 'er', 'um', etc.

Respondent no. 12 transcript	Category code
INT: okay, so if I can start first by talking about your motivations, and could you tell me in your own words how you came to set up Mountain Pastures? RES: it's, it's an interesting issue because our motivations are probably a lot different to most people's, we started off in 1991 and *we bought this section of property which was one farm at that stage, and they were running about 2, 000 angora goats and sheep on it. Yeah, they were working, they were working on a burning system, where when there was a drought they would set the veld alight, and then immediately after the rain they would then feed it, so when we arrived here it really looked like a desert, I think that's the best way you can describe it, it looked terrible.*	*C_A3 [Local-scale drivers, supply - LK unsuitable for farming - over-grazing & over-use]*
We then decided that we wanted to bring it back to what is should be, we wanted to bring back the animals that were here,	**I_C [Conservation motivations - restore 'original' condition]**
and *at the same time, and this is where we different from others, at the same time we wanted to be able to make a difference in the communities in the area at large as well. I don't believe that conservation stops at the fauna and flora, we've got to incorporate our people as well, especially in South Africa.* So it's a very different mentality perhaps of what you would have in a first world issue where, where it would be business first! So, what we then did was, for the first, we were hoping to start, after we bought in 1991 we were hoping to start in 1993, but	*G_I [Conservation views - social responsibility/ development]*
due to the fact that it was so badly damaged, due to, to agriculture, **specially in this area where you got a marginal agricultural potential, very marginal!**	*C_A3 [Local-scale drivers, supply - LK unsuitable for farming - over-grazing & over-use]*
Um, it took us until 1998 before we could bring in the first animals, but *obviously it doesn't help bringing in*	**C_A2 [Local-scale drivers, supply - LK unsuitable for farming -**

animals and getting the environment sorted out and you can't afford to sustain it! So you have to bring in your tourism side then to sustain what you doing. And, um, we managed to do that, I think to a large degree, in fact at this stage we, we'd influenced the lives of about, I'd say comfortably 300 (breadwinners?) within our area, comfortably, in various ways.	**marginal land]** *G_B [Conservation views - financial sustainability]*
INT: okay. So tell me, did you originally buy the land to set up a private nature reserve?	
RES: *yes, that was the intention. And we then purchased, as we went along, we purchased more and more*	*A_C1.1 [Global-scale drivers - socio-cultural factors - conservation desires - nature reserve 'dream']*
INT: yes. Okay, and now you have 2, 000 ha, is that right?	
RES: it's about 2, 000 ha, but we work in association with other guys which makes it up to about 5, 000	
INT: yes, you were saying on the phone about this, and I'm quite interested, you mentioned this on the phone, I was very interested in this idea, you're not in a conservancy I take it?	**J_A1 [Social capital – active cooperation - neighbours]**
RES: **not in a conservancy, but what we've done, is we utilising areas of the adjoining farmers that they not using for their farming activities, and they get paid for it.**	**J_G [Social capital - benefits from cooperation]** **→ H_B1 [Landowner own roles - agents in landscape - own landscape use models]**
INT: interesting. And how did you come up with this idea?	*J_A1 [Social capital – active cooperation - neighbours]*
RES: I think it was born out of necessity! *Because, if you take for instance, we needed to bring in buffalo, now your buffalo here, clean buffalo, cost you in the region of about 200,000 Rand a cow, and to have enough buffalo you going to need at least 12-13 buffalo so you can imagine the input cost! So we then looked for somebody that would be interested in breeding buffalo. We then purchased property adjoining, which they then purchased from us, and they started their buffalo-breeding programme. So our neighbours now have a buffalo-breeding programme which we utilise for our guests, and we pay them per visit. And if you take the other one, we've got an arrangement with them, they've got a whole load of San rock paintings, we give them a certain amount of money per month, to access those paintings, and then that forms part of the whole reserve as well, and that's another 1,600 ha, and then we've also got the (.) other farmers adjoining where they then allow us to utilise the mountains for hikes and flower trails, etcetera. So everybody makes up, and that puts together an amount of about 5,000 ha.*	*→ H_B1 [Landowner own roles - agents in landscape - own landscape use models]*
INT: okay. So you obviously have done a lot of thinking about the relation of your land to your neighbours, ... apart from the benefits it brings to your tourism trade, do you feel it has other benefits, the fact that you are, sort of using your land together?	*C_A2 [Local-scale drivers, supply - LK unsuitable for farming - marginal land]*
RES: *yes, definitely, because unproductive land can now generate an income, for the farm! And what we've done as well, when we purchased the farm, we haven't kicked the farmer off the land.* If he was farming with apples for instance, **you find that only 10% of the actual land**	*J_G [Social capital - benefits from cooperation]* **C_A2 [Local-scale drivers, supply - LK unsuitable for farming -**

around here is utilised for agriculture, the rest is so marginal that they'll push sheep and they'll push cattle into them, and actually cause more damage than anything else! *So what we say to them is continue on the 10%, and leave the 90%, and we'll put game there which actually does very well*	**marginal land]** **C_A3 [Local-scale drivers, supply – LK unsuitable for farming - over-grazing & over-use]** *→H_B1 [Landowner own roles - agents in landscape - own landscape use models]*
INT: yes, yes. Okay. Now, tell me, you've mentioned the fact that agriculture is very marginal in this area, would you, if … agriculture were more viable, do you think you would farm on your land?	*→A_C1.1 [Global-scale drivers; nature reserve 'dream']*
RES: *no, I don't think so,* I think that if you look at the package that we can put together here {…}	
INT: so, do you feel, what do you feel apart from what it means to you personally, what do you feel that the most important benefit of this nature reserve is?	**I_C [Conservation motivations; restore 'original' condition]**
RES: well you see we don't look at it from a personal aspect, **the personal aspect is the, is the pleasure that we get from seeing that the nature return to what it is, and enjoying the animals and the surroundings. So that, that's what we get out of it,** *don't, don't think we make money out of it, there's not that much money to be made. If you do it on a different basis where it's a take situation, and not of give and take, well then you can make money out of it. But what we saying is let's stabilise our whole area, let's get people involved, let's get people involved in developing the area, on a sustainable basis, with the environment as a priority,* and **it's working! It really is working! You cannot believe how well it's working**	**A_C1.1 [Global-scale drivers - socio-cultural factors - conservation desires - nature reserve 'dream']** *→A_C5.1 [Global-scale drivers – socio-cultural factors – lifestyle choices - lifestyle investment]* *G_I [Conservation views - social responsibility/ development]* **H_B2 [Landowner own roles – agents in landscape - pride in success]** **→ H_B1 [Landowner own roles - agents in landscape - own landscape use models]**
INT: okay. So, and you mentioned it's not a very profitable enterprise, would you be able to maintain this area if it made no profit at all? RES: *if you break even, yes. Which we are managing to do* {…}	*→A_C5.1 [Global-scale drivers – socio-cultural factors – lifestyle choices - lifestyle investment]* *I_C1 [Conservation motivations - larger areas for conservation]*
RES: *I think that our long-term goal was that this whole valley,* **which really is not suitable for, for, … farming,** *should then return as a nature area,* and it's absolutely perfect for that, because it's closed in, by the two mountains on either side	**C_A2 [Local-scale drivers, supply - LK unsuitable for farming - marginal land]**
INT: I've heard more about this thing about farming not being sustainable, would you say that farming has become less sustainable as time has gone on? RES: *yes, definitely*	*A_A4 [Global-scale drivers - political-economic changes - farming less sustainable]*
INT: and why would you say it has? RES: okay, *let me give you an example. In 1975, in 1975 you could swap 500 bags of wheat for a tractor. To do the same now, you know how many bags of wheat you need? Nearly 15,000 for the same size tractor.* **All subsidies were stopped in 1994 for farming,** *the dumping of (.) cheap products in South Africa since we've become part of the global market, has just made it non-viable for farmers*! **So your input costs have reached such a high, that you simply cannot make a profit, and it's not only the input costs, the machinery, fertilisers, fuel, that kind of thing,** but	**A_A1.2 [Global-scale drivers - political-economic changes - deregulation - end of farming subsidies]** *A_A1.1. [Global-scale drivers - political-economic changes - deregulation - competition with global markets]* **A_A2 [Global-scale drivers - political-economic changes - high**

also the stupid laws that are being implemented on your minimum wages, what's happening is every time they up the minimum wage, you lose that percentage of labour, if the wage goes up by 12%, 12% less labour, and it all has to be done by the same, ... the same work has to be done by less people, is the bottom line. **And then of course your climate change is also making a difference, there's definitely a drop in rainfall.**	**input costs]** *A_A1.3 [Global-scale drivers - political-economic changes - deregulation - change in labour relations]* **C_A2.1.2 [Local-scale drivers, supply - marginal land - water limiting factor - climate change]**
INT: how do you think the land-use trends in the area are going then, what do you think is happening in this part of the region? RES: *what's happening is that slowly but surely there's a shrinkage on the utilisation of land. In other words, more, more intensified on smaller areas, which leaves more area that's not being utilised at all.* INT: and, what do you think is happening on the land that's not being utilised? RES: basically they are being left to go back to the veld, but they are being utilised with sheep, goats, I see goats are coming in very strong, ... goats, because they can utilise more of the veld than what sheep would graze, and even more than what cattle would, and you start seeing now that they start to bring in African cattle, which is the Nguni cattle, which also utilise portions of the fynbos that shouldn't be utilised! It's as easy as that. *And if we don't give the farmers an alternative, they've got no choice, remember they paying rates and taxes on those lands now, which they never used to do. So they have to get some form of income!*	*C_B [Local-scale drivers, supply; land use changes in LK]* *→A_A4 [Global-scale drivers - political-economic changes - farming less sustainable]*
INT: how many nature-based ventures are there in the Little Karoo, would you say? RES: yes, there's, **there's a lot of people that have tried it,** basically their biggest problem is they don't realise what the cost implication is going to be, and there's no shortcuts. You've either got to do it right, or not do it at all. So I think they've got at the moment probably 6 similar ventures, that are running in different directions. Of those 6 I would say that 2 have the opportunity to become successful. The one, one is based solely in, in fact the game areas they've got is solely for hunting, it's been put there so that people can get (from Plettenberg Bay?) from the holiday spots to there to shoot animals, that's basically what it's for, I don't agree with that so, ... I don't see that one succeeding at all! That's one of them, ... yeah, the others (.) nah, they've got a chance. But whether they're going to have much of an impact, on the community themselves, that I don't know.	**C_B [Local-scale drivers, supply; land use changes in LK]**
INT: and tell me, um, how come you haven't - your land is obviously in a sense an informal nature reserve, I presume you've made a decision not to make it more formally a-- RES: *without a doubt, because the minute you get formal they come in with a whole load of bull, they start red tape. So we not interested in their red tape*, because red tape-- **if you look at nature conservation's ideas,** *and I've been fighting with them now for the last five*	*M_C2 [Views of authorities - authorities' faults – bureaucracy & lack of delivery]* **M_C1 [Views of authorities - authorities' faults – not practical]** *L_B2 [Interaction with authorities - level of contact – conflict with CNC]*

years, **because they are so heavenly-minded that they have no earthly use,** that's, that's (.) INT: I see. Okay. And, ... more about perhaps how you came to this area originally, what, what attracted you to the LK?	
RES: we come from Knysna, and what we did, ... in the 80s, is we realised that the country was going to change, *we realised that you needed to be able to make a different in the country, and, you would have to make a difference in an area where people were actually motivated to do that.* So we looked throughout the southern, the southern, the eastern, and even the Western parts of the Western Cape, Eastern Cape, and even the Northern Cape, and we realised that Uniondale's area, this part of the LK, had the best potential to succeed. Not because of the climate or because of the plant or the fauna or the flora, but because of the attitude of the people! And that's why we decided to do it here. The bonus is that it works very well as far as the animals go, the animals adapted to this area beautifully INT: and why, why at the specific time that you did, what prompted that particular decision? RES: okay, I was in the defence force for a long time, I was in the South African army for many many years. And, ... finished up with them only in 1996 INT: I see. And did you know people who owned these kinds of ventures before you set your own up?	*G_I [Conservation views - social responsibility/ development]*
RES: no. INT: okay. So, was it entirely your own motivation to set this nature reserve up, or would you say anyone or anything else played a part? RES: *it was a family venture, that's all. It was a dream of my father's, and still is, and we sort of bought into the dream*	*A_C1.1 [Global-scale drivers - socio-cultural factors - conservation desires - nature reserve 'dream']* *→ I_F [Conservation motivations - role of upbringing/past experiences]*
{...} INT: okay. And what do you think the greatest threat to your natural area might be? RES: um, **greatest threat I would say is (.) government legislation**	**M_C2 [Views of authorities - authorities' faults – bureaucracy & lack of delivery]**
INT: government legislation? RES: **government legislation, removing the sustainability and the feasibility. Whether it's taxation, ...BEE, or whatever they want to call it, if they make rules that cannot make it viable then obviously it's going to go (?)** INT: yeah. And what do you think, what do you think could or should be done with regards to this problem?	
RES: I think that what, what one needs to do, you know at the moment they've got BEE score-cards, black economic empowerment scorecards, and you get points for everything that you do successfully to, to, ... encourage black economic development. Now we very much into that, so we don't have a problem with that. *But we feel there should be an environmental scorecard as well. And that environmental scorecard should give*	*O_A [Incentives - recognition & delivery]*
you benefits like for instance reduction on taxes, rebates, etcetera, if you are in fact benefiting the natural	*M_C2 [Views of authorities - authorities' faults – bureaucracy &*

environment, and, and it's people. It's all very logical! INT: yes, yes. But as I understand there are tax rebates for lands under conservation? RES: no, no, no. *They say there are, but there aren't. They say that they considering, there's no such thing at the moment, they, they considering it, I studied that brief paper on, on the biodiversity, and even though they said that there can be rebates, you talk to your municipality, who's the person that receives the revenue, they tell you*	*lack of delivery]*
to jump in the lake INT: okay. So, are, are you aware of any formal government or conservation board programmes that offer assistance to landowners who protect natural areas,	*→ N_B1 [Views of Stewardship - drawbacks – implementation]*
in exchange for-- RES: *they talking about it, but nothing's been produced, they talking about it*	*L_A1 [Interaction with authorities – level of awareness – awareness of conservation initiatives]*
INT: okay. So you haven't, are you familiar with the Conservation Stewardship Programme? RES: *yes* INT: and, you know that they have begun to sign the first agreements? RES: *yes.* And, **and have the beneficiaries, or the landowners, received any benefits yet?** INT: Well, they still finishing writing the contract, you obviously know what the Programme is about? RES: **I've looked at it, and the big problem I've got is that, that, it's so theoretical in so many ways that it's not …**	**N_B1 [Views of Stewardship - drawbacks - implementation]** **→ M_C2 [Views of authorities - authorities' faults – bureaucracy & lack of delivery]** **→ M_C1 [Views of authorities - authorities' faults – not practical]**
((Interruption)) INT: Sorry, you were saying, it's not theoretical in many ways that it's not? RES: it's, it's just, **it just, I don't know, it doesn't make it viable.** *You know, take for instance if I want to get involved in, in a conservation area, the first thing that they tell me to do is I've got to remove all alien trees from my property, okay? So now we cut down all these trees that are really making everything beautiful!* **And if you don't do that then you can't be classified as a conservation area, it's crazy, it really is crazy.** *So each one should actually have to, to, to be (.) evaluated on its own merits*	**N_B1 [Views of Stewardship - drawbacks - implementation]** *P_G1 [Views of nature - non-conformist - non-indigenous species]* **M_C2 [Views of authorities - authorities' faults - bureaucracy & lack of delivery]** ***→ M_C1 [Views of authorities - authorities' faults - not practical]***
INT: okay. Do you think there's anything good at all in that approach? RES: I've got to be very careful what I say, because I, I've had a hell of fights with, especially Cape Nature Conservation, I don't want to get excited about it. The things, *the reason that things don't work, is that they for instance, the constitution guarantees an input of everybody, okay? But! They only guarantee the input!*	*O_A [Incentives - recognition & delivery]* *M_C3 [Views of authorities - authorities' faults - attitude problems]*
They don't guarantee that they'll utilise that input! So they write a document, the Biodiversity Bill, they write the document, they ask us for input, and then they scratch whatever input we put in it, because it doesn't fit in with their administrative plan for the environment. It's crazy! **We're the guys,** in fact, *how many of Cape Nature Conservation's conservation areas are sustainable? None! Not one! Why not? Because they are*	**H_A [Landowner own roles - important conservation role]** *M_C1 [Views of authorities - authorities' faults - not practical]* **M_E2 [Views of authorities - need for change - recognise & work with landowners]**

not practical, they are not responsible, for the finances of those places. **So we need a balance, and at one stage we got to a point where we had undertakings from Cape Nature Conservation, where everything was going hunky dory**! And the next thing the Biodiversity Bill came in, and was promulgated and accepted, *which then gave Cape Nature Conservation a bit of clout, and they just scrapped everything that we said, it was as easy as that*! The only concessions they made, were when we really started getting snotty with them, and told them that we weren't prepared to be classified as zoo-parks or zoos, so they just changed name terminology, that's all	*M_C3 [Views of authorities - authorities' faults - attitude problems]*
INT: uh-hu. So, I can take it as the programme stands, that you wouldn't join it. RES: no INT: and is there anything or any way they could change it or anything they could offer you that—	**M_E2 [Views of authorities - need for change - recognise & work with landowners]**
RES: **all we saying to them, is listen to our practical experience when it comes to sustainability**! *Why, if our (?) blue wildebeest, I've had blue wildebeest here for the last five years, why can I no longer bring in new bloodstock from outside? Because they want me to get rid of it, because they were not supposed to be here* **and yet my, my ecosystems are functioning 100%!** *Why do that? That's crazy. It's a different matter if I'm bringing in blue wildebeest so that people can shoot them on a 40-acre piece of property, that's not what I'm planning to do. That's the thing that makes it sad, because you've got some people that are being ... un-environmentally friendly, and doing strange things, everybody's classified the same. And I don't think it's necessary to be*	**H_A2 [Landowner own roles - important conservation role - good at conservation]** *M_C3 [Views of authorities - authorities' faults - attitude problems]* *M_C1 [Views of authorities - authorities' faults - not practical]* **M_C3 [Views of authorities - authorities' faults - attitude problems]**
INT: okay. Do you think they should, in essence (?) RES: definitely. Definitely. **In a non-partisan way**. We can't all be right! INT: sure! Okay. Perhaps more then about your actual views on conservation, and what conservation means. Are you familiar with the term biodiversity? RES: yes, very much so INT: so could you tell me what it means to you?	
RES: if you look at the Biodiversity Bill that I've had to studied for the last two years, and you look at what the term biodiversity means to the conservatives, ... it's their ideal of how to protect the fauna and flora in a specific area so that it's not affected by alien or invader fauna or flora. That's, that's what they see as the biodiversity as far as I can make it out.	*→ M_E2 [Views of authorities - need for change - recognise & work with landowners]*
What we saying is, biodiversity by all means, but be realistic. Be totally realistic. I agree with the Biodiversity Bill, I agree with the biodiversity (.) aims, goals, where they headed, *but it's just too airy-fairy, it needs to be practical, made practical*	*E_E1 [Conservation knowledge - biodiversity - diversity]* **E_E3 [Conservation knowledge - biodiversity - sustainability]** *E_E2 [Conservation knowledge - biodiversity - action]*
INT: I was thinking more, more, what does biodiversity actually mean to you, as a term? RES: yeah, *biodiversity for me, if I have to, to really think about it, is the difference, or the diversity of, fauna and flora in a specific area, and the beauty of that* **and how to sustain that, not only for, for nature but also**	

for our people. That would be what I, *how I see the active protection of biodiversity* INT: and can you then tell me what then doing conservation means to you? Doing conservation, do you think of it perhaps as something each person does alone, in cooperation, do you think of it at a small scale, big scale?	**G_H3 [Conservation views – environmental education – importance of examples]** *H_A2 [Landowner own roles - important conservation role - good at conservation]*
RES: **I see that you need to have an example of how conservation can succeed, financially as well, so that the whole concept can be expanded from one central point**. *So in other words, if you take where we are at at the moment, if you look at what we've managed to do for conservation, in the past 12 years, you'd be astounded.*	*→ H_B1 + H_B2 [Landowner own roles - agents in landscape - own landscape use models + pride in success]*
When we got here, there was one black eagle, and it's wing was shot full of holes, because the farmers believed that the black eagle would catch their lambs, so from a conservation side we said to them "listen chaps, we'll pay for every lamb that that black eagle catches". We paid for three lambs in 12 years and there's now seven black eagles. **So that's what I'm talking about! Laying a foundation, and expanding it**. *You can do the same with baboons. The baboons here, they were*	**[Still G_H3]**
shooting up to a hundred baboons a year in this valley, and those baboons play a very important role in the conservation of the plants, and (one?) didn't know that!	**G_B [Conservation views - financial sustainability]**
And what we did, we then implemented a value to the baboon, and with that value being implemented on the baboon, you know how many baboons are shot a year? Six. Big difference. **Because now that baboon has got a value.** INT: … and where would you say that your knowledge of conservation, and sort of, biodiversity comes from? RES: *yeah I was in Southern Angola for many years, and also in Namibia, and I was fortunate to be there in a period of time before it was destroyed by the civil war, and we spent 90% of the year out in the, in the bush, in twos, with the reconnaissance, and that gave me an appreciation for what Southern Africa can look like* if	*F_B2 [Knowledge sources - past experiences - various]*
handled correctly, but then you don't need civil wards, then you don't need poverty, you don't need those kinds of things, that needs to be (?)	*F_A2 [Knowledge sources - people - local & indigenous]*
INT: yes. And more perhaps about how you understand, I mean obviously the recces gave you an appreciation for it, I wonder how you developed your knowledge about plants, (?) RES: *I was very fortunate that, I was involved with a, a group of Portuguese-African soldiers, who lived off the*	***→ I_F [Conservation motivations - role of upbringing/past experiences]***
veld. I was also involved with a lot of the San people in Southern Angola, and they taught us so much! About how the veld can sustain you, if you look after it. **And I think that was probably the seed that was sown, originally** INT: and nowadays, how do you feel you that you keep	*F_D + E + A2 + A1 [Knowledge source - reading + practical experience + local & indigenous people + conservation staff]* *→ L_D [Interaction with authorities -advice from CNC]*
abreast of issues, I don't know, do you read— RES: *read, trial and error, and also cross-pollination from other farmers, and, and even Nature Conservation.*	**M_B1 [Views of authorities - rapport with CNC - good individuals]**
Look, I'm not against Nature Conservation, I've got	**M_B1**

very, very good friends in Nature Conservation, there some super guys there, some super ladies that really know what they're doing, we're fortunate in our area to have specifically some of the best that you could possibly get. Um, the idiots seem to be consolidated down in Cape Town, in the cities, maybe they should stay there and get out of conservation, but **the guys that are on the grounds here, the Smiths, the Clarks ((pseudonyms)) super, super people, people who can make such a difference. If you take James Clark ((pseudonym)), and his knowledge,**	*G_H2 [Conservation views - env education - importance of env edu]* **M_B1**
and you can spread his knowledge amongst our people, do you know how much it will mean for conservation? **That is incredible. Susan ((pseudonym)) the same, she's also got a passion ... all of them! The whole bunch!**	*J_A1 [Social capital – active cooperation - neighbours]* **J_A4 [Social capital – active cooperation – various]**
<u>INT</u>: so, obviously you cooperate with your neighbours, would you say that you cooperate with other people for the purposes of conservation?	*L_C2 [Interaction with authorities - involvement with CNC - cooperation]*
<u>RES</u>: Very much so! We, *we cooperate not only with our neighbours,* **we also cooperate with other NGOs, we cooperate with, with ... foreigners,** *and we also cooperate with Nature Conservation to a large extent*	**J_A4 [Social capital – active cooperation – various]** **J_G [Social capital - benefits from cooperation]**
<u>INT</u>: in, in what kind of ways? <u>RES</u>: **we, for instance, are now looking at bringing in rhino, we've given foreigners the opportunity to invest funding in the, in the rhino breeding project, so in other words they can do the payment for that, and then conservation benefits from it. And they benefit from it because they get, they get all the publicity.** *So, I think, you know, one can put together such a hell of a package where everybody wins. We believe in a win-win situation. It's as easy as that.*	*G_I [Conservation views - social responsibility/ development]* *→ G_B [Conservation views - financial sustainability]* **M_C1 [Views of authorities - authorities' faults - not practical]** *→ M_E2 [Views of authorities - need for change]*
Everybody must win, including (?). But you cannot have one winning and the other losing. **That's where nature conservation is making a mistake. They want the environment to win, but they leaving the rest out. Never (?)**	**→ E_B1 [Conservation knowledge – conservation - management actions]**
<u>INT</u>: okay. Okay. And specifically on your land then, what would you say that good conservation management is? I mean, for example, do you do alien plants clearing? <u>RES</u>: **yes we've done about 1.5 million Rand's worth of alien plants clearing, mainly black wattle, poplar, hakea, so we've, we've done all that.** *But once again it needs to be done in moderation! What they did with the alien eradication programme, is they eradicated to such an extent, that our people haven't got wood to burn. So now they haven't got wood to burn, what they do? The next best, the next best wood to burn is some of your fynbos! So now all of a sudden, your trees that are hard, hardy trees, that were growing in the veld, they get used for firewood! People have to burn something! Your protea species, your* Protea (nitida?) *for instance, is one of them that has started, because it's nice hard wood. To a lesser degree you find that your, your ((? Names of trees)) and those kinds of things are also being used for firewood. It's a very, very fine balance and you, you can't be ultra-conservative in any of them. If there is a*	*M_C1 [Views of authorities - authorities' faults - not practical]* *→ M_E2 [Views of authorities - need for change]*

patch of black wattle that's not going to spread or can be contained, hell, leave it so the people can at least have firewood! And, maybe, aim to be able to, to, move away from firewood in the long-term. Or, plant indigenous trees and until those indigenous trees have taken over, keep the black wattles there! So, it's a balance, what we doing at the moment, we advocating that they must plant Acacia karoo, *they've done some tests, because* Acacia karoo *not only good for your feed, they won't invade this area, because they are from this area, and, good, good feed for the animals and good firewood! So that's what we looking at now as an alternative. But we need to keep black wattle in place so that the other plants aren't attacked in the meantime out of desperation.* INT: uh-hu. And, I was wondering whether you do restoration on your land? RES: **very much so, yeah** INT: how about monitoring of the wildlife? RES: **we do monitoring**, we, *we been pleasantly surprised on the success that we've had with* ***the cycles of nature*** *that we've in fact managed to, to encourage.* **Obviously one has to get involved from a management side sometimes, when your so-called problem animals tend to, to increase. I'll give you an example, in our area we need jackal to control the population of the lynx. But if you've got a jackal, I'll tell you something, you've got all your farmers up in arms. So, it means that you have to then take the place of the jackal and then keep the population of the lynx in control. So sometimes you have to do things that you don't want to do, but unfortunately,** *once again you cannot be pr--, you know, precise* INT: uh-hu. How about research, does research take place on your land? RES: yes, **we bring in guys from, or students from (Saasveld?), they come out and they are doing a couple of research projects on this area,** *especially the recovery that we've had from what you saw on those photos, to what we got now, because we had a very unusual situation where we didn't know how we were going to address it. The photos that were taken there, of, of the veld, I can show you what it looked like, like that. That was three years, three years that nothing grew.* And we sat with a situation of what to do about it! **Now immediately Nature Conservation said "right, you'll have to go and get areas of fynbos that you'll (?) and spread it and all that kind of thing". Now if you take the cost of that on a thousand hectares, I mean it's just not viable!** *And then there was a San, an old San man that used to sit on his ass, I'll never forget him, and he said to me "Man, what's your problem?" I said "what do you mean, what's your problem?" he says to me, "you so worried about the veld, but the baboons have already made a plan!" I said "the baboons have made a plan?" he said "yeah, every time a baboon wants to eat, it rolls over a rock to get something to eat*	**→ E_B1 [Conservation knowledge – conservation - management actions]** **→ E_B1** *H_B2 [Landowner own roles – agents in landscape - pride in success]* *→ H_A2 [Landowner own roles - important conservation role - good at conservation]* ***P_A [Nature views – nature in balance]*** **→ E_B1 [Conservation knowledge – conservation - management actions]** *→ M_C1 [Views of authorities - authorities' faults - not practical]* **J_A4 [Social capital – active cooperation – various]** *→ C_A3 [Local-scale drivers, supply - LK unsuitable for farming - over-grazing & over-use]* **→ M_C1 [Views of authorities - authorities' faults - not practical]** *F_A2 [Knowledge sources - people - local & indigenous]*

underneath. And when it rolls over that rock, it's putting the rock on a seedbed, so all you do is go turn over the rocks and the plants will come up again!" I said to him "(Jan?) I think you're crazy but let's give it a bash". So I got 50 people in and we spread them out in long rows, and all they did was overturn these rocks. Three weeks later we had rain, and three weeks after that it looked like a Dalmatian dog. Wherever there was a rock, you had this green patch of different plants coming up, mainly grasses in the beginning. And then the pioneer plants came through, and then all of a sudden after	**J_A4 [Social capital – active cooperation – various]**
about, I think 5-6 years, it's reached the point now where it's 80% back to normal. **So, little things like that, that, that they researching now to see how much of a role did the baboons play? What is the difference in the area where we overturned rocks, where the rocks weren't overturned? So they are busy with that, that as well, and then they also doing research on the plants in the area because we've got a whole load of plants, things that's coming together**	*F_J [Knowledge sources - practical knowledge superior]*
INT: *so a situation where the local knowledge outweighed the—* RES: *yes. Without a doubt.*	*E_J1 [Conservation knowledge - management plan necessary]* ***H_B2 [Landowner own roles - agents in landscape - pride in success]***
INT: okay. … and tell me, I remember from the last conversation, you said you had a management plan for your land, … I wonder how you came about, to decide to have a management plan in the first place, what prompted that motivation, how you came up with them? RES: *if you don't have a management plan, then you're not going to go anywhere. You need to, to work in a specific direction all the time, and …* ***and it really has been successful***! You know it's no use having, a, a (.) plant re-established, management plan, and then you bring in the wrong animals that destroy the plants that you're trying to rectify. Also to bring in alien species, to feed animals in an unnatural situation, not, not what it's	*E_K [Conservation knowledge - role of trial-and-error]* *F_E2 [Knowledge sources - practical experience - trial-and-error]*
about. *So we've had to work by trial-and-error because most people don't know of what, what the real potential is, in this specific area, as far as feed goes. And what we've found over the years, that your ((? Name of plant)) that is an indigenous plant, your* rooigrass *which is also here as an indigenous grass, and one or two others, really are sustainable for the animals. And, what we doing now, is in lands where, where basically there were weeds, old farming lands, … we now re-establishing those specific grasses,* ***and it's working like, like a treat.***	***H_B2 [Landowner own roles – agents in landscape - pride in success]*** ***→ F_J [Knowledge sources - practical knowledge superior]*** *F_E2* **F_D [Knowledge sources – reading]**
INT: okay. And, …so, is it mainly trial-and-error-- RES: *completely trial-and-error.* **Obviously you read up a bit on the Internet and so on,** *but nobody can tell you. Lorena, there's no-one here than can say what can be done (in the wood?). In fact, they told me, that I can forget about gemsbok because gemsbok will be dead here within a week, because of (Karoo --?), and springbok will be dead within a week, but when we*	*E_K [Conservation knowledge - role of trial-and-error]* *F_E2 [Knowledge sources - practical experience - trial-and-error]* *→ F_J [Knowledge sources - practical knowledge superior]*
looked at the San rock art paintings, there's a painting of a gemsbok, so now where did they see a gemsbok?	**P_B1 [Views of nature - natural - no humans]**

And lo and behold, we found out that because we so high here, we got a little patch, when I say little patch I mean about 3,000-4,000 ha, where there's no (Karoo --?) and that's why gemsbok will survive, and do survive, and do very, very well. Same with springbok!	*E_I1 [Conservation knowledge - targets/landscape - targets not familiar]*
INT: okay. Very interesting. Okay, so, for the last few questions, can you tell me first what the word natural means to you?	*F_J [Knowledge sources - practical knowledge superior]*
RES: **natural is without interference from humans**. That's the way I would, I would probably describe it INT: … obviously you know a lot about biodiversity, … are you familiar with the idea of biodiversity targets?	
RES: *not as familiar as I would like to. I don't understand it* INT: okay. And what about the concept of ecosystem conservation, or landscape conservation? RES: once again, I can support it 100% *so long as it doesn't become so (.) … theoretical that it's not practical*	*→ E_I2 [Conservation knowledge - targets/landscape -landscape not familiar]* *P_A [Nature views – nature in balance]* **G_I [Conservation views - social responsibility/ development]**
INT: hmm. Can you tell me what it means to you? RES: repeat the term again? INT: … ecosystem conservation, sometimes called landscape conservation	
RES: okay, *let me take the ecosystem conservation. Ecosystem for me means package. In other words, not one part of the package, but the whole. And ecosystem conservation would then mean the looking after the whole of the ecosystem,* **including people. We cannot**	*A_B3 [Global-scale drivers - socio-political landscape - migration]*
exclude people. (..) We've got to realise that people will have a negative influence, that we've got to minimise {…}	*A_B3*
INT: why do you think land values are going up so much? RES: *because we in the Western Cape and people are running away from, from the Northern Provinces to get to what they see as a safer area* INT: really? So ou feel there's an influx of people moving from the North to the South? RES: *without a doubt* INT: and you think they're coming to the LK because it's got a lot of—well, because … there's something special that attracts them such as--? RES: *because 96% of the population of the LK is what we would classify as our brown people. All brown people. All Afrikaans-speaking, same culture, same customs, and you'll find that most South African whites can associate with your coloured community very, very easily. In fact, it's one community, it's just never been recognised. And that I think is probably what the draw-card is. Remember your African culture is very different.*	*B_E3 [Local-scale drivers, demand - safety & security - culture]*

APPENDIX F:

Summary table of respondent characteristics

The table provided below summarises the characteristics of respondents interviewed during Phase 3 of research. The order in which respondents appear in the table reflects their order of appearance in the thesis, by their pseudonym. Respondent ages are given in a ten-year age bracket. In the category 'Resident', the code 'Y' indicates that the respondent resides full-time on the PCA (private conservation area), whilst the code 'N' indicates that the respondent is a part-time or occasional resident on the PCA. 'WLK' and 'ELK' respectively stand for 'Western Little Karoo' and 'Eastern Little Karoo'; the PCA size ranges are in hectares. The category 'Profit status' refers to whether the PCA is run for profit or not; category codes are as follows: 'NP' = not for profit, 'FO' = for profit and fully operational, 'D' = for profit and in a development phase, 'CL' = not for profit but run to cover losses. The respondent 'Thomas' is not a PCA owner and thus respondent characteristics quoted in the table do not apply, beyond gender and age.

Pseudonym	Gender	Age	Resident	PCA location	PCA size	Main land-use	Profit status
Gareth	Male	40-49	Yes	WLK	<999	Non-use	NP
John	Male	40-49	Yes	ELK	2-2,999	Ecotourism	FO
Jim	Male	30-39	No	WLK	2-2,999	Non-use	CL
David	Male	60-69	No	WLK	15,000+	Ecotourism	FO
Philip	Male	40-49	No	WLK	<999	Ecotourism	D
Karl	Male	50-59	No	WLK	15,000+	Non-use	NP
Richard	Male	50-59	No	WLK	3-3,999	Non-use	NP
Jenny	Female	50-59	No	WLK	2-2,999	Non-use/ organic farming	D
Jeremy	Male	50-59	No	WLK	6-6,999	Ecotourism	FO
Matt	Male	60-69	No	WLK	8-8,999	Ecotourism	FO
Beth	Female	50-59	Yes	WLK	2-2,999	Non-use	NP
George	Male	50-59	No	ELK	3-3,999	Game ranching	D
Steve	Male	40-49	Yes	WLK	<999	Organic farming	D
William	Male	60-69	No	WLK	6-6,999	Non-use	CL
Peter	Male	60-69	No	WLK	1-1,999	Non-use	NP
Alice	Female	60-69	Yes	WLK	<999	Non-use	NP
Kevin	Male	60-69	Yes	WLK	<999	Non-use	NP
Thomas	Male	60-69	N/A	N/A	N/A	N/A	N/A
Maria	Female	40-49	Yes	WLK	<999	Organic farming	CL
Linda	Female	60-69	Yes	ELK	<999	Ecotourism	FO

APPENDIX G:

Interview guide

A1-a. Understand the motivations driving PCA owners

1. Why do you have your natural area?

2. *For initial PCAs*: Did you consciously buy (and set up) your natural area for this/these reason(s), or did this/these come later?
   For converted PCAs: Why did you set up your PCA in place of the prior use you made of the land?

3. Do you run your land as a PCA, in part, because your feel that farming or other activities are not economically sustainable in the Little Karoo? [*If appropriate, for long-standing and/or converted PPAs*] Would you say this has always been the case, or that farming (or other) has lately become unproductive? When?

4. Establishing a natural area can have different positive side effects. What do you see as the most important benefit of the presence of your natural area, apart from what it means to you personally?
   [*Prompt*: So, for example, do you think its most important benefit is to the community, to the economy, to conservation, something else]

5. How important would you say that contributing to conservation with your natural area is to you, compared to [any factors mentioned above]?

6. *For business PCAs*: Would you maintain your natural area even if it didn't turn a profit; what about if it only generated a small profit?
   b. If you found you could do more for conservation on your land, but you had to sacrifice some income, would you be able to sustain/afford this, would you want to?

   For non-profit PCAs: Why isn't it important to you to make income from your land?
   b. Do you think there might be a point in the future where you need to make a profit from your land to justify keeping it?

7. *For 'formal' PCAs*: Why did you put your land under PNR status/ why did you join the conservancy?
   [*Prompt*: Did you feel it would make your land more secure?]
   For 'informal' PCAs: Why is your land not under PNR status, have you ever considered turning it into a private nature reserve, or forming a conservancy?

A1-b. Motivations: exploring why PCAs are a recent phenomenon

1. What made you first think of getting/setting up a natural area

2. Why did you think of getting/setting up a natural area at the time you did

3. Do you know other people with a natural area, if so, do they own a natural area in the same area you do?
   b. Did you know them before buying/setting up your natural area?
   c. Did they play any part in your decision to get/set up a natural area?

4. Did anyone or anything else play a part in your decision to get/set up a natural area?

5. Why did you choose the Little Karoo?

A2. Permanence

1. What do you see yourself using the land for in the long-term future, say 20 years time? And beyond that, do you have any ideas? (E.g. sell, give to children, etc.)

2. If, for whatever reason, you had or wanted to sell your PCA, would you have any preferences or restrictions on whom you'd sell to?

3. What do you think the greatest threats to keeping your natural area are; do you have any concerns about the long-term security and duration of your area

4. What do you think can or should be done to prevent or get round this/these?

5. Are there any other factors that might make you have to give up your natural area, or change the way you used it?
   b. *For business/converted PCAs*: if agriculture becomes more economically productive, would you look into that?

B. Incentives

1. Are you aware of any government or conservation board programmes that offer assistance to private landowners who protect natural areas?

If yes:
   b. Which programmes are you familiar with?
   c. Did this/these play any part in your decision to establish or maintain your natural area? If so, why, how?
   d. [*If they mention Stewardship Scheme*] I'm curious how much people know about the policy. Do you happen to remember any of the details of the Conservation Stewardship scheme?
      [*If necessary*: correct misperceptions; fill any blanks they have: *Show cards*]

If no, or if they don't mention Stewardship:
   b. Have you ever heard of the Conservation Stewardship Programme introduced in 2004 -- the one that allows for three voluntary categories of private protected areas?

Mini-briefing [key points; use *Information sheets*]

- I'd like to describe the Conservation Stewardship scheme to you, so you know what it's about. It's designed to help people like you who are protecting a natural area.
- Landowners can enter into one of three conservation stewardship agreements with Cape Nature Conservation [*Show card*]
- Duration of each scheme, benefits & restrictions [*Show card*]
- *Additional points*: with regards to Contract NRs: one of the benefits is that the Protected Areas Act 2004 can give private land contractual reserve status equivalent to provincial reserve; this means that a servitude goes on the title deed (the agreement is not only made with CNC, but with the Minister as well), and the land is re-zoned to Open Space 3. New landowners will face same restrictions, although will negotiate a new contract (i.e. management plan) with CNC. The agreements only restrict development rights that are incompatible with maintaining the biodiversity values on the site. However, because land is re-zoned, landowners must apply for permission and an EIA to carry out determined land-uses e.g. hunting, tourism. What is allowed depends on the specific conditions of each property. Landowners are asked to define their development footprints up front, and exclude any possible hard developments from the actual area covered by the agreement. With regards to benefits, one is that the property is safeguarded against possible developments from other parties/organisations, e.g. ESKOM (can't put power lines in), someone building a dam upriver, putting a road through, etc. Further, should get exemption from land-tax, although this depends on the local municipality
- *Additional points*: in exchange for these incentives, the owner agrees to leave the land in a mostly natural condition. What is meant by natural condition is very flexible. Many land uses are still allowable, e.g. grazing, ecotourism, hunting. Anything would be allowed or considered if it didn't harm the land
- *Additional points*: a conservation area is virtually the same as a conservancy
- Do you have any questions about the scheme?

2. What do you think of this scheme?

3. What do you like about it, if anything?
   [*For example*: which elements are liked? Which option might be suitable for the property? What incentives are liked best?]

4. What don't you like about it, if anything?

5. Do you think it could be improved, if so, how? (I.e., what would make the program more appealing to you)? [*Note: ask exactly how they expect the govt/conservation board to be able to help in the manner they suggest*]

6. As the programme stands, have you, or would you be interested in joining?

If yes:

   b. Why?
   c. [*If necessary*] What do you see as the benefits of the scheme to you?
   d. What do you see as the benefits you'd be providing (for example to others, or conservation) by joining the programme?
      [Why they think they deserve incentives for conservation; what do they think they're providing in exchange?]
   e. [*If suitable/applicable*] would you pay to join this scheme? How much?

If maybe/no:

b. Why? (Or, why are you undecided?)

c. What would you want in exchange for joining the programme? (I.e., what kinds of incentives)?

[*Prompts*: financial incentives seem to appeal to a lot of landowners; would you agree with this?]

If they mention finance, or don't know:

- You may be aware that Nature Conservation does not have political or funding priority; government and conservation agencies struggle to find enough money to protect nature both inside and outside of parks and reserves. That's why it's difficult to get government or conservation boards to give out financial incentives. The Stewardship Scheme as it currently stands already judges applications from landowners based on the ecological value of the property and the changes in land use required to meet the objectives of the scheme. For financial incentives to be included as part of the programme, the conservation board would be forced to choose the landowners they could fund. The payment amount requested by a landowner would play a key role in determining whether an award could be made or not. So, I'd like you to give me an estimate (in monetary terms) of how much you would require annually, per hectare, to sign-up to each of the three Conservation Stewardship options. Please take a moment to think about this. When considering how much you would require, please think about your natural area's yearly running costs, and don't forget to consider that there would be other landowners applying to take part in the Stewardship scheme. I would like as realistic an estimate as possible, that is, the minimum amount that you actually would accept.

c. *Show cards for landowners to cost – concentrate on answers for the contract nature reserves*

d. So that I can understand your specific requirements better, can you tell me what activities you would principally spend the money on?

e. Would you be happy for this sum to be in the form of a rates rebate? Or would it have to be a grant for habitat management activities?

If nothing could induce them to join, or *in conclusion*:

7. Do you have any other suggestions or comments as to what the Govt or conservation board could do for you, in exchange for formal commitments to protect the land?

C. Conservation issues

1. Are you familiar with the term biodiversity at all?

If yes:

b. Can you tell me what it means to you?

2. Can you tell me what doing conservation means to you? [Do they see it as a personal thing, something others do, something done in cooperation, what scales do they think of: their land, locally, regionally, nationally, globally]
[*Prompts*: what do you immediately think about when I mention doing conservation; do you think of what conservation should achieve, do you think of what you do, or what others (and who) do or ought to do]

3. Where would you say your knowledge of conservation and nature/biodiversity comes from? Any other sources?
[*Prompts*: self-taught (books, Internet, scientific publications), family, friends, locals, Cape Nature, specific training/education/experience]

4. Would you say you cooperate with others for the purpose of conservation? Who?
[*Prompt*: Cape Nature staff, other landowners, NGOs, etc]

If yes:

b. In what ways? How often? How do you think this is beneficial to nature conservation?

c. Do you see any of these people regularly to talk about biodiversity/nature and conservation?

d. Have you thought of the relationship of your land to your neighbours; and/or to other (public) protected areas

If yes:

e. In what ways, and what prompted you to consider the relationship of your land to your neighbours/protected areas? Do you think your land should be connected up to your neighbour's, so game can move around?

If no:

b. Do you think it might be necessary, would you like to? Why, who with, in what ways? Why do you *not* cooperate with anyone?

5. Do you take any advice in conservation management from anyone?

6. What would you say that doing 'good' conservation means, on your land?
[*Prompt*: if they can't answer, then "what would be 'bad' conservation?"]

7. Re-cap the management interventions conducted [*check sheet*], why those specific management interventions? On the basis of what was/is the decision made?

8. [*If appropriate*] Why are not more management activities carried out [give examples if necessary]?
[*Prompt*: Would you intervene more often in your area if you could afford it, or do you not think it's necessary]

9. When you talk of conserving, what specifically are you talking of conserving? And why [that]?
[*Prompts*: wildlife, plants, landscape, scenery, ecosystems]

10. Do you have a formal conservation management plan for your land? What about an informal one?

PCAs with conservation plan:

b. Can you tell me more about it? [Specifics: what does it cover, and why; how was it drawn up (alone, in consultation with others, from reading determined publications, etc.)]

c. What made you feel you needed to draw up a management plan in the first place?

PCAs without conservation plan:

b. Why haven't you drawn up a management plan yet?

c. Do you think you will in the future, when and how?

11. What about conservation goals? [Cover same topics as Q.10: formal/informal; what do they consist of; why those; how were they determined (has anything influenced their formulation); *If no goals*: why not, will any be set in the future]

12. [*If applicable*] What does 'natural' mean to you?

13. Are you familiar with the idea of biodiversity or conservation targets at all? What about ecosystem conservation, or regional/landscape conservation?

If yes:

b. What do they mean to you? And have they influenced the way you bought, set up or run your land at all?
[*Prompts*: looking for a possible influence on management goals, interventions, location choice, cooperation with neighbours]

If no:

b. Did you give any thought to the particular conditions of the landscape, veld, wildlife or plants when buying or setting up your area? In what way?

Demographics and contextual variables
Age:
Gender:
Income of respondent/ Job occupation:
PPA for leisure/income:
No of hours spent on PPA:
Ethnic Origin:
[Brochure available?]

Land Price data
Purchase price:
Year of purchase:
Any financial data on PPA available?

Questions
Do you have any questions for me?

APPENDIX H:

Statistical tables

1. (a) Proportion of WLK captured by SPAs vs. proportion of ELK captured by SPAs, and (b) proportion of domain above 1,000 m captured by SPAs vs. proportion of domain below 1,000 m captured by SPAs

(a)

	% SPA	% Not SPA
WLK	12.2	87.8
ELK	15	85

(b)

	% SPA	% Not SPA
>1000	34.9	65.1
<1000	6.6	93.4

2. (a) Proportion of WLK captured by PCAs vs. ELK, and (b) proportion of domain above 1,000 m captured by PCAs vs. below 1,000 m

(a)

	% PCA	% Not PCA
WLK	22	78
ELK	10.8	89.2

(b)

	% PCA	% Not PCA
>1000	10.9	89.1
<1000	13.5	86.5

3. Proportion of Fynbos, Source, Drain, Renosterveld, Succulent Karoo and Thicket present in domain that is captured or not within SPAs, vs. the proportion that is captured or not by PCAs

Fynbos[1]

	% Protected[2]	% Not Protected[3]
SPAs	41	59
PCAs	11	89

[1] Extent of Fynbos in domain: 3217.2 ha

Source[1]

	% Protected[2]	% Not Protected[3]
SPAs	33	67
PCAs	11	89

[1] Extent of Source in domain: 375.7 ha

Drain[1]

	% Protected[2]	% Not Protected[3]
SPAs	4	96
PCAs	13	87

[1] Extent of Drain in domain: 1031 ha

Renosterveld[1]

	% Protected[2]	% Not Protected[3]
SPAs	7	93
PCAs	23.5	76.5

[1] Extent of Renosterveld in domain: 1967.4 ha

Succulent Karoo[1]

	% Protected[2]	% Not Protected[3]
SPAs	8	92
PCAs	23	77

[1] Extent of S. Karoo in domain: 3251.5 ha

Thicket[1]

	% Protected[2]	% Not Protected[3]
SPAs	5	95
PCAs	17	83

[1] Extent of Thicket in domain: 6761.4 ha

[2] '% Protected' refers to the proportion of the biome captured within the protected area system under consideration, e.g. 41% of Fynbos in the domain is captured by SPAs

[3] '% Not Protected' refers to the proportion of the biome that is not captured by the protected area system under consideration, e.g. 59% of Fynbos in the domain does not fall within SPAs

4. Extent of different biomes (in km^2) within the PCA system vs. the extent of different biomes within PCAs in the WLK and the ELK

	In PCAs	In WLK PCAs	In ELK PCAs
Source	41.2	6.2	35
Drain	137.3	112	25.3
Renoster	464	312.5	151.5
Fynbos	352.6	174.4	178.2
S. Karoo	755.4	727	28.4
Thicket	1143	824.5	318.5

5. Extent of different vegetation transformation categories (in km^2) within the LK domain and within SPAs and PCAs

	In LK	In SPAs	In PCAs
Severe	4182.5	168.6	484.9
Moderate	9285.7	1071.3	1973.4
Pristine	3120.1	978.1	433.9

6. (a) Proportion of severely and not severely transformed habitat captured by PCAs and SPAs, and (b) proportion of pristine and not pristine habitat captured by PCAs and SPAs

(a)

	% Severe	% Not Severe
PCAs	16.8	83.2
SPAs	7.6	92.4

(b)

	% Pristine	% Not Pristine
PCAs	15	85
SPAs	44	56

7. Extent (in km^2) of Fynbos, Renosterveld, Thicket, S. Karoo, Drain and Source, across different transformation categories, within the SPA system vs. the PCA system

Fynbos

	In SPAs	In PCAs
Severe	72.2	15.2
Moderate	406	163.1
Pristine	823.6	173.9

Renosterveld

	In SPAs	In PCAs
Severe	7.4	47.8
Moderate	84.9	310
Pristine	44.2	105.6

Thicket

	In SPAs	In PCAs
Severe	34.4	161.2
Moderate	289.4	858.3
Pristine	37	123.4

S. Karoo

	In SPAs	In PCAs
Severe	37.4	207.7
Moderate	210.6	543.8
Pristine	2.9	3.9

Drain

	In SPAs	In PCAs
Severe	8.8	46.9
Moderate	31.4	78.3
Pristine	4.4	12

Source

	In SPAs	In PCAs
Severe	8.4	6.1
Moderate	49	19.9
Pristine	66	15.1

8. Median sizes of reserves in the SPA system vs. the PCA system (conservancies numbered from 57 to 60)

SPA	Size (km^2)
1	627.60
2	18.80
3	47.85
4	276.60
5	91.90
6	13.35
7	27.00
8	270.50
9	6.00
10	.10
11	.30
12	730.00
13	29.30

PCA	Size (km^2)	PCA	Size (km^2)	PCA	Size (km^2)
1	43.70	21	9.80	41	7.60
2	11.60	22	2.65	42	9.00
3	62.60	23	11.80	43	7.70
4	5.35	24	29.00	44	1.70
5	24.75	25	7.20	45	4.80
6	66.90	26	20.75	46	33.60
7	7.00	27	16.00	47	501.30
8	31.20	28	28.40	48	31.90
9	13.70	29	25.40	49	38.20
10	34.20	30	64.50	50	26.10
11	34.50	31	129.70	51	37.30
12	31.90	32	69.45	52	11.40
13	11.50	33	19.90	53	42.90
14	4.60	34	7.00	54	33.10
15	36.20	35	78.95	55	16.60
16	12.20	36	44.60	56	24.80
17	61.40	37	58.10	57	323.10
18	4.75	38	70.70	58	150.30
19	2.50	39	27.70	59	53.00
20	21.90	40	5.10	60	268.50

9. Connectivity of reserves in the SPA system vs. the PCA system

	% Connected	% Not Connected
SPAs	19	81
PCAs	30	70

	% 100% Connected	% Not 100% Connected
SPAs	0	100
PCAs	7	93

	% >50% Connected	% Not >50% Connected
SPAs	0	100
PCAs	17	83

	% <10% Connected	% Not <10% Connected
SPAs	12	88
PCAs	3	97

10. (a) Length of ownership of PCAs, and (b) length of expected ownership

(a)

No. of years	No. of PCAs
< 1 - 2	7
3 - 5	17
6 - 8	8
9 – 11	9
12 - 14	6
15+	3

(b)

Expected Ownership (Years)	No. of owners
>= 20	36
< 20	11

11. (a) Profit-making status of PCAs, and (b) profit-making status of PCAs vs. length of ownership

(a)

Status	No. of PCAs
For Profit	23
Not for Profit	27

(b)

		Status	
		Not for Profit	For Profit*
Ownership Length (years)	<= 5	8	16
	6-11	8	9
	12+	3	6

* For Profit category here includes also PCAs intending to run for profit in the future

12. Presence of a management plan vs. (a) formality of PCA status, and (b) profit-making status of PCAs

(a)

		Status	
		Formal	Informal
Management plan	Yes	7	6
	No	19	17

(b)

		Status	
		Not for profit	For Profit*
Management plan	Yes	6	7
	No	21	16

* For Profit category here includes also PCAs intending to run for profit in the future

13. Presence of management goals vs. (a) formality of PCA status, and (b) profit-making status of PCAs

(a)

		Status	
		Formal	Informal
Management goals	Yes	12	15
	No	14	9

(b)

		Status	
		Not for profit	For Profit*
Management goals	Yes	14	11
	No	13	12

* For Profit category here includes also PCAs intending to run for profit in the future

14. Profit-making status of PCAs vs. economic motivations

		Status	
		Not for Profit	For Profit
Economic Score	Low (0-2)	21	5
	High (3-5)	5	15

15. Formality of PCA status vs. importance of property-rights security

PCA	Status[1]	Security Score[2]	PCA	Status[1]	Security Score[2]
1	1	4	26	2	0
2	2	0	27	2	2
3	1	5	28	2	4
4	2	3	29	2	1
5	2	0	30	1	4
6	1	0	31	1	4
7	1	3	32	2	3
8	1	0	33	1	5
9	1	3	34	1	2
10	1	0	35	2	0
11	2	5	36	1	5
12	1	4	37	1	2
13	2	3	38	1	4
14	2	2	39	1	5
15	2	2	40	2	0
16	2	0	41	1	0
17	2	3	42	2	0
18	2	1	43	1	3
19	1	5	44	1	2
20	2	4	45	1	0
21	1	5			
22	2	0			
23	2	3			
24	1	5			
25	1	5			

[1] Where 1 = Formal PCA, 2 = Informal PCA
[2] Where 0 = lowest score, 5 = highest score

16. Profit-making status of PCAs vs. formality of status

		Formal Status	
		Formal	Informal
Profit Status	For Profit*	20	11
	Not for Profit	7	14

* For Profit category here includes also PCAs intending to run for profit in the future

17. Formality of status vs. (a) expected duration of ownership, and (b) importance of formal recognition as an incentive measure

(a)

		Status	
		Formal	Informal
Expected duration (years)	<20	8	3
	>20	16	20

(b)

PCA	Status[1]	Recognition Score[2]	PCA	Status[1]	Recognition Score[2]
1	1	10	26	2	0
2	2	10	27	2	5
3	1	10	28	1	3
4	2	9	29	2	10
5	2	4	30	2	9
6	1	10	31	1	10
7	1	10	32	1	10
8	1	10	33	2	10
9	1	8	34	1	10
10	1	8	35	1	10
11	2	10	36	2	10
12	1	8	37	1	8
13	2	8	38	2	10
14	2	10	39	1	8
15	2	10	40	1	2
16	2	10	41	1	9
17	2	8	42	2	8
18	2	10	43	1	10
19	1	10	44	1	10
20	2	8	45	1	8
21	1	10	46	1	10
22	2	10			
23	2	5			
24	1	10			
25	1	0			

[1] Where 1 = Formal PCA, 2 = Informal PCA
[2] Where 0 = lowest score, 10 = highest score

APPENDIX I:

Questionnaire data

In a few cases, questions that may identify particular PCAs have either been excluded, or the relative data have been aggregated. Data relative to Question A3.1 (duration of PCAs) have been aggregated because knowing the year a PCA was initiated (in combination with the other information supplied, such as land-uses) could allow PCAs to be identified. The same holds true for Questions:

- A3.2: the relatively few cases of landowners converting from a previous land-use could make them easily identifiable, especially given the other information supplied, such as land-uses.
- A3.3: the few cases of landowners not intending to maintain their PCA for the foreseeable future (i.e. 20 years or longer) could make them easily identifiable, where others may be aware that a landowner is intending to sell in the near future or within a set time frame.
- A4.2: the relatively few instances of PCAs showing a profit could make them identifiable, in a sector where there is likely to be intense awareness and interest 'in the competition' by business-minded landowners. Especially in view of the sensitive nature of financial information, this data was aggregated.
- A4.6 & A4.7: the very few cases of PCAs showing either a significant total gross income or a significant total gross loss could make them identifiable, in a sector where there is likely to be intense awareness and interest 'in the competition' by business-minded landowners. Especially in view of the sensitive nature of financial information, this data was aggregated.
- C1.1: size data for PCAs was aggregated because specific information on size could make a PCA identifiable, especially for the few private reserves that are much larger than the others.

Please do not make use of this questionnaire data without prior permission of the author.

Section A – General Sectoral Information

A1. Tenure

A1.1 Ownership: Indiv = an individual or family; Co = a for-profit organisation e.g. a company; Oth = other.

PCA	Category	PCA	Category	PCA	Category	PCA	Category	PCA	Category
1	Individ	11	Individ	21	Individ	31	Individ	41	Individ
2	Individ	12	Individ	22	Individ	32	Oth	42	Oth
3	Individ	13	Individ	23	Individ	33	Individ	43	Individ
4	Individ	14	Individ	24	Co	34	Individ	44	Co
5	Individ	15	Co	25	Co	35	Individ	45	Co
6	Individ	16	Co	26	Individ	36	Co	46	Individ
7	Co	17	Individ	27	Co	37	Individ	47	Co
8	Individ	18	Co	28	Individ	38	Individ	48	Individ
9	Individ	19	Co	29	Individ	39	Individ	49	Individ
10	Individ	20	Co	30	Individ	40	Co	50	Co

A1.2 Management Authority: Own = the owners; Another = another individual/family; Co = for-profit organisation; Oth = other.

PCA	Category	PCA	Category	PCA	Category	PCA	Category	PCA	Category
1	Another	11	Owners	21	Owners	31	Owners	41	Owners
2	Other	12	Owners	22	Another	32	Another	42	Owners
3	No data	13	Owners	23	Another	33	Owners	43	Owners
4	Owners	14	Owners	24	Owners	34	Owners	44	Owners
5	Owners	15	Another	25	Owners	35	Owners	45	Owners
6	Another	16	Owners	26	Owners	36	Another	46	Owners
7	Another	17	Owners	27	Owners	37	Owners	47	Owners
8	Owners	18	Owners	28	Oth	38	Owners	48	Owners
9	Another	19	Owners	29	Another	39	Owners	49	Another
10	Another	20	Owners	30	Owners	40	Another	50	Owners

A2. Land use

A2.1 & A2.2 Land Use & Frequency: possible land-uses: W-VD = wildlife-viewing (daytime), W-VO = wildlife-viewing (overnight), GH = game hunting, GR = game ranching, F = livestock/game farming, A = agriculture, H = harvesting plants for sale, M = mining, PE = personal enjoyment, O = other. Most frequent two land-uses underlined.

PCA	Occasionally	Regularly	All the Time
1	W-VD		W-VO, PE
2	PE		
3	W-VO	PE	W-VD, A
4			PE, A, O[1]
5	WV-D, A	F, PE	O[1]
6	GH	PE	F, O[2]
7		GH, PE	A
8			PE, O[1]
9	PE		A, O[1]
10	WV-D, VW-O	GH, PE	GR, F, A
11	F, A, H	PE	
12	WV-D, WV-O, GH	PE	GR
13			PE
14	F	PE	WV-D, WV-O, A
15	GH	VW-D	F, PE
16			PE
17	A		WV-D, WV-O, PE, O[2]
18	GH, GR		PE
19		PE	
20		GH, PE	F
21			PE, A
22	GH, GR	WV-D, PE	
23	M		PE
24	WV-D, GH		PE
25		PE	F, A
26			F, A, PE, O[1]
27			WV-D, WV-O, GH, GR, F, A, PE
28	WV-D, VW-O	PE	F, A
29	VW-O	WV-D, GR, PE	
30			A, PE, O[1]
31		GH	F, A, PE
32		PE	WV-D, VW-O
33	GR	WV-D, WV-O, GH	PE
34			A, PE, O[1]
35			H, PE
36	PE		WV-O, A
37			F, PE
38	A	VV-D, WV-O, GH	PE, O
39	WV-D, WV-O, GH		GR, H, PE
40	M	PE	WV-D, WV-O
41		Oth	WV-D, WV-O, GR, PE
42		PE	
43	WV-D, WV-O, F	GH	GR, A, PE
44	WV-D, PE	GR, F	GH
45	WV-O, M		WV-D, PE, O[3]
46			A, PE
47	WV-D		WV-O, PE, O[2]
48		GR, PE	VW-D, VW-O, GH, F
49	WV-D, WV-O, H		A, F, O[1]
50			PE, O[2]

[1] Non-use; [2] Conservation; [3] Sale of products from PCA

A2.3 Land-use Change: N = No change; Y = change; M = maybe; +T = increase tourism; +C = increase conservation; GH = introduce game hunting; -F: scale down or eliminate farming; GR = introduce game ranching.

PCA	Change	PCA	Change	PCA	Change	PCA	Change	PCA	Change
1	N	11	Y: +C	21	N	31	Y: GR	41	N/A
2	N	12	Y: +T	22	Y: +T	32	N	42	N
3	Y: +T	13	N	23	M: +T	33	N	43	N
4	N	14	N	24	Y: GR	34	N	44	N
5	Y: +T	15	N	25	Y: +T	35	Y: +T	45	Y: +T
6	N	16	Y: GH	26	Y: +T	36	Y: +C	46	N
7	Y: +T	17	N	27	Y: +T	37	Y: +T	47	N
8	N	18	N	28	N	38	N	48	N
9	Y: +T	19	Y: GH, +T	29	Y: +T	39	Y: +T	49	Y
10	Y: +T	20	Y: -F	30	N	40	N	50	No Data

A3. Permanence

A3.1 Duration: length of ownership (years) [aggregated data].

Years	No of PCAs	Years	No of PCAs	Years	No of PCAs
< 1 - 1 year	3	6	4	11	3
2	4	7	3	12	3
3	5	8	1	13	1
4	5	9	3	14	2
5	7	10	3	> 15 years	3

A3.2 Previous land-use: duration of ownership vs. conversion to a PCA. Started = landowner started PCA on arrival; Converted = landowner already owned land and converted to a PCA from a previous land-use; Oth = other [aggregated data].

Conversion	No of PCAs
Started	35
Converted	10
Other	5

A3.3 Expected Duration: [aggregated data].

Years	No of PCAs
<5 years	3
5 - 10 years	2
15 - 20 years	2
20+ years	36
Don't know	4

A3.4 Factors Affecting Duration: scores 0-10; N/A = not applicable. PS = political stability; Reg = better government regulations or legislation; Help = receiving help from the government or other organisations; Ec = strong economy (in terms of the demand on the services provided by your PCA); Man = better management or organisation of the PCA; Wild = good protection of the natural wildlife; Sc = good protection of the natural scenery; 3rd = good relationships with third parties (e.g. industries); LC = good relationships with local communities; Oth = other; ND = no data. **Bold scores refer to the single most important factor.**

PCA	PS	Reg	Help	Ec	Man	Wild	Sc	3rd	LC	Oth
1	8	10	10	**10**	5	8	8	6	9	
2	8.5	N/A	6	N/A	N/A	**10**	10	N/A	N/A	
3	10	7	7	**10**	N/A	10	8	7	8	
4	**10**	8	5	10	10	10	10	10	10	
5	10	10	**10**	10	7	9	10	8	9	
6	8	8	5	8	N/A	**10**	10	8	10	
7	7	N/A	0	6	**7.5**	7	7	0	7	
8					No Data					
9	8	6	6	8	10	10	10	6	9	**10**[1]
10	7	5	8	8	5	10	**10**	5	10	
11	8	6	9	9	9	**9**	9	7	8	**8**
12	10	5	5	3	8	10	10	5	5	**10**[2]
13	**10**	10	0	0	10	10	10	10	10	
14	8	8	8	4	9	10	10	9	8	10
15	**10**	10	7	7	5	10	10	10	10	
16	8	4	7	10	6	10	10	0	**10**	
17	**10**	5	2	5	2	10	10	2	6	
18	8	**10**	0	0	10	10	5	0	8	

PCA	PS	Reg	Help	Ec	Man	Wild	Sc	3rd	LC	Oth
19	8	7	7	7	8	5	7	5	10	8
20	5	9	9	0	0	10	10	5	9	10
21	10	N/A	10	10	N/A	10	10	10	10	
22	10	7	5	8	8	8	8	5	5	
23	10[3]	7	6	6	8	8	8	4	4	
24	10	8	8	0	10	10	10	0	10	
25	10	7	10	10	10	10	10	5	8	
26	2.5	10	10	ND	10	10	10	N/A	10	
27	10	10	8	7	4	10	10	9	10	
28	7	3	2	2	2	10	10	2	5	
29	7	10	4	6	5	10	10	6	10	
30	9	7.5	6.5	N/A	5	7.5	7.5	N/A	N/A	9[4]
31	5	10	8	5	0	10	10	8	8	
32	8	5	0	9	6	10	10	7	9	
33	8	9	0	8.5	7	10	10	8.5	10	
34	6.5	6.5	8	5	7	8	8	N/A	7.5	10[5]
35	9	10	10	10	10	10	10	6	10	
36	9	8	9	9	5	8	8	7	9	
37	5	9	5	10	9	10	10	5	10	
38	8	4	7	10	6	10	10	0	10	
39	10	10	6	8	N/A	10	10	7	5	10[6]
40	10	10	10	10	6	6	10	7	6	
41	6	10	10	7	10	9	10	0	8	
42	8	0	7	0	0	10	10	5	7	
43	6	6	4.5	6.5	6.5	9	9	5	6	9.5[7]
44	10	4	4	8	4	8	8	5	5	
45	8	7	6	9	4	10	10	0	8	10[6]
46	10	10	5	10	5	10	10	N/A	10	10[8]
47	10	10	5	5	5	10	10	0	10	10[4]
48	10	8	0	9	0	9	9	9	9	
49	10	8	2	8	2	9	9	0	10	
50	8	5	10	5	5	7	10	6	6	

[1]Sustainable farming practices; [2]Total cost of running PCA; [3]Intended as 'land security from seizure'; [4]Good relationship with farming community; [5]Cooperation at all levels, between govt & landowners, and between landowners; [6]Assistance from conservation board/govt, in terms of listening/reacting to needs of landowners; [7]Owners' financial position; [8]Keeping area under-populated

A4. Finance

A4.1 Status: NP = not for profit; CL = to cover losses; F = not currently for profit, but in the future; D = for profit, in development phase; FO = for profit, fully operational.

PCA	Status	PCA	Status	PCA	Status	PCA	Status	PCA	Status
1	D	11	F	21	CL	31	FO	41	F
2	NP	12	NP	22	F	32	FO	42	NP
3	FO	13	NP	23	F	33	FO	43	D
4	FO	14	FO	24	F	34	D	44	D
5	NP	15	NP	25	CL	35	FO	45	D
6	F	16	NP	26	D	36	D	46	NP
7	CL	17	NP	27	D	37	FO	47	FO
8	NP	18	NP	28	NP	38	FO	48	FO
9	F	19	D	29	D	39	D	49	NP
10	CL	20	CL	30	NP	40	FO	50	F

A4.2 Profitability: Yes = PCA showed a profit over last financial year; No = PCA did not show a profit over last financial year; Breaks even = PCA broke even over last financial year [aggregated data].

Profit	No of PCAs
Yes	6
No[1]	16
Breaks even	1

[1] Main reason: development costs (7/16 PCAs)

A4.3 Future Profit: -100% = decrease by as much as 100%; -50% = decrease as much as 50%; S = stay the same; +50% = go up by as much as 50%; +100% = go up by as much as 100%; Oth = other; DK = don't know.

PCA	Profit	PCA	Profit	PCA	Profit	PCA	Profit	PCA	Profit
1	+50%	11	N/A	21	N/A	31	+50%	41	N/A
2	N/A	12	N/A	22	N/A	32	+50%	42	N/A
3	+100%	13	N/A	23	N/A	33	+100%	43	S
4	+50%	14	+50%	24	N/A	34	+50%	44	S
5	N/A	15	N/A	25	N/A	35	+50%	45	S
6	N/A	16	N/A	26	+50%	36	+50%	46	N/A
7	N/A	17	N/A	27	+50%	37	S	47	+50%
8	N/A	18	N/A	28	N/A	38	+50%	48	+100%
9	N/A	19	Oth	29	S	39	+100%	49	N/A
10	N/A	20	N/A	30	N/A	40	+50%	50	N/A

A4.4 Source of Income: Y = PCA is/will be main source of income; N = PCA not/won't be main source of income.

PCA	Income	PCA	Income	PCA	Income	PCA	Income	PCA	Income
1	N	11	N	21	N/A	31	N	41	Y
2	N/A	12	N/A	22	N	32	N	42	N/A
3	N	13	N/A	23	N	33	Y	43	N
4	Y	14	Y	24	N	34	N	44	N
5	N/A	15	N/A	25	N/A	35	N	45	N
6	N	16	N/A	26	Y	36	N	46	N/A
7	N/A	17	N/A	27	Y	37	N	47	Y
8	N/A	18	N/A	28	N/A	38	N	48	N
9	Y	19	N	29	N	39	Y	49	N/A
10	N/A	20	N/A	30	N/A	40	N	50	N

A4.5 Relative Profit: Y = running the PCA a more profitable use of the land; N = *running the* PCA not a more profitable use of the land; DK = don't know.

PCA	Profitabl	PCA	Profitabl	PCA	Profitabl	PCA	Profitabl	PCA	Profitabl
1	Y	11	N	21	N/A	31	Y	41	Y
2	N/A	12	N/A	22	Y	32	Y	42	N/A
3	No Data	13	N/A	23	Y	33	Y	43	Y
4	Y	14	N	24	N	34	DK	44	Y
5	N/A	15	N/A	25	N/A	35	N	45	Y
6	N	16	N/A	26	Y	36	Y	46	N/A
7	N/A	17	N/A	27	Y	37	Y	47	N
8	N/A	18	N/A	28	N/A	38	Y	48	N
9	N	19	Y	29	N	39	Y	49	N/A
10	N/A	20	N/A	30	N/A	40	Y	50	No Data

A4.6 Total Gross Income: in South Africa Rand, over the last financial year [aggregated data].

Gross Income Category	No of PCAs
None	21
Less than R100, 000	15
R100, 000 – R200, 000	3
R200, 000 – R500, 000	2
R500, 000 – R1 million	0
R1 million – R5 million	2
More than R5 million	0

A4.7 Total Gross Loss: in South Africa Rand, over the last financial year [aggregated data].

Gross Loss Category	No of PCAs
None	5
Less than R100, 000	18
R100, 000 – R200, 000	6
R200, 000 – R500, 000	7
R500, 000 – R1 million	0
R1 million – R5 million	5
More than R5 million	0

Section B – Motivations and Incentives

B1. Motivations

B1.1 Establishment: scores 0-5. ND = no data. Ec = to make money from tourism, game ranching and/or hunting; Con = to protect nature or the natural landscape; Soc = to help the local economy or community; Sec = to increase the security of your property rights to the land; Oth = other. **Bold scores refer to the most important reason.**

PCA	Ec	Con	Soc	Sec	Oth	PCA	Ec	Con	Soc	Sec	Oth
1	**5**	4	4	4		26	0	**5**	5	5	5
2	0	**5**	0	0		27	5	5	5	5	**5**[1]
3			ND			28	0	**5**	3	0	
4	0	**5**	2	5		29	3	**5**	5	2	
5	0	**4**	0	3		30	0	0	0	0	**5**[1]
6			ND			31	4	**5**	3	4	
7	0	4	2	0	**5**[1]	32			ND		
8	0	**5**	0	0	5[2]	33	4	5	**5**	1	
9	2	**5**	4	3	5[2]	34	0	**5**	3	4	
10	3	**5**	2	0		35	**5**	5	4	4	4
11	1	**5**	4	3	5[2]	36	4	**5**	4	3	
12	0	4	2	0	**5**[1]	37	3	**5**	3	5	
13	0	**5**	4	5		38	5	**5**	2	2	5
14	4	**5**	4	4		39	5	**5**	3	0	5
15	0	**5**	0	3		40	**5**	5	5	5	
16	0	**5**	2	2	5[1]	41	5	**5**	5	0	
17	0	**5**	3	2		42			ND		
18	0	**5**	0	0		43	2.5	5	3	2	**5**[1]
19	4	5	4	3	**5**[3]	44	4	4	3	4	**5**[4]
20	2	5	4	1	**5**[2]	45	2	4	4	**5**	4
21	0	**5**	5	5	5	46	0	5	3	0	**5**[1]
22	5	4	2	4	**5**[1]	47	0	**5**	4	0	
23	0	5	5	5	**5**[3]	48	1	**5**	0	0	
24	0	**5**	0	0		49	0	**5**	4	3	
25	3	5	3	3	**5**[1]	50	3	**5**	3	2	

[1]For personal enjoyment; [2]Conservation-related reason; [3]Personal gratification; [4]Sustainable agriculture

B1.2 Location choice:

PCA	Reasons	PCA	Reasons	PCA	Reasons
1	Distance to CT[1]	18	Already owned land; scenery; wildlife; close to other PAs	35	No Data
2	Scenery; wildlife[2]; close to other PAs; cultural features; cost	19	Distance to tourist destinations; scenery; wildlife	36	Scenery; already owned land
3	No Data	20	Wildlife; remoteness	37	No Data
4	No Data	21	No Data	38	Distance to CT; scenery; wildlife; cultural features; cost
5	Cost; scenery	22	Already owned part; cost; scenery	39	Scenery; cost
6	No Data	23	Distance to CT; scenery; cost	40	Distance to CT; lack of competition; scenery; ease of purchase
7	Belonged to family	24	Distance to CT; close to other PAs; scenery	41	Cost; peaceful; scenery; close to tourist routes; wildlife
8	Distance to schools; scenery; cost	25	No Data	42	No Data
9	No Data	26	No Data	43	Distance to CT; scenery; wildlife; close to tourist routes
10	Scenery	27	Distance to CT; scenery; wildlife	44	Wildlife; scenery; close to other PAs; cultural features
11	Already owned land	28	Wildlife; scenery; close to other PAs	45	Wildlife; scenery; close to tourist routes; cultural features; opportunity
12	Scenery; wildlife; distance to CT; cost	29	Scenery; wildlife	46	Distance to CT
13	Scenery; wildlife; close to other PAs	30	No Data	47	Scenery; close to tourist routes; wildlife
14	No Data	31	Already owned land	48	Already owned land; scenery; wildlife; close to tourist routes
15	Scenery; wildlife; close to other PAs	32	No Data	49	No Data
16	Distance to CT; wildlife; scenery; cost	33	Area with good recovery potential; scenery	50	Wildlife; distance to CT; scenery
17	Scenery; wildlife; close to other PAs; cost	34	No Data		

[1] Cape Town; [2] Includes either or both flora and fauna

B1.3 Protected Status: Y = would like formal legal status as a protected area; N = would not like formal legal status as a protected area; N/A = not applicable

PCA	Formal	PCA	Formal	PCA	Formal	PCA	Formal	PCA	Formal
1	Y	11	Y	21	Y	31	Y	41	Y
2	Y	12	Y	22	Y	32	No Data	42	Y
3	No Data	13	Y	23	Y	33	N	43	Y
4	Y	14	Y	24	Y	34	Y	44	N
5	Y	15	Y	25	Y	35	Y	45	N/A
6	No Data	16	N	26	Y	36	Y	46	Y
7	Y	17	Y	27	Y	37	Y	47	Y
8	Y	18	Y	28	Y	38	N	48	N
9	Y	19	Y	29	N	39	Y	49	Y
10	Y	20	Y	30	Y	40	Y	50	Y

B2. Incentives

B2.1 & B2.2 Assistance & Desired Assistance: NG = national government; PG = provincial government; LG = local government; EC = external consultants; U = universities; NGO = NGOs; Oth = Other. **Desired sources of assistance are highlighted in bold.**

PCA	Assist.	PCA	Assist.	PCA	Assist.	PCA	Assist.	PCA	Assist.
1	PG, LG	11	PG, LG, EC, **PG**	21	None	31	PG, **PG**	41	**Govt**
2	None	12	**PG, EC**	22	NG, **NG**	32	PG, **PG**	42	**U**
3	PG, EC, U	13	None	23	EC, PG, **EC**	33	EC, PG, U	43	PG, EC, U, **NG**
4	U	14	**PG**	24	None	34	None	44	NGOs
5	No Data	15	None	25	None	35	EC, PG, **PG**	45	EC, U, **PG**
6	**NGOs**	16	PG, EC, **NG**	26	**U**	36	**PG, NGOs**	46	PG, **PG**
7	EC, U	17	None	27	PG, **PG**	37	U, PG, **NG**	47	**PG, LG**
8	PG, **LG**	18	PG, EC	28	EC, U, **EC**	38	PG, EC, **NG**	48	None
9	**NG**	19	**PG, EC**	29	**PG**	39	*	49	**Govt**
10	None	20	NGOs, **LG, PG**	30	None	40	NG, PG, EC, U, NGOs	50	PG, **NGOs**

* All sources of assistance desired

B2.3 Incentives: scores 0-10. N/A = not applicable. DK = don't know. Tour = help with marketing tourism; Fin = financial help; Adv = management advice; Man = direct help with management activities; Dev = Extra development and/or use-rights to the land; Form = being formally recognised as a protected area; AI = help with alien plant control; Oth = other. **Bold scores refer to the single most valuable incentive.**

PCA	Tour	Fin	Adv	Man	Dev	Form	AI	Oth
1	**10**	10	8	9	7	10	9	
2	N/A	6	8	N/A	N/A	**10**	N/A	
3				No Data				
4	0	5	10	10	10	10	10	**10**[1]
5	0	8	8	9	8	9	**10**	9
6	0	**10**	7	8	0	10	10	
7	0	**10**	7	3	3	4	0	
8	2.5	10	8	**10**	0	10	8	
9	9	**10**	9	9	N/A	10	9	
10	10	**10**	7	10	0	10	10	
11	7	8	9	7	6	9	**10**	8
12	3	**8**	8	0	0	8	5	
13	0	0	10	0	0	**10**	10	
14	**10**	10	8	10	8	8	0	10
15	10	10	5	**10**	10	8	8	
16	10	10	0	9	0	10	10	**10**[2]
17	0	0	10	**10**	0	10	10	
18	0	0	**10**	0	0	10	10	
19	7	8	8	5	7	8	8	**9**[3]
20	2	10	5	5	0	10	9	**10**[4]
21	0	0	10	5	0	**10**	0	
22	10	**10**	4	10	8	8	0	
23	5	**10**	5	6	5	10	10	
24	0	5	5	0	0	10	10	
25	8	**8**	8	5	5	5	7	
26	10	10	10	10	N/A	10	10	
27	10	**10**	5	5	8	N/A	9	
28	0	7	**8**	4	0	0	0	
29	6	10	10	5	5	5	2	10
30	6.5	6	7	5	5	3	**9**	
31	10	**10**	8	10	10	10	0	
32	6	5	4	6	**8**	N/A	2	6
33	9.5	0	6	7	8	9	**10**	9
34	3.5	7	8.5	7	N/A	10	8	8
35	10	10	8	7	10	10	10	**10**[5]
36	8	8	8	5	6	**10**	8	
37	**10**	10	9	9	5	10	9	

PCA	Tour	Fin	Adv	Man	Dev	Form	Al	Oth
38	10	10	0	9	0	10	10	
39	10	8	10	10	4	10	10	10
40	10	6	1	2	8	8	10	
41	10	10	10	10	10	10	10	
42	7	10	2	10	0	10	8	10[5]
43	8	8	7	7	7	8	7	8
44	5	7	5	8	2	2	2	
45	8	10	9	7	3	9	0	10[6]
46	2	10	10	4	3	8	8	
47	10	10	6	10	0	10	10	
48	10	DK	DK	DK	DK	DK	DK	
49	5	0	8	10	0	10	8	10
50	8	10	9	10	5	8	10	

[1]To have property rights security increased; [2]Clearing confusion over land tax; [3]Specific subsidies; [4]Assistance with soil erosion & building access roads; [5]More understanding from conservation authorities; [6]Less bureaucracy

Section C – Conservation Performance

C1. Size

C1.1 Size: [aggregated data]

Size (ha)	No of PCAs
< 999	12
1, 000 - 3, 000	14
3, 000 - 5, 000	13
5, 000 - 15, 000	8
35, 000+	2

C1.2 Enlargement: Y = yes; N = no.

PCA	Enlarge	PCA	Enlarge	PCA	Enlarge	PCA	Enlarge	PCA	Enlarge
1	N	11	N	21	N	31	Y	41	N
2	N	12	Y	22	N	32	N	42	N
3	N	13	Y	23	Y	33	Y	43	Y
4	Y	14	N	24	Y	34	N	44	Y
5	N	15	Y	25	N	35	N	45	N
6	Y	16	N	26	N	36	N	46	N
7	Y	17	N	27	Y	37	N	47	N
8	N	18	N	28	N	38	Y	48	N
9	N	19	Y	29	Y	39	N	49	No Data
10	N	20	N	30	N	40	Y	50	N

C2. Management goals

C2.1 Management Plan: Y = yes; N = no.

PCA	Plan	PCA	Plan	PCA	Plan	PCA	Plan	PCA	Plan
1	N	11	Y	21	N	31	N	41	N
2	N	12	N	22	N	32	N	42	N
3	Y	13	N	23	Y	33	Y	43	N
4	N	14	N	24	Y	34	N	44	N
5	N	15	No Data	25	N	35	Y	45	Y
6	N	16	N	26	N	36	Y	46	N
7	N	17	N	27	N	37	N	47	N
8	Y	18	N	28	Y	38	Y	48	N
9	N	19	N	29	Y	39	Y	49	N
10	N	20	Y	30	N	40	Y	50	Y

C2.2 Management Goals: P = for plants; W = for wildlife; L = for landscape/scenery; R = other resources.

PCA	Goals	PCA	Goals	PCA	Goals	PCA	Goals	PCA	Goals
1	W	11	P, W, L	21	None	31	None	41	None
2	None	12	None	22	None	32	None	42	P, W
3	No Data	13	P, W, L, R	23	P, W, L	33	P, W	43	P, W, L, R
4	None	14	None	24	P, W, L	34	None	44	P, W, L
5	None	15	P, W, L	25	P, W	35	P, W, L	45	P, L
6	W, L	16	P, W, R	26	None	36	None	46	None
7	P, W	17	P	27	P, W	37	None	47	None
8	L	18	None	28	P, W	38	P, W, R	48	None
9	None	19	P, W, L, R	29	P, W, L	39	P, W	49	None
10	None	20	P, W, L	30	None	40	P, W, L	50	W

C2.3 Future Plan/Goals: Y = Yes; N = No; DK = don't know.

PCA	Goals	PCA	Goals	PCA	Goals	PCA	Goals	PCA	Goals
1	N	11	N/A	21	N	31	N	41	N
2	N	12	Y	22	Y	32	Y	42	N
3	No Data	13	No Data	23	N/A	33	N/A	43	Y
4	Y	14	Y	24	N/A	34	N	44	Maybe
5	Y	15	No Data	25	Y	35	N/A	45	N/A
6	Y	16	Y	26	N	36	No Data	46	Y
7	N	17	N	27	Y	37	Y	47	N
8	No Data	18	No Data	28	Y	38	N/A	48	DK
9	Y	19	Y	29	N	39	N/A	49	Y
10	Y	20	N/A	30	N	40	N/A	50	N/A

C2.4 (goals for) Non-indigenous Species: Y = Yes; N = No.

PCA	Goals	PCA	Goals	PCA	Goals	PCA	Goals	PCA	Goals
1	N	11	Y	21	N	31	Y	41	N
2	Y	12	Y	22	N	32	Y	42	N
3	Y	13	Y	23	Y	33	N/A	43	Y
4	N	14	N	24	Y	34	N	44	Y
5	Y	15	N	25	Y	35	Y	45	No Data
6	Y	16	Y	26	N	36	Y	46	Y
7	Y	17	Y	27	N	37	Y	47	No Data
8	Y	18	Y	28	Y	38	Y	48	N
9	N	19	Y	29	Y	39	Y	49	N
10	N	20	Y	30	N	40	N	50	No Data

C3. Management strategies

C3.1 & C3.5 & C3.6 & C3.7 & C3.11 & C3.12: Month = yes, at least once a month; 6 Months = yes, at least once every 6 months; Year = yes, at least once a year; N = no. AV = Alien Vegetation; M = monitoring; R = research; UI = use of scientific information; C = clearing; SM = species maintenance.

PCA	Month	6 Months	Year	N	Other
1			UI	AL, M, R, C, SM	
2				AV, M, R, UI, C, SM	
3	M	AV	UI	R, C, SM	
4	AV	C	UI	M, R, SM	
5		AV		M, R, UI, C, SM	
6	M, R	AV		C, SM	UI[1]
7		M		R, C	AV[1], UI, SM
8				R, C, SM	AV[1], M, UI[1]
9				AV [N/A], M, R, UI, C, SM	
10	M			AV [N/A], R, UI, C, SM	
11	AV			M, R, UI, C, SM	
12			AV	M, UI, C, SM	R
13			AV, M	R, UI, C, SM	
14			UI	AV [N/A], M, R, C, SM	
15			AV, SM	M, R, UI, C	
16		M	R	UI, C, SM	AV[1]
17		UI		R, C, SM	AV[1], M
18		AV	M, UI	R, C, SM	

PCA	Month	6 Months	Year	N	Other
19		AV, UI		M, R, C, SM	
20	AV, M, R, UI			C, SM	
21	M		UI	AV [N/A], R, C, SM	
22				AV, M, R, UI, C	
23	M, UI			R, C, SM	AV[1]
24	M		AV	R, IU, C, SM	
25		SM		M, R, UI, C	AV[1]
26				AV [N/A], M, R, UI, C, SM	
27	M	R		AV, UI, C, SM	
28				AV [N/A], M, R, UI, C, SM	
29	M, UI	AV		R, C, SM	
30				AV, M, R, UI, C, SM	
31			SM	AV [N/A], UI, C	M, R
32	M, UI	AV		R, C, SM	
33	AV, M	R	SM	C	UI[1]
34	UI, SM			AV, M, R, C	
35		AV	R	M, UI, C, SM	
36		AV		M, R, C, SM	UI[1]
37	AV			M, R, UI, C, SM	
38		M	R	UI, C, SM	AV[1]
39		AV, UI, C		R	M
40	M, R, UI			AV [N/A], C, SM	
41				M, R, C, SM	AV, UI
42	M			AV [N/A], R, UI, C, SM	
43	M	UI, SM	AV, R	C	
44			SM	AV, M, R, UI, C	
45		R		M, UI, SM	AV[1], C
46				AV [N/A], M, R, C, SM	
47	AV			R, UI, C, SM	M
48	M			AV, R, UI, C, SM	
49				AV [N/A], M, R, UI, C, SM	
50			AV	M, R, UI, C, SM	

[1] Indicates activities that take place 'as necessary' or 'opportunistically'

C3.2 & C3.3 & C3.4 & C3.9 & C3.10: Y = yes; N = no. Restoration = restoration programmes; Fire = fire regime; Poaching = anti-poaching patrols; Removal = species removal; Fencing = PCA fenced in.

PCA	Restoration	Fire	Poaching	Removal	Fencing
1	Y	Y	N (not nec.)	N	Y
2	N	N	N (not nec.)	N	Y
3	Y	N	Y (currently daily)	N	Y
4	Y	Y	N (not nec)	N	N (partly unf.)
5	N	N	N (not nec)	N	N (partly unf.)
6	Y	Y	Y (almost daily)	Y	Y
7	Y	N	N (too difficult)	N	Y
8	N	Y	Y (2-3 x year)	N	Y
9	Y	Y	N (not nec)	N	N (partly unf.)
10	N	N	Y (opportunistic)	N	Y
11	Y	N	N (too difficult)	N	Y
12	Y	N/A	Y (weekly)	N	Y
13	Y	N	N (too difficult)	N	Y
14	N	N	N (too difficult)	N	Y
15	Y	N	N (no details)	N	Y
16	Y	Y	Y (every few months)	N	Y
17	N	N/A	N (not nec)	N	Y
18	N	N	Y (3 x week)	N	Y
19	N	N	Y (1 x week)	N	Y
20	Y	N	N (not nec)	N	Y
21	Y	Y	N (not nec)	N	Y

PCA	Restoration	Fire	Poaching	Removal	Fencing
22	N	N	N (too costly)	Y	Y
23	Y	N	N (too diff)	N	Y
24	Y	N	N (not nec)	N	Y
25	Y	N	Y (irregular)	N	Y
26	N	Y	Y (1 x week)	N	Y
27	Y	N	Y (2-3 x week)	N	Y
28	Y	N	Y (regular)	N	Y
29	Y	Y	Y (1 x week)	N	Y
30	N	N	N (not nec)	Y	Y
31	Y	N	Y (1 x 2 weeks)	Y	Y
32	Y	N	Y (1 x 4-6 weeks)	N	Y
33	Y	Y	N (not nec)	N	Y
34	N	Y	Y (2-3 x month)	N	Y
35	Y	N	N (not nec)	N	Y
36	Y	N	N (too costly)	N	Y
37	Y	N	N (not nec)	N	Y
38	Y	Y	Y (1 x 2 months)	N	Y
39	Y	Y	Y (regularly)	N	Y
40	Y	N	Y (2 x week)	Y	Y
41	N	Y	Y	N	Y
42	Y	N	N (not nec)	N	Y
43	Y	Y	Y (1 x week)	N	Y
44	Y	N	Y	N	Y
45	Y	N	N (not nec)	N	Y
46	N	Y	N (not nec)	N	Y
47	Y	N	Y (irregular)	N	N
48	N	N	N (too infreq.)	N	Y
49	N	N	N (too diff)	N	Y
50	Y	N	N (too diff)	N	Y