

**The UNESCO MAB Programme in South Africa:  
Current challenges and future options relating to the  
implementation of Biosphere Reserves**

Inauguraldissertation

zur

Erlangung des akademischen Grades

Doctor rerum naturalium (Dr. rer. nat.)

an der Mathematisch-Naturwissenschaftlichen Fakultät

der Ernst-Moritz-Arndt-Universität Greifswald

vorgelegt von

Ruida Pool-Stanvliet

Geboren am 02.09.1959

in Malmesbury, South Africa

Greifswald, 08.10.2014

Dekan: Prof. Dr. Klaus Fesser

1. Gutachter: Prof. Dr. Susanne Stoll-Kleemann

2. Gutachter: Prof. Dr. Kobus Müller

Tag der Promotion: 8 October 2014

## **Dedication**

To my late father who believed in the power of education.

Also to:

Etienne – my loving husband who never stopped believing in me.

Mika – for being my grammatical whizz kid.

Emma – for all the high fives and moral support.

Jana – for playing house when I had to take leave of absence from home.

*“Who is the land? We are, but not less the meanest flower that blows.  
Land ecology discards at the outset the fallacious notion that the wild  
community is one thing, the human community another.”*

(Aldo Leopold: January 11, 1887 – April 21, 1948)

## ABSTRACT

The UNESCO Man and the Biosphere Programme has been active in South Africa for almost 20 years. The country currently has six designated biosphere reserves with a few sites in various stages of the nomination process. Within the South African context, agencies are using a series of seemingly different instruments to practice landscape-scale management. The UNESCO biosphere reserve concept sometimes finds it difficult to obtain prominence amongst these different landscape initiatives. Biosphere reserves are special sites wherein sustainable development is promoted. For this reason, the biosphere reserve concept has much to offer towards long-term sustainable social-ecological land management.

In our modern age of population growth, dwindling natural resources and a general disconnectedness of humans from nature due to large scale urbanization, there is an urgent need for innovative ways in which to showcase sustainable living practices. South Africa has limited natural, economic and social resources and therefore needs to prioritize where these resources could best be allocated.

This dissertation comprises the history of the MAB Programme in South Africa, as well as a multicase study on five existing biosphere reserves. Results from this study indicated that not all biosphere reserves are equally effective in their implementation of the three functions of biosphere reserves and that all biosphere reserves in South Africa face an uncertain future due to pressing challenges. Collective results of the multicase study as well as literature reviews were used to inform options for the future effective implementation of the MAB Programme in South Africa. Options that could contribute towards effective biosphere reserves include more sustainable funding support, and community-based demonstration projects.

In addition a new suite of criteria to inform the selection of future biosphere reserves was developed. Biosphere reserves need to be optimally located in order to secure long-term efficiency and effectiveness. These sites need to be representative of biodiversity, efficiently managed and persistent in the long run. Presently in South Africa, new sites for biosphere reserves are nominated in an ad hoc manner. Should their locations be selected discerningly, they offer many benefits to the South African social and environmental landscape that should be recognized and utilized. The final suite of selection criteria are structured according to four subsections, namely a general section that addresses national matters of general concern to the MAB Programme, and three sections covering the three biosphere reserve functions of conservation, sustainable development and logistic support.

This suite of biosphere reserve selection criteria for South Africa is being put forward for deliberation and discussion at local, provincial and national level. It has the potential to be of valuable assistance in selection processes for future effective and efficient biosphere reserves that will proudly earn their place in the South African landscape as ‘special places for people and nature’.

## ABSTRAKT

Das Programm „Mensch und Biosphäre“ der UNESCO wird seit fast 20 Jahren aktiv in Südafrika umgesetzt. Das Land verfügt zurzeit über sechs anerkannte Biosphärenreservate; außerdem befinden sich einige Standorte in den verschiedenen Phasen des Ernennungsprozesses. Im südafrikanischen Kontext wenden Behörden eine Reihe von scheinbar unterschiedlichen Instrumenten zum Praktizieren von Landschaftsplanung an. Die Durchsetzung des Konzepts der UNESCO-Biosphärenreservate erweist sich im Hinblick auf die unterschiedlichen Landschaftsplanungsinitiativen manchmal als schwierig. Biosphärenreservate sind besondere Orte mit Schwerpunkt auf nachhaltiger Entwicklung. Aus diesem Grund kann das Biosphärenreservatkonzept viel zur Förderung einer langfristig nachhaltigen sozio-ökologischen Raumnutzung beitragen.

In unserem modernen von Bevölkerungswachstum, versiegenden Naturressourcen und einer aufgrund von großräumiger Verstädterung allgemeinen Entfernung des Menschen von der Natur gekennzeichnetem Zeitalter besteht eine dringende Notwendigkeit für innovative Wege zur Erzielung von nachhaltigen Lebenspraktiken. Südafrikas natürliche, ökonomische und soziale Ressourcen sind begrenzt und das Land muss daher bei der Bestimmung, wie diese Ressourcen bestmöglich eingeteilt werden können, Schwerpunkte setzen.

Die vorliegende Dissertation umfasst die Geschichte des MAB-Programms in Südafrika sowie eine multiple Fallstudie zu fünf bestehenden Biosphärenreservaten. Die Ergebnisse dieser Studie zeigten, dass nicht alle Biosphärenreservate bei der Umsetzung der drei Funktionen von Biosphärenreservaten gleich effektiv sind und dass alle Biosphärenreservate in Südafrika aufgrund von dringenden Herausforderungen einer ungewissen Zukunft entgegensehen. Die gesammelten Ergebnisse dieser multiplen Fallstudie sowie aus Literaturrecherchen wurden dazu eingesetzt, Möglichkeiten für die zukünftige effektive Umsetzung des MAB-Programms in Südafrika zu stützen. Möglichkeiten, die zu effektiven Biosphärenreservaten beitragen könnten, sind unter anderem eine nachhaltigere finanzielle Unterstützung sowie gemeinschaftsbasierte Demonstrationsprojekte.

Außerdem wurde eine neue Folge von Kriterien zur Unterstützung der Auswahl von zukünftigen Biosphärenreservaten entwickelt. Biosphärenreservate müssen optimal angesiedelt werden, um Effizienz und Effektivität langfristig zu sichern. Diese Standorte müssen repräsentativ für Biodiversität und langlebig sein und außerdem effizient verwaltet werden. Derzeit werden in Südafrika neue Standorte für Biosphärenreservate auf Ad-hoc-Basis nominiert. Bei einer kritischen Auswahl der entsprechenden Standorte bieten die Reservate sowohl unter sozialen als auch Umweltaspekten einen umfangreichen Nutzen für Südafrika, der erkannt und genutzt werden sollte.

Die endgültige Folge von Auswahlkriterien ist nach vier Unterabschnitten strukturiert, und zwar einem allgemeinen Abschnitt, der nationale Angelegenheiten von allgemeinem Interesse im Hinblick auf das MAB-Programm angeht, sowie drei Abschnitten, die die drei Funktionen von Biosphärenreservaten, d. h. Bewahrung, nachhaltige Entwicklung und logistische Unterstützung, abdecken.

Diese Folge von Auswahlkriterien für Biosphärenreservate für Südafrika werden zur Beratung und Diskussion auf lokaler, Provinz- sowie nationaler Ebene bereitgestellt. Sie können sich in Auswahlprozessen für zukünftige effektive und effiziente Biosphärenreservate, die zurecht ihren Platz als ‚besondere Orte für Menschen und Natur‘ in der südafrikanischen Landschaft verdienen, potenziell als wertvolle Hilfe erweisen.

## SUMMARY

Planet Earth is home to more than seven billion *Homo sapiens* individuals and is at present experiencing an environmental crisis with insufficient natural resources to sustain the well-being of humanity. It is common knowledge that biological diversity is the very essence that sustains life on earth and forms the backbone of quality living conditions. However, people in general are increasingly becoming disconnected from nature. In our modern age there is an urgent need for innovative ways to deal with the conservation of biodiversity within the sphere of triple-bottom-line-inclusive sustainable development (addressing ecological, social, and economic dimensions). The UNESCO Man and the Biosphere Programme (MAB), as implemented through the biosphere reserve concept, offers such a mechanism.

The MAB Programme incorporates large landscapes that are internationally recognized as important sites for biodiversity conservation, but with a focus on social-ecological sustainable development. The first part of this dissertation comprises the history of implementation of the MAB Programme in South Africa. Based on information gathered through literature searches and a number of interviews with key people, the global origin of the MAB Programme and its implementation over the past few decades in South Africa was verified, while challenges and benefits to the country were highlighted.

South Africa has six designated biosphere reserves with varying degrees of effectiveness. At present new biosphere reserves get selected in an ad hoc way by groups of people convinced about the added value of the MAB Programme. There is a perceived lack of effective and efficient biosphere reserves in the country where the flow of benefits to local communities are being showcased. Therefore the need was identified to devise options for the future, more effective implementation of the MAB Programme in the country.

The research design of the dissertation encompassed a qualitative multicase study. The multicase study included five existing biosphere reserves, namely Kogelberg, Cape West Coast, Waterberg, Kruger to Canyons and Cape Winelands. The Kogelberg Biosphere Reserve is Africa's southernmost and oldest biosphere reserve, located in the Western Cape Province. The reserve comprises approximately 100 000 ha, including vast tracts of natural vegetation, important marine habitats, major wetland systems, five towns and various settlements, agricultural lands, commercial plantations and recreational resorts. The Cape West Coast Biosphere Reserve is a large expanse hugging the southernmost section of the western coastline of South Africa, with the West Coast National Park as a terrestrial core area and the seascape surrounding Dassen Island, about 15 km offshore, as a marine core. The Waterberg Biosphere Reserve is a vast, remote, serene expanse of breath-taking natural beauty, located in Limpopo Province, the northernmost province of South

Africa, and is the world's only Savanna biosphere reserve. The Kruger to Canyons Biosphere Region comprises the area from the Kruger National Park on the eastern boundary to the escarpment of the Drakensberg range in the south-west, including the well-known Blyde River Canyon as well as other smaller canyons. The Cape Winelands Biosphere Reserve encompasses wonderful geographical, biological and cultural diversity: from the high Cape Fold Mountains to deep river valleys, rolling hills, commercial forests, world-renowned wineries, small agricultural settlements and beautiful historical towns. Sections of the biosphere reserve form part of the extensive Cape Floral Region Protected Areas World Heritage Site.

A social science research methodology was followed with the main objective to provide a comparison between the five cases. A number of research tools were applied, including literature reviews, interview surveys, questionnaire surveys, unobtrusive content analysis and participant observations. Semi-structured and open-ended interviews were conducted with selected persons relevant to each biosphere reserve. The interviews were based on a set of questions distilled through a literature review process and aimed to investigate the effectiveness of the biosphere reserves. Despite different scores, there was not a major difference between the ratings of the five cases, mainly because all biosphere reserves in the country use more or less similar implementation guidelines. Data from interviews and questionnaire surveys were used to address problems and challenges faced by the biosphere reserves as well as to gather information on positive aspects related to biosphere reserve management. Collectively ranked lists of the challenges and positive aspects were generated.

Options for the future effective implementation of the MAB Programme included more sustainable funding support through the establishment of a National Biosphere Reserve Trust Fund; and demonstration projects such as small, co-managed communal areas ('community biospheres') that could serve as long-term projects, aimed at getting communities to understand the value of the biosphere reserve concept, to form an integral part of a specific biosphere reserve, to take part in collaborative management, and to facilitate the implementation of sustainable projects to the economic benefit of relevant communities.

Results of the multicase study provided an analysis of the strengths and weaknesses of existing biosphere reserves in the country. In addition to the results of the multicase study, relevant information was gathered from available literature to inform the drafting of a suite of biosphere reserve selection criteria for South Africa. A formal literature review was conducted on global biosphere reserve selection criteria. Because of the multidisciplinary, flexible and sometimes erratic nature of the biosphere reserve concept, the review touched on relevant topics, including

landscape-scale conservation, spatial prioritization, protected area selection processes and social-ecological systems.

Designing suites of selection criteria is not an easy process and has not been attempted by many countries. Although much has been published on aspects that need to be addressed for biosphere reserves to have a positive influence in the landscape, little work has been done on selection criteria for the optimal location of biosphere reserves. The biosphere reserve selection criteria for South Africa needed to be informed by existing biosphere reserves and needed the support of the biosphere reserve fraternity. Therefore methods used to obtain relevant information included literature searches; a national questionnaire; and four focus group sessions. All available knowledge, information and opinions, have been used to inform the suite of selection criteria. The final list included 44 criteria, divided into 25 Mandatory and 19 Evaluation criteria. The criteria were structured according to four subsections, namely a general section that addressed national matters of general concern to the MAB Programme, and three sections covering the three biosphere reserve functions of conservation, sustainable development and logistic support.

South Africa has excellent conservation related legislation as well as excellent strategies addressing pressing topics such as sustainable development and climate change. Biosphere reserves do not feature anywhere in the national system of legislation and policies. Although biosphere reserves get nominated with support from national government, each biosphere reserve is basically very much left on its own to find ways of successfully making a difference through implementation of the MAB Programme.

Within the South African context the MAB Programme could play a more prominent role in current government strategies related to poverty alleviation, environmental sustainability, social upliftment, transformation and economic development. The biosphere reserve concept should be realized as a valuable land management tool with which to integrate people and the environment in a manner that supports the country's natural and cultural conservation and sustainable development objectives while improving human well-being. This dissertation aimed to identify options for the future effective implementation of the MAB Programme. The newly devised suite of South African biosphere reserve selection criteria is being put forward for deliberation and discussion at local, provincial and national level. These criteria could be of valuable assistance in the selection processes for future effective and efficient biosphere reserves that could play an important role in landscape management in South Africa.

## ZUSAMMENFASSUNG

Der Planet Erde ist Heimat für mehr als sieben Milliarden Individuen der Spezies *Homo sapiens* und erlebt zurzeit eine Umweltkrise, in der sich die Naturressourcen als unzureichend erweisen, um das Wohlergehen der Menschheit zu erhalten. Es ist allgemein bekannt, dass Biodiversität das wesentliche Element darstellt, das das Leben auf der Erde erhält und das Rückgrat von qualitativen Lebensbedingungen bildet. Trotzdem entfernen sich Menschen im Allgemeinen mehr und mehr von der Natur. In unserem modernen Zeitalter besteht eine dringende Notwendigkeit für innovative Wege, um die Bewahrung von Biodiversität im Rahmen des Drei-Säulen-Modells für nachhaltige Entwicklung (unter Berücksichtigung der ökologischen, sozialen und ökonomischen Dimension) anzugehen. Das Programm „Mensch und Biosphäre (MAB)“ der UNESCO, wie durch das Biosphärenreservatkonzept umgesetzt, bietet einen solchen Mechanismus.

Das MAB-Programm beinhaltet beträchtliche Landschaften, die international als wichtige Orte für die Bewahrung von Biodiversität anerkannt sind, jedoch mit Schwerpunkt auf sozio-ökologisch nachhaltiger Entwicklung. Der erste Teil dieser Dissertation umfasst die Geschichte der Umsetzung des MAB-Programms in Südafrika. Auf der Grundlage von durch Literaturrecherchen und eine Reihe von Interviews mit wichtigen Akteuren gesammelten Informationen wurde der globale Ursprung des MAB-Programms und seine Umsetzung über die vergangenen Jahrzehnte in Südafrika verifiziert und die Herausforderungen und Nutzen für das Land wurden hervorgehoben.

Südafrika verfügt über sechs anerkannte Biosphärenreservate mit unterschiedlichen Effektivitätsgraden. Derzeit werden neue Biosphärenreservate auf einer Ad-hoc-Basis von Gruppen von Personen ausgewählt, die vom Mehrwert des MAB-Programms überzeugt sind. Es besteht ein wahrgenommener Mangel an effektiven und effizienten nationalen Biosphärenreservaten, bei denen der Nutzenfluss für lokale Gemeinschaften ersichtlich ist. Daher wurde der Bedarf festgestellt, Möglichkeiten für die zukünftige effektivere Umsetzung des MAB-Programms im Land zu erarbeiten.

Das Forschungsdesign der Dissertation beinhaltete eine qualitative multiple Fallstudie. Die multiple Fallstudie umfasste fünf bestehende Biosphärenreservate: Kogelberg, Cape West Coast, Waterberg, Kruger to Canyons und Cape Winelands. Das Biosphärenreservat Kogelberg ist Afrikas südlichstes und ältestes Biosphärenreservat und befindet sich in der südafrikanischen Provinz Westkap. Das Reservat erstreckt sich über ein Gebiet von ungefähr 100.000 Hektar, das ausgedehnte Abschnitte natürlicher Vegetation, wichtige Meereshabitats, bedeutende Feuchtgebietsysteme, fünf Städte sowie verschiedene Ansiedlungen, landwirtschaftlich genutztes Land, kommerzielle Anbaugelände sowie Erholungsgebiete umfasst. Das Cape West Coast Biosphärenreservat ist ein weit ausgedehntes Gebiet, das an den südlichsten Abschnitt von Südafrikas Westküste grenzt, wobei der West Coast

National Park die Kernlandzone und die etwa 15 km von der Küste entfernte, die Dassen-Insel umgebende Meereslandschaft die Kernmeereszone bilden. Das Biosphärenreservat Waterberg ist ein ausgedehntes, abgelegenes, ruhiges Gebiet von atemberaubender natürlicher Schönheit in der Provinz Limpopo, der nördlichsten Provinz Südafrikas, und ist das einzige Savannen-Biosphärenreservat der Welt. Die Biosphärenregion Kruger to Canyons umfasst das Gebiet vom Krüger-Nationalpark an der östlichen Grenze bis zu den Steilhängen der Drakensberg-Gebirgskette im Südwesten und schließt den bekannten Blyde River Canyon sowie andere kleinere Canyons ein. Das Biosphärenreservat Cape Winelands umschließt eine beeindruckende geografische, biologische und kulturelle Diversität: von den hohen Cape Fold Mountains über tiefe Flusstäler, sanfte Hügel, kommerziell genutzte Wälder, weltbekannte Weingüter bis hin zu kleineren Landwirtschaftsansiedlungen und wunderhübschen historischen Städten. Teile des Biosphärenreservats gehören zur weitläufigen, als Weltkulturerbe anerkannten Schutzregion Cape Floral.

Es wurde eine Methodologie der sozialwissenschaftlichen Forschung mit dem Hauptziel verfolgt, einen Vergleich zwischen den fünf Fällen bereitzustellen. Eine Reihe von Forschungsinstrumenten wurden eingesetzt, wie unter anderem Literaturrecherchen, als Interview durchgeführte Befragungen, als Fragebogen durchgeführte Befragungen, unaufdringliche Inhaltsanalyse sowie teilnehmende Beobachtungen. Es wurden semistrukturierte und offene Interviews mit ausgewählten, für jedes Biosphärenreservat wichtigen Personen geführt. Die Interviews basierten auf einem Satz Fragen, die durch einen Literaturrecherchenprozess herauskristallisiert wurden und darauf hinzielten, die Effektivität der Biosphärenreservate zu untersuchen. Trotz unterschiedlicher Benotungen bestand kein größerer Unterschied bei den Bewertungen der fünf Fälle, was in erster Linie darauf zurückzuführen ist, dass alle Biosphärenreservate im Land mehr oder weniger dieselben Umsetzungsrichtlinien anwenden. Daten aus Interviews und anhand von Fragebögen durchgeführten Umfragen wurden zum Angehen von Problemen und Herausforderungen, mit denen sich die Biosphärenreservate konfrontiert sehen, und zum Sammeln von Informationen zu den positiven Aspekten im Hinblick auf die Geschäftsführung der Biosphärenreservate verwendet. Es wurden gemeinsame Ranglisten zu den Herausforderungen und den positiven Aspekten erstellt.

Möglichkeiten für die zukünftige effektive Umsetzung des MAB-Programms waren unter anderem eine nachhaltigere finanzielle Unterstützung durch die Einrichtung eines Treuhandfonds für nationale Biosphärenreservate; und Demonstrationsprojekte, wie z. B. kleine, gemeinschaftlich verwaltete kommunale Gebiete („Gemeinschaftsbiosphären“), die als Langzeitprojekte dienen könnten und darauf hinzielen, bei Gemeinschaften ein Verständnis für den Wert des Biosphärenreservatkonzepts zu schaffen, um einen festen Bestandteil eines bestimmten

Biosphärenreservats zu bilden, um bei der kooperativen Verwaltung mitzuwirken und um die Umsetzung von nachhaltigen Projekten zum wirtschaftlichen Nutzen der betroffenen Gemeinschaften zu ermöglichen.

Die Ergebnisse der multiplen Fallstudie lieferten eine Analyse der Stärken und Schwächen von bestehenden Biosphärenreservaten im Land. Neben den Ergebnissen der multiplen Fallstudie wurden relevante Informationen aus der verfügbaren Literatur gesammelt und als Grundlage für den Entwurf einer Folge von Auswahlkriterien für Biosphärenreservate für Südafrika verwendet. Es wurde eine formale Literaturrecherche zu den globalen Auswahlkriterien für Biosphärenreservate durchgeführt. Aufgrund des multidisziplinären, flexiblen und manchmal unregelmäßigen Charakters des Biosphärenreservatkonzepts bezog sich die Recherche auf relevante Themen, wie Landschaftsplanung und Naturschutz, räumliche Priorisierung, Auswahlprozesse für Schutzgebiete sowie sozio-ökologische Systeme.

Die Erarbeitung von Folgen von Auswahlkriterien ist kein einfacher Prozess, der noch nicht von vielen Ländern unternommen wurde. Zwar gibt es viele Veröffentlichungen zu Aspekten, die berücksichtigt werden müssen, um einen positiven Einfluss von Biosphärenreservaten in der Landschaft sicherzustellen, doch nur wenige Arbeiten zu den Auswahlkriterien für den optimalen Standort von Biosphärenreservaten. Die Auswahlkriterien für Biosphärenreservate für Südafrika mussten auf der Grundlage der bestehenden Biosphärenreservate aufgebaut werden und erforderten die Unterstützung seitens der Gemeinschaft der Biosphärenreservate. Aus diesem Grund umfassten die Methoden, die zum Erhalt der maßgeblichen Informationen eingesetzt wurden, Literaturrecherchen, einen nationalen Fragebogen sowie vier Sitzungen mit Fokusgruppen. Die Gesamtheit des verfügbaren Wissens, der verfügbaren Informationen und Meinungen wurde als Grundlage für die Erarbeitung der Folge von Auswahlkriterien eingesetzt. Die endgültige Liste umfasste 44 Kriterien, aufgeteilt in 25 obligatorische und 19 Beurteilungskriterien. Die Kriterien wurden nach vier Unterabschnitten strukturiert, und zwar einem allgemeinen Abschnitt, der nationale Angelegenheiten von allgemeinem Interesse im Hinblick auf das MAB-Programm angeht, sowie drei Abschnitten, die die drei Funktionen von Biosphärenreservaten, d. h. Bewahrung, nachhaltige Entwicklung und logistische Unterstützung, abdecken.

Südafrika verfügt über eine ausgezeichnete Gesetzgebung zu Naturschutz sowie hervorragende Strategien zum Angehen von Themen wie nachhaltige Entwicklung und Klimawandel.

Biosphärenreservate kommen jedoch nirgendwo im nationalen Rahmenwerk der Gesetzgebung und Richtlinien vor. Obwohl Biosphärenreservate mit der Unterstützung der nationalen Regierung nominiert werden, wird jedes Biosphärenreservat im Wesentlichen sich selbst überlassen, um Wege zu finden, damit durch die Umsetzung des MAB-Programms etwas erreicht werden kann.

Im südafrikanischen Kontext könnte das MAB-Programm eine wesentlich prominentere Rolle bei den aktuellen Strategien der Regierung im Hinblick auf Abbau von Armut, Umweltnachhaltigkeit, soziale Verbesserung, Transformierung und wirtschaftliche Entwicklung spielen. Das Biosphärenreservatkonzept sollte als ein wertvolles Instrument der Raumnutzungsplanung erkannt werden, mit dem Menschen und Umwelt in einer Weise integriert werden können, die die Ziele des Landes im Hinblick auf Natur- und Kulturschutz sowie nachhaltige Entwicklung unterstützt und gleichzeitig das Wohlergehen der Menschen verbessert. Das Ziel dieser Dissertation war es, Möglichkeiten für die zukünftige effektive Umsetzung des MAB-Programms aufzuzeigen. Die neu erarbeitete Folge von Auswahlkriterien für südafrikanische Biosphärenreservate wird zur Beratung und Diskussion auf lokaler, Provinz- sowie nationaler Ebene bereitgestellt. Diese Kriterien für Biosphärenreservate könnten sich in Auswahlprozessen für zukünftige effektive und effiziente Biosphärenreservate potenziell als wertvolle Hilfe herausstellen, die eine wichtige Rolle in der Landschaftsplanung in Südafrika spielen könnten.

## TABLE OF CONTENTS

Dedication .....	i
ABSTRACT .....	iii
ABSTRAKT .....	v
SUMMARY .....	vii
ZUSAMMENFASSUNG .....	x
LIST OF FIGURES .....	xviii
LIST OF TABLES .....	xix
LIST OF ANNEXURES .....	xx
ACRONYMS & ABBREVIATIONS .....	xxi
<b>1 INTRODUCTION .....</b>	<b>1</b>
1.1 Research Questions .....	2
1.2 Research Design .....	3
1.2.1 Rationale for Research Design .....	4
1.2.2 Distinct Research Phases .....	5
1.3 Structure of the Dissertation .....	6
1.4 Background .....	7
<b>2 HISTORY OF THE UNESCO MAB PROGRAMME IN SOUTH AFRICA.....</b>	<b>11</b>
2.1 Origin and Early Development of the UNESCO MAB Programme .....	11
2.2 The MAB Programme in South Africa .....	13
2.2.1 The Era 1990 to 1999 .....	13
2.2.2 The Era 2000 to 2007 .....	15
2.2.3 The Era Since 2008 .....	17
2.3 The Biosphere Reserve Concept in Landscape Management in South Africa .....	18
2.4 Challenges with Implementation of the MAB Programme in South Africa .....	20
2.5 South African Biosphere Reserves: Existing and Proposed .....	22
<b>3 LITERATURE REVIEW .....</b>	<b>25</b>
3.1 Characteristics of Biosphere Reserves .....	25
3.1.1 What is a Biosphere Reserve .....	25
3.1.2 Biosphere Reserves in Relation to Living Landscapes and Social-ecological Systems ..	27
3.1.3 The Position of Biosphere Reserves in the South African Protected Area System.....	27
3.2 Spatial Location of Biosphere Reserves .....	29
3.2.1 Results .....	31
3.2.2 Discussion.....	33

3.3	Emerging Issues.....	39
3.4	Closing Remarks.....	41
4	METHODOLOGY .....	43
4.1	Basic Concepts .....	43
4.1.1	Effective Biosphere Reserves.....	43
4.1.2	Importance of Institutional Mechanisms.....	47
4.2	Multicase Study Methods .....	48
4.2.1	Unobtrusive Content Analysis.....	51
4.2.2	Interview Surveys.....	52
4.2.3	Questionnaire Surveys .....	53
4.2.4	Observations .....	54
4.3	South African Biosphere Reserve Selection Criteria Methods.....	54
4.3.1	National Questionnaire.....	55
4.3.2	Selected Focus Group Sessions.....	55
5	A MULTICASE STUDY OF FIVE BIOSPHERE RESERVES IN SOUTH AFRICA: INDIVIDUAL CASE STUDIES.....	57
5.1	South Africa's First Biosphere Reserve: A Case Study of the Kogelberg Biosphere Reserve	57
5.1.1	Overview .....	57
5.1.2	Description of the Kogelberg Domain.....	58
5.1.3	Inception of the Kogelberg Biosphere Reserve.....	61
5.1.4	Implementation of the Kogelberg Biosphere Reserve.....	64
5.1.5	Results.....	72
5.1.6	Discussion.....	76
5.1.7	Synopsis.....	78
5.2	Management Model for a Section of the South African Coastal Zone: A Case Study of the Cape West Coast Biosphere Reserve .....	79
5.2.1	Overview .....	79
5.2.2	General Description of the Cape West Coast.....	79
5.2.3	Inception of the Cape West Coast Biosphere Reserve .....	81
5.2.4	Features of the Cape West Coast Biosphere Reserve.....	83
5.2.5	Current Structure of the Cape West Coast Biosphere Reserve .....	86
5.2.6	Cape West Coast Biosphere Reserve Spatial Development Framework Plan .....	92
5.2.7	Challenges Facing the Cape West Coast Biosphere Reserve .....	92
5.2.8	Results.....	93

5.2.9	Discussion.....	96
5.2.10	Synopsis.....	97
5.3	The World’s Only Savanna Biosphere Reserve: A Case Study of the Waterberg Biosphere Reserve.....	97
5.3.1	Overview .....	97
5.3.2	Description of the Waterberg Biosphere Reserve Domain.....	98
5.3.3	Inception of the Waterberg Biosphere Reserve .....	104
5.3.4	Implementation of the Waterberg Biosphere Reserve.....	105
5.3.5	Dawning of a New Era .....	112
5.3.6	Results .....	115
5.3.7	Discussion.....	117
5.3.8	Synopsis.....	119
5.4	South Africa’s Most Remarkable Wildlife Tourist Destination: A Case Study of the Kruger to Canyons Biosphere Region.....	121
5.4.1	Overview .....	121
5.4.2	Description of the Kruger to Canyons Biosphere Region Domain .....	121
5.4.3	Inception of the Kruger to Canyons Biosphere Region.....	128
5.4.4	Implementation of the Kruger to Canyons Biosphere Region .....	129
5.4.5	Results .....	139
5.4.6	Discussion.....	141
5.4.7	Synopsis.....	142
5.5	A Sustainable Development Model for the Wine Lands of the Western Cape: A Case Study of the Cape Winelands Biosphere Reserve.....	143
5.5.1	Overview .....	143
5.5.2	Description of the Cape Winelands Biosphere Reserve Domain.....	144
5.5.3	Inception of the Cape Winelands Biosphere Reserve.....	148
5.5.4	Implementation of the Cape Winelands Biosphere Reserve .....	149
5.5.5	Results .....	155
5.5.6	Discussion.....	159
5.5.7	Synopsis.....	160
6	COLLECTIVE RESULTS OF THE MULTICASE STUDY .....	163
6.1	Introduction .....	163
6.2	Collective Results .....	163
6.3	Discussion.....	169
6.4	Closing Remarks.....	172

7	THE FUTURE OF THE UNESCO MAB PROGRAMME IN SOUTH AFRICA .....	174
7.1	Participation in Biosphere Reserve Management .....	176
7.2	Biosphere Reserve Selection Criteria for South Africa.....	179
7.2.1	National Questionnaire.....	183
7.2.2	Selected Focus Group Sessions.....	185
7.2.3	Discussion.....	186
7.3	Synopsis.....	195
8	CONCLUSION.....	198
	REFERENCES.....	203
	Eidesstattliche Erklärung.....	227
	Acknowledgements.....	228
	Annexure 1: Literature review on biosphere reserve criteria: Suites of criteria .....	229
	Annexure 2: List of components to be used in semi-structured interviews on the effectiveness of South African biosphere reserves.....	231
	Annexure 3: Questionnaire survey for stakeholders represented on the management entity of individual biosphere reserves .....	233
	Annexure 4: Questionnaire on Criteria for South African Biosphere Reserves.....	236
	Annexure 5: Results from semi-structured interviews on the effectiveness of the Kogelberg Biosphere Reserve .....	240
	Annexure 6: Results from semi-structured interviews on the effectiveness of the Cape West Coast Biosphere Reserve .....	242
	Annexure 7: Results from semi-structured interviews on the effectiveness of the Waterberg Biosphere Reserve .....	244
	Annexure 8: Lessons learnt and recommendations for the future of the Kruger to Canyons Biosphere Region from the Lessons Learnt Workshop in 2010.....	246
	Annexure 9: Results from semi-structured interviews on the effectiveness of the Kruger to Canyons Biosphere Region .....	248
	Annexure 10: Results form semi-structured interviews on the effectiveness of the Cape Winelands Biosphere Reserve .....	250
	Annexure 11: Significance rating of possible criteria.....	252

## LIST OF FIGURES

Figure 1: Proposed network of cluster biosphere reserves for the Fynbos Biome, South Africa.....	14
Figure 2: Location of biosphere reserves in South Africa .....	22
Figure 3: Realms of individual studies according to 59 full-text papers reviewed indicated in percentages as well as number of papers in brackets.....	32
Figure 4: Region or country of relevance to the 43 studies resulting from spatial prioritization literature, indicated in percentages as well as numbers of papers in brackets .....	33
Figure 5: Home country of 32 main authors resulting from spatial prioritization literature, indicated in percentages as well as number of authors in brackets .....	33
Figure 6: Location and extent of the Kogelberg Biosphere Reserve.....	58
Figure 7: Logo of the Kogelberg Biosphere Reserve .....	60
Figure 8: Location of the Cape West Coast Biosphere Reserve .....	80
Figure 9: Zonation of the Cape West Coast Biosphere Reserve .....	84
Figure 10: Structure of the Cape West Coast Biosphere Reserve Company .....	87
Figure 11: Logo of the Cape West Coast Biosphere Reserve .....	90
Figure 12: Logo of the Waterberg Biosphere Reserve.....	99
Figure 13: Zonation of the Waterberg Biosphere Reserve .....	100
Figure 14: New proposed extent and zonation of the Waterberg Biosphere Reserve .....	114
Figure 15: Logo and symbolism of the Kruger to Canyons Biosphere Region .....	122
Figure 16: Zonation of the Kruger to Canyons Biosphere Region.....	123
Figure 17: Relevance of Kruger to Canyons Biosphere Region to the Great Limpopo Transfrontier Park between South Africa, Mozambique and Zimbabwe .....	123
Figure 18: Location of the Cape Winelands Biosphere Reserve .....	144
Figure 19: Zonation of the Cape Winelands Biosphere Reserve .....	145
Figure 20: Structure of the Cape Winelands Biosphere Reserve Management Committee .....	151
Figure 21: Logo and rationale of the Cape Winelands Biosphere Reserve.....	154
Figure 22: Percentage effectiveness of South African Biosphere Reserves .....	164
Figure 23: In your opinion, is the biosphere reserve concept a valuable tool with which to do landscape management in South Africa? .....	165
Figure 24: In your biosphere reserve, do you think the designation is adding value to the area? ....	165
Figure 25: Is the organization that you represent in support of the biosphere reserve? .....	166
Figure 26: Are you of the opinion that the management entity of your biosphere reserve is doing a good job of managing the biosphere reserve effectively? .....	167
Figure 27: Do you truly agree with the statement 'biosphere reserves are special places for people and nature'? .....	167

## LIST OF TABLES

Table 1: Research questions and objectives .....	3
Table 2: Structure of dissertation listing components of individual chapters.....	7
Table 3: Primary Spatial Planning Categories according to the Bioregional Planning Policy of the Western Cape Province.....	16
Table 4: South African biosphere reserves .....	22
Table 5: Biosphere reserve functions and elements according to UNESCO .....	26
Table 6: List of UNESCO MAB documentation with relevance to biosphere reserve criteria .....	31
Table 7: Goals and objectives for effective biosphere reserves according to UNESCO.....	43
Table 8: Requirements for an effective biosphere reserve .....	47
Table 9: Details of unobtrusive content analysis for each individual case study .....	51
Table 10: Details of people interviewed in each biosphere reserve case study.....	52
Table 11: Details of people who completed the questionnaire survey for each biosphere reserve case study.....	53
Table 12: Reasons for supporting the Kogelberg Biosphere Reserve nomination process.....	63
Table 13: Kogelberg Biosphere Reserve collective ranking of list of problems/challenges .....	73
Table 14: Kogelberg Biosphere Reserve collective ranking of list of positive elements.....	74
Table 15: Cape West Coast Biosphere Reserve: Themes, goals and objectives .....	88
Table 16: Closed and ongoing projects of the Cape West Coast Biosphere Reserve .....	91
Table 17: Cape West Coast Biosphere Reserve collective ranking list of problems/challenges .....	94
Table 18: Cape West Coast Biosphere Reserve collective ranking list of positive elements.....	95
Table 19: System of categories and zoning as applied by the Waterberg Biosphere Reserve.....	109
Table 20: Waterberg Biosphere Reserve collective ranking of list of problems/challenges .....	116
Table 21: Waterberg Biosphere Reserve collective ranking of list of positive elements .....	117
Table 22: Kruger to Canyons Biosphere Region original classification of Transition Zones .....	124
Table 23: Kruger to Canyons Biosphere Region list of species, endemics and red data status.....	125
Table 24: Projects implemented in the Kruger to Canyons Biosphere Region .....	131
Table 25: Kruger to Canyons Biosphere Region collective ranking of list of problems/challenges....	140
Table 26: Kruger to Canyons Biosphere Region collective ranking of list of positive elements.....	141
Table 27: Cape Winelands Biosphere Reserve collective ranking of list of problems/challenges.....	156
Table 28: Cape Winelands Biosphere Reserve collective ranking of list of positive elements.....	157
Table 29: Results on effectiveness of South African biosphere reserves .....	163
Table 30: Collective ranking of list of problems/challenges .....	167
Table 31: Collective ranking of list of positive elements .....	168
Table 32: Principles of good governance and how it relates to South African biosphere reserves ...	182
Table 33: Challenges to the effective management of South African biosphere reserves .....	184

Table 34: Aspects important to the efficient running of a South African biosphere reserve.....	185
Table 35: Suite of South African biosphere reserve selection criteria.....	190
Table 36: Description of South African biosphere reserve selection criteria .....	192

## LIST OF ANNEXURES

Annexure 1: Literature review on biosphere reserve criteria: Suites of criteria .....	229
Annexure 2: List of components to be used in semi-structured interviews on the effectiveness of South African biosphere reserves .....	231
Annexure 3: Questionnaire survey for stakeholders represented on the management entity of individual biosphere reserves .....	233
Annexure 4: Questionnaire on Criteria for South African Biosphere Reserves .....	236
Annexure 5: Results from semi-structured interviews on the effectiveness of the Kogelberg Biosphere Reserve .....	240
Annexure 6: Results from semi-structured interviews on the effectiveness of the Cape West Coast Biosphere Reserve .....	242
Annexure 7: Results from semi-structured interviews on the effectiveness of the Waterberg Biosphere Reserve .....	244
Annexure 8: Lessons learnt and recommendations for the future of the Kruger to Canyons Biosphere Region from the Lessons Learnt Workshop in 2010 .....	246
Annexure 9: Results from semi-structured interviews on the effectiveness of the Kruger to Canyons Biosphere Region .....	248
Annexure 10: Results form semi-structured interviews on the effectiveness of the Cape Winelands Biosphere Reserve .....	250
Annexure 11: Significance rating of possible criteria.....	252

## ACRONYMS & ABBREVIATIONS

ANC	African National Congress
C.A.P.E.	Cape Action for People and the Environment
CBD	Convention on Biological Diversity
CEBC	Centre for Evidence-Based Conservation
CFR	Cape Floristic Region
CNC	Cape Nature Conservation
CWBR	Cape Winelands Biosphere Reserve
CWCBR	Cape West Coast Biosphere Reserve
DA	Democratic Alliance
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DEAT	Department of Environmental Affairs and Tourism
DED	German Development Service
EMF	Environmental Management Framework
EXCO	Executive Committee
FAO	Food and Agriculture Organization
GEF	Global Environment Facility
GIZ	German Society for International Cooperation (Deutsche Gesellschaft für Internationale Zusammenarbeit)
GoBi	German Governance of Biodiversity Project
GTZ	German Organisation for Technical Cooperation (Deutsche Gesellschaft für Technische Zusammenarbeit)
ICC	International Coordinating Council
IUCN	International Union for the Conservation of Nature
JANIS	Joint ANZECC/MCFFA National Forest Policy Statement Implementation Subcommittee
K2C	Kruger to Canyons Biosphere Region
KBR	Kogelberg Biosphere Reserve
KBRC	Kogelberg Biosphere Reserve Company
KOBIO	Kogelberg Biosphere Association
LEDET	Limpopo Department of Economic Development, Environment and Tourism
LTER	Long-term ecological research
MAB	Man and the Biosphere Programme of UNESCO

MAP	Madrid Action Plan
MELISSA	Managing the Environment Locally in Sub-Saharan Africa
MPA	Marine Protected Area
MTPA	Mpumalanga Parks and Tourism Agency
NDP	National Development Plan
NEMA	National Environmental Management Act
NEM:BA	National Environmental Management Biodiversity Act
NEM:PAA	National Environmental Management Protected Areas Act
NEPAD	New Partnership for Africa's Development
NGO	Non-governmental Organization
NPC	National Planning Commission
PSDF	Provincial Spatial Development Framework
SANBI	South African National Biodiversity Institute
TFCA	Transfrontier Conservation Area
UK	United Kingdom
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational Scientific and Cultural Organization
VBR	Vhembe Biosphere Reserve
WBR	Waterberg Biosphere Reserve
WBRC	Waterberg Biosphere Reserve Company
WCED	World Commission on Environment and Development
WNBR	World Network of Biosphere Reserves

# 1 INTRODUCTION

*“It is not simply nostalgia for a romantic and rural past that causes us to grieve over the loss of natural open space. It is a concern over the loss of human values. For we are not distinct from nature; we are a part of it, and so far as our places are degraded, we too will be degraded” (Alan Grussow, 1972. A Sense of Place: The Artist and the Land. p. 27)*

The introduction of new concepts that could open up vast opportunities always results in exciting times. Such was the feeling when the Man and the Biosphere (MAB) Programme of UNESCO (United Nations Educational, Scientific and Cultural Organization) was introduced in South Africa in the late 1980s. A mutual feeling of expectation was shared amongst conservationists, spatial planners and community members.

The implementation of UNESCO’s MAB Programme and the resultant biosphere reserve concept is relatively new to South Africa, with the first biosphere reserve only proclaimed in 1998. Currently South Africa has six designated biosphere reserves.

Although the title refers to ‘reserve’, biosphere reserves are much more than merely protected areas. They truly are *“special places for people and nature”* (UNESCO 2002a) and encapsulate the ideas on sustainable development and conservation as expressed at the Rio Conference through documents such as the Convention on Biological Diversity and Agenda 21. In addition, the application of UNESCO’s MAB Programme is increasingly being considered as an effective tool for the implementation of bioregional planning principles. The biosphere reserve concept thus comprises a wide range of issues and is inclusive by nature, thereby addressing not only biodiversity conservation, but also the social, economic and cultural aspects of a given region.

The biosphere reserve concept is therefore an ideal tool to be used for socially inclusive landscape management in South Africa. Despite the usefulness of the biosphere reserve concept towards promoting sustainable development, it still enjoys very limited visibility in the country. This problem is linked to the support demonstrated at both provincial and national level for other initiatives that are mostly very closely aligned with the biosphere reserve concept and are commonly referred to as landscape initiatives. This research study includes a comparative analysis of five existing biosphere reserves in South Africa with respect to individual performance, challenges, effectiveness and added value. Results obtained from these five case studies were used to outline future options for the implementation of the MAB Programme in the country in a more beneficial way. Since it is important for biosphere reserves to be optimally located in the landscape in order to be truly effective, the results of the multicase study as well as that of an in-depth literature review were used in an additional scientific process to devise a suite of criteria with which to evaluate new sites for nomination to UNESCO as biosphere reserves. The main objective was to differentiate between

biosphere reserves and other landscape initiatives, to strengthen the usefulness of the biosphere reserve concept in landscape management, and thus confirm the notion that biosphere reserves are indeed 'special places'.

## 1.1 Research Questions

Research questions sometimes present themselves through experience or through theoretical concern (Robson 2002). This was the case for this research study, as the researcher has considerable experience in dealing with the research topic of biosphere reserves and has an inherent concern for the successful implementation of the MAB Programme in South Africa. Given this context, the primary research question of the dissertation was the following:

How can challenges and success factors related to the current implementation of the MAB Programme in South Africa inform a scientific process to devise future options for the more effective implementation of the Programme in future?

The secondary research questions, implemented to obtain scientific information as a basis for the main question, were:

1. How has the UNESCO MAB Programme been implemented in South Africa since its introduction to the country?
2. How does the effectiveness of biosphere reserve implementation in five sites compare?
3. How could scientific information gained from a multicase biosphere reserve study be used to inform the process of devising future options for the MAB Programme in South Africa?

Specific research objectives related to the research questions were as follows:

1. To research and verify the history of the UNESCO MAB Programme in South Africa.
2. To research, analyze and compare successes and challenges of five existing biosphere reserves in South Africa.
3. Based on lessons learned from existing biosphere reserves, to research, devise and propose future options for implementing the MAB Programme in South Africa and achieve effective biosphere reserves.

The research questions and objectives are listed in Table 1.

The following statement formed the point of departure:

The UNESCO biosphere reserve concept is beneficial in the South African context, because:

1. it is a unique category of landscape conservation and differs from other landscape initiatives including protected areas;
2. it focuses more on socially-inclusive environmental management than other landscape initiatives including protected areas;
3. it provides for a collaborative institutional structure;
4. it provides a tool to link biodiversity conservation to socio-economic issues;
5. it is compatible with bioregional planning and strengthens municipal planning processes.

**Table 1: Research questions and objectives**

PRIMARY RESEARCH QUESTION		
How can challenges and success factors related to the current implementation of the MAB Programme in South Africa inform a scientific process to devise future options for the more effective implementation of the Programme in future?		
SECONDARY RESEARCH QUESTIONS		
1. How has the UNESCO MAB Programme been implemented in South Africa since its introduction to the country?	2. How does the effectiveness of biosphere reserve implementation in five sites compare?	3. How could scientific information resulting from the multicase study be used to inform the process of devising future options for the MAB Programme in South Africa?
↓ ↓ ↓		
RESEARCH OBJECTIVES		
1. To research and verify the history of the UNESCO MAB Programme in South Africa.	2. To research, analyze and compare successes and challenges of five existing biosphere reserves in South Africa.	3. Based on lessons learned from existing biosphere reserves, to research, devise and propose future options for implementing the MAB Programme in South Africa and achieve effective biosphere reserves.

## 1.2 Research Design

Biosphere reserves are special places where sustainable development is supported and active integration of biodiversity conservation, socio-economic development and research is being promoted (UNESCO 1996a). Biosphere reserves therefore differ in their make-up and intent from traditional protected areas. After much deliberation with protected area management institutions and other landscape-scale conservation initiatives, it was decided that the time is opportune to research and investigate future options for biosphere reserves and thus determine the niche of the

MAB Programme in the South African landscape management system. Such options would need to be based on research results obtained through analyzing the data accumulated through empirical studies of existing biosphere reserves.

### **1.2.1 Rationale for Research Design**

Biosphere reserves are “*areas of terrestrial and coastal/marine ecosystems or a combination thereof, which are internationally recognized within the framework of UNESCO’s Programme on Man and the Biosphere*” (UNESCO 1996a).

Closer to home in South Africa, biosphere reserves are implemented as a specific type of landscape initiative, contributing to the ever-expanding system of protected areas in the country. Although the UNESCO MAB Programme has been implemented in South Africa since the early 1990s, not much has been published on South African biosphere reserves in the formal literature.

The importance of protected areas to humankind has been the topic of much discussion over the last few decades, specifically at the World Parks Congresses in Bali, Indonesia in 1982; Caracas, Venezuela in 1992; and Durban, South Africa in 2002. A general notion emerged that the traditional way of managing protected areas should change to include a more people-oriented approach. The importance of partnerships and relations with people in managing protected areas, termed adaptive co-management, has been proved to be non-negotiable (Beresford & Phillips 2000; Berkes 2009; Hamin 2001; Sandström 2008; Stoll-Kleemann & O’Riordan 2002; Stoll-Kleemann & Welp 2008). Biosphere reserves incorporate people-oriented co-management approaches.

Today modern men face dramatic challenges due to uncontrollable and sometimes irreversible occurrences such as global warming resulting in the biodiversity extinction crisis. The world today needs pristine benchmark sites that can keep reminding us of the true natural wealth of our planet.

We do not however live in a pristine world. We inhabit a planet that has to support more than seven billion people and is finding it more and more difficult to do so with the constant increase in consumptive utilization. It is widely recognized that the global population increase has a marked influence on the environment. It is also a well-known fact that biological diversity is the very essence that sustains life on earth and forms the backbone of quality living conditions (Stanvliet & Parnell 2006; Stoll-Kleemann & Job 2008). It has thus become important to think differently about safeguarding biodiversity and ecological systems through promoting sustainable development.

UNESCO’s World Network of Biosphere Reserves (WNBR) includes 621 sites in 117 countries, including South Africa (UNESCO 2013). New locations for biosphere reserves in South Africa get selected in a random way based on a number of factors including threats to the landscape and

biodiversity, value as a land-use planning tool, presence of interested communities, political buy-in and stakeholder support. This practice has led to a situation where some of the existing biosphere reserves are less efficient than others in fulfilling the three functions, as prescribed by UNESCO's guidelines (of conservation, sustainable development and logistic support) and in some of South Africa's nine provinces<sup>1</sup>, stronger support is shown for the MAB Programme than in others. This notwithstanding, the value of the MAB Programme is acknowledged and support is growing for the effective selection of biosphere reserves that have the potential to showcase sustainable development.

The research that culminated in this dissertation contributes to fulfilling a need for relevant information on the effective implementation of the MAB Programme and the selection of sites for future biosphere reserves in South Africa. Interest groups for the various research reports include but are not limited to academic colleagues both local and abroad; policy makers, specifically within the protected area and spatial planning fraternities; practitioners of the biosphere reserve concept; and potential funders of studies related to the MAB Programme.

### 1.2.2 Distinct Research Phases

This research study was executed in a number of distinct, consecutive phases:

- i. Very little has been formally published about the implementation of the MAB Programme and the efficiency of individual biosphere reserves in South Africa. In order to provide a place of departure and a broad basis for this study, the history of the MAB Programme's implementation has been researched and verified as the first research phase. The qualitative research process comprised data collection techniques, including literature and document reviews related to the implementation of the MAB Programme in the country, and a number of in-person interviews as well as verbal interactions with key people. This historical section details the early implementation of the biosphere reserve concept and its evolution throughout the last number of years to a more inclusive landscape management framework. Specific emphasis was placed on finding out the challenges and benefits of the MAB Programme with respect to South Africa as a developing country, as well as providing a view on the future of the MAB Programme in South Africa.
- ii. Although much literature was consulted during the various research phases, an in-depth literature review was conducted as the second research phase. The review brought about deeper insight and a conceptual reflection of the issues at hand and provided information on which the subsequent research phases, particularly the fourth phase, were based. The

---

<sup>1</sup> South Africa is divided into nine provinces, namely the Western Cape, Eastern Cape, Northern Cape, North West, Free State, KwaZulu-Natal, Mpumalanga, Gauteng and Limpopo.

- literature review covered a range of relevant topics including landscape-scale conservation, spatial prioritization, protected area selection processes and social-ecological systems.
- iii. A multicase study (Derthick 1972; Stake 2006) on South African biosphere reserves was conducted as the third research phase with the view of understanding the current implementation, and deliberating about future options for the more successful and effective implementation of the MAB Programme in the country. The multicase investigation consisted of five individual case studies on the Kogelberg, Cape West Coast, Waterberg, Kruger to Canyons and Cape Winelands Biosphere Reserves. A social science research methodology was followed with respect to the multicase study.
  - iv. The fourth research phase followed a qualitative research process to devise future options relating to implementation of the MAB Programme, and concluded with a suite of biosphere reserve selection criteria for South Africa. Information resulting from the literature review and multicase study informed this process. In addition the research process included focus group sessions with the South African biosphere reserve fraternity.

### 1.3 Structure of the Dissertation

The dissertation is organised into eight main chapters which are subdivided into sections and subsections. Chapter 1 provides a brief introduction to the dissertation, followed by the research questions, goals and objectives. Subsequent sections of this chapter investigate and describe the research design, including the four distinct research phases, followed by the structure of the dissertation and a brief background section. In Chapter 2 the first research phase, i.e. the global origin of the MAB Programme and the history of its implementation in South Africa is described. This chapter also includes information regarding the position of the MAB Programme and biosphere reserves as landscape management entities in South Africa. A formal literature review on relevant aspects relating to biosphere reserves throughout the world was conducted as the second research phase. The literature review is detailed in Chapter 3. The methodology of the entire research study is explained in Chapter 4, including the specific methods that were repeatedly applied in the multicase study, comprising five individual case studies on selected biosphere reserves. The third research phase comprized the multicase study that is analyzed in Chapter 5, whereas collective results of the multicase study are discussed in Chapter 6. Chapter 7 deals with new thinking related to future options and the selection of new biosphere reserves in South Africa. Based on all information obtained through the multicase study and literature review, a new suite of biosphere reserve selection criteria was devised for South Africa. This represented the fourth research phase. The last chapter, Chapter 8, contains the culmination of the dissertation and the final conclusion.

Components of the chapters are summarized in Table 2.

**Table 2: Structure of dissertation listing components of individual chapters**

CHAPTER		COMPONENTS OF CHAPTER	RESEARCH QUESTIONS AND OBJECTIVES	RESEARCH PHASES
1	Introduction	Problem statement; research questions; research objectives; rationale of the research design; research phases; dissertation structure; background		
2	History of the MAB Programme in South Africa	Global origin of MAB; implementation in South Africa since 1990; biosphere reserves in landscape management; challenges and benefits of the Programme in South Africa	Secondary question 1 Research objective 1	First research phase
3	Literature Review	Background; methods of how the literature review was conducted; results; discussion		Second research phase
4	Methodology	Basic concepts; detailed methods of the multicase study; methods of selection criteria		
5	Multicase Study of five Biosphere Reserves	Details of individual case studies of five biosphere reserves included in the multicase study: Kogelberg; Cape West Coast; Waterberg; Kruger to Canyons; Cape Winelands	Secondary question 2 Research objective 2	Third research phase
6	Collective Results of the Multicase Study	Collective results of the multicase study: comparing the five individual cases	Secondary question 2 Research objective 2	
7	The Future of the UNESCO MAB Programme in South Africa	Overview; participation in biosphere reserve management; suite of South African biosphere reserve criteria	Secondary question 3 Research objective 3	Fourth research phase
8	Conclusion	Concluding the dissertation		

## 1.4 Background

This research study focused on the use of the MAB Programme through its implementation in biosphere reserves as a land management tool to ensure sustainable development in South Africa. Sustainable development, as defined during the United Nations Conference on Environment and Development in 1991, is *“the ability to meet the needs of the present without compromising the ability of future generations to meet their own needs”* (WCED 1987). South Africa defines sustainable development in some more detail as *“the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations”* (NEMA No. 107 of 1998). In 2003, the United Nations Secretary-General Kofi Annan reminded the world that *“biological diversity is essential for human existence and has a*

*crucial role to play in sustainable development and the eradication of poverty*" (CBD Secretariat 2003).

Worldwide there are growing concerns over the continuing loss of biological diversity. As far back as 1972, Alan Grussow pointed out that humans are part of nature (Grussow 1972, p. 27). This was emphasized by Kellert (1996) in stating that people in general depend on a relationship with nature and living diversity to achieve lives rich in meaning and value. Dasmann (1972) noted that "*major segments of the World's biota may be lost through failure to establish even a minimum degree of protection*". According to Al Gore "*the global environment crisis is as real as rain*". Diamond (2003) stated that human needs and the environment are "*inexorably linked*". Nonetheless, modern society has embraced a dangerous illusion in coming to believe it can live apart from nature (Kellert 1996).

It is projected that Africa will be the fastest growing region in the World, and its share of the World's population will increase from approximately 15 per cent to almost 21 per cent (Faaland 1982; UN 2001). The African population is projected to more than treble, from 470 million in 1980 to 1 544 million in 2025 (Tabah 1982; Devas & Rakodi 1993). Numerous communities in Africa suffer extensively from poverty and a resultant lack in quality of life. Impoverishment usually results in environmental deterioration (Steinberg & Miranda 2005). Very few modern communities can claim that they are remotely sustainable, even despite the age old practice of subsistence living in certain societies. Thus, the greatest need for humankind is to realize the ecological constraints of the environment while pursuing the quest for better living conditions for all sectors of society (Linehan & Gross 1998).

South Africa is listed as one of Earth's 17 biologically wealthiest countries. This is unique as it is the only country on the list that has no tropical rainforest system. It has one of the five richest floras on Earth and houses three of the 34 global conservation hotspots (Mittermeier *et al.* 1997, 2004).

Traditionally, protected areas have always been extremely important in the quest to protect valuable irreplaceable biodiversity from unscrupulous decision-makers and reckless developments, which is still the case today. Protected areas have been around since the late nineteenth century and started with the establishment of Yellowstone National Park in the USA in 1872. The primary aim of protected areas as it was applied since then until the late twentieth century, was about protecting biological diversity and ecosystems against potential negative human impacts.

South Africa promulgated the National Environmental Management Protected Areas Act (NEM:PAA No. 57 of 2003) that provides the legal substantiation for the different types of protected areas in the country. The biosphere reserve concept is being dealt with at the national level as a support mechanism to the system of protected areas. Modern protected areas tend to implement a more

regional approach in management and planning by incorporating a landscape buffer and in some cases also a cultural buffer that addresses the needs of local populations (Zube 1995). This is being implemented in South Africa through the recent buffer zone strategy for national parks wherein it is stated that a buffer zone is to promote a conservation economy, ecotourism and sustainability. As these aspects are also being addressed by biosphere reserves, the differences between modern protected areas and biosphere reserves are becoming less distinct.

South Africa's national government has drafted a protected areas expansion strategy wherein biosphere reserves are being referred to as conservation areas because they are not formally proclaimed in terms of protected area legislation. Conservation areas are recognized as important complementary mechanisms for achieving national conservation objectives (Department of Environmental Affairs and Tourism 2007). Biosphere reserves offer spaces in which to showcase sustainable development (Bridgewater 2002; Matysek *et al.* 2006; UNESCO 2002a; UNESCO Today 2007). Although this is a noble statement, we need excellent examples of sustainable development in action to convince people to support biosphere reserves as living landscapes.

To manage a biosphere reserve properly, is a major challenge. According to Batisse (1997) it "*lies somewhere between science and art*". One of the objectives of a biosphere reserve is to improve the quality of life of people in the area, linking directly to economic opportunities. Most important is to obtain the delicate balance between biodiversity conservation and economic viability. In the book on biodiversity, sustainability and human communities by O'Riordan and Stoll-Kleemann (2002), the need for combining ecological and social needs is very often mentioned, as well as the "*people first*" notion of promoting sustainable livelihoods of local people through management practices in protected areas.

Residents would like to receive some form of benefit from the existence of a biosphere reserve. Price (2002) related the benefits of biosphere reserves to being sites of excellence that demonstrate sustainable development approaches. People generally look towards biosphere reserves to assist in alleviating poverty (Stoll-Kleemann & Job 2008) which places a high expectation on biosphere reserve management. The UNESCO office in Jakarta has produced a document on lessons from biosphere reserves in the Asia-Pacific region (UNESCO 2010), a region heavily threatened by widespread poverty. The economic impact of biosphere reserves on poverty alleviation has been tested in Sierra Gorda Biosphere Reserve in Mexico, Maya Biosphere Reserve in Guatemala and Bosawa Biosphere Reserve in Nicaragua with various success rates. The UNESCO document (UNESCO 2010) states quite controversially "*there is insufficient information available to judge whether biosphere reserves are indeed a useful tool in sustainable development and poverty alleviation*". This viewpoint

has been echoed by Francis (2004) through noting that Canadian biosphere reserves are not discreet economic entities.

Poverty eradication has been identified as one of the Millennium Development Goals (UN 2000). When this goal is being viewed in association with the goal of ensuring environmental sustainability and reducing biodiversity loss (UN 2000), it provides a perfect description of the niche within which a biosphere reserve is being realized. However, poverty alleviation has generally supplanted biodiversity conservation in international debates (Sanderson & Redford 2003). It is a difficult task to align environmental custodianship with poverty alleviation and worldwide many such efforts have not succeeded (Tuhus-Dubrow 2010). Leisher *et al.* (2010) have identified six conservation mechanisms that could be tools for alleviating poverty, including nature-based tourism, protected area jobs and agrobiodiversity conservation. Notwithstanding the fact that the poor rely very heavily on biodiversity, there is no possibility of a win-win correlation between biodiversity conservation and poverty reduction, but only a situation of “*win more and lose less*” (Roe *et al.* 2011). With an ever increasing human population, greater consumption patterns, high levels of land degradation, greater demand on a reduced agriculture and extreme levels of biodiversity loss, could there be any hopes for any form of future sustainability? This is the prediction that biosphere reserves face as these special areas are earmarked to ‘show the way to a more sustainable future’ (UNESCO 2002a).

## 2 HISTORY OF THE UNESCO MAB PROGRAMME IN SOUTH AFRICA

*“How many times can a man turn his head and pretend that he just doesn’t see” (Bob Dylan)*

The historical happenings in relation to the implementation of UNESCO’s Man and the Biosphere (MAB) Programme in South Africa have never been officially documented. This situation was therefore addressed in the first research phase of this study. The MAB Programme is a much undervalued framework for conservation and landscape planning in South Africa; nonetheless biosphere reserves have huge potential as landscapes where social-ecological land management can be practised towards a more sustainable future for all. This chapter, based on information gained through literature searches and a number of interviews with key people, investigates the global origin of the MAB Programme and its implementation over the past few decades in South Africa, as well as highlighting challenges and benefits of the Programme to the country. This chapter therefore responds to secondary research question 1: ‘How has the UNESCO MAB Programme been implemented in South Africa since its introduction to the country?’

### 2.1 Origin and Early Development of the UNESCO MAB Programme

The MAB Programme originated with the Biosphere Conference held in 1968 in Paris and was formally launched by UNESCO at the 16<sup>th</sup> session of the General Conference in 1970 (Batisse 1986; UNESCO 2002a). The MAB Programme promotes the establishment of biosphere reserves throughout all biogeographical provinces of the world. The concept of biosphere reserves originated with the Task Force on Criteria and Guidelines for the Choice and Establishment of Biosphere Reserves of 1974. Biosphere reserves are therefore designated by UNESCO and form part of the World Network of Biosphere Reserves (WNBR), which was launched in 1976 (UNESCO 1996a) and is organized into a support structure of regional and sub-regional networks. Two important consequences flowed from the Biosphere Conference. Firstly, it marked the debut of the term ‘biosphere’ on the international agenda. Secondly, the Biosphere Conference firmly declared that the utilization and the conservation of our land and water resources should go hand-in-hand rather than in opposition, and that inter-disciplinary approaches should be promoted to achieve this aim (UNESCO 2002a). At present the WNBR consists of 621 sites in 117 countries (UNESCO 2013).

The first international biosphere reserve congress was held in Minsk, Belarus in 1983 (UNESCO 2002a). The congress gave result to an ‘Action Plan for Biosphere Reserves’ that was adopted by the eighth session of the International Coordinating Council of MAB in December 1984 (UNESCO 1984, 2002). In March 1995 a second world congress, the International Conference for Biosphere Reserves, was convened by UNESCO in Seville, Spain. The tangible results of the Seville Conference were the Seville Strategy for Biosphere Reserves and the Statutory Framework of the WNBR

(UNESCO 1996a). Since then these documents have provided a common platform for the development of biosphere reserves, and defined the principles, criteria and procedure for their designation (Robertson Vernhes 2007). They also established the framework for governance of the WNBR and provided for a periodic review of designated sites for every ten years of their existence. The Seville Strategy specifically notes that “*biosphere reserves are established to promote and demonstrate a balanced relationship between humans and the biosphere*” (UNESCO 1996a).

The essence of the biosphere reserve concept is about the combination of three complementary functions: conservation (of landscapes, ecosystems, species and genetic variation); sustainable development (fostering economic development which is ecologically and culturally sustainable); and logistic support (promoting research, monitoring, education and training) (UNESCO 1996a). These functions need to be implemented within a defined landscape and delimited according to a zonation system along a progression from preservation to sustainable resource use in the form of an inner core area, adjoining buffer zones and an outer transition zone.

The Vision for Biosphere Reserves into the Twenty-first Century, which also emerged from the Seville Conference, emphasized that biosphere reserves could become theatres for reconciling people and nature. This vision took cognizance of the worldwide emphasis on sustainable development as phrased by the Brundtland Commission in 1987 and promoted by the United Nations Conference on Environment and Development (UNCED), convened in Rio de Janeiro, Brazil, in 1992. Biosphere reserves were quite progressive at the time and pre-dated formal recognitions of sustainable development. Although biosphere reserves are not recognized as formal protected areas, the concept offers a landscape-scale management framework that supports and demonstrates sustainable development (Alfsen-Norodom & Lane 2002; Bridgewater *et al.* 1996; Bridgewater 2002; Stoll-Kleemann & Welp 2008).

The five-year follow-up to the Seville Conference, the Seville +5 International Meeting of Experts, was held in Pamplona, Spain, in November 2000. Since Seville +5, biosphere reserves have entered a new phase with greater emphasis on their contribution to socio-economic development. A resolution on the World Network of Biosphere Reserves that was passed at the First World Conservation Congress in Montreal in October 1996, reflects this approach and stresses that the biosphere reserve concept is “*an innovative and practical model for the implementation of significant elements of the Convention on Biological Diversity and other conventions concerned with the conservation and sustainable use of biological diversity*” and that the World Network “*should expand and the biosphere reserve concept be implemented more widely*” (UNESCO 2002a).

With reference to the African context, West African environment ministers requested the NEPAD (New Partnership for Africa's Development) to use the UNESCO biosphere reserve framework as laboratories for sustainable development in the implementation of NEPAD's environmental action plan (UNESCO Press 2004).

The third World Congress of Biosphere Reserves was held in February 2008 in Madrid, Spain. The congress adopted the Madrid Action Plan (MAP) which plotted the strategy of the MAB Programme for 2008 to 2013 in 31 goals and 67 detailed actions at the levels of the MAB Bureau and Secretariat, regional networks, national MAB committees, and individual biosphere reserves. The MAP promoted biosphere reserves as *"the principal internationally-designated areas dedicated to sustainable development in the 21<sup>st</sup> century"* (UNESCO 2008). It provides a road map as a directive for internalization of biosphere reserves and the MAB Programme in all relevant countries.

## 2.2 The MAB Programme in South Africa

### 2.2.1 The Era 1990 to 1999

The MAB Programme was introduced to South Africa in the early 1990s coinciding with the country re-entering the international arena. The year 1990 proved to be the start of major change in South Africa. On 11 February 1990 Nelson Mandela was released from prison and the country was slowly starting to prepare for a democracy. In 1990 the Chief Directorate of Nature and Environmental Conservation drafted a document on a potential holistic conservation strategy for the entire Fynbos Biome (Burgers *et al.* 1990). Although it was drafted more than 20 years ago now, the document is still relevant in emphasizing the looming transformation and destruction of natural habitats that result in a loss of environmental quality and a degraded quality of life. The involvement of local communities in conservation and development issues was highlighted in the document as being critically important. The UNESCO MAB Programme was singled out as the most appropriate mechanism for a holistic approach to conservation (Burgers *et al.* 1990).

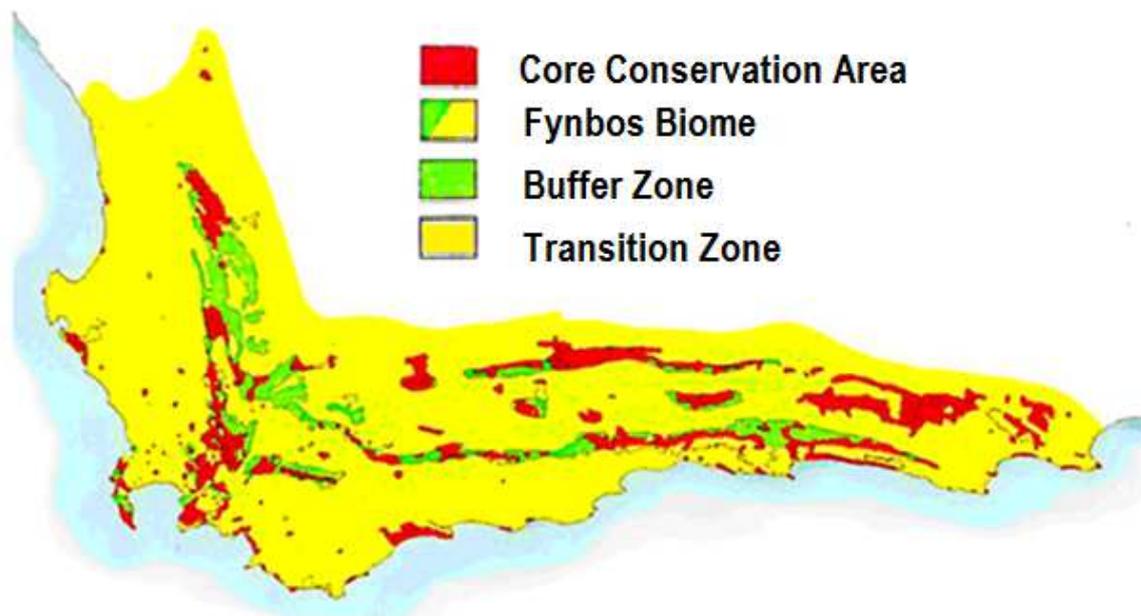
The document (Burgers *et al.* 1990) promoted the establishment of a single Fynbos Biome biosphere reserve that would consist of a coupled network of:

- areas of conservation importance as core conservation areas: national parks, wilderness areas, nature reserves, natural sections of state forests, and private nature reserves that enjoy long-term protection;
- declared mountain catchment areas and protected environments as inner natural zones;

- adjoining private lands that would be included into the biosphere reserve on a voluntary basis as outer zones - these areas were noted as resource conservation and resource development zones;
- corridors that would join conservation areas into networks.

It was intended that a Fynbos Biome biosphere reserve would offer a colligative framework toward the optimal integration of conservation and development in the Biome (Burgers *et al.* 1990).

The document by Burgers *et al.* (1990) initiated wide deliberations with regard to the use of the MAB Programme and the implementation of biosphere reserves. Early discussions at first focused only on the Western Cape Province, in particular the Fynbos Biome. A proposed cluster system of Fynbos Biome biosphere reserves was depicted on a map dated 1991 (Burgers *et al.* 1990; Figure 1).



(Acknowledgement: CapeNature)

**Figure 1: Proposed network of cluster biosphere reserves for the Fynbos Biome, South Africa**

In April 1994 the first democratic elections took place in South Africa. This major event resulted in South Africa's acceptance in the international arena and the country embarked upon liaisons with a number of international conventions, the first of which were the Convention on Biological Diversity and the World Heritage Convention of UNESCO. A UNESCO National Commission was established by the Departments of Foreign Affairs and Education which gave rise to a country agreement between UNESCO and South Africa, signed in 1995 and subsequent to South Africa being introduced to the MAB Programme (Naude 2009). The Department of Environmental Affairs and Tourism (presently

named Environmental Affairs) became the line function department for the MAB Programme and the World Heritage Convention.

South Africa was represented by one person at the UNESCO Seville Conference in 1995. Personal discussions with UNESCO resulted in their official visit to the Western Cape subsequent to the conference. This visit furthered negotiations that were taken up by the Western Cape Nature Conservation Board (previously known as the Chief Directorate of Nature and Environmental Conservation) in collaboration with local communities and led to support for biosphere reserve processes.

In 1995 the Western Cape provincial cabinet approved a submission on the implementation of bioregional planning as a basis for spatial planning in the province. Bioregional planning is framed as a management system to promote sustainable development practices that are implemented through biosphere reserves (Canca 2002).

Around the country a number of sites were identified for biosphere reserve status. Some provincial governments, specifically the Western Cape, Limpopo and Mpumalanga, have shown more interest in the MAB Programme. Negotiations and collaborations with relevant stakeholders and role-players eventually led to the designation of South Africa's first official biosphere reserve in 1998 (Stanvliet *et al.* 2004a).

### **2.2.2 The Era 2000 to 2007**

The year 2000 marked the final adoption of bioregional planning as a framework for the Western Cape Province (Department of Planning, Local Government and Housing 2000). The bioregional planning framework provides guidelines for all planning documentation and biosphere reserves are identified as a spatial model for the implementation of the principles. Bioregional planning makes use of a system of Spatial Planning Categories that was based on the three-tiered zonation system of biosphere reserves (Table 3).

The Western Cape Provincial Spatial Development Framework (PSDF) was approved and signed by the minister of the Department of Environmental Affairs and Development Planning (DEA&DP) in 2005 (Department of Environmental Affairs and Development Planning 2005). This document guides the use of the approved Spatial Planning Categories by municipalities in compiling their individual integrated development plans and spatial development frameworks and plans. The South African approach to core areas of biosphere reserves allow for areas that are listed as formal protected areas according to the Protected Areas Act to be included, but also valuable land in private ownership that is legally secured e.g. by means of a stewardship contract.

**Table 3: Primary Spatial Planning Categories according to the Bioregional Planning Policy of the Western Cape Province**

CATEGORY	DESCRIPTION	CLASSIFICATION CRITERIA & LAND USE
Category A	Core Conservation Area	<ul style="list-style-type: none"> <li>a) Areas of high conservation importance (highly irreplaceable) that must be protected from change.</li> <li>b) Only non-consumptive land-uses may be allowed under strict conditions.</li> <li>c) No development allowed.</li> </ul>
Category B	Buffer Area	<ul style="list-style-type: none"> <li>a) Serving as a buffer between Category A Areas and Category C Areas.</li> <li>b) Providing an appropriate interim classification for conservation-worthy areas that do not have statutory protection, including ecological corridors, and former forestry and agricultural areas that are worthy of rehabilitation.</li> <li>c) Appropriate sustainable development and non-consumptive land-uses may be allowed conditionally.</li> </ul>
Category C	Agricultural areas	<ul style="list-style-type: none"> <li>a) Rural areas where extensive and intensive agriculture is practiced.</li> <li>b) Forestry areas.</li> </ul>
Category D	Urban-related areas	Accommodating a broad spectrum of nodal urban-related settlements and associated services and infrastructure.
Category E	Industrial areas	Representing the industrial areas where very high intensity of human activity and consumptive land-use occur.
Category F	Surface infrastructure and buildings	All surface infrastructure and buildings not catered for in the above categories, including roads, railway lines, power lines, communication structures, etc.

The biosphere reserve fraternity in South Africa has had a number of get-togethers to discuss issues of joint importance and to muster up government support for biosphere reserves in the country. The first official meeting was the First Southern African Biosphere Reserve Learning Seminar that was strongly supported by UNESCO and took place at the Southern African Wildlife College in the Kruger National Park in May 2000. In May 2003 a South African biosphere reserve workshop was held at Ganzekraal in the Cape West Coast Biosphere Reserve. A presentation on the experience of South African biosphere reserves was delivered during the Vth IUCN (International Union for the Conservation of Nature) World Parks Congress in Durban in September 2003.

Following an identified need for biosphere reserve guidelines for South Africa, a manual providing background and guidelines for the implementation of the biosphere reserve concept was completed

in 2004 and widely distributed through the national Department of Environmental Affairs and Tourism (Stanvliet *et al.* 2004a).

### 2.2.3 The Era Since 2008

The 3<sup>rd</sup> World Congress of Biosphere Reserves in Madrid in 2008 was attended by a number of delegates from South Africa. In response to the MAP, South Africa drafted a Position Paper for Biosphere Reserves that included a detailed list of actions to implement the MAP in a South African context (South African Biosphere Reserve Working Group 2008). This South African Position Paper was jointly drafted by the delegates of the National Biosphere Reserve Workshop that was held in the Limpopo Province in May 2008. It is stated in the Position Paper for Biosphere Reserves that the MAB Programme could play a more prominent role in current government strategies related to poverty alleviation, environmental sustainability, social upliftment, transformation and economic development. Within the South African context the biosphere reserve concept should be realized as a valuable land management tool with which to integrate people and the environment in a manner that supports the country's natural and cultural conservation and sustainable development objectives while improving human well-being. Thus the vision for South African biosphere reserves is stated as follows (South African Biosphere Reserve Working Group 2008): *“South African biospheres are special landscapes where socio-ecological land management is practised towards a more sustainable future for all”*.

The Department of Environmental Affairs (DEA), being the focal point for implementing the MAB Programme, had the responsibility of establishing a national MAB committee. This task was completed in 2010 and the committee had its first meeting in November of that year. The roles and responsibilities of the National MAB Committee are defined in an approved terms of reference. The DEA provides the secretariat. Members of the Committee include representatives of national and provincial governments, as well as all designated biosphere reserves and biosphere reserve initiatives throughout the country. The Committee has regular biannual meetings and workshops<sup>2</sup>. At present the MAB Programme is active in five provinces. In the Western Cape, the DEA&DP gave prominence to the UNESCO MAB principles and the implementation of biosphere reserves in their operational plan (Smith 2009). The establishment of biosphere reserves is listed as a key performance area of the DEA&DP. The DEA&DP funds individual biosphere reserves in the province within a limited budget, mainly for logistical support such as operational expenses.

---

<sup>2</sup> Meetings held: November 2010 (Pretoria, Gauteng); April 2011 (Franschoek, Western Cape); October 2011 (Swadini, Limpopo); March 2012 (Saldanha, Western Cape); November 2012 (Waterberg, Limpopo); September 2013 (Pretoria, Gauteng); February 2014 (Blyde Estates, Limpopo)

In Limpopo Province, the responsibility for the MAB Programme falls under the Department of Economic Development, Environment and Tourism (LEDET). The MAB Programme and biosphere reserves is also a performance area of LEDET. Funding support to biosphere reserves is provided by LEDET in the form of limited logistical support and funds towards the compilation of management plans. Mpumalanga Province provides support to the MAB Programme through the Mpumalanga Tourism and Parks Agency.

The MAB Programme should be seen as a vehicle for implementing provincial policies as well as a strategic partner in support of provincial agendas such as sustainable development, climate change adaptation, environmental education and training.

### 2.3 The Biosphere Reserve Concept in Landscape Management in South Africa

Within the South African context, agencies are using a series of seemingly different instruments to practise landscape-scale management. Of these the most prominent are World Heritage Sites, biodiversity initiatives (Text Box 1), transfrontier conservation areas<sup>3</sup> (Text Box 2), megareserves (Text Box 1) and biosphere reserves. It is sometimes difficult for the UNESCO biosphere reserve concept to obtain prominence amongst these different landscape initiatives.

#### **Text Box 1: C.A.P.E.**

*The Cape Action for People and the Environment (C.A.P.E.), an initiative funded by the Global Environment Facility in the Cape Floristic Region, originally used the term “megareserve” for areas in which large-scale biodiversity conservation is practiced. Currently other terminology such as “initiative” or “corridor” is being used within the C.A.P.E. to describe these areas. The following large-scale biodiversity conservation plans are currently being implemented under the auspices of C.A.P.E.: the Greater Cederberg Biodiversity Corridor, the Gouritz Initiative and the Agulhas Biodiversity Initiative in the Western Cape Province, and the Baviaanskloof Initiative in the Eastern Cape Province.*

#### **Text Box 2: Transfrontier Conservation Areas**

*In the past attempts were made to establish a transboundary biosphere reserve in South Africa and neighbouring countries but it was not supported by national government due to the already existing transfrontier conservation areas (peace parks). Currently there are 227 transfrontier conservation areas around the world, 32 in Africa of which 6 straddle South Africa, namely Ai-Ais-Richtersveld Transfrontier Park (with Namibia), Kgalagadi (with Botswana), Greater Mapungubwe (with Botswana and Zimbabwe), Great Limpopo (with Mozambique and Zimbabwe), Maloti-Drakensberg (with Lesotho), and Lubombo (with Mozambique).*

<sup>3</sup> A transfrontier conservation area (TFCA) is defined as “the area or component of a large ecological region that straddles the boundaries of two or more countries, encompassing one or more protected areas as well as multiple resource use areas” (<http://www.peaceparks.org>).

The basic aims and objectives of most of these instruments and mechanisms are generally quite similar. However, the biosphere reserve concept embraces most of the important inherent principles of the major landscape-scale management initiatives. The concept has sustainable development as one of its points of departure. The two ideas (biosphere reserves and sustainable development) operate within the same conceptual framework, namely to promote socio-environmentally compatible living practices, thus it offers practical solutions to the many challenges facing landscape managers today (Stanvliet *et al.* 2004b). Within this context the MAB Programme can be used very effectively to bridge the divide between conservation and development and today the MAB Programme is being promoted as an excellent conciliatory tool through which to obtain socio-inclusive environmental management in a developing country within the framework of sustainable development (Moss 2009; SA Biosphere Reserve Working Group 2008).

It is however important to investigate the added value of using the biosphere reserve concept, as indicated in objective IV.1.8<sup>4</sup> of the Seville Strategy. One of the added values of the biosphere reserve concept lies in its international designation, taking pride in the UNESCO stamp of approval. In 2007 Stoll-Kleemann observed that *“the values and advantages of biosphere reserves must, in future, be more convincingly put over to decision-makers and their consultants”* (Stoll-Kleemann 2007). In South Africa, this statement proved to be very true over the past years.

Today the support for biosphere reserves from South Africa’s national government is still very limited. Dedicated funding support to biosphere reserves is almost impossible because of certain financial management systems. The National Environmental Management Act (NEMA No. 107 of 1998) gave rise to two further acts: the Protected Areas Act and the Biodiversity Act (NEM:BA No. 10 of 2004). The Protected Areas Act had the objective of rationalising the different kinds of protected areas. The final act describes four types of protected areas, namely special nature reserves, nature reserves, national parks and protected environments. Other types of protected areas are described under different pieces of legislation, namely world heritage sites (World Heritage Act 1999), marine protected areas (Marine Living Resources Act 1998), specially protected forest areas (National Forests Act 1998) and mountain catchment areas (Mountain Catchment Areas Act 1970). Biosphere reserves were not identified as an individual kind of protected area in the Protected Areas Act because a biosphere reserve could make use of many of the different kinds of protected areas within its boundaries. It could also make use of the category ‘Protected Environment’ to legislate for certain areas such as buffer zones.

---

<sup>4</sup> Objective IV.1.8: *“Develop and periodically review strategies and national action plans for biosphere reserves; these strategies should strive for complementarity and added value of biosphere reserves with respect to other national instruments for conservation”* (UNESCO 1996a).

As a result, the legal standing of biosphere reserves remains a challenge. The Western Cape is the only province that has promulgated a Biosphere Reserve Act (No. 6 of 2011). It is a regulatory act to support the establishment, management and funding of biosphere reserves in the province.

## 2.4 Challenges with Implementation of the MAB Programme in South Africa

The MAB Programme has been active in South Africa for almost two decades, and has resulted in six designated biosphere reserves and a few proposed sites. Despite stern efforts by a group of biosphere reserve practitioners, the concept is still not well-known and sufficiently supported in the country.

The biosphere reserve concept is very much in line with modern thinking of landscape management because it seeks to balance ecological requirements with the economic needs of people living in these particular areas. For this reason it is potentially one of the greatest instruments to promote collaboration across administrative and political boundaries, especially in Sub-Saharan Africa, while demonstrating a practical implementation of sustainable development.

In South Africa however, biosphere reserves are often wrongfully perceived as a conservation instrument with which to block unwanted development. The message that biosphere reserves are not to be used as green conservation tools should be very well understood and communicated. The benefits of implementing the MAB framework through biosphere reserves must be made very clear. There are too few good examples of well-managed biosphere reserves in South Africa. Success stories should be much more widely communicated across a broader audience. In UNESCO's 'Biosphere Reserves: Special Places for People and Nature' it is pertinently stated: *"Conservation-sustainable development policies are fine on paper. The challenges are with their implementation"* (UNESCO 2002a).

It must be emphasized that biosphere reserves are not just another type of protected natural space, but that they correspond to a broader and much more ambitious concept. It is accepted that protected areas, separated from the larger biogeographical landscape of which they form part, have less chance of fulfilling their conservation function than a protected area that is treated as a component of the wider landscape. Methods benefitting the latter include innovative tools such as biosphere reserves that are implemented towards promoting sustainable development across political boundaries.

Biosphere reserves follow an ingenious concept and have rightly been labelled as *"special places for people and nature"* (Bridgewater 2002; UNESCO 2002a). The biosphere reserve concept is inclusive by nature, thereby addressing not only biodiversity conservation, but also the social, ecological and

cultural aspects of a given region (Batisse 2001; Stanvliet & Parnell 2006). Biosphere reserves offer models of 'sustainable development in action' and are the embodiment of the Ecosystem Approach, as adopted under the Convention of Biological Diversity (UNESCO 2000).

The most important value of implementing the biosphere reserve concept lies in its international affiliation with UNESCO. The MAB WNBR is one of only two international networks that are based on regional sites (Lotze-Campen *et al.* 2008). Being part of the WNBR carries a wealth of international recognition and access to expertise, thereby facilitating funding from a variety of international institutions.

Biosphere reserves foster collaborative thinking about the future management of a defined space. They promote decentralization of decision-making whilst promoting collaboration and co-management practices between all stakeholders. Some of the benefits of a biosphere reserve are noted by Stoll-Kleemann and Welp (2008): joint decision-making by a broad range of players; more effective implementation of management practices because of wide support for the biosphere reserve; pooling of expertise and knowledge that results in high-quality decision-making, and the ability to act as a coordinating unit between different organizations.

It is important to be able to measure net benefits to the environment, the human population, development and the economy of a biosphere reserve. For this reason the Kogelberg and Cape West Coast Biosphere Reserves have embarked on a process to identify biosphere reserve specific sustainability indicators that could be used to assist in identifying the success and/or failures of individual biosphere reserves.

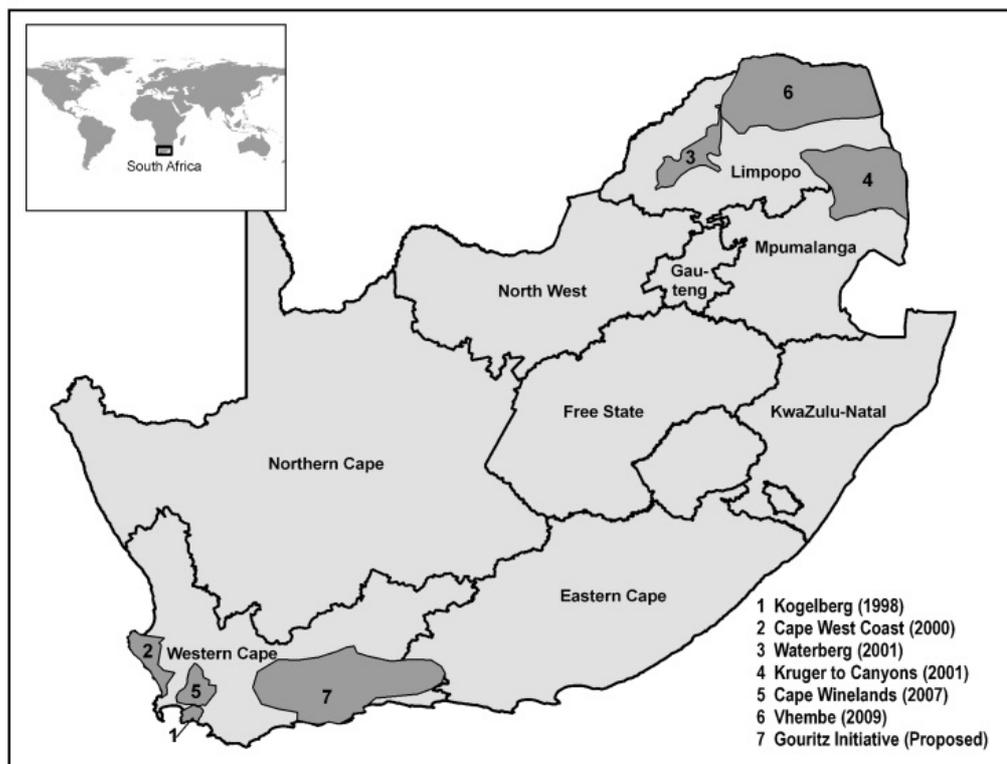
The future of the MAB Programme in South Africa would be more secure if it were recognized that it addresses the focus areas of national government, namely climate change mitigation and adaptation, and social development including poverty alleviation and job creation. The DEA has adopted a strategy for the expansion of protected areas based on ecological information; 94% of the focus areas are in private ownership. Therefore an urgent need exists for innovative ways with which to implement biodiversity conservation. Biosphere reserves offer such an option and play an integrational role towards ensuring complementarity and harmonization of all existing designations, schemes, policies, and initiatives within a specific defined space. Although biosphere reserves are not included in the National Protected Areas Expansion Strategy, the MAB Programme is a valuable tool in this regard.

The potential of the MAB Programme in South Africa lies in the value of biosphere reserves as demonstration sites for sustainable land management. However, it is a fact that other pressing issues currently at play in South Africa - such as population growth, poverty, job creation, poor

service delivery, and environmental degradation – usually get preference in the national discourse while biosphere reserves and the role they can play in addressing some of these problems are not well understood and recognized.

## 2.5 South African Biosphere Reserves: Existing and Proposed

South Africa has six UNESCO designated biosphere reserves and two sites whose nominations are currently being reviewed by UNESCO (Figure 2, Table 4). Each one was established for very specific reasons and the processes differed dramatically. At present all biosphere reserves have private companies, registered as non-profit organizations, as management entities and each is individually responsible for implementation and funding.



(Acknowledgement: CapeNature)

**Figure 2: Location of biosphere reserves in South Africa**

**Table 4: South African biosphere reserves**

BIOSPHERE RESERVE	PROVINCE	YEAR OF DESIGNATION	TOTAL SIZE	MANAGEMENT ENTITY
Kogelberg	Western Cape	1998	100 000 ha	Private Company
Cape West Coast	Western Cape	2000	378 000 ha	Private Company
Kruger to Canyons	Limpopo and	2001	2 474 700 ha	Private Company

	Mpumalanga			
Waterberg	Limpopo	2001	417 000 ha	Private Company
Cape Winelands	Western Cape	2007	322 000 ha	Private Company
Vhembe	Limpopo	2009	3 070 000 ha	Private Company
Gouritz Cluster	Western Cape	Under review	3 269 000 ha	Private Company
Magaliesberg	Gauteng and North West	Under review	230 846 ha	TBD

The Kogelberg Biosphere Reserve (Western Cape) was the first to be designated in South Africa in December 1998 and comprises 100 000 ha including both terrestrial and marine areas. The Cape West Coast Biosphere Reserve (Western Cape) followed in 2000 and includes 378 000 ha including both terrestrial and marine areas. Both the Kruger to Canyons and the Waterberg Biosphere Reserves were designated in 2001. The Waterberg (Limpopo) is an area of 417 000 ha and was the first biosphere reserve in the northern reaches of South Africa. The Kruger to Canyons Biosphere Reserve (Limpopo and Mpumalanga) is a vast area of 2 609 356 ha and one of South Africa's largest biosphere reserves. The Cape Winelands Biosphere Reserve (Western Cape) was designated in September 2007 and encompasses an area of 322 000 ha.

South Africa's newest biosphere reserve, the Vhembe Biosphere Reserve, was designated in 2009. This is the second largest biosphere reserve in the country with a size of 3 070 000 ha. Vhembe is located in the far northernmost reaches of South Africa, entirely within Limpopo Province and includes the Soutpansberg (a hotspot for South African biodiversity and endemism). It covers the entire Vhembe District of Limpopo Province, Blouberg Local Municipality and the northern part of the Kruger National Park. The indigenous people in Vhembe have a rich history of Indigenous Knowledge Systems and the aim of the biosphere reserve is to pro-actively conserve and promote these systems. Vhembe forms part of two transfrontier conservation parks - Great Limpopo and Greater Mapungubwe.

The Gouritz Cluster in the Western Cape is another landscape that opted for biosphere reserve status. The process of nominating the area as a type of cluster biosphere reserve started towards the end of 2008 (Joseph 2008; Lombard & Wolfe 2004; Pasquini 2008). The nomination document was submitted to the DEA in 2011. UNESCO subsequently requested additional information and the nomination is currently being reviewed for designation in 2014. The area comprising the proposed Gouritz Cluster Biosphere Reserve covers approximately 3 269 000 ha which will make it the largest biosphere reserve in the country. The proposed biosphere reserve will contribute significantly to biodiversity conservation in the Klein Karoo.

The nomination for the Magaliesberg Biosphere has been submitted to UNESCO and was deferred due to the location of a nuclear research centre within the biosphere reserve. It was proposed that the nuclear facility be excluded and the biosphere reserve zonation reconsidered. The nomination document was updated accordingly, resubmitted and is currently being reviewed, also for designation in 2014. One site that is presently being looked at as a potential biosphere reserve is the Marico area in North West Province.

After considering the history and status of the existing and proposed biosphere reserves, the first five biosphere reserves described above were selected for a comprehensive multicase study, as discussed in Chapter 5.

### 3 LITERATURE REVIEW

*"I like the intersection of the humanities and science. There's something magical about that place." (Steve Jobs)*

This chapter provides the results of a global literature review that was conducted as the second research phase. The review brought about deeper insight and a conceptual reflection of the issues at hand and provided information on which the subsequent research phases, particularly the fourth phase, were based. Issues of interest to this study's perspective on the current and future implementation of the MAB Programme in South Africa were reviewed.

Implementing the biosphere reserve concept covers such wide theoretical and practical fields that it is important to narrow down a study and to provide focus on specific topics of interest. The literature review is presented in two sections. The first section includes the characteristics of biosphere reserves, whereas the second section comprises the findings of a literature search on selection criteria for the spatial location of protected areas and biosphere reserves. Because of the multidisciplinary, flexible and sometimes erratic nature of the biosphere reserve concept, the review touched on relevant topics including the nature of biosphere reserves, landscape-scale conservation, spatial prioritization, protected area selection processes and social-ecological systems.

#### 3.1 Characteristics of Biosphere Reserves

It is important in a research study to define some relevant theoretical concepts. Some of the concepts related to the characteristics of biosphere reserves in the South African landscape are being explored in this section, starting with what is meant by the term 'biosphere reserve'.

##### 3.1.1 What is a Biosphere Reserve

UNESCO's MAB Programme incorporates large landscapes that are internationally recognized as important sites for biodiversity conservation, but with a focus on social-ecological sustainable development. Some call it 'biospheres'. Others refer to 'biosphere regions' or 'biosphere areas'. The correct term is 'biosphere reserves'. According to the formal definition as noted in UNESCO's Seville Strategy, biosphere reserves are *"areas of terrestrial and coastal/marine ecosystems or a combination thereof, which are internationally recognized within the framework of UNESCO's Programme on Man and the Biosphere"* (UNESCO 1996a).

UNESCO's guideline documentation for biosphere reserves (UNESCO 1996a), specify that a biosphere reserve should fulfil three specific functions within a zonation system comprising three elements (Table 5). In the case of biosphere reserves, the statement *"the whole is more than the sum of its parts"* is very true (Gates & Morgan 2003; Peres 2005).

**Table 5: Biosphere reserve functions and elements according to UNESCO**

<b>BIOSPHERE RESERVE FUNCTION</b>	<b>DETAILED DESCRIPTION</b>
Conservation function	To preserve genetic resources, species, ecosystems and landscapes.
Development function	To foster sustainable economic and human development.
Logistic support function	To support demonstration projects, environmental education and training, and research and monitoring related to local, national and global issues of conservation and sustainable development.
<b>BIOSPHERE RESERVE ELEMENT</b>	<b>DETAILED DESCRIPTION</b>
Core areas	Securely protected sites for conserving biological diversity, monitoring minimally disturbed ecosystems, and undertaking non-destructive research and other low-impact uses (such as education).
Buffer zone	Usually surrounds or adjoins the core areas, and is used for co-operative activities compatible with sound ecological practices, including environmental education, recreation, ecotourism and applied and basic research.
Transition area/Area of cooperation	A flexible area that may contain a variety of agricultural activities, settlements and other uses in which local communities, management agencies, scientists, non-governmental organizations, cultural groups, economic interests and other stakeholders work together to manage and sustainably develop the area's resources.

Biosphere reserves are different things to different people. In early days, some countries observed biosphere reserves as a 'scientific concept' (McAlpine & Molloy 1977). Nowadays biosphere reserves are sites in which the interests of humans and nature are balanced (Stoll-Kleemann *et al.* 2011). The biosphere reserve concept is seen as a device to contribute towards protection of infrastructure such as in education, culture and transport (Sahler 2007). It is also a tool with which to implement international conventions such as the Convention on Biological Diversity, the World Heritage Convention and the Ramsar Convention (Bridgewater & Creswell 1998; Marton-Lefèvre 2007). Biosphere reserves are model regions that showcase sustainable development practices (German MAB National Committee 2005) and provide spaces to educate people about a sustainable way of life (Kruse-Graumann 2007). It provides ideal sites in which to combine traditional and modern land-uses and landscapes (Konold 2007), and in which to promote collective action against the impacts of climate change (Jaeger 2007). Biosphere reserves provide forums for people to get involved in generating new ideas to solve local problems (Stoll-Kleemann & Job 2008; Stoll-Kleemann & Welp 2008). The MAB Programme provides a networking opportunity for the coordination of regional monitoring efforts in order to provide policy-makers with much needed information with which to address issues of international environmental importance (Bock & Soles 1998). The biosphere reserve concept has been identified as a landscape-level approach that does not exclude people and is therefore an ideal tool with which to balance strictly protected areas with sustainably-managed production areas that could provide benefits toward poverty reduction (Roe *et al.* 2011). In

summary, the biosphere reserve concept is a valuable tool with which to achieve social-ecological land management towards a more sustainable future, especially in developing countries (Pool-Stanvliet 2013a, 2013b).

### 3.1.2 Biosphere Reserves in Relation to Living Landscapes and Social-ecological Systems

It is saddening that people in general are increasingly becoming disconnected from nature. In the rural African context, the evasive link between humans and the natural environment very much translates to the quest of “*keeping people on the land in living landscapes*” (Knight & Cowling 2003). This brings us to deliberate on what is meant by a lived-in, living landscape. It basically corresponds to large tracts of land where biodiversity conservation is practiced in coherence with people living and working in the area and striving for sustainable livelihoods. Knight and Cowling (2003) provide a definition: “*An area of land whose extent is measured at the scale of kilometres, which displays a collection of different ecosystems and land-uses, in which ecological, agricultural and social systems are managed so that they function sustainably, thereby ensuring the natural and cultural resources of the landscape are available for future generations*”. Different models of such living landscapes are available, such as megaconservancies (Knight & Cowling 2003; Rouget *et al.* 2006), special management areas (Ashwell *et al.* 2006), biodiversity corridors (Ashwell *et al.* 2006; Brown *et al.* 2003; Naughton-Treves *et al.* 2005; Rivera *et al.* 2002; Rouget *et al.* 2006), megareserves (Ashwell *et al.* 2006; Peres 2005), mega-conservation areas (Younge & Fowkes 2003), peace parks and transfrontier reserves (Zimmerer 2000), and biosphere reserves (Batisse 1986, 1997; Bridgewater 2002; Stanvliet *et al.* 2004a; UNESCO 2002a).

Traditional conservation practice has undergone some dramatic changes in the past few decades and is focusing increasingly on interactions between nature and society (Wells *et al.* 1992; Zimmerer 2000). Living landscapes comprise constant interaction between humans and their natural environment, which is exactly the focus of UNESCO’s MAB Programme as implemented through biosphere reserves. The biosphere reserve concept can also be regarded as coupled social-ecological systems<sup>5</sup> with a strong multi-disciplinary basis (Matysek 2009; Makeddah 2010).

### 3.1.3 The Position of Biosphere Reserves in the South African Protected Area System

It seems that conservation science is increasingly recognizing that biodiversity conservation cannot be implemented without involving species of the human kind. In addition, in accordance with Brunckhorst *et al.* (2006), human social systems should be modified to serve a greater interest in the future of the natural world. The traditional way of practising biodiversity conservation is through

<sup>5</sup> Functional definition: “A social-ecological system is a complex system whose goal is the well-being of a community of humans and non-human life forms and their geophysical environment” (Glaser *et al.* 2008; Halliday & Glaser 2011).

formal protected areas registered according to the IUCN protected area management categories. The original list proposed in 1978 included ten categories in which biosphere reserves and World Heritage Sites were listed as distinct categories. However, the final list of six categories published in 1994 excluded biosphere reserves and World Heritage Sites on the basis that those are international designations and are overlying other protected area categories (IUCN 1994). Category five on this list (Protected Landscape/Seascape) has much in common with biosphere reserves as it also incorporates the interaction between humans and nature.

South Africa implements a plethora of public and private conservation instruments for managing social-ecological systems. These include different types of protected areas as well as other examples such as the Greater Cederberg Biodiversity Corridor (Western Cape Province), Agulhas Biodiversity Initiative (Western Cape Province), Garden Route Initiative (Western Cape Province), Baviaanskloof Mega-reserve (Eastern Cape Province), Eden to Addo Corridor Initiative (Western and Eastern Cape Provinces), Waterberg Nature Conservancy (Limpopo Province), Maloti-Drakensberg Transfrontier Conservation and Development Area (South Africa and Lesotho), Great Limpopo Transfrontier Park (South Africa, Mozambique and Zimbabwe), and the internationally designated biosphere reserves.

All of these initiatives include at least one area that has been declared in terms of the National Environmental Management: Protected Areas Act (No. 57 of 2003). The Protected Areas Act had the objective of rationalising the different kinds of protected areas. Similar to IUCN's list of protected areas, biosphere reserves were not identified as an individual kind of protected area in the Protected Areas Act due to the fact that a biosphere reserve could make use of many of the different kinds of protected areas within its boundaries.

Because protected areas have to fulfil a social role in addition to biodiversity conservation, the differences between protected areas and biosphere reserves are becoming less distinct. Some partnerships between protected areas and community groups such as Integrated Conservation and Development Projects are organized according to core areas and surrounding buffer zones, much similar to biosphere reserves (Naughton-Treves *et al.* 2005). Sustainable development is one of the main strongholds of a biosphere reserve. It has however been argued by some that conservation and development are incongruent goals (Naughton-Treves *et al.* 2005; Oates 1999). In order to reconcile the goals of biodiversity conservation and sustainable development, some authors have noted the usefulness of landscape-level initiatives that would create areas with varied zoning surrounding strictly protected areas (Naughton-Treves *et al.* 2005; Peres 2005; Zimmerer 2000). The concept of UNESCO's MAB Programme perfectly fits this description. It also corresponds to the two Millennium Development Goals that pose a challenge for biodiversity conservation, namely Goal 1: "Eradicate extreme poverty and hunger"; and Goal 7: "Ensure environmental sustainability" (UN 2000).

To combat the predicament faced by purist conservation actions (to have an additional interest in social issues), South Africa needs excellent examples of sustainable development in action. Biosphere reserves lend themselves to showcase sustainable development towards “*special places for people and nature*” (Bridgewater 2002; UNESCO 2002a). In order to be regarded as special, to be effective and efficient according to UNESCO’s guidelines as contained in the Seville Strategy (UNESCO 1996a), biosphere reserves need to be optimally located. At present, biosphere reserves in South Africa are selected in an ad hoc manner. This follows a global practise resulting in the establishment of conservation areas that are not always in the most suitable locations. More often than not protected areas tend to be on land that was historically either remote, not economically viable or easily available, and some are still being selected in an opportunistic way (Knight & Cowling 2007; Lombard *et al.* 1999; Margules & Pressey 2000; Pressey *et al.* 2000).

The Western Cape is the only province in South Africa that has promulgated an act relating to biosphere reserves. The Western Cape Biosphere Reserves Act states: “*Any person, group of persons or organ of state may request the Minister to preliminarily approve the establishment of a biosphere reserve in the Province*”. Although the Act confirms that biosphere reserves are to protect areas of high biodiversity value and ecological importance, it does not provide any details on how the selection of such sites should be executed.

Limited resources such as availability of land, opportunities for biodiversity conservation and sustainable development projects, as well as financial and human resources, have urged a definite need to set priorities. Therefore efforts to establish so-called living landscapes such as biosphere reserves, must be effectively planned, located and executed.

### 3.2 Spatial Location of Biosphere Reserves

According to Roberge (1998), effective biosphere reserves could contribute to the survival of our planet as it creates an invitation to all people involved, to make a difference and excel. In order to be effective, biosphere reserves need to be selected discerningly with regards to their spatial location. This section provides the findings of a literature search on selecting the spatial locations of protected areas, including living landscapes such as biosphere reserves. In order to address the flexible nature of biosphere reserves, this formal literature search was conducted in three distinct steps.

As a first step, the entire body of UNESCO MAB literature, where it relates to criteria for selecting and evaluating biosphere reserves, was reviewed. Publications on the UNESCO MAB web site (UNESCO 2012) were searched with the key word: criteria. Out of a total of 202 records (search performed in May 2012), only eleven documents were of relevance.

The second step comprised a search of the global peer reviewed literature through the application of a systematic review methodology (CEBC 2010). The databases Scirus and Scopus were used to select a list of papers from international journals with respect to biosphere reserve criteria. The primary research question of this study, related to future options for the more effective implementation of the MAB Programme, determined the key words used in the search. One of the options, as noted in the paragraphs above, includes guidelines on future biosphere reserve site selection. Because of the flexibility of the biosphere reserve concept, designing suites of selection criteria is not an easy process and has not been attempted by many countries. Therefore the effectiveness of different sets of key words was attempted using an iterative process. Key words were combined using Boolean logical operators (CEBC 2010). Final key words used were: (criteria OR guidelines) AND biosphere. Subject areas of papers were confined to: environmental science; agricultural and biological sciences; earth and planetary sciences; social sciences. This search gave a list of 3 526 records (search performed in April 2012). The results were searched with the key word: biosphere reserve. Language was limited to English and German and results were searched once more with the key word: criteria. This selection gave a list of 602 records. Relevant papers were then selected through reading the title and abstract. This filter provided a final list of 40 records.

An additional search was conducted also using both Scopus and Scirus databases. Two sets of key words were used: (1) select\* AND biosphere reserve; (2) criteria AND biosphere AND (select\* OR evaluat\*) and refined with "biosphere reserve". The same subject areas and language were selected as in the first search. This selection gave a list of 1010 journal records and 845 records from the grey literature (search performed in April 2012). After applying the filter of title and abstract, 19 records in addition to the first list of 40 were identified.

The science of selecting priority areas for biodiversity conservation is relatively new and is generally referred to as spatial prioritization. It incorporates conservation planning processes and is widely used in selecting new protected areas. Because of the conservation function of biosphere reserves, the global peer reviewed literature on spatial prioritization was searched as a third step. The following key words were used: (conservation planning OR spatial prioritization) AND selection AND protected. Results were limited to journal sources for the period from 1998 to present, first refined with the key words "reserve selection" and refined once more with "systematic conservation planning". This search provided a list of 369 records (search performed in April 2012). Relevant papers were then selected through reading the title and abstract. This filter provided a list of 43 additional records to the previous searches.

### 3.2.1 Results

Review of the UNESCO MAB documentation (first step) included fundamental documents such as: 1974 Task Force on criteria and guidelines for the choice and establishment of biosphere reserves; 1985 Action Plan for biosphere reserves; Seville Strategy; Statutory Framework of the World Network; German biosphere reserve criteria, Seville +5; and the Madrid Action Plan (Table 6, UNESCO 2012).

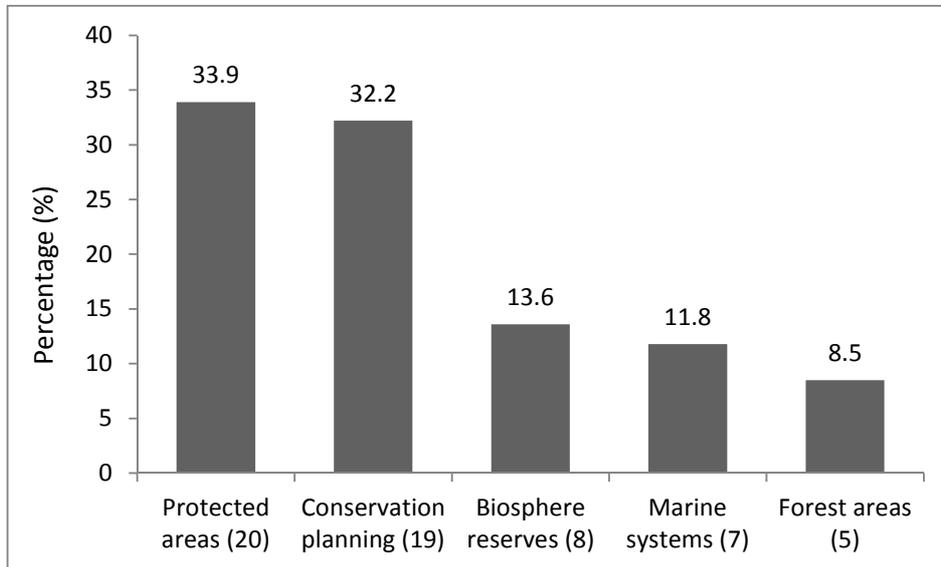
**Table 6: List of UNESCO MAB documentation with relevance to biosphere reserve criteria**

NO	DOCUMENT	DATE OF PUBLICATION	AUTHOR
1	Report on the 3 <sup>rd</sup> session of the MAB ICC: 17-29 September 1974	1974	MAB ICC
2	MAB Report Series No. 22: Task Force on criteria and guidelines for the choice and establishment of Biosphere Reserves	1974	UNESCO and UNEP
3	Action Plan for Biosphere Reserves, February 1985	1985	UNESCO MAB
4	Criteria for the designation and evaluation of UNESCO Biosphere Reserves in Germany	1996	German National Commission for UNESCO MAB (Weidenhammer, S. - editor)
5	Seville Strategy and Statutory Framework of the World Network	1996	UNESCO MAB
6	MAB Digest 19: A Guide to Biosphere Reserve management: A methodology applied to French Biosphere Reserves	1998	Bioret, F., Cibien, C., Génot, J-C. & Lecomte, J.
7	MAB Report Series No. 69: Seville +5, International meeting of experts, Proceedings	2001	UNESCO MAB
8	Report on the 17 <sup>th</sup> session of the MAB ICC: 18-22 March 2002	2002	MAB ICC
9	Biosphere Reserves: Special places for people and nature	2002	UNESCO MAB
10	Madrid Declaration 8 February 2008	2008	UNESCO MAB
11	Madrid Action Plan for Biosphere Reserves 2008-2013	2008	UNESCO MAB

A systematic review of the global peer reviewed literature relating to biosphere reserve criteria (second step) gave a final list of 59 records. Relevant information recorded from the papers included: title; name of journal; year of publication; main author; co-authors; country of relevance to the article; country in which main author resides; specific criteria listed (Y/N); relevant to biosphere reserves (Y/N); and relevant to protected areas in general.

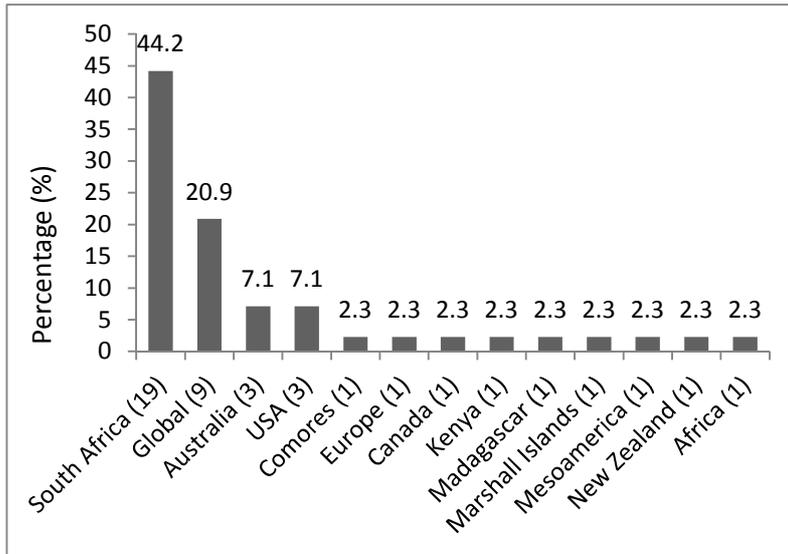
Of the 59 papers reviewed, 36 listed specific criteria applied to the selection of some type of protected area. Of these, only eight were specifically referring to biosphere reserves and a further

six were relevant to both protected areas and biosphere reserves. According to the full text, eight papers were based on biosphere reserve studies, seven were referring to marine systems, five to forest areas, 20 to protected areas in general, and 19 were from the conservation planning discipline (Figure 3).

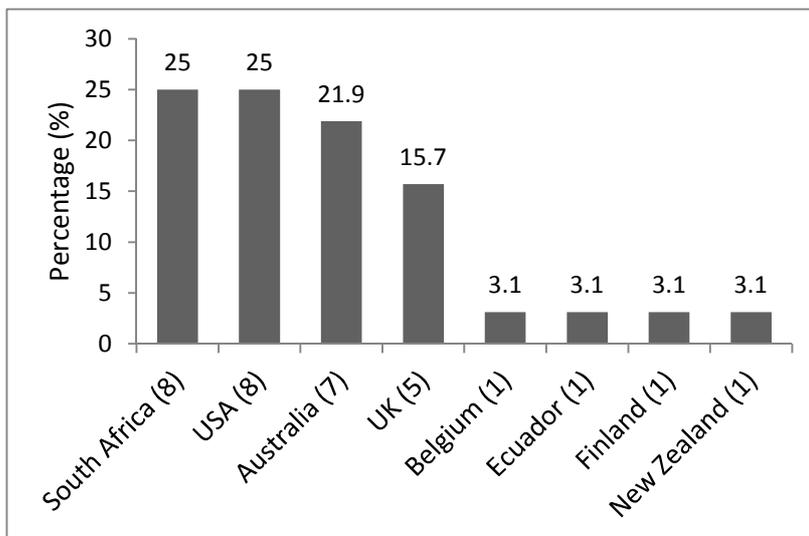


**Figure 3: Realms of individual studies according to 59 full-text papers reviewed indicated in percentages as well as number of papers in brackets**

Of the literature on spatial prioritization (third step), 43 papers were reviewed. Relevant information recorded from the papers included: title; name of journal; year of publication; main author; co-authors; country of relevance to the article; and country in which main author resides. According to the full text, most of the studies (19) were conducted in South Africa, nine were of global concern, three each in Australia and the United States of America (USA), and the rest spread over a number of countries (Figure 4). The 43 papers were authored by 32 main authors of whom eight reside in South Africa, eight in the USA, seven in Australia, five in the United Kingdom (UK) and one each in four other countries (Figure 5).



**Figure 4: Region or country of relevance to the 43 studies resulting from spatial prioritization literature, indicated in percentages as well as numbers of papers in brackets**



**Figure 5: Home country of 32 main authors resulting from spatial prioritization literature, indicated in percentages as well as number of authors in brackets**

### 3.2.2 Discussion

#### 3.2.2.1 Biosphere Reserve Literature

Chief Seattle's widely used quotation 'all things are connected' dates back to 1854. In our view, this reflects credit upon the basic aim of UNESCO's MAB Programme - to improve the relationship between humans and the natural environment. In 1974 the International Coordinating Council (ICC) of MAB identified the importance of protected areas as being baselines against which change could be measured over time (UNESCO 1974a). Thus biosphere reserves would contribute to achieving a

world-wide network of protected areas representative of the world's biomes. A Task Force was convened to identify criteria and guidelines for the establishment of biosphere reserves. The objectives of a network of biosphere reserves were three-fold: (1) conservation of biodiversity; (2) environmentally based research; and (3) education and training. Biosphere reserves would incorporate both core and buffer zones with all forms of utilization confined to the latter (UNESCO 1974b). The difference with other types of protected areas was that biosphere reserves could include areas that do not conform to the IUCN Protected Area Management Categories. Criteria for the selection of natural areas as biosphere reserves included: (1) representativeness; (2) diversity; (3) naturalness; and (4) effectiveness as a conservation unit. It must be noted that these criteria all refer to protected sites and therefore additional selection of 'man-modified areas' was included to form part of buffer zones of biosphere reserves (UNESCO 1974b). Countries were encouraged to initiate surveys in order to identify areas to be established as biosphere reserves (UNESCO 1974a). Some years later, the Seville +5 document noted that UNESCO's biosphere reserve periodic review process should facilitate the drafting of country specific guidelines for selection of new biosphere reserves (UNESCO 2001).

Following the first International Biosphere Reserve Congress held in 1983 in Minsk, an Action Plan for Biosphere Reserves was formulated (Batisse 1985; UNESCO 1984). Although UNEP (the United Nations Environment Programme), IUCN and the FAO (Food and Agriculture Organization of the United Nations) cooperated, UNESCO remains the main implementing body of the MAB Programme. The 1985 Action Plan listed seven main characteristics of biosphere reserves (protection, representativeness, research, education, buffer zones, legislation and human interaction) to align them to provide examples of 'sustainable development in action'. Nine general objectives were listed, namely: (1) international network; (2) management; (3) in situ conservation; (4) research; (5) monitoring; (6) regional planning; (7) local participation; (8) education and training; and (9) information (UNESCO 1984). Ten years later these objectives with accompanying actions were reflected in the goals and objectives of the Seville Strategy, although not verbatim (UNESCO 1996a).

The Action Plan also called on countries to assist in improving and expanding the international biosphere reserve network. Conforming to this request, the National MAB Committee of Germany made the stern effort to prepare a much detailed suite of criteria with which to review new biosphere reserve applications and to evaluate existing sites. The criteria were approved in January 1996 and comprise a two-tiered system of ten exclusion and 29 evaluation criteria, divided into structural and functional criteria (German Commission for UNESCO 2007; German MAB National Committee 1996; UNESCO MAB 1996). Only applications that fulfill all exclusion criteria are subjected to further review for nomination to UNESCO. The suite of functional criteria consists only

of evaluation criteria, whereas some subdivisions of the structural criteria consist only of exclusion criteria, namely representativeness, size, and zonation. This provides proof of the importance of the latter three criteria in selecting German biosphere reserves. It is necessary to note that representativeness in this case includes both natural and socio-economic systems, as well as land use. Much alike the German system, Switzerland also uses a system of ten mandatory and eight assessing criteria for the selection and evaluation of their biosphere reserves, as noted in the Seville +5 document (Ruoss 2001). Interestingly enough, the Swiss criteria correspond to the German criteria, although it is much simplified. However, the Swiss included a point scoring system for the assessment criteria. In 1996 Austria also compiled a system of 38 biosphere reserve criteria, consisting of obligatory and evaluation criteria (Austrian MAB Committee 1996, 2006). The 21 obligatory criteria must be met before a biosphere reserve nomination will be submitted for review. The Seville Strategy (UNESCO 1996a) lists four goals and eleven objectives aimed at the appropriate functioning of the World Network of Biosphere Reserves. In addition it lists activities to be performed at the international, national and individual biosphere reserve level that provides an action list for biosphere reserves and national authorities. The Statutory Framework (UNESCO 1996a) contributes to international recognition of biosphere reserves as quality sites that promote sustainable development. Thus it provides a suite of seven criteria that sites have to match in order to qualify for biosphere reserve status. In a later guide on implementing the Statutory Framework, it was noted that UNESCO's Advisory Committee for Biosphere Reserves tends to insist that new biosphere reserves should fully respond to the first five criteria but the last two criteria could be fulfilled at a later stage (Robertson Vernhes 2007). The German and Switzerland biosphere reserve criteria were listed in relation to the criteria of the Seville Strategy.

A guide for managing biosphere reserves in France has been drafted in 1998 (Bioret *et al.* 1998). Although it does not set specific criteria to which new sites for biosphere reserves need to conform, the guide is used for review purposes. It notes aspects that need to be addressed by biosphere reserves including legal status, zonation and management of the different zones, management structures, size of the site, research and education.

In October 2000, five years after the conference in Seville, UNESCO held an international meeting of experts in Pamplona, Spain. The final outcome of the meeting was the document titled Seville +5 that contains much useful information on progress, strengths and weaknesses of the implementation of the MAB Programme across the world. Important principles that need to be applied in biosphere reserves were noted, such as participation of local people (Iribarren 2001; Mburugu 2001), coordination across political levels (Sahou 2001), impacts of legislation (Na 2001; Nianyong 2001) and importance of financial support (Nianyong 2001).

Some of these principles were again emphasized in the Madrid Action Plan such as participatory management, ecological connectivity, importance of research and education, funding partnerships and clearly defined zones (UNESCO 2008).

### **3.2.2.2 Conservation Planning Literature**

A substantial body of literature exists on the selection of areas for biodiversity protection and the design of conservation area networks. A wealth of approaches, tools, strategies and frameworks are available on how exactly to conduct such a selection and network design. Most of these concur on the fact that the starting point is to develop a vision and objectives for the proposed network (Didier *et al.* 2009; Hockey & Branch 1997; Kelleher & Kenchington 1993; Makeddah 2010; McGregor 2003; Rawinski & Price 1994). Thereafter follows the selection of specific suites of criteria and a discussion as to the scale at which the selection will be conducted (Gilman *et al.* 2011; JANIS 1997; Stevens 2002). Many of the studies emphasize the importance of including not only ecological criteria, but also social, economic and political attributes (Brandon *et al.* 2005; Fuller *et al.* 2006; Garmendia *et al.* 2010; Gilman *et al.* 2011; Ianni & Geneletti 2010; Moffett & Sarkar 2006; Roberts *et al.* 2003a; Williams *et al.* 2005). General criteria mentioned by Moffett and Sarkar (2006) include biological criteria such as some surrogate representing biodiversity, size of units, shape, total area, connectivity and accessibility; and socio-political criteria such as economic costs, human population, scenic beauty, cultural heritage and educational value.

Detailed criteria setting was done in some case studies on specific protected area systems, such as Sabah, Malaysia (Phua & Minowa 2005), Namibia (Moffett *et al.* 2006), Mexico (Fuller *et al.* 2006), Equatorial Guinea (Zafra-Calvo *et al.* 2010), Brazil (Funch & Harley 2007), South Africa (Hockey & Branch 1997), Northwestern Argentina (Ianni & Geneletti 2010), Australia (JANIS 1997) and Taiwan (Kuo & Yu 1999).

It has been argued by several authors (Brandon *et al.* 2005; Gilman *et al.* 2011; JANIS 1997; Kim 2008; Roberts *et al.* 2003a, 2003b) that biodiversity conservation criteria are the most important and should precede and inform governance and socio-economic criteria. This notion is comprehensible, seeing that, in general, protected areas have biodiversity conservation as their main objective.

In some cases, complete and detailed suites of criteria have been adopted for a specific purpose. For the selection of sites for a network of marine reserves, Roberts *et al.* (2003b) have drafted a criteria suite that includes two prerequisites that must be considered first (biogeography; habitat diversity), two excluding criteria (human and natural threats) and eight criteria that could be used to modify the evaluation (size; distance apart; vulnerable habitats; vulnerable life stages; species of special interest; inclusion of exploited species; linkages between systems; ecosystem services). Criteria for

area selection in Argentina included twenty criteria across four groups – biophysical, social, economic and political (Ianni & Geneletti 2010). Area selection in Taiwan was based on two sets of criteria: the characteristics of the site (six sections) and its management objectives (four sections) (Kuo & Yu 1999). In some cases, distinctions are made between criteria for the selection of individual sites and those for selecting a network of sites (Ohl *et al.* 2007).

In 1997, Australia endorsed a system of criteria with which to select forest areas for the conservation of biological diversity but also for an industry based on sustainably managed forests (JANIS 1997). It is referred to as the CAR system of forest reserves, based on the three principles of comprehensiveness, adequacy and representativeness, and comprises a number of very detailed selection criteria grouped under biodiversity, old-growth forests and wilderness areas.

Pressey *et al.* (2000) noted that we need better procedures to identify priority areas for conservation action. This thought was confirmed in a very bold global assessment of adequate biodiversity coverage of protected areas where it was noted that more scientifically rigorous processes are needed to ensure persistency of biodiversity (Rodrigues *et al.* 2004). We also need to measure the effectiveness of our actions. A pressing need for conservation action is an important aspect to consider. Areas that are under serious threat should be timeously selected and should receive higher importance (Pressey *et al.* 2000).

When we relate the criteria for selecting protected areas to the identification of sites for biosphere reserves, it is clear that the latter process would need to include much more than only biodiversity criteria. Some of the lead authors within the discipline of landscape ecology agree that interaction between ecology and social-economic issues is indeed a weakness (after Calder 2007). The science of landscape ecology, with its focus on natural systems, needs to be translated into social and political systems. Biosphere reserves are positioned to implement this translation. A strong element of landscape planning is needed to provide a framework on which to base sustainable development (Selman 2010). The process of selecting future biosphere reserves is thus a kind of conservation planning exercise that needs to include humanistic views and needs. One way to include human population needs into conservation planning is with multi-criteria analysis (Diaz-Balteiro & Romero 2008; Ettazarini 2011; Moffett & Sarkar 2006; Moffett *et al.* 2006; Fuller *et al.* 2006). To our knowledge, a spatial prioritization approach with the specific aim of designating biosphere reserves has only been done once and on a very small scale on the island of Bioko, Equatorial Guinea (Zafra-Calvo *et al.* 2010). This study has used biodiversity importance to select the locations of the three biosphere reserve zones.

Of the 43 reviewed papers on spatial prioritization, one individual from South Africa was the main author of nine papers and co-author of an additional four papers. It could be rightfully deduced, as confirmed by Balmford (2003), that South Africa is showing the way in the conservation planning discipline.

It is a well-known fact that biodiversity conservation is generally not a high priority on political agendas. Therefore, due to restricted availability in South Africa of natural resources, sustainable development opportunities, funding, will-power and manpower, the selection of landscape priorities needs to be conducted very carefully and needs to be based on the best scientific information available. Various factors come into play during selection processes of such landscapes, such as a means of identifying landscapes (Fairbanks & Benn 2000), threats, irreplaceability (Gaston *et al.* 2002; Moore *et al.* 2004; Rouget *et al.* 2006), availability of relevant data (Didier *et al.* 2009; Margules & Pressey 2000; Smith *et al.* 2006), connectivity between various realms (Beger *et al.* 2010), potential for representation and persistence (Cabeza & Moilanen 2001; Cowling *et al.* 1999a; Knight *et al.* 2006c; Margules & Pressey 2000; Moilanen *et al.* 2011; Pressey *et al.* 2003; Rouget *et al.* 2006), inclusion or not of human-altered lands (Polasky *et al.* 2008), costs of the selection exercise (Didier *et al.* 2009; Smith *et al.* 2006), and capacitated people and institutions (Knight *et al.* 2006c, 2011c; Margules & Pressey 2000).

A process of systematically selecting future sites for biosphere reserves has very seldom been conducted (Zafra-Calvo *et al.* 2010). Biosphere reserves need to be selected through a spatially-explicit process supported by biodiversity and socially-based information. In essence this refers to 'conservation planning' or '*spatial prioritization*'. Conservation planning is in essence a spatial process that is carried out at different scales (Cowling & Pressey 2003; Didier *et al.* 2009; Hermoso & Kennard 2012; Margules & Pressey 2000; Naidoo *et al.* 2006; Smith *et al.* 2006). Systematic conservation prioritization (Beger *et al.* 2010), more often referred to as spatial prioritization (Downsborough *et al.* 2011; Knight *et al.* 2010, 2011a, 2011b, 2011c; Moilanen *et al.* 2011), is in essence similar to conservation planning, namely a spatial technique to identify sites for future protected areas.

Spatial prioritization is a widely applied assessment tool to identify priority conservation areas in South Africa (Downsborough *et al.* 2011; Knight *et al.* 2006c, 2010, 2011a; Wilson *et al.* 2009), hence the excellent examples of conservation plans based on spatial prioritizations (Cole *et al.* 2000; Cowling *et al.* 1999b, 2003; Fairbanks & Benn 2000; Lombard *et al.* 1999; Moilanen *et al.* 2011; Rouget *et al.* 2006). Despite excellent plans, very few of these actually result in effective on-the-ground implementation. Because spatial prioritization is a specialized, relatively young practice, it is mainly performed by persons in a consulting capacity without the responsibility to ensure effective

implementation of recommendations. It is however crucial to link the prioritization phase ('knowing') with successful long-term implementation of relevant conservation instruments at selected sites ('doing') (Downsborough *et al.* 2011; Knight *et al.* 2008; Sewall *et al.* 2011). There has been some concern about the practical application of conservation planning (Balmford 2003; Cowling & Pressey 2003; Gelderblom *et al.* 2003; Knight *et al.* 2006b, 2006c; Reyers *et al.* 2010; Smith *et al.* 2009) and this plays out in the perceived 'research-implementation' or 'knowing-doing' gap (Knight *et al.* 2006b, 2008; Reyers *et al.* 2010). Something surely is amiss.

The successful implementation of spatial prioritization outcomes depends on the union of natural and social sciences (Vane-Wright 1996). In addition, the effectiveness of a landscape conservation initiative often depends on various factors such as willingness of land owners (Knight *et al.* 2011a), stakeholder collaboration (Baker *et al.* 2011; Balmford 2003; Knight *et al.* 2006b), economic concerns including implementation costs as well as long-term monetary security (Moore *et al.* 2004; Naidoo *et al.* 2006), human perceptions of conservation relevance (Fowler 2009), and capacity of land-use decision-makers (Cowling *et al.* 2004; Knight & Cowling 2007).

In order to ensure long-term implementation success, an interdisciplinary approach to spatial prioritization (with much exchange between disciplines) is needed that incorporates not only conservation issues, but also the social, economic and political spheres. The biosphere reserve concept offers such an implementation tool. Biosphere reserves are multidisciplinary in nature (need to incorporate more than one discipline), but should be managed in a transdisciplinary way (true integration between disciplines) to ensure the cross-over from a scientific to a social process (Reyers *et al.* 2010).

Taking all the above complexities into account, it is clear that much is required to ensure long-term effective biosphere reserve implementation. All noted aspects should be considered in the process of selecting criteria that will be used in site selection processes towards the optimal location of future biosphere reserves.

### 3.3 Emerging Issues

Specific themes seem to be repeated throughout all reviewed global literature on conservation planning and biosphere reserve criteria. These are grouped into six main subsections as listed in Annexure 1.

Much has been written about the important trait of representativeness. UNESCO notes it as a criterion in the selection of biosphere reserves, specifically relating to biogeographical regions (UNESCO 1996a). Representativeness means a representation of important biological diversity at a specific scale. The aim would be to cover the full range of the selected entity in a network of sites,

whether that be ecosystems, ecoregions, bioregions, or biomes (Margules & Pressey 2000). Another important trait to keep in mind is persistency (the option to prolong) (Knight *et al.* 2006b; Margules & Pressey 2000; Rouget *et al.* 2006). Some authors used site selection methods that have the tendency to prioritize representation over persistency (Cabeza & Moilanen 2001; Margules *et al.* 1988; Williams *et al.* 2005). Other biological criteria include biodiversity importance, total size and size of individual zones, ecological resilience, availability of data and land cover.

Stakeholder collaboration has been identified a number of times as a very important aspect to ensure successful implementation of conservation planning initiatives (Fee *et al.* 2009; Gilman 1997; Gilman *et al.* 2011; Kim 2008; Knight *et al.* 2006b; Lü *et al.* 2003; McGregor 2003; Roberts *et al.* 2003b; Shafer 1999; Shearer & Xiang 2009). Other social criteria include population size, human impacts and educational value. The potential value of a site for scientific research has also been noted as well as the presence of research projects.

With regards to management issues, criteria include zonation, institutional collaboration, spatial design and manageability. Other aspects to be taken into account include management efficiency (Knight *et al.* 2006b) and capacity of land managers (Knight *et al.* 2011b).

Economic aspects pertaining to biosphere reserves have been discussed at length by various authors. Establishment costs as well as operational costs and sustainable financing are included as economic criteria. This related to the dire financial situation currently experienced by most South African biosphere reserves.

Although biosphere reserves are in most cases independent entities, the support of relevant political spheres is non-negotiable. Many papers have listed the level of political acceptability as an important aspect. Integration of biosphere reserve zonation into land-use planning has been highlighted. Biosphere reserves are in essence a form of bioregional management as noted by Von Droste (1995). Thus, by using bioregional planning principles as a point of departure, biosphere reserves could provide an implementable land-use management tool with which to proactively guide future sustainable development within a given landscape. Consequently the delimitation into three distinct zones has been used as a management criterion in some studies.

In the South African landscape, much information is available such as the various fine scale conservation plans referred to earlier, as well as a national overview of important areas for biodiversity conservation listed in the National Biodiversity Strategy and Action Plan (Reyers *et al.* 2007). However, details on how to implement and manage selected landscapes are mostly undefined. We are of the opinion that UNESCO's biosphere reserve framework offers an opportunity

to bridge various gaps such as the research-implementation gap and the divide between natural and social sciences, referred to by Robertson as ‘public ecology’ (Robertson 2002).

The fact that the biosphere reserve concept is not easy to implement effectively, mainly because of its interdisciplinary character, provides a major stumbling-block and challenge. As noted by Bioret *et al.* (1998) “*it is notoriously difficult to implement in the real world*” and again through this research “*a biosphere reserve is difficult to implement, and sometimes even to comprehend, because of the innate, inbuilt flexibility of the concept itself*”.

In social-ecological systems such as biosphere reserves, ecological, social and economic information need to be taken into account during selection processes. Knight *et al.* (2010) noted that there is no record of a study where human and social factors have been mapped for inclusion in spatial prioritizations. New terminology has emerged to refer to the inclusion of such factors to ensure successful implementation actions, namely ‘conservation opportunity’ (Knight *et al.* 2010, 2011b). It could be deduced that a process of conservation opportunity mapping is needed for the identification of future locations of biosphere reserves.

### 3.4 Closing Remarks

The well-known statement on the quest for biosphere reserves “*how can we reconcile the conservation of biodiversity and biological resources with their sustainable use*” (UNESCO 1996a) creates an opportunity for much deliberation. Maybe these two notions cannot be reconciled. Maybe they are so far removed from each other and actually occur on different sides of the sustainability scale so that they are completely incongruent. Conservation of biodiversity is so vital to human life that it needs to be securely protected in order to provide baselines against which change could be monitored into the future.

Thus we have to face a question asked by Andrian (2003) and many others: What makes a biosphere reserve such a ‘special place’? Maybe the answer lies in the fact that the concept offers an opportunity to provide for strict biodiversity protection as well as sustainable utilization within an integrated large landscape. With the World becoming a global village, actions are increasingly based on larger areas and not small, site-specific initiatives. Global challenges such as climate change and loss of biodiversity force us to think larger and especially in conservation, to conserve larger landscapes, ecosystems and processes rather than smaller habitats and individual species. Biosphere reserves are therefore ideally placed as large landscape-scale initiatives. A plea was made by Fee *et al.* (2009) to promote the implementation of the Ecosystem Approach of the CBD – this approach fits the biosphere reserve concept extremely well as demonstrated in the publication ‘Solving the Puzzle’ (UNESCO 2000).

In his field of expertise, the late Steve Jobs commented on the magic of the interchange between science and the humanities (Isaacson 2011). The biosphere reserve concept is an instrument that is used for this purpose. Based on sound science, biosphere reserves aim to implement the cross-over to human sciences, including economics and politics. Much like the sentiments expressed by Steve Jobs, we have the opportunity to 'work the magic' in an effective system of biosphere reserves.

## 4 METHODOLOGY

*“What is the use of repeating all that stuff, if you don’t explain it as you go on? It’s by far the most confusing thing I ever heard!” (The Mock Turtle, Alice in Wonderland)*

Results obtained from the literature review, including the theoretical concepts, informed the multicase study (third research phase) on five of the six existing biosphere reserves in South Africa. The main aim of this multicase study was about finding out whether biosphere reserve implementation in South Africa is successful and effective, or whether it does not really contribute valuable benefits within their relevant landscapes.

### 4.1 Basic Concepts

Because the five biosphere reserves were subjected to in-depth reviews related to their inception, implementation and effectiveness, information on some basic concepts was obtained to be used in the different case studies. These concepts included: what can be regarded as an effective biosphere reserve; and the importance of institutional mechanisms to support effective biosphere reserves.

#### 4.1.1 Effective Biosphere Reserves

The question of what constitutes an effective biosphere reserve is not easy to answer. Firstly, we have to deliberate on what is meant by an effective biosphere reserve. According to UNESCO’s guideline documentation for biosphere reserves (UNESCO 1996a), a biosphere reserve should fulfil three specific functions within a zonation system comprising three elements.

UNESCO (1996a) states the role of biosphere reserves quite clearly: *“Biosphere reserves are designed to deal with one of the most important questions the World faces today: How can we reconcile conservation of biodiversity and biological resources with their sustainable use?”* It then goes on to note that an effective biosphere reserve *“involves natural and social scientists; conservation and development groups; management authorities and local communities - all working together on this complex issue.”*

In addition, the Seville Strategy spells out detailed goals and objectives to guide the development of effective biosphere reserves (Table 7), and the Statutory Framework of the WNBR provides a set of seven criteria that an area must comply with to qualify as a biosphere reserve (UNESCO 1996a).

**Table 7: Goals and objectives for effective biosphere reserves according to UNESCO**

GOALS	OBJECTIVES
I: Use biosphere reserves to conserve natural and cultural diversity	I.1 Improve the coverage of natural and cultural biodiversity by means of the World Network of Biosphere Reserves
	I.2 Integrate biosphere reserves into conservation planning
II: Utilize biosphere reserves as	II.1: Secure the support and involvement of local people

models of land management and of approaches to sustainable development	II.2: Ensure better harmonization and interaction among the different biosphere reserve zones
	II.3: Integrate biosphere reserves into regional planning
III: Use biosphere reserve for research, monitoring, education and training	III.1: Improve knowledge of the interactions between humans and the biosphere
	III.2: Improve monitoring activities
	III.3: Improve education, public awareness and involvement
	III.4: Improve training for specialists and managers
IV: Implement the biosphere reserve concept	IV.1: Integrate the functions of biosphere reserves
	IV.2: Strengthen the World Network of Biosphere Reserves

In 1994 a survey evaluation of biosphere reserve effectiveness was carried out in preparation for the International Conference on Biosphere Reserves that was held in Seville, Spain in March 1995. Some of the challenges that are still faced by biosphere reserves today were identified during those early years. These included a lack of institutional authority and financial resources (Corbett 1995). It was noted that biosphere reserves were working towards becoming ‘fully functional’ biosphere reserves by addressing the three UNESCO defined functions of conservation, sustainable development and logistical support. During the Seville Conference, the complementarity of biosphere reserves to a protected area system was noted by China, and the United States identified biosphere reserves as being “*one of the most exciting and relevant concepts for ecosystem management*” (UNESCO 1996b).

The Madrid Action Plan for Biosphere Reserves addresses ways of making biosphere reserves more effective in combining the three functions. It basically revolves around functional zonation for biosphere reserves and includes actions such as developing practical guidelines for zonation, performance standards for each zone, national recognition of zonation as an important planning tool, and better connectivity between zones across the landscape (UNESCO 2008).

A wide literature exists on the effectiveness of protected area management in general (Gilligan *et al.* 2005; Hockings 2000; Hockings & Phillips 1999; Hockings *et al.* 2000, 2003; Leverington *et al.* 2010; Pasquini 2003; Singh 1999). Management effectiveness is defined by Hockings, Stolton and Dudley (2000) to include the three main components of design issues; management systems; and protected area objectives. The set of criteria and questions to ascertain management effectiveness of an area should be guided by a set of area specific values including natural, cultural and social (Hockings *et al.* 2000). A management effectiveness framework could be tailor made and applied across a range of scales, from the local through national to international levels.

In order to gain insight into the effectiveness of protected areas, many different measures are being used. Pressey and Taffs (2001) identified five measures, namely number of protected areas; total extent; representativeness of land systems; efficiency towards conservation targets; and

vulnerability bias towards vegetation loss. Additional measures that could be taken into account are mentioned such as design measures (size, boundaries), management measures (management plans and resources) and ecological integrity (Ervin 2003; Pressey & Taffs 2001). Smith and Theberge (1986) identified three categories of criteria, namely ecological; cultural; and planning and management. A practical study on the management effectiveness of South African protected areas by Pasquini (2003) used measures relating to three fields, namely income and resource issues; management issues; and social and human use issues. Pressures from surrounding human communities has been identified as a great risk, together with three major threats (funding, personnel, infrastructure) that can be lumped together under the general term 'lack of capacity'. Pasquini (2003) noted a shared view of protected area managers towards a culture that "*staff must begin to run a protected area like a business*".

The ineffectiveness of protected areas is most often linked to inadequate support from governments in terms of legislation, lack of financial support, and incomplete management plans (Stoll-Kleemann & Job 2008).

In the general literature few articles focus specifically on how to measure the effectiveness of biosphere reserves (Lü *et al.* 2003; Corbett 1995). A list of themes to be used in assessing management of protected areas has been identified by Queensland Parks and Wildlife Service (Text Box 3 - Queensland Parks and Wildlife Service 2002). Although these speak pertinently to activities within protected areas, they could also be considered in the framework of a biosphere reserve.

**Text Box 3: Performance Management Themes**

- Parks systems
- Management systems
- Protecting individual species
- Ecological habitat and ecosystem monitoring
- Fire management
- Pests and weeds
- Habitat rehabilitation
- Human use and recreation
- Visitor and community attitudes

The Wolong Biosphere Reserve in south-western China, designated by UNESCO in 1980, was subjected to a study on its effectiveness according to the reserve's functions (Lü *et al.* 2003). The five functions (nature conservation; environmental education; scientific research; social development; economic development) were found to fall between marginally effective and effective and the study could provide guidance on where the biosphere reserve could improve.

A management effectiveness study on the Dja Biosphere Reserve in Cameroon was based on a set of criteria agreed upon by project staff (Text Box 4 - Hakizumwami 2000). Several issues were identified that should also be addressed to obtain a more balanced approach to management effectiveness. These include issues that are very pertinent to biosphere reserves in general such as impact of the protected area on livelihoods; commitment of governmental institutions; integration of the protected area within the wider regional network; and the complementarity of objectives of different actors (Hakizumwami 2000).

**Text Box 4: Criteria for the assessment of management effectiveness in the Dja Biosphere Reserve, Cameroon**

- Status of protected area
- Pressures on the reserve
- Legislation
- Natural resources management systems
- Financial and human resources sustainability
- Partnerships
- Relations with local population

In a study on forest protected areas, Dudley *et al.* (1999) noted that in order to be better protected, systems (such as forests) should aim to conserve all components of biodiversity, and they should seek to be politically effective. This notion speaks directly to biosphere reserves. Some threats that could have an impact on effectiveness and should be taken into account when looking at biosphere reserves, include illegal incursions such as poaching; air pollution; climate change; extractive industries; and changes in land-use tenure (Dudley *et al.* 1999). In a study on the evaluation of threats to forest biosphere reserves (Mehring & Stoll-Kleemann 2008), most frequently mentioned threats for non-high income countries were identified as illegal activities, overexploitation, fire and land use. South Africa is being classified by the World Bank as an upper middle income country (World Bank 2011) therefore these threats could be related to the South African situation and were addressed during the case study interviews.

It is difficult to ascertain when a biosphere reserve is being implemented 'successfully' (IUCN 1995; Price 2002). The periodic review process of UNESCO's MAB Programme could provide some guidance. This process is enshrined in article 9 of the Statutory Framework of the WNBR (UNESCO 1996a).

It would have been noticed that we are referring to protected areas and biosphere reserves almost in an interchangeable manner. Biosphere reserves are however not alike protected areas and are not listed as a type of protected area in South Africa's National Environmental Management

Protected Areas Act. Biosphere reserves encompass a wider notion than merely a protected area (De Klerk 2004; Naude 2001; UNESCO 1996a, UNESCO 2008) and are indeed regarded as special places (UNESCO 2002a).

Because biosphere reserves are so much different from traditionally listed protected areas, they deserve a special approach. After surveying the relevant literature, a list of essential requirements for an effective biosphere reserve has been extracted for this study (Table 8). Through this process note was taken of some components that could be related to selecting a biosphere reserve and still other components that could only be related to biosphere reserves that are already in the implementation phase and are therefore issues of effectiveness.

**Table 8: Requirements for an effective biosphere reserve**

COMPONENT FOR BIOSPHERE RESERVE COMPLIANCE	
1	The biosphere reserve conforms to the requirements of fulfilling the three UNESCO functions, in other words the biosphere reserve is active in the fields of biodiversity conservation, development projects that promote sustainability, and the logistic field of research, environmental education and capacity building through training.
2	The biosphere reserve area is delimited according to a zoning system of three distinct demarcations (usually referred to as core, buffer and transition) where each of the demarcations has unique management objectives.
3	The biosphere reserve area is uniquely representative of specific elements (vegetation types; habitats) of a biogeographical region or biome.
4	The biosphere reserve has a uniquely assigned institutional authority that incorporates active partnerships between all relevant stakeholders and major roleplayers. The institutional authority is representative across disciplines, authorities, gender and race.
5	The biosphere reserve has an approved and updated management plan/framework with a vision statement and clearly defined objectives.
6	The biosphere reserve has an independent operating space and at least one dedicated staff member.
7	The biosphere reserve has access to sufficient monetary resources to enable the reserve to implement core business operations.
8	The biosphere reserve can provide proof of support by relevant political tiers, including provincial government and local authorities such as municipalities.
9	The biosphere reserve can provide evidence of collaborative adaptive management to address challenges such as pressures from local communities, illegal incursions and changes in land-use patterns.
10	If older than 10 years, the biosphere reserve has taken part in the UNESCO periodic review. Otherwise the biosphere reserve commits to the periodic review process when requested.

#### 4.1.2 Importance of Institutional Mechanisms

The important role of an excellent administrative or management entity in the success of a biosphere reserve has been very well documented.

Each biosphere reserve needs a dedicated authority (referred to in this dissertation as a management entity) and framework to focus on management of the domain as a UNESCO designated biosphere reserve. The Seville Strategy for Biosphere Reserves (UNESCO 1996a) states in Objective II.2.3 and Objective IV.1.13 “*develop and establish institutional mechanisms to manage,*

*co-ordinate and integrate the biosphere reserve's programmes and activities*". It also refers in Objective IV.1.11 to the need for an overall management plan or policy. The Statutory Framework of the WNBR (UNESCO 1996a) very clearly defines the provision of a management policy or plan and an implementation authority as one of the criteria. The MAP (UNESCO 2008) refers to the importance of a management framework in action 10.2 *"every biosphere reserve should establish a management committee"*. South Africa has compiled a response to the MAP that refers to management frameworks in target 10. With reference to South Africa, action 10.1 states *"implement management structure e.g. Section 21 companies"*. Action 10.2 notes *"establish management committee for each biosphere reserve"*. It further states that such management committee should be representative of all stakeholders within the biosphere reserve domain (SA Biosphere Reserve Working Group 2008).

Much has been published on the design and responsibilities of administrative frameworks of biosphere reserves (Bonheur 2001; Fritz-Vietta & Stoll-Kleemann 2008; Mitchell 2005; Sahou 2001; Stoll-Kleemann & Welp 2008; Victor *et al.* 2004). Bonheur (2001) noted the management challenge of creating *"a legal and institutional arrangement which enables relevant government agencies to work together in a coordinated and cooperative manner"*. The management framework of the São Paulo City Green Belt Biosphere Reserve in Brazil (an integral part of the Atlantic Forest Biosphere Reserve) consists of a two-tiered structure, namely a coordinating board with an executive responsibility and a management council that is more concerned with actions where communities are involved (Victor *et al.* 2004). Stoll-Kleemann and Welp (2008) noted the role of a biosphere reserve administrative framework as a *"coordinator of efforts"*. A participatory approach involving all stakeholders is non-negotiable. It is important for all landscape-scale initiatives, including biosphere reserves, to allow access for people to management decisions through the principles of participation and shared governance (O'Riordan 2002; O'Riordan & Stoll-Kleemann 2002; Pretty 2002). The building of partnerships is crucial to the long-term success of a biosphere reserve (Batisse 2001), not only between government agencies but involving all major role-players. In effect, a biosphere reserve management entity is primarily fulfilling a coordination function, hence the discussions around a management role versus a coordination role in biosphere reserves (Bioret 2001; Sahou 2001; Stanvliet *et al.* 2004a).

## 4.2 Multicase Study Methods

An analysis of the five biosphere reserves as well as verifying future options for the implementation of the MAB Programme in South Africa need to be based on an investigation of the strengths, challenges and opportunities with reference to existing biosphere reserves in the country. It was therefore decided to gather information and collect data by conducting a multicase study (Derthick 1972; Stake 2006). The multicase study provided observations towards understanding the current

implementation, and deliberating about future options for the more successful and effective implementation of the MAB Programme in the country.

Much has been published on the pros and cons as well as the ease and difficulty of conducting case studies as a research methodology (Babbie 2010; Della Porta & Keating 2008a; Derthick 1972; Gerring 2007; Margoluis & Salafsky 1998; Scholz & Tietje 2002; Stake 2006; Yin 2009). The case study is a recommended research method where the aim is to gain a meaningful understanding of specific organisational processes or behaviour, as is the case with the study of South African biosphere reserves (Yin 2009). In addition, the case study methodological approach could be used to cross the divide between scientific and practical elements that are both markedly present in biosphere reserves (Gerring 2007). However, the status of the case study as a research method is still viewed critically and with scepticism by some practitioners (Gerring 2007; Scholz & Tietje 2002; Vennesson 2008).

The multicase study on South African biosphere reserves responds to secondary research question 2: 'How does the effectiveness of biosphere reserve implementation in five sites compare?' More detailed aspects to be addressed for each individual biosphere reserve included:

- (i) How did the biosphere reserve come about? - i.e. the history of establishment.
- (ii) Why was the biosphere reserve established? - i.e. reasons for nomination to UNESCO.
- (iii) What is the type of management mechanism for the biosphere reserve and why was it selected?
- (iv) What are the distinguishable characteristics of the biosphere reserve that prove its difference to another type of protected area?
- (v) How effective is the biosphere reserve being implemented?

Due to the nature of these questions, with the focus on 'why' and 'how', and to be appropriate to the research approach, the qualitative multicase study was selected as the preferred research method (Della Porta & Keating 2008b; Stake 2006; Yin 2009). This study, on a small number of individual cases within the multicase study, included values and human emotions and thus followed a more qualitative than quantitative approach, therefore basically taking the form of an exploratory study (Andrian 2003; Babbie 2010; Mouton 1996, 2001).

Biosphere reserves are in essence about the interactions between natural systems and human

populations as reflected by the MAB logo (Ankh, reflecting Man and the Biosphere<sup>6</sup>). The case study approach has been valued to address the different aspects of environmental systems and their ill-defined relationship with social systems (Scholz & Tietje 2002).

As noted by Babbie (2010), methodology is “*the science of finding out*”. Departing from the concepts discussed above, the main aim of this multicase study on South African biosphere reserves was about finding out how the biosphere reserve concept is being implemented and why it is either successful, or not really contributing valuable benefits to a specific landscape. Studies on management arrangements in South African biosphere reserves have seldom been published. The same goes for studies that compare different biosphere reserves in the country. This multicase study focused on individual biosphere reserves with replication between the cases (Scholz & Tietje 2002; Yin 2009). The detailed description of the methods that follows was therefore repeated in each of the five cases. A number of important points of departure formed the basis for these case studies, such as uniqueness of the biosphere reserve; benefits accrued as a result of the biosphere reserve concept; difference between biosphere reserves and protected areas; effectiveness of biosphere reserve implementation; particulars of institutional mechanisms; representativeness of management entity; guidance provided by a management framework; and legal implications of biosphere reserve implementation.

There is general agreement about techniques to be used when conducting qualitative research, of which the most common are: direct and participant observations; interview surveys; questionnaire surveys; focus groups; matrix ranking; and unobtrusive content analysis (Babbie 2010; Della Porta & Keating 2008c; Frankfort-Nachmias & Nachmias 1992; Gerring 2007; Margoluis & Salafsky 1998; Scholz & Tietje 2002; Strauss & Corbin 1998; Yin 2009). A case study should make use of multiple sources of information to collect all relevant evidence in order to culminate in a complete case study (Scholz & Tietje 2002; Yin 2009). In this multicase study, participant observation and in-depth knowledge of the research topic are evident, thus the study could be classified as a form of action research (Frankfort-Nachmias & Nachmias 1992).

Techniques selected and used in each of the five cases included: unobtrusive content analysis; interview surveys; questionnaire surveys; and participant observations.

---

<sup>6</sup> The "Ankh" is the ancient Egyptian sign of life. It is being used to designate biosphere reserves as those special or sacred places that preserve and enable the evolutionary processes of life. The ankh is one of the most ancient forms of the cross, pointing to some kind of conjunction of opposing forces. The two forces that conjoin in biosphere reserves are the destinies of humanity and nature (UNESCO 2002a).

### 4.2.1 Unobtrusive Content Analysis

All available and relevant forms of record keeping were investigated for evidence, including UNESCO biosphere reserve nomination documents; public participation write-ups; meeting minutes; media articles; legal documentation; constitutions; management plans; spatial planning documentation; unpublished reports; archival records; and internet information. Details of individual case studies are listed in Table 9.

**Table 9: Details of unobtrusive content analysis for each individual case study**

BIOSPHERE RESERVE	DOCUMENTS AND INFORMATION ACCESSED
Kogelberg	<ul style="list-style-type: none"> <li>▪ UNESCO biosphere reserve nomination</li> <li>▪ public participation write-ups</li> <li>▪ meeting minutes of the Management Committee and the Board of Directors</li> <li>▪ media articles</li> <li>▪ legal documentation including Articles and Memorandum of Association of the Kogelberg Biosphere Reserve Company</li> <li>▪ KOBIO constitution</li> <li>▪ strategic management framework</li> <li>▪ spatial planning documentation</li> <li>▪ unpublished reports</li> <li>▪ archival records</li> <li>▪ internet information</li> </ul>
Cape West Coast	<ul style="list-style-type: none"> <li>▪ UNESCO biosphere reserve nomination</li> <li>▪ public participation write-ups</li> <li>▪ meeting minutes of Board of Directors and Technical Advisors</li> <li>▪ media articles</li> <li>▪ legal documentation including Articles and Memorandum of Association of the Cape West Coast Biosphere Reserve Company</li> <li>▪ strategic management framework</li> <li>▪ spatial planning documentation</li> <li>▪ unpublished reports</li> <li>▪ archival records</li> <li>▪ internet information</li> </ul>
Waterberg	<ul style="list-style-type: none"> <li>▪ UNESCO biosphere reserve nomination</li> <li>▪ public participation write-ups</li> <li>▪ meeting minutes of the interim and management committees</li> <li>▪ media articles</li> <li>▪ legal documentation</li> <li>▪ spatial planning documentation</li> <li>▪ unpublished reports</li> <li>▪ archival records</li> <li>▪ internet information</li> </ul>
Kruger to Canyons	<ul style="list-style-type: none"> <li>▪ UNESCO biosphere reserve nomination</li> <li>▪ public participation write-ups</li> <li>▪ meeting minutes of the interim committee and stakeholder council</li> <li>▪ media articles</li> <li>▪ legal documentation</li> <li>▪ spatial planning documentation</li> <li>▪ unpublished reports</li> <li>▪ archival records</li> <li>▪ internet information</li> </ul>
Cape Winelands	<ul style="list-style-type: none"> <li>▪ UNESCO biosphere reserve nomination</li> <li>▪ public participation write-ups</li> </ul>

	<ul style="list-style-type: none"> <li>▪ meeting minutes of the interim and management committees</li> <li>▪ media articles</li> <li>▪ legal documentation including Articles and Memorandum of Association of the Cape Winelands Biosphere Reserve Company</li> <li>▪ CWBR framework plan</li> <li>▪ unpublished reports</li> <li>▪ archival records</li> <li>▪ internet information</li> </ul>
--	--

#### 4.2.2 Interview Surveys

Semi-structured and open-ended interviews were conducted with selected persons relevant to each biosphere reserve. Biosphere reserve requirements as listed in Table 8 were transferred into a list of components to reflect the effectiveness of the biosphere reserve (Annexure 2). These questions served as an interview guide to enable comparability of responses (Merton & Kendall 1946).

Questions stated were used in obtaining information on individual biosphere reserve cases and focused on the site level scale (after Hockings *et al.* 2000). The following people, where available, were interviewed: coordinator/manager; chair of the management entity; conservation official; municipal official; community member; political representative. Details of the people interviewed in each biosphere reserve are listed in Table 10. All interviews were recorded and transcribed. Results of individual biosphere reserves are to inform a process according to which better management of the biosphere reserve could be facilitated (Stoll-Kleemann 2010).

**Table 10: Details of people interviewed in each biosphere reserve case study**

BIOSPHERE RESERVE	DETAILS OF PEOPLE INVOLVED IN INTERVIEW SURVEYS
Kogelberg	<ol style="list-style-type: none"> <li>1. KBR Coordinator</li> <li>2. Chair of the Management Committee</li> <li>3. Conservation official</li> <li>4. Municipal official</li> <li>5. Community member</li> <li>6. Political representative</li> </ol>
Cape West Coast	<ol style="list-style-type: none"> <li>1. CWCBR Project Coordinator</li> <li>2. Chair of the Board of Directors</li> <li>3. Conservation official</li> <li>4. Municipal official</li> <li>5. Community member</li> </ol>
Waterberg	<ol style="list-style-type: none"> <li>1. Chair of the WBR Management Committee</li> <li>2. Senior Manager Environment Empowerment Services, LEDET</li> <li>3. Chief Director Tourism and Community Environment Development, LEDET</li> <li>4. Manager Environment Special Programs, LEDET</li> </ol>
Kruger to Canyons	<ol style="list-style-type: none"> <li>1. K2C Project Manager</li> <li>2. Chair of the K2C EXCO</li> <li>3. Manager Environment Special Programs, LEDET</li> <li>4. Community representative who is a member of the K2C EXCO</li> </ol>
Cape Winelands	<ol style="list-style-type: none"> <li>1. CWBR Interim Coordinator</li> <li>2. Chair of the Board of Directors</li> <li>3. Conservation official</li> </ol>

	<ol style="list-style-type: none"> <li>4. Municipal official</li> <li>5. Political representative</li> </ol>
--	--

### 4.2.3 Questionnaire Surveys

Questionnaires were designed for specific groups with the view of obtaining information and perceptions that are not readily available. The questionnaire is attached as Annexure 3. At least the representatives of major stakeholders on the management entity were targeted, representing: private landowners; research; local municipalities; district municipalities; protected area management; provincial government; and spatial planning and/or tourism. The specific questionnaire was constructed through a comprehensive review of existing literature and augmented by the researcher's extensive knowledge of the biosphere reserve concept and its implementation in South Africa. Details of the people who completed the questionnaire surveys for each biosphere reserve are listed in Table 11. Questionnaire information was analyzed with matrix ranking.

**Table 11: Details of people who completed the questionnaire survey for each biosphere reserve case study**

BIOSPHERE RESERVE	DETAILS OF PEOPLE INVOLVED IN INTERVIEW SURVEYS
Kogelberg	<ol style="list-style-type: none"> <li>1. Environmental councillor, Elgin Grabouw Vyeboom Villiersdorp Farmers' Association (involved 1992 to 2009)</li> <li>2. Councillor, Overstrand Municipality (involved inception to present)</li> <li>3. Head Environmental Management, Overberg District Municipality (involved 2003 to present)</li> <li>4. Area manager, City of Cape Town (involved 2006 to present)</li> <li>5. Conservation manager, Kogelberg Nature Reserve, CapeNature (involved 1990 to present)</li> <li>6. Deputy Director, DEA&amp;DP (involved 2005 to present)</li> <li>7. Environmental Manager, Theewaterskloof Municipality (involved 2007 to present)</li> </ol>
Cape West Coast	<ol style="list-style-type: none"> <li>1. Private landowner (involved 1997 to present)</li> <li>2. Councillor, City of Cape Town (involved 2007 to present)</li> <li>3. Staff member, Cape West Coast District Municipality (involved 2007 to present)</li> <li>4. Regional Manager Environmental and Heritage Management, City of Cape Town (involved 1997 to present)</li> <li>5. Senior Section Ranger, West Coast National Park (involved inception to present)</li> <li>6. Chief Town and Regional Planner, DEA&amp;DP (involved 1997 to present)</li> <li>7. Councillor, Saldanha Bay Municipality (involved 2010 to present)</li> </ol>
Waterberg	<ol style="list-style-type: none"> <li>1. Private landowner (involved 2004 to present)</li> <li>2. Manager Economic Development, District Municipality (involved 2006 to present)</li> <li>3. Manager Private Nature Reserve (involved 2001 to present)</li> <li>4. South African National Parks Environmental representative (involved 2009 to present)</li> <li>5. Senior Manager Provincial Government (involved 1996 to present)</li> <li>6. Local Economic Development officer, local municipality (involved 2005 to present)</li> </ol>

	<p>present)</p> <ol style="list-style-type: none"> <li>7. Manager Economic Development and International Relations, local municipality and tourism association (involved 2010 to present)</li> </ol>
Kruger to Canyons	<ol style="list-style-type: none"> <li>1. Chairperson of private conservancy (involved 2005 to present)</li> <li>2. Member of private biosphere reserve training trust (involved 2005 to present)</li> <li>3. Local economic development manager, District Municipality (involved 2008 to present)</li> <li>4. South African Environmental Observation Network node manager (involved 2007 to present)</li> <li>5. Strategic conservation planner and environmental manager, South African National Parks (involved 2009 to present)</li> <li>6. Manager, LEDET (involved 2008 to present)</li> <li>7. Director Spatial Planning and Economic Development, SACPLAN (involved 2006 to present)</li> </ol>
Cape Winelands	<ol style="list-style-type: none"> <li>1. Private landowner, Conservancy chair (involved inception to present)</li> <li>2. Private tourism developer (involved 2009 to present)</li> <li>3. Staff member of the Cape Winelands District Municipality (involved inception to present)</li> <li>4. Research associate, University of Stellenbosch (involved inception to present)</li> <li>5. Conservation Manager, Limietberg Nature Reserve, CapeNature (involved inception to present)</li> <li>6. Town and Regional Planner, DEA&amp;DP (involved 2009 to present)</li> <li>7. Manager Spatial Planning, Environment and Heritage, Stellenbosch Municipality (involved inception to present)</li> </ol>

#### 4.2.4 Observations

Participant observation (Sandström 2008) was a consequence of the direct involvement of the researcher with biosphere reserve related issues in South Africa. Direct observations were made through attending meetings, workshops and group sessions. Notes were taken of all observations whether they seemed important or unimportant at the particular time.

Data obtained through content analysis and observations were used towards a complete portrayal of the historical past and present situation of the five case studies. The aim of the multicase study was to provide an almost complete picture of implementation of the biosphere reserve concept in South Africa to date, including strengths, problem areas, opportunities and future challenges. It provided insight into positioning of the MAB Programme in the South African landscape management system.

### 4.3 South African Biosphere Reserve Selection Criteria Methods

Through deliberations on possible future options for the more effective implementation of the MAB Programme in South Africa, the need was identified to devise a suite of South African specific selection criteria to secure the optimal location of biosphere reserves in the future. Following are details of the methods used to obtain information for this process, namely (i) a national questionnaire; and (ii) focus group sessions.

### 4.3.1 National Questionnaire

South Africa has established a National MAB Committee in November 2010. Members of the Committee include representatives of national and provincial government, as well as all designated biosphere reserves and biosphere reserve initiatives throughout the country. The DEA provides the secretariat for the Committee, and manages and updates the electronic member list. This list was used to distribute a national questionnaire on biosphere reserve criteria for South Africa (Annexure 4). A total of 51 questionnaires were distributed in November 2012, with reminders sent out twice during December 2012. A total of 18 questionnaires were completed and returned.

### 4.3.2 Selected Focus Group Sessions

The network of people involved in existing and proposed South African biosphere reserves is relatively small and consists of only 51 members according to the electronic list of the DEA. Although the national questionnaires were distributed to the entire network, the response rate was most unsatisfactory. Therefore it was decided to conduct focus group sessions as an additional method with which to collect the network's collaborative opinions on biosphere reserve criteria for South Africa.

Focus groups were shown to be an effective social research tool that facilitates communication and the exchange of views between participants concerning a specific topic (Kameda *et al.* 1997; Kitzinger 1995; Margoluis & Salafsky 1998; Merton & Kendall 1946; Tucker 2013; Walker 1985; Watts & Ebbutt 1987). In this case, relating to people directly involved in the day-to-day management of biosphere reserves, focus groups are particularly useful to explore the knowledge and experiences of such people (Kitzinger 1995; Stoll-Kleemann & Welp 2008; Tucker 2013).

A total of four focus group sessions were held, three in the Western Cape Province (one each in the Kogelberg, Gouritz Cluster and Cape West Coast Biosphere Reserves), and one collaborative group session in Limpopo Province. The groups were all 'naturally occurring' (Kitzinger 1995; Watts & Ebbutt 1987), in other words they have known each other personally, were used to working together, and had in-depth knowledge of the MAB Programme in South Africa, which enabled easy, uncomplicated discussions and simplified the task of the moderator. The focus group sessions lasted for one to two hours each and all observations were recorded whether it seemed important or unimportant at the particular time.

The sessions were moderated in accordance with an agenda, covering three specific topics:

1. Political connections in biosphere reserve management, and general political support for biosphere reserves.

2. Social investment in local communities of biosphere reserves towards sustainable development.
3. Biosphere reserve criteria for South Africa (*to be used to carefully select biosphere reserves with the view to create effectively managed landscapes where humans and nature could co-exist in a sustainable way*).

## 5 A MULTICASE STUDY OF FIVE BIOSPHERE RESERVES IN SOUTH AFRICA: INDIVIDUAL CASE STUDIES

A multicase study (Derthick 1972; Stake 2006) on South African biosphere reserves was conducted as the third research phase with the view of understanding the current implementation, and deliberating about future options for the more successful and effective implementation of the MAB Programme in the country. This chapter includes the multicase study comprising five individual biosphere reserve case studies, namely the Kogelberg Biosphere Reserve, Cape West Coast Biosphere Reserve, Waterberg Biosphere Reserve, Kruger to Canyons Biosphere Region and the Cape Winelands Biosphere Reserve. A social science research methodology as described in Chapter 4 was followed with the main objective to provide evidence to a variety of issues related to their implementation, support base, status, and how they differ inherently from traditional protected areas.

### 5.1 South Africa's First Biosphere Reserve: A Case Study of the Kogelberg Biosphere Reserve

*"The slow one now will later be fast, as the present now will later be past" (Bob Dylan)*

#### 5.1.1 Overview

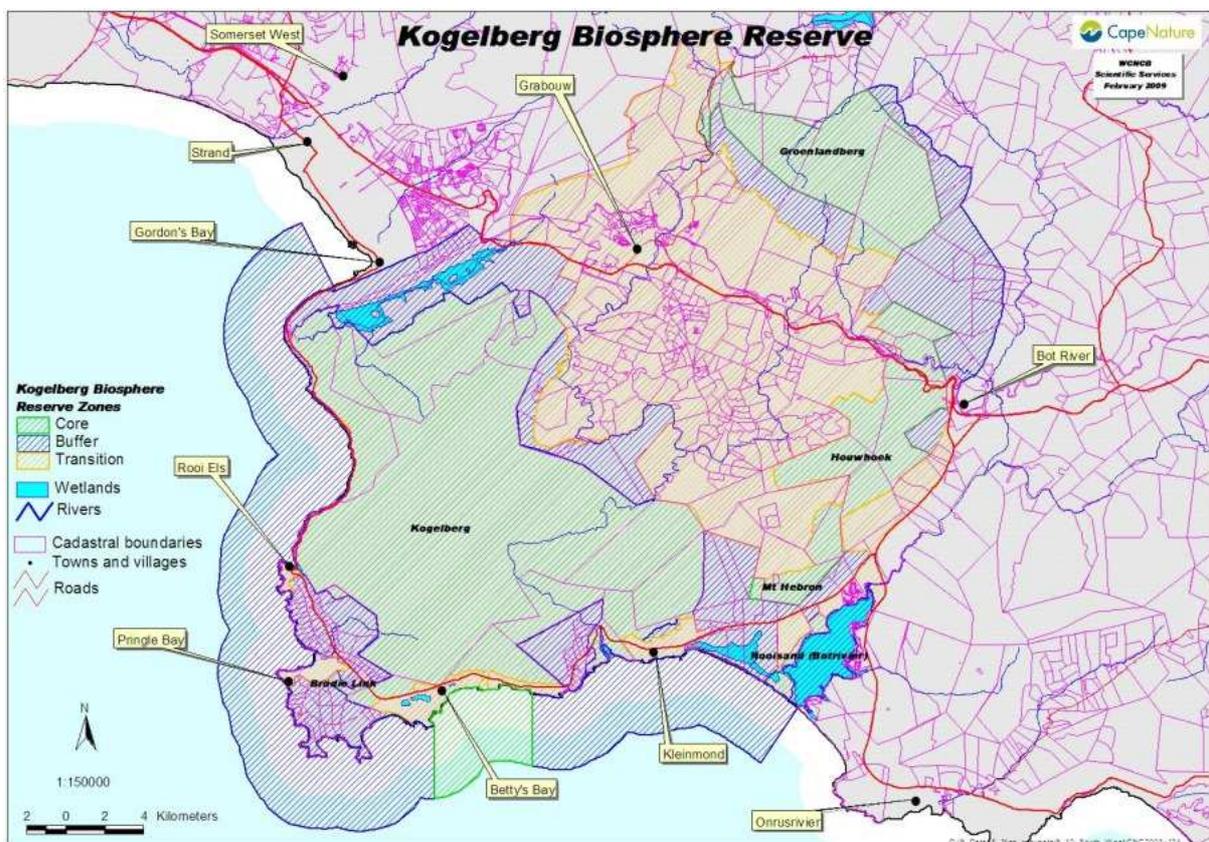
The south-westernmost corner of South Africa is home to the Cape Floristic Region (CFR), the smallest and most diverse of the six floral kingdoms of the World (Takhtajan 1986; Cowling & Hilton-Taylor 1994). In the heart of the CFR, some 60 km to the south-east of Cape Town, lies the Kogelberg, a mountainous area that is widely regarded as a botanical hot-spot (Van Wyk & Smith 2001) and a centre of endemism (Cowling 1990; Cowling *et al.* 1992; Cowling & Procheş 2005; Oliver *et al.* 1983; Rebelo & Siegfried 1990; Weimarck 1941).

The incredible biological wealth of the Kogelberg area contributed to its designation as a biosphere reserve under the MAB Programme of UNESCO in 1998. This was South Africa's first biosphere reserve and others would follow from 2000.

UNESCO's MAB Programme and its realization in biosphere reserves is a very useful concept with which to achieve biodiversity conservation in a developing country such as South Africa and is an excellent tool with which to extend systems of protected areas. The concept is based on the inclusion of people in biodiversity conservation management. This perspective is very different from the historical way biodiversity conservation was practiced with the exclusion of people (Stoll-Kleemann & O'Riordan 2002).

### 5.1.2 Description of the Kogelberg Domain

The Kogelberg Biosphere Reserve (KBR) is Africa's southernmost biosphere reserve and lies in the Western Cape Province of South Africa. The reserve comprises approximately 100 000 ha, including terrestrial and marine components, covering terrain from below sea level to the highest peak<sup>7</sup> of 1270 m and stretches along the coast from Gordon's Bay in the west to the Bot River Vlei in the east, and inland to the Groenlandberg. It includes the marine zone up to two nautical miles along its 70 km coastline (Figure 6). Included are vast tracts of natural vegetation, important marine habitats, major wetland systems, five towns and various settlements, agricultural lands, commercial plantations and recreational resorts.



(Acknowledgement: CapeNature)

**Figure 6: Location and extent of the Kogelberg Biosphere Reserve**

#### 5.1.2.1 Delineation of Zones

With the inception of the KBR, a process of delineation of the three basic biosphere reserve zones was followed according to the guidelines of core areas being predominantly pristine state land, buffer zones having biodiversity importance and being either in public or private ownership, and

<sup>7</sup> The Kogelberg peak is at 1270 m the highest peak within 2 km of the coast in the southern hemisphere (Dr. John Rourke *pers. com.*).

transition zones being mainly converted land. As far as possible the boundaries of the KBR coincide with ecological boundaries such as watersheds, rather than regional planning boundaries.

The primary core area of the KBR, the Kogelberg Nature Reserve, is a declared state forest and is owned by the Department of Public Works (the overseers of all state land in the country). The biosphere reserve core also includes other smaller tracts of state land and a marine protected area. Management of the Kogelberg Nature Reserve and other parcels of state forest was delegated to the Provincial Department of Nature Conservation (CNC) that later rebranded itself as CapeNature. The core area is made up of 21 880 ha of terrestrial land. The Betty's Bay Marine Protected Area (MPA) forms part of the core and comprises 1 629 ha. Two national government departments - Department of Environmental Affairs and Department of Agriculture, Forestry and Fisheries - are jointly responsible for various aspects of managing the marine areas. However, management of the Betty's Bay Marine Protected Area has been delegated to CapeNature.

At the heart of the KBR are mountainous areas and the Palmiet River catchment which are managed primarily for biodiversity conservation and also yield high quantities of quality water. In its lower reaches, the Palmiet River flows through the Kogelberg Nature Reserve. Within this region the river, geomorphologically rejuvenated by its passage across steep gradients and over rocky extrusions, also receives flows from pristine sub-catchments, with the result that it is one of the few rivers in the country that can boast of lower reaches in a near-natural state.

The upper and middle sections of the Palmiet catchment fall within the buffer and transition zones of the KBR and are intensively cultivated for fruit farming and plantation forestry. The majority of land within the buffer zones is in private ownership, most of it being smallholdings in a natural or near-natural state. Some areas are also state-owned by national government or local authorities. The marine area up to two nautical miles from the coast, excluding the Betty's Bay MPA, forms part of the buffer zone. The terrestrial buffer zone comprises 17 000 ha and the marine buffer zone 23 000 ha.

There are basically three types of transition zones included in the KBR, namely towns and settlements; farmlands; and commercial plantations. The farmlands are in private ownership and comprise mainly three types, namely apple farms, wine farms and farming with indigenous plant species. The commercial plantations are mainly pine (*Pinus* spp.), owned by Cape Pine. Transition zones comprise 32 000 ha.

#### **5.1.2.2 Outstanding Biological Features**

The KBR lies within the CFR that is regarded as a hot-spot for biodiversity conservation worldwide (Myers *et al.* 2000). The CFR includes all the vegetation types within the area known as the Fynbos

Biome or commonly referred to as Fynbos (Rebello *et al.* 2006). The Kogelberg area comprises a number of different vegetation types including Sandstone Fynbos (unit Kogelberg Sandstone Fynbos), Shale Fynbos (units Cape Winelands Shale Fynbos and Elgin Shale Fynbos), Shale Band Vegetation (unit Western Coastal Shale Band Vegetation), Western Strandveld (unit Overberg Dune Strandveld), and Seashore Vegetation (unit Cape Seashore Vegetation) (Mucina & Rutherford 2006).



**Figure 7: Logo of the Kogelberg Biosphere Reserve**

Floristically the KBR, in specific the Kogelberg Sandstone Fynbos is regarded as the “*the heart of the Cape flora*” (Rebello *et al.* 2006). It has an exceptional floral diversity of over 1 880 plant species occurring in only 240 square kilometres. Of the 178 known rare and noteworthy species, 150 are locally endemic.

The Kogelberg region is known for its special plant species, which include *inter alia* the Marsh Rose, *Orothamnus zeyheri* (vulnerable) that is depicted in the logo of the KBR (Figure 7). Other special plants include *Mimetes hottentoticus* (critically endangered), *Agapanthus africanus* subsp. *walshii* (endangered), *Nivenia stokoei* (rare), *Erica pillansii* (rare) and *Haemanthus canaliculatus* (endangered). The diversity is attributed to rapid change in species composition along habitat gradients (Boucher 1978; Cowling 1990).

The vegetation is predominantly Fynbos. A few remnant patches of indigenous forest are confined to fire resistant habitats such as kloofs (small valleys). The coastal plains have a variety of different habitats and associated plant communities. Distinct plant communities are also found along the watercourses flowing through the Kogelberg region.

William Paterson, in his 1775 account of the Hangklip area within the coastal section of the KBR, recorded seeing some buffalo and plenty of eland. Although these mammals are now gone, an array

of smaller animals remain, e.g. water mongoose, porcupine, red rock rabbit, honey badger, bat eared and Cape fox. The antelope are represented by grysbok, klipspringer, common duiker and grey rhebuck. Top predators of the area include the leopard and black eagle.

Numerous reptiles and amphibians are represented within the KBR, e.g. the rare micro frog (*Microbatrachella capensis*). The Bot River Vlei is an important habitat for a wide variety of water birds. An area in Betty's Bay provides habitat for one of only two land-based breeding colonies of the endangered African penguin (*Spheniscus demersus*) (IUCN 2013). The marine area hosts a wide variety of marine life of which the shellfish species, abalone (*Haliotis midae* or locally known as perlemoen) is rapidly depleting due to overexploitation for commercial purposes.

The ecological functioning of the natural environment is sustained by an array of interactions between plants and animals. Insects are by far the most significant pollinators in Fynbos. Many of the Kogelberg's endemics rely on seed dispersal by ant species, a mutualistic relationship called myrmecochory. Studies have revealed that the Palmiet River and its tributaries is a mega hotspot for dragonflies (Odonata). Grant and Samways (2007) refer to the KBR as an 'irreplaceable area' and have shown that 53% of dragonflies and 26% of recorded taxa are national endemics.

All available biodiversity information clearly demonstrates that the KBR is indeed a very special place on earth, worthy to receive special treatment.

### 5.1.3 Inception of the Kogelberg Biosphere Reserve

The KBR was the first to be designated by UNESCO in South Africa. During the 1980s the Department of Water Affairs and Forestry embarked on a mission to source additional water resources for the growing water demand of the ever-increasing urban population within the City of Cape Town and surrounds. One of the alternatives was the construction of a new dam in the lower reaches of the Palmiet River (proposed lower Hangklip dam) that was announced in 1991 and would have flooded the main parts of the Kogelberg valley. The proposed dam was of great concern amongst environmentalists and this sensitive issue was showcased in the March 1982 issue of *Veld & Flora* (the official journal of the Botanical Society of Southern Africa). Articles highlighted aspects such as the need for a dam, the impacts on the quality of water in the Palmiet River and the Palmiet estuary, management implications and the detrimental impacts the dam would have had on the rich biodiversity of the Kogelberg valley (Boucher 1982; Lückhoff 1982; Roberts 1982).

The Kogelberg Nature Reserve was at that time very much unavailable to the public and very few people ever entered the reserve. When Cape Nature Conservation (CNC) realized the tremendous threat posed by the proposed dam, they had very little community support to fight the dam due to the seclusivity of the Kogelberg Nature Reserve. CNC therefore organized a Kogelberg workshop in

May 1991 in Stellenbosch to raise the biodiversity plight of the Kogelberg area in light of the threat of the proposed dam. The proceedings identified the best option for securing the biodiversity of the area as the designation of a biosphere reserve. This idea provided further impetus for the groundbreaking document by CNC in 1990 that initiated discussions on the implementation of the MAB Programme by proposing a cluster biosphere reserve network for the entire Fynbos Biome (Burgers *et al.* 1990). The Kogelberg workshop thus resulted in a drive towards a Kogelberg Biosphere Reserve (Burgers *et al.* 1991) that included a much-needed community pressure group to support the 'save the Kogelberg' campaign.

The community group targeted by CNC as collaborators was then known as the Hangklip Regional Forum, in 1992 renamed to the Greater Kogelberg-Hangklip Regional Forum (Hyman 2006). Due to their increased interest in issues related to the biosphere reserve, the Forum was again renamed in 1994 to the Kogelberg Biosphere Association (KOBIO) who identified the realization of the Kogelberg Biosphere Reserve as its main objective. A substantial public meeting was organized by KOBIO in December 1993 to distribute information about the biosphere reserve (KOBIO 1997). In 1995 KOBIO made a submission to the Minister of Environmental Affairs and Tourism to expedite the biosphere reserve process for the Kogelberg and subsequently the minister instructed CNC to take the lead. The process to establish the KBR was by then strongly supported by CNC (Jordaan 1991). Specific staff members were made available to work on this project and the communications team produced material in support of the 'save the Kogelberg' campaign. In addition, KOBIO produced valuable material in the form of newspaper articles, posters, brochures and exhibitions (KOBIO 1997).

KOBIO drafted a vision and mission that would have directed the association's future actions in the Kogelberg region (see Text Box 5).

#### **Text Box 5: Vision and mission of the Kogelberg Biosphere Association (KOBIO)**

##### ***KOBIO Vision***

*In the KBR, our communities stand united in sustainably conserving one of the richest biodiversity hotspots on Earth and the magnificent land and seascapes that conceived it ... not only for our benefit, but for the World into the future.*

##### ***KOBIO Mission***

*To help conserve the biodiversity and scenic splendour of the KBR through motivating and promoting environmentally sustainable living and other biosphere reserve principles.*

All individuals and group efforts eventually led to the submission of the nomination to UNESCO in January 1998 (Cape Nature Conservation 1998) and the subsequent designation of the Kogelberg Biosphere Reserve by UNESCO in December 1998. This was South Africa's first officially declared

biosphere reserve and with that, KOBIO's main aim was achieved. In the nomination document KOBIO was named as fulfilling the public participation and community representation roles (Cape Nature Conservation 1998).

The nomination process for the KBR did not always proceed very smoothly. A first attempt at a nomination document compiled by CNC was turned down by the Department of Environmental Affairs and Tourism (Cape Nature Conservation 1992). The nomination was returned in the middle of 1995 stating it was not compiled according to the latest UNESCO format and that letters of support from all relevant administrations will be needed. Following a request from the minister, a new nomination document was drafted with Cape Nature Conservation taking the lead. The submission of the second nomination, compiled with full participation of all parties involved, resulted in the designation of the KBR. Throughout the years leading to designation, individuals, conservation managers, local authorities, groups of interested persons, NGOs (non-governmental organizations) and other role-players provided support usually due to very specific reasons as listed in Table 12 (based on Hyman 2006). One of the strengths built into the flexible nature of the biosphere reserve concept is that all of these diverse groupings can be accommodated within one biosphere reserve. The management entity only needs to find ways of channeling the respective energies functionally.

**Table 12: Reasons for supporting the Kogelberg Biosphere Reserve nomination process**

FIELD OF SUPPORT	GROUP	REASONS
<b>Protectionistic</b>	Reserve management, green activists, NGOs	True concern for securing the area's exceptional biodiversity wealth
<b>Preventing further development</b>	Property owners	"After me, no more" or NIMBY (not in my back yard) attitude, strong support for the conservation function of the biosphere reserve
<b>Maintaining the integrity of the area</b>	Conservation minded property owners, NGOs	Did not want to see changes to the environment in which they bought into years ago, risk-aversion strategies
<b>Maintaining higher property values</b>	Self-interested property owners	Stricter conservation mechanisms are seen as keeping the "sense of place" intact and resulting in higher property values
<b>Change old conservation mindset of reserves</b>	Liberal thinkers	Steering away from the old conservatism perception of reserves that are fenced and exclude people
<b>International prestige</b>	MAB supporters, local authorities	Intellectual knowledge of the opportunities of the MAB Program after South Africa has entered the international arena in 1994, international exposure by being part of the WNBR
<b>Maintaining local control of the water resource</b>	Conservation managers, local authorities, farmers	Keeping local resources for local development
<b>Time available to support a good cause</b>	Retired property owners	An interesting campaign to become involved in and support, also intellectually stimulating
<b>Integrated solution for environmental protection</b>	Liberal thinkers	Belief that people must be part of the long-term conservation solution, need to bridge the divide

		between conservation and social development
<b>Poverty alleviating opportunities</b>	Individuals	Perceived the biosphere reserve concept as a potential tool to assist with poverty alleviation and job creation
<b>Political</b>	Conservation managers, local authorities, NGOs	Lobby for political interest and support for the area and specifically the biosphere reserve concept, secure project funding through the biosphere reserve

#### 5.1.4 Implementation of the Kogelberg Biosphere Reserve

##### 5.1.4.1 Early Troubled Years

Early negotiations with regards to the Kogelberg Biosphere Reserve started off with a committee that was named the Kogelberg Sub-committee and had its first meeting in April 1997. This sub-committee was renamed to the Kogelberg Management Committee after designation of the biosphere reserve in December 1998. The Management Committee had its first meeting in March 1999. The large Management Committee included representatives from almost all major role-players and stakeholders. The committee was chaired by the mayor of the Overstrand Municipality, albeit in his private capacity, and the secretariat was seconded by CapeNature. In 2000 it was decided to restructure the Management Committee into a system of working groups that would result in the larger Management Committee having to meet only once or twice per year. The working groups included seven so-called 'management sub-committees'. These sub-committees were not responsible for management *per se* but it was rather a means of reporting back to the main Management Committee on activities according to specific geographic regions. Other working groups were formed for finances, biodiversity monitoring, environmental education, and communication. This system was not fully operational and eventually did not result in less often meetings of the large Management Committee. Nevertheless, the system was in operation until 2001.

The Kogelberg Management Committee successfully completed a number of initiatives even before official UNESCO designation. These included awareness materials such as a series of pamphlets, and environmental education projects. The Committee also had inputs into many projects, processes and activities in the region. The official launch of the biosphere reserve was held at the Harold Porter National Botanical Gardens (part of the core area) on 16 April 1999. The national minister of Environmental Affairs as well as two provincial ministers and a representative from UNESCO attended the function.

The Management Committee met at two-monthly intervals and addressed issues of which some were only resolved many years later, such as marine protected areas, a biosphere reserve

management plan, a tourism plan, national and provincial MAB committees, inclusion of core areas into a World Heritage Site, trademark registration, and sustainable development.

During the Protected Areas in the 21<sup>st</sup> Century Symposium at Albany, Western Australia in November 1997, a private discussion mooted the possibility of twinning the Kogelberg and Fitzgerald River Biosphere Reserves. In November 1999 a member of the Kogelberg Management Committee paid a visit to the Fitzgerald River Biosphere Reserve in Australia to follow up on the proposed twinning arrangement. A written offer was accepted by the Fitzgerald in January 2000 and the two biosphere reserves were therefore officially engaged in a twinning agreement. Subsequently a staff member of Fitzgerald visited the Kogelberg in October 2000. A memorandum of understanding was signed in September 2001 stating possible collaborations such as information exchange, voluntary cross visits and comparative research. It also mentioned the twinning should be reviewed on a five year interval. Despite great interest of certain individuals at the time, the twinning arrangement did not deliver any other collaborations or benefits and it was not further pursued.

A process to compile a business plan for the KBR started in December 2000. A working group of the Kogelberg Management Committee appointed a consultant to draft the plan. At that time it was already resolved that the Management Committee was not the best vehicle for managing a biosphere reserve and another option should be investigated. The new management structure should ensure the continued existence of the KBR into the future, make provision for management of the marine zone as a separate entity closely linked to the terrestrial area, and have access to secure financial resources. Two options arose, namely a separately funded office under supervision of the Western Cape Nature Conservation Board (CapeNature); and an independent non-profit organization established under South African legislation. Keeping in mind that the first option could create a precedent for future biosphere reserves and its related financial implications to CapeNature, the establishment of a non-profit organization to serve the purpose of coordinating the biosphere reserve was identified as the best option for a secure future. This option presented the possibility to appoint a permanent biosphere reserve coordinator which was a high priority as the person acting in the position of coordinator at that time was a staff member of CapeNature and could not continue indefinitely with the supporting role. The business plan therefore had the principle objective of guiding the design of such a company and its structures.

The final business plan was organized into eight areas of action, namely (i) a chairperson; (ii) administration; (iii) tourism, marketing and public relations; (iv) agriculture and forestry; (v) economic development and planning; (vi) environmental management and research; (vii) community development and labour; and (viii) education and training. An indicative budget for each of the action areas was drafted. This turned out to be extremely unrealistic and no such funds were

ever received by the KBR. In fact, secure funding sources is maybe the most pressing challenge faced by the KBR on a day to day basis. Still, in the absence of management funding, a public process to nominate and appoint a Board of Directors of the proposed KBR Company to serve each of the action areas was successfully completed. The new directors had their first meeting with the Management Committee on 2 November 2001. Following this positive get-together, the newly elected chairperson who was a respected businessman, realized to great dismay that the KBR Company has not formally been registered. This meant the elected directors were not actually directors because of the non-existence of the company. Thus the registration of the company with accompanying Memorandum and Articles of Association according to legislation was pursued as a matter of urgency. Following a lengthy procedure, the Kogelberg Biosphere Reserve Company (KBRC) was registered in April 2002 as a non-profit organization in terms of the Companies Act (No. 71 of 2008). It was realized that a new Board of Directors will have to be elected at some point and the current so-called directors are actually only members of the company. The chairperson then issued a statement to the effect that the KBR Management Committee will cease to exist in view of the new company structure and will be replaced by a system of sub-committees (according to the action areas) through which the Management Committee members could form part of the operations of the KBRC. This announcement was not very well received, resulting in a difficult time when the company had limited connection with the members of the Management Committee. In a sense there was also a lack of clarity with respect to the responsibilities, role and functions of the KBRC. At that time the only direction was provided by the UNESCO Seville Strategy (UNESCO 1996a) and a very cumbersome vision statement (see Text Box 6).

**Text Box 6: Kogelberg Biosphere Reserve Vision Statement**

The Kogelberg Biosphere Reserve serves to protect biodiversity, habitats and natural ecological systems and processes within its boundaries and immediate surrounds. Sound management practices will be applied to protect ecological integrity and sustainability of the natural environment. The KBR is dedicated towards benefitting the people living and working in the region. It addresses co-operation with all role-players, sound visitor use and tourism, education, communication, training, sustainable utilization of natural resources, research and long-term ecological monitoring in co-operation with other agencies and institutions. Finally, the KBR is dedicated towards implementing the biosphere reserve concept in the region and fulfilling the three functions as described by UNESCO.

During the next few years the members of the company (who only consisted of the elected eight) had regular meetings and embarked on some projects such as the drafting of a zoning plan for the KBR. Consultants were appointed during 2002 to draft the zoning plan, but the project was discontinued before it could deliver any final outcomes. The urgent need for a zoning plan resulted

in 2009 in a funding drive for a biosphere reserve framework plan that would include detailed land-use descriptions of the three main biosphere reserve zones.

During this period of high tension and mainly due to influences beyond their control, the Directors had numerous disagreements with members of KOBIO. Some personality clashes exacerbated this situation (Hyman 2006). It was somewhat relieved with the Board's request to KOBIO to fulfil a commenting role on behalf of the KBRC with regards to new development applications that would have a marked influence on the biosphere reserve. For many years KOBIO distributed informative quarterly newsletters to all its members. Their objective having been realized with the KBR designation, KOBIO eventually merged with the biosphere reserve management entity.

In August 2003, the chair of the KBRC found it impossible to continue in this position and resigned. This decision resulted in the company going dormant and for a few months things came to a complete standstill.

#### *5.1.4.2 New Phase for the Kogelberg Biosphere Reserve Company*

Following onto this stagnant period, the provincial minister of Environmental Affairs and Development Planning called on the Overberg District Municipality to set up a tentative working group with the view of re-establishing the KBRC. At the beginning of 2004 a process was put into place to re-establish the local authorities' support for the KBR. A series of meetings were held with the tentative working group. On 11 October 2004 a meeting took place between all four local authorities (Overberg District Municipality; City of Cape Town; Overstrand Municipality and Theewaterskloof Municipality) where the problems relating to the KBR Company and the best way forward were discussed at length. The outcomes of the meeting were that the local authorities emphasized their support for the KBR and indicated their willingness to cooperate towards its future success. A special supportive committee was established. This committee played a major role in the revival of the KBRC with support from all the major role-players, including the South African MAB National Focal Point.

A new operational system of monthly meetings of the remaining directors and the supportive committee was set in place. This committee was referred to as the Technical Committee as it comprised representatives from provincial and local government, as well as representatives from the core (CapeNature), buffer and transition areas, and it provided support to the KBRC directors. The lack of a directive document guiding the future of the company was identified as a major priority. Subsequently funding was secured from the Development Bank of South Africa and a team of consultants was appointed in August 2005 to draft a strategic management framework. The final framework was completed in May 2007 and included: (i) a Strategic Plan - that broadly defines the

strategic directions the company should take in moving forward; (ii) a Management Plan - the specifics of how the company is going to undertake its core business activities over the medium-term (3 years); and (iv) a Corporate Plan - the actions required to institutionally restructure the KBRC and make it an effective management agent. Through a consultative process a much more concise vision statement and mission for the KBR were formulated (see Text Box 7).

**Text Box 7: Vision and mission for the Kogelberg Biosphere Reserve Company**

Kogelberg's most precious assets are its people and the unique natural environment they are privileged to live in. It is special as the biodiversity hotspot of the Cape Floral Kingdom. It is also special as an environment that the local community benefits from, especially those previously disadvantaged, and one that they share with visitors. It is an environment that the community nurtures so that future generations can continue to benefit from the use of its marine and terrestrial resources.

This quest for the Kogelberg as a model sustainable living environment is shared by civil society, land owners, the business community and authorities. To pursue the journey down this road together these interest groups are partners in the Kogelberg Biosphere Reserve. This is their vehicle for learning from each other, networking with biosphere reserves across the globe, and sharing their experience with others.

**KBRC Vision Statement:**

*“Kogelberg Biosphere Reserve– the Cape Floral Kingdom’s model sustainable living environment for all”*

**KBRC Mission:**

The Kogelberg Biosphere Reserve is managed in accordance with UNESCO's Man and the Biosphere program. The entity managing the KBR is a partnership between different stakeholders who are working together to establish Kogelberg as a model of sustainable development. To this end the core business activities are:

- ▶ Education, training, marketing and publicity to the KBR's customers (Outreach)
- ▶ Supporting and co-ordinating socio-economic development, service delivery and conservation initiatives in the biosphere reserve (Development and Conservation)
- ▶ Promoting and exchanging biosphere level research and planning (Logistics)

Then, in 2000, an innovative programme named the Cape Action for People and the Environment (C.A.P.E.) to conserve the Cape Floristic Region was started. It is based on the Cape Action Plan for the Environment, or the C.A.P.E. 2000 Strategy. This systematic conservation plan was prepared with the assistance of the Global Environment Facility (GEF) through the World Bank, adopted by the South African government and administered by the South African National Biodiversity Institute (Ashwell *et al.* 2006). The C.A.P.E. Programme had six interrelated components of which one was to unleash the potential of protected areas. Priority landscape initiatives *inter alia* biosphere reserves were included under this component. Subsequently in 2006 the KBR was allocated a substantial GEF grant (for what was referred to as the C.A.P.E. Kogelberg Project) for an initial period of three years

that was later extended to four years. For various practical reasons, CapeNature was given the task to administer the funds in collaboration with the KBRC. The grant was originally earmarked for three specific project outcomes, namely:

1. Establish a Kogelberg marine protected area and pilot fisheries co-management arrangements;
2. Develop and implement plans for responsible tourism in the Kogelberg Biosphere Reserve including marine protected area;
3. Develop Protected Area business plans and mechanisms for financial sustainability for the Kogelberg including the marine component.

The grant enabled the KBRC to appoint a biosphere reserve coordinator that was done in June 2006. A KBR office was established with a permanent administrative officer and thus at last the KBRC had a permanent space with a staff complement of two people. Unfortunately the coordinator did not perform as anticipated and was removed from office in September 2007. This created the need for CapeNature to step in and facilitate the restructuring of the C.A.P.E. Kogelberg Project into four dedicated components:

1. Marine conservation

A contract was negotiated with WWF-SA to be the responsible institution for this component. A marine manager was appointed as a staff member of WWF-SA. The main deliverable of this component was an integrated management plan for the Kogelberg coast that was completed in 2009. In addition a marine situation assessment (including socio-economic and spatial assessments) and a marine co-management report for the Kogelberg coast were prepared by a team of consultants.

2. Governance issues

An amount of money was allocated to the KBRC for the specific purpose of recruiting a new coordinator and to support the KBRC office.

3. Small/medium grants funding

A small grants project was established with both CapeNature and the KBRC as joint implementing partners. A project framework identified three strategic directions that had to be equally addressed through projects:

Strategic Direction 1: Unleashing the potential of the Kogelberg Biosphere reserve through responsible tourism

Strategic Direction 2: Implement Community-based Natural Resource Management projects within the Kogelberg Biosphere Reserve

Strategic Direction 3: Raising awareness of, and share lessons on the Kogelberg Biosphere Reserve

Eventually four different projects, each with community involvement, were approved and successfully completed.

#### 4. Expansion of protected areas

This component was split into two outcomes, the first of which was the contract appointment of a Kogelberg stewardship officer who worked with landowners towards securing priority biodiversity corridors. The second outcome was to obtain the services of a botanist that could identify the top priorities for stewardship action within the Kogelberg domain with accompanying detailed site reports.

The restructured C.A.P.E. Kogelberg Project enabled the appointment of a new coordinator in April 2008, who collaborated with CapeNature on the successful completion of all four project components in June 2010.

Through the C.A.P.E. Kogelberg Project many benefits were accrued to the Kogelberg area. Unfortunately the completion of the project also marked the end of the funding cycle. The KBRC could not manage to secure additional funds timeously and thus the services of the coordinator could not be extended.

#### ***5.1.4.3 Strengths of the Kogelberg Biosphere Reserve***

Given the three functions of a biosphere reserve, the conservation function is being addressed best within the KBR. This is as a result of excellent communication between the managers of the various core areas, namely CapeNature's Kogelberg Nature Reserve and other smaller state forest areas, the City of Cape Town's Steenbras catchment area, and the South African National Botanical Institute's Harold Porter Botanical Gardens (Johns 2010). Managers interact with co-operative support in cases that involve all areas across boundaries such as fires and alien vegetation management. All of the core areas have strict management guidelines that the managers have to adhere to. Ecological research and monitoring is enshrined in the management plans of the core areas. One of the objectives of the Kogelberg Nature Reserve specifically states "*co-operative ecological management*" of the different areas as "*core areas of the Kogelberg Biosphere Reserve*". Sections of the core area also form part of the extensive Cape Floral Region Protected Areas World Heritage Site. This was a serial nomination and the site was inscribed on the World Heritage List in 2004. It is made up of

eight protected areas covering 553 000 ha. One of the protected areas is named the Boland Mountain Complex and it includes *inter alia* the Kogelberg Nature Reserve, Highlands State Forest and Groenlandberg, all of which form part of the KBR core areas.

The Harold Porter Botanical Gardens has a special project for environmental education. During designated environmental weeks such as marine week and arbor week, the Botanical Gardens educate school learners on specific topics. Information about the biosphere reserve is included in their programs.

The notion of sustainable development is strongly supported by all administrative authorities. At designation of the KBR, the Kogelberg Nature Reserve core area included a small development of five wooden houses that were being rented out for visitors. Recently this development footprint has been redesigned according to sustainable principles and rebuilt in 2011 to incorporate a more environmentally-friendly tourism development on the same footprint.

#### **5.1.4.4 Current challenges of the Kogelberg Biosphere Reserve Company**

Documentation relating to the KBRC including the Articles and Memorandum of Association was revisited during 2008 and subsequently updated and resubmitted to the registrar of companies. During this process the main objective of the company was changed from the rather cumbersome previous description to a much more concise objective (see Text Box 8).

##### **Text Box 8: Main objective of the Kogelberg Biosphere Reserve Company**

Previous version:

*“The main business which the Company is to carry on is the conservation and protection of the natural environment, including flora, fauna and the biosphere, in the Kogelberg conservation area and the promotion and management of such area as a biosphere.”*

New version:

*“The main object of the company is to manage the Kogelberg Biosphere Reserve in accordance with UNESCO’s Man and the Biosphere Programme.”*

The Technical Committee as described in the old company documentation was renamed to the Management Committee that has the main task of supporting the Board of Directors with technical expertise. The new company structure has made it possible to elect a new Board of Directors that was done at a special general meeting in December 2009. The new directors have a challenging time ahead to guide and direct the KBR towards a secure future and to raise awareness of, and support for the biosphere reserve amongst all levels of society. The directors have monthly meetings, supported by the Management Committee.

Given the lack of monetary resources, the directors and Management Committee have identified two priority activities for immediate action, namely (i) the drafting of a framework plan for the KBR that would provide guidance on preferred land uses of the various zones, and (ii) a funding strategy to secure the position of a biosphere reserve coordinator for a reasonable time period.

In respect of marine conservation issues, a Kogelberg Marine Working Group has been in operation since 2007. The working group operates with the support of, and in liaison with the KBRC, WWF-SA and the C.A.P.E. Program. Important outputs from the marine working group included documentation produced under the marine conservation aspects of the C.A.P.E. Kogelberg Project. Currently Marine and Coastal Management falls under two national departments - Department of Environmental Affairs and Department of Agriculture, Forestry and Fisheries. The Kogelberg coastline is one of three marine priorities within the Western Cape Province and will be addressed within the framework of a Marine Protected Area, which is a multi-managed area including specifically identified recruitment zones. The great achievement with marine conservation processes in the Kogelberg region is that it now has the support from national government through formally established strategies that align with the ten priorities of national government.

Despite serious problems with increased abalone poaching in the Kogelberg area, the state president promised local residents in 2009 he would consider lifting the ban on commercial abalone harvesting. In light of this statement, potential political interference in marine conservation aspects is being regarded as terribly dangerous and could cause serious complications (Heydorn & Clarke 2010). Illegal exploitation of abalone is being stimulated by exceedingly high black market prices. Commercial value of the abalone resource outcores the combined values of all other marine resources and is estimated in excess of R100 million per annum (Clarke *et al.* 2002). It is foreseen that the newly established national strategies would assist in providing up-to-date information to the powers that be to support well-considered decisions.

### 5.1.5 Results

Data obtained through content analysis, interview surveys, questionnaire surveys and observations were used towards a portrayal of the past and present situation of the KBR.

The semi-structured interviews provided opinions related to the effectiveness of the KBR.

Descriptive results are summarized in Annexure 5. A general rating of between 1 and 3 (where 1 means not meeting the criteria at all, 2 means a middle of the road performance, and 3 means a good performance) was allocated for each component based on the performance of the biosphere reserve as expressed by the interviewees. Out of a potential total of 33, the KBR scored 23 (69.7%).

The questionnaire survey (Annexure 3), completed by the seven interviewees, consisted of personal information (box 1) and three question boxes (boxes 2 to 4). Question box 2 provided interviewees the opportunity to put forward an opinion on five questions of a general biosphere reserve nature. The first question was: *“In your opinion, is the biosphere reserve concept a valuable tool with which to do landscape management in South Africa?”* Of the seven interviewees, five gave a ‘yes’ response and two indicated ‘maybe’.

The second question was: *“In your biosphere reserve, do you think the designation is adding value to the area?”* One interviewee noted *“benefits have been difficult to quantify as they are not being specifically monitored so they are an informed guess”*. Five interviewees reacted positive and two mentioned ‘somewhat’.

The third question elicited a reaction on institutional support for the KBR - *“Is the organization that you represent in support of the biosphere reserve?”* Five interviewees responded ‘yes’ and two indicated ‘not fully’.

The fourth question produced interesting opinions on the ideal of an effective biosphere reserve. The question *“Are you of the opinion that the management entity of your biosphere reserve is doing a good job of managing the biosphere reserve effectively?”* was answered with a statement of ‘somewhat’ by six interviewees and only one responded ‘yes’. Two interviewees specifically mentioned the need for increased landowner support and another one noted the need to be proactive in gaining cooperation from municipalities.

The last question turned out a positive response by all seven interviewees - *“Do you truly agree with the statement ‘biosphere reserves are special places for people and nature?’”*

The third box addressed problems and challenges faced by the KBR. Interviewees were given 10 elements to order in priority from highest to lowest. The responses were analyzed with matrix ranking, specifically preference ranking (Margoluis & Salafsky 1998). The collective ranking from highest to lowest came out as follows (Table 13):

**Table 13: Kogelberg Biosphere Reserve collective ranking of list of problems/challenges**

KBR Collective Ranking of List of Problems/Challenges	
1	Support (buy-in) from local authorities (municipalities)
2	Too little benefits perceived by local communities resulting in a lack of support
3,4	Insufficient long-term financial resources
3,4	Too little awareness amongst role-players and local communities
5	Insufficient legal means (lack of ‘teeth’) to implement the biosphere reserve concept

6	Not enough insight into the value of implementing the biosphere reserve concept
7	Biosphere reserve concept not strongly supported by national government
8	Lack of dedicated biosphere reserve personnel
9	Lack of long-term vision and objectives
10	Too much of a conservation (green) focus and not enough emphasis on other issues such as development

Untimely wildfires were mentioned by two interviewees as an additional management challenge, specifically in the core of the biosphere reserve. Another interviewee put specific emphasis on the problems with marine conservation and the lack of cooperation between the three tiers of government. There is an obvious problem with overexploitation and poaching in the marine component. One interviewee noted *“How do you tell people to stop illegal activities when they are struggling to make ends meet”*. This is a particular challenge in the KBR. Political will in supporting the MAB Programme in the country was identified as a major challenge.

The fourth box addressed positive elements linked to the KBR. Interviewees were again given 10 elements to order in priority from highest to lowest. After analysis of the responses with preference ranking (Margoluis & Salafsky 1998), the collective ranking from highest to lowest came out as follows (Table 14):

**Table 14: Kogelberg Biosphere Reserve collective ranking of list of positive elements**

KBR Collective Ranking of List of Positive Elements	
1	The biosphere reserve concept is a tool with which to facilitate collaborative management to the benefit of the region
2	The biosphere reserve has resulted in people becoming more aware of their interconnectedness to the natural environment
3,4	The biosphere reserve provides a means to attract international funding to the region
3,4	The biosphere reserve creates awareness about sustainable development
5	The biosphere reserve creates an opportunity for communities to be involved in management decisions about the future of their area
6	The biosphere reserve creates international visibility for the area
7	A biosphere reserve is much different (in a positive way) to a traditional protected area such as a national park or nature reserve
8	The biosphere reserve has resulted in increased property values
9	The biosphere reserve attracts more tourists/visitors
10	The biosphere reserve created more jobs in the area

In both the lists of challenges and positive elements, positions three and four were given identical collective rankings. One of the highlighted benefits is the protection that the biosphere reserve

concept provides against unsuitable development, specifically in the core and buffer areas. This must be seen in conjunction with the implementation of the biosphere reserve zones through incorporation into spatial framework plans. A positive impact on conservation and associated research was mentioned as something to not overlook. Although collaborative management was identified as the number one positive element, the lack of sufficient involvement of marginalized people in the KBR was noted as of concern.

Through the series of personal interviews, some pressing challenges for the future of the KBR were identified. The most serious of these challenges is to secure the integrity of the buffer zone (Johns 2010). In the KBR region, most of the buffer zone consists of private smallholdings. Some of those have absentee landowners and most are only used for single residential or holiday purposes. It is only recently that an increasing number of smallholding landowners are applying for development rights for agricultural purposes or to create small tourist resorts. Approvals of such applications result in negative impacts on the integrity of the buffer zone. The KBR does not have a continuous buffer but where the buffer does border onto the core it plays a very important role to protect the core from outside influences such as wild fires and the spreading of alien vegetation. With a constant increase in development applications, there is a shortage of available land for future expansion. Thus future developments would end up compromising sections of either the buffer or the core areas. It is being argued that the KBR needs a much heavier hand in implementing the objectives of the biosphere reserve. The KBRC needs to provide inputs into development applications to ensure that biosphere reserve principles are being observed (Green 2010). Currently the KBRC does not have the capacity to fulfil this very important task.

The KBR completed their first ten year review for UNESCO in 2009. This process was seen as very positive as it forced the biosphere reserve management entity to evaluate the direction they are taking (Dehrmann 2010). The lack of response from UNESCO following submission of the periodic review document was however noted as a concern. UNESCO should be more involved in providing direction and guidance to biosphere reserves as a follow-up action to the periodic review.

During the interviews, a few respondents mentioned the challenge of implementing a biosphere reserve effectively without tangible support from all tiers of government. The most preferred model was outlined by a politician as the ideal situation where national government would channel funding through provincial and local government to a biosphere reserve non-profit organization for the promotion of biosphere reserve principles (Smuts 2010). One of the respondents put it strongly *“We will never be able to run a biosphere reserve without input from government”*.

Benefits of the KBR to the general public as mentioned during the interviews included environmental protection of specific areas; tourism opportunities; the possibility of job creation (although seen as subsidiary); environmental services such as clean air and clean water; (hopefully) the future restoration of marine species; community involvement to a higher degree than other protected areas; fire management and alien clearing support to members of urban conservancies within the KBR. One interviewee noted the biosphere reserve is being perceived by some inhabitants as an area where their assets (mainly real estate) are being protected, in other words a purely economic reason for supporting the biosphere reserve concept.

Collective results of the multicase are discussed in Chapter 6.

### 5.1.6 Discussion

Collective results of all data showed a strong support for the biosphere reserve concept as a tool for landscape management in the South African context. Equally, the only question on the electronic questionnaire that got a unanimously positive response was agreement to biosphere reserves being “*special places for people and nature*”. The fact that the correct implementation of a biosphere reserve results in a ‘collaborative management tool’ has been ranked number one of the positive elements. This could however refer to the interviewees’ viewpoint on an ideal situation, given the contradiction that a lack of support from local authorities was ranked highest of the challenges faced by the KBR. Linked to this issue is the only question with a definite negative response, namely the opinion on the effective management of the KBR. Of the interviewees 6 out of 7 responses indicated the biosphere reserve is not managed as effectively as it should. A number of interviewees referred to the need for increased support from local authorities, landowners and impoverished communities. In contrast, it was noted that the biosphere reserve should show support specifically to impoverished communities in ways that could add to improving livelihoods through resource utilization and job creation. However, the creation of new job opportunities was ranked last of the positive elements of the biosphere reserve.

After careful screening of all responses, the collective impression was one of a biosphere reserve with great potential, but one that is not being implemented very effectively. The KBR is doing very well in certain functional areas such as biodiversity conservation. A negative on the side of the marine component is the struggle between administrations to implement effective marine conservation mechanisms and to obtain the collaboration of relevant communities.

Zonation of the biosphere reserve is in place and was instilled into municipal planning documentation through the drafting of the Kogelberg Biosphere Reserve Framework Plan that also addressed specific development guidelines for each zone. The KBR is being managed by a well-

respected Board of Directors of the independent Kogelberg Biosphere Reserve Company. It is guided by a strategic management framework with a vision and clearly identified objectives. The biosphere reserve however falls short of pursuing partnerships with relevant institutions and communities more rigorously. This directly reflects on the level of support from municipalities, with an impact on the provision made for the biosphere reserve in the annual municipal budgets. At present the KBR receives some financial support from one of the local authorities, but no contributions from the other three authorities, which is a serious concern. The financial future of the KBR is quite bleak. In addition the KBR will have to face many challenges in the coming years. One interviewee mentioned the success of a biosphere reserve is directly relevant to the team who is driving it and that the concept is “*very difficult to implement*”.

A biosphere reserve should add tangible value to an area despite of existing spatial frameworks and interventions. The biosphere reserve designation usually adds another spatial layer that could complicate on-the-ground management between varied administrations. One interviewee mentioned the importance of ‘added value’ although it is very difficult to quantify. It could result in organizations and communities not fully supporting the biosphere reserve simply because they are not convinced of the benefits of the concept.

Many of the problems and challenges faced by the KBR as noted by respondents and interviewees reflect back to the important discussion on how exactly to enforce a biosphere reserve in the South African legal context. One interviewee noted a biosphere reserve could provide protection against unsuitable development in certain areas, but to do this the biosphere reserve zones need to be enforceable. It is widely acknowledged that biosphere reserves need some kind of mechanism to ensure their effective implementation. Such mechanisms could include options along a wide range from basic collaborative methods to strict enforcement through legislation. An example of the latter exists in Cambodia where a royal decree has been implemented as the legal basis for biosphere reserve implementation (Bonheur 2001). In a study on the KBR, Hyman (2006) noted that legislative support for biosphere reserve functions is needed in running a successful biosphere reserve.

In South Africa, biosphere reserves are being implemented according to a soft-law approach (Stanvliet *et al.* 2004a) as it is not included in the Protected Areas Act as a specific type of protected area (NEM:PAA 2003). This approach makes it difficult to influence land-use decisions. The best practical option is to inscribe biosphere reserve zonation into an official spatial planning framework which will then be enforceable through provincial planning legislation. Thus, in 2010 the Kogelberg Biosphere Reserve has started the process of drafting a biosphere reserve framework plan, which was completed in 2012. This plan is grounded in the provincial bioregional planning framework (Department of Planning, Local Government and Housing 2000) and uses Spatial Planning Categories

to reflect the three tiered zonation of the biosphere reserve. Specific development guidelines for each zone are noted in line with the Seville Strategy for Biosphere Reserves, but at the same time very much site specific.

Throughout this study a number of issues were repeatedly noted, and proved through the process of triangulation (Margoluis & Salafsky 1998), as of importance in ensuring an effective biosphere reserve. These include some sort of legislative support; long-term political commitment; an efficient management entity; designated staff members; a sustainable funding stream; and buy-in from landowners, as also noted by Hyman (2006), a *“fair measure of goodwill”*. Most importantly is obtaining the delicate balance between biodiversity conservation and economic viability, in other words the *“people first”* challenge without compromising this most needed balance.

### 5.1.7 Synopsis

In light of the incredible biodiversity wealth of the region, the KBR is indeed a special place on earth. Its scenic beauty contributes to the area being widely regarded by inhabitants as a special place in which to reside.

Initial discussions about a biosphere reserve for the area started as a controversy over construction of a major dam in the Palmiet River, much alike the opposition to the Perimetral Road Project that gave rise to the São Paulo City Green Belt Biosphere Reserve (Victor *et al.* 2004). Many years later, after much deliberation between various role-players, the KBR was designated by UNESCO in 1998. During the first number of years following designation, the management entity changed shape a few times. Eventually an independent private company was selected as being the best vehicle. Thus the Kogelberg Biosphere Reserve Company was registered in 2002 and updated and re-registered in 2008.

Now, after more than 10 years of existence, the KBR is finding itself at a tipping point. It is being managed by a well-structured company and has an established Board of Directors guided by a Strategic Management Framework, Management Committee and office staffed by one administrative officer. However, without a designated coordinator, limited operational funding and no long-term secure financial support, the future does not look too promising. Results of the case study showed a general more positive than negative attitude towards management of the biosphere reserve. This could be due partly to long-term involvement and a strong sense of commitment on the side of the interviewees, but could also reflect a true belief in the potential of the biosphere reserve concept as a landscape management tool in South Africa. One interviewee specifically pointed out that the biosphere reserve concept *“is more likely to work than traditional nature reserves”*.

It is of the utmost importance for the KBR management entity to get their house in order, as clearly stated during one of the interviews “*we need to make our own future*”. The KBR is abound with opportunities, but, as one interviewee noted, the company is presently “*out of touch*” with real-life management challenges. The KBR needs strong leadership to secure a sustainable future otherwise the KBR could most likely end up as a biosphere reserve on the brink of collapse. It remains to be seen whether the South African national government will intervene in such an unfortunate situation.

## **5.2 Management Model for a Section of the South African Coastal Zone: A Case Study of the Cape West Coast Biosphere Reserve**

*“The land of the big blue sky” (Jimmy Walsh)*

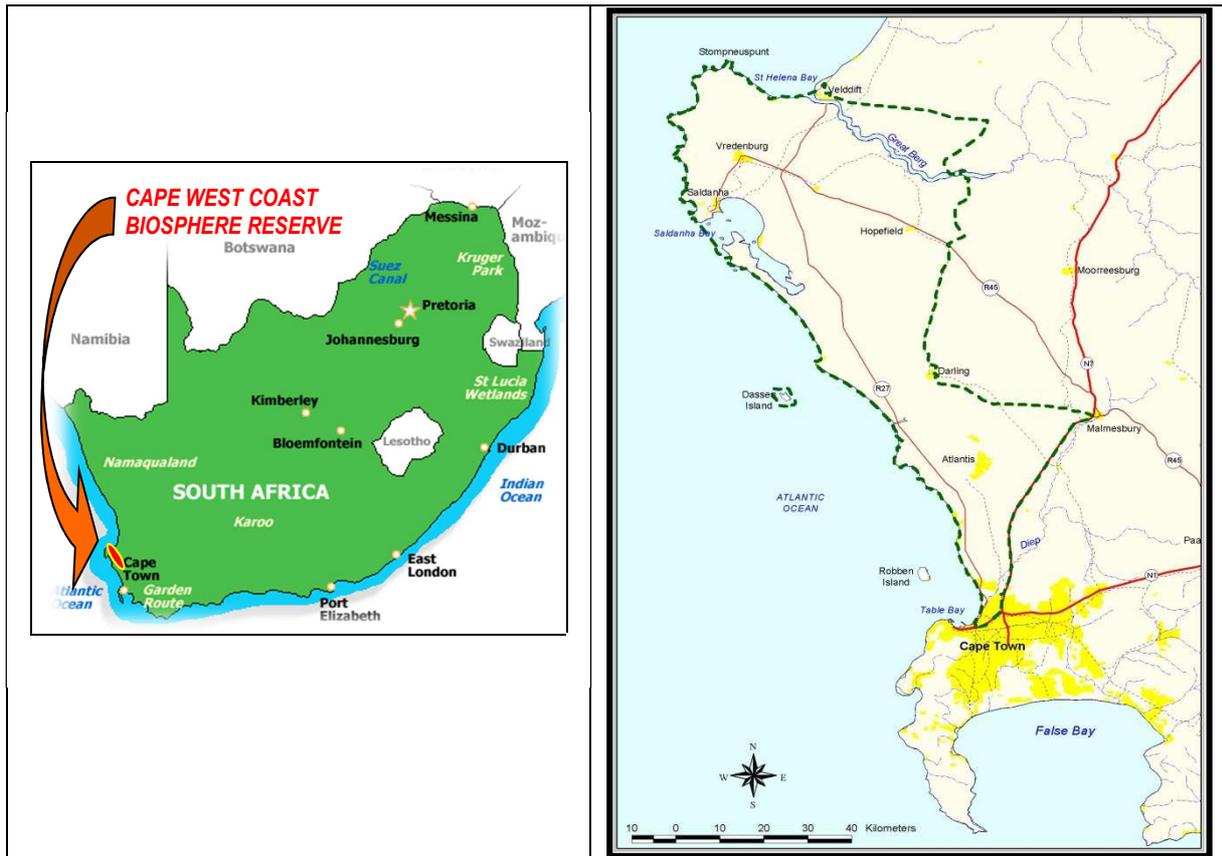
### **5.2.1 Overview**

The Cape West Coast Biosphere Reserve (CWCBR) has been designated by UNESCO under the MAB Programme in November 2000. The success of the designation has been the result of a long process of negotiation and participation by a large number of individuals, institutions and authorities.

The CWCBR is a vast expanse hugging the southernmost section of the western coastline of South Africa. It covers 378 000 ha, stretching from the City of Cape Town in the south to the mouth of the Berg River in the north. It has the magnificent West Coast National Park as a terrestrial core area and the seascape surrounding Dassen Island as a marine core. Buffer and transition zones include land resorting under the City of Cape Town, the West Coast District Municipality, and three local authorities, namely Swartland, Saldanha Bay and Berg River.

### **5.2.2 General Description of the Cape West Coast**

South Africa’s western coastline stretches from Cape Town in the south to the mouth of the Orange River in the north at the border with Namibia. The area of the CWCBR comprises the southernmost part of this coastline, stretching from the mouth of the Diep River in the Cape Town metropolitan area to the Berg River estuary, some 180 km up coast (Figure 8). To the east it stretches inland to include the sand dune area of Atlantis, the Darling hills, the area around the Elandsfontein fossil site and the lower sections of the Berg River. Dassen Island, about 15 km offshore, is included in the CWCBR as part of the core area. The Saldanha Port, situated in Saldanha Bay, the deepest natural harbour in Africa, is included in the CWCBR.



(Acknowledgement: Cape West Coast Biosphere Reserve Company)

### Figure 8: Location of the Cape West Coast Biosphere Reserve

The region has unique natural resources that support a variety of industrial sectors including agriculture, tourism, mining, and fishing. The hub of South Africa's commercial fishing is situated on the West Coast. Other important economic sectors include the minerals beneficiation plants of Namakwa Sands and Saldanha Steel (DEAT 1999). The Cape West Coast is subjected to increasing development pressures and demands on the utilization of natural resources. In order to uphold the quality of life of its inhabitants and to secure the conservation of its biological diversity that underpins the health of all systems, including humans, the region stands to benefit greatly from a holistic management framework such as what the CWCBR offers.

The greater Cape West Coast region is of immense value in the conservation of avifaunal biodiversity because of the long coastline, a number of Ramsar sites and estuaries. The Langebaan lagoon is a registered Ramsar site that falls within the CWCBR and is an important habitat for wader bird species as well as other animal species such as fish, mussels and clams. The Langebaan lagoon is also protected according to the Bonn Convention on migratory birds. Another important bird sanctuary is the Riet Vlei Wetland Reserve on the southern boundary of the CWCBR.

The Berg River, having a permanently open river mouth, is being regarded as crucial to the fish life of the Cape West Coast. The river cuts across the northernmost section of the biosphere reserve.

Game farming and the accompanying introduction of indigenous game species are becoming more and more a land use of choice in this region. This practice is deriving income from the sustainable use of biodiversity resources and is making the people more aware of sustainable land-use possibilities.

The West Coast National Park is the main conservation area along the Cape West Coast. The park surrounds the Langebaan lagoon and offers a wide array of bird life, antelope and a spectacular display of spring flowers. Salt marshes in the park are home to large concentrations of migrant wader birds from the northern hemisphere. The park offers environmental education programs based at the Geelbek centre on the shores of Langebaan lagoon.

Despite the marked increase in population numbers from the 1996 census to the 2001 census, the area is still very sparsely populated with the majority of people residing within the city of Atlantis and on the Saldanha peninsula. As expected, the core areas are virtually uninhabited, the buffer zones have small population densities and by far the majority of people live within the transition areas. Most of the population speak Afrikaans with English as a second and widely understood language. The West Coast Fossil Park at Elandsfontein, a declared national monument, houses many discoveries of prehistoric animals, as well as the fossilized human footprints of 117 000 years BP that was excavated from Kraal Bay at the Langebaan lagoon in 1995 (Roberts 2002).

The West Coast's vernacular dwellings are of a very specific style that can still be seen in many historic homes. In many coastal settlements, the West Coast architectural style is being preserved and new buildings are being erected using the same style elements of which the much sought-after coastal town of Paternoster is a good example.

### **5.2.3 Inception of the Cape West Coast Biosphere Reserve**

UNESCO organized the much cited Biosphere Reserve Conference in Seville, Spain in 1995. After the conference, staff members of UNESCO paid an official visit to South Africa that included site visits to the Cape West Coast and the Kogelberg areas. Collaborations with local communities subsequent to the UNESCO visit resulted in support for the idea of a biosphere reserve on the Cape West Coast.

During 1995 the Western Cape provincial cabinet approved a submission on the implementation of bioregional planning as a basis for spatial planning in the province. Deliberations relating to the MAB Programme and biosphere reserves resulted in a bioregional planning approach for the Western Cape that was drafted under contract by the DEA&DP. The bioregional planning framework

(Department of Planning, Local Government and Housing 2000) provides guidelines for all spatial planning documentation in the Western Cape Province and biosphere reserves are identified as a spatial model for implementation of the principles.

The bioregional planning framework paved the way for future biosphere reserve nominations. The Cape West Coast Biosphere Reserve followed on a spatial planning process by the local municipality and thus the establishment of the biosphere reserve was very much a top down approach (De Witt 2009). A steering committee, chaired by a local resident, was established to work with the consultants who compiled the spatial development plan for the West Coast District Municipality. This West Coast Sub-regional Structure Plan identified the opportunity of establishing a biosphere reserve and the feasibility of such an option was investigated in a report following a pilot study in 1995. Subsequently in 1996, a discussion document on a biosphere reserve along the Cape West Coast was generated. The process of establishing the Cape West Coast Biosphere Reserve thus had very much an element of spatial planning and development. This process preceded the biosphere reserve nomination, submitted to UNESCO in 1999.

In March 1997, a workshop was held to discuss the proposed biosphere reserve for the Cape West Coast. The name 'Cape West Coast Biosphere Reserve' was decided upon and, interestingly enough, the issues that were highlighted to be emphasized included the importance of public participation, unanimity between stakeholders in decision-making, and a focus on communication with UNESCO relating to themes such as land uses, zonation and background on reasons for nominating the area as a biosphere reserve. A formal public consultation process was undertaken during 1997 and 1998. Personal involvement of various people in support of the MAB Programme aided progress with implementation of the biosphere reserve. Through communication with local communities, three reasons were identified in support of establishing a biosphere reserve, namely good governance, collaborative management and the ideal of sustainable development (Du Toit 2010).

In 1998 (before designation) an interim management committee was selected to steer the nomination process. In April 1999 a constitution for the Cape West Coast Biosphere Reserve was approved at a meeting where eleven members of a management committee were elected, representing the following sectors (DEAT 1999):

- Land owners / Rate Payer's Associations
- Industry
- Community
- Provincial and National Government
- Local government

- Agriculture
- Tourism
- Environment
- Parastatals

The new management committee was designated to become a private company, registered as a non-profit organization, in the future. Anticipating the future company, directors were elected in April 1999, representing a specific portfolio, or the core, buffer, transition, or one of the tiers of government. There were seven portfolios:

- Administration
- Community development and labour
- Environmental affairs and research
- Agriculture and mining
- Public relations, marketing and education
- Economic and spatial development
- Tourism

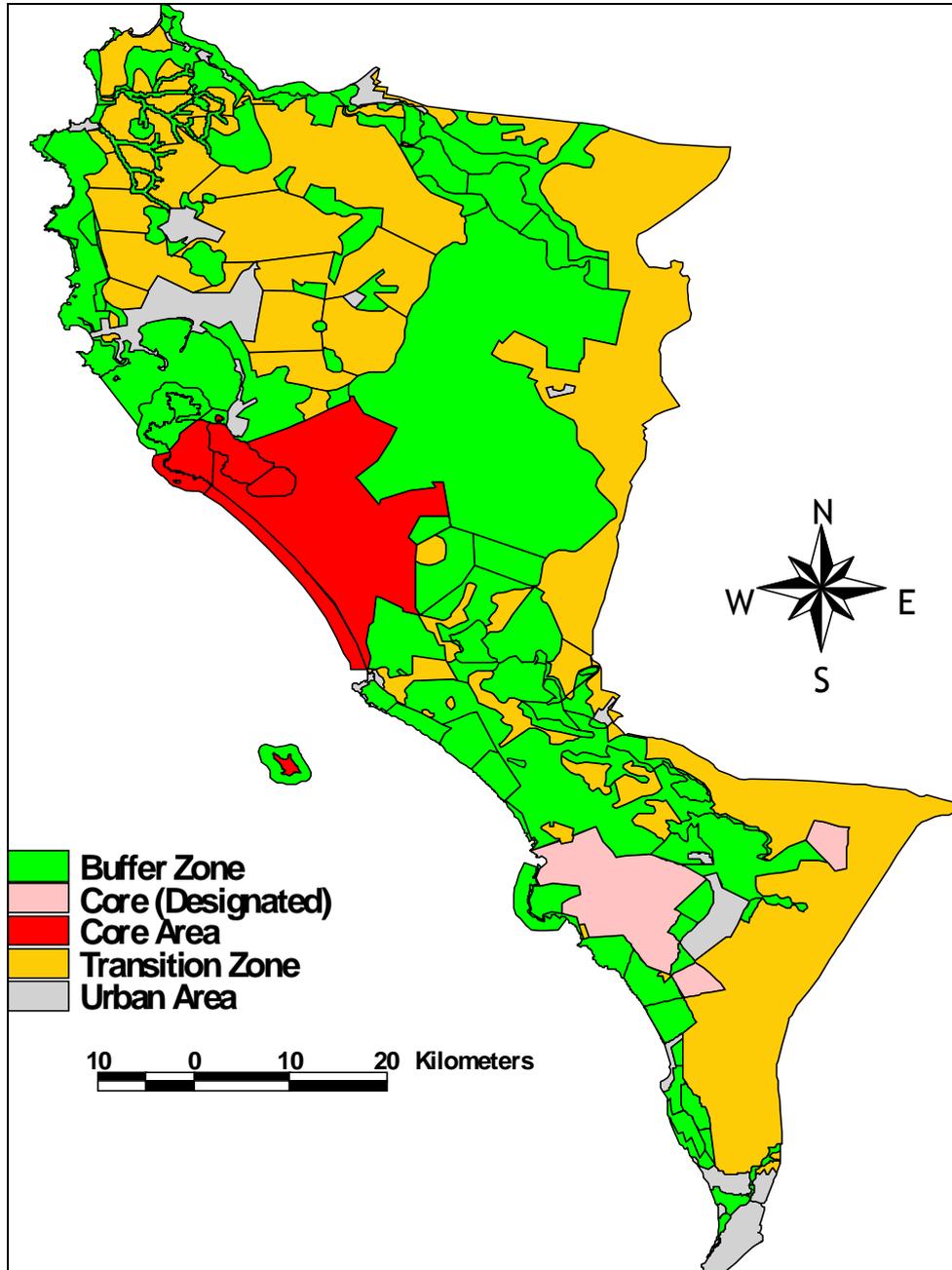
The management committee had the immediate function of overseeing the preparation of the biosphere reserve nomination, updating the constitution, and drawing up a management plan.

#### **5.2.4 Features of the Cape West Coast Biosphere Reserve**

The CWCBR was designated by UNESCO in 2000. It encompasses an area that is characterized by a unique mosaic of diverse ecosystems, including marine areas, wetlands, dune fields, plains covered with indigenous vegetation, and rocky outcrops. The area houses about 1 500 plant species of which some 8.5% are endemics (DEAT 1999).

Initial identification of the core zones and buffer areas of the biosphere reserve was based on biological criteria, given the fact that some vegetation communities are under-represented in the existing protected area system (Heijnis *et al.* 1999). The zonation of the biosphere reserve includes a designated core area (the West Coast National Park) of 33 685 ha, an area earmarked as a future southern core of 13 805 ha, buffer zones of 172 643 ha and transition zones of 157 867 ha (Figure 9). The future core area comprises the Witzand dune fields at the city of Atlantis, as well as some public lands with important biodiversity in the southern section of the CWCBR, including a 20 km stretch of coastline. The marine surrounds of Dassen Island form the marine core area. Designated core areas only comprise 15% of the total area of the CWCBR. Private agricultural lands that are used to a degree for stock farming or the harvesting of wild flowers are included in the buffer. Important culturally historical sites are included in the buffer, such as the fossil site where the prehistoric sabre

tooth lion and 'Saldanha Man' were discovered; and the site of the Battle of Blaauwberg that took place in 1806. The transition zone covers intensive agricultural lands, towns and smaller settlements, resort developments and undeveloped lands that are densely invaded by alien vegetation.



(Acknowledgement: SetPlan)

#### Figure 9: Zonation of the Cape West Coast Biosphere Reserve

Dassen Island was added as an extension to the biosphere reserve and included into the core area in 2003. The island is about 10 km from the shore and is 220 ha in size. It is a low-lying, flat island with the highest point only 19 m above sea level. The island, being uninhabited apart from the reserve manager and lighthouse keeper, is a haven for a wide variety of birds. The most important species

for management interventions with the highest conservation priorities are the African penguin; white pelican; bank, crowned, Cape and white-breasted cormorants; African black oystercatcher; swift tern; Hartlaub's gull and Leach's storm petrel. The island has a resident reserve manager and an approved management plan.

The Langebaan Ramsar site, designated in April 1988, includes four small islands and the Langebaan lagoon, a 15 km long saline water body. The lagoon forms the focal point of the West Coast National Park.

In contrast to its biological wealth, the area of the CWCBR also encompasses extensive commercial and industrial enterprises. The Koeberg Nuclear Power Station, the only nuclear plant in the country, is located within the CWCBR and includes the Koeberg Nature Reserve of 3 000 ha. Koeberg is a pressurized water reactor system that uses sea water for cooling. It is the only biosphere reserve in the world that includes a nuclear power station and an oil refinery.

#### **5.2.4.1 Vegetation**

The Cape West Coast Biosphere Reserve (CWCBR) falls within the Cape Floristic Region, the smallest and most diverse of the six plant kingdoms of the world (Cowling & Hilton-Taylor 1994; Takhtajan 1986).

South Africa's natural systems are divided into 9 biomes. The CWCBR falls wholly within the Fynbos Biome that comprises only 6.6% of South Africa's land cover. As subunits, three distinct bioregions, namely the West Coast Renosterveld Bioregion (the most threatened bioregion in the Western Cape Province), the Southwest Fynbos Bioregion and the West Strandveld Bioregion, are being realised within the land area of the CWCBR (Mucina & Rutherford 2006).

At a more detailed vegetation level, Mucina & Rutherford (2006) identify a number of different vegetation types within the CWCBR, namely Sand Fynbos (units Hopefield Sand Fynbos and Atlantis Sand Fynbos), Shale Renosterveld (unit Swartland Shale Renosterveld), Granite Renosterveld (unit Swartland Granite Renosterveld), Western Strandveld (units Saldanha Granite Strandveld, Saldanha Flats Strandveld, Saldanha Limestone Strandveld, Langebaan Dune Strandveld and Cape Flats Dune Strandveld), Estuarine Vegetation (unit Cape Estuarine Salt Marshes), Seashore Vegetation (unit Cape Seashore Vegetation) and Inland Saline Vegetation (unit Cape Inland Salt Pans). The vegetation unit on Dassen Island is Langebaan Dune Strandveld.

Infestation by alien vegetation is a major threat to biodiversity conservation in the area. Such infestations cover vast areas and displace natural vegetation. The alien trees also reduce recharge and as such have a marked influence on water availability through aquifers. The large aquifers that

the city of Atlantis depends on for its entire water supply are being threatened by dense alien infestations.

#### **5.2.4.2 Fauna**

The enriched waters of the cold West Coast Benguela marine system support a large diversity of sea-life such as anchovies, snoek, rock lobster and whales. Heaviside's dolphin (*Cephalorhynchus heavisidii*), Southern right whale (*Eubalaena australis*), humpback whale (*Megaptera novaeangliae*) and Bryde's whale (*Balaenoptera edeni*) are periodically seen off the coast of the CWCBR (DEAT 1999). The rocky intertidal zone is covered with mussels and limpets.

Although seldom observed, several small mammals and reptiles occur within the CWCBR. Species include (amongst many others) duiker, steenbok, Cape grysbok, Cape grey mongoose, porcupine, Cape dune mole rat, Cape golden mole, angulate tortoise, Cape legless skink, Cape girdled lizard, spiny agama, Namaqua dwarf chameleon, Namaqua rain frog, Cape sand frog, many-horned adder, coral snake and Cape sand snake (DEAT 1999). Large mammals conserved within protected areas of the CWCBR include black rhino, eland, springbok, red hartebeest and bontebok.

The CWCBR is a birder's haven. The extensive intertidal area of the Langebaan lagoon supports up to 55 000 water birds in summer, most of which are waders. The Saldanha Bay islands to the north of the lagoon are home to nearly a quarter of a million sea birds, including Cape gannets, Cape cormorants and kelp gulls. Saldanha Bay and Langebaan lagoon have a surface area of approximately 13 000 ha. Another exceptional bird area is the Berg River estuary that is being regarded as the most important vlei area in terms of wader bird numbers in South Africa (DEAT 1999; Hockey & Velasquez 1992). The Berg River is one of only four estuaries in the country that are permanently open to the sea (Hockey & Velasquez 1992). Forty-four wader species have been recorded at the Berg River estuary and more than 240 species along the tidal reaches of the river (Hockey & Velasquez 1992). The Rietvlei Wetlands Reserve in the southern section of the CWCBR is also an important vlei area for wader birds and is a declared Protected Environment under the Protected Areas Act.

#### **5.2.5 Current Structure of the Cape West Coast Biosphere Reserve**

The biosphere reserve is managed through a private company with representation by all major stakeholders from an office near Darling, a centrally situated small town. Currently the CWCBR has a staff complement of four with additional capacity in the form of interns who assist for shorter periods of up to a year. During 2010 the CWCBR had the privilege of hosting five interns of whom three were foreigners. The staff members are all appointed in contract positions of various periods. The coordinator's position is funded from international sources, the conservation stewardship officer is funded by WWF-SA Table Mountain Fund, the third contract position is that of an

environmental educator and the fourth position is an administration officer whose position is permanently funded by the DEA&DP. The latter also provides sufficient funding for daily operational expenses related to the office, according to a memorandum of agreement.

#### 5.2.5.1 Institutional Authority

The institutional authority of the CWCBR is a private company, registered as a non-profit organization under the South African Company Law and has been issued a certificate under the Income Tax Act (Act 58 of 1962) with regards to deduction of donations to the company. The company has a Board of Directors that is supported by a committee of technical advisors (Figure 10). The Board of Directors has a Chairperson and 7 portfolio directors. Portfolios include Tourism; Education; Communications and Marketing; Agriculture and Mining; Administration and Financial; Community and Labour Affairs; and Biodiversity. In addition there are directors responsible for the Northern Area and Southern Area. Technical advisors include representatives of the five local authorities (City of Cape Town, West Coast District Municipality, municipalities of Swartland, Berg River and Saldanha Bay), government departments and land managers such as South African National Parks and CapeNature. The company has monthly meetings. Municipality representatives are generally either a planner or a tourism officer. Attendance of meetings by these representatives is very often related to whether a project that will benefit the specific municipality will be discussed (Du Toit 2010).

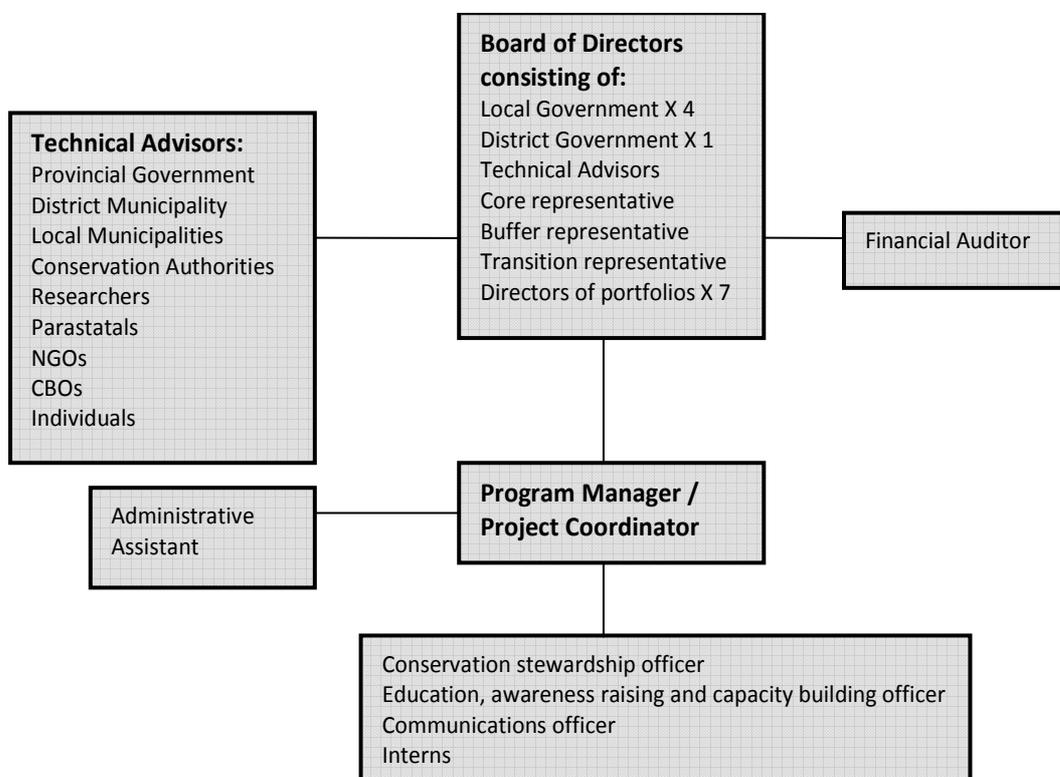


Figure 10: Structure of the Cape West Coast Biosphere Reserve Company

From the inception of the first institutional authority of the CWCBR it was clearly noted that directors will be required to be active and to spend time on actions related to the biosphere reserve, notwithstanding the fact that all directors are serving in a voluntary capacity. Therefore directors need to be replaced periodically to ensure high level management capacity as everybody has different skills and will not have the same amount of time available. The number of permanent staff members is directly related to budget limitations. In the same way the use of external consultants are limited by available financial resources.

#### 5.2.5.2 Management Framework

The biosphere reserve has an approved management framework including a strategic plan that sets out the vision of the CWCBR Company, and a business plan that sets out how objectives will be achieved. The vision of the CWCBR is defined in the strategic plan (Text Box 9). This is much in line with the saying of a well-respected past member of the CWCBR when asked about his wish for the biosphere reserve *“In an ideal world the vision will be realized - the best outcome is where man lives in concordance with the environment and respects all its gifts without the need to destroy them totally”* (Donne Murray 1951-2007).

#### **Text Box 9: Cape West Coast Biosphere Reserve Vision Statement**

We see the Cape West Coast Biosphere Reserve as the best international example of integrating rapid growth and change with biodiversity conservation, sustainable living and heritage preservation.

Detailed goals and objectives, grouped according to specific themes, form part of the strategic plan. The themes and goals are set out in Table 15. The objectives were further broken down into strategies; action plans were drafted, identifying responsibilities and time lines. The strategic plan is set out as a visionary document and, although biodiversity is being seen as important, the plan is noted to be a people centered document (CWCBR 2004).

**Table 15: Cape West Coast Biosphere Reserve: Themes, goals and objectives**

<b>Theme: Conservation</b>	
Goal 1: To conserve, maintain and rehabilitate biodiversity in the CWCBR.	Objective 1.1: Conserve ecologically important indigenous vegetation, habitat and ecological processes on both public and private land.
	Objective 1.2: Remove alien vegetation.
Goal 2: To conserve non-renewable resources.	Objective 2.1: Conserve surface and ground water.
Goal 3: To maintain the paleontological, historical and cultural heritage of the CWCBR.	
<b>Theme: Sustainable Development and Planning</b>	
Goal 4: To contribute to enhancing the sustainable economic well-being of communities.	Objective 4.1: Develop employment programmes for environmental rehabilitation.

	Objective 4.2: Develop a West Coast oriented eco-tourism training programme.
Goal 5: To contribute to coherent planning at all levels to provide models of land management.	Objective 5.1: Develop a spatial conservation and growth plan for the CWCBR.
	Objective 5.2: Develop a detailed spatial plan for of the Southern Area of the CWCBR.
Goal 6: To adopt the precautionary principle to development in the region.	
<b>Theme - Stakeholder Interaction</b>	
Goal 7: To seek stakeholders and community support for the CWCBR.	Objective 7.1: Provide continuous and effective feedback on the CWCBR to all existing stakeholders.
Goal 8: To promote recognition of the CWCBR.	Objective 8.1: Develop a communications strategy.
<b>Theme - Research and Monitoring</b>	
Goal 9: To comprehend and understand change in the region.	
<b>Theme - Education and Capacity Building</b>	
Goal 10: To provide education, awareness building and training to further community and stakeholder knowledge.	Objective 10.1: Provide a training course on biodiversity and biosphere reserves to schoolteachers.
<b>Theme - Operational and Institutional</b>	
Goal 11: To secure adequate initial and ongoing management resources for the CWCBR.	Objective 11.1: Obtain grant funding for CWCBR management human resources and capital items.
	Objective 11.2: Obtain grant funding for research and monitoring.
Goal 12: To ensure effective, participatory and adaptive management.	Objective 12.1: Develop coherent business plans for all CWCBR company activities.
	Objective 12.2: Develop performance indicators and manage by objective.
Goal 13: To coordinate with national and international networks.	

The business plan sets out actions required to achieve the goals of the strategic plan. It is clustered according to specific programmes and projects and includes over fifty projects in six programmes. A number of potential funders are identified in the business plan for future reference. It is specifically noted that the CWCBR is essentially a social enterprise. Therefore, instead of financial gains, the CWCBR Company strives towards outputs of a social nature.

The business plan outlines the way the CWCBR Company is currently structured, but then goes further to state a vision for the way future business should be conducted to align with the Company's vision (CWCBR 2004 – Text Box 10).

**Text Box 10: Cape West Coast Biosphere Reserve Future Business**

The Company provides services to members and stakeholders by coordinating projects and programmes that integrate rapid growth and change with biodiversity conservation, sustainable living and heritage preservation.

This statement could appear to be straightforward, but it manages to emphasize a way in which a biosphere reserve could add value to existing management practices within a specific region. The ideal is to facilitate projects and programmes that create direct benefits for the various social, economic and environmental systems through addressing needs in the specific area. There are two possible ways of implementing this vision: firstly a biosphere reserve could source additional funding streams; secondly a biosphere reserve could make use of existing funding such as local authorities' budgets, but adding value by facilitating social responsibilities of such authorities.

As a precaution it is noted that the CWCBR should not act as a pressure group or a social NGO and should not compete with functions of existing organizations.

#### 5.2.5.3 Marketing and Communications

The CWCBR has upgraded their logo (Figure 11); note omission of the term 'reserve' because of it being inevitably coupled to the historical meaning of an exclusion area (Stanvliet *et al.* 2004a). The biosphere reserve has an active web portal (<http://www.capebiosphere.co.za>) that serves as a marketing and communications tool. An interesting add-on is an ethos statement (Text Box 11) that members of the CWCBR Company may sign to demonstrate their support for the biosphere reserve, its vision and objectives.



Figure 11: Logo of the Cape West Coast Biosphere Reserve

#### Text Box 11: Ethos Statement of the Cape West Coast Biosphere Reserve

As a member of the CWCBR, I inspire to the values underwritten by the CWCBR and more importantly UNESCO's Man and the Biosphere (MAB) initiative.

This means that the written mission of the 'MAB' initiative to bring man, environment and economic activity into balance (sustainability) is my inspirational framework.

I/My commercial entity would like to be a responsible citizen and pledge to that effect not to engage in, be the catalyst for and allow any abusive relationship that negatively influences man, our environment or our socio-economic interaction.

I will engage in activities, be they social, commercial or recreational, in such a manner that is responsible to community, environment and the CWCBR.

Signed by digital acceptance.

Signatory member.

#### 5.2.5.4 Closed and ongoing projects

Throughout the last ten years the CWCBR has been actively sourcing funding and executing projects to the benefit of people, biodiversity and the CWCBR Company. Details on an impressive number of closed and ongoing projects are listed in Table 16. In this way the biosphere reserve is making a difference in the every-day lives of people of the region which is highly commendable.

**Table 16: Closed and ongoing projects of the Cape West Coast Biosphere Reserve**

<b>CLOSED PROJECTS</b>	<b>FUNDER</b>	<b>DESCRIPTION</b>	<b>TIME LINE</b>
<b>Biodiversity Corridor Development</b>	Table Mountain Fund	Delineation of a biodiversity corridor to secure the future southern core of the CWCBR	2003 - 2007
<b>Dune Rehabilitation Project</b>	City of Cape Town	Reclamation and rehabilitation of a dune system in the Milnerton region	2008
<b>Fynbos Rehabilitation Project</b>	Netherlands Ministry of Agriculture, Nature and Food Quality	Fynbos rehabilitation in identified sites within the CWCBR, as well as facilitation of the 2007 Darling Wild Flower Show.	2007 - 2008
<b>GIS Project</b>	Department of Agriculture Western Cape	Assisting with updating the Department of Agriculture's GIS of privately owned land	2010
<b>Mamre CREW Project</b>	SA National Biodiversity Institute (SANBI)	Appointment of a biodiversity officer to assist with implementing the Mamre CREW project	2008 - 2010
<b>Stewardship Extension Project</b>	World Bank	Appointment of a stewardship extension officer to secure priority sites within the CWCBR	2009
<b>YES Project</b>	City of Cape Town	Youth Environmental Schools Programme (YES): CWCBR implemented environmental education programmes for three environmental weeks	2009
<b>ONGOING PROJECTS</b>	<b>FUNDER</b>	<b>DESCRIPTION</b>	<b>TIME LINE</b>
<b>!Khwa Ttu Land Rehabilitation Project</b>	Global Environment Facility (GEF) Small Grants Programme	Facilitate a land rehabilitation project at !Khwa Ttu	2009 -
<b>AfriSam Conservation Officers</b>	AfriSam	AfriSam sponsors students to study at the South African Wildlife College as part of their corporate social responsibility. CWCBR has identified sites on AfriSam property as potential stewardship sites	2010 -
<b>Alien Clearing Project</b>	Department of Agriculture Western Cape	Funding for alien clearing on private property is being channeled through the CWCBR	2010 -
<b>Conservation</b>	WWF-SA	Appointment of a conservation officer to	2009 - 2012

<b>Officer</b>		negotiate a major industrial corridor	
<b>CWCBR Framework Plan</b>	Provincial Govt of the Western Cape, West Coast District Municipality	Drafting of a CWCBR Framework Plan	2008 -
<b>Donne Murray Bursary Project</b>	CWCBR	Special fund for bursaries for tertiary students from the Atlantis/Mamre region	2004 -
<b>LandCare Project</b>	Department of Agriculture Western Cape	Partnership with CWCBR on implementation of a sustainable development project	2010 -
<b>Mountain to Sea Project</b>	Netherlands Ministry of Agriculture, Nature and Food Quality, City of Cape Town	Disadvantaged children hike up Table Mountain and tour through CWCBR	2007 -
<b>CWCBR Project Coordinator</b>	Critical Ecosystems Partnership Fund (CEPF)	Operational costs of CWCBR to pay salary of coordinator	2006 - 2011
<b>Trails and Tourism Project</b>	Development Bank of SA	Feasibility study on tourism potential of CWCBR. Need to source funding for implementation of identified projects	2008 -
<b>Young Professional</b>	Table Mountain Fund	Appointment of a young professional for CWCBR	2009- 2011

### 5.2.6 Cape West Coast Biosphere Reserve Spatial Development Framework Plan

The Western Cape Biosphere Reserves Act (No. 6 of 2011) prescribes the preparation of spatial framework plans for all biosphere reserves that must be consistent with other spatial planning documentation. Such a biosphere reserve framework plan, if approved by the minister, could be regarded as a plan approved in terms of section 4(6) of the Land Use Planning Ordinance which will render it a statutory document that local authorities have to adhere to. In practical terms a framework plan integrates the biosphere reserve into the municipal land-use planning system.

The CWCBR has completed a Framework Plan in 2009. It identifies Spatial Planning Categories for all cadastral units in terms of the Provincial Bioregional Planning Framework. The framework plan seeks to inform spatial plans of relevant local authorities regarding how best to achieve the agenda of the CWCBR. The framework plan is an opportunistic way of implementing biosphere reserve principles through integration into land-use planning processes of local authorities.

### 5.2.7 Challenges Facing the Cape West Coast Biosphere Reserve

The biosphere reserve's association with the metropolitan area of the City of Cape Town poses serious pressures related to human settlement expansion. New developments, supporting industrial

expansion or residential housing, could translate in the conversion of natural areas which would have a negative impact on biodiversity conservation. Similarly the conservation function is under great threat from a very real expansion in mining applications.

The availability of sufficient good quality water resources is of the utmost importance in securing future developments in the area. Some of the major threats to water security include pollution of aquifers due to chemical and industrial runoff, and a reduced water supply due to alien vegetation infestations and the effects of climate change. A further challenge is the unequal access to potable water where the access of water supplies to lower socio-economic groups should be improved.

In addition, the CWCBR is facing institutional challenges relating to support for future existence of the biosphere reserve, and continuity of staffing. The biosphere reserve is constantly seeking increased buy-in and support from local authorities and communities, specifically the less-advantaged members of society. Without continuous support from these actors, the biosphere reserve will face an uncertain future. Continuity of staff members could pose a challenge in case where staff members could vacate their positions and the CWCBR could find it difficult to recruit replacements with sufficient knowledge and expertise.

### 5.2.8 Results

Data obtained through content analysis, interview surveys, questionnaire surveys and observations were used towards a portrayal of the past and present situation of the CWCBR.

The semi-structured interviews provided opinions related to the effectiveness of the CWCBR. Descriptive results are summarized in Annexure 6. A general rating of between 1 and 3 (where 1 means not meeting the criteria at all, 2 means a middle of the road performance, and 3 means a good performance) was allocated for each component based on the performance of the biosphere reserve as expressed by the interviewees. Out of a potential total of 33, the CWCBR scored 26 (78.8%).

The questionnaire survey (Annexure 3), completed by the seven interviewees, consisted of personal information (box 1) and three question boxes (boxes 2 to 4). Question box 2 provided interviewees the opportunity to put forward an opinion on five questions of a general biosphere reserve nature. The first question was: *“In your opinion, is the biosphere reserve concept a valuable tool with which to do landscape management in South Africa?”* All seven interviewees gave a ‘yes’ response.

The second question was: *“In your biosphere reserve, do you think the designation is adding value to the area?”* All seven interviewees reacted positive. One interviewee made specific mention of the

value of being internationally recognized; *“adding an internationally recognized layer to a local area provides value and status”*.

The third question elicited a reaction on institutional support for the CWCBR - *“Is the organization that you represent in support of the biosphere reserve?”* Six interviewees responded ‘yes’ and one municipal councillor indicated ‘not fully’. This statement was supported by another interviewee by noting the specific municipality does not follow biosphere reserve principles because of the practice of pumping polluted water into the Langebaan lagoon of the West Coast National Park.

The fourth question proved trust in the management entity’s capacity to run an effective biosphere reserve. The question *“Are you of the opinion that the management entity of your biosphere reserve is doing a good job of managing the biosphere reserve effectively?”* was answered positively by all seven interviewees. It was however noted that positive publicity is needed so that the public could be more aware of the biosphere reserve’s goals and objectives for the area.

The last question again turned out a positive response by all seven interviewees - *“Do you truly agree with the statement ‘biosphere reserves are special places for people and nature?’”*

The third box addressed problems and challenges faced by the CWCBR. Interviewees were given 10 elements to order in priority from highest to lowest. The responses were analyzed with matrix ranking, specifically preference ranking (Margoluis & Salafsky 1998). The collective ranking from highest to lowest came out as follows (Table 17):

**Table 17: Cape West Coast Biosphere Reserve collecting ranking list of problems/challenges**

	<b>CWCBR Collective Ranking of List of Problems/Challenges</b>
1	Insufficient long-term financial resources
2	Lack of dedicated biosphere reserve personnel
3	Support (buy-in) from local authorities (municipalities)
4	Too little benefits perceived by local communities resulting in a lack of support
5	Too little awareness amongst role-players and local communities
6	Biosphere reserve concept not strongly supported by national government
7	Not enough insight into the value of implementing the biosphere reserve concept
8	Lack of long-term vision and objectives
9	Too much of a conservation (green) focus and not enough emphasis on other issues such as development
10	Insufficient legal means (lack of ‘teeth’) to implement the biosphere reserve concept

Administrative support functions such as financial security, sufficient staff members and support from major stakeholders came out as most important challenges. Although the CWCBR has had

major successes in securing over ZAR20 million in project funding and operational financing from various national and international sources, monetary security was still identified as the most important challenge. This proves the dire position of South African biosphere reserves resulting from little financial support from provincial governments, but none from national government.

One interviewee, referring to himself as a *“fully disillusioned civil society member”* specifically noted there are people with *“self-interests at work with too much non-private involvement”*. The conservation agenda is being perceived by some as being too important, although conservation officials commented on good support from the CWCBR for conservation actions. Hence the identified need for the CWCBR to find the sometimes evasive balance between the three biosphere reserve functions, the *“search for sustainable balance”* as noted by Kušová *et al.* (2008).

A highlighted concern involved the perceived lack of input on new development applications with regards to biosphere reserve principles. The area is under extreme development pressure resulting in a great need for the CWCBR to ensure sustainable development principles are being adhered to by decision makers and relevant authorities.

A *“lack of support and benefits for land owners and businesses”* was identified as a problem that needs to be addressed by the CWCBR management entity.

The fourth box addressed positive elements linked to the CWCBR. Interviewees were again given 10 elements to order in priority from highest to lowest. After analysis of the responses with preference ranking (Margoluis & Salafsky 1998), the collective ranking from highest to lowest came out as follows (Table 18):

**Table 18: Cape West Coast Biosphere Reserve collective ranking list of positive elements**

CWCBR Collective Ranking of List of Positive Elements	
1	The biosphere reserve concept is a tool with which to facilitate collaborative management to the benefit of the region
2,3	A biosphere reserve is much different (in a positive way) to a traditional protected area such as a national park or nature reserve
2,3	The biosphere reserve creates an opportunity for communities to be involved in management decisions about the future of their area
4,5	The biosphere reserve attracts more tourists/visitors
4,5	The biosphere reserve provides a means to attract international funding to the region
6	The biosphere reserve created more jobs in the area
7	The biosphere reserve creates international visibility for the area
8	The biosphere reserve creates awareness about sustainable development
9	The biosphere reserve has resulted in people becoming more aware of their interconnectedness to the natural environment
10	The biosphere reserve has resulted in increased property values

Collaboration with role-players proved to be successfully implemented by the CWCBR's management entity. Unfortunately at the same time some interviewees mentioned the need for greater involvement specifically of private landowners. The fact that the statement on awareness was ranked as second last on the positive elements proves that the biosphere reserve still has work to do on incorporating public communities.

Collective results of the multicase are discussed in Chapter 6.

### 5.2.9 Discussion

The CWCBR currently finds itself at an interesting position. It seems that financial security almost always features as the most important point of discussion. The biosphere reserve was designated in 2000 and it is only during the past two years that the biosphere reserve has secured long-term monetary resources (Du Toit 2010). Despite this very positive achievement, some members of the management entity are still concerned about the financial future of the Company, due to the lack of a secure capital reserve that would ensure a solvent company.

Another breakthrough for the CWCBR is the establishment of an industrial biodiversity corridor, claimed to be the first one worldwide (Du Toit 2010). Through an agreement with a large private company (AfriSam), a biodiversity agreement has been established for protection of natural open spaces on their land. The CWCBR provides a service to manage the land on behalf of the private company. In addition the biosphere reserve executes a social responsibility project on behalf of the private company and the latter remunerates the biosphere reserve for its services. In this way both parties benefit extensively from the agreement.

Throughout the survey process the need for greater awareness and involvement of some sectors of society was mentioned numerously. Some local authorities are not really fully in support of the biosphere reserve. This notion extends to certain land owners and members of historically disadvantaged communities. General awareness about the values, objectives and benefits of the CWCBR needs to be promoted. Broader participation from all walks of society would increase confidence and trust in, and social acceptance of, the biosphere reserve management entity (O'Riordan & Stoll-Kleemann 2002; Stoll-Kleemann & Welp 2008). Inclusion of stakeholders and their interests is widely regarded as being crucial to sustainable management of protected areas (Batisse 1997; McNeely 1995; O'Riordan & Stoll-Kleemann 2002; Stoll-Kleemann & O'Riordan 2002). This is then also one of the most important tasks of biosphere reserves (Stoll-Kleemann & Welp 2008; Stoll-Kleemann *et al.* 2010). Public participation can be effected in many different ways, for example through interactive workshops as was done during the drafting process of the CWCBR framework plan. Another approach that could be beneficial to the CWCBR is to engage people through their

current activities and interests (O’Riordan & Stoll-Kleemann 2002). In this way the biosphere reserve could respond to the request for support by land owners and businesses. The opportunity exists for the CWCBR to serve as a multidisciplinary “*parallel learning organization*” as noted by Stoll-Kleemann and Welp (2008), with the consequence that current stakeholders could grow into becoming true shareholders of the biosphere reserve (Stoll-Kleemann & O’Riordan 2002).

### 5.2.10 Synopsis

The CWCBR is a vast expanse of beautiful scenery, of vital importance to biodiversity conservation and an area which numerous people are privileged to call home, but at the same time subject to immense development pressure. After a long process of deliberation, negotiation and collaboration, the biosphere reserve was designated by UNESCO in November 2000. Dassen Island and marine surrounds were added as the marine core area in 2003. Presently the biosphere reserve is managed by a private company with a permanent staff, an office and secure monetary support.

To manage a biosphere reserve properly is a major challenge. According to Batisse (1997), it “*lies somewhere between science and art*”. The CWCBR has been in existence now for longer than 10 years. It has overcome a great number of obstacles through these years and finds itself presently in a favourable position with regards to management structure, monetary resources and support from stakeholders.

This south-westernmost region of the Western Cape of South Africa, this “*land of the big blue sky*” is well on its way to become a very successful biosphere reserve, showcasing a collaborative management model for a section of the South African coastal zone.

## 5.3 The World’s Only Savanna Biosphere Reserve: A Case Study of the Waterberg Biosphere Reserve

*“The Waterberg is like indelible ink – Once experienced, never to be erased” (Clive Walker)*

### 5.3.1 Overview

Limpopo Province, the northernmost of South Africa’s nine provinces houses a spectacular stretch of land designated as the Waterberg Biosphere Reserve (WBR). Waterberg (translated: Mountain of Water), together with Soutpansberg and Drakensberg are three large mountain ranges in Limpopo that serve as crucial water reservoirs. The WBR is a vast, remote, serene expanse of breathtaking natural beauty. Designation with UNESCO in 2001 as part of the MAB Programme has added international prestige to this mostly secluded area.

Biosphere reserves are regarded as “*special places for people and nature*” (Bridgewater 2002; UNESCO 2002a). Such is the 417 000 ha of the Waterberg, the world’s only Savanna biosphere reserve. It is being coordinated by a private company in a collaborative management style with all role-players including local and provincial government, local communities, private landowners and other interest groups. The main objectives of the biosphere reserve are to provide long-term protection to special landscapes and to secure better living conditions for local inhabitants.

The WBR is a unique landscape and presently plays an important role in deliberating future land-use planning in Limpopo Province. Although biosphere reserves are not included in South African legislation, the biosphere reserve concept could be seen as a valuable tool within the South African national protected area expansion strategy.

### 5.3.2 Description of the Waterberg Biosphere Reserve Domain

Biosphere reserves are special places on Earth (Bridgewater 2002; UNESCO 2002a) and it is quite common for biosphere reserves to be located in some of the most aesthetically pleasing and pristine areas. Very few can compete with the Waterberg Massif, home of the Waterberg Biosphere Reserve in South Africa.

The Waterberg mountain range instills a sense of vastness and has been described as “*remote and serene*” (Walker & Bothma 2005), a wild place of sheer physical splendour (Taylor *et al.* 2003), “*one of the last wilderness areas in South Africa*” (Gutteridge 2008), a “*stunningly beautiful part of South Africa*” (Waterberg Meander 2009), a mystery region and a wonderland (Marais 1972). A well-respected resident provides an emotional picture “*It has a beauty unmatched, from its soaring craggy heights on the southern escarpment with the Seven Sisters guarding the plains, to the north-eastern buttresses of spectacular rock formations, rising sheer out of the bushveld plains. The central plateau provides a stunning feeling of emptiness and yet man has lived within these mountains for the past 2000 years - a fact we should be ever mindful of*” (C. Walker, 1 August 1995).

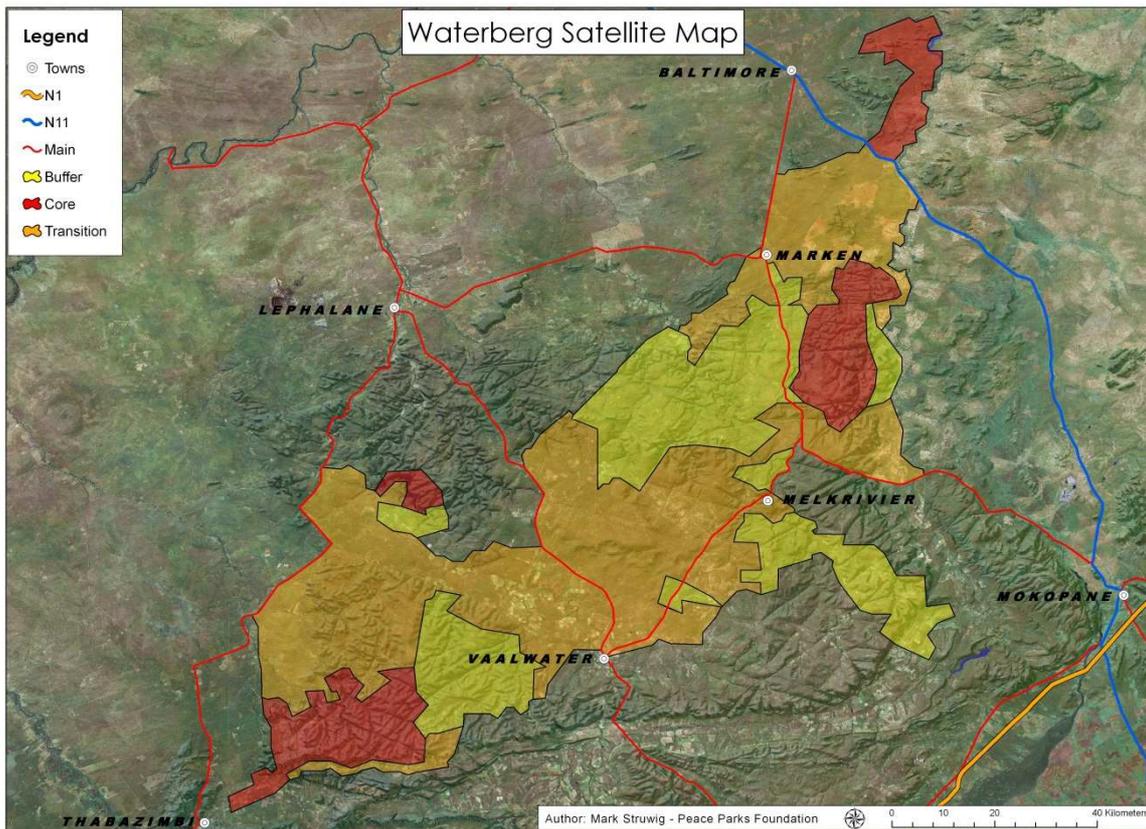
In this sparsely populated expanse of intense greenness, roofed over with a wide blue sky, there appears in the nighttime blackness millions of stars as wide as the grace of the Lord - “*all the most glorious jewels of heaven*”, as noted by Eugène Marais (1972). This spectacular region is the heartland of the Waterberg, the world’s only Savanna biosphere reserve. It’s logo is depicted in Figure 12.



**Figure 12: Logo of the Waterberg Biosphere Reserve**

The WBR was designated by UNESCO in March 2001 and currently covers an area of 417 000 ha. It is located in the northernmost province of South Africa - Limpopo; home also to two other biosphere reserves, Kruger to Canyons and Vhembe (Figure 2), resulting in a third of the province located within biosphere reserves (Steenkamp 2011). The WBR is delimited into core, buffer and transition zones (Figure 13). Vaalwater is the only village of note within the biosphere reserve. It is an extremely sparsely populated area and most is taken up by the Waterberg Massif with the highest elevation at 2 085 meters above sea level.

This mountain massif of around 14 500 square kilometers is a geological feature in the middle of a large plain, almost half as old as the Earth (Walker & Bothma 2005). In its rugged, solitary remoteness it serves as a very important water resource for the surrounding rural Limpopo landscape. Four main rivers form the mountain catchment - Lephala, Mokolo, Matlabas and Mogalakwena rivers. An interesting fact is that the Waterberg was once a giant lake that has dried up (De Klerk 2011). The Waterberg was inhabited since the early Hominids and has been used in more recent historical times mainly for cattle and crop farming. Due to a drastic change in land-use practices, the area is nowadays mostly known for wildlife related practices such as ecotourism, game viewing, hunting, and sustainable utilization of wildlife. Hunting, whether for trophies or meat, is one of the biggest income generating industries in the area (WBR Committee 1998).



**Figure 13: Zonation of the Waterberg Biosphere Reserve**

Waterberg, as the name implies, was once a system of great rivers and lakes. In the historical past there were times of severe droughts that caused great concern and were extensively documented by Eugène Marais in his essays (1972). Today the region again serves as an important water reservoir. Eugène Nielen Marais, known as the first son of the Waterberg, first brought the Waterberg and its varied wildlife to the attention of naturalists and scientists through his work early in the 20th Century. Although described as “*socially liminal*” (Swart 2004), Marais was a writer, poet and naturalist of note who spent an important part of his life in the Waterberg. He resided on the farms Doornhoek and Rietfontein from 1907 to shortly after his forty-sixth birthday in January 1917 (Rousseau 1974). During his time at Rietfontein, Marais wrote a poem that reflects on the times of plentiful rains (Text Box 12).

Marais was greatly inspired by the Waterberg’s wildlife and conducted intensive research on termites - or the white ant - and chacma baboons (Marais 1934, 1969). His wonderment for the region and its natural elements is clearly reflected in another one of his poems (Text Box 13)

**Text Box 12: Poem by Eugène Marais**Wanneer dit reën op Rietfontein

Wanneer dit reën op Rietfontein  
en deur die stof 'n straal van groen verskyn,  
wanneer die wolke, swart en swaar belaaï,  
in voue oor die berge pak en swaai, ...

*"Oh when it rains on Rietfontein  
and streaks of green gleam on the dusty plain  
and when the swollen clouds, all black and grey  
in folds over the mountains clutch and sway."*  
(Marais, Eugène Nielen 2005)

**Text Box 13: Poem by Eugène Marais**Let me not die

Dear God, let me not die  
Before I reach the hills I love.  
Amid the whitened faces streaming by,  
Still in my heart I can behold  
Their vestiture of blue and gold.  
I see their stately crests against the sky,  
The glory of Thy sun on high,  
The beckoning of the friendly trees.  
I hear the drowsy murmur of the bees,  
And on my weary heart,  
Peace sinks like a sigh.

Here in this throng I could not rest,  
I always loved the wild things best.  
(Marais, Eugène Nielen 2005)

The Waterberg is a stronghold for South Africa's big five (lion, leopard, elephant, rhinoceros and buffalo). Although the elephant is a totem of the indigenous Langa people, the Chief agreed to the use of this symbol on the logo of the WBR as depicted in Figure 12 (Masibe 2011). Some of the flagship animals have been hunted to almost extinction in the past, but have returned due to extensive conservation actions. The WBR is located within the Bushveld district that houses an impressive diversity of species, including mammalian, reptilian, avian and aquatic. The nomination document mentioned at least 18 rare or threatened species of plants, 11 bird species, four reptile species, four species of fish, one butterfly species, and 18 mammals that occur in the biosphere reserve (WBR Committee 1998).

Mammalian species such as red hartebeest, eland, elephant, rhinoceros, kudu and giraffe are being portrayed by the rich historical presence of San rock art in the Waterberg. Since the 1950s the vast wildlife has been decimated by hunters. However, conversion of land to conservation and game farming practices over the last 25 years, including the establishment of Marakele National Park, has resulted in successful reintroductions of all historically represented species. The addition of community land through the land restitution process has the potential to eventually result in consolidation of one of the largest public/private conservation areas in southern Africa.

The highly endangered African wild dog (*Lycaon pictus*) occurs in the Waterberg region. Most of the populations are found outside protected areas, therefore private conservation land plays an important role in providing habitat for the wild dog. The WBR will soon embark upon the development of a biodiversity management plan for the African wild dog with support from relevant NGOs.

The Waterberg area has unique geological formations and represents a biogeographical region found nowhere else in the country. It has unique wetland habitats due to drainage related to the four major rivers. According to the historic Acocks reference (1988), there are six veld types represented in the WBR, of which Sour Bushveld (mountainous savanna) is the most predominant. Mucina and Rutherford (2006) include the following vegetation types within the Savanna Biome of the Bushveld district: Central Sandy Bushveld; Waterberg Mountain Bushveld; Roodeberg Bushveld; Western Sandy Bushveld; Waterberg-Magaliesberg Summit Sourveld. Numerous endemic and/or rare plant species are found within the WBR and 43% of the more than 5 500 species of the Savanna Biome are regarded as being endemic. The rugged mountains feature *Faurea saligna* (beechwood) and *Protea caffra* (highveld protea) whereas the lower lying areas are home to a variety of tall trees such as *Acacia burkei* (black monkey-thorn) *Acacia robusta* (splendid acacia), *Ziziphus* (buffalo-thorns) and *Euclea* (quarri) species (Coates Palgrave 2003; Mucina & Rutherford 2006).

A comprehensive field guide by Gutteridge (2008) provides detailed information on biodiversity of the Waterberg, including sections on mammals, birds, reptiles, amphibians, scorpions, spiders, butterflies and moths, flowering plants, trees and grasses. An interesting bird-related tale observed in the Waterberg is that of a honeyguide that guides its human followers to snakes, often pythons. The area includes more than 400 species of birds, including woodland species, thornveld species and a varied waterbird community.

Marakele National Park, the primary core area of the WBR, is a mountainous area 670 m<sup>2</sup> boasting an impressive variety of wildlife. It is well known for the largest colony of endangered Cape vultures (*Gyps coprotheres*) in the world. This vulture is endemic to southern Africa and live on virtually inaccessible cliffs. Marakele houses a breeding colony of more than 800 pairs. The park is an excellent site for more than 250 species of woodland and savanna birds. Raptors include the African harrier hawk (*Gymnogene*), jackal buzzard and several eagle species, such as Verreaux's (black), African hawk, black-chested, and brown snake eagle. Peregrine and lanner falcons also occur. Apart from the big five, there are sixteen species of antelope within Marakele, including sable, kudu, eland, impala, waterbuck, and tsessebe. Other interesting resident species within the area include aardwolf (*Proteles cristata*), brown hyena, honey badger, African wild cat, Sharpe's grysbok, pangolin and thick-tailed bushbaby (Waterberg Meander 2009).

Among snakes, the Southern African Python (*Python natalensis*) and Black Mamba (*Dendroaspis polylepis*) are common to the Waterberg area. In an article published in August 1933, Eugène Marais made note of the "*fastest snake in the whole world*", referring to the black mamba and called it the Waterberg's "*terrifying reptile*" (Marais 1972). The mamba is also known to be the largest poisonous snake in Africa, measured 18 feet in length in Swaershoek on the farm Rietvlei in the Waterberg

(Marais 1972). The Waterberg plateau is known to have the highest recorded density of snakes anywhere in South Africa (Waterberg Meander 2009).

The Waterberg has been forever ingrained in literature through publication of the monumental works on baboons and termites by the naturalist Eugène Marais. His work on baboons (*Papio ursinus*) was first published in Afrikaans as 'Burgers van die Berge' (Marais 1938), later translated as 'The Soul of the Ape' (Marais 1969). 'Siel van die Mier', his work on termites (*Eutermes* spp.), was first published as a series of articles (Swart 2004) and later as a book, 'The Soul of the White Ant' (Marais 1937).

Environmental education has always carried a high priority in the Waterberg region due to the passion of one conservationist who has played an important role in establishing the WBR. Apart from having a critical role to play in the future of the biosphere reserve by redressing some social anomalies of the past, environmental education is also a means of instilling into the minds of previously disadvantaged groups the opportunities for environmental careers (Baber *et al.* 2003). A dedicated, internationally recognized facility, the Lapalala Wilderness Environmental School was established in 1981 on the privately owned Lapalala Wilderness; an area of 36 000 ha which makes it one of the largest private reserves in South Africa. The environmental school operates under a non-profit organization, the Wilderness Trust of Southern Africa and to date more than 50 000 school learners have been taught at the school. In addition, the Waterberg Environmental Centre (also operated under the Wilderness Trust) was set up in a restored primary school building. The centre includes the first ever Rhinoceros museum in Africa which forms part of the Waterberg Living Museum since 1997.

Throughout the years the larger Waterberg area has been renowned as a tourism destination. It is within easy reach of the Gauteng periphery (only a three hour drive), is devoid of any major mineral deposits and related mining activities, is unsuitable for commercial forestry, is sparsely populated, malaria free, has low levels of light pollution and therefore still remains an area of natural beauty. Tourism has been identified as one of Limpopo Province's economic pillars (De Klerk 2004). The WBR has contributed a great deal in promoting community tourism and creating a recognizable brand (Baber 2011). The Waterberg Meander provides visibility to many local community enterprises and creates jobs for a variety of tourist guides. The area offers a wide range of eco-tourism experiences, whether on foot, by car, bicycle, or on horseback and provides some of the most scenic outlooks in the country (Waterberg Meander 2009). One family, resident in the Waterberg for generations, has established an internationally renowned horseback safari business. The area further houses the oldest and largest cluster of horseback destinations in South Africa.

De Klerk (2004) noted the well-developed hunting industry constitutes a major part of tourism in the Waterberg, generating hundreds of millions of South African rand from both foreign and domestic hunters. Various forms of hunting are performed in the region, including trophy hunting, meat hunting, bird hunting and bow hunting.

In addition, anthropological and archaeological tourism is well developed in the Waterberg and surrounds. Opportunities include historical rock art sites, Iron Age pottery, remains of ancient walled settlements and viewing of traditional skills. Visitors to the area have the choice of overnighting in tourist-oriented bush lodges or staying with African rural communities in their authentic settings (Waterberg Meander 2009).

In stark contrast to the almost euphoric conservation state of the Waterberg area, is the deplorable conditions under which some local residents reside. Some local townships face a lack of basic amenities such as water, energy and sanitation. Sewage treatment plants are dysfunctional to the point where raw sewage is being discharged into river systems. Limpopo is one of the provinces where more than half of sewage systems are not treating effluent to acceptable standards. Communities also face very high levels of HIV and AIDS and subsequently a high number of child-headed households and orphans are prevalent. These circumstances are however not only restricted to the Waterberg and surrounds, but reflect the direful social systems in large parts of the country. South Africa is experiencing the largest HIV and AIDS epidemic in the world. Although Limpopo has one of the lowest HIV and AIDS incidences in the country, it is one of four provinces still experiencing high numbers of new infections. Being a sustainable social-ecological land management tool, the biosphere reserve has a responsibility to address these serious challenges within their area.

### **5.3.3 Inception of the Waterberg Biosphere Reserve**

The Waterberg is characterized by immense natural beauty, a high unemployment rate amongst the sparse population, landless rural communities, increasing ecotourism potential and large tracts of conserved lands. Given these special circumstances, the UNESCO biosphere reserve concept was identified in the mid-1990s as the best land-use model to achieve the most needed balance within the region. In 1996 a South African delegation undertook a MAB study tour to the United States of America. An Indian Reservation in Arizona, part of a cross-border biosphere reserve with Mexico, presented many similarities with the Waterberg area of Limpopo (De Klerk 2011) - also rural, quite remote, pristine nature areas with resident local communities. Thus one of the outcomes of the visit was the start of a participation process with various role-players in view of a proposed Waterberg Biosphere Reserve (De Klerk 2004). Reasons for selecting the Waterberg area for the first biosphere reserve in Limpopo are:

1. Its unique biodiversity and relatively “under researched” components.
2. Its cultural diversity.
3. Its population dynamics.
4. The organized private and community structures that were in place.
5. The land use profile and vastness of the area.
6. Eagerness of the local people to participate in such a project.

The process was spearheaded by a very well-known conservationist cum artist of the region, and a motivated staff member of provincial government, with assistance from a well-respected community representative and a landowner with historic roots in the area.

Although the biosphere reserve concept was new to Limpopo Province, the timing was perhaps just right and with most needed systems in place, influential people began supporting the WBR ideal. Marakele National Park at the heart of the Waterberg was proclaimed in 1994 and was identified as the primary core area of the WBR. The name refers to ‘a place of sanctuary’ (Marakele NP 2011) which is reflected by a sense of serenity in the wide vistas and at the low-impact accommodation facilities. Local communities (Langa people) were involved in biosphere reserve processes right from the start through dedicated representatives. At first the biosphere reserve ideal was perceived as another way of white people to continue holding onto private ownership of land. However, this perception changed dramatically throughout the years as the real nature of the WBR was understood as being about integration of conservation and development with the view to facilitate economic opportunities for local communities (Masibe 2011). Biosphere reserve negotiations resulted in much closer connections between traditional communities and wealthier land owners. The Waterberg was positioned as a region within which future tourism ventures were to benefit all relevant interest groups. The newly established Waterberg Meander (2009) serves as a case in point.

#### **5.3.4 Implementation of the Waterberg Biosphere Reserve**

The WBR stretches over 417 406 ha and encompasses four core areas of 121 249 ha, buffer zones of 146 157 ha and transition zones of 150 000 ha. Apart from Marakele National Park in the south, three areas with community involvement form part of the core, namely Masebe Nature Reserve, Wonderkop Nature Reserve and the Moepel farms. Masebe is a tribal reserve, owned by the community. Wonderkop and the Moepel farms are state owned, managed and to be utilized in collaboration with relevant rural communities. The Waterberg Nature Conservancy of 160 000 ha makes up almost the entire buffer zone. This Conservancy consists of privately owned lands on which ecotourism forms the main economic activity, providing employment to more than 900 people from surrounding communities. Members of the Conservancy played a major role in establishing the WBR and are still today very actively supporting the biosphere reserve. Human

population numbers approximately 80 000 with the majority residing in the only major town, Vaalwater, and within a number of small rural settlements (WBR Committee 1998). The WBR nomination was compiled in 1998 and resulted in formal international designation in March 2001.

The Waterberg Nature Conservancy was first initiated in 1982. Negotiations were ongoing for a number of years until the formal establishment of the Conservancy with a constitution and logo in 1990. Currently the Conservancy consists of 63 members covering 163 000 hectares (WNC 2011), most of which falls within the WBR buffer zone. The Conservancy forms the backbone of the WBR until today.

Since designation, the WBR has established a representative management committee according to a constitution with the following vision and mission (Text Box 14).

**Text Box 14: Vision and Mission of the Waterberg Biosphere Reserve Management Committee**

Vision:

To maximise this unique area's considerable potential for not only conservation, sustainable development and social upliftment, but also research and education.

Mission:

To build a conservation and sustainable-use ethic, which can then be effectively monitored; to promote appropriate and sustainable development; to actively spread benefits and opportunities to poorer members of the community; and to facilitate relevant research, education and skills training in the area.

Specific objectives of the WBR Management Committee are:

1. Participate in the MAB programme of UNESCO, through relevant government agencies and structures.
2. Generate interest and active participation in environmental conservation amongst its members.
3. Conserve and enhance the scenic environment, indigenous fauna and flora, and cultural history of the Waterberg mountains.
4. Implement strategies for the sustainable utilization of the natural and cultural resources of the area.
5. Improve the quality of life of the people within the Waterberg area through the creation of job opportunities and the execution of education and training programmes.
6. Enhance the tourism potential and tourism information network in the Waterberg area.
7. Maintain the Biosphere Reserve Centre (office) that will provide a local scientific and technical support service to the biosphere reserve members relating to all biosphere issues.

8. Participate in joint ventures to promote the reserve on a regional and global scale.
9. Subject itself to National and Provincial Legislation and Policies relating to environmental issues.
10. Conduct appropriate work in collaboration with existing institutions locally, provincially, nationally and internationally.
11. Coordinate all biosphere activities within the Biosphere Reserve and act as a communication pivot between stakeholder groupings.

However the biosphere reserve also has to operate within a wide range of challenges that could compromise the Committee's ideals, namely:

1. Conflicting land uses, with the most sensitive areas being under greatest threat.
2. Fragmented conservation efforts leading to the potential for further fragmentation.
3. Impoverished rural communities with limited skills and resources.
4. Extreme levels of unemployment, particularly among the youth.
5. Development pressures.
6. The presence of a high proportion of leisure properties with limited employment provision.
7. Low profitability of tourism businesses.
8. Land-use planning guidelines that are lacking.
9. Limited legal protection and a need for biosphere planning to be integrated into the Integrated Development Plans, Spatial Development Frameworks, Land-Use Plans, provincial conservation plan, etc.
10. Institutional and financial capacity constraints.
11. Awareness and support.
12. Branding of the Waterberg.

The Committee consists of quite a large number of members, representing all relevant stakeholders, including government agencies, local authorities, private landowners, tourism, community groupings, private foundations and land claimants. Meetings are being held on a quarterly basis. The Committee works within a system consisting of four sub-committees namely (i) finance, (ii) land reform and economic development, (iii) environment, and (iv) education and training.

In January 2010 the Management Committee was transformed to a private company, registered as a non-profit organization. The Waterberg Biosphere Reserve Company (WBRC) was registered in accordance with the Companies Act, although the Management Committee is still in place with proportional representation by 32 stakeholder groups. Voting rights of members of the company are spelled out in the constitution according to level of involvement in the biosphere reserve. The WBRC has four directors, elected by the Management Committee. The WBR has an active web site:

<http://www.waterbergbiosphere.org>.

A strong relationship exists between the WBRC and the Waterberg District Municipality (WDM). A Memorandum of Understanding was recently signed between these two parties with the aim to strengthen the relationship even more into the future. The MoU specifies dedicated support to the WBRC as a part of the spatial development framework of the WDM, support for implementing a permanent WBR office, and also provision of a budget that will enable the appointment of a full-time WBR programme coordinator (WBR 2010).

The WBR is implementing an innovative incentive system for landowners who actively demonstrate support for the biosphere reserve. The objectives of the biosphere reserve are divided into ten land-use challenges to be addressed by landowners (Baber *et al.* 2003):

1. Soil conservation practices.
2. Water management practices.
3. Management of vegetation.
4. Management of wild animals.
5. Pollution and waste management.
6. Contributions to the quality of life and economic wellbeing of local inhabitants.
7. Conservation and enhancement of rare or endangered species of fauna and flora.
8. Conservation and enhancement of historical and cultural sites.
9. Support of environmental research.
10. Appropriate physical development.

The extent, to which these challenges are being met, forms part of a unique zoning system through which properties could obtain a specific category, linked to incentives (Table 19). Broad zoning into core, buffer or transition follows UNESCO guidelines. Narrow zoning into one of the four categories (entry, bronze, silver, gold) is dependent upon levels of meeting the ten land-use challenges. The aim of this process is to inspire landowners to partner with, and support the biosphere reserve.

**Table 19: System of categories and zoning as applied by the Waterberg Biosphere Reserve**

ZONE EQUAL STATUS			
CATEGORY	CORE	BUFFER	TRANSITION
<b>Entry</b>	Area proclaimed as a protected area	Subject to WBR objectives	Subject to WBR objectives
<b>Bronze</b>	N/A	Long-term management plan in place	Long-term management plan in place
<b>Silver</b>	N/A	Plan being implemented	Plan being implemented
<b>Gold</b>	Management complies with scientific management plan	Plan achieved	Plan achieved

←-----→

↑  
HIGHER STATUS  
↓

#### 5.3.4.1 Challenges

The WBR has been in existence now for just more than ten years and has increasingly embedded the biosphere reserve concept throughout the region. Despite its wide support and credibly bright future, the WBRC is currently in a position where it has to face up to a number of quite serious challenges, some of the most pressing include unemployment related to landlessness and lack of skills, potential routing of large power lines, unsuitable development, limited legal protection, and institutional challenges.

##### 5.3.4.1.1 Unemployment

Unemployment remains one of South Africa's most serious social challenges. As the population increases, labour supply continues to grow and government is concerned about the slow absorption of labour in the formal economy. The country has a very high unemployment rate, especially amongst the younger population. In the first quarter of 2011 the actual unemployment rate was 25% (Bloomsberg Businessweek 2011) versus the historical high of 31.2% in March 2003.

Given the virtual absence of large industries, forestry and high-intensity agriculture in the Waterberg, unemployment is a serious challenge to the WBRC. A survey in 2010 amongst school leavers in Vaalwater showed that only 2% of the 2008 learners were taken up in formal employment (Baber 2011).

One of the WBRC's responses to the unemployment challenge is to create more opportunities for local communities within ecotourism ventures. The Waterberg Meander currently includes 13 community projects, 22 sites of interest and 32 private enterprises. The European Union and Waterberg District Municipality, in partnership with the WBR, provided funding for implementing the Meander, addressing the challenge of ensuring economic benefits and job opportunities to previously disadvantaged local communities.

The biosphere reserve is also facilitating improved skills training in the area related to the ecotourism and wildlife industries through linking with the National Skills Fund.

#### 5.3.4.1.2 Land Restitution Process

Traditional rural populations in the Waterberg are mostly landless, resource poor communities. Some of these groupings do not share a common understanding of the value of conserving the area and promoting ecotourism and have thus resolved to apply pressure of returning to conventional forms of agriculture through land redistribution (Baber *et al.* 2003). In 2005 a large portion of the 36 000 ha Lapalala Wilderness in the Waterberg was subjected to a land claim. National governmental processes to resolve land claims are very tedious and time-consuming and to date the Lapalala claim has not been finalized despite indications in 2009 that this claim has been degazetted (Hofstatter 2009). However, the owners of Lapalala have initiated discussions with the land claimants and together the parties have formulated future scenarios to the benefit of all. This links to the envisaged Moepel Farms Community Reserve that will provide local communities with economic incentives of job creation and income from wildlife management. All proposed developments are currently on hold until the land claim issues have been resolved. The role of the biosphere reserve is to ensure benefits to local people in order to alleviate pressing unemployment and poverty. As one interviewee mentioned, "*the area cannot be possessed only by the wealthy privileged*". This is exactly the vision of the WBRC through Lapalala and subsequent communication with local communities.

Despite these undertakings, the Waterberg Living Museum on Lapalala closed in 2008 as a result of the imminent land claims, with subsequent relocation of the entire museum, including Rhino rehabilitation facilities. Time will tell what the future of Lapalala, the Environmental School and the Living Museum will hold.

#### 5.3.4.1.3 Power Lines

The Waterberg, well-known for its unimpeded vistas, currently face the threat of Eskom (South Africa's electricity supplier) routing a high voltage electricity distribution network from the new coal-fired power station, Medupi (near Lephalale, outside to the north of the biosphere reserve), across

the Waterberg plateau. The new power station was scheduled to be commissioned in 2012 and the routing of the new power lines could possibly be devastating to the WBR.

#### 5.3.4.1.4 Residential Development

The Waterberg area's comparative economic advantage is one of being associated with nature based tourism, supported by large contiguous conservation areas. The Waterberg has a very specific 'sense of place'. This term has been described as "*a sense of the beauty and the wealth of phenomena that comprise a particular place*" (Xu 1995). It is rooted in the native soil that defines you and nurtures you with identity and special strength (Ferris 1998). A sense of place is "*how human beings experience themselves as being in place*" (Miller 2006), and is necessary for identification and belonging (Relph 1976). However, the Waterberg's sense of place is being challenged and could eventually be destroyed by extensive fragmentation of the landscape into smaller properties, as well as the subdivision of large tracts of land to provide for lifestyle estates (Baber 2011), specifically aimed at providing residence to the wealthier sections of society. This situation has a knock-on effect on unemployment levels due to the low employment provision of these leisure properties.

#### 5.3.4.1.5 Legal Protection

In the South African legal system, the biosphere reserve concept has no implied legal standing and is being implemented according to a soft-law approach (Stanvliet *et al.* 2004a). This poses some implementation problems in that a biosphere reserve does not have any legal power to enforce its objectives.

On national level, some aspects of a biosphere reserve fall within the realm of the Protected Areas Act and the National Environmental Management Biodiversity Act (Act 10 of 2004). However, biosphere reserves as land management entities have not been inscribed in the Protected Areas Act. At the level of local government, the Municipal Systems Act (Act 32 of 2000) that legislates for spatial development frameworks and plans, directly impacts on biosphere reserves. This Act prescribes the drafting of an integrated development plan for each municipality which is very much developmentally oriented according to section 26. It also addresses a spatial development framework that would form the basis for land-use management in the jurisdictional area of the municipality. The integrated development plan guides all planning and development within a municipality.

Limpopo government's Department of Economic Development, Environment and Tourism (LEDET) has drafted policy guidelines on implementing the MAB Programme. Accordingly LEDET is responsible for coordinating the MAB Programme on provincial level and facilitate implementation

on local government level. Individual municipalities are supposed to incorporate biosphere reserves into all local planning and development initiatives and to support individual biosphere reserves through establishment of formal agreements such as the MoU between the WBRC and WDM. Municipal planning processes offer opportunities to enshrine biosphere reserve principles in future land-use decision-making processes and thus providing detailed spatial guidance for future land-use management.

#### 5.3.4.1.6 Institutional Challenges

The WBR, like most other South African biosphere reserves, experience a constant monetary shortage, specifically operational funding. For the past years, principal funding has been through dedicated project funding such as the Waterberg Meander and WBR Management Plan. In addition, the WBR never had permanent staff members. It was only very recently that a local resident was appointed on half-time as the WBR coordinator.

It is intended that the mutual agreement between the WBRC and Waterberg District Municipality through signing of the Memorandum of Understanding will result in some secure funding to the biosphere reserve on an annual basis that will take care of basic operational expenses. Recently the WBR has entered into negotiations to secure the services of a professional fundraiser who will be responsible for exploring sustainable funding streams into the future.

#### 5.3.5 Dawning of a New Era

The year 2011 marks the 10 year existence of the WBR. This milestone resulted in eligibility of the biosphere reserve for completing the UNESCO 10 year review process. The WBR Management Committee therefore had to reflect on the impact and successes of the biosphere reserve since its inception. The WBRC could never accrue significant monetary resources because the biosphere reserve was facilitated mainly through volunteer input. Some marked successes were achieved throughout the last decade, but the impact of the existence of the biosphere reserve and its international designation were not as notable as was envisaged.

In the absence of a clear directional framework, the WBRC embarked on a process to draft a biosphere reserve management plan that was completed early in 2011. The purpose of the management plan was three-fold as in Text Box 15.

Currently the WBRC operates with a system of four sub-committees. The Management Plan proposes an expanded system of sub-committees to cover all implementation areas of the biosphere reserve (Text Box 16).

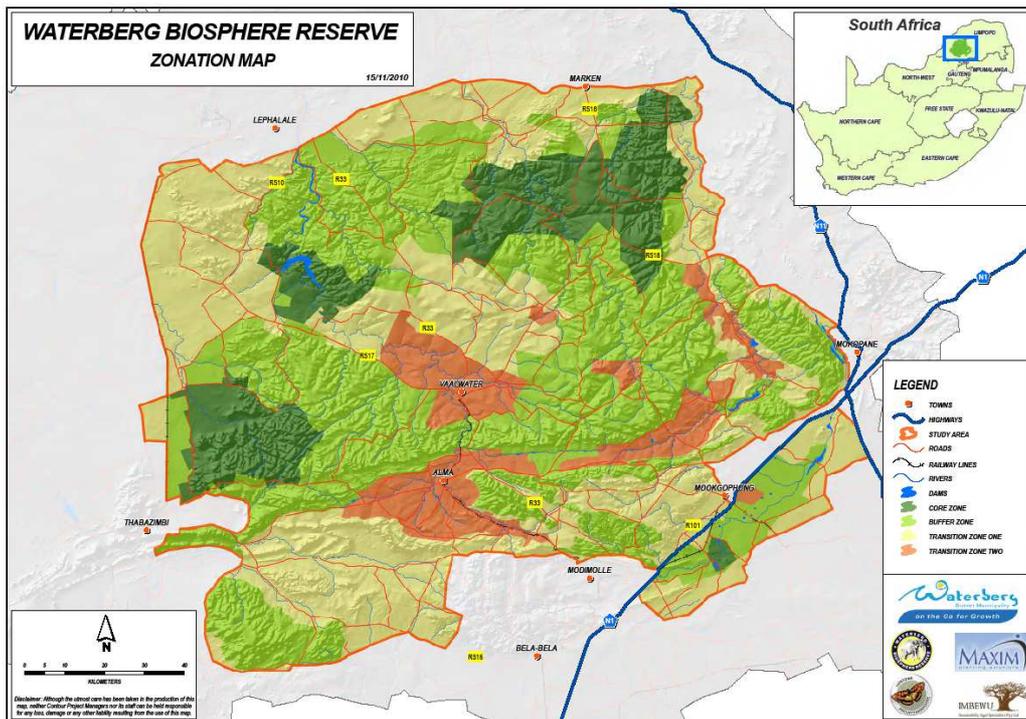
**Text Box 15: Purpose of the Waterberg Biosphere Reserve Management Plan**

1. Capitalize on environmental and economic potential and, by supporting decision-making, ensure sustainable development in line with relevant legislation
2. Be integrated within local and district planning instruments
3. Prepare for the periodic review of the WBR required by the UNESCO MAB Programme

**Text Box 16: Proposed Sub-committees for the Waterberg Biosphere Reserve Management Committee**

1. Socio-economic development
2. Environmental conservation
3. Tourism
4. Development planning (urban and rural)
5. Heritage conservation
6. Research and monitoring
7. Finance and fundraising
8. Education and training
9. Marketing

In drafting the management plan for the biosphere reserve, the domain was defined as much broader than the current extent of the WBR (WBR 2010). It was deemed necessary to include the whole of the Waterberg mountain massif as well as Nylsvley Nature Reserve to the south-east. The latter is a registered Ramsar site since July 1998. Interesting to note is that the new boundaries were selected in such a way to exclude major towns and developed areas so as to strengthen the status of the extended WBR as an internationally renowned conservation area. This process resulted in selection of a new domain for the WBR (Figure 14), still entirely within the Waterberg District Municipality, but encompassing an area of 1 727 614 ha in comparison to the initially designated 417 406 ha. Nylsvley Nature Reserve of 3 978 ha to the south of the north-south national road is intended for inclusion in the core area of the newly designed WBR. The new delimitation was included in the periodic review that was submitted to UNESCO.



(Acknowledgement: Waterberg Biosphere Reserve Company)

**Figure 14: New proposed extent and zonation of the Waterberg Biosphere Reserve**

The WBR Management Plan is a very comprehensive document addressing in much detail the rationale for extending the biosphere reserve to a much larger size. Detailed land-use and development guidelines for each of four biosphere reserve zones namely core, buffer, transition I and transition II include the following (WBR 2010):

- i. Description of zone indicating areas that would be included.
- ii. Permitted land uses and an indication of what will not be permitted, including conservation, tourism, agriculture, industry, business, infrastructure, solid waste disposal, sewage treatment, residential development and community services.
- iii. Detailed development parameters for conservation, tourism and residential developments indicating density, footprint, height, subdivisions, building lines and general conditions.

Core areas are seen to have biodiversity conservation as the priority land use. Buffer zones also have conservation as the priority land use, but include mostly private farms and could house tourism and educational facilities. It is stated that smallholdings will not be included in the buffer zone. Transition zones are divided into two categories according to the levels of impact and disturbance; transition I would retain the undisturbed character of the Waterberg but would allow for a higher level of

tourism development than buffer zones; transition II would provide for more intensive development including agriculture, infrastructure, towns and settlements.

These detailed regulations could be seen as forming an integral part of a spatial framework for the biosphere reserve. All developmental processes will be conducted in close collaboration with local municipalities and Limpopo Province.

### 5.3.6 Results

Data obtained through content analysis, interview surveys, questionnaire surveys and observations were used towards a portrayal of the past and present situation of the WBR.

The semi-structured interviews provided opinions related to the effectiveness of the WBR.

Descriptive results are summarized in Annexure 7. A general rating of between 1 and 3 (where 1 means not meeting the criteria at all, 2 means a middle of the road performance, and 3 means a good performance) was allocated for each component based on the performance of the biosphere reserve as expressed by the interviewees. Out of a potential total of 33, the WBR scored 25 (75.8%).

The questionnaire survey (Annexure 3), completed by the seven interviewees, consisted of personal information (box 1) and three question boxes (boxes 2 to 4). Question box 2 provided interviewees the opportunity to put forward an opinion on five questions of a general biosphere reserve nature. The first question was: *“In your opinion, is the biosphere reserve concept a valuable tool with which to do landscape management in South Africa?”* Of the seven interviewees, six gave a ‘yes’ response and one answered ‘maybe’.

The second question was: *“In your biosphere reserve, do you think the designation is adding value to the area?”* Six interviewees reacted positive, while only one mentioned ‘somewhat’.

The third question elicited a reaction on institutional support for the WBR - *“Is the organization that you represent in support of the biosphere reserve?”* All seven interviewees responded ‘yes’.

The fourth question produced interesting opinions on the ideal of an effective biosphere reserve. The question *“Are you of the opinion that the management entity of your biosphere reserve is doing a good job of managing the biosphere reserve effectively?”* was answered with a statement of ‘somewhat’ by three interviewees, three responded ‘yes’ and one said ‘no’. One interviewee noted a specific wish that the biosphere reserve should take responsibility for developing local settlements for destitute communities in partnership with local authorities.

The last question turned out a positive response by five interviewees whereas two responded ‘sometimes’ - *“Do you truly agree with the statement ‘biosphere reserves are special places for people and nature’?”*

Responses to these five questions indicate in general support for using the biosphere reserve concept as a tool for sustainable land management and a perception that it adds value to the area. There is however a sense that the WBR is not being managed very effectively.

The third box addressed problems and challenges faced by the WBR. Interviewees were given 10 elements to order in priority from highest to lowest. The responses were analyzed with matrix ranking, specifically preference ranking (Margoluis & Salafsky 1998). The collective ranking from highest to lowest came out as follows (Table 20):

**Table 20: Waterberg Biosphere Reserve collective ranking of list of problems/challenges**

WBR Collective Ranking of List of Problems/Challenges	
1	Insufficient long-term financial resources
2	Too little benefits perceived by local communities resulting in a lack of support
3	Insufficient legal means (lack of 'teeth') to implement the biosphere reserve concept
4	Lack of dedicated biosphere reserve personnel
5,6	Lack of long-term vision and objectives
5,6	Biosphere reserve concept not strongly supported by national government
7	Support (buy-in) from local authorities (municipalities)
8	Too little awareness amongst role-players and local communities
9	Not enough insight into the value of implementing the biosphere reserve concept
10	Too much of a conservation (green) focus and not enough emphasis on other issues such as development

Implementation aspects specific to biosphere reserves (also referred to in Table 8) namely monetary resources, legal implications and the need for permanent staff, rate as the most pressing challenges to the future of the WBR. Another issue that is being encountered by many biosphere reserves is whether real benefits accrue to resident communities as a result of the existence of the biosphere reserve. This issue is rated as second highest challenge, although knowledge about the biosphere reserve concept is not being perceived as a serious problem (rated in the ninth position).

The fourth box addressed positive elements linked to the WBR. Interviewees were again given 10 elements to order in priority from highest to lowest. After analysis of the responses with preference ranking (Margoluis & Salafsky 1998), the collective ranking from highest to lowest came out as follows (Table 21):

**Table 21: Waterberg Biosphere Reserve collective ranking of list of positive elements**

<b>WBR Collective Ranking of List of Positive Elements</b>	
1,2	The biosphere reserve creates international visibility for the area
1,2	The biosphere reserve concept is a tool with which to facilitate collaborative management to the benefit of the region
3	The biosphere reserve creates an opportunity for communities to be involved in management decisions about the future of their area
4	The biosphere reserve attracts more tourists/visitors
5	A biosphere reserve is much different (in a positive way) to a traditional protected area such as a national park or nature reserve
6	The biosphere reserve provides a means to attract international funding to the region
7	The biosphere reserve has resulted in people becoming more aware of their interconnectedness to the natural environment
8,9,10	The biosphere reserve creates awareness about sustainable development
8,9,10	The biosphere reserve created more jobs in the area
8,9,10	The biosphere reserve has resulted in increased property values

From these results, it could be inferred that the biosphere reserve concept is being hailed as a special management tool with which to instil collaborative management between a wide range of stakeholders, as well as a means of getting international recognition for the specific area. Rating of the ability to attract funding as number six links to monetary challenges rated as the most important implementation hurdle. It is interesting that the fact of a biosphere reserve being so much different from an ordinary protected area has only been rated as number five on the list of positive elements. Collective results of the multicase study are discussed in Chapter 6.

### 5.3.7 Discussion

Considering all information and opinions, it could be concluded that the WBR is held in high esteem and widely supported by a range of affected role-players. Still there remain sections of society who stand critical to the real benefits of having a designated biosphere reserve in their area, and furthermore other sections of society who are not even aware of the biosphere reserve's existence.

Use of the word 'reserve' was questioned by one of the interviewees with the view that it still conveys the message of an area where people are being excluded, which is a very sensitive issue in South African society. It was pointed out that ordinary people still find it difficult to grasp the meaning of a biosphere reserve and its terminology, a task that is to be addressed by all South African biosphere reserves.

Over the years the WBR has been ongoing mainly due to the extraordinary commitment of a few volunteers. Consequently, during interviews it was suggested that UNESCO needs to be much more

involved with specific pertinent issues of an area before deciding on designation. Issues include securing support from major stakeholders, availability of funding for institutional capacity and rationale for the boundaries of the biosphere reserve.

Legal implications were very highly rated as a challenge. To date Limpopo Province has not drafted any provincial planning legislation, but the province has promulgated the Limpopo Environmental Management Act in 2003 (Act 7 of 2003). This Act provides for the creation of limited development areas wherein specific developments or activities could be prohibited. This opens up the possibility for incorporating biosphere reserve zonation guidelines as part of the regulations of the Act. Such guidelines have been drafted as part of the WBR Management Plan. Other land-use guidelines exist in the form of the Limpopo Spatial Development Framework as well as district and local municipal spatial plans. However, the WBR is not included in these plans and biosphere reserve zonation is not being recognized. There is therefore a lack of a holistic land management approach within the WBR domain. Here the Western Cape bioregional planning guidelines could serve as an example of how to deal with land management on a provincial scale.

The link between a landscape initiative such as a biosphere reserve and the area's economic potential has been widely emphasized. Beresford and Phillips (2000) noted the success of a protected landscape as being linked to continued viability of the local economy, and conserving the area must be seen as relevant to meeting local people's social and economic needs. The same notion, linked to the goal of sustainable development, has been highlighted by Gambino (1998) in Italy. The provision of local benefits by biosphere reserves, contributing to improving quality of life, has been identified as a key issue in the Czech Republic (Kuřová *et al.* 2008). In the book on biodiversity, sustainability and human communities by O'Riordan and Stoll-Kleemann (2002), the need for combining ecological and social needs is very often emphasized, as well as the 'people first' notion of promoting sustainable livelihoods of local people through management practices in protected areas. People generally look towards biosphere reserves to assist in alleviating poverty (Stoll-Kleemann & Job 2008) which places a high expectation on biosphere reserve management. The UNESCO office in Jakarta has produced a document on lessons from biosphere reserves in the Asia-Pacific region (UNESCO 2010), a region heavily threatened by wide-spread poverty. The economic impact of biosphere reserves on poverty alleviation has been tested in Sierra Gorda Biosphere Reserve in Mexico, Maya Biosphere Reserve in Guatemala and Bosawa Biosphere Reserve in Nicaragua with various success rates. The UNESCO document (UNESCO 2010) states quite controversially "*there is insufficient information available to judge whether biosphere reserves are indeed a useful tool in sustainable development and poverty alleviation*". This viewpoint has been echoed by Francis (2004) through noting that Canadian biosphere reserves are not discreet

economic entities. Nonetheless one of the objectives of the WBRC is to improve the quality of life of people in the area, linking directly to economic opportunities. One of the biggest challenges impeding this goal is ever-present poverty which the biosphere reserve has to face in collaboration with relevant authorities.

Residents would like to receive benefits in some form from the existence of the WBR. Price (2002) related the benefits of biosphere reserves to being sites of excellence that demonstrate sustainable development approaches. Improved income opportunities for local communities provided by the biosphere reserve have been proved in certain instances such as Tonle Sap Biosphere Reserve in Cambodia (Bonheur 2001). The Periodic Review process of UNESCO requires information on income and benefits to local communities derived from the biosphere reserve. However these refer mainly to tourism activities and do not address livelihood problems, such as landlessness, unemployment and poverty in general. The Madrid Action Plan addresses in quite detail the economic contributions of biosphere reserves, relating to benefits to local populations (UNESCO 2008). Target 26 specifically states *“improved generation of profits and livelihood benefits in biosphere reserves”*, with the economic contribution of biosphere reserves to local economies as one of the identified actions. It is therefore pertinent for biosphere reserves to make an active contribution to social and economic needs of local populations as emphasized by interviewees in the case of the WBR.

### 5.3.8 Synopsis

The WBR juxtaposes wealthy landowners with landless, resource poor rural communities in a striking way. Given the extensive challenges faced by the WBRC, the biosphere reserve is at a crucial point in illuminating the future. It needs to take heed of the intrinsic nature of the MAB Programme, which it does very effectively, but also has to demonstrate a positive influence on daily livelihood struggles of its inhabitants. The WBR has innovative ideas on how to grow support and thus instil the value of the biosphere reserve into the hearts and minds of all involved. These include the MoU with the WDM, incentive system with landowners, and community managed reserves to promote ecotourism. The biosphere reserve therefore plays a role in assisting local communities in making in-roads into ecotourism ventures to provide a more secure economic future for local inhabitants.

In order to have an effective biosphere reserve, some crucial issues have a large impact, such as its size and extent, inclusiveness across ecological and social ranges, monetary security, representativeness of management authority, and legal position. Another very important issue is the human factor. Support from municipalities is crucial to the future of a biosphere reserve.

Municipalities however are pressed to focus on basic needs such as water, health, access roads and electricity, thus biosphere reserves are not very significant in any political agenda. Municipal

councillors also often do not understand the issues (Masibe 2011) and therefore the biosphere reserve has to enlighten them on a continual basis. Success of a biosphere reserve is most often heavily influenced by personalities of staff and other members of the management authority. In-depth knowledge of the MAB Programme and a focused view of the larger impact of the biosphere reserve is needed and not a demeanor of personal gain. Fortunately the WBR is being spearheaded by people that have the well-being of the biosphere reserve as their foremost goal.

The legal standing of biosphere reserves in South Africa remains very problematic. The soft-law approach, although not very effective, should be weighed up against maintaining implementation flexibility within the MAB Programme. Limpopo Province currently does not have a legislative land-use framework (De Klerk 2011; WBR 2010), in contrast to the Western Cape Province where such a framework does exist and was found the ideal way through which to legislate for land use within a biosphere reserve. The WBR still has to find best avenues for collaborative implementation of land-use legislation.

Given the nature of the MAB Programme in South Africa as a non-legislated land management tool, it is interesting that the following forward-looking statement is made in the WBR Management Plan: *“The WBR must move away from essentially just being a voluntary based organization to one that is run like a business”* (WBR 2010). This is much in line with perspectives of other South African biosphere reserves but opens up a discussion on maintaining flexibility within the biosphere reserve concept and its rightful place within a system of landscape management tools. Thus some interviewees aired the opinion that a strong business interest could pose problems for biosphere reserve management. Nevertheless the biosphere reserve concept is perceived as an essential tool in national government’s protected areas expansion strategy with which to integrate people and the environment in a manner that supports the country’s natural and cultural conservation and sustainable development objectives while improving human well-being. The fact that the national government may not fully comprehend the role that biosphere reserves fulfill in achieving their goals, as noted by an interviewee, continues to be an important matter to resolve.

The WBR covers an exquisite landscape that features highly on the South African conservation agenda. It is facing an exciting future with plans to enlarge the biosphere reserve to more than four times its current extent. Although the WBR is currently being managed relatively effectively in comparison to other South African biosphere reserves, it is facing some potentially serious challenges. Should this biosphere reserve succeed in negotiating better land-use decision-making legislation with Limpopo provincial government, it will greatly aid in elevating the position of the MAB Programme on the list of landscape management tools in the South African context.

## 5.4 South Africa's Most Remarkable Wildlife Tourist Destination: A Case Study of the Kruger to Canyons Biosphere Region

*"Our imagination is the only limit to what we can hope to have in the future" (Charles F. Kettering)*

### 5.4.1 Overview

Kruger National Park is one of the topmost tourist destinations in South Africa. Visitors are not always aware that, when spending time in arguably the best game reserve in the world, they are also within the core of one of the world's largest UNESCO designated biosphere reserves, the Kruger to Canyons Biosphere Region.

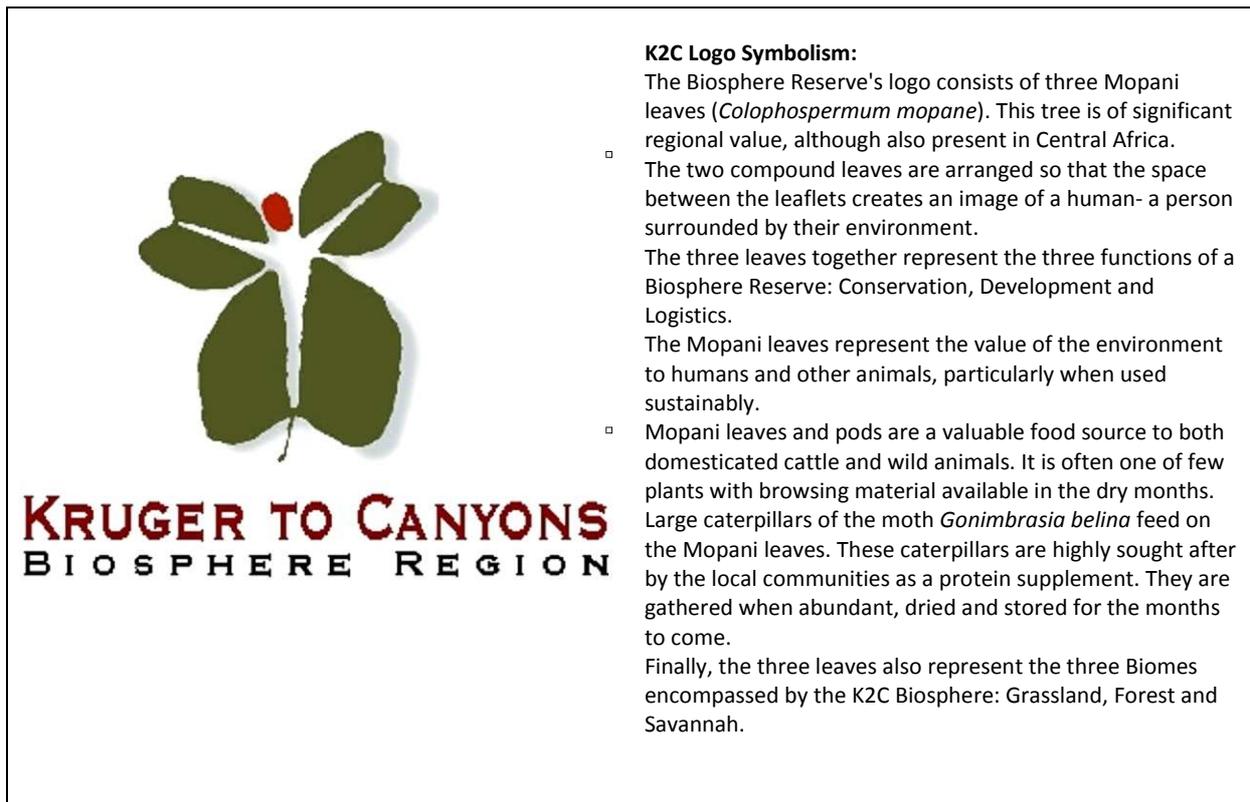
The name has a geographical connotation and indicates the area from Kruger National Park on the eastern boundary to the escarpment of the Drakensberg range in the south-west, including the well-known Blyde River Canyon as well as other smaller canyons.

Kruger to Canyons Biosphere Region is located in the heart of the Lowveld. The area is a wildlife sanctuary like no other with a unique bush atmosphere reflecting the true quality of Africa. A sizeable portion of the landmark Kruger National Park forms part of the core area of the Kruger to Canyons Biosphere Region. This is the land of baobabs, fever trees, knob thorns, marula and mopane trees underneath which lurk the Big Five (lion, leopard, elephant, buffalo and rhinoceros), the Little Five (buffalo weaver, elephant shrew, leopard tortoise, ant lion and rhino beetle), the birding Big Six (ground hornbill, kori bustard, lappet-faced vulture, martial eagle, pel's fishing owl and saddle-bill stork) and more species of mammals than any other African game reserve (Kruger National Park 2011).

Collaborative management is practiced in the biosphere reserve through a representative management entity and dedicated volunteers. A number of projects are being implemented with the view to provide benefits to local communities and addressing poverty alleviation while at the same time ensuring conservation of biodiversity of national and international importance.

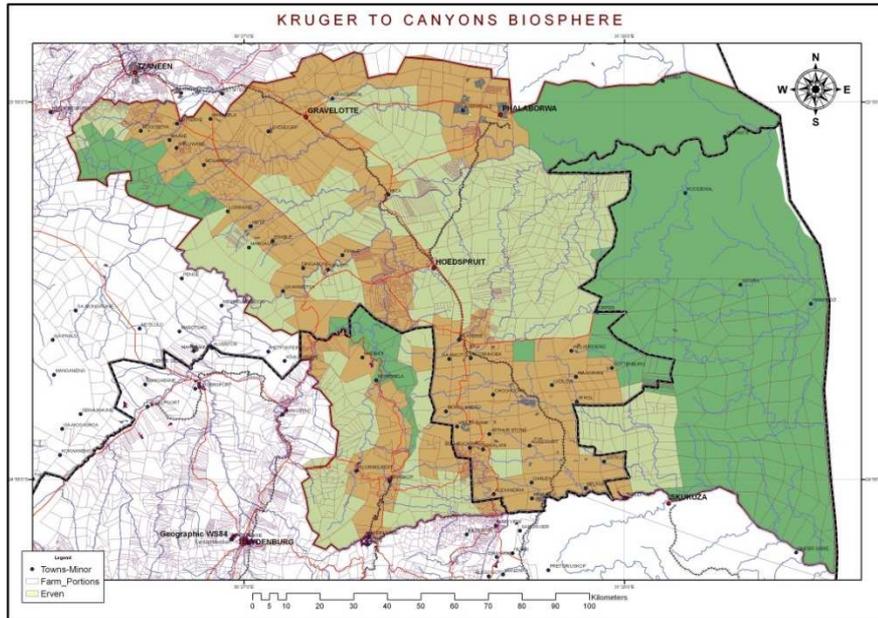
### 5.4.2 Description of the Kruger to Canyons Biosphere Region Domain

On the 20th of September 2001 the Kruger to Canyons Biosphere Reserve was registered in Paris by the UNESCO under the MAB Programme. Lately the Kruger to Canyons Biosphere Reserve is being referred to as the Kruger to Canyons Biosphere Region (K2C). This change in name is due to the historical connotation in the South African context of the term 'reserve' where it was inevitably coupled to an exclusion area (Stanvliet *et al.* 2004a). A biosphere reserve on the other hand is indeed a *"special place for people and nature"* (Bridgewater 2002; UNESCO 2002a) as clearly demonstrated by K2C's logo and its symbolism (Figure 15).



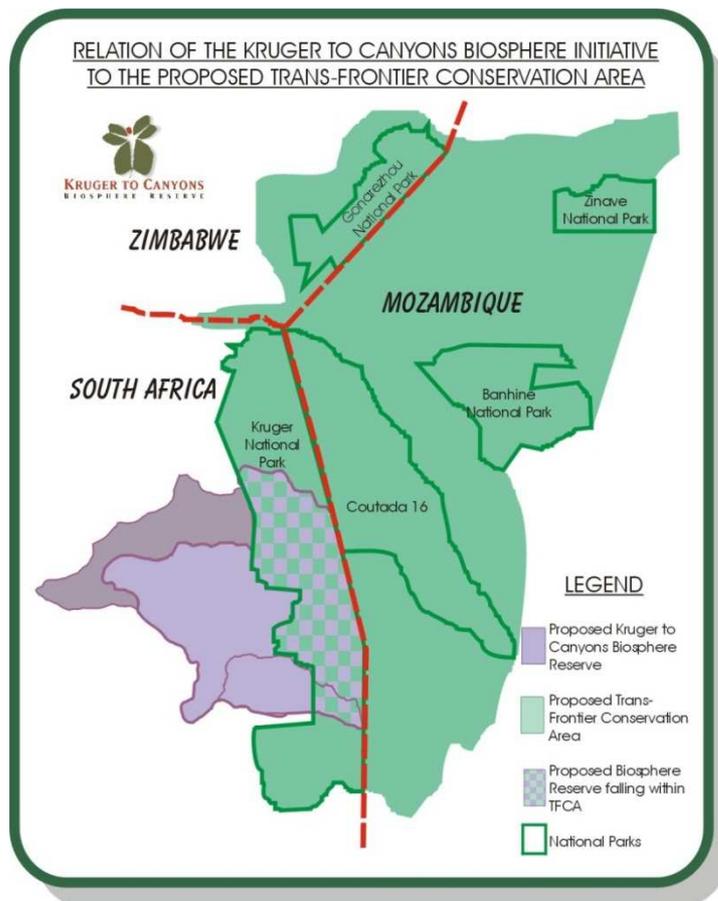
**Figure 15: Logo and symbolism of the Kruger to Canyons Biosphere Region**

The K2C covers a vast expanse of about 2.6 million hectares, making it one of the largest biosphere reserves in the world. It is demarcated into core areas of 923 770 ha which cover a significant section of South Africa's world renowned Kruger National Park, buffer zones of 485 586 ha, and a transition zone of 1.2 million ha (Figure 16). K2C thus also forms part of the Great Limpopo Transfrontier Park, a conservation area linking South Africa, Mozambique and Zimbabwe, covering approximately 35 000 km<sup>2</sup> (3.5 million ha), one of the largest conservation areas in the world (Figure 17). Apart from the Kruger National Park, five provincial nature reserves and one tribal reserve are included as core areas. Most of the buffer is made up of privately owned conservation land.



(Acknowledgement: Kruger to Canyons Biosphere Region Company)

**Figure 16: Zonation of the Kruger to Canyons Biosphere Region**



(Acknowledgement: Kruger to Canyons Biosphere Region Company)

**Figure 17: Relevance of Kruger to Canyons Biosphere Region to the Great Limpopo Transfrontier Park between South Africa, Mozambique and Zimbabwe**

In the nomination document (Newenham 2001) the transition zone was defined as five distinct zones (Table 22). Currently however the K2C treats all five delineations as one all-encompassing transition zone.

**Table 22: Kruger to Canyons Biosphere Region original classification of Transition Zones**

SUB-ZONATION	DESCRIPTION
Transition 1	Areas of cattle farming and tribal grazing land without transformation of natural habitat. Sustainable practices are taking place in this zone.
Transition 2	Areas that have undergone transformation from natural habitat to cultivated species, for commercial or subsistence purposes. The crops have an economical contribution and are not necessarily managed sustainably.
Transition 3	Small towns and rural villages with fairly poor or limited infrastructure.
Transition 4	Major towns including residential settlements and big businesses. Well-developed and sometimes advanced infrastructure. Areas in the process of being developed are also included.
Transition 5	High impact mining including gold, phosphate, copper and mica. Mining activities have a major impact on the environment and are not sustainable activities at all but are a major contributor to the economy.

K2C bridges the Limpopo and Mpumalanga Provinces (about 50% in each province), and it is also at the interface of the Eastern Transvaal Drakensberg Escarpment and the Central Lowveld. Sections of three of the country's seven biomes are included in the K2C, namely Grasslands and Afro-montane forests of the escarpment and the Savanna of the lowveld (Newenham 2001). Highest altitude is at 2 050 m with annual precipitation varying from 400 to 3 000 mm, depending on the region. The escarpment, source of eight perennial rivers, is a very important water catchment area contributing to local and provincial needs.

The K2C domain boasts the world's largest area of privately owned nature reserves. Each has its own management objectives but all are primarily managed for its wildlife populations and recreational utilization in the form of ecotourism and hunting for trophies or meat. Game ranches with high-quality accommodation are abundant and tourists can choose from a wide selection. Many of these game farms border directly onto the Kruger National Park and in some cases internal fences have been dropped. Agricultural activities in the area include cattle farming and crops such as vegetables and subtropical fruits. Commercial plantations of pine species (*Pinus* spp.) or blue gums (*Eucalyptus* spp.) cover large areas.

Ecotourism has been one of the main economic activities throughout history due to the presence of Kruger National Park and many private game facilities. The park welcomes approximately 1.5 million visitors annually.

A summary of plant and vertebrate species was listed in the nomination document (Newenham 2001). Numbers of species, numbers of endemic species and numbers of Red Data listed species are given in Table 23.

**Table 23: Kruger to Canyons Biosphere Region list of species, endemics and red data status**

Kingdom	Group	No. of Families	No. of Species	Endemic	RED DATA STATUS				Economic Importance
					Endangered	Vulnerable	Rare	Indeterminate	
ANIMAL	Mammals	37	149	5	3	9	14	13	42
	Birds	76	510	8	4	8	21	18	31
	Reptiles	16	147	36	0	2	4	0	12
	Amphibians	8	42	7	0	0	1	0	1
	Fish	14	57	2	0	1	5	0	33
FLORAL	Plants	204	2 761	116	6	8	38	8	190
<b>TOTALS</b>		<b>355</b>	<b>3666</b>	<b>174</b>	<b>13</b>	<b>28</b>	<b>83</b>	<b>45</b>	<b>309</b>
					<b>169 Red Data Listed Species</b>				

#### 5.4.2.1 History

Historical events of note in the K2C revolve around early settlers, the Stone Age people, black immigrants from the north, white European settlers arriving from 1838, discovery of gold in 1874, a hunting lifestyle, outbreak of rinderpest in 1896, the Anglo-Boer war in 1899, appointment of the first warden of Sabie Game Reserve in 1902, import of wattle and eucalyptus from Australia for forestry since 1904, proclamation of Kruger National Park in 1926, separation of people from their land, increase of private conservation land from 1960, establishment of 'homelands' in 1972, Apartheid regime, consolidation of conservation land from the 1980's, the country's first democratic elections in 1994 and designation of the K2C in 2001.

K2C has a population of about 1.5 million, residing mainly within the transition zone. About 97% of the population is black Africans with a high percentage of unemployment. There is a constant influx of people from neighbouring Mozambique, contributing to rising poverty and a higher demand on natural resources. Only about 21% of people are employed with the biggest employers being the agricultural and conservation sectors. A staggering 70% of people have no income at all. Eleven different languages are being spoken within the area and an astounding 61 religions are followed (Newenham 2001).

Tourism has always been a major economic activity in the region. Bestowed with breath-taking landscapes, big five game species, culturally interesting locations, important biodiversity and vast unspoilt conservation areas, the region offers almost unmatched opportunities specifically for ecotourists. The status of Kruger National Park as a global must-see and very high annual visitor numbers is a case in point. Tourism is the life line of many of the reserves and due to its global popularity Kruger National Park is one of the top five financially viable national parks in the country. Economic activities, including tourism, provide a certain range of benefits to local communities. Although ecotourism is often perceived as a means towards income and better living conditions, it is however not the only solution to socio-economic problems. Possible benefits to local community groupings are listed by Newenham (2001):

1. Improved and/or increased employment opportunities.
2. Development of new infrastructure, and improvement of existing infrastructure.
3. Greater opportunities for development initiatives in the future.
4. Provision of basic needs (e.g. clean water).
5. Improve the overall standard of health.
6. An increase in income per capita, which will lead to an improvement in the quality of life.
7. Greater opportunities for research projects in the future.
8. Improve and expand conservation efforts.
9. Greater coordination amongst different initiatives.

Employment opportunities could be increased through various ecotourism products. However the K2C does not yet have a clearly defined strategy to market this very large area as an ecotourism destination of note.

#### **5.4.2.2 Flora**

Acocks (1988) recognized seven veld types within the K2C. The latest vegetation classification by Mucina and Rutherford (2006) includes the following vegetation types as part of the K2C domain, Granite Lowveld, Legogote Sour Bushveld, Tzaneen Sour Bushveld, Central Sandy Bushveld,

Sekhukhune Plains Bushveld, Lowveld Rugged Mopaneveld, Phalaborwa-Timbavati Mopaneveld, Northern Escarpment Dolomite Grassland, Northern Escarpment Quartzite Sourveld, and Northern Escarpment Afromontane Forest.

The Wolkberg escarpment, including the Wolkberg Wilderness Area, is considered to be one of the floristic hotspots in South Africa (Balance & King 1999). More than 2 761 plant species have been recorded in the biosphere reserve domain. Medicinal plant trade is having a huge impact on indigenous plant species with large quantities being distributed to Gauteng Province.

An array of larger trees can be found such as, sjambok pod (*Cassia abbreviata*) with its long, hanging pods and bright green foliage; the Transvaal teak (*Pterocarpus angolensis*); round-leaved teak (*Pterocarpus rotundifolius*); baobab (*Adansonia digitata*); knobby thorn (*Acacia nigrescens*); the very popular and valuable marula (*Sclerocarya birrea*); wild pear (*Dombeya rotundifolia*); lucky-bean trees (*Erythrina* spp.); brak thorn (*Acacia robusta*); *Acacia ataxacantha* with its tangled creeper-like hook-thorns; *Acacia schweinfurthii* with its white balls; umbrella thorn (*Acacia tortilis*); scented thorn (*Acacia nilotica*) and sweet thorn (*Acacia karroo*), one of the most widespread trees in Africa (Coates Palgrave 2003).

#### 5.4.2.3 Fauna

Due to a large diversity of habitats, a wide range of faunal species, including the big five, are found within the area. Some of the more prominent species include the African wild dog (*Lycaon pictus*), elephant (*Loxodonta africana*), blue wildebeest (*Connochaetes taurinus*), cheetah (*Acinonyx jubatus*), Lichtenstein hartebeest (*Alcelaphus lichtensteinii*), Burchell's zebra (*Equus burchellii*) and kudu (*Tragelaphus strepsiceros*).

Of the 102 threatened butterflies in South Africa, 31 (30%) occur in the Grassland Biome (Henning & Henning 1989) and are therefore present in the K2C.

Of the eight endemic bird species, the migrant blue swallow (*Hirundo atrocaerulea*) breeds mostly on private forested lands. All of the country's 12 owl species, as well as all of the stork species can be found inside the biosphere region. The big six of birding, namely ground hornbill, kori bustard, lappet-faced vulture, martial eagle, pel's fishing owl and saddle-bill stork are also present in the region.

Caterpillars of the mopani emperor moth (*Gonimbrasia belina*) are known as mopani worms. These are considered a great delicacy amongst African communities and are being collected in vast quantities. The caterpillars contain 60% crude protein and are a valuable and nutritional food source for local inhabitants (Headings & Rahnema 2002).

The little five of animals can also be found in the region. They are the buffalo weaver, elephant shrew, leopard tortoise, ant lion and rhino beetle (How Safaris Work 2011).

### 5.4.3 Inception of the Kruger to Canyons Biosphere Region

The notorious Apartheid political regime in South Africa has kept a physical distance between communities of different racial origins. Transformation started to happen from the late 1980s, culminating in the country's first democratic elections in April 1994. During those times of political unrest, the Central Lowveld Development Forum was actively working on bringing communities together (Thompson 2011). Consultants were appointed to draft a framework for managing development in the area bordering onto the Kruger National Park. The biosphere reserve concept was selected as the most applicable framework with which to improve quality of life for all people without compromising biodiversity conservation initiatives, and to allow for the breaking down of divisions in the region (Uys 2011). Interest in the concept started in about 1992 and continued to grow from strength to strength. The origin of the K2C was therefore a "*grass roots driven initiative*" (Newenham 2001). After 1994 there was a lapse of about four years until funding to support the drafting of a nomination document was obtained from MELISSA (Managing the Environment Locally in Sub-Saharan Africa) through the World Bank. On 23 May 1998 a launch of the Kruger to Canyons Biosphere Reserve Initiative was held that resulted in the selection of a steering committee with representatives from nineteen major interest groups. The steering committee was re-organized into a stakeholder council from within which a trust was elected to act as a legal entity (Newenham 2001).

The nomination was done by a small group of people directly involved with the K2C, submitted to UNESCO early in 2001 which resulted in designation in September 2001. Selection of the specific K2C extent was based mainly on water catchment areas. The nomination document (Newenham 2001) refers to the area as a cluster biosphere reserve with contiguous zones. Reasons for nominating the area as a cluster biosphere reserve have relevance to the nine core protected areas within two 'clusters', the escarpment and the lowveld.

Apart from two provinces, K2C spans across two district municipalities and four local municipalities - Ehlanzeni district with Bushbuckridge and Thaba Chweu municipalities (in Mpumalanga Province); Mopani district with Maruleng and Ba-Phalaborwa municipalities (in Limpopo Province).

The guiding philosophy behind the K2C as mentioned in the nomination document is stated in Text Box 17.

**Text Box 17: Kruger to Canyons Biosphere Region guiding philosophy**

The Kruger to Canyons Biosphere Region (formerly Central Lowveld Biosphere Reserve) is a development community bound together in the realisation and commitment to the principle that all people have a responsibility to the environment. Regional sustainability is dependent on co-operation and partnerships between all stakeholders, and equitable sharing of resources and benefits.

In the very early stages the management of the K2C was facilitated by the South African Wildlife College that has its location on the border of the Kruger National Park. As this was not a situation that could continue indefinitely, the K2C was subsequently coordinated by the chairperson of the Executive Committee, a local resident acting in a voluntary capacity.

The first Kruger to Canyons Stakeholder Council was in place before UNESCO designation. This council had five task teams through which to ensure the three biosphere reserve functions are being implemented in the region, namely one task team each for the conservation and development functions, whereas the logistic function had three task teams - research, communication and environmental education (Newenham 2001). The task teams mainly operated through building partnerships with existing initiatives.

#### **5.4.4 Implementation of the Kruger to Canyons Biosphere Region**

Since 2007 the management entity of the K2C was in the form of a voluntary association, the K2C Representatives Council. It has been established according to a constitution and has elected an executive committee (EXCO) that consisted of nine members. The association is a non-profit organization. Membership is voluntary and open to individuals or groups residing in, or carrying out activities within the K2C. The original stakeholder council was transformed into the Representatives Council, consisting of more than 70 representatives.

The K2C Representatives Council has an impressive list of members from all major stakeholders, covering core, buffer and transition areas, including conservation, government departments, local authorities, tourism, research, agriculture, tribal authorities, traditional healers, education, forestry, mining, business and NGOs. For the purpose of transparency the Council should meet at least twice annually, but sometimes they meet only once a year or even less often. The EXCO meets regularly, however it often consists of only three individuals who are all involved in a voluntary capacity. This is not an ideal situation given the very large area covered by the K2C. Since August 2011 the voluntary association has been registered as a private company, registered as a non-profit organization in accordance with the Companies Act.

A Project Manager was appointed on a two-year contract as a paid staff member. Much later in August 2008 a Coordinator was appointed. Unfortunately due to financial constraints the Coordinator's contract had to be terminated in July 2009 (Makhubela 2011). The Project Manager's contract also had to be terminated end December 2010 due to insufficient monetary resources. In 2009 the Coordinator occupied an office in a new building in Hoedspruit that was erected for the K2C through a partnership with Maruleng Municipality with funds from the European Union. Due to unplanned financial circumstances the K2C could not secure an operational budget which resulted in the building currently being maintained and operated by the Municipality. At present the K2C has no paid staff members.

Most online information on the K2C can be found as a subsection to a website on guided safaris within the Kruger to Canyons region ([http://kruger2canyons.com/learningcentre/kruger\\_to\\_canyons\\_biosphere.php](http://kruger2canyons.com/learningcentre/kruger_to_canyons_biosphere.php)). A clear K2C vision and mission has been drafted as noted in Text Box 18.

**Text Box 18: Vision of the Kruger to Canyons Biosphere Region**

To foster harmonious integration of people and nature for sustainable development through participation, knowledge sharing, poverty reduction and human well-being improvements, cultural values and society's ability to cope with change, thus contributing to the Millennium Development Goals.

**Mission of the Kruger to Canyons Biosphere Region**

To establish and maintain the K2C as the pre-eminent conservation and development model in southern Africa.

A crucial aspect of the K2C is ongoing communication with, and involvement of, relevant local communities. Due to large sprawling rural communities this difficult task is not being dealt with very efficiently (Makhubela 2011). The K2C issues a regular electronic newsletter. Rural communities, making up the largest part of the population, do not have easy access to electronic media, resulting in communication not regularly reaching these stakeholders.

K2C has strong support from Limpopo provincial government through promoting the signing of two Memorandums of Understanding. K2C however will not be a signatory as the MoUs are to be signed between LEDET as main partner, and Mpumalanga Parks and Tourism Agency (MTPA) and Mopani District Municipality as second partners respectively. The MoU with MTPA basically covers the development of a management plan for the K2C with funding forthcoming from the two provinces. The MoU with Mopani supports a financial contribution from Limpopo Province to Mopani District Municipality to be used for implementation of the K2C management plan, community-based

projects, office equipment and facilitation of K2C meetings. Up to date these MoUs have not been finalised and therefore have not been formally signed and implemented. At present, support from Mpumalanga provincial government is not adequate and needs to be addressed as a matter of urgency by expediting the MoU.

Community expectations from the K2C are very high. They are looking for ways to assist them in their fight against joblessness and poverty. Therefore it is understandable for communities to rather support biosphere projects that could lead to job creation and income generation, than biodiversity conservation initiatives (Makhubela 2011). It is however for biosphere reserves to support projects across a very wide range of all three biosphere reserve functions. The K2C is doing a sterling job of securing local and international funding to implement an impressive list of projects (Thompson 2011, Uys 2011). Details of the projects are summarized in Table 24. Following are more details of some of the larger projects.

**Table 24: Projects implemented in the Kruger to Canyons Biosphere Region**

PROJECT	DESCRIPTION
Communication	<p>Pamphlets have been drafted and distributed on topics relevant to the K2C:</p> <ul style="list-style-type: none"> <li>▪ Development in K2C</li> <li>▪ Guidelines for development in K2C</li> <li>▪ Responsible tourism in K2C</li> </ul> <p>Electronic newsletters compiled by the K2C Project Manager</p>
Bushbuckridge Biocultural Protocol	<p>Project in collaboration with traditional health practitioners of Bushbuckridge</p> <p>Two issues to be addressed:</p> <ol style="list-style-type: none"> <li>i. accesses to medicinal plants and sustainable harvesting: creating a sustainable fund towards medicinal nurseries through voluntary carbon offsets with tourism lodges</li> <li>ii. partnership between healers and cosmetic companies with regards to traditional knowledge through Natural Justice and SilkSA</li> </ol> <p>Workshops were held with community involvement Feasibility study was done Communities are already using the protocol</p>
River Corridor	<p>Project to establish a link between Kruger NP and Blyde River Canyon based on stewardship</p> <p>Have set up a project steering committee Feasibility study and implementation plan were done Funded by German government through AZF Currently writing funding proposals – draft to GEF done</p>
UNESCO Schools in Biospheres	<p>Link exists between the Martin-Polich Gymnasium in Fladugen, Germany and the Southern Cross School in Hoedspruit</p> <p>8 learners visited Germany in June 2011 Planning to extend this project to other schools in biosphere reserves through interaction with UNESCO</p>
Sustainable Living Festival, Hoedspruit	<p>An annual Sustainable Living Festival is held over 3 days in Hoedspruit Communities and businesses participate</p>
fRfR (from the region, for the region)	<p>Use of fRfR stickers to identify locally produced goods and products Still in its infancy stage – to be accompanied by a major marketing programme</p>

### 5.4.4.1 Projects

#### 5.4.4.1.1 Bushbuckridge Biocultural Protocol

The rationale behind this project is the conservation and sustainable utilization of biodiversity. Medicinal plants have always been grown by traditional rural communities and are sustainably harvested according to spiritual values and customary laws. Traditional knowledge is shared on the basis of consultation, reciprocity and benefit-sharing. Medicinal healers face two key challenges, namely their access to medicinal plants is limited by differential property rights, and they are discriminated against by certain groups and struggle to gain income from their services due to widespread poverty in their communities. Traditional medicines are widely referred to as 'muthi'. The use of traditional medicines is founded in cultural and ancestral traditions and is seen by rural communities to be complementary to western drugs. Medicinal plants are also subject to over-harvesting by herbalists and muthi hunters, collecting large quantities especially on communal lands and using unsustainable methods (Biocultural Protocol 2009).

The Bushbuckridge Biocultural protocol project was initiated in 2009 in partnership with Natural Justice, a non-profit organization working with communities to develop their legal capacity to demand social and environmental justice. The document was jointly funded by MTPA through the Mpumalanga Rural Development Programme and the German Organisation for Technical Cooperation, GTZ (presently the GIZ). Meetings were held and a representative body, Bushbuckridge Traditional Health Practitioners, was formed. Traditional healers of Bushbuckridge have rights under the National Environmental Management: Biodiversity Act (2004) and the resulting Bioprospecting, Access and Benefit Sharing Regulations (2008). The protocol addresses improved access to land including protected areas, education on sustainable harvesting methods, establishing community run medicinal plant nurseries, and potential remuneration from commercialization of traditional knowledge (Biocultural Protocol 2009).

Following a series of meetings and workshops, three sites were selected for a pilot study on medicinal plants, one site in each of the biosphere zones, to inform the implementation of the biocultural protocol. During this process, traditional healers noted four needs, namely (i) the improvement of the traditional health practitioners' access to conservation areas and reduction of the over-harvesting of medicinal plants by others in communal areas; (ii) recognition by government of the traditional health practitioners' contributions to and benefits from the region's biodiversity; (iii) establishment of a medicinal plants conservation and development area; and (iv) engagement with local groups such as traditional leaders, health facilities, and church leaders to discuss the role of traditional health practitioners in their communities. A detailed 'lessons learnt' document has been compiled that could prove very useful in taking this project further.

#### 5.4.4.1.2 Schools in Biospheres

The balanced relationship between people and nature and between conservation and development as practised in biosphere reserves need to be promoted as a core value in people's lives. One school within the K2C has taken this task upon itself to spread awareness of sustainable living amongst all communities, starting with school learners. The Southern Cross School in Hoedspruit has embarked upon a project to develop a network of schools in biosphere reserves in collaboration with UNESCO. Being a nature-based school, Southern Cross is perfectly situated to further this project and is promoting biosphere reserve objectives through partnerships with other schools within the K2C.

The Schools in Biospheres project is financially supported by Germany through exposure with the UNESCO office in Bonn. A first exchange between K2C and the Rhön Biosphere Reserve took place in 2007 when members from the K2C went to Germany. In 2008 the Rhön Biosphere Reserve visited K2C which paved the way for the first exchange between learners from Southern Cross and the Martin-Polich Gymnasium based in Fladugen in the Rhön Biosphere Reserve in July 2011. It is envisaged that this project be expanded to other like-minded schools locally and nationally to eventually grow into an international exchange network between biosphere reserves. The aim is to create an "Association of Biosphere Schools" that could share ideas and information through exchanges and conferences. In this way educators and learners would be able to broaden their knowledge of biosphere reserves and sustainable development and spread awareness of the MAB Programme in general.

#### 5.4.4.1.3 River Corridor

Another project jointly funded by German GTZ and Mpumalanga Rural Development Programme was a feasibility study on the K2C Conservation and Development Corridor project. It is focused around the Blyde River - Olifants River Corridor with the view to restore ecological integrity and reinstate ecosystem services, in collaboration with local residents. A consultant was appointed to compile the feasibility study, as well as an implementation plan and fundraising strategy.

The project is set in an area of harsh living conditions and severe socio-economic challenges. Poverty is widespread with 26% of residents having no income at all and 70% earning less than ZAR 10 000 (€ 905) per annum. The K2C has to face the fact that poverty will worsen unless communities are assisted to reposition themselves economically. Poverty reduction has been a cornerstone of South Africa's government since the first national democratic elections in 1994. Some positive interventions have had marked successes such as free access to basic services, child support grants, the extended public works programme, school fee exemptions and free access to antiretroviral medicine in treating HIV/AIDS patients (May 2010).

The five year objective for the river corridor project is: *“local economic development while conserving prioritized river corridors in the K2C”*. A viewpoint expressed in project documentation is that the K2C’s strength lies in the fact that ‘the whole is more than the sum of its parts’. This notion is very well demonstrated through this project. Funding for continuance of the project is currently being sourced.

#### 5.4.4.1.4 Sustainable Living Festival

A Sustainable Living Festival is being held in the K2C annually since 2008. The aim of the festival is closely aligned to that of a biosphere reserve, namely to promote sustainable living practises. It provides a platform to showcase methods of sustainable living such as renewable energy, recycling, water wise gardening and organic agriculture and promotes locally manufactured produce. The festival also includes a number of workshops that attract participants from all over the country. The 2011 festival included a national MAB committee meeting as well as workshops on the production of biodiesel, sandbag construction techniques, responsible tourism and a rhino workshop aimed at discussion around the national crises with rhino poaching which is extremely evident in the K2C area, specifically the Kruger National Park.

The main aim of the festival is to create awareness about people’s dependence on natural resources and their responsibility as caretakers of an Earth that our children have to inherit. The festival also has positive social repercussions as put very aptly by one attendee of the 2009 festival: *“Not only did the Sustainable Living Festival educate people about global warming and nature conservation, it also brought black and white people together, something many haven’t seen between the members of the Hoedspruit and Acornhoek communities”* (Mkhatshwa 2009).

#### 5.4.4.2 Challenges

The location of the K2C within a region with widespread abject poverty, and the fact that most of the biosphere reserve coordination is being conducted by volunteers, brings on a range of challenges that the biosphere region has to face up to. Some of the most pressing are being discussed in greater detail.

##### 5.4.4.2.1 Land restitution

During the Apartheid regime in South Africa, some communities were forcefully removed from land on which they resided in terms of the Group Areas Acts. It was basically a *“massive exercise in social engineering”* (White 1998). Following the country’s first democratic elections, the government embarked on a process of land restitution in an attempt to redress some of the injustices of the past – embedded in the Restitution of Land Rights Act (Act 22 of 1994). The right to claim land was based on beneficial occupation of land for a continuous period after June 1913 of not less than 10 years,

which is much wider than what is generally understood under ownership of land. All land claims were to be submitted by December 1998 and a total of 79 649 claims were made. A presidential target was set for all claims to be resolved by 2005, but this target was however not met. Sections of the Kruger National Park are currently subjected to land claims that still have to be resolved. The outcomes of these claims could lead to a change in ownership, but most will likely result in monetary compensation to the claimants.

#### 5.4.4.2.2 Mining

Mining activities have had a serious impact on the region for more than a hundred years. Scale of mining ranges from small scale to large deep level and open cast mines. Mines are not sustainable practices at all but they contribute greatly to job creation, employment and the economy of the area in general. Mining operations are strictly regulated and mines need to be rehabilitated at the end of their life span and this offers opportunities where K2C could contribute.

#### 5.4.4.2.3 Poor standards of living

The K2C area has a high population of black, landless and illiterate people. The most difficult hurdle to overcome in the K2C area is an insecure and uncertain land tenure situation (Thompson 2011). During the Apartheid regime, rights to land and access were regulated. Nevertheless most black rural communities still reside within a tribal system where communal ownership of land is at the order of the day and subsistence farming is being practised. In these locations municipalities are facing an extensive backlog in service infrastructure such as housing, roads, sewage, and access to potable water. To aggravate the situation, there is also a large influx of people from neighbouring countries, settling in the area, demanding access to resources and competing for job opportunities. Agriculture, forestry and tourism are the main employers. Apart from a number of permanent jobs, the vast majority of rural communities do not benefit from the lucrative tourism sector or the agricultural sector with regards to big game farming practices.

#### 5.4.4.2.4 Sustainable development

The biosphere reserve has sustainable development as one of its three primary functions. The key is for the K2C to become the primary engine through which to promote sustainable development practices in collaboration with local authorities. This quest and its link to poverty alleviation is seen as the biggest challenge and necessity for the K2C in the immediate future (Thompson 2011).

#### 5.4.4.2.5 Organizational capacity and monetary resources

The K2C is being managed by an executive committee with a supporting representative council, referred to as the stakeholder council. On 30 September 2011, coinciding with the Sustainable Living Festival, the new K2C Nodal Centre was officially opened in Hoedspruit. This is the same building in

which the first coordinator's office was located during 2009. The centre, funded by the European Union and erected on land that was donated by a private residential development, will in future again house the office of the K2C as well as a municipal tourism office.

Presently the K2C has no permanent staff. The new and previous chairpersons are both working on a voluntary basis. These people together with the former Project Manager provide very dedicated support to the K2C. A funding application for the Blyde River - Olifants River Corridor project is in the process of being approved and will provide for a number of staff to be appointed on a contract basis. The nodal centre will be used as the implementation office of the project.

A formal partnership exists between the K2C and the Rhön Biosphere Reserve in Germany. A MoU between these two partners was signed during the Convention on Biological Diversity COP 9 in Bonn on 28 May 2008 (Text Box 19). Similarities between the two biosphere reserves include ecotourism, land-use change and inclusion of disadvantaged groups (ENB On the Side 2008). The main aims of the partnership are the sharing of information, the creation of exchange programmes, the formation of project and business partnerships, and the cooperation and assistance of project implementation and potential related funding. A potential partnership based on the Bionade model – an organic soft drink produced in the Rhön Biosphere Reserve – was discussed at the time.

**Text Box 19: COP 9 Side Event, 28 May 2008, Bonn, Germany**

**UNESCO-Biosphere Reserves: Ecological, economic, cultural and social benefits and their linkages in the World Network: "Doing together – Learning together: Kruger to Canyons Biosphere Region (South Africa) and Rhön Biosphere Reserve (Germany)"**

This side event demonstrates why UNESCO biosphere reserves are innovative instruments for linking conservation and sustainable development. Presently 531 biosphere reserves in 105 countries are working in this context to make a difference. The sharing of their experience and the co-operation within the World Network of Biosphere Reserves underlines the important function of biosphere reserves as learning regions and as learning platforms for sustainable development. Keynotes in this side event reflect this issue on the global level (by UNESCO MAB-Secretariat), on the national level (by the German MAB-Committee and the Ministry of Environmental Affairs and Tourism, South Africa) and on the level of development co-operation (by GTZ). The co-operation between the Rhön Biosphere Reserve, Germany and the Kruger to Canyons Biosphere Region, South Africa will be presented as a practical example of mutual knowledge transfer and private sector co-operation.

The K2C – Rhön partnership resulted in financial support from the GTZ for certain aspects of projects such as the Biocultural protocol and the Blyde – Olifants River Corridor. The Bionade model has not yet been taken up in a formal partnership.

UNESCO's Madrid Action Plan (MAP) was drafted with the view to reach out to all sectors of society to create a new partnership between environmental and development agendas (UNESCO 2008). Under the action areas of Science and Capacity Enhancement, and Partnerships, the MAP makes specific reference to the need for financial sustainability in biosphere reserves. Although the K2C has made substantial progress on securing partnerships, financial sustainability has not yet been secured.

At present the K2C does not have any operational funding therefore the new office will only be manned once such funding could be forthcoming from either project funding or governmental contributions. The K2C cannot be dependent on foreign donors and has thus embarked upon negotiations with local authorities with the view to enter into agreements that could contribute towards financial security for the biosphere reserve.

Financial sustainability is a major challenge to all South African biosphere reserves and is something that is being discussed with national government on a continual basis.

#### ***5.4.4.3 Management Plan***

With designation in 2001, the K2C did not have a management plan but it was indicated that such a plan would incorporate contributions from existing management plans of areas included in the biosphere reserve as well as other relevant planning documents. A biosphere reserve management plan should not be a prescriptive document but rather an encompassing guideline towards sustainable practices. Newenham (2001) identified strategies that will enable the biosphere region to become more relevant in their coordinating role:

1. Investigate means to provide benefits to local people.
2. Meet local needs.
3. Plan holistically.
4. Plan the bioregion as a system that addresses national and international objectives.
5. Define clear objectives for management of different zones.
6. Plan zone management individually, linked to the bioregional system.
7. Manage adaptively.
8. Foster scientific and participatory research.
9. Form networks of supporting institutions and partnerships.
10. Build public support and disseminate information.

Planning and management of the different zones of the biosphere region are listed as strategies. It is therefore interesting that the K2C Management Plan has been drafted by the two provincial authorities, LEDET and MTPA. The Management Plan was done in the format of an Environmental

Management Framework, providing a framework within which conservation and development could co-exist.

It is very positive that the local authorities have adopted the biosphere region as an all-encompassing framework, but responsibilities for implementation are quite vague, as well as distinction between roles of authorities versus that of the biosphere region. Nonetheless a Spatial Development Framework is being proposed for the K2C, which is much in line with thought processes of the biosphere reserves in the Western Cape Province.

As part of the Spatial Development Framework, a process was followed through which five environmental control zones were identified for the K2C, namely:

- Critically sensitive environments that must be conserved (non-negotiable);
- High sensitive environments that must be conserved/reserved (negotiable);
- Medium sensitive environments that may be developed or which use should be reserved (negotiable);
- Sensitive environments that may be developed (negotiable);
- Environments that are not sensitive.

Land-use guidelines for each of these control zones as they relate to the three biosphere zones of core, buffer and transition, have been compiled.

Following extensive details of management plans of the different protected areas included in the core of the K2C, a 'common management plan' is put forward for the K2C. However, this plan is submitted under the provision of the National Environmental Management Protected Areas Act (Act 57 of 2003) which is not the correct format as the K2C is not a gazetted entity according to this Act.

The Management Plan provides for the formation of a K2C Management Board and an operational unit, the EXCO. Meetings of the Management Board are to be held quarterly and the EXCO submits written monthly reports on their activities to the Board. Responsibilities of the Management Board are not very clear as the Management Plan refers to some issues of coordination and collaboration, but also to issues of day-to-day management intensity such as perimeter control, security, human-wildlife conflict and fire records which are not necessarily the responsibility of the K2C. The MAP is quoted almost verbatim and no indication is given of the responses required from the K2C.

Due to the planned transformation of the K2C management entity to a private company, a lessons learnt workshop was held in 2010 to review issues, successes and partnerships. The workshop was funded and jointly facilitated by the German Development Service (DED). The main outcome of the workshop was a valuable document that listed lessons learnt and recommendations for the future

(Wilmink & Zange 2010). For future reference the list is provided in Annexure 8. The K2C private company (a non-profit organization) was registered in August 2011.

#### 5.4.5 Results

Data obtained through content analysis, interview surveys, questionnaire surveys and observations were used towards a portrayal of the past and present situation of the K2C.

The semi-structured interviews provided opinions related to the effectiveness of the K2C.

Descriptive results are summarized in Annexure 9. A general rating of between 1 and 3 (where 1 means not meeting the criteria at all, 2 means a middle of the road performance, and 3 means a good performance) was allocated for each component based on the performance of the biosphere region as expressed by the interviewees. Out of a potential total of 33, the K2C scored 24 (72.7%).

The questionnaire survey (Annexure 3), completed by the seven interviewees, consisted of personal information (box 1) and three question boxes (boxes 2 to 4). Question box 2 provided interviewees the opportunity to put forward an opinion on five questions of a general biosphere reserve nature. The first question was: *“In your opinion, is the biosphere reserve concept a valuable tool with which to do landscape management in South Africa?”* Six interviewees gave a ‘yes’ response and one said ‘maybe’.

The second question was: *“In your biosphere reserve, do you think the designation is adding value to the area?”* Four interviewees reacted positive while three mentioned ‘somewhat’. This outcome shows that people have not been fully convinced of the value adding factor of a biosphere reserve.

The third question elicited a reaction on institutional support for the K2C - *“Is the organization that you represent in support of the biosphere reserve?”* Of the seven interviewees, six responded ‘yes’ whereas one said ‘no’, which provides a positive bearing on the biosphere reserve.

The fourth question produced interesting opinions on the ideal of an effective biosphere reserve. The question *“Are you of the opinion that the management entity of your biosphere reserve is doing a good job of managing the biosphere reserve effectively?”* was answered with a statement of ‘somewhat’ by three interviewees, three responded ‘yes’ and one indicated ‘no’. In relation to the present predicament of the biosphere reserve of having no permanent staff and little secure funding, this outcome is understandable.

The last question turned out a positive response by all seven interviewees - *“Do you truly agree with the statement ‘biosphere reserves are special places for people and nature?’”*

One interviewee noted that the concept of a biosphere reserve is not sufficiently understood by most spheres of government, especially with regards to a marketing tool for promoting tourism. This

links to the lack of an implementable strategy with which to market the K2C as an ecotourism destination of note. Special mention was made of the unmatched passion, enthusiasm and sacrifices made by the new and previous chairpersons, as well as the former Project Manager who all work on a voluntary basis.

The third box addressed problems and challenges faced by the K2C. Interviewees were given 10 elements to order in priority from highest to lowest. The responses were analysed with matrix ranking, specifically preference ranking (Margoluis & Salafsky 1998). The collective ranking from highest to lowest came out as follows (Table 25):

**Table 25: Kruger to Canyons Biosphere Region collective ranking of list of problems/challenges**

<b>K2C Collective Ranking of List of Problems/Challenges</b>	
1	Support (buy-in) from local authorities (municipalities)
2	Insufficient long-term financial resources
3	Biosphere reserve concept not strongly supported by national government
4	Lack of dedicated biosphere reserve personnel
5	Not enough insight into the value of implementing the biosphere reserve concept
6	Insufficient legal means (lack of 'teeth') to implement the biosphere reserve concept
7	Too little benefits perceived by local communities resulting in a lack of support
8	Too little awareness amongst role-players and local communities
9	Too much of a conservation (green) focus and not enough emphasis on other issues such as development
10	Lack of long-term vision and objectives

Given the financial challenges faced by the K2C, an interviewee mentioned that the small dedicated biosphere reserve team could achieve a lot even without government support. The soft-law status of biosphere reserves makes it difficult to channel financial resources from government to the biospheres. Municipalities are already overstretched by continuing demands for services and find it difficult to make significant financial contributions to biospheres. The lack of a biosphere reserve legislative mandate was identified as a problem.

The intricate political system spanning two provinces, two district municipalities and four local municipalities sometimes causes conflict at decision and implementation level and was identified as a challenge to the K2C. It was noted that overpopulation, poverty, job creation and poor service delivery need urgent attention before the influence of a biosphere reserve would be recognized and understood.

The fourth box addressed positive elements linked to the K2C. Interviewees were again given 10 elements to order in priority from highest to lowest. After analysis of the responses with preference ranking (Margoluis & Salafsky 1998), the collective ranking from highest to lowest came out as follows (Table 26):

**Table 26: Kruger to Canyons Biosphere Region collective ranking of list of positive elements**

K2C Collective Ranking of List of Positive Elements	
1	The biosphere reserve creates international visibility for the area
2	The biosphere reserve provides a means to attract international funding to the region
3,4	The biosphere reserve concept is a tool with which to facilitate collaborative management to the benefit of the region
3,4	The biosphere reserve creates awareness about sustainable development
5	The biosphere reserve creates an opportunity for communities to be involved in management decisions about the future of their area
6	The biosphere reserve attracts more tourists/visitors
7	A biosphere reserve is much different (in a positive way) to a traditional protected area such as a national park or nature reserve
8	The biosphere reserve has resulted in people becoming more aware of their interconnectedness to the natural environment
9	The biosphere reserve has resulted in increased property values
10	The biosphere reserve created more jobs in the area

One interviewee mentioned the difficulty to list positive elements due to little tangible progress with the K2C. However the K2C made good progress in terms of getting various decision makers together around a joint vision for the future of the region. Enabling collective efforts across political boundaries in some cases was noted as a positive intervention. Two interviewees again mentioned the value of having strong leadership and very dedicated voluntary staff. With the growing demand for land, the role of the biosphere reserve in promoting sustainable land-use throughout the region was noted. The positive effect of creating a sense of pride was mentioned by an interviewee.

Collective results of the multicase study are discussed in Chapter 6.

#### 5.4.6 Discussion

On the whole, all outcomes of the questionnaires and interview process showed a general support for the MAB Programme and the K2C in particular. It is demonstrated by the responses to the question on the value of the biosphere reserve concept as a landscape management tool in South Africa which was answered positively by six of the seven interviewees, as well as the ranking of the vision and objectives in the last position on the list of challenges. People believe in the vision of the

K2C relating to sustainable development which provides a strong base from which the K2C management entity could only go from strength to strength.

The K2C is put forward as a 'cluster biosphere reserve', a term that could be interpreted in different ways. One viewpoint of a cluster biosphere reserve is an association of separately designated administrative units that cooperate in implementing biosphere reserve roles (Stanvliet *et al.* 2004a). UNESCO's biosphere reserve nomination form specifically states "*a biosphere reserve made up of several geographically separate units is called a cluster biosphere reserve*" (UNESCO 2004). Different parts of a cluster biosphere reserve are not usually administered by the same entity and hence the overall management of a cluster biosphere reserve benefits from coordinating mechanisms between administrative authorities. However there is more than one perception of what a cluster biosphere reserve really corresponds to. One example is multiple sites containing different ecosystems administered as a single unit by a single agency (McCrone 1983) which broadly describes the K2C.

The management entity of the K2C is a private company, registered as a non-profit organization. It is planned for the two provinces and district municipalities to be represented on the Board of Directors of the K2C Company which is different to the manner in which biosphere reserves in the Western Cape Province construct their Boards of Directors. Funding for the K2C Management Plan and proposed registration of the company is forthcoming from the two provinces which demonstrate support to the biosphere reserve in a very positive way.

The value adding factor of biosphere reserves continues to be a contested topic in South Africa. In the large region of the K2C it is important for the biosphere reserve to demonstrate added values and benefits especially in so far they could contribute to better connectivity between important conservation areas and better living conditions to the poorer members of communities. Because a biosphere reserve is so much dependent on collaboration with landowners and administrations, a reward system could be greatly beneficial with which to reward behaviour that fits in with the biosphere reserve concept. Such mechanisms could potentially include legal means or financial incentives.

#### 5.4.7 Synopsis

The biosphere reserve concept has been identified as a landscape-level approach that does not exclude people and is therefore an ideal tool with which to balance strictly protected areas with sustainably-managed production areas that could provide benefits toward poverty reduction (Roe *et al.* 2011). The mainstreaming of biodiversity into different sectors at local municipal level provides opportunities for local economic development and poverty reduction (Roe *et al.* 2011). This has

been showcased by South African biosphere reserves through the drafting of detailed spatial framework plans.

Rural upliftment through conservation related projects is very much the focus of the K2C. However, because of increasing urbanization (Folke *et al.* 1997), most political systems are very much urban biased and not enough attention and related funding are channelled to rural development (Mellor 2002). In general, African countries focus more on poverty alleviation than biodiversity conservation. The need for rich countries to assist lower income nations in protecting biodiversity and enlarging protected areas was therefore noted by Mellor (2002). Poverty reduction and biodiversity conservation need to go hand in hand. This concept is being showcased through the link between the K2C and Rhön Biosphere Reserve in Germany, where Germany provides technical inputs and financial assistance towards projects that would have a positive impact on poverty alleviation, but at the same time also contribute towards biodiversity conservation.

It is now just more than 10 years since designation of the K2C by UNESCO and the biosphere region has to embark on the prescribed 10 year review process. K2C has to reflect on their management effectiveness and the impact of their projects, some of which were more successful than others. In an area where there are so many social, economic and conservation initiatives, the position of the K2C needs to be articulated. All biosphere reserves in South Africa face an uncertain future related to the lack of monetary support. Maybe the K2C is ideally positioned to demonstrate the value of relationships between lower income countries in Africa and high income countries that lead to international funding partnerships. With so much potential, the K2C could showcase an effective biosphere reserve that is not dependent on government funding, but still provides social-ecological benefits towards a sustainable living space and a better life for all.

## 5.5 A Sustainable Development Model for the Wine Lands of the Western Cape: A Case Study of the Cape Winelands Biosphere Reserve

*“There is nothing more difficult ... than to take the lead in the introduction of a new order of things” (Niccolo Machiavelli, 16th century)*

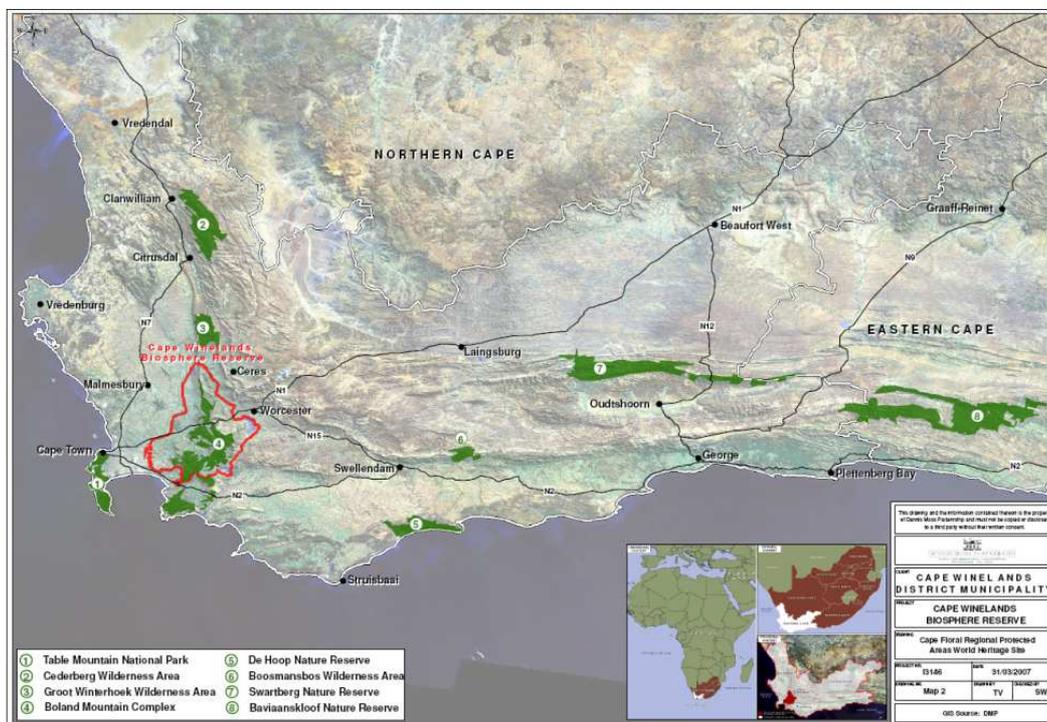
### 5.5.1 Overview

A mere 40 km inland from Cape Town lies one of the most beautiful and awe-inspiring areas in the world - the Cape Winelands. In 2007, a spectacular stretch of more than 300 000 ha was designated by UNESCO as the Cape Winelands Biosphere Reserve and now forms part of the World Network of Biosphere Reserves.

The biosphere reserve is managed by a private company without share capital, incorporated in accordance with the Companies Act, in close collaboration with government departments, local authorities, landowners and communities. It has an approved spatial framework plan, is in the process of developing an integrated management framework and envisages implementing a sustainable development management model for the region.

### 5.5.2 Description of the Cape Winelands Biosphere Reserve Domain

The Cape Winelands Biosphere Reserve (CWBR) encompasses an area of 322 030 ha in the Western Cape Province, bordering the City of Cape Town in the south westernmost corner of South Africa (Figure 18).

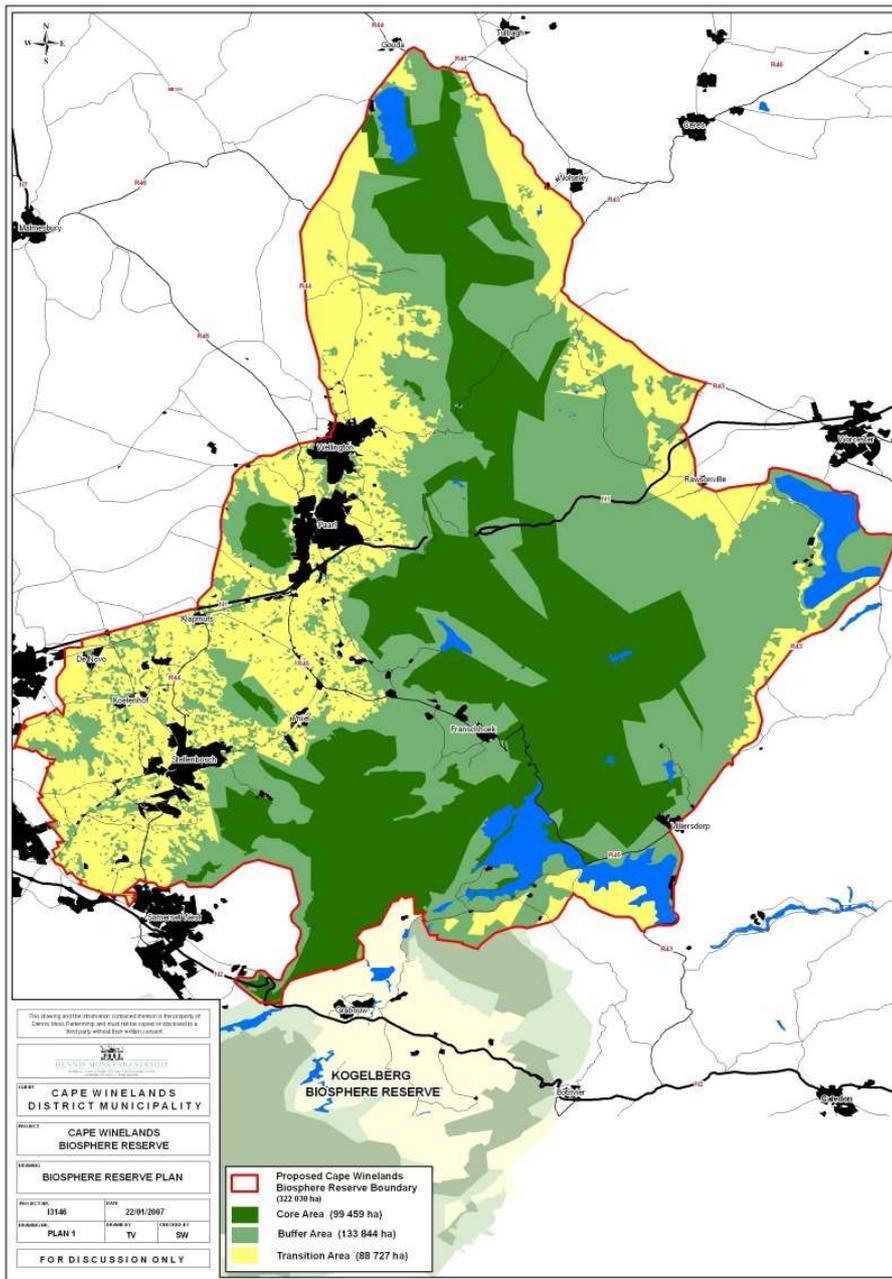


(Acknowledgement: Dennis Moss Partnership)

### Figure 18: Location of the Cape Winelands Biosphere Reserve

This region of immense beauty slopes across elevations from 20 m to 1 860 m above sea level. A wonderful diversity is included, from the high Cape Fold Mountains, to deep river valleys, rolling hills, commercial forests, world-renowned wineries, small agricultural settlements and beautiful historical towns. The CWBR shares a border to the south with the Kogelberg Biosphere Reserve and is in close proximity to the Cape West Coast Biosphere Reserve to the west.

The biosphere reserve is delimited into core areas of 99 459 ha (31% of total area), buffer zones of 133 844 ha (42%) and transition areas of 88 727 ha (27%) (Figure 19). Core areas comprise statutory conserved provincial nature reserves, local authority nature reserves and one private nature reserve.



(Acknowledgement: Dennis Moss Partnership)

**Figure 19: Zonation of the Cape Winelands Biosphere Reserve**

Of the core areas, 93% is being managed by one institution, namely CapeNature. Most of the core is situated on slopes of higher mountain ranges. Sections of the core area also form part of the extensive Cape Floral Region Protected Areas World Heritage Site. This was a serial nomination and the site was inscribed on the World Heritage List in 2004. It is made up of eight protected areas covering 553 000 ha. One of the protected areas is named the Boland Mountain Complex and it includes *inter alia* the Hottentots Holland, Jonkershoek and Limietberg Nature Reserves, all of which

form part of the CWBR core areas. Buffer zones include mostly natural areas that are registered as private nature reserves or are included in private conservancies. Some private mountain catchment areas (declared under the Mountain Catchment Areas Act of 1970), managed by CapeNature, also form part of the buffer. Transition areas consist mainly of urbanized, cultivated and otherwise transformed lands.

The CWBR lies within the Cape Floristic Region (CFR) that is regarded as a hot-spot for biodiversity conservation worldwide (Myers *et al.* 2000). Of the species within the CFR, 68% are endemic to the region (Cowling & Holmes 1992). The CWBR area comprises a number of different vegetation types including Sandstone Fynbos, Shale Fynbos, Alluvium Fynbos, Shale Renosterveld, Granite Fynbos and Granite Renosterveld (Mucina & Rutherford 2006).

The outstanding features of the CWBR are too much to mention. The nomination document describes all elements, from biodiversity to cultural and historic, in the greatest detail (Cape Winelands District Municipality 2007). Aspects most important to the biosphere reserve will be noted here.

The CWBR contributes greatly to conserving the globally important Fynbos, including both biotic and abiotic elements. Core areas consisting of pristine natural landscapes (Cowling & Richardson 1995) form a continuous biodiversity corridor running from north to south through the biosphere reserve and linking up with the mountainous areas of the Kogelberg Biosphere Reserve. In this way the functioning of valuable ecosystem processes are being ensured as well as preservation of habitat for large mammals such as the endangered Cape leopard (*Panthera pardus*). An impressive list of plant species can be found in the CWBR, including representatives of the three main Fynbos components; the ericoid, restioid and proteoid components. Safe habitat is provided for a number of threatened species, such as the blushing bride (*Serruria florida*), silver mimetes (*Mimetes argenteus*), *Diastella buekii*, *Moraea worcesterensis*, *Haemanthus pumilio* and *Gladiolus citrinus* (to name but a few). The area also boasts a large variety of birds. Some of the most conspicuous include the Cape eagle owl, African fish eagle, black eagle, malachite sunbird, blue crane, Cape sugarbird and jackal buzzard.

A significant number of reptiles and amphibians occur in the CWBR, including the endangered geometric tortoise (*Psammobates geometricus*), listed as one of the world's top 25 endangered turtles (Turtle Conservation Coalition 2011). Quite a few endangered butterflies and various endemic fish species also occur within the CWBR. Examples of fish include the critically endangered itvis (*Barbus andrewii*) from the Berg River and the Berg River redbin (*Pseudobarbus burgii*), restricted to tributaries of the Berg River (Skelton 1993).

Ecological corridors have been identified, mainly along major river courses, to link core and buffer areas with the view to allow genetic movement within ecosystems.

The region has been inhabited since approximately 1 million years ago by the San people, the first known indigenous human population. In 1652 Europeans colonized the surrounds of the Cape of Good Hope as a stop-over for sailing vessels of the Dutch East India Company. The first village to be established outside of Cape Town was Stellenbosch when Governor Simon van der Stel allocated a number of farms on the banks of a river that he crossed and aptly named Eerste River (translation: First River). By the end of the nineteenth century the major towns and villages of the CWBR were established, including Stellenbosch, Paarl, Wellington and Franschhoek. The rich history of the last 330 years is palpable when one walks the streets of these towns with beautifully preserved historical buildings that loom from every corner. Stellenbosch, Paarl and Wellington are the most densely populated towns in the CWBR. The total permanent population of the biosphere reserve area is approximately 320 000. Only about 35% of the population is employed and a staggering 54% has no income. These figures show clearly that a very large percentage of the CWBR population live in abject poverty which is a core challenge to be faced by relevant administrations, including the biosphere reserve management entity.

As the name implies, the wine lands region is probably the most famous for its epic wine routes. The Stellenbosch Wine Route is the oldest wine route in South Africa. This wonderful wine experience is divided into five sub-routes and includes more than 200 wine and grape producers. The agricultural sector is therefore one of the main providers of employment.

The University of Stellenbosch is the second oldest university in the country and is home to some 25 000 students. With three biosphere reserves on its doorstep, the university is becoming more and more involved in research projects related to the biosphere reserve concept and using biosphere reserves as study sites.

The region is worldwide very well known for its vernacular architectural styles, including Early Cape and Cape Dutch. The Stellenbosch Village Museum boasts the oldest restored townhouse in the country – the Schreuderhuis. Many excellent examples of Cape Dutch homesteads are dotted around the CWBR, as well as beautifully restored buildings from other eras such as Georgian, Edwardian and Victorian.

Large reservoirs receiving pristine water from various mountain ranges provide services to populated areas both inside and outside of the CWBR. Water runoff in Fynbos catchments is amongst the highest in the world. Provision of clean water is one of the major ecosystem services of

the biosphere reserve. At the same time changes in land-use patterns could have a potentially serious detrimental impact on this service.

The nomination document of the CWBR was drafted in such a way as to position the biosphere reserve as an entity to facilitate sustainable development as a mechanism against poverty and inequality. It was stated that the management entity of the biosphere reserve “*will function under the auspices of the District Municipality and will be accountable to the latter*” (Cape Winelands District Municipality 2007). It was foreseen for the management entity to eventually be a registered non-profit company.

The nomination document clearly noted that the CWBR will be promoted as a site of excellence to support environmental sustainability and human well-being. It is therefore stated that the CWBR would support the development of the Cape Winelands as “*an area of excellence and good practice for people, culture and nature*” (Cape Winelands District Municipality 2007). The main business of the management entity as described in the Memorandum of Association is “*to carry on the promotion, advancement and fulfilment of the three basic functions of a biosphere reserve*”.

### 5.5.3 Inception of the Cape Winelands Biosphere Reserve

During 1990 the then Chief Directorate of Nature and Environmental Conservation of the Western Cape Province (presently known as CapeNature) drafted a document on a potential holistic conservation strategy for the entire Fynbos Biome (Burgers *et al.* 1990). This document promoted the establishment of a single Fynbos Biome biosphere reserve, what could have been perceived as a ‘cluster biosphere reserve’ (Stanvliet *et al.* 2004a) and initiated wide deliberations with regards to the use of the MAB Programme and the implementation of biosphere reserves. The core areas of what would many years later become the Cape Winelands Biosphere Reserve were already depicted on the map accompanying the document.

In May 2000 the first Southern African biosphere reserve learning seminar was held at the Hans Hoheizen Research Station at the Southern African Wildlife College in the Kruger National Park. In a report on this seminar, delivered during the Seville +5 international meeting of experts in Pamplona, Spain later that year, the so-called Boland Biosphere Reserve (similar area to the CWBR) was noted (Naude 2001). The biosphere reserve idea had its origins in 1998 with the Stellenbosch Municipality and University of Stellenbosch and was grounded in the Stellenbosch structure plan (Moss 2009). The name originated with merging the then Breede River District and Winelands District into the Boland District in the run-up to the 2000 national elections (Johnson 2010). Since 2002 the Boland Biosphere Reserve idea was promoted by municipalities and documentation was generated regarding a proposed Boland Biosphere Reserve. In June 2005, the then Executive Mayor of the Cape

Winelands District Municipality and other representatives visited UNESCO in Paris, France, to discuss key aspects of the biosphere reserve proposal. Later in 2005 during a consultative process the name Cape Winelands Biosphere Reserve was decided upon. At a District Municipality council meeting in August 2005, a resolution was taken to “*seek support of all stakeholders for the establishment of a biosphere reserve.*”

The outer boundaries of the CWBR correspond with bioregions in accordance with the bioregional planning guidelines of the Western Cape Province (Department of Planning, Local Government and Housing 2000). At local administration level, the CWBR comprises the entire area of Stellenbosch Municipality, as well as sections of Drakenstein, Breede Valley, Witzenberg and Theewaterskloof Municipalities. The main champion is the Cape Winelands District Municipality. The latter envisaged the biosphere reserve to not be a future liability or so-called “*optional extra*” but to eventually form an integral part of municipal functions. This notion led to the generally accepted principle that responsibilities of municipalities versus that of the biosphere reserve will have to be very clearly defined.

A team of consultants was appointed and funded by the District Municipality to compile the formal nomination to UNESCO. The process included an extensive public participation process, focusing mainly on private landowners with the view to obtain increasing support for the biosphere reserve. The very detailed and lengthy nomination was very well received by UNESCO and eventually led to the CWBR’s designation in September 2007.

## **5.5.4 Implementation of the Cape Winelands Biosphere Reserve**

### **5.5.4.1 Interim arrangements**

After designation, more than a year lapsed while administrations were deliberating the institutional future of the biosphere reserve. In November 2008 the Cape Winelands District Municipality established an interim steering committee to provide guidance to the CWBR until such time as the formal management entity would be in existence. The interim committee facilitated two important processes, namely (i) drafting of a spatial framework plan for the CWBR, and (ii) documentation towards the establishment of a non-profit company as the management entity.

Specific goals of the CWBR were identified (see Text Box 20).

**Text Box 20: Goals of the Cape Winelands Biosphere Reserve****International level**

- a. *Provide practical ways to resolve land-use conflict and to protect biological diversity*
- b. *Provide opportunities and share ideas for education, recreation and tourism to address conservation and sustainability issues*
- c. *Co-operate on thematic projects or on ecosystem types*
- d. *Create a connection among people and cultures worldwide on how to live in harmony with the environment and each other*

**Local level**

- a. *Help create and maintain a healthy environment for people and their families*
- b. *Maintain productive and healthy landscapes*
- c. *Reduce conflict among people*
- d. *Encourage diverse local economies to revitalize rural areas*
- e. *Increase the involvement of communities in land-use decisions and thus the connection to the land*
- f. *Support and facilitate interconnected scientific studies and monitoring*
- g. *Celebrate cultural diversity and provide opportunities to maintain existing traditions and lifestyles*

As a first priority a biosphere reserve Framework Plan, based on bioregional planning principles, was drafted with various opportunities throughout the process for stakeholders, including landowners, to provide inputs. The final CWBR Framework Plan was adopted in 2010 by the Cape Winelands District Municipality as biosphere reserve custodian and provides detailed spatial guidance for future land-use management.

Through a consultative process, the management entity to champion the CWBR was selected by the interim committee to be a private company, registered in accordance with the Companies Act. An interesting point of discussion with inception of the biosphere reserve was the positioning of the management entity as a “*development agency*” (Cape Winelands District Municipality 2007). It was argued that this notion will put the biosphere reserve in direct opposition to the municipalities, which have a defined development oriented agenda according to the Municipal Systems Act (Act 32 of 2000).

However, in 1997 Brandon noted it would be likely for conservation agencies to become rural development organizations in partnership with other stakeholders (Brandon 1997). Another example can be obtained from the Uckermark Lakes Nature Park in Germany that puts itself out as a servicing agency for local interests (Stoll-Kleemann & O’Riordan 2002). Such comprehensive management agendas could be related to modern biosphere reserves and, if appropriate, be translated into objectives of the biosphere reserve management entity.

#### 5.5.4.2 Management Entity

The Cape Winelands Biosphere Reserve Company was formally registered as a private company, registered as a non-profit organization during 2010. Out of the interim committee, persons were elected to serve as the first Directors of the Company. The interim committee was subsequently translated into a management committee that includes the Board of Directors. This resulted in quite a similar management structure to the other two biosphere reserves in the Western Cape Province - Kogelberg and Cape West Coast. The management committee adopted the vision of the CWBR as stated in the nomination document: *“An area of excellence and good practice for people, culture and nature”*. The structure of the management committee, as depicted in Figure 20, incorporates a Board of Directors, technical advisors and a coordination unit. The committee meets on a monthly basis. Each Director is allocated a specific portfolio as listed in Text Box 21.

#### Text Box 21: Functions of the CWBR established as Portfolios

1. Administration and Finance
2. Biodiversity and Research
3. Agriculture and Forestry
4. Economic Development and Planning
5. Community Affairs, Labour and Education
6. Marketing, Public Relations and Communications
7. Business and Corporate Engagement
8. Tourism and Heritage

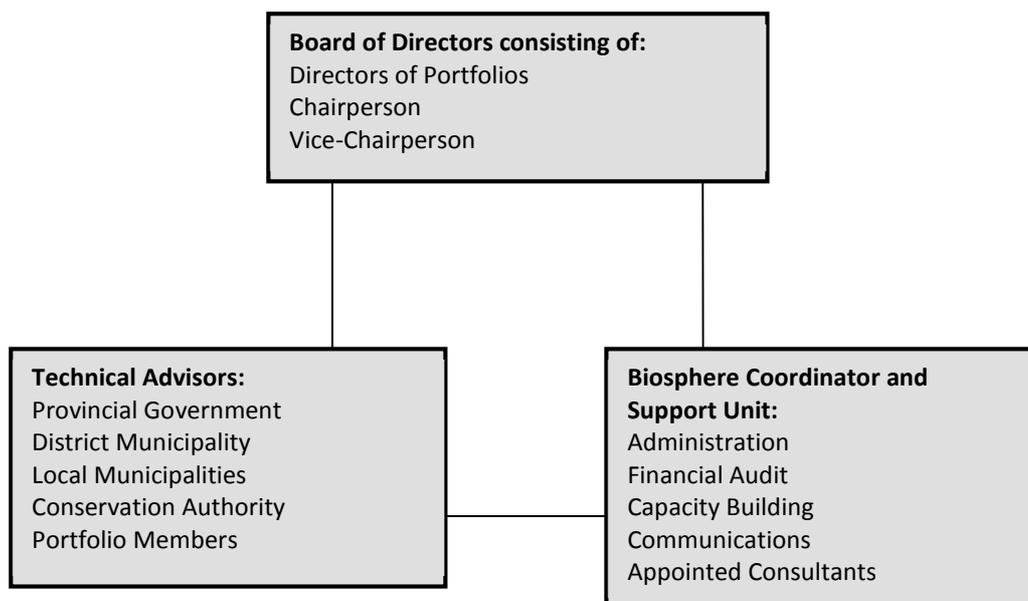


Figure 20: Structure of the Cape Winelands Biosphere Reserve Management Committee

Note needs to be taken of the position of local authority representatives as members of the management committee. Some time ago councillors were allowed to represent their local authority as a Director in a biosphere reserve company. However, due to the code of conduct for councillors as spelled out in the Municipal Structures Act (Act 117 of 1998), it does not support good governance if councillors are elected in directors' positions in private companies. Hence the decision was made that local authorities will be represented in a technical capacity but the option still remains for individual councillors to serve as directors solely in a private capacity.

Functions of the management committee are:

- a. Facilitation of employment creation and economic growth.
- b. Support for implementation of collective local, provincial and national government projects where the biosphere reserve is concerned.
- c. Globalisation and promotion of international competitiveness.
- d. Creation of enabling environments for private sector growth and public-private partnerships.
- e. Procurement and appropriate allocation of development funding.
- f. Provision of support, expertise, guidance and funding to local business, especially SMME's (Small, Medium and Micro Enterprises).
- g. Preparation of a detailed land use pattern in the form of a comprehensive framework plan.
- h. Implementation of a multi-stakeholder approach, with specific emphasis on the involvement of local communities in issues that influence them directly.
- i. Resolution of conflict pertaining to the use of resources and development.
- j. Integration of cultural and biological diversity in ecosystem management through the use of traditional knowledge and science.
- k. Demonstration of sound implementation and management policies in conservation and in all economic sectors represented in the biosphere reserve.
- l. Development of a culture of learning, training and education throughout the local communities.
- m. Support for development strategies that build upon and promote the comparative and competitive advantages of the region; in particular the promotion of the role of responsible tourism in the Cape Winelands Biosphere Reserve.
- n. Development and regulation of a biosphere branding and marketing strategy aimed at improving the comparative and competitive status of the biosphere in the global arena.

Drafting of a CWBR Strategic Management Framework and Business Plan has been identified as a high priority for the CWBR Company to address in the very near future. This need has been included in a road map as compiled by the management committee (Text Box 22). Since late 2010 the CWBR is actively implementing an awareness campaign that includes information leaflet and banners. A new biosphere reserve logo was formally approved at a meeting on 7 December 2010 (Figure 21).

**Text Box 22: Road Map for the Cape Winelands Biosphere Reserve July 2010**

The Cape Winelands Biosphere Reserve Interim Committee will support the Cape Winelands District Municipality in achieving the following most needed actions to secure the future of the CWBR:

1. Collaborate with the appointed attorneys (Dykes and Van Heerden) to finalize the registration of the Cape Winelands Biosphere Reserve Section 21 Company with accompanying Articles and Memorandum of Association.
2. Liaise with the appointed architect firm (Jakupa) to obtain a final submission on proposals for Bells Lodge. Address the options for utilization by a not-for-profit company, terms of possible lease, options for sub-letting, and the possibility of a MOU with the landowners (Department of Public Works). Review necessary documentation and keep on file to future reference.
3. Draft job descriptions for a CWBR Coordinator and a CWBR Administrative Assistant.
4. Investigate different funding options to secure a dedicated position for the Coordinator. In time, follow due process to appoint a CWBR Coordinator on contract.
5. Draft a membership structure, including membership fees for the CWBR Company. Draft a flyer to provide details on membership and benefits. Advertise the membership drive in local media. Finalize the administrative side of keeping an updated members list.
6. Draft a letter from the District Municipality to relevant organizations and institutions to provide feedback on progress with the CWBR and to reconfirm support for the CWBR from organizations, institutions and mayors.
7. Finalize a document on director portfolios and relevant operational detail. Align portfolios to the expertise of current directors.
8. Finalize a CWBR logo, postal address and letterhead.
9. Secure the services of an auditor, bookkeeper and company secretary.
10. Investigate practical options for a CWBR office space.
11. Discuss the long-term future of administrative services for the CWBR with the District Municipality.
12. Implement a CWBR promotions campaign with allocated funding from the District Municipality.
13. Draft a Memorandum of Association/Understanding between the CWBR and relevant municipalities. Keep on file for use when the Coordinator has been appointed.
14. Obtain a final copy of the CWBR Spatial Development Framework Plan.
15. Investigate options of drafting a CWBR Strategic Management Framework and Business Plan.



**Figure 21: Logo and rationale of the Cape Winelands Biosphere Reserve**

The first annual general meeting of the CWBR Company took place on 26 May 2011 at which people were nominated and elected to serve as the first Directors of the Company. Company structures are to include the following:

- Subscribing members – individuals, paying a membership fee, that subscribe to the vision and mission of the CWBR and have voting rights at annual general meetings.
- Institutional membership – institutions and non-governmental organizations (e.g. Conservancies) positively indicating a synergy and compatibility with the objectives and goals of the CWBR.
- Business/Corporate membership – small, medium sized and national businesses wishing to support the aims of the CWBR and paying varying membership fees according to the size category to which it belongs.
- Partners - five crucial partners have been identified, namely a local university as an academic partner to assist in executing the biosphere reserve’s research responsibilities; an

auditing partner that will contribute bookkeeping and auditing services; a banking partner that will provide banking facilities to the CWBR; a legal partner that will look after the interests of the CWBR Company; and a local government partner, a role that is currently being fulfilled by the Cape Winelands District Municipality. Only technical support, no financial support, will be required from these partners, except the District Municipality.

- Co-opted secretariat, currently provided by the Cape Winelands District Municipality.

#### 5.5.4.3 Monetary Security

During the previous political dispensation in the Cape Winelands District Municipality, the CWBR was generously supported with sufficient financial means to compile the nomination and relevant documentation, including awareness materials. Recently, however, the district municipality is not nearly supporting the biosphere reserve to the same financial extent although they still provide most needed secretarial services to the biosphere reserve. Despite their rather bleak financial situation at present, the CWBR is planning for a most secure financial future with very innovative tools, including so-called founding members (Holmes 2010). The aim is to move away from government supported funding systems towards financial support from the private market.

#### 5.5.5 Results

Data obtained through content analysis, interview surveys, questionnaire surveys and observations were used towards a portrayal of the past and present situation of the CWBR.

The semi-structured interviews provided opinions related to the effectiveness of the CWBR.

Descriptive results are summarized in Annexure 10. A general rating of between 1 and 3 (where 1 means not meeting the criteria at all, 2 means a middle of the road performance, and 3 means a good performance) was allocated for each component based on the performance of the biosphere reserve as expressed by the interviewees. Out of a potential total of 33, the CWBR scored 24 (72.7%).

The questionnaire survey (Annexure 3), completed by the seven interviewees, consisted of personal information (box 1) and three question boxes (boxes 2 to 4). Question box 2 provided interviewees the opportunity to put forward an opinion on five questions of a general biosphere reserve nature. The first question was: *“In your opinion, is the biosphere reserve concept a valuable tool with which to do landscape management in South Africa?”* All seven interviewees gave a ‘yes’ response.

The second question was: *“In your biosphere reserve, do you think the designation is adding value to the area?”* Three interviewees reacted positive, three mentioned ‘somewhat’ and one said ‘no’. The latter interviewee noted *“unless the custodians of biodiversity are given teeth ... the biosphere reserve will not be effective”*.

The third question elicited a reaction on institutional support for the CWBR - *“Is the organization that you represent in support of the biosphere reserve?”* All seven interviewees responded ‘yes’.

The fourth question produced interesting opinions on the ideal of an effective biosphere reserve. The question *“Are you of the opinion that the management entity of your biosphere reserve is doing a good job of managing the biosphere reserve effectively?”* was answered with a statement of ‘somewhat’ by three interviewees and four responded ‘yes’.

The last question turned out a positive response by five interviewees whereas two responded ‘sometimes’ - *“Do you truly agree with the statement ‘biosphere reserves are special places for people and nature’?”* The outcome of this question support a general belief in the potential of the biosphere reserve concept, however, one interviewee specifically noted that the biosphere reserve concept is much more effective if applied in a smaller homogenous area. In larger biosphere reserves, diverse populations are being divided by natural boundaries which also sometimes act as social boundaries and complicate biosphere reserve awareness and marketing projects.

The third box addressed problems and challenges faced by the CWBR. Interviewees were given 10 elements to order in priority from highest to lowest. The responses were analyzed with matrix ranking, specifically preference ranking (Margoluis & Salafsky 1998). The collective ranking from highest to lowest came out as follows (Table 27):

**Table 27: Cape Winelands Biosphere Reserve collective ranking of list of problems/challenges**

CWBR Collective Ranking of List of Problems/Challenges	
1	Insufficient long-term financial resources
2	Too little benefits perceived by local communities resulting in a lack of support
3	Too little awareness amongst role-players and local communities
4	Support (buy-in) from local authorities (municipalities)
5	Lack of dedicated biosphere reserve personnel
6	Lack of long-term vision and objectives
7	Not enough insight into the value of implementing the biosphere reserve concept
8	Insufficient legal means (lack of ‘teeth’) to implement the biosphere reserve concept
9	Too much of a conservation (green) focus and not enough emphasis on other issues such as development
10	Biosphere reserve concept not strongly supported by national government

The first four positions are closely related to the fact that the biosphere reserve has been in existence for a short period of time, resulting in factors such as funding problems, lack of awareness and support and the often discussed topic of benefits to local populations.

A specific challenge noted by one interviewee, is for the biosphere reserve to coordinate activities between different institutions to allow for greater visibility of the CWBR's vision. The task of convincing people of the benefits of a biosphere reserve was also highlighted as a challenge. Urban sprawl and increased development in rural areas were noted as a particularly serious problem. A patchwork of residential developments in rural areas will erode the character of the region and could result in a perpetuation of 'apartheid planning' where the rich are grouped within security estates albeit with some financial benefits flowing to poor communities.

The fourth box addressed positive elements linked to the CWBR. Interviewees were again given 10 elements to order in priority from highest to lowest. After analysis of the responses with preference ranking (Margoluis & Salafsky 1998), the collective ranking from highest to lowest came out as follows (Table 28):

**Table 28: Cape Winelands Biosphere Reserve collective ranking of list of positive elements**

CWBR Collective Ranking of List of Positive Elements	
1	The biosphere reserve creates awareness about sustainable development
2	The biosphere reserve provides a means to attract international funding to the region
3	The biosphere reserve has resulted in people becoming more aware of their interconnectedness to the natural environment
4,5	The biosphere reserve creates an opportunity for communities to be involved in management decisions about the future of their area
4,5	The biosphere reserve concept is a tool with which to facilitate collaborative management to the benefit of the region
6	The biosphere reserve creates international visibility for the area
7	A biosphere reserve is much different (in a positive way) to a traditional protected area such as a national park or nature reserve
8	The biosphere reserve attracts more tourists/visitors
9	The biosphere reserve created more jobs in the area
10	The biosphere reserve has resulted in increased property values

It is interesting to note the positive elements in face of the identified challenges. It addresses almost similar issues. In clarification, a number of interviewees mentioned the difficulty to provide a clear record of positive elements because the CWBR has only been an active entity for about two years. Thus most listed positive aspects are being perceived as potential and will only be realised once the management entity is in full operation and sufficiently funded. Nonetheless most are of the opinion that the CWBR has the potential to become a truly efficient biosphere reserve, a tool with which to address pressing issues such as climate change, and an example to other South African biosphere reserves in future.

Different opinions were provided on the actual value of the biosphere reserve concept. In this specific region it is of special importance due to the fine line between responsibilities of the district municipality and the biosphere reserve management entity. Bioregional planning principles are in any case implemented within local authorities through spatial planning processes. These are further refined through the biosphere reserve framework plan. However a designated biosphere reserve does provide international recognition for areas of exceptional significance from a global perspective.

In more than one interview the importance of using relevant legislation to ensure implementation of the biosphere reserve was emphasized (Johnson 2010; Le Keur 2011; Volschenk 2010). In 2010, the CWBR has approved a Framework Plan that puts forward a very detailed guide for future land-use management. The plan is mapped on a 1:5000 scale using 36 Spatial Planning Categories (Volschenk 2010) and is integrated within the five involved local authorities. This Framework Plan used bioregional planning principles as a point of departure and provides an implementable land-use management tool to guide future sustainable development (Johnson 2010).

One enabling approach included in the CWBR Framework Plan is that of a sustainable development initiative (SDI), broadly defined as *“an overarching socio-economic development and environmental rehabilitation initiative that is enabled and supported by large-scale property development”* (Dennis Moss Partnership 2007). As noted during one of the interviews, the notion of a SDI could carry the theme of the CWBR into effect - a sustainable development model for the Cape Winelands (Volschenk 2010). A SDI typically involves an element of residential development which could be either perceived as favourable due to accompanying benefits to resident communities, or could be concluded as having too much of a negative impact on the sense of place. Thus, a controversy unfolded in relation to the expediency of development outside of a delimited urban edge. The PSDF favours compaction of existing urban areas above establishment of new urban nodes in areas that are mostly of a rural nature. Nevertheless, the Boschendal SDI within the CWBR was presented during the 3<sup>rd</sup> World Congress of Biosphere Reserves in Madrid, Spain in February 2008 as a South African example of a practical demonstration of biosphere reserve principles. It was noted that most case studies presented at Madrid concluded with the question of *“How do we give meaningful practical effect to the promotion of the three functions of biosphere reserves”*. In light of this challenge, the South African example was apparently well received (Moss 2009). Others perceive a SDI as a disguise for promoting residential development in otherwise unfavourable locations.

The interesting perception that a biosphere reserve must be run on sound business principles, albeit with some flexibility, was raised by one of the interviewees (Holmes 2010). The CWBR is currently experimenting with a new concept of financing biosphere reserves that involves a move away from

government funding towards funding by the private business world. The selling point is the opportunities for development and sustainability that is being provided by the biosphere reserve model (Holmes 2010).

The CWBR is being perceived in a generally positive light by all interviewees. Some forthright critique was also noted, specifically related to inclusivity of the management framework, with reference to involvement of historically disadvantaged communities. Concern was expressed over the funding mechanisms of the biosphere reserve. A long-term solution could potentially be found in facilitating joint South African biosphere reserve funding applications. A so-called “*technical virtual network facility*” (Johnson 2010) could be useful in obtaining inputs from all six biosphere reserves in the country.

Collective results of the multicase study are discussed in Chapter 6.

### 5.5.6 Discussion

“*A biosphere reserve is about people*” and “*biodiversity is priceless*” sum up the culmination of aspects to be incorporated in biosphere reserve implementation (Holmes 2010; Johnson 2010). In order to be successful, a biosphere reserve needs to give a voice to all levels of society which could sometimes prove to be very problematic. Even in South Africa, being a true rainbow nation, it should be possible to obtain “*unity despite diversity*” (Johnson 2010) when society supports the same long-term vision for the region in which they reside. One of the issues highlighted by all interviewees is the need for a widely supported biosphere reserve vision and objectives.

Deliberations on how best to use existing legislation in furthering biosphere reserve implementation finds specific relevance in the case of the CWBR. This biosphere reserve had its origins in spatial planning processes, guided by national and provincial planning legislation, particularly the Municipal Systems Act and the Provincial Land Use Planning Ordinance.

In the section on integrated development planning as contained in the Municipal Systems Act, it is stated that municipal planning must be developmentally oriented. The Act prescribes the drafting of an integrated development plan for each municipality which is very much developmentally oriented according to section 26. It also addresses a spatial development framework that would form the basis for land-use management in the jurisdictional area of the municipality. The integrated development plan guides all planning and development within a municipality.

The aim of the Land Use Planning Ordinance (1985) is to regulate land-use planning throughout the Western Cape Province and it provides guidelines in relation to drafting of structure plans by local authorities. It grants a local authority the option to submit a structure plan for land within its area of

jurisdiction that will guide spatial development of the area to which it relates. The opportunity then exists for a local authority to have such a structure plan approved by the provincial powers that be under section 4 (6) of the Ordinance as a plan that needs to be adhered to for the following 10 years. In the Western Cape Province, structure plans are being drafted according to bioregional planning principles as contained in the bioregional planning guidelines of the Province (Department of Planning, Local Government and Housing 2000).

A further legislative tool which can be used to emphasize the biodiversity sector's importance as part of planning processes is the drafting of bioregional plans for selected bioregions (Department of Environmental Affairs and Tourism 2009). The national Biodiversity Act addresses the declaration of bioregions and publication of bioregional plans (NEM:BA 2004). Such a bioregional plan identifies critical biodiversity areas that, after approval of the bioregional plan, must be incorporated into integrated development plans and framework plans of local authorities. The Biodiversity Act regulates local authorities to incorporate approved bioregional plans as part of their integrated development plans. As biosphere reserves follow ecological boundaries and include several ecosystems, the possibility exists for biosphere reserves to be declared as bioregions with subsequent incorporation into legislation. This notion should be explored further.

The Constitution of South Africa (1996) states objects of municipalities that include *inter alia* "to promote social and economic development" and also "to promote a safe and healthy environment". Municipalities are the most prominent service providers to residents regardless of it being environmental services such as clean water, or social services such as education and housing. Municipalities are therefore involved in a delicate balancing act to satisfy all users including business, residents and the environment. Because biosphere reserves are subject to political conflicts and changes in political interests (Isacch 2008; Johnson 2010; Stoll-Kleemann 2005a), constant political complications also add to the complexity of the situation. A biosphere reserve could play a positive role in providing municipalities with a widely accepted framework within which decisions could be justified (Johnson 2010). The biosphere reserve vision and management framework project across political dispensations and could be used to train politicians and decision-makers in the basic concepts of sustainable development.

### 5.5.7 Synopsis

A biosphere reserve is difficult to implement, and sometimes even to comprehend, because of the innate, inbuilt flexibility of the concept itself, which has to address many aspects of various biological and sociological issues. Ironically, this flexibility and the many other facets associated with biosphere reserves, provide the reason why the concept is ultimately so successful.

Many people still confuse a biosphere reserve with a type of conservation area (Stoll-Kleemann & Welp 2008) and thus regard the conservation function as the most important, which is factually incorrect. Some groupings of society would consider a biosphere reserve a green tool with which to fight unwanted developments. In contrast, other interest groups would promote so-called sustainable residential developments on the basis of its location within a biosphere reserve.

It is essential in the South African dispensation for a biosphere reserve to be fully accepted and supported by all relevant role-players, including politicians in power. It is however a well-proven policy that biosphere reserves need to be managed in a non-political manner to ensure continuity beyond political terms of office. It was mentioned that 'green' issues are not a political mobilizing factor and are not to be seen as having political advantages (Johnson 2010; Stoll-Kleemann & O'Riordan 2002); nonetheless political buy-in is needed for a biosphere reserve to have the intended impact. In the Cape Winelands power of government alters between the national reigning party, the African National Congress (ANC) and the main opposition party, the Democratic Alliance (DA). Both have environmental policies that differ in their approach to environmental issues of concern. The environmental policy of the ANC projects a humanitarian point of view towards the environment. Its broad policy statement reads *"The ANC believes that all citizens of South Africa, present and future, have the right to a safe and healthy environment, and to a life of well-being. The broad objective of our environmental policy will be to fulfil this right. In this context, growth and development within South Africa will be based on the principles of sustainability"* (ANC 2011). The DA's approach to environmental management is grounded in a document *"In-trust-for-the-nation"* (DA 2009). This document refers in much detail to the need for a well-managed environment. The vision statement starts with *"the sustainability of the South African economy and our efforts at creating new opportunities for our citizens relies on the sound management of our environment and energy economy for both the current and future generations."* Whereas the DA promotes a spirit of responsible, custodian care towards the environment, the ANC supports a more human-centered approach with focus on equitable access to resources (both renewable and non-renewable) and public participation in management of resources. Mention is being made of the objective to eliminate the negative environmental impact of the past apartheid regime. In a position paper on South African biosphere reserves, the lack of political interest and support was noted as a challenge to implementation of the biosphere reserve concept (South African Biosphere Reserve Working Group 2008). Therefore each biosphere reserve needs to position itself in order to find an affinity with the political powers that be within their decision-making structures.

While it is important to note the different political approaches to environmental issues and the general misconception of biosphere reserves as conservation areas, it is crucial to market the

biosphere reserve concept as a sustainable social-ecological land management tool. The value of using the biosphere reserve concept lies in its ability to inclusively stretch beyond biodiversity by giving equal priority to socio-economic issues (Stanvliet & Parnell 2006).

This intrinsic value of the biosphere reserve concept is being realized through the CWBR. Although still in its early stages, the CWBR has the potential to become a well-managed multidisciplinary tool that will guide future land management decisions in support of sustainable development.

## 6 COLLECTIVE RESULTS OF THE MULTICASE STUDY

*“You know, sometimes it is the artist's task to find out how much music you can still make with what you have left” (Itzhak Perlman)*

The multicase study was conducted on five of the six UNESCO designated biosphere reserves in South Africa, namely the Kogelberg Biosphere Reserve, Cape West Coast Biosphere Reserve, Waterberg Biosphere Reserve, Kruger to Canyons Biosphere Region and the Cape Winelands Biosphere Reserve. General descriptions and individual results for all case studies are contained in Chapter 5.

In this chapter the collective outcomes of the individual case studies are compared and discussed. It includes collaborative results based on the social science methodology that was followed in all five cases, including matrix ranking of questionnaire responses, interview outcomes and ranking of the effectiveness of each biosphere reserve.

### 6.1 Introduction

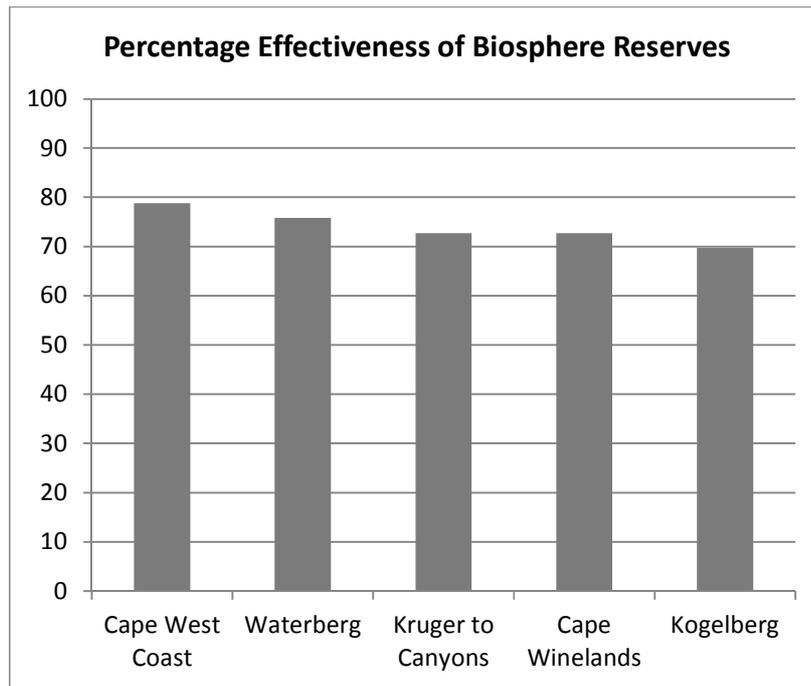
The main objective of the multicase study was to understand the current implementation of biosphere reserves, which contributed to gaining insight into options for the future effective implementation of the MAB Programme in South Africa. The individual cases assisted in understanding the overarching MAB Programme (Stake 2006). The five case studies provided evidence to some issues related to their implementation, support base, status, and how they differ inherently from traditional protected areas. Collective results are presented accordingly.

### 6.2 Collective Results

The issue of how effective each biosphere reserve is being implemented has been tested by means of semi-structured interviews (Table 10) according to an interview guide (Annexure 2). Comparative ratings for the effectiveness of the individual biosphere reserves (Annexures 5, 6, 7, 9 and 10) are listed in Table 29 and shown in Figure 22.

**Table 29: Results on effectiveness of South African biosphere reserves**

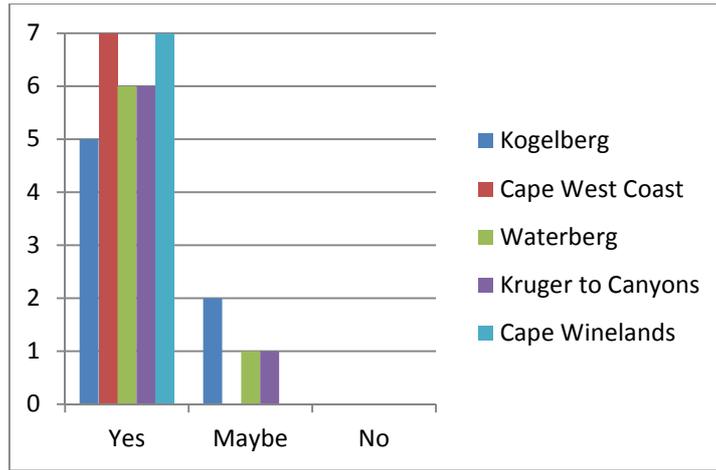
BIOSPHERE RESERVE	DATE OF DESIGNATION	RATING out of 33	PERCENTAGE
KOGELBERG	December 1998	23	69.7%
CAPE WEST COAST	November 2000	26	78.8%
WATERBERG	March 2001	25	75.8%
KRUGER TO CANYONS	September 2001	24	72.7%
CAPE WINELANDS	November 2000	24	72.7%



**Figure 22: Percentage effectiveness of South African Biosphere Reserves**

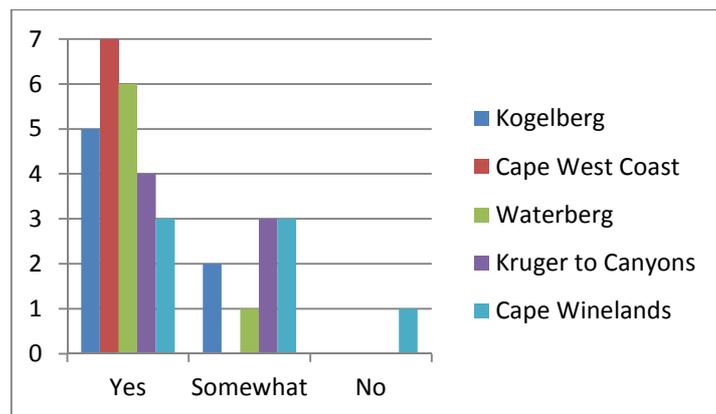
The questionnaire survey (Annexure 3) provided seven interviewees of each biosphere reserve the opportunity to put forward an opinion on five questions of a general biosphere reserve nature (Table 11). Interviewees were given three choices in answering each of the five questions.

Question 1: In your opinion, is the biosphere reserve concept a valuable tool with which to do landscape management in South Africa? The question referred to a series of instruments being used in the South African context with which to practice landscape-scale management, such as World Heritage Sites, biodiversity initiatives, transfrontier conservation areas, biosphere reserves and megareserves. Of the 35 interviewees, 31 (89%) gave a 'yes' response to the question whether the biosphere reserve concept is a useful tool for landscape management, which indicates strong support for the concept as a land management tool. There was general agreement amongst interviewees of the different biosphere reserves (Figure 23).



**Figure 23: In your opinion, is the biosphere reserve concept a valuable tool with which to do landscape management in South Africa?**

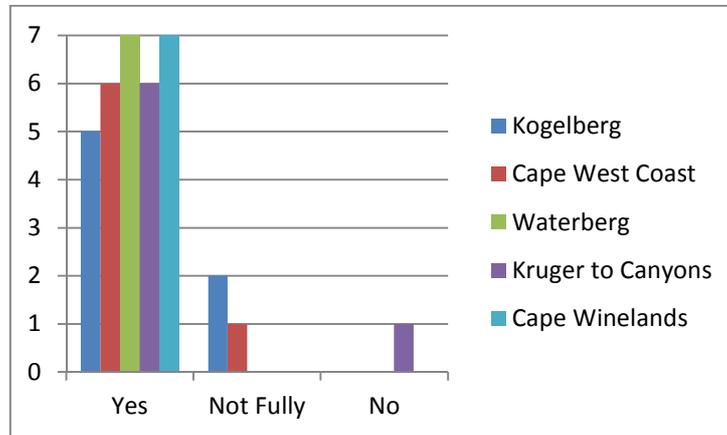
Question 2: In your biosphere reserve, do you think the designation is adding value to the area? The second question deals with the expectation of the public that the biosphere reserve designation would add value to the region. This is important in view of the high expectations of the public in this regard. There was less agreement than on the first question: of the 35 interviewees, 25 (71%) responded positively, nine (26%) mentioned ‘somewhat’ and one (3%) said ‘no’ (Figure 24). One interviewee specifically noted that value and status is gained by a local area if it is promulgated by an internationally recognized framework such as a biosphere reserve. The negative response of 29% of the interviewees bears reference to the challenge faced by all biosphere reserves to ensure the flow of benefits to both humans and the environment. The Cape West Coast is the only case where all interviewees responded positively which confirms the fact that it obtained the highest score pertaining to effectiveness in this study.



**Figure 24: In your biosphere reserve, do you think the designation is adding value to the area?**

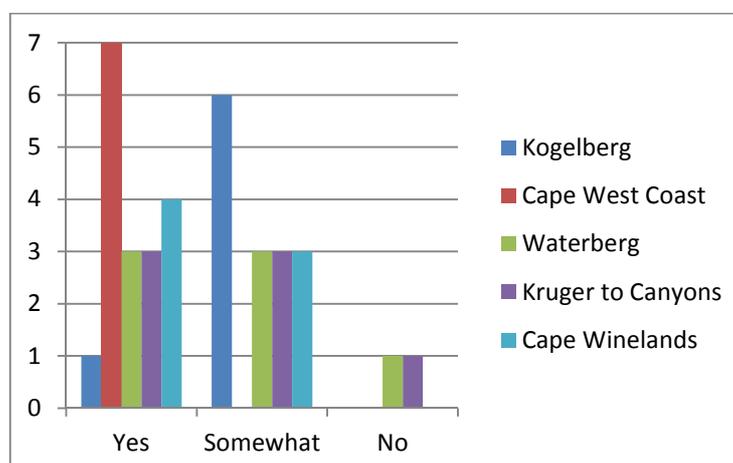
Question 3: Is the organization that you represent in support of the biosphere reserve? Responses to the question that elicited a reaction on institutional support for the relevant biosphere reserve is

given in Figure 25. By far the majority, namely 31 (89%) of the 35 interviewees responded positively to the question whether the organization they represent supports the idea of a biosphere reserve. One of the Kruger to Canyons stakeholders indicated a lack of support for the biosphere reserve, reasoning that it is a good concept but cannot achieve much in a developing country.



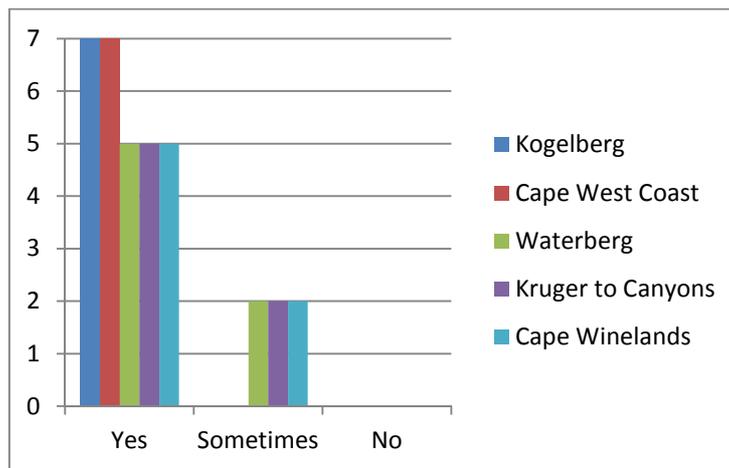
**Figure 25: Is the organization that you represent in support of the biosphere reserve?**

Question 4: Are you of the opinion that the management entity of your biosphere reserve is doing a good job of managing the biosphere reserve effectively? The question in Figure 26 elicited a response on whether interviewees thought the biosphere reserves were managed effectively, and this question presented interesting responses. Of the 35 interviewees, only 18 (51%) said 'yes', 15 (43%) indicated 'somewhat' and two (6%) said 'no'. Perceptions of the effectiveness of the biosphere reserve management entities are clearly not very positive. These reactions could be related to the general lack of permanent biosphere reserve staff, challenges with government support for the MAB Programme and the impending lack of financial support to biosphere reserves in the country. The need to be proactive in gaining cooperation from municipalities was noted. The Cape West Coast is the only case that elicited a wholly positive response which is related to their well-established management entity and sufficient monetary resources.



**Figure 26: Are you of the opinion that the management entity of your biosphere reserve is doing a good job of managing the biosphere reserve effectively?**

Question 5: Do you truly agree with the statement 'biosphere reserves are special places for people and nature'? The outcome of the final question on whether the interviewees were considering biosphere reserves as special places for people and nature (Figure 27) yielded a positive response from 83% of interviewees. This proved that people in general do believe in the potential of the biosphere reserve concept, something that could be used to the advantage of the South African biosphere reserve fraternity in future.



**Figure 27: Do you truly agree with the statement 'biosphere reserves are special places for people and nature'?**

Data from interviews and questionnaire surveys were used to address problems and challenges faced by the biosphere reserves. Interviewees were given ten elements of relevance to the South African context to order in priority from highest to lowest. The responses were analysed with matrix ranking, specifically preference ranking (Margoluis & Salafsky 1998). The collective ranking from highest to lowest of the ten challenges for all five cases came out as follows (Table 30):

**Table 30: Collective ranking of list of problems/challenges**

Collective Ranking of List of Problems/Challenges	
1	Insufficient long-term financial resources
2	Support (buy-in) from local authorities (municipalities)
3	Too little benefits perceived by local communities resulting in a lack of support
4	Lack of dedicated biosphere reserve personnel
5	Too little awareness amongst role-players and local communities
6	Biosphere reserve concept not strongly supported by national government
7	Insufficient legal means (lack of 'teeth') to implement the biosphere reserve concept
8	Not enough insight into the value of implementing the biosphere reserve concept

9	Lack of long-term vision and objectives
10	Too much of a conservation (green) focus and not enough emphasis on other issues such as development

In the same way ten positive elements were also ranked from highest to lowest and the collective ranking for all five cases was as follows (Table 31):

**Table 31: Collective ranking of list of positive elements**

Collective Ranking of List of Positive Elements	
1	The biosphere reserve concept is a tool with which to facilitate collaborative management to the benefit of the region
2	The biosphere reserve provides a means to attract international funding to the region
3	The biosphere reserve creates an opportunity for communities to be involved in management decisions about the future of their area
4	The biosphere reserve creates international visibility for the area
5	The biosphere reserve creates awareness about sustainable development
6	A biosphere reserve is much different (in a positive way) to a traditional protected area such as a national park or nature reserve
7	The biosphere reserve has resulted in people becoming more aware of their interconnectedness to the natural environment
8	The biosphere reserve attracts more tourists/visitors
9	The biosphere reserve created more jobs in the area
10	The biosphere reserve has resulted in increased property values

Aspects of biosphere reserve implementation, including administrative support are some of the most pressing challenges. In some instances biosphere reserves fall short of pursuing partnerships with relevant stakeholders which would strengthen collaborative management. Other additional challenges and positive elements were also mentioned. Illegal harvesting and overexploitation, specifically related to marine resources and wildlife such as rhino is a serious threat. Viewed in terms of the abject poverty and high unemployment statistics in South Africa, this is a serious challenge facing all biosphere reserves. Unfortunately there are some sectors of society who are not even aware of the existence of the biosphere reserve in their region, something that could be addressed through widespread communication and awareness campaigns. It was mentioned that biosphere reserves should give a voice to all levels of society, as one interviewee put so aptly *“a biosphere reserve is about people”*.

The biosphere reserve concept could provide protection against unsuitable development in core and buffer areas as experienced by some biosphere reserve cases. To be effective, clear development guidelines need to be drafted for each biosphere reserve zone which would then ideally be integrated into a spatial development framework plan. This would address the legal challenge of

biosphere reserve implementation (lack of ‘teeth’, rated number seven on the list of challenges), as well as the positive aspect of creating awareness about sustainable development (rated in the fifth place).

### 6.3 Discussion

The five case studies were compared with respect to management effectiveness (Table 29 and Figure 22). The Cape West Coast (CWCBR) emerged as the most effective biosphere reserve, mainly because of its permanent staff and large income allocated to projects through which the biosphere reserve is very well embedded in the region. Nonetheless the biosphere reserve still lacks a secure capital reserve that would ensure a solvent company in the long-term. There is also still a need for greater awareness amongst some walks of society. The CWCBR is showcasing collaborative management and has the most secure funding and staffing model of all South African biosphere reserves. The Kogelberg (KBR) finds itself at the lower end of the scale which is comprehensible due to the challenges of not having a coordinator at present, no project funding for the immediate future and insufficient support throughout the area. Although the KBR finds itself currently at a tipping point, the Board of Directors has put measures in place to ensure the more effective collaborative management of the biosphere reserve, which is likely to make a difference in the near future. The Waterberg (WBR) emerged as the second highest achiever which is mirrored by the fact that it is being held in high esteem and widely supported throughout the region. This notwithstanding, the WBR is currently at a crucial point in illuminating their future and has plans to enlarge the biosphere reserve to more than four times its current extent. The Kruger to Canyons (K2C) and Cape Winelands (CWBR) achieved a similar score although they are operating quite differently. The CWBR is very much based on sound business principles because of the background of the chairperson. Inclusivity as it refers to all levels of society is still a challenge in this biosphere reserve. The CWBR is too recent to be fully operational yet. K2C is run by a group of volunteers who work with unmatched passion and enthusiasm. The biosphere reserve needs to be promoted in this area where there are many other social, economic and conservation initiatives. Despite different scores, there are not major differences between the ratings of the five cases, mainly because all biosphere reserves in the country use more or less the same implementation guidelines.

The questionnaire survey provided major role-players the opportunity to put forward their opinion on various issues related to implementation of their specific biosphere reserve. Questions that solicited the most positive responses are those in Figures 23 and 25 that bear reference to organizational support for the biosphere reserve concept. The most negative responses were related to the question of effective management (Figure 26), indicating pressing problems with efficient

implementation of the concept in South Africa. It must however be kept in mind that these opinions were forthcoming from a group of people who are all closely involved with existing biosphere reserves and have insight into the prospects offered by the MAB Programme. Biosphere reserve management entities have the complicated task to take heed of the intrinsic nature of the MAB Programme, but at the same time to also demonstrate a positive influence on daily livelihood struggles of its inhabitants.

Rating of insufficient financial resources as the most pressing challenge (Table 30) relates to the unfulfilled prospect of the biosphere reserve concept being seen to attract international funding (second on the list of positives in Table 31). This is in accordance with the dire financial situation currently experienced by the majority of South African biosphere reserves. More often than not a secure capital reserve is needed to ensure a solvent biosphere reserve. Despite their widely acclaimed usefulness, biosphere reserves do not get financial support from national government for operational expenses. Provincial governments provide limited funding to biosphere reserves within their jurisdiction. Therefore all biosphere reserves have opted for a private company as a management entity in order to have access to international funding sources (Table 4). A widely supported perception is that a biosphere reserve must be run on sound business principles, albeit with some flexibility. One biosphere reserve is currently experimenting with a new concept of financing that involves a move away from government funding towards funding by the private business world. A different notion that could be explored in future is the establishment of a national biosphere reserve holdings fund through which personnel and operational costs would be provided to designated biosphere reserves.

Although communities are being given an opportunity to be involved in management decisions, biosphere reserves often still gravely lack in providing tangible benefits to local communities, especially previously disadvantaged communities. This is strengthened by the very low positive rating of the role of creating new job opportunities, as presently constituted biosphere reserves are not geared to start job-creating enterprises on a large scale. Some benefits to be gained as mentioned by the interviewees included tourism opportunities, environmental services, community involvement to a higher degree than other protected areas, and protection of real estate assets (listed as an economical reason for supporting a biosphere reserve).

The challenges rated in the second, fifth and sixth places refer to a frequently mentioned issue that the concept of a biosphere reserve is not sufficiently understood by most spheres of government and some sectors of society. The need for greater awareness and involvement was noted. Because biosphere reserves are subject to political conflicts and changes in political interests (Isacch 2008; Stoll-Kleemann 2005a), constant political fluctuations also add to the complexity of the situation.

Given the erratic nature of the biosphere reserve concept, it is essential in the South African dispensation for a biosphere reserve to be fully accepted and supported by all relevant role-players, including politicians in power. Although political buy-in is crucial, a biosphere reserve needs to be managed in a non-political manner, enabling collective efforts across political boundaries. A biosphere reserve could play a positive role in providing political leaders within municipalities with a widely accepted framework within which decisions could be justified.

One of the issues highlighted by all interviewees is the need for a widely supported biosphere reserve vision and objectives. The fact that it is not seen as a major challenge (number 9, Table 30) indicates that people are generally in support of the relevant biosphere reserves' visions. As noted by Schliep and Stoll-Kleemann (2010), an understanding of the key objectives of the MAB Programme and of an individual biosphere reserve could make a difference in such a *"multi-stakeholder decision-making process"*. They mention that biosphere reserve coordination is *"highly dependent on the ability of experts to communicate the programme's objectives to all concerned"*. This ability serves to strengthen the collaborative management function of a biosphere reserve, which is collectively perceived as the most positive aspect (Table 31). There is however a misalignment between this viewpoint of collaborative management and the perceived lack of support by important stakeholders as indicated by the second highest challenge in Table 30. All these views strengthen the fact that the biosphere reserve concept is experiencing implementation difficulties but has great potential within South Africa.

The statement *"biosphere reserves are different to traditional protected areas"* has been rated in the sixth position on the list of positives. It is however widely emphasized that biosphere reserves are so much more than protected areas (De Klerk 2004; Naude 2001; UNESCO 1996a, 2008) and therefore biosphere reserves deserve a special approach. The importance of using relevant legislation to ensure implementation of the biosphere reserve concept was often emphasized. A generally expressed opinion was *"unless the custodians of biodiversity are given teeth, the biosphere reserve will not be effective"*. These comments must be seen in light of the lack of enforcement mechanisms forthcoming from the MAB Programme itself (Schliep *et al.* 2008). Presently the biosphere reserve concept in South Africa is being legislated using a soft-law approach. It is not embedded in the Protected Areas Act (NEM:PAA 2003), although it is being dealt with nationally as a support mechanism to the protected areas expansion strategy. Von Droste (1995) noted that biosphere reserves are in essence a form of bioregional management. The opportunity exists for biosphere reserves in South Africa to draft spatial framework plans, using bioregional planning principles as a point of departure that would provide an implementable land-use management tool to proactively guide future sustainable development within the region. Hence awareness about

sustainable development was rated in the fifth place on the list of positive aspects. A spatial plan would allow biosphere reserves to facilitate better connectivity between important conservation areas that would assist in addressing pressing issues such as adapting to climate change.

In the light of many people still confusing a biosphere reserve with a type of conservation area (Stoll-Kleemann & Welp 2008), it is comforting that this notion has been rated as the least of all ten challenges. Management frameworks or plans have been drafted for four of the biosphere reserve cases, apart from the Cape Winelands. From these documents it can be concluded that South African biosphere reserves are definitely addressing all three functions of conservation, development and logistic support. In some cases there could be a slight bias towards a specific function where the sometimes evasive balance between the three functions still needs to be sought. All in all the biosphere reserves are contributing towards sustainable development in its broadest sense.

## 6.4 Closing Remarks

Considering all information and opinions, it could be inferred that the biosphere reserve concept is being hailed as a special management tool with which to instil collaborative management between a wide range of stakeholders, as well as a means of getting international recognition for a specific area. One of the objectives of a biosphere reserve often is to improve the quality of life of people in the area, linking directly to economic opportunities. One of the biggest challenges impeding this goal in South Africa is the large part of society that is clamped down by ever-present poverty, a problem which the biosphere reserves have to face in collaboration with relevant authorities. It is therefore, as emphasized by some interviewees, pertinent for biosphere reserves to make an active contribution to social and economic needs of local populations. Still, the value adding factor of biosphere reserves continues to be a contested topic in South Africa.

Mainstreaming of biodiversity into different sectors at local municipal level provides opportunities for local economic development and poverty reduction (Roe *et al.* 2011). This has been showcased by South African biosphere reserves through the drafting of comprehensive spatial framework plans that has direct reference to the legal standing of biosphere reserves. The process of drafting a framework plan facilitates coherent planning and land-use management in terms of the principles of sustainable development, and it optimizes the implementation of the three global functions of biosphere reserves. The development of such a spatial conservation and growth plan provides a model for efficient bioregional planning and management, gives physical effect to the MAB Programme and provides a tool for reconciling and integrating the conflicting interests and pressures of land-use planning (KBRC 2011). Biosphere reserve framework plans are integrated and aligned

with local authority strategic planning guidelines and formulate spatial development implementation strategies for specific areas.

Legislative implications related to biosphere reserves in South Africa remains very problematic. The soft-law approach, although not very effective, should be weighed up against maintaining implementation flexibility within the MAB Programme. South Africa does not have any dedicated national biosphere reserve legislation. The MAB Programme is currently active in three of the country's nine provinces, namely Limpopo, Mpumalanga and the Western Cape. Each province implements the program in its own way. Limpopo Province has promulgated an Environmental Management Act but does not have a holistic land management approach in contrast with the Western Cape Province where a land management framework does exist and was found the ideal way through which to legislate for land-use within a biosphere reserve. The new Western Cape Biosphere Reserves Act (Government Gazette Extraordinary 6936 of 13 December 2011) prescribes the drafting of spatial framework plans for each biosphere reserve that could be used as a legislative land-use tool.

The fact that the South African national government may not fully comprehend the role that biosphere reserves could fulfill in achieving their goals continues to be an important matter to resolve. Biosphere reserves could be showcasing a collaborative management model in the form of a tool with which to integrate people and the environment in a manner that supports the country's natural and cultural conservation and sustainable development objectives while improving human well-being. It is a fact that all biosphere reserves in South Africa face an uncertain future related to monetary support. African countries in general have the tendency to focus more on poverty alleviation than biodiversity conservation and thus little attention and related funding is channelled to rural development. The need for rich countries to assist lower income nations in protecting biodiversity and enlarging protected areas was therefore noted by Mellor (2002). It is a distinct possibility that biosphere reserves are ideally positioned to demonstrate the value of relationships between lower income countries in Africa and high income countries that could lead to international funding partnerships. This is one notion to be explored through the process of establishing a national biosphere reserve holdings fund.

This multicase study has demonstrated the value of the MAB Programme as implemented through biosphere reserves as an internationally acclaimed framework with which to address pressing issues such as climate change. Thus, if executed with prudence, the biosphere reserve concept does have a future with social-ecological land-management strategies in South Africa.

## 7 THE FUTURE OF THE UNESCO MAB PROGRAMME IN SOUTH AFRICA

*"We cannot solve the problems that we have created with the same thinking that created them." (Albert Einstein)*

In our modern age of population growth, dwindling natural resources and a general disconnectedness of humans from nature, there is an urgent need to find ways of living more sustainably on Earth and to be more connected to the plight of our Planet. As proven by the multicase study, the UNESCO MAB Programme offers innovative thinking towards socially-inclusive environmental management through the implementation of biosphere reserves.

This chapter responds to secondary research question 3: 'How could scientific information gained from a multicase biosphere reserve study be used to inform the process of devising future options for the MAB Programme in South Africa?' The chapter therefore builds on the results of the multicase study and provides options for the future effective implementation of biosphere reserves (the fourth research phase), in order to capitalize on the potential of the MAB Programme in South Africa.

The existing six designated biosphere reserves in the country as well as the two currently on review by UNESCO (Table 4), collectively cover an area of 10 261 546 ha (102 615 km<sup>2</sup>), approximately 8.4% of South Africa's total land area. Although this figure includes core areas that are registered as national parks or nature reserves, it is clearly not an insignificant figure in the greater national system of protected areas.

A biosphere reserve is difficult to implement, and sometimes even to comprehend, because of the innate, inbuilt flexibility of the concept itself, which has to address many aspects of various biological and sociological issues. The value of using the biosphere reserve concept lies in this ability to inclusively stretch beyond biodiversity by giving equal priority to socio-economic issues (Stanvliet & Parnell 2006). Ironically, this flexibility and the many other facets associated with biosphere reserves, provide the reason why the concept is ultimately so successful. It is however a fact that pressing issues currently at play in South Africa such as overpopulation, poverty, job creation and poor service delivery sometimes need urgent attention before the influence of a biosphere reserve would be recognized and understood.

Apart from the Protected Areas Act, the South African conservation landscape is being directed by a large suite of guidelines and strategies. Some of the most prominent include the National Climate Change Response Strategy of 2004, National Biodiversity Assessment of 2004, National Framework for Sustainable Development of 2008, National Strategy on Sustainable Development and Action Plan of 2010, National Biodiversity Framework of 2009, and the National Protected Area Expansion

Strategy of 2010. Although Marton-Lefèvre (2007) refers to the biosphere reserve concept as a “*visionary tool*”, it is not being acknowledged as such in South Africa. The concept concurs with the notions of sustainable development and the establishment of conservation corridors, nonetheless biosphere reserves are not mentioned in the National Framework for Sustainable Development of 2008 or the National Strategy on Sustainable Development and Action Plan of 2010, nor is it included in the Protected Areas Act of 2003 or the National Protected Area Expansion Strategy of 2010, or any note of it made in the National Climate Change Response Strategy of 2004. At present, the most prominent document that aims to provide direction for future development within all sectors of the country is the National Development Plan 2030 (NDP) – “*a plan for the country to eliminate poverty and reduce inequality by 2030*” (NPC 2012).

Given South Africa’s growing population and limited natural resources to support human well-being and sustainable lifestyles, we need to start thinking differently in order to solve eminent problems related to the quest for sustainable development within living landscapes. It is a disturbing fact that all South African biosphere reserves face an uncertain future, as proven through the multicase study and confirmed during discussions at National MAB Committee meetings. The most pressing challenges impeding the effectiveness of these biosphere reserves are a shortage of permanent staff members, the constant challenge of securing financial resources specifically for operational funding, and a general lack of support, buy-in and awareness of the biosphere reserve concept. These relate to the collective list of challenges as given in Table 30. Ironically, the list of positive elements according to Table 31, contradict these findings in that the biosphere reserve concept is seen to provide a vehicle that could attract funding as well as facilitate buy-in through collaborative management opportunities. New approaches are therefore needed to ensure the long-term effectiveness of existing and future biosphere reserves.

Biosphere reserves in South Africa and Canada are being implemented in much the same way. In both countries almost all biosphere reserve management entities are set up as non-profit organizations with no regulatory authority and therefore have to operate within the existing national and provincial legislative framework. Similar to South Africa, Reed and Egunyu (2013) noted that Canadian biosphere reserves play a role as ‘facilitator’ in regional governance. In both countries biosphere reserves do not receive direct funding from national government. Neither the MAB Programme nor the biosphere reserve concept *per se* features highly in the South African legislative system of social-ecological landscapes. Government funding mechanisms in general are coupled to legislative mandates and therefore biosphere reserves do not enjoy much financial support from national government and limited support from some provincial governments such as the Western Cape and Limpopo. With respect to the resultant financial challenges faced by all biosphere reserves,

a holdings fund that will be managed to the benefit of all designated biosphere reserves in South Africa, named the National Biosphere Reserve Trust Fund, was recently investigated and formally established. The main objective of this Trust Fund is to build up a secure long-term monetary resource that could support all biosphere reserves with operational funding to ensure fulfilment of the three biosphere reserve functions.

Two additional approaches to facilitate the more effective implementation of the MAB Programme in the country was identified, namely (i) to bring the biosphere reserve concept closer to the people, in order to address the challenge of lack of buy-in from relevant sectors of society; and (ii) to devise a suite of selection criteria to ensure the optimal location and effectiveness of future biosphere reserves. These will be discussed in more detail in the following sections.

## **7.1 Participation in Biosphere Reserve Management**

Biosphere reserves are perceived to create opportunities for communities to be involved in management decisions as indicated in the third position of positive aspects as listed in Table 31. In the third position of challenges as listed in Table 30, it is noted that too little benefits are accrued to local communities, resulting in a lack of support and participation in the management of a biosphere reserve. Insufficient buy-in, specifically from poorer communities, is a serious concern in South African biosphere reserves.

Use of the term 'biosphere reserve' continues to be a controversial topic. Although biosphere reserves are not primarily focusing on conservation, the misconception that biosphere reserves are another type of conservation tool still persists. During the previous apartheid political dispensation in South Africa, the term 'reserve' was inevitably coupled to the meaning of an exclusion area, only accessible to certain racial groups (Carruthers 1995; Stanvliet *et al.* 2004a). This perception should be stifled through increasingly creating awareness about the MAB Programme and the true nature of the biosphere reserve concept. It is widely accepted that the biosphere reserve concept is difficult to grasp, especially by local communities who struggle to make a decent living. For the wealthier sectors of society, supporting landscape conservation initiatives is the right thing to do, but disadvantaged and jobless sectors of society sometimes try to live off the land and therefore have a vastly different perception of life. In some provinces of South Africa, traditional leaders play an important role in facilitating interaction with local communities. This is where it is crucial for biosphere reserves to showcase sustainable development in its true sense by contributing towards biodiversity conservation as well as better living conditions and progressive economies for local inhabitants.

Despite 20 years of democracy, South African society still struggles with intrinsic racial tensions. The previous apartheid state was based on enforced racial discrimination and ethnical divisions. The current post-apartheid state follows a non-racial ideology based on equity and equality, but is put under restraint by many social, economic and political challenges. The history of racially-divided practices is still very much enshrined in the minds of South Africans and more recent governmental practices such as affirmative action and black economic empowerment do not assist in alleviating these deep-seated societal strains (Battersby-Lennard 2009; Hammett 2008).

South Africa has a three-tiered system of governance: national, provincial and local government. The latter consists of metropolitan, district and local municipalities, all of whom are involved as main stakeholders in biosphere reserve implementation. Local government is focused on growing local economies and providing infrastructure and services. Included in the main objectives of national government that filters through to the local level is poverty alleviation through job creation. Adding to this weighty task is the fact that South Africa is a 'nascent universal welfare state' as noted by Hammett (2008) and therefore budgets are very carefully allocated. The ruling political party at local government level provides direction to municipalities, generally with the view to get re-elected. Given the demography of the country, the mass of the electorate resides in informal settlements where unemployment is rife and people are experiencing daily livelihood struggles. It is to this electorate that municipalities have to provide services towards better living conditions, including necessities such as electricity, running water and sewerage. It could therefore be understood that biosphere reserves are often not strongly supported (Coetzer *et al.* 2013). However, this opens up opportunities for the management entities of biosphere reserves in that they could work towards creating benefits for local people and municipalities alike. Biosphere reserves therefore need to position them to speak to political agendas and to get local politicians excited and involved. Hence it is of the utmost importance to get politicians and local councillors to understand the essence of biosphere reserves. Management entities should make every effort to get politicians, municipal officials and even mayors directly involved.

In addition to the need to speak to political agendas, it is quite clear that biosphere reserves need to speak to the people as well. Traditional leaders could be important associates in getting the message of a biosphere reserve across to local inhabitants. These leaders are respected and trusted by the people and could be valuable allies to biosphere reserves. It is therefore to the benefit of biosphere

reserves to spend much Africa time<sup>8</sup> in embracing traditional culture and incorporating traditional authorities into their decision-making spheres.

This is especially crucial in areas home to a high concentration of poor, landless people of which the Waterberg, Kruger to Canyons and Vhembe are examples. An idea that emerged through the research process was for biosphere reserves to create smaller sites that would form part of the larger biosphere reserve, but which would be owned and managed by local communities to their sole benefit and in which the principles of the biosphere reserve concept could be showcased. Such sites would bring about awareness of people's interconnectedness to the natural environment, could add recreational and economic value to livelihoods of communities and would provide a special sense of place. Such a site exists in the form of the Moepel Farms in the WBR. The Moepel Farms of some 32 000 ha comprise previously state-owned land that have been transferred to local community ownership through the land restitution process. Traditionally the Moepel Farms were used for livestock farming but because of the biodiversity wealth of these lands, it has been earmarked for tourism development instead. However, in many rural areas local people are hesitant about biodiversity conservation efforts and tend to oppose interventions regardless of future benefits (Senyolo 2010). Therefore relationships with local people are absolutely vital. Because of the mountainous setting and limited grazing, the Moepel Farms are not viable for agricultural practices in the long-term, therefore the communities have agreed to opt for a conservation land use with tourism development (Senyolo 2010). In a recent study related to the Moepel Farms, Senyolo (2010) indicated that tourism ventures could provide an income potential to the communities of seven times higher than traditional livestock farming. However, as noted by Tumusiime and Vedeld (2012), this is not always the case as income derived from tourism is often not adequate. Scepticism still exists amongst some communities, and conflicts over benefits resulting from conservation initiatives are still evident. Co-management in the true sense of the word where communities have an equal say in management decisions of the relevant land parcels is at the root of the solution (Cundill *et al.* 2013). Presently the Moepel Farms have not resolved their future as yet.

A working example of a much smaller community-managed site is the Mndawe Trust Protected Environment within the Thaba Chweu Municipality. The site was allocated to the Mndawe Community Trust following a land restitution process. Although this site of 826 ha is not located within a biosphere reserve, it is the first community owned protected environment in Mpumalanga and could offer learning opportunities to biosphere reserves on how to collaborate with traditional

---

<sup>8</sup> 'Africa time' in this context refers to the relaxed attitude towards time as perceived in many parts of Africa, in that it often takes much longer to obtain certain objectives than originally anticipated.

authorities. The site was recently declared as a protected environment in terms of section 28(1)(a)(i) of the NEM:PAA wherein the management was assigned to the Mndawe Trust (consisting of a traditional community). A management agreement was signed between the Mndawe Trust and the MTPA that will include the drafting of a management and zonation plan. The vision is to develop the protected environment for ecotourism and game breeding with the assistance of the MTPA, which will ensure a steady income to the Mndawe Trust for distribution amongst community members.

Existing biosphere reserves as well as biosphere reserve proponents should take note of these and similar initiatives of smaller, self-governed communal areas that could serve the role of letting biosphere reserves actually 'speak' to the people.

## 7.2 Biosphere Reserve Selection Criteria for South Africa

As indicated by results of the multicase study, not all biosphere reserves in South Africa are equally effective. At present new biosphere reserves in the country are selected in an ad hoc manner and are therefore not necessarily optimally located. There is a need to use South Africa's available natural, economic and social resources wisely. Biosphere reserves need to be representative of biodiversity, efficiently managed and persistent in the long run. Should their locations be selected discerningly in a spatially-explicit manner, they offer a long-term conservation opportunity towards the showcasing of sustainable development practices. It was therefore deemed necessary to devise a suite of biosphere reserve selection criteria for the country that would assist with this challenge. In the Seville Strategy, UNESCO specifically notes: "*States are encouraged to elaborate and implement national criteria for biosphere reserves which take into account the special conditions of the State concerned*" (UNESCO 1996a).

To ensure the effectiveness of biosphere reserves in fulfilling UNESCO's goals, biosphere reserves are required to complete a review process every 10 years. One way to track effectiveness is through implementing a set of sustainability indicators. Tucker (2013) developed sustainability indicators for South African biosphere reserves that could be used to measure progress and track effectiveness. Biosphere reserves therefore need to be located in places where they have the most optimal prospects of being effective and efficient. Sustainability indicators were grouped according to specific goals important to the effectiveness of biosphere reserves, including (i) increased land for conservation; (ii) external leverage for conservation funds; (iii) increasing numbers of projects creating jobs; (iv) increased community awareness; (v) water quality and quantity; (vi) sustainable development and planning; (vii) stakeholder support; (viii) research and monitoring; (ix) education and capacity; (x) operational and institutional governance (Tucker 2013). These indicators need to inform biosphere reserve selection criteria. Guidelines on biosphere reserve site selection would

assist in assuring their effectiveness and positive impact in the South African social and environmental landscape.

Effectiveness of protected areas is compromised if their selection was based mostly on opportunism (Pressey & Taffs 2001). In the past, selection of sites for the establishment of protected areas was usually done in an ad hoc or opportunistic way and based on the availability of land, most of which have been land that are not commercially valuable or relatively rugged (Cowling *et al.* 1999a; Knight & Cowling 2007; Margules & Pressey 2000; Pressey 1994; Pressey & Taffs 2001; Pressey *et al.* 1993; Rodrigues *et al.* 2004). Other reasons for selecting protected areas included spectacular scenery (Terborgh & Winter 1983), tourist revenue (Huntley 1978), and water catchments (Rebelo & Siegfried 1992). This so-called 'worthless lands' theory has been much criticized (Cox 1983) in view of the sites not being selected in a systematic manner. This practice should be prevented in the future selection of biosphere reserves.

Numerous aspects come into play when deliberating about biosphere reserve selection criteria. Some provinces have strategic guideline documents with a bearing on the implementation of biosphere reserves. In 2000, the Western Cape Provincial Government adopted bioregional planning as the planning and management approach in the province. As discussed in a special issue of Parks (Volume 9, Number 3, October 1999), bioregionalism has much in common with the MAB Programme. Bioregional planning is an approach for large landscapes that takes care of both biodiversity conservation and the needs of people (Miller & Hamilton 1999). Through applying the bioregional approach, biosphere reserves could be integrated into even larger corridor projects (Georgiadis & Campello 1999; Watson & Wilkins 1999). Bioregionalism incorporate many of the issues at play in the implementation of biosphere reserves, such as stakeholder collaboration, delimitation of zones, research, economic viability and adaptive management (Miller & Hamilton 1999). Some biosphere reserves in South Africa already delimit their outer boundaries to coincide with bioregions in accordance with bioregional planning principles (Pool-Stanvliet & Giliomee 2013).

In addition, the Western Cape Province has the Provincial Spatial Development Framework of 2009 and the Western Cape Biosphere Reserves Act of 2011. It is the only province that has drafted legislation dedicated to the facilitation and management of biosphere reserves, as well as the regulation of land use in such reserves. Limpopo Province has promulgated the Limpopo Environmental Management Act in 2003 (Act 7 of 2003). This Act provides for the creation of limited development areas wherein specific developments or activities could be prohibited. This opens up the possibility for incorporating biosphere reserve zonation guidelines as part of the regulations of the Act.

The link between a landscape initiative such as a biosphere reserve and an area's economic potential has been widely emphasized. Beresford and Phillips (2000) noted the success of a protected landscape as being linked to continued viability of the local economy, and conservation actions must be seen as relevant to meeting local people's social and economic needs. The same notion, linked to the goal of sustainable development, has been highlighted by Gambino in Italy (1998). The provision of local benefits by biosphere reserves, contributing to improving quality of life, has been identified as a key issue in the Czech Republic (Kuřová *et al.* 2008).

The Periodic Review process of UNESCO requires information on income and benefits to local communities derived from biosphere reserves. These however refer mainly to tourism activities and do not address livelihood problems, such as landlessness, unemployment and poverty in general. The Madrid Action Plan addresses in much detail the economic contributions of biosphere reserves, relating to benefits to local populations (UNESCO 2008). Target 26 specifically states "*improved generation of profits and livelihood benefits in biosphere reserves*", with the economic contribution of biosphere reserves to local economies as one of the identified actions.

Biosphere reserves form part of a multi-level system of governance including a multitude of authorities, agencies and institutions at local, provincial, national and international levels (Berkes 2009; Pollock 2004; Schliep & Stoll-Kleemann 2010). Governance in terms of this study is defined as "*the interactions among structures, processes and traditions that determine how power and responsibilities are exercised, how decisions are taken and how citizens or other stakeholders have their say*" (Graham *et al.* 2003). The strength of an effective governance system lies in its ability to form responsible partnerships between government, business and civil society towards realizing a shared vision, and to provide stakeholders an input into decision-making. The Institute on Governance in Canada has listed five principles of good governance (Table 32 from Graham *et al.* 2003). These principles are reflected in the way in which biosphere reserves are implemented. This view is supported by Pollock (2004) in the statement that biosphere reserves are well-placed to facilitate regional governance due to their cross-sectoral emphasis. In the multicase study, aspects of effectiveness and positive aspects related to the implementation of the five biosphere reserves were addressed. The outcomes have much in common with the principles of good governance as indicated in Table 32. Still, not all South African biosphere reserves are effectively implemented. There are various reasons why the MAB Programme is not very effective in the country, including political and legislative systems amongst others.

**Table 32: Principles of good governance and how it relates to South African biosphere reserves**

<b>Five Good Governance Principles</b>	<b>UNDP Principles on which these are based</b>	<b>Related requirements for an effective biosphere reserve in South Africa</b>
1. Legitimacy and Voice	<ul style="list-style-type: none"> <li>▪ Participation</li> <li>▪ Consensus orientation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Respect for democracy, although biosphere reserve is non-political</li> <li>▪ Active partnerships between all relevant stakeholders and major role-players, including local indigenous people</li> </ul>
2. Direction	<ul style="list-style-type: none"> <li>▪ Strategic vision, including human development and historical, cultural and social complexities</li> </ul>	<ul style="list-style-type: none"> <li>▪ Widely supported adaptive management framework including clearly defined vision and objectives</li> <li>▪ Management done in accordance with national and international conventions, treaties, legislation and guidelines</li> <li>▪ Representative management entity with defined responsibilities</li> <li>▪ Dedicated staff</li> </ul>
3. Performance	<ul style="list-style-type: none"> <li>▪ Responsiveness of institutions and processes to stakeholders</li> <li>▪ Effectiveness and efficiency</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reflect three MAB functions of conservation, sustainable development and logistic support</li> <li>▪ Managed effectively and efficiently</li> <li>▪ Secure long-term funding for implementation of functions</li> <li>▪ Implement sustainability indicators</li> </ul>
4. Accountability	<ul style="list-style-type: none"> <li>▪ Accountability to the public and to institutional stakeholders</li> <li>▪ Transparency</li> </ul>	<ul style="list-style-type: none"> <li>▪ Address the complementarity and responsibilities of stakeholders relating to biosphere reserve objectives</li> <li>▪ Provide proof of support by relevant political tiers, including provincial government and local authorities such as municipalities</li> <li>▪ Transparent and legal management entity</li> </ul>
5. Fairness	<ul style="list-style-type: none"> <li>▪ Equity</li> <li>▪ Rule of Law</li> </ul>	<ul style="list-style-type: none"> <li>▪ The management entity should be representative across disciplines, authorities, gender and race</li> <li>▪ Implement MAB Programme in accordance with national and provincial legislation</li> <li>▪ Respect for rights and uses of land owners and traditional communities</li> <li>▪ Public participation in establishing the biosphere reserve</li> </ul>

The Presidency of South Africa adopted an outcomes approach in 2010 to ensure that government is focused on issues pertinent to improving the life of all South Africans (The Presidency of South Africa 2010). The natural and social environments are included in outcome 7 ('vibrant, equitable and sustainable rural communities with food security for all') and outcome 10 ('environmental assets and natural resources that are well protected and continually enhanced'). The ruling party (the ANC) identified five priority areas for government, namely (i) creating decent jobs; (ii) education; (iii) health; (iv) fighting crime and corruption; and (v) rural development, food security and land reform.

The 12 national outcomes provide focus until 2014. In 2012 the Cabinet acknowledged the NDP as the new strategic framework to form the basis of future government planning (NPC 2012). There is however a correlation between the NDP priorities and the national outcomes.

In order to secure the future of biosphere reserves and other living landscapes, it is crucial to align most efforts with the NDP. It is thus promising that sustainable management of the environment is listed in the NDP as a critical capability at country level. In addition, building environmental sustainability and resilience is one of the critical actions of the NDP. Under the latter action, two of the proposed measures to protect natural resources include an environmental management framework and an inflated target for the amount of land and oceans under protection (NPC 2012). The NDP couples ensuring environmental sustainability to the transition to a low-carbon economy that has socio-economic development as a focus. A discerning acknowledgement is made that human well-being is dependent on the health of our Planet (NPC 2012). The national strategy for protected area expansion is aiming to achieve the target given for land and oceans under protection. A specific note is made of the importance to grasp opportunities that could create large viable protected areas in intact landscapes (Government of South Africa 2010). Although the MAB Programme is not mentioned as a possible tool, it provides for such an opportunity.

As discussed in paragraph 4.3, two methods were used to obtain information from the national biosphere reserve group of people on potential biosphere reserve selection criteria for South Africa. Additional information was obtained from relevant literature. The results are discussed below.

### 7.2.1 National Questionnaire

Of the 51 questionnaires distributed, a total of 18 completed questionnaires were received, which represents 35% of the recipients. The main objective of the questionnaire was to solicit opinions on the need for South African biosphere reserve criteria, as well as to obtain inputs on a range of possible criteria. The question *“do you agree with the following statement: South Africa needs country specific criteria which can be used in the evaluation of new sites for UNESCO biosphere reserves”* was answered positively by 14 respondents (78%), whereas one answered negatively and three respondents said they are unsure. Reflections on possible criteria were tested with a rating of significance where the number 1 indicated a low significance; the number 2 indicated moderate significance and the number 3, high significance. Ratings are listed in Annexure 11.

The respondents' opinions of the three biggest challenges to the effective management of their specific biosphere reserve were requested. The biggest challenges noted between all 18 respondents are listed in Table 33.

**Table 33: Challenges to the effective management of South African biosphere reserves**

Challenge (not in order of priority)	Number of Responses
Funding for staff, projects and job creation	13
Creating awareness of the biosphere reserve concept through education	8
Buy-in from, and alignment with government institutions	7
Threats posed by mining developments	4
Getting buy-in from poor/local communities	3
Need for knowledgeable champions / a full-time coordinator	3
Effective development in divided communities	2
Control of alien invasive vegetation	2
Making the biosphere reserve relevant to people's lives	1
Addressing skepticism amongst farming communities	1
Administrative capacity	1
Conflict of stakeholder interests	1
Large size of, and large population numbers in biosphere reserve	1
Unsustainable use of natural resources	1
The 'Africa syndrome' – time it takes to get anything done	1

The questions of size for individual biosphere reserves as well as for relevant zones get discussed very often, especially in documents originating from UNESCO. The Madrid Action Plan mentions the issue of size: *“Ensure sufficient size of each zone for the biosphere reserve functions”* (UNESCO 2008, Action 13.3). Related to this statement, the question was asked to the respondents whether there should be a size limit for future South African biosphere reserves. On the idea of setting a minimum size, eight responded positively and 10 were of the opinion that no minimum size should be set. On maximum size, 14 responded negatively, three said ‘yes’ and one indicated ‘unsure’. Two of South Africa’s biosphere reserves are very large indeed - 3 070 000 ha and 3 184 723 ha respectively. Two persons involved in these biosphere reserves actually suggested maximum sizes of 1 million and 2 million ha respectively. Another respondent (also involved in one of the large biosphere reserves) noted for a biosphere reserve to remain manageable, the maximum size should be 450 000 ha. Suggestions of minimum sizes varied between 10 000 ha and 250 000 ha, but the main suggestions were for a biosphere reserve to be ecologically viable as a land management unit, and to use natural demarcations such as water catchments as outer boundaries.

Finally, the respondents were requested to put forward opinions on aspects that influence the efficient running of a biosphere reserve. Responses are listed in Table 34.

**Table 34: Aspects important to the efficient running of a South African biosphere reserve**

<b>Aspects needed to be in place at the outset of nomination (not in order of priority)</b>	<b>Number of Responses</b>
Funding for operational expenses, including permanent staff	8
Commitment of support from local authorities	4
Education/awareness program to ensure public support	4
Agreements with relevant government departments	2
Efficient guidance by DEA	2
Advocacy program	2
Demarcation in order to limit number of authorities	1
Management plan	1
Consultation with land owners around buffer zones	1
A biosphere reserve management guide	1
Fine scale plan identifying priority conservation areas	1
National and provincial expansion strategies	1

### 7.2.2 Selected Focus Group Sessions

In light of the limited South African biosphere reserve network of people, the focus group sessions were well attended. The Western Cape sessions were held on 15 May 2013 in George (Gouritz Cluster Biosphere Reserve), 16 May 2013 in Kleinmond (Kogelberg Biosphere Reserve) and 12 August 2013 in Saldanha (Cape West Coast Biosphere Reserve) and were attended by 11, eight and three persons respectively. The Limpopo session was held in Polokwane on 23 May 2013 and was attended by 17 persons representing three biosphere reserves (Waterberg, Vhembe and Kruger to Canyons). The three specific topics of discussion elicited lively debate and expression of opinions. It was agreed that the setting of criteria for selecting future biosphere reserves is not a simplistic task. Some notable suggestions from the focus group attendees were:

- Categorize criteria according to the three biosphere reserve functions, with specific emphasis on sustainable development criteria.
- Education is important due to the dire state of the national education system specifically in rural areas.
- It is crucial to have a champion, supported by a civil society grouping that is passionately pursuing the idea of a biosphere reserve.
- Need proof of sustainable funding sources.
- Biosphere reserves should ideally not cross provincial boundaries.
- Size should not be set although a biosphere reserve could be too small in terms of ecosystem functioning.
- Ideally, a biosphere reserve should encapsulate an entire ecosystem.

- The majority of role-players (including local authorities) should indicate support of the biosphere reserve ideal.
- Conventional UNESCO prescribed three-way zonation system should be in place. In addition, a system of sensitivity mapping could add value.
- Focus on natural boundaries such as water catchments, but should have the presence of human communities within catchments.
- Representativeness of biogeographical areas.
- Need to contain some element of uniqueness/characteristic natural feature.
- A biosphere reserve is about 'man' and 'biosphere' therefore an interaction between core conservation sites and communities must be showcased.
- Proof of public participation processes, in other words most stakeholders (including local communities) should have been targeted with awareness programmes.
- The chances of success need to be present. This could be indicated through a survey.
- Possibility of corridor establishment, specifically altitudinal corridors should be present.

### 7.2.3 Discussion

Information obtained through the described methods and discussed above, all have a bearing on setting biosphere reserve selection criteria for South Africa. Perceived challenges as listed in Table 33 are reflected in the list of aspects needed to be in place to ensure an efficient biosphere reserve (Table 34). The greatest challenges are the quest for funding as well as buy-in and awareness of the biosphere reserve concept. Respondents noted that funding for operations and staff, as well as the support from the public and local authorities need to be in place to ensure efficiency.

Although much has been published on aspects that need to be addressed for biosphere reserves to have a positive influence in the landscape, little work has been done on selection criteria for the optimal location of biosphere reserves. Nonetheless, a substantive body of literature reflects on factors pertaining to the success or failure of biosphere reserves, some of which could be translated into potential selection criteria. Specific factors as listed by Stoll-Kleemann (2007) and reiterated through the focus group sessions, include community involvement, environmental education, qualified staff, political support, appropriate funding, institutional design, exploitation of natural resources and population growth.

In this connection, the German Governance of Biodiversity (GoBi) project has done extensive research on biosphere reserves and governance, from which valuable information could be extrapolated. From 2004 to 2007 the GoBi project was coordinated by the Humboldt University of Berlin. This project was about assessing successes and failures of governance and management approaches used in biosphere reserves all over the world (Stoll-Kleemann 2005b; Stoll-Kleemann *et al.* 2008). Much could be learned from the results of this project in terms of aspects that need to be

addressed in the selection of new biosphere reserves in order to ensure the long-term effectiveness of these sites.

Stoll-Kleemann (2005b, 2007) identified success factors for biosphere reserve management, some of which could be translated into biosphere reserve criteria: environmental education; research and monitoring; involvement and participation of population; adaptive management and management capacity; cooperation with authorities; qualified staff; political support; funding and economic opportunities; legislation and enforcement of the concept; institutional responsibilities and accountability; representation of stakeholder interests; delineation of borders; poverty; exploitation of natural resources; population growth. In the results of a questionnaire survey conducted in 2004, the most important issues noted by biosphere reserve managers were: local involvement and support of communities; outreach activities; leadership; adequate funding; enforcement; relationships with local authorities; and pressures on resources as a result of poverty (Stoll-Kleemann 2005a).

Public participation and involvement of all stakeholders towards facilitation of adaptive management have been highlighted in the literature as of crucial importance to biosphere reserve management entities (Fritz-Vietta & Stoll-Kleemann 2008; Lämmle 2007; Price 2002; Schultz *et al.* 2011; Stoll-Kleemann 2005b, 2007; Stoll-Kleemann & O’Riordan 2002; Stoll-Kleemann & Welp 2008; Stoll-Kleemann *et al.* 2010). Participation processes related to biosphere reserves should be executed, not only to convey a message and create awareness, but especially with the view to secure buy-in and support from the widest possible range of stakeholders and role-players.

Co-management and continual involvement of all relevant partners lie at the heart of the biosphere reserve concept. Participatory management is an important issue as it relates to a biosphere reserve’s governance structure and effective participation of civil society, not only in discussions but also in decision-making roles (Fritz-Vietta & Stoll-Kleemann 2008; IUCN 1998; Olsson *et al.* 2004; Pollock 2004; Rakotonindrina 1998; Schliep & Stoll-Kleemann 2010; Stoll-Kleemann 2005a; Stoll-Kleemann & O’Riordan 2002; Stoll-Kleemann & Welp 2008; Stoll-Kleemann *et al.* 2010). The importance of partnerships at international, national and local levels has been noted as well as the need for interactions amongst relevant actors (IUCN 1998; Stoll-Kleemann 2008). Roles of biosphere reserves in providing environmental awareness and education towards promoting sustainable development have been emphasized (Baber *et al.* 2003; Fritz-Vietta & Stoll-Kleemann 2008; Ola-Adams 2001; UNESCO 2002a). The capacity of a biosphere reserve’s institutional structure is a much debated topic (Bioret 2001; Fritz-Vietta & Stoll-Kleemann 2008). Human perceptions of biodiversity and social impacts of conservation actions are debated by many authors (Kuřová *et al.* 2008; Lotze-Campen *et al.* 2008; Matysek 2009; Stoll-Kleemann *et al.* 2011).

Biosphere reserves should be able to fulfil the three complementary functions according to UNESCO's Seville Strategy which should be reflected in management actions (Price 2002). Amidst the equal importance of the three functions, conservation of biodiversity remains a key element in biosphere reserve site selection (UNESCO 2002a). Some obvious obstacles in the success of biosphere reserves include political support, ongoing monetary security and inclusion in bioregional planning systems (Matysek *et al.* 2006). In relation to the latter, biosphere reserves should ideally be delimited into three distinct zones of core, buffer and transition, and developments should conform to regulations within this zonation system in order to reduce conflict between conservation and development (UNESCO 1996a, 2008; Ma *et al.* 2009).

The fact that biosphere reserves are being perceived as 'sites of excellence' (Price 2002; Price *et al.* 2010; UNESCO 1996a, 2002a) means that they have to show success and effectiveness in implementing the biosphere reserve concept and complying with their mandate as set out in the Seville Strategy (Schultz & Lundholm 2010; UNESCO 1996a).

When drafting a set of biosphere reserve selection criteria, the context and scale of the matter need to be taken into account. In addressing the context, UNESCO's guidelines as well as the country's specific legislation and statutory provisions come into play. With regards to the scale, this research attempted to draft selection criteria that would be applied at the national scale, but at the same time taking the provincial and local scales into account. The proposal is to structure selection criteria for South African biosphere reserves into four subsections, namely a general section that addresses national matters of general concern to the MAB Programme, and three sections covering the three biosphere reserve functions. In addition, Mandatory and Evaluation criteria are indicated in order to distinguish between criteria that biosphere reserves need to fully conform to before the nomination is submitted (Mandatory), and criteria that could be addressed after designation (Evaluation).

The general subsection covers areas such as the Seville Strategy and Statutory Framework, as well as issues such as sustainability, human rights and stakeholder support.

The conservation subsection covers representivity, biodiversity importance, persistence, uniqueness and climate change research. Representativeness of biological diversity could refer to various entities such as biogeographical provinces (Udvardy 1975), ecoregions (Olson & Dinerstein 2002), biomes, bioregions (Brunckhorst 2000), vegetation types, ecosystems or habitat types (Margules & Pressey 2000). A large body of literature exists with respect to the design of representative reserve networks (Cabeza & Moilanen 2001; Cowling *et al.* 1999a; Knight *et al.* 2006a; Lombard *et al.* 1999; Margules *et al.* 1988; Moffett & Sarkar 2006) and the selection of specific sites for the location of protected areas (Cowling *et al.* 2003; Kirkpatrick 1983; Lombard *et al.* 1997; Rebelo & Siegfried 1992;

Zafra-Calvo *et al.* 2010). It is not the aim of this research to explain the techniques of designing a representative system of biosphere reserves for South Africa, but to propose the criteria to be used in the selection process, of which representivity of biodiversity is but one.

Mucina and Rutherford (2006) described nine biomes and 435 vegetation types in South Africa. Based on floral composition, biomes are divided into bioregions. Bioregions are natural landscapes that could be subdivided into sub-regions which could be used as land-use planning units for selecting protected areas. Landscapes are the scale at which humans interact with the environment (Brunckhorst 2001). The biosphere reserve concept is a landscape<sup>9</sup> management tool with which to facilitate sustainable integrated resource management (Brunckhorst 2001; Stoll-Kleemann 2005b). We propose the use of bioregions as a biodiversity surrogate in the process of selecting sites for biosphere reserves.

The subsection on sustainable development covers zonation, landscape functions, specific traits of the zones, size, management framework and legislation. It is proposed that Biosphere Demonstration Projects (Madrid Action Plan action 18.1) must become a concept in South African biosphere reserves as it will assist in making biosphere reserves relevant to sustainable development practices.

One proposed criterion is that a biosphere reserve should encompass an entire ecosystem. Natural boundaries would enable a biosphere reserve to provide ecosystem services (Millennium Ecosystem Assessment 2005). Different frameworks exist in the literature to link ecosystems to human well-being (such as Haines-Young & Potschin 2010). With regards to a biosphere reserve, the term 'landscape functions' could be used instead of ecosystem services. Landscape functions are defined by De Groot (1992) as the "*capacity of ecosystems to provide goods and services that satisfy human needs, directly and indirectly*". There are numerous landscape functions that could be provided by biosphere reserves (University of Vienna 2008) but in the context of this research, it suffices to note that a biosphere reserve should be explicit about the specific landscape functions the site could provide.

The logistic support section covers a wide range of topics, including stakeholder support, community awareness, management entities, financial security, education, empowerment and social responsibility. In fulfilling their quest to speak to the people, stakeholder support, community awareness and empowerment all are vital aspects of getting local people involved. Traditional

---

<sup>9</sup> Landscape in this context means "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" (Council of Europe 2000).

authorities and their leaders, where relevant, must be targeted and accommodated within their specific sphere of self-governance.

In the light of all available knowledge, information and opinions by knowledgeable persons connected to the South African biosphere reserve fraternity, a suite of selection criteria for South African biosphere reserves has been devised. Mandatory and Evaluation criteria are listed in Table 35 while more detailed descriptions of all criteria are given in Table 36. In drafting the criteria, the following were taken into account:

- Information obtained through the various literature reviews.
- Components used in semi-structured interviews on the effectiveness of South African biosphere reserves (Annexure 2).
- General principles of good governance (Table 32).
- Possible criteria as put forward through responses to the South African biosphere reserve questionnaire (Annexure 4).
- Challenges to the effective management of South African biosphere reserves (Table 33).
- Aspects important to the efficient running of South African biosphere reserves (Table 34).
- Information obtained through focus group sessions.
- Findings of a South African study on biosphere reserve sustainability indicators.
- Biosphere reserve criteria adopted by individual countries.
- Biosphere reserve success factors as identified through the GoBi project.

**Table 35: Suite of South African biosphere reserve selection criteria**

<b>GENERAL</b>	<b>Mandatory (M) Evaluation (E)</b>
1. Meet requirements of Seville Strategy and Article 4 of the Statutory Framework of the WNBR	M
2. Committed to sustainable development practices	M
3. Contribute towards conservation of biological and cultural diversity	M
4. Proof of majority stakeholder support for the establishment of biosphere reserve	M
5. Proof of networking endeavours at all scales	E
6. Implement MAB Programme in accordance with national and provincial legislation	E
7. Respect for rights and uses of land owners and traditional communities	E
<b>CONSERVATION</b>	<b>Mandatory (M) Evaluation (E)</b>
1. Representative of a specific bioregion (subdivisions of biomes)	M
2. Proof of biological significance	M
3. Long-term persistence of biosphere reserve/chances of success	M

4. Need to contain some element of uniqueness/characteristic natural feature (geography, altitudinal corridor)	M
5. Ideally a biosphere reserve should encompass an entire ecosystem	E
6. Fine-scale spatial plan indicating priority areas in need of conservation	E
7. Core areas listed as LTER sites for climate change research and monitoring	E
<b>SUSTAINABLE DEVELOPMENT</b>	<b>Mandatory (M) Evaluation (E)</b>
1. Delimitation into core, buffer and transition zones with use and development guidelines for each zone	M
2. Core areas long-term legally protected in terms of the NEM:PAA	M
3. Contribute to the provision of landscape functions	M
4. Buffer zone functions specified (e.g. connectivity, buffering the core, cultural diversity)	M
5. Proof of consultations with buffer zone land owners	M
6. Transition zone with meaningful boundaries, specified through consultation processes. Outer boundary should be demarcated primarily according to natural boundaries and secondly according to cadastres	M
7. Sufficient size of all zones to fulfil required functions	M
8. Approved management framework with clearly defined vision and objectives and consideration of manageability of biosphere reserve	M
9. Co-operative conservation and development strategies (e.g. connectivity, integrated planning)	E
10. Established Biosphere Reserve Demonstration Projects	E
11. Promote alternative, sustainable livelihoods	E
12. Proof of sustainable land-use practices/strategies/initiatives	E
13. Legal enforcement of the biosphere reserve	E
14. Address large population numbers and resultant challenges such as land restitution, unsustainable use of natural resources	E
<b>LOGISTIC SUPPORT</b>	<b>Mandatory (M) Evaluation (E)</b>
1. Proof of stakeholder support through participatory processes, specifically targeting local and traditional communities	M
2. Proof of political support through agreements with government departments, active involvement of politicians including mayors	M
3. Dedicated champion, support group and additional staff, office space	M
4. Proof of financial support for salaries and operational costs for at least 3 years, approved budget	M
5. Designated representative (disciplines, authorities, gender and race) and transparent management entity with approved responsibilities	M
6. Proof of independency of management entity from government and political influences	M
7. Institutional collaboration	M
8. Presence of human communities within the biosphere reserve	M
9. Educational value	M
10. Ensure relevance of biosphere reserve's existence through relationship building (taking the Africa time syndrome into account), provide benefits to local communities and stakeholders such as job creation	E
11. Proof of awareness programmes	E

12. Perform a research and monitoring role, established links with educational institutions	E
13. Improve capacity through stakeholder empowerment	E
14. Integration with relevant urban areas and urban authorities	E
15. Play a role in corporate social responsibility schemes	E
16. Use the biosphere reserve brand in partnerships	E

**Table 36: Description of South African biosphere reserve selection criteria**

<p><b>GENERAL</b></p> <ol style="list-style-type: none"> <li><b>1. Meet requirements of Seville Strategy and Article 4 of the Statutory Framework of the WNBR</b> <i>Biosphere reserves need to address the 3 complementary functions within a 3-tiered zonation system of core, buffer and transition areas as described in the Seville Strategy, as well as conform to all 7 criteria as listed in Article 4 of the Statutory Framework of the WNBR. This information is needed to complete the prescribed UNESCO MAB nomination form.</i></li> <li><b>2. Committed to sustainable development practices</b> <i>Biosphere reserve management entity needs to make a statement related to their commitment to promote and support sustainable development practices.</i></li> <li><b>3. Contribute towards conservation of biological and cultural diversity</b> <i>Biosphere reserves need to make a defined contribution to at least one aspect of biological or cultural diversity which is not sufficiently represented in South African biosphere reserves.</i></li> <li><b>4. Proof of majority stakeholder support for the establishment of biosphere reserve</b> <i>Biosphere reserve management entity needs to supply the results of a survey addressed to all major stakeholders, indicating majority support for the establishment of the biosphere reserve.</i></li> <li><b>5. Proof of networking endeavours at all scales</b> <i>Biosphere reserve management entity has to provide proof in the form of agendas, attendance lists and minutes of networking opportunities with all major stakeholders, specifically including government departments, land administrators, NGOs, large businesses and community groupings.</i></li> <li><b>6. Implement MAB Programme in accordance with national and provincial legislation</b> <i>Depiction of the legal means that will be used to implement the biosphere reserve, such as protected area legislation, local authority by-laws and spatial planning processes.</i></li> <li><b>7. Respect for rights and uses of land owners and traditional communities</b> <i>Respect indicated in accordance with the Constitution of the Republic of South Africa, No. 108 of 1996, specifically chapter 1 (Founding Provisions), chapter 2 (Bill of Rights) and chapter 12 (Traditional Leaders).</i></li> </ol>
<p><b>CONSERVATION</b></p> <ol style="list-style-type: none"> <li><b>1. Representative of a specific bioregion (subdivisions of biomes)</b> <i>Description of the specific bioregion that the biosphere reserve will represent in the national system of biosphere reserves, taking the location of other biosphere reserves into account.</i></li> <li><b>2. Proof of biological significance</b> <i>Biosphere reserves need to be of specific significance to biodiversity, such as the presence of transitional vegetation types, rare and threatened species, endangered habitat types, species of special concern.</i></li> <li><b>3. Long-term persistence of biosphere reserve/chances of success</b> <i>Depiction of the chances that the biosphere reserve will be implemented successfully, efficiently</i></li> </ol>

and effectively over the long-term. Buy-in from stakeholders, integration into policies and land-use planning processes, support from local communities, financial soundness, amongst others could be used to verify chances of success.

**4. Need to contain some element of uniqueness/characteristic natural feature (geography, altitudinal corridor)**

Each biosphere reserve need to provide a description of a unique element contained in the functional space of the biosphere reserve that is not present in another South African biosphere reserve.

**5. Ideally a biosphere reserve should encompass an entire ecosystem**

Description of the ecosystem or unique ecosystem complex that forms the basis of the demarcation of the outer boundary of the biosphere reserve.

**6. Fine-scale spatial plan indicating priority areas in need of conservation**

An indication of commitment to draft a fine-scale conservation plan for the entire biosphere reserve that would inform management practices.

**7. Core areas listed as LTER sites for climate change research and monitoring**

A commitment to investigate the potential of biosphere reserve core areas as an integral part of the South African long-term environmental observation network.

**SUSTAINABLE DEVELOPMENT**

**1. Delimitation into core, buffer and transition areas/zones with use and development guidelines for each zone**

Provide a map of the detailed zonation of the biosphere reserve, including guidelines for the use and potential future development of each zone.

**2. Core areas long-term legally protected in terms of the NEM:PAA**

All core areas must be formally protected with an allocated legal status in terms of the NEM:PAA.

**3. Contribute to the provision of landscape functions**

Biosphere reserves need to be specific about the landscape functions to be provided, amongst others conservation of water catchments, unpolluted air, recreational spaces, sustainable utilization of specific natural resources, and natural sources of energy.

**4. Buffer zone functions specified (e.g. connectivity, buffering the core, cultural diversity)**

Buffer zones are generally the most important functional spaces of biosphere reserves and the functions of the specific buffer zones need to be specified, amongst others connectivity, buffering the core, and cultural diversity.

**5. Proof of consultations with buffer zone land owners**

All buffer zone land owners must be consulted and proof of their consent to their land forming part of the biosphere reserve buffer zone need to be submitted.

**6. Transition zone with meaningful boundaries, specified through consultation. Outer boundary should be demarcated primarily according to natural boundaries and secondly according to cadastres**

Transition zones need to have been demarcated with meaningful boundaries, preferably according to natural boundaries, additionally by means of cadastral boundaries. Provide proof of consultation processes with relevant land owners and administrations.

**7. Sufficient size of all zones to fulfil required functions**

An indication of why the specific sizes of zones have been allocated. Minimum size of a biosphere reserve should ideally not be less than 50 000 ha.

**8. Approved management framework with clearly defined vision and objectives and consideration of manageability of biosphere reserve**

Submission of a management plan or management framework that provides directional guidance to the future of the biosphere reserve. A clearly defined vision and objectives that have been approved and adopted by all major stakeholders. The management plan needs to be specific about how the biosphere reserve will be collectively managed by all relevant role-players.

**9. Co-operative conservation and development strategies (e.g. connectivity, integrated planning)**

*Proof of strategies with collaborators such as plans to manage corridors for biodiversity connectivity, integrated planning processes, stewardship agreements, amongst others.*

**10. Established Biosphere Reserve Demonstration Projects**

*Plans to set up demonstration projects that would showcase sustainable development practices and provide benefits to local inhabitants, with a specific focus on co-managed communal areas under traditional authority ruling, with the objective to form an integral part of the biosphere reserve.*

**11. Promote alternative, sustainable livelihoods**

*Commitment by biosphere reserve management entity to support and promote alternative livelihoods such as use of renewable energy, wise water use, water purification, recycling ventures, use of indigenous vegetation in gardening and beautification.*

**12. Proof of sustainable land-use practices/strategies/initiatives**

*Commitment by biosphere reserve management entity to work with land owners to promote sustainable land-use practices and initiatives.*

**13. Legal enforcement of the biosphere reserve**

*Explore all legislative means and options to secure the enforcement of the biosphere reserve concept and describe how these will be used and enforced.*

**14. Address large population numbers and resultant challenges such as land restitution, unsustainable use of natural resources**

*Provide innovative ideas on how to address ever growing population numbers, changing consumption patterns and resultant strain on natural resources. If relevant, provide commitment to address land restitution challenges and plans on collaboration with new land owners with a focus on co-management practices.*

**LOGISTIC SUPPORT**

**1. Proof of stakeholder support through participatory processes, specifically targeting local and traditional communities**

*Biosphere reserve management entity needs to provide proof of collaboration with local and traditional communities and some proof of their support for the establishment of the biosphere reserve.*

**2. Proof of political support through agreements with government departments, active involvement of politicians including mayors**

*Biosphere reserve management entity needs to provide proof of political support through signed Memorandums of Understanding with relevant departments and administrations.*

**3. Dedicated champion, support group and additional staff, office space**

*Biosphere reserves need to have at least one dedicated person that acts as the spokesperson for the biosphere reserve. In addition, proof of a support group needs to be provided as well as an indication of available office space.*

**4. Proof of financial support for salaries and operational costs for at least 3 years, approved budget**

*Submit an approved budget with sufficient financial resources to cover the salary of one person and basic operational costs of the biosphere reserve for at least 3 years.*

**5. Designated representative (disciplines, authorities, gender and race) and transparent management entity with approved responsibilities**

*Details of the biosphere reserve management entity with representation across disciplines, authorities, gender and race. A clear indication of responsibilities of each representative on the management entity must be provided.*

**6. Proof of independency of management entity from government and political influences**

*Biosphere reserves are non-political entities and proof of independency needs to be submitted.*

**7. Institutional collaboration**

*Proof of the biosphere reserve management entity's collaboration with all major institutions, administrations and government departments in order to secure collaborative management of*

*the biosphere reserve.*

**8. Presence of human communities within the biosphere reserve**

*A biosphere reserve is about 'man' and its interaction with the 'biosphere' therefore there needs to be interaction with human communities within the area of influence of the biosphere reserve.*

**9. Educational value**

*An indication of how the biosphere reserve will be utilized to improve the educational impact within its boundaries and even beyond.*

**10. Ensure relevance of biosphere reserve's existence through relationship building (taking the Africa time syndrome into account), provide benefits to local communities and stakeholders such as job creation**

*Commitment to spend much time in building relationships with local inhabitants, especially the less advantaged sections of society. Provide an indication of how the biosphere reserve will provide benefits to local communities and stakeholders with the view to making a difference to people's lives.*

**11. Proof of awareness programmes**

*Creating awareness about the MAB Programme is crucial to the existence of a biosphere reserve therefore proof of awareness programmes with a range of community groupings need to be provided.*

**12. Perform a research and monitoring role, established links with educational institutions**

*Biosphere reserves need to be involved in research and monitoring projects and programmes. Provide commitment to secure research links with educational institutions, specifically universities, in the vicinity of the biosphere reserve.*

**13. Improve capacity through stakeholder empowerment**

*Stakeholders in general do not have sufficient knowledge about the MAB Programme and the biosphere reserve concept. Indicate commitment to improve capacity of stakeholders through learning seminars and knowledge exchange opportunities.*

**14. Integration with relevant urban areas and urban authorities**

*Where relevant, urban authorities need to be secured as collaborative partners with the view to integrate the benefits of the biosphere reserve into urban areas.*

**15. Play a role in corporate social responsibility schemes**

*Local government has a social responsibility towards their constituent but does not always have the necessary in-house skills and expertise. Biosphere reserves could step into this void through acting as an implementing agent for governmental projects towards their social responsibility mandate and measures to this effect need to be provided. This could ensure that biosphere reserves would be recognized as valuable partners by provincial and local government.*

**16. Use the biosphere reserve brand in partnerships**

*The branding of the name of the biosphere reserve could be utilized to showcase sustainable development practices. If relevant, the biosphere reserve logo could be registered as a trade mark and used as a marketing and awareness building tool.*

### 7.3 Synopsis

South Africa has excellent conservation related legislation as well as excellent strategies addressing pressing topics such as sustainable development and climate change. Biosphere reserves do not feature anywhere in the national system of legislation and policies. Although biosphere reserves get nominated with support from national government, each biosphere reserve is basically very much left on its own to find ways of successfully making a difference through implementation of the MAB

Programme. The National MAB Committee is fulfilling certain crucial roles but is not receiving the necessary recognition and support from national government. Similar to findings of case studies in the Czech Republic, Hungary and Poland, the MAB label is often perceived as a ‘cosmetic add-on without content’ (Schliep & Stoll-Kleemann 2010). As indicated through the multicase study, implementation of the MAB Programme in South Africa is struggling with horizontal integration at local level as well as vertical integration with national authorities. Although some institutions such as South African National Parks and the South African National Biodiversity Institute implement many of the principles of the Seville Strategy, no recognition is given to the MAB Programme. This could be ascribed to a number of different causes such as a perceived lack of effectively managed biosphere reserves, insufficient knowledge of the opportunities inherent to the MAB Programme, lack of appropriately trained personnel, visionary shortcomings with regards to the true nature of sustainable development, non-political nature of biosphere reserves, and sometimes due to interpersonal personality or collegial clashes.

Within the South African context the MAB Programme could play a more prominent role in current government strategies related to poverty alleviation, environmental sustainability, social upliftment, transformation and economic development. Some successes related to these aspects have been shown by some of the biosphere reserves through the case studies. The biosphere reserve concept should be realized as a valuable land management tool with which to integrate people and the environment in a manner that supports the country’s natural and cultural conservation and sustainable development objectives while improving human well-being. The notion of small, self-governed communal areas serves as an excellent example. These areas could be given an individual status by referring to ‘community biospheres’ with a specific vision such as ‘conserve and live’. This talk to the vision for South African biosphere reserves (SA Biosphere Reserve Working Group 2008): *“South African Biospheres are special landscapes where socio-ecological land management is practiced towards a more sustainable future for all.”*

To some people the biosphere reserve concept is an enigmatic ideal. To others, it is a perfect solution to our modern day quest for sustainable development. One focus group attendee noted *“biosphere reserves are all about everything”!* The MAB Programme offers many opportunities for socially-inclusive landscape management. The biosphere reserve concept differs from traditional protected areas in that human settlements and human involvement are integral parts of the landscape and management of a biosphere reserve (UNESCO 2002a, 2008; Walker & Solecki 1999). Hence the biosphere reserve concept is particularly favoured in developing countries (Coetzer *et al.* 2013). The global accolade through UNESCO could attract development and provide access to resources that might otherwise not be available.

The Department of Environmental Affairs of South Africa has adopted a strategy for the expansion of protected areas based on ecological information of which 94% of the focus areas are in private ownership. Therefore an urgent need exists for innovative ways with which to implement biodiversity conservation. Biosphere reserves offer such an option. The South African biosphere reserves generally face uncertain futures, especially due to a lack of sufficient monetary resources. This has led to the establishment of the National Biosphere Reserve Trust Fund that is envisaged to support biosphere reserves with operational funding. Because of limited financial resources, government has to prioritize areas where limited resources will be allocated. The biosphere reserve selection criteria have the ability to fulfil this role and attendees of the focus groups were supportive of the process to devise such criteria. Biosphere reserves play an integration role towards ensuring complementarity and harmonisation of all existing designations, schemes, policies, and initiatives within a specific defined space.

The proposed suite of biosphere reserve selection criteria for South Africa took note of suggestions made by focus group attendees as well as information obtained through the national questionnaire and relevant literature. This list is organized into four subsections indicating mandatory and evaluation criteria and is being put forward for deliberation and discussion at local, provincial and national level. Once approved and adopted, it could be of valuable assistance in selection processes for future effective and efficient biosphere reserves that will proudly earn their place in the South African landscape as 'special places for people and nature'.

## 8 CONCLUSION

*“The time has arrived when, as a bottom-line conclusion, we must recognize that we ultimately can safeguard biodiversity only by safeguarding the biosphere as well —with all that this entails for agriculture, industry, energy, and a host of other sectors, especially the growth of both population and consumption” (Norman Myers 1997; In: Biodiversity II p. 134)*

The Earth has changed from a nature-dominated blue planet billions of years ago to a human-dominated planet as we know it today. Our species, *Homo sapiens*, is responsible for most of the change. As far back as 1798, Thomas Malthus contemplated a future where the human population will outgrow the supply of food available to sustain their needs (Malthus 1798). This prediction has become strikingly true in present times and currently our World is experiencing an environmental crisis as a result of a rapidly growing human population and insufficient natural resources to sustain human livelihoods. Ohl *et al.* (2007) made a note that we live in Anthropocene, which reflects on a constant interaction between humans and nature.

According to the Convention on Biological Diversity, the loss of biodiversity worldwide was supposed to be greatly reduced by the year 2010 (Haber 2008, UNEP 2002). Today biodiversity is still disappearing at an alarming rate. In future land-use change, especially in terrestrial areas, will have the greatest negative impact on biodiversity (Sala *et al.* 2000). In addition, population growth and changes in consumption patterns will also have a large impact on the natural environment (Cincotta *et al.* 2000). Maybe we need to act a little differently. Maybe the human population should be made more aware of the plight of our Earth through closer connections to the natural world.

This dissertation has emphasized the valuable role that the MAB Programme could play in the sphere of social-ecological landscape management in South Africa. One of the important outcomes of a biosphere reserve is namely the interconnectedness between people and the natural environment. South Africa is a country with an almost unmatched wealth of biological diversity. It is also a developing country with major social and economic challenges. People’s perceptions of the importance of biodiversity as the backbone to quality living conditions differ dramatically from strict conservationists on one end of the scale to a total disconnectedness from nature at the other end of the scale. Some traditional rural communities struggle to make a living off the land while wealthier sectors of society manage the natural environment to their economic benefit. Politicians and decision-makers often do not see eye to eye and in some instances decisions are being made in support of personal or political agendas.

UNESCO’s MAB Programme as implemented through biosphere reserves offers a non-political, all-inclusive landscape management framework that supports triple bottom line sustainable development. The multicase study on five biosphere reserves has indicated some difference in

management effectiveness. All South African biosphere reserves use the vehicle of a non-profit organization for their management entities, due to general insufficient support from local and national government. Each biosphere reserve is basically left on its own to find effective ways of implementing the MAB Programme within its specific region. As indicated by the effectiveness measures, some biosphere reserves are more successful than others. The MAB Programme is not legislated in South Africa and is not included in any policies, including the protected areas expansion strategy. Because of constant political fluctuations in the South African dispensation, it is essential that the biosphere reserve concept be fully accepted and supported by all relevant role-players, including politicians in power. Biosphere reserves are managed in a non-political manner, but they are well-suited to play a positive role in providing political leaders with a widely accepted framework within which decisions could be justified. It is however important that the biosphere reserve concept is given most needed recognition in the South African system of policies and legislation. Biosphere reserve spatial framework plans, based on bioregional planning principles, could provide a legal land-use management tool to proactively guide future sustainable development within a specific region.

The MAB Programme is not well-known and understood by politicians in South Africa and therefore is not perceived as a topic that could evoke new members to a political party. Although it was noted that both the ruling party and the main opposition support the MAB Programme in principle, the Programme is often not seen as benefitting the cause of local government. An intrinsic problem is that politicians and government officials do not always see eye to eye and if not convinced of the value of biosphere reserves, they could find it difficult to provide much needed support.

Local government has limited financial resources with which to fulfil many mandates. Their main priority is to provide services to ratepayers which they struggle to achieve with available budgets. Local government has a social responsibility towards their constituency but does not always have the necessary in-house skills and expertise. Biosphere reserves could step into this void through acting as an implementing agent for governmental projects towards their social responsibility mandate. This could ensure that biosphere reserves would be better acknowledged by provincial and local government as valuable partners.

Results of the multicase study referred to some of the most pressing challenges experienced by all biosphere reserve management entities, namely a lack of support from national government in terms of policies and financial assistance, unawareness of the value of using biosphere reserves in facilitating sustainable landscape management, and wide-ranging problems with efficient implementation of the biosphere reserve concept in the country. Generally there is a need for greater awareness of the biosphere reserve concept amongst many walks of society. Nonetheless

the biosphere reserve concept is being hailed in general as a very beneficial collaborative management tool.

Biosphere reserves must make a positive difference in the lives of people within their specific area of influence. Unfortunately, most South African biosphere reserves still lack in providing tangible benefits to local communities, especially poverty-stricken communities. Therefore it is crucial for biosphere reserves to build trust through real relationships with communities. Rural communal landscapes in South Africa are very often subjected to governance by traditional authorities. Biosphere reserves should make every effort to incorporate traditional leaders and traditional authorities into their decision-making spheres.

Biosphere reserve management entities have the complicated task to take heed of the intrinsic nature of the MAB Programme with the three functions of conservation, development and logistic support, but at the same time to also demonstrate a positive influence on daily livelihood struggles of its inhabitants. Biosphere reserves therefore need to retain the delicate balance between biodiversity conservation and economic viability.

South Africa still struggles with deep-seated societal strains. In some areas stark divisions exist between higher-income and lower-income sectors of society, between the employed and unemployed, and between landowners and the landless. It is within this social system that biosphere reserves have to realize their potential and provide added value and benefits to the human population as well as to the conservation of biodiversity. Regardless of societal divisions, biosphere reserve management entities need to build relationships with all sectors of society. It was noted that wealthier sectors of society support landscape conservation initiatives because they find it the right thing to do, but disadvantaged and jobless sectors of society sometimes try to live off the land and therefore have a vastly different perception of life. It is therefore proposed that South African biosphere reserves implement so-called Biosphere Reserve Demonstration Projects (as noted in the Seville Strategy as well as the Madrid Action Plan). An option that should be given more attention in the near future includes small, co-managed communal areas ('community biospheres') that could serve as long-term projects, aimed at getting communities to understand the value of the biosphere reserve concept, to form an integral part of a specific biosphere reserve, to take part in collaborative management, and to facilitate the implementation of sustainable projects to the economic benefit of relevant communities. Such Demonstration Projects would assist in making biosphere reserves relevant to everyday life within communities. Such a model should take cognisance of the management capacity within communities (Fabricius *et al.* 2007), scepticism about implementation success of community conservation projects (King 2007), perceived benefits of conservation projects (Jones 2006), and the social differentiation within communities as noted by King (2007).

Research objectives for this dissertation were to research the history of implementation of the MAB Programme in South Africa; to analyze successes and challenges of existing biosphere reserves; and to devise future options for the Programme in the country. Results of the multicase study indicated that the biosphere reserve concept is not embedded equally successful in the different sites. Financial support for the functions of biosphere reserves is a constant challenge as well as awareness of the value of the concept towards sustainable development. The MAB Programme does not have legal status in South Africa, is not acknowledged in relevant strategies and policies, and is therefore implemented according to a soft-law approach. Fact is that the theoretical concepts stipulated in international treaties and conventions such as Agenda 21, the World Heritage Convention and the Ecosystem Approach of the Convention on Biological Diversity find practical implementation through biosphere reserves. This includes practical aspects such as buffer zone creation, collaborative management, corridor development to facilitate climate change adaptation strategies, and multi-disciplinary approaches to planning and management (Marton-Levèfre 2007). Following on results of the multicase study, a national questionnaire and focus group sessions, some options for the future effective implementation of the MAB Programme were resolved. A National Biosphere Reserve Trust Fund, of which the main objective is to build up a secure long-term monetary resource that could support all biosphere reserves with operational funding, has been established to address the financial shortcomings of biosphere reserves. Furthermore it is proposed that biosphere reserves set up Demonstration Projects to facilitate the implementation of sustainable projects to the economic benefit of relevant communities. An example includes small, co-managed communal areas ('community biospheres') that could serve as long-term projects that will form an integral part of a specific biosphere reserve, aimed at getting communities to understand the value of the biosphere reserve to their everyday livelihoods.

Finally, all available knowledge, information and opinions eventually informed a new suite of selection criteria that was devised for South African biosphere reserves. The final list included 44 criteria, divided into 25 Mandatory and 19 Evaluation criteria. The criteria were structured according to four subsections, namely a general section that addressed national matters of general concern to the MAB Programme, and three sections covering the three biosphere reserve functions of conservation, sustainable development and logistic support.

The World Network of Biosphere Reserves currently consists of 621 biosphere reserves. Of these, 163 (26%) were designated in the very early years before 1980. Almost a third of all biosphere reserves - 188 (30%) - were designated during the following 21 years from 1980 to 1999. After 2000, 270 biosphere reserves (44%) were designated. This indicates continual support of the MAB Programme globally and a greater worldwide interest in the establishment of biosphere reserves.

South Africa should take cognizance of this international trend and recognise the potential of biosphere reserves in its national quest for sustainable development.

Conservation practitioners have long ago realized that conservation cannot be done in isolation from people. Although still impeded by pressing challenges, the biosphere reserve concept presently finds itself at the most beneficial position in the South African government system since its inception, due to the existence of a National MAB Committee and an independent attempt by the biosphere reserve fraternity to establish the National Biosphere Reserve Trust Fund. General biosphere reserve principles, rooted in socio-economic sustainable development, have already filtered through in management approaches of other conservation areas in South Africa. The proposed national biosphere reserve selection criteria would assist in the optimal location of future biosphere reserves in the country, thereby ensuring that biosphere reserves would be recognized as functional, effective and efficient landscape entities. Thus, if carefully executed, the biosphere reserve concept does have a future within social-ecological sustainable landscape management in South Africa.

## REFERENCES

- Acocks, J.P.H. 1988. Veld Types of South Africa. Memoirs of the Botanical Survey of South Africa No. 57. Edition 3. Botanical Research Institute, South Africa.
- African National Congress (ANC). 2011. Principles of Environmental Policy. URL: <http://www.anc.org.za/258> (accessed on 2012/05/14).
- Alfsen-Norodom, C. & Lane, B. 2002. Global knowledge networking for site specific strategies: The International Conference on Biodiversity and Society. *Environmental Science & Policy* 5: 3-8.
- Andrian, G. 2003. Reconciling Biodiversity Preservation and Local Sustainable Development: The Role of the MAB Biosphere Reserves in the South Eastern European countries. PhD thesis, University of Padova, Italy. URL: [http://deposit.ddb.de/cgi-bin/dokserv?idn=975459678&dok\\_var=d1&dok\\_ext=pdf&filename=97549678.pdf](http://deposit.ddb.de/cgi-bin/dokserv?idn=975459678&dok_var=d1&dok_ext=pdf&filename=97549678.pdf) (accessed on 2008/10/28).
- Ashwell, A., Sandwith, T., Barnett, M., Parker, A. & Wisani, F. 2006. Fynbos Fynmense: people making biodiversity work. SANBI Biodiversity Series 4. South African National Biodiversity Institute, Pretoria.
- Austrian MAB Committee. 1996. Erhalt der biologischen und kulturellen Vielfalt. Modelle für nachhaltige Entwicklungsstrategien im 21. Jahrhundert. Orte der Forschung, Bildung und Umweltbeobachtung (doi: 10.1553/ibk; ISBN-13: 978-3-7001-3742-9). URL: <http://epub.oeaw.ac.at/Projektberichte> (accessed on 2012/02/16).
- Austrian MAB Committee. 2006. URL: <http://www.uibk.ac.at/igf/projekte/mab.html.en> (accessed on 2012/02/16).
- Babbie, E. 2010. The practice of social research. 12th edition. USA: Wadsworth.
- Baber, R. 2011. Personal communication. Chairperson, Waterberg Biosphere Reserve Company. Polokwane.
- Baber, R., De Klerk, A. & Walker, C. 2003. Environmental education and its role in the Waterberg Biosphere Reserve, South Africa. *Prospects* 33 (3): 283-291.
- Baker, N., Beger, M., McClennen, C., Ishoda, A. & Edwards, F. 2011. Reimaanlok: A national framework for conservation area planning in the Marshall Islands. *Journal of Marine Biology* 2011: 1-11.
- Balance, A. & King, N. 1999. State of the environment in South Africa – an overview. Pretoria: Consortium printers.
- Balmford, A. 2003. Conservation planning in the real world: South Africa shows the way. *Trends in Ecology and Evolution* 18(9): 435-438.
- Batisse, M. 1985. Action Plan for Biosphere Reserves. *Environmental Conservation* 12(1): 17-27.
- Batisse, M. 1986. Developing and focusing the biosphere reserve concept. *Nature & Resources* 22(3): 2-11.
- Batisse, M. 1997. Biosphere reserves: a challenge for biodiversity conservation and regional planning. *Environment* 39 (5): 7-33.
- Batisse, M. 2001. Biosphere Reserves: A Personal Appraisal. In: Proceedings of Seville + 5 International Meeting of Experts, Pamplona, Spain, 23 to 27 October 2000. MAB Report Series No. 69, UNESCO, France, at 11. Full text of Seville + 5 Proceedings at <http://www.unesco.org/mab>

- Battersby-Lennard, J. 2009. Apartheid/Post-Apartheid. In: Kitchin, R., Thrift, N. (eds.) *International Encyclopedia of Human Geography, Volume I*, pp. 167-173. Oxford: Elsevier.
- Beger, M., Grantham, H.S., Pressey, R.L., Wilson, K.A., Peterson, E.L., Dorfman, D., Mumby, P.J., Lourival, R., Brumbaugh, D.R. & Possingham, H.P. 2010. Conservation planning for connectivity across marine, freshwater and terrestrial realms. *Biological Conservation* 143: 565-575.
- Beresford, M. & Phillips, A. 2000. Protected landscapes: A conservation model for the 21st century. *The George Wright Forum* 17(1): 15-26.
- Berkes, F. 2009. Evolution of co-management: Role of knowledge generation, bridging organizations and social learning. *Journal of Environmental Management* 90: 1692-1702.
- Biocultural Protocol. 2009. Biocultural protocol of the traditional health practitioners of Bushbuckridge. Unpublished report.
- Bioret, F. 2001. Biosphere reserve manager or coordinator? *Parks* 11(1): 26-28.
- Bioret, F., Cibien, C., Génot, J-C. & Lecomte, J. 1998. *A Guide to Biosphere Reserve Management: a Methodology applied to French Biosphere Reserves*. MAB Digest 19. UNESCO, Paris.
- Bloomberg Businessweek. 2011. South African unemployment rate climbs on new job-seekers. May 3, 2011.
- Bock, B.C. & Soles, R.E. 1998. Networking using biosphere reserves. pp 21-23, in: IUCN. *Biosphere Reserves – Myth or Reality? Proceedings of a workshop at the 1996 IUCN World Conservation Congress, Montreal, Canada*. IUCN, Gland, Switzerland and Cambridge, UK. vi + 59 pp.
- Bonheur, N. 2001. Tonle Sap Biosphere Reserve, Cambodia: management and zonation challenges. *Parks* 11(1): 3-8.
- Boucher, C. 1978. Cape Hangklip area. II. The vegetation. *Bothalia* 12(3): 455-497.
- Boucher, C. 1982. The Kogelberg state forest and environs - a paradise for Cape flora. *Veld & Flora* 68(1): 9-11.
- Brandon, K. 1997. Policy and practical considerations in land-use strategies for biodiversity conservation. In: Kramer, R.E., Van Schaik, C.P. & Johnson, J. (eds.) *Last stand: Protected areas and the defence of tropical biodiversity*. New York: Oxford University Press, pp: 90-114.
- Brandon, K., Gorenflo, L.J., Rodriques, A.S.L. & Waller, R.W. 2005. Reconciling biodiversity conservation, people, protected areas, and agricultural suitability in Mexico. *World Development* 33(9): 1403-1418.
- Bridgewater, P.B. 2002. Biosphere reserves: special places for people and nature. *Environmental Science & Policy* 5: 9-12.
- Bridgewater, P.B. & Creswell, I.D. 1998. The reality of the World Network of Biosphere Reserves: Its relevance for the implementation of the Convention on Biological Diversity. pp 1-6, in: IUCN. *Biosphere Reserves – Myth or Reality? Proceedings of a workshop at the 1996 IUCN World Conservation Congress, Montreal, Canada*. IUCN, Gland, Switzerland and Cambridge, UK. vi + 59 pp.
- Bridgewater, P., Phillips, A., Green, M. & Amos, B. 1996. *Biosphere reserves and the IUCN system of protected area management categories*. Australian Nature Conservation Agency, World Conservation Union and UNESCO, Canberra, Australia.
- Brown, J., Mitchell, N. & Tuxill, J. 2003. Partnerships and lived-in landscapes: an evolving US system of parks and protected areas. *Parks* 13(2): 31-41.

- Brunckhorst, D.J. 2000. Bioregional planning: Resource management beyond the new Millennium. Harwood Academic, Gordon & Breach, Amsterdam.
- Brunckhorst, D.J. 2001. Building capital through bioregional planning and biosphere reserves. *Ethics in Science and Environmental Politics* 2001: 19-32.
- Brunckhorst, D., Coop, P. & Reeve, I. 2006. 'Eco-civic' optimisation: A nested framework for planning and managing landscapes. *Landscape and Urban Planning* 75: 265-281.
- Burgers, C.J., Fairall, N. & Andrag, R.H. 1990. Raamwerk vir 'n Holistiese Bewaringstrategie in die Fynbosbroom: Die Biosfeerreservaatkonsep? Unpublished document, 15 Oktober 1990. Hoofdirektorat: Natuur- en Omgewingsbewaring, Kaapse Provinsiale Administrasie.
- Burgers, C.J., Avis, J.E. & Ruddock, G.S. 1991. An approach to a conservation strategy for the Kogelberg Area. Unpublished document, 17 May 1991. Chief Directorate: Nature and Environmental Conservation, Cape Provincial Administration.
- Cabeza, M. & Moilanen, A. 2001. Design of reserve networks and the persistence of biodiversity. *Trends in Ecology & Evolution* 16:242–248.
- Calder, K.W. 2007. A LEEP forward: Biodiversity futures for New Zealand. Master dissertation. Massey University, Palmerston North, New Zealand.
- Canca, A. 2002. The application of bioregional planning methodology to promote sustainable development as applied by the Provincial Government of the Western Cape. Paper delivered at the Planning Africa 2002 Conference, 18-20 September 2002, Durban.
- Cape Nature Conservation. 1992. Motivation for the establishment of the Kogelberg Biosphere Reserve, Republic of South Africa. Unpublished document, Provincial Administration of the Cape of Good Hope.
- Cape Nature Conservation. 1998. Motivation for the establishment of the Kogelberg Biosphere Reserve, Western Cape Province, South Africa. Unpublished document, Western Cape Nature Conservation Board.
- Cape West Coast Biosphere Reserve (CWCBR). 2004. Management Framework: Strategic Plan and Business Plan. Unpublished document.
- Cape Winelands District Municipality. 2007. Application for nomination of Cape Winelands Biosphere Reserve. May 2007. Unpublished document, Cape Winelands District Municipality.
- Carruthers, J. 1995. The Kruger National Park: A social and political history. Pietermaritzburg: University of Natal Press.
- Centre for Evidence-Based Conservation (CEBC). 2010. Guidelines for Systematic Review in Environmental Management. Version 4.0. Environmental Evidence: [www.environmentalevidence.org/Authors.htm](http://www.environmentalevidence.org/Authors.htm) (accessed on 2012/01/13).
- Cincotta, R.P., Wisniewski, J. & Engelman, R. 2000. Human population in the biodiversity hotspots. *Nature* 404: 990-992.
- Clarke, B.M., Atkinson, L., Attwood, C., Glazewski, J., Berk, C., Spencer, C. & Le Roux, P. 2002. Business plan for the Kogelberg Marine Park. Unpublished document.
- Coates Palgrave, K. 2003. Trees of Southern Africa. Edition 3. Cape Town: Struik Publishers.
- Coetzer, K.L., Witkowski, E.T.F. & Erasmus, B.F.N. 2013. Reviewing biosphere reserve globally: effective conservation action or bureaucratic label? *Biological Reviews*, doi: 10.1111/brv.12044 URL: <http://onlinelibrary.wiley.com.ez.sun.ac.za/doi/10.1111/brv.12044/abstract> (accessed on 2013/06/05).

- Cole, N., Lombard, A.T., Cowling, R.M., Euston-Brown, D., Richardson, D.M., & Heijnis, C.E. 2000. Framework for a Conservation Plan for the Agulhas Plain, Cape Floristic Region, South Africa. Institute for Plant Conservation, University of Cape Town, Cape Town.
- Constitution of the Republic of South Africa, 1996. URL: <http://www.info.gov.za/documents/constitution/index.htm> (accessed on 2010/11/18).
- Convention on Biological Diversity Secretariat. 2003. International Day for Biological Diversity. Biodiversity and poverty alleviation – challenges for sustainable development. Press release for media use. URL: <http://www.biodiv.org/doc/press/> (accessed on 2013/02/26).
- Corbett, M. 1995. An Evaluation of the Coverage and Management Effectiveness of Biosphere Reserves. Yale School of Forestry and Environmental Studies-IUCN: The World Conservation Union. International Conference on Biosphere Reserves. Seville. 49 pp.
- Council of Europe. 2000. European Landscape Convention. Firenze, October 20, 2000.
- Cowling, R.M. 1990. Diversity components in a species-rich area of the Cape Floristic Region. *Journal of Vegetation Science* 1: 699-710.
- Cowling, R.M. & Hilton-Taylor, C. 1994. Patterns of plant diversity and endemism in southern Africa: an overview. In: Huntley, B.J. (ed.) *Botanical diversity in southern Africa*. *Strelitzia* 1: 31-52, SANBI, Pretoria.
- Cowling, R. & Holmes, P.M. 1992. Plant diversity and endemism. Chapter 3 in: Cowling, R. (ed.) *The ecology of Fynbos*, pp. 23-61. Cape Town: Oxford University Press.
- Cowling, R. & Richardson, D. 1995. *Fynbos: South Africa's unique Floral Kingdom*. Fernwood Press, University of Cape Town.
- Cowling, R.M. & Pressey, R.L. 2003. Editorial: Introduction to systematic conservation planning in the Cape Floristic Region. *Biological Conservation* 112: 1-13.
- Cowling, R.M. & Procheş, Ş. 2005. Patterns and evolution of plant diversity in the Cape Floristic Region. *Biol. Skr.* 55: 273-288. In: Friis, I. & Balslev, H. (eds.) *Plant diversity and complexity patterns. Local, regional and global dimensions. Proceedings of an international symposium held at the Royal Danish Academy of Sciences and Letters in Copenhagen, Denmark, 25 - 28 May, 2003*. URL: <http://www.nmmu.ac.za/documents/richardcowling/Cowling%20Proches%202005%20Evolution%20Cape%20FL%20Reg%20RDS%20symposium.pdf> (accessed on 2010/11/04).
- Cowling, R.M., Holmes, P.M. & Rebelo, A.G. 1992. Plant diversity and endemism. In R.M. Cowling (ed.) *The ecology of Fynbos: nutrients, fire, and diversity*, pp. 62-112. Cape Town: Oxford University Press.
- Cowling, R.M., Pressey, R.L., Lombard, A.T., Desmet, P.G. & Ellis, A.G. 1999a. From representation to persistence: requirements for a sustainable system of conservation areas in the species-rich mediterranean-climate desert of southern Africa. *Diversity and Distributions* 5: 51-71.
- Cowling, R.M., Pressey, R.L., Lombard, A.T., Heijnis, C.E., Richardson, D.M. & Cole, N. 1999b. Framework for a conservation plan for the Cape Floristic Region (Institute for Plant Conservation Report 9902). University of Cape Town, Cape Town.
- Cowling, R.M., Pressey, R.L., Rouget, M. & Lombard, A.T. 2003. A conservation plan for a global biodiversity hotspot – the Cape Floristic Region, South Africa. *Biological Conservation* 112: 191-216.
- Cowling, R.M., Knight, A.T., Faith, D.P., Ferrier, S., Lombard, A.T., Driver, A., Rouget, M., Maze, K. & Desmet, P.G. 2004. Nature conservation requires more than a passion for species. *Conservation Biology* 18(6): 1674-1676.

- Cox, T.R. 1983. The “worthless lands” thesis: Another perspective. *Journal of Forest History* 27 (3): 144-145.
- Cundill, G., Thondhlana, G., Sisitka, L., Shackelton, S. & Blore, M. 2013. Land claims and the pursuit of co-management on four protected areas in South Africa. *Land Use Policy* 35: 171-178.
- Dasmann, R.F. 1972. Towards a system for classifying natural regions of the World and their representation by National Parks and Reserves. *Biological Conservation* 4(4): 247-255.
- De Groot, R.S. 1992. *Functions of Nature: Evaluation of nature in environmental planning, management and decision making*, Groningen (Wolters-Noordhoff BV).
- Dehrmann, A. 2010. Personal communication. Onrust.
- De Klerk, A. 2004. *The Waterberg Biosphere Reserve, a land use plan for ecotourism destination development*. Msc thesis. Department of Botany, Faculty of Natural Sciences. University of Pretoria, South Africa.
- De Klerk, A. 2011. Personal communication. Chief Director, Tourism and Community Environment Development. Limpopo Department of Economic Development, Environment and Tourism. Polokwane.
- Della Porta, D. & Keating, M. (eds.) 2008a. *Approaches and methodologies in the social sciences. A pluralist perspective*. Cambridge: Cambridge University Press.
- Della Porta, D. & Keating, M. 2008b. Comparing approaches, methodologies and methods. Some concluding remarks. Chapter 16: 316-322. In: Della Porta, D. & Keating, M. (eds.) *Approaches and methodologies in the social sciences. A pluralist perspective*. Cambridge: Cambridge University Press.
- Della Porta, D. & Keating, M. 2008c. How many approaches in the social sciences? An epistemological introduction. Chapter 2: 19-39. In: Della Porta, D. & Keating, M. (eds.) *Approaches and methodologies in the social sciences. A pluralist perspective*. Cambridge: Cambridge University Press.
- Democratic Alliance (DA). 2009. *In Trust for the Nation*. Policy document. URL: <http://www.da.org.za/docs/645/in-trust-for-the-nation.pdf> (accessed on 2011/01/12).
- Dennis Moss Partnership. 2007. *Project-based Sustainable Development Initiative (SDI) Approach*. Unpublished document. Dennis Moss Partnership, Stellenbosch.
- Department of Environmental Affairs and Development Planning. 2005. *Western Cape Provincial Spatial Development Framework*. Unpublished report. Provincial Government of the Western Cape.
- Department of Environmental Affairs and Tourism (DEAT). 1999. *Proposed West Coast Biosphere Reserve*. Application for nomination to UNESCO. Unpublished document. DEAT, Pretoria.
- Department of Environmental Affairs and Tourism. 2007. *The National Protected Areas Expansion Strategy 2008-2012*. URL: <http://www.environment.gov.za/Branches/BioConservation/areasOfWork/Protected%20Areas%20Expansion%20Strategy/Protected%20Areas%20Expansion%20Strategy%20-%2025%20Nov%202007.pdf> (accessed on 2011/01/12).
- Department of Environmental Affairs and Tourism. 2009. *National Environmental Management: Biodiversity Act. Guideline regarding the determination of bioregions and the preparation of and publication of bioregional plans*. Government Gazette, No. 32006, 16 March 2009. Republic of South Africa.

- Department of Planning, Local Government and Housing. 2000. Bioregional planning framework for the Western Cape Province. Unpublished report. Provincial Government of the Western Cape.
- Derthick, M. 1972. *New towns in-town: Why a federal program failed*. Washington DC: The Urban Institute.
- Devas, N. & Rakodi, C. 1993. The urban challenge. Chapter 1: 1-40. In: Devas, N. & Rakodi, C. (eds.) *Managing Fast Growing Cities. New approaches to urban planning and management in the developing world*. England: Longman Scientific & Technical, Essex.
- De Witt, B. 2009. Personal communication. EnviroAfrica, Somerset West.
- Diamond, J. 2003. *The Last Americans: Environmental Collapse and the End of Civilization*. Harper's Magazine, June 2003. URL: <http://www.mindfully.org/Heritage/2003/Civilization-Collapse-EndJun03.htm> (accessed on 2013/03/05).
- Diaz-Balteiro, L. & Romero, C. 2008. Making forestry decisions with multiple criteria: A review and an assessment. *Forest Ecology and Management* 255: 3222-3241.
- Didier, K.A., Wilkie, D., Douglas-Hamilton, I., Frank, L., Georgiadis, N., Graham, M., Ihwagi, F., King, A., Cotterill, A., Rubenstein, D. & Woodroffe, R. 2009. Conservation planning on a budget: a "resource light" method for mapping priorities at a landscape scale? *Biodiversity Conservation* 18: 1979-2000.
- Downsborough, L., Shackleton, C.M. & Knight, A.T. 2011. The potential for voluntary instruments to achieve conservation planning goals: the case of conservancies in South Africa. *Oryx* 45: 357-364.
- Dudley, N., Hockings, M., Stolton, S. & Kiernan, M. 1999. Effectiveness of forest protected areas. A paper for the IFF intersessional meeting on protected areas in Puerto Rico, March 1999. URL: <http://www.equilibriumconsultants.com/upload/document/puertorico.pdf> (accessed on 2010/05/21).
- Du Toit, J. 2010. Personal communication. Cape West Coast Biosphere Reserve.
- ENB On the Side. 2008. *UNESCO-Biosphere Reserves: Ecological, Economic, Cultural and Social Benefits. A Special Report on Selected Side Events at the Ninth Conference of the Parties (COP 9) to the Convention on Biological Diversity (CBD)*. Issue no. 8, International Institute for Sustainable Development (IISD). URL: <http://www.iisd.ca/biodiv/cop9/enbots/pdf/enbots0919e.pdf> (accessed on 2011/10/25).
- Ervin, J. 2003. Protected Area Assessments in Perspective. *BioScience* 53 (9): 819-822.
- Ettazarini, S. 2011. GIS-based multi-source database, a strategic tool for sustainable development planning: Case of Qalaat Mgouna, Morocco. *Environmental Earth Sciences*, 62(7): 1437-1445.
- Faaland, J. 1982. *Population and the World Economy in the 21st Century*. England: Basil Blackwell Publishers, Oxford.
- Fabricius, C., Folke, C., Cundill, G. & Schultz, L. 2007. Powerless spectators, coping actors, and adaptive co-managers: A synthesis of the role of communities in ecosystem management. *Ecology and Society* 12(1): 29. URL: <http://www.ecologyandsociety.org/vol12/iss1/art29/>.
- Fairbanks, D.H.K. & Benn, G.A. 2000. Identifying regional landscapes for conservation planning: a case study from KwaZulu-Natal, South Africa. *Landscape and Urban Planning* 50: 237-257.
- Fee, E., Gerber, K., Rust, J., Haggenueller, K., Korn, H. & Ibsch, P. 2009. Stuck in the clouds: Bringing the CBD's Ecosystem Approach for conservation management down to Earth in Canada and Germany. *Journal for Nature Conservation* 17: 212-227.
- Ferris, W.R. 1998. A Sense of Place. *Humanities* 19(1): 6-7.

- Folke, C., Jansson, A., Larsson, J. & Costanza, R. 1997. Ecosystem appropriation by Cities. *Ambio* 26(3): 167–172.
- Francis, G. 2004. Biosphere Reserves in Canada: Ideals and some experience. *Environments* 32(3): 3-26.
- Frankfort-Nachmias, C. & Nachmias, D. 1992. *Research Methods in the Social Sciences*. 1992. 4th edition. Edward Arnold, London.
- Fritz-Vietta, N.V.M. & Stoll-Kleemann, S. 2008. How to foster organisational capacity for integrated biosphere reserve management: The Biosphere Reserve Mananara-Nord, Madagascar. *GAIA* 17/S1: 169-176.
- Fuller, T., Munguía, M., Mayfield, M., Sánchez-Cordero, V. & Sarkar, S. 2006. Incorporating connectivity into conservation planning: A multi-criteria case study from central Mexico. *Biological Conservation* 133: 131-142.
- Funch, R.R. & Harley, R.M. 2007. Reconfiguring the boundaries of the Chapada Diamantina National Park (Brazil) using ecological criteria in the context of a human-dominated landscape. *Landscape and Urban Planning* 83: 355-362.
- Gambino, R. 1998. Parks and Protected Areas in Italy: An overview. *The George Wright Forum* 15(2): 30-42.
- Garmendia, E., Gamboa, G., Franco, J., Garmendia, J.M., Liria, P. & Olazabal, M. 2010. Social multi-criteria evaluation as a decision support tool for integrated coastal zone management. *Ocean and Coastal Management* 53: 385-403.
- Gaston, K.J., Pressey, R.L. & Margules, C.R. 2002. Persistence and vulnerability: retaining biodiversity in the landscape and in protected areas. *Journal of Biosciences* 27(4 Supplement 2): 361-384.
- Gates, L. & Morgan, N.I.M. 2003. Report from the Field: The whole is so much greater than the sum of its parts. *The George Wright Forum* 20(2): 60-67.
- Gelderblom, C.M., Van Wilgen, B.W., Nel, J.L., Sandwith, T., Botha, M. & Hauck, M. 2003. Turing strategy into action: implementing a conservation action plan in the Cape Floristic Region. *Biological Conservation* 112: 291-297.
- Georgiadis, G. & Campello, S. 1999. The corridor of the Serra do Mar. *Parks* 9(3): 25-34.
- German Commission for UNESCO. 2007. Criteria for Biosphere Reserves in Germany. *UNESCO Today* 2(2007): 46-50.
- German MAB National Committee (ed.) 1996. Criteria for designation and evaluation of UNESCO biosphere reserves in Germany, Bonn.
- German MAB National Committee (ed.) 2005. Full of Life: UNESCO Biosphere Reserves – Model regions for sustainable development. Bonn, Germany: Springer.
- Gerring, J. 2007. Case study research. Principles and practices. Cambridge: Cambridge University Press.
- Gilligan, B., Dudley, N., Fernandez De Tejada, A. & Toivonen, H. 2005. Management Effectiveness Evaluation of Finland's Protected Areas. Nature protection Publications of Metsähallitus. Series A 147.
- Gilman, E.L. 1997. Community based and multiple purpose protected areas: A model to select and manage protected areas with lessons from the Pacific Islands. *Coastal Management* 25: 59-91.

- Gilman, E.L., Dunn, D., Read, A., Hyrenbach, K.D. & Warner, R. 2011. Designing criteria suites to identify discrete and networked sites of high value across manifestations of biodiversity. *Biodiversity and Conservation* 20: 3363-3383.
- Glaser, M., Krause, G., Ratter, B. & Welp, M. 2008. Human-Nature-Interaction in the Anthropocene. Potential of social-ecological systems analysis. Preparation paper for the DGH-Symposium "Human-Nature-Interactions in the Anthropocene: Potentials of social-ecological systems analysis", Sommerhausen, 29th – 31st May 2008. URL: [www.dgh2008.org](http://www.dgh2008.org) (accessed on 2013/04/18).
- Government of South Africa. 2010. National Protected Area Expansion Strategy for South Africa 2008: Priorities for expanding the protected area network for ecological sustainability and climate change adaptation. Pretoria: Government of South Africa.
- Graham, J., Amos, B. & Plumptre, T. 2003. Governance principles for protected areas in the 21st century. Prepared for the 5th World Parks Congress, Durban, South Africa. Institute on Governance, Ottawa, Canada. URL: <http://www.iog.ca/publications/governance-principles-for-protected-areas-in-the-21st-century> (accessed on 2013/04/25).
- Grant, P.B.C. & Samways, M.J. 2007. Montane refugia for endemic and Red Listed dragonflies in the Cape Floristic Region biodiversity hotspot. *Biodiversity and Conservation* 16: 787-805.
- Green, N. 2010. Personal communication. Kleinmond.
- Grussow, A. 1972. *A Sense of Place: The Artist and the Land*.
- Gutteridge, L. 2008. *The South African Bushveld: A Field Guide from the Waterberg*. Johannesburg: Southbound, Newlands.
- Haber, W. 2008. Biological diversity - a concept going astray? *GAIA* 17/S1:91 - 96.
- Haines-Young, R., & Potschin, M. 2010. The links between biodiversity, ecosystem services and human well-being. In: Raffaelli, D. & Frid, C. (eds.) *Ecosystem Ecology: a new synthesis*. BES Ecological Reviews Series. Cambridge: Cambridge University Press.
- Hakizumwami, E. 2000. Case Study 3: Management effectiveness of the Dja Reserve, Cameroon. In: Hockings, M., Stolton, S. & Dudley, N. 2000. *Evaluating Effectiveness. A framework for assessing the management of protected areas*. IUCN World Commission on Protected Areas Best Practice Protected Area Guidelines Series No. 6.
- Halliday, A. & Glaser, M. 2011. A management perspective on social-ecological systems: A generic system model and its application to a case study from Peru. *Research in Human Ecology* 18(1): 1-18.
- Hamin, E.M. 2001. The US National Park Service's partnership parks: collaborative responses to middle landscapes. *Land Use Policy* 18(2): 123-135.
- Hammett, D. 2008. The challenge of a perception of 'un-entitlement' to citizenship in post-Apartheid South Africa. *Political Geography* 27: 652-668.
- Headings, M.E. & Rahnema, S. 2002. The Nutritional Value of Mopane Worms, *Gonimbrasia belina* (Lepidoptera: Saturniidae) for Human Consumption. The Ohio State University, Agricultural Technical Institute, Wooster, OH. URL: [http://esa.confex.com/esa/2002/techprogram/paper\\_8534.htm](http://esa.confex.com/esa/2002/techprogram/paper_8534.htm) (accessed on 2011/09/14).
- Heijnis, C.E., Lombard, A.T., Cowling, R.M. & Desmet, P.G. 1999. Picking up the pieces: a biosphere reserve framework for a fragmented landscape - the coastal lowlands of the Western Cape, South Africa. *Biodiversity and Conservation* 8 (4): 471-496.

- Henning, S.F. & Henning, G.A. 1989. South African Red Data Book - Butterflies. South African National Scientific Programmes Report No. 158. Pretoria: CSIR, 175 pp.
- Hermoso, V. & Kennard, M.J. 2012. Uncertainty in coarse conservation assessments hinders the efficient achievement of conservation goals. *Biological Conservation* 147: 52-59.
- Heydorn, A. & Clarke, B. 2010. South Africa: Poaching in Paradise: Sustainable resource utilization or common theft. In: Carleton, G. & McCormick-Ray, J. Coastal-marine conservation: Science and Policy. In press.
- Hockey, P.A.R. & Branch, G.M. 1997. Criteria, objectives and methodology for evaluating marine protected areas in South Africa. *South African Journal of Marine Science* 18: 369-383.
- Hockey, P.A.R. & Velasquez, C.R. 1992. The Berg River estuary - a major Western Cape wetland. *Birding in Southern Africa* 44(4): 108-114.
- Hockings, M. 2000. Evaluating Protected Area Management: A review of systems for assessing management effectiveness of protected areas. Occasional paper 2000. School of Natural and Rural Systems Management, University of Queensland, Australia.
- Hockings, M. & Phillips, A. 1999. How well are we doing? Some thought on the effectiveness of protected areas. *Parks* 9: 5-14.
- Hockings, M., Stolton, S. & Dudley, N. 2000. Evaluating Effectiveness. A framework for assessing the management of protected areas. IUCN World Commission on Protected Areas Best Practice Protected Area Guidelines Series No. 6.
- Hockings, M., Leverington, F. & James, R. 2003. Evaluating management effectiveness: maintaining protected areas for now and the future. IUCN World Commission on Protected Areas, WWF, University of Queensland, Australia.
- Hofstatter, S. 2009. South Africa: Threat of turmoil follows land claim u-turn. 23 December 2009, BusinessDay.
- Holmes, L. 2010. Personal communication. Green Point, Cape Town.
- How Safaris Work. 2011. Introduction to how safaris work. URL: <http://www.howstuffworks.com/safari.htm/printable> (accessed on 2011/11/03).
- Huntley, B.J. 1978. Ecosystem conservation in southern Africa. Pages 1333-1384. In M.J.A. Werger, M.J.A. & Van Bruggen, A.C. (eds.) *Biogeography and ecology of southern Africa*. The Hague: Junk.
- Hyman, G. 2006. How a powerful minority has exploited UNESCO Biosphere Reserve status: A case study of the Kogelberg Biosphere Reserve, South Africa. Master thesis, Université de Paris-Sorbonne, Paris.
- Ianni, E. & Geneletti, D. 2010. Applying the ecosystem approach to select priority areas for forest landscape restoration in the Yungas, Northwestern Argentina. *Environmental Management* 46: 748-760.
- Iribarren, I.B. 2001. Experience in Spain. In: UNESCO. 2001. Seville +5: International meeting of experts. MAB Report Series No. 69. UNESCO, Paris, pp. 95-99.
- Isaacson, W. 2011. *Steve Jobs*. New York: Simon & Schuster.
- Isacch, J.P. 2008. Implementing the biosphere reserve concept: the case of Parque Atlántico Mar Chiquito biosphere reserve from Argentina. *Biodiversity Conservation* 17: 1799-1804.
- IUCN. 1994. Guidelines for Protected Area Management Categories. CNPPA with the assistance of WCMC. IUCN, Gland, Switzerland and Cambridge, UK. 261 pp.

- IUCN. 1995. Evaluation of the Implementation of the 1984 Action Plan for Biosphere Reserves. UNESCO, Paris.
- IUCN. 1998. Biosphere Reserves - Myth or Reality? Proceedings of a Workshop at the 1996 IUCN World Conservation Congress, Montreal, Canada. IUCN Gland, Switzerland and Cambridge, UK. vi + 59 pp.
- IUCN. 2013. IUCN Red List of Threatened Species. Version 2013.2. URL: <http://www.iucnredlist.org> (accessed on 2014/01/27).
- Jaeger, C. 2007. The challenge climate change. UNESCO Today 2(2007): 27-29.
- JANIS (Joint ANZECC/MCFFA National Forest Policy Statement Implementation Sub-committee). 1997. Nationally agreed criteria for the establishment of a comprehensive, adequate and representative reserve system for forests in Australia. Canberra: Commonwealth of Australia.
- Johns, M. 2010. Personal communication. Kogelberg Nature Reserve, Kleinmond.
- Johnson, C. 2010. Personal communication. Cape Winelands District Municipality, Worcester.
- Jones, J.L. 2006. Dynamics of conservation and society: The case of Maputaland, South Africa. Doctoral dissertation, University of Pretoria, Pretoria. URL: <http://upetd.up.ac.za/thesis/available/etd-01192007-111257/unrestricted/00front.pdf> (accessed on 2013/09/10).
- Jordaan, A.L. 1991. The Kogelberg: conservation versus development. Appendix 1 in: Cape Nature Conservation. 1998. Motivation for the establishment of the Kogelberg Biosphere Reserve, Western Cape Province, South Africa. Unpublished document, Provincial Administration of the Western Cape.
- Joseph, G. 2008. A guideline for the formation and initiation of a biosphere reserve for the Klein Karoo. Unpublished report, Gouritz Initiative. URL: [http://www.gouritz.com/index.php?option=com\\_docman&task=cat\\_view&gid=34&Itemid=54](http://www.gouritz.com/index.php?option=com_docman&task=cat_view&gid=34&Itemid=54) (accessed on 2011/07/04).
- Kameda, T., Ohtsubo, Y., Takezawa, M. 1997. Centrality in Sociocognitive Networks and Social Influence: An Illustration in a Group Decision-Making Context. *Journal of Personality and Social Psychology* 73(2): 296–309.
- Kelleher, G. & Kenchington, R. 1993. Political and social dynamics for establishing marine protected areas. Chapter 6: 43-55. In: Price, A.R.G. & Humphrey, S.L. (eds.) Application of the Biosphere Reserve concept to coastal marine areas: Papers presented at the UNESCO/IUCN San Francisco workshop of 14-20 August 1989. A marine conservation and development report. IUCN, Gland, Switzerland, viii + 114 pp.
- Kellert, S.R. 1996. *The Value of Life: Biological Diversity and Human Society*. Washington D.C.: Island Press.
- Kim, J-O. 2008. An integrative area selection method for biodiversity conservation in the DMZ and the CCZ of South Korea. Doctoral dissertation. University of Texas, Austin.
- King, B.H. 2007. Conservation and community in the new South Africa: A case study of the Mahushe Shongwe Game Reserve. *Geoforum* 38: 207-219.
- Kirkpatrick, J.B. 1983. An iterative method for establishing priorities for the selection of nature reserves: An example from Tasmania. *Biological Conservation* 25: 127-134.
- Kitzinger, J. 1995. Introducing focus groups. *British Medical Journal* 311: 299-302.
- Knight, A. T. & Cowling, R.M. 2003. The megaconservancy network concept: "Keeping people on the land in living landscapes." Report N-45. Terrestrial Ecology Research Unit, University of Port

- Elizabeth, Port Elizabeth, South Africa. URL:  
<http://bgis.sanbi.org/STEP/STEP%20MCN%20Concept%20Document.pdf> (accessed 2012/03/12).
- Knight, A.T. & Cowling, R.M. 2007. Embracing opportunism in the selection of priority conservation areas. *Conservation Biology* 21(4): 1124-1126.
- Knight, A.T., Driver, A., Cowling, R.M., Maze, K., Desmet, P.G., Lombard, A.T., Rouget, M., Botha, M.A., Boshoff, A.F., Castley, J.G., Goodman, P.S., Mackinnon, K., Pierce, S.M., Sims-Castley, R., Stewart, W.I. & Von Hase, A. 2006a. Designing systematic conservation assessments that promote effective implementation: Best practice from South Africa. *Conservation Biology* 20(3): 739-750.
- Knight, A. T., Cowling, R.M. & Campbell, B.M. 2006b. An operational model for implementing conservation action. *Conservation Biology* 20(2): 408-419.
- Knight, A.T., Driver, A., Cowling, R.M., Maze, K., Desmet, P.G., Lombard, A.T., Rouget, M., Botha, M.A., Boshoff, A.F., Castley, J.G., Goodman, P.S., Mackinnon, K., Pierce, S.M., Sims-Castley, R., Stewart, W.I. & Von Hase, A. 2006c. Designing systematic conservation assessments that promote effective implementation: Best practice from South Africa. *Conservation Biology* 20(3): 739-750.
- Knight, A.T., Cowling, R.M., Rouget, M., Balmford, A., Lombard, A.T. & Campbell, B.M. 2008. Knowing but not doing: selecting priority conservation areas and the research-implementation gap. *Conservation Biology* 22: 610-617.
- Knight, A.T., Cowling, R.M., Difford, M. & Campbell, B.M. 2010. Mapping human and social dimensions of conservation opportunity for the scheduling of conservation action on private land. *Conservation Biology* 24(5): 1348-1358.
- Knight, A.T., Grantham, H.S., Smith, R.J., McGregor, G.K., Possingham, H.P. & Cowling, R.M. 2011a. Land managers' willingness-to-sell defines conservation opportunity for protected area expansion. *Biological Conservation* 144: 2623-2630.
- Knight, A.T., Sarkar, S., Smith, R.J., Strange, N. & Wilson, K.A. 2011b. Engage the hodgepodge: management factors are essential when prioritizing areas for restoration and conservation action. *Diversity and Distributions* 17: 1234-1238.
- Knight, A.T., Cowling, R.M., Boshoff, A.F., Wilson, S.L. & Pierce, S.M. 2011c. Walking in STEP: Lessons for linking spatial prioritisations to implementation strategies. *Biological Conservation* 144: 202-2011.
- Kogelberg Biosphere Association (KOBIO). 1997. A brief history of KOBIO, its public involvement and informational activities. Appendix 4 in: Cape Nature Conservation. 1998. Motivation for the establishment of the Kogelberg Biosphere Reserve, Western Cape Province, South Africa. Unpublished document, Provincial Administration of the Western Cape.
- Kogelberg Biosphere Reserve Company (KBRC). 2011. Kogelberg Biosphere Reserve Framework Plan. Status Quo Report. iKapa EnviroPlan and ECOSOL-GIS. Unpublished report.
- Konold, W. 2007. Dynamism and change of cultural landscapes. What can biosphere reserves accomplish? *UNESCO Today* 2(2007): 18-21.
- Kruger National Park. 2011. Mpumalanga Game Reserves: Kruger National Park. URL:  
[http://www.sa-venues.com/game-reserves/mp\\_l\\_kruger.htm](http://www.sa-venues.com/game-reserves/mp_l_kruger.htm) (accessed on 2011/11/04).
- Kruse-Graumann, L. 2007. Education for sustainable development in German biosphere reserves. *UNESCO Today* 2(2007): 22-26.

- Kuo, N. & Yu, Y. 1999. An evaluation system for National Park selection in Taiwan. *Journal of Environmental Planning and Management* 42(5): 735-745.
- Kušová, D., Těšitel, J., Matějka, K. & Bartoš, M. 2008. Biosphere reserves - An attempt to form sustainable landscapes. A case study of three biosphere reserves in the Czech Republic. *Landscape and Urban Planning* 84: 38-51.
- Lämmle, M. 2007. Changes Lead to New Perspectives. *UNESCO Today* 2(2007): 62-64.
- Leisher, C., Sanjayan, M., Blockhus, J., Kontoleon, A. & Larsen, S.N. 2010. Does conserving biodiversity work to reduce poverty? A state of knowledge review. In: *Linking biodiversity conservation and poverty alleviation: A state of knowledge review*. CBD Technical Series No. 55, Secretariat of the Convention on Biological Diversity. Montreal, Canada.
- Le Keur, K. 2011. Personal communication. Cape Winelands District Municipality, Stellenbosch.
- Leverington, F., Kettner, A., Nolte, C., Marr, M., Stolton, S., Pavese, H., Stoll-Kleemann, S. & Hockings, M. 2010. Protected Area Management Effectiveness Assessments in Europe. Overview of European methodologies. BfN-Skripten 271b. Federal Agency for Nature Conservation, Bonn, Germany.
- Linehan, J.R. & Gross, M. 1998. Back to the future, back to basics: the social ecology of landscapes and the future of landscape planning. *Landscape and Urban Planning* 42: 207-223.
- Lombard and Wolfe CC. 2004. GIS specialist services. Gouritz Initiative final report. Western Cape Nature Conservation, George.
- Lombard, A.T., Cowling, R.M., Pressey, R.L. & Mustart, P.J. 1997. Reserve design on the Agulhas Plain, South Africa: A flexible tool for conservation in a species-rich and fragmented landscape. *Conservation Biology* 11: 1101-1116.
- Lombard, A.T., Hilton-Taylor, C., Rebelo, A.G., Pressey, R.L. & Cowling, R.M. 1999. Reserve selection in the Succulent Karoo, South Africa: coping with high compositional turnover. *Plant Ecology* 142: 35-55.
- Lotze-Campen, H., Reusswig, F. & Stoll-Kleemann, S. 2008. Socio-ecological monitoring of biodiversity change: Building upon the World Network of Biosphere Reserves. *GAIA* 17/S1: 107-115.
- Lü, Y., Chen, L., Fu, B & Liu, S. 2003. A framework for evaluating the effectiveness of protected areas: the case of the Wolong Biosphere Reserve. *Landscape and Urban Planning* 63: 213-223.
- Lückhoff, H.A. 1982. Early history of the Kogelberg and Cape Hangklip areas and management of the state forest. *Veld & Flora* 68(1): 12-13.
- Ma, Z., Li, B., Li, W., Han, N., Chen, J. & Watkinson, A.R. 2009. Conflicts between biodiversity conservation and development in a biosphere reserve. *Journal of Applied Ecology* 46(3): 527-535.
- Makeddah, L.J. 2010. Investigating the feasibility of establishing a biosphere reserve on the Northeast Coast of St. Lucia. Master dissertation. University of Waterloo, Ontario, Canada.
- Makhubela, R. 2011. Personal communication. Deputy Chair, EXCO, K2C. Acornhoek, March 2011.
- Malthus, T. 1798. *An Essay on the Principle of Population*. London. URL: <http://www.esp.org/books/malthus/population/malthus.pdf> (accessed on 2013/06/27).
- Marais, E.N. 1934. *Die Siel van die Mier*. Pretoria: Van Schaik.
- Marais, E.N. 1937. *The Soul of the White Ant*. London: Penguin.
- Marais, E.N. 1938. *Burgers van die Berge*. Pretoria: Van Schaik.

- Marais, E.N. 1969. *The Soul of the Ape*. New York: Atheneum.
- Marais, E. 1972. *The Road to Waterberg and other essays*. Cape Town: Human & Rousseau.
- Marais, Eugène N. 2005. *Die Volledige Versamelde Gedigte*. Pretoria: Die Protea Boekhuis.
- Marakele National Park. 2011. URL: <http://www.sanparks.org/parks/marakele/all.php> (accessed on 2011/05/04).
- Margoluis, R. & Salafsky, N. 1998. *Measures of Success. Designing, managing and monitoring conservation and development projects*. Washington DC: Island Press
- Margules, C.R. & Pressey, R.L. 2000. Systematic conservation planning. *Nature* 405: 243-253.
- Margules, C.R., Nicholls, A.O. & Pressey, R.L. 1988. Selecting networks of reserves to maximise biological diversity. *Biological Conservation* 43: 63-73.
- Marton-Lefèvre, J. 2007. Biosphere reserves – a visionary tool for addressing today’s challenges. *UNESCO Today* 2(2007): 10-12.
- Masibe, L. 2011. Personal communication. Director, Environment Empowerment Services. Limpopo Department of Economic Development, Environment and Tourism. Polokwane.
- Matysek, K.A. 2009. *Resilience and social-ecological systems: The UNESCO Biosphere Reserve program in Australia and Canada*. Doctoral dissertation, University of Tasmania.
- Matysek, K.A., Stratford, E. & Kriwoken, L.K. 2006. The UNESCO Biosphere Reserve Program in Australia: constraints and opportunities for localized sustainable development. *The Canadian Geographer* 50(1): 85-100.
- May, J. 2010. *Poverty Eradication: The South African experience*. Paper prepared for Department of Economic and Social Affairs, Division for Social Policy and Development and Economic Commission for Africa, Economic Development and NEPAD Division Expert Group Meeting on Poverty Eradication. 15-17 September 2010, United Nations Conference Centre, Addis Ababa, Ethiopia. URL: <http://www.un.org/esa/socdev/social/meetings/egm10/documents/May%20paper.pdf> (accessed on 2011/09/23).
- Mburugu, J.M. 2001. Utilization of biosphere reserves as models of land management and approaches to sustainable development: A case study of Amboseli Biosphere Reserve, Kenya. In: UNESCO. 2001. *Seville +5: International meeting of experts*. MAB Report Series No. 69. UNESCO, Paris, pp. 100-103.
- McAlpine J.R. & Molloy, B.P.J. 1977. *Techniques for selection of biosphere reserves: report of the UNESCO Regional Workshop supported jointly by the UNESCO Regular Program and Participation Program and the Australian and New Zealand National Commissions for UNESCO: Australia and New Zealand, 27 October – 7 November 1977*. Department of Education, Australia.
- McCrone, J.D. 1983. Cluster Biosphere Reserves. Workshop Session A.III. UNESCO MAB Programme, First International Biosphere Reserve Congress, 26 September to 2 October 1983, Minsk, BSSR-USSR. URL: <http://unesdoc.unesco.org/images/0005/000562/056244eb.pdf> (accessed on 2011/11/03).
- McGregor, T. 2003. *Conservation on a regional scale: Assessing the Yellowstone to Yukon Conservation Initiatives*. Master dissertation. University of Waterloo, Ontario, Canada.
- McNeely, J.A. 1995. *Expanding partnerships in conservation*. Washington DC: Island Press.
- Mehring, M. & Stoll-Kleemann, S. 2008. Evaluation of major threats to forest biosphere reserves: A global view. *GAIA* 17/S1: 125-133.

- Mellor, J.W. 2002. Poverty reduction and biodiversity conservation: The complex role for intensifying agriculture. A viewpoint series on poverty and the environment, October 2002. WWF Macroeconomics for Sustainable Development Program Office, Washington DC, USA. URL: <http://assets.panda.org/downloads/mellor.pdf> (accessed on 2011/09/20).
- Merton, R.K. & Kendall, P.L. 1946. The Focused Interview. *American Journal of Sociology* 51: 541-557.
- Millennium Ecosystem Assessment. 2005. *Ecosystems and Human Well Being*. Island Press.
- Miller, L. 2006. *Being and Belonging*. Doctoral thesis, University of Tasmania. URL: <http://eprints.utas.edu.au/7952/2/02WholeThesisMiller.pdf> (accessed on 2011/06/22).
- Miller, K.R. & Hamilton, L.S. 1999. Editorial. *Parks* 9(3): 1-6.
- Mitchell, A.H. 2005. Final Report: Tonle Sap Biosphere Reserve policy analysis and secretariat action plan. Unpublished report, Asian Development Bank. URL: <http://www.adb.org/Documents/Reports/Consultant/TonleSap/biosphere-reserve.pdf> (accessed on 2009/09/25).
- Mittermeier, R.A., Gil, P.R. & Mittermeier, C. G. 1997. *Megadiversity: Earth's Biologically Wealthiest Nations*. Monterrey, Mexico: CEMEX.
- Mittermeier, R.A., Gil, P.R., Hoffmann, M., Pilgrim, J., Brooks, T., Mittermeier, C.G., Lamoreux, J. & Da Fonseca, G.A.B. 2004. *Hotspots Revisited: Earth's Biologically Richest and Most Threatened Terrestrial Ecoregions*. Mexico City, Mexico: CEMEX.
- Mkhatshwa, T. 2009. Sustainable Living Festival. *The African*, 6 November 2009. URL: <http://www.africanmag.com/FORUM-1072-design004> (accessed on 2011/10/21).
- Moffett, A. & Sarkar, S. 2006. Incorporating multiple criteria into the design of conservation area networks: a minireview with recommendations. *Diversity and Distributions* 12: 125-137.
- Moffett, A., Dyer, J.S. & Sarkar, S. 2006. Integrating biodiversity representation with multiple criteria in North-Central Namibia using non-dominated alternatives and a modified analytic hierarchy process. *Biological Conservation* 129: 181-191.
- Moilanen, A., Leathwick, J.R. & Quinn, J.M. 2011. Spatial prioritization of conservation management. *Conservation Letters* 4: 383-393.
- Moore, J., Balmford, A., Allnutt, T. & Burgess, N. 2004. Integrating costs into conservation planning across Africa. *Biological Conservation* 117: 343-350.
- Moss, D. 2009. Personal communication. Dennis Moss Partnership, Stellenbosch.
- Mouton, J. 1996. *Understanding Social Research*. Pretoria: Van Schaik Publishers.
- Mouton, J. 2001. *How to succeed in your Master's and Doctoral Studies*. Pretoria: Van Schaik Publishers.
- Mucina, L. & Rutherford, M.C. (eds.) 2006. *The vegetation of South Africa, Lesotho and Swaziland*. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.
- Myers, N., Mittermeier, R.A., Mittermeier, C.G., Da Fonseca, G.A.B. & Ken, J. 2000. Biodiversity hotspots for conservation priorities. *Nature* 403: 853-858.
- Na, J.K. 2001. Biosphere reserves, conservation policy and legal instruments in the Republic of Korea. In: UNESCO. 2001. *Seville +5: International meeting of experts*. MAB Report Series No. 69. UNESCO, Paris, pp. 163-165.
- Naidoo, R., Balmford, A., Ferraro, P.J., Polasky, S., Ricketts, T.H. & Rouget, M. 2006. Integrating economic costs into conservation planning. *Trends in Ecology and Evolution* 21(12): 681-687.

- National Planning Commission (NPC). 2012. National Development Plan 2030: Our Future – make it work. Department: The Presidency, Republic of South Africa. URL: <http://www.npconline.co.za> (accessed on 2013/02/15).
- Naude, K. 2001. Partners in biodiversity conservation and sustainable development: First South African biosphere reserve learning seminar. In: UNESCO. 2001. Seville +5 International meeting of experts, Proceedings, Pamplona, Spain. MAB Report Series No. 69, UNESCO, Paris, pp. 170-171.
- Naude, K. 2009. Personal communication. Department of Environmental Affairs, Pretoria.
- Naughton-Treves, L., Holland, M.B. & Brandon, K. 2005. The Role of Protected Areas in Conserving Biodiversity and Sustaining Local Livelihoods. *Annual Review of Environment and Resources* 30: 219-252.
- Newenham, J. 2001. The proposed Kruger to Canyons Biosphere Reserve. Submission to UNESCO's MAB Programme, January 2001. Unpublished document.
- Nianyong, H. 2001. Chinese Biosphere Reserve Network (CBRN): An instrument for implementing the Seville Strategy in China. In: UNESCO. 2001. Seville +5: International meeting of experts. MAB Report Series No. 69. UNESCO, Paris, pp. 135-136.
- Oates J. 1999. *Myth and Reality in the Rain Forest: How Conservation Strategies Are Failing in West Africa*. Berkeley: University of California Press.
- Ohl, C., Krauze, K. & Grünbühel, C. 2007. Towards an understanding of long-term ecosystem dynamics by merging socio-economic and environmental research criteria for long-term socio-ecological research sites selection. *Ecological Economics* 63: 383-391.
- Ola-Adams, B.A. 2001. Education, awareness-building and training in support of biosphere reserves: experience from Nigeria. *Parks* 11(1): 18-23.
- Oliver, E.G.H., Linder, H.P. & Rourke, J.P. 1983. Geographical distribution of present-day Cape taxa and their phylogeographical significance. *Bothalia* 14: 427-440.
- Olson, D.M. & Dinerstein, E. 2002. The Global 200: Priority ecoregions for global conservation. *Annals of the Missouri Botanical Garden* 89(2): 199-224.
- Olsson, P., Folke, C. & Hahn, T. 2004. Social-ecological transformations for ecosystem management: the development of adaptive co-management of a wetland landscape in Southern Sweden. *Ecology & Society* 9(4): 2 [www document]. URL: <http://www.ecologyandsociety.org/vol9/iss4/art2/> (accessed on 2012/10/02).
- O'Riordan, T. 2002. Protecting beyond the protected. Chapter 1 in: O'Riordan, T. & Stoll-Kleemann, S. (eds.) *Biodiversity, sustainability and human communities. Protecting beyond the protected*. Cambridge: Cambridge University Press, pp. 3-29.
- O'Riordan, T. & Stoll-Kleemann, S. 2002. Deliberative democracy and participatory biodiversity. In: O'Riordan, T. & Stoll-Kleemann, S. (eds.) *Biodiversity, sustainability and human communities. Protecting beyond the protected*. Cambridge: Cambridge University Press, pp. 87-112.
- Pasquini, L. 2003. Assessing the management effectiveness of protected areas in South Africa: a system-wide preliminary survey. Unpublished report. MRes Ecology and Environmental Management, University of Pretoria.
- Pasquini, L. 2008. Assessing the suitability and feasibility of implementing a biosphere reserve in the Gouritz Initiative domain. Unpublished report.
- Peres, C.A. 2005. Why we need megareserves in Amazonia. *Conservation Biology* 19(3): 728-733.

- Phua, M. & Minowa, M. 2005. A GIS-based multi-criterion decision making approach to forest conservation planning at a landscape level: A case study of the Kinabalu area, Sabah, Malaysia. *Landscape and Urban Planning* 71: 207-222.
- Polasky, S., Nelson, E., Camm, J., Csuti, B., Fackler, P., Lonsdorf, E., Montgomery, C., White, D., Arthur, J., Garber-Yonts, B., Haight, R., Kagan, J., Starfield, A. & Tobalske, C. 2008. Where to put things? Spatial land management to sustain biodiversity and economic returns. *Biological Conservation* 141: 1505-1524.
- Pollock, R.M. 2004. Identifying principles for place-based governance in biosphere reserves. *Environments* 32(3): 27-41.
- Pool-Stanvliet, R. 2013a. Die historiese verloop van die UNESCO MAB-Program in Suid-Afrika. *LitNet Akademies, Jaargang 10, Nommer 2*: 418-445. URL: [http://litnet.co.za/assets//pdf/joernaaluitgawe%2010\(2\)/10\(2\)\\_GW\\_PoolStanvliet.pdf](http://litnet.co.za/assets//pdf/joernaaluitgawe%2010(2)/10(2)_GW_PoolStanvliet.pdf) (accessed on 2013/09/09).
- Pool-Stanvliet, R. 2013b. A history of the UNESCO Man and the Biosphere Programme in South Africa. *South African Journal of Science* 109(9/10), Art. #a0035. 6 pages. URL: <http://dx.doi.org/10.1590/sajs.2013/a0035> (accessed on 2013/09/26).
- Pool-Stanvliet, R. & Giliomee, J.H. 2013. A sustainable development model for the wine lands of the Western Cape: A case study of the Cape Winelands Biosphere Reserve. In: Pool-Stanvliet, R. & Clüsener-Godt, M. *AfriMAB Biosphere Reserves in Sub-Saharan Africa: Showcasing Sustainable Development*. Chapter 4, pp. 45-72, Department of Environmental Affairs and UNESCO. Pretoria: Government of South Africa.
- Pressey, R.L. 1994. Ad hoc reservations: forward or backward steps in developing representative reserve systems? *Conservation Biology* 8(3): 662-668.
- Pressey, R.L. & Taffs, K.H. 2001. Sampling of land types by protected areas: three measures of effectiveness applied to western New South Wales. *Biological Conservation* 101: 105-117.
- Pressey, R.L., Humphries, C.J., Margules, C.R., Vane-Wright, R.I. & Williams, P.H. 1993. Beyond Opportunism: Key Principles for Systematic Reserve Selection. *TREE* 8(4): 124-128.
- Pressey, R.L., Hager, T.C., Ryan, K.M., Schwarz, J., Wall, S., Ferrier, S. & Creaser, P.M. 2000. Using abiotic data for conservation assessments over extensive regions: quantitative methods applied across New South Wales, Australia. *Biological Conservation* 96: 55-82.
- Pressey, R.L., Cowling, R.M. & Rouget, M. 2003. Formulating conservation targets for biodiversity pattern and process in the Cape Floristic Region, South Africa. *Biological Conservation* 112: 99-127.
- Pretty, J. 2002. People, livelihoods and collective action in biodiversity. Chapter 4 in: O’Riordan, T. & Stoll-Kleemann, S. (eds.) *Biodiversity, sustainability and human communities. Protecting beyond the protected*. Cambridge: Cambridge University Press, pp. 61-86.
- Price, M. 2002. The Periodic Review of Biosphere Reserves: A mechanism to foster sites of excellence for conservation and sustainable development. *Environmental Science and Policy* 5(1): 13-19.
- Price, M.F. MacDonald, F. & Nuttall, I. 1999. Review of UK Biosphere Reserves. Environmental Change Unit, University of Oxford.
- Price, M.F., Park, J.J. & Bouamrane, M. 2010. Reporting progress on internationally designated sites: the periodic review of BRs. *Environmental Science and Policy* 13: 549-557.

- Queensland Parks and Wildlife Service. 2002. A review of current approaches to performance measurement in protected area management. Committee on National Parks and Protected Area Management, Benchmarking and Best Practice Program.
- Rakotonindrina, R. 1998. The economic reality of the participation of local communities in biosphere reserves: a case from Madagascar. In: IUCN. 1998. Biosphere Reserves - Myth or Reality? Proceedings of a Workshop at the 1996 IUCN World Conservation Congress, Montreal, Canada. IUCN Gland, Switzerland and Cambridge, UK, pp. 29-33.
- Rawinski, T.J. & Price, S.D. 1994. Conclusion: An action plan for coastal plain wetland conservation. Toward a continental conservation strategy. *Biological Conservation* 68: 281-284.
- Rebello, A.G. & Siegfried, W.R. 1990. Protection of Fynbos vegetation: ideal and real world options. *Biological Conservation* 54: 15-31.
- Rebello, A.G., & Siegfried, W.R. 1992. Where should nature reserves be located in the Cape Floristic region, South Africa? Models for the spatial configuration of a reserve network aimed at maximising the protection of floral diversity. *Conservation Biology* 6: 243-252.
- Rebello, A.G., Boucher, C., Helme, N., Mucina, L. & Rutherford, M.C. 2006. Fynbos Biome. Chapter 4, pp. 52 - 219. In: Mucina, L. & Rutherford, M.C. (eds.) 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.
- Reed, M.G. & Egunyu, F. 2013. Management effectiveness in UNESCO Biosphere Reserves: Learning from Canadian periodic reviews. *Environmental Science and Policy* 25: 107-117.
- Relph, E. 1976. *Place and Placelessness*. London: Pion.
- Reyers, B., Rouget, M., Jonas, Z., Cowling, R.M., Driver, A., Maze, K. & Desmet, P. 2007. Developing products for conservation decision-making: lessons from a spatial biodiversity assessment for South Africa. *Diversity and Distributions* 13: 608-619.
- Reyers, B., Roux, D.J., Cowling, R.M., Ginsburg, A.E., Nel, J.L. & O'Farrell, P. 2010. Conservation planning as a transdisciplinary process. *Conservation Biology* 24(4): 957-965.
- Rivera, V.S., Cordero, P.M., Cruz, I.A. & Borrás, M.F. 2002. The Mesoamerican Biological Corridor and local participation. *Parks* 12(2): 42-54.
- Roberge, C. 1998. Can biosphere reserves be truly multifunctional: a case from Quebec. In: IUCN. 1998. Biosphere Reserves - Myth or Reality? Proceedings of a Workshop at the 1996 IUCN World Conservation Congress, Montreal, Canada. IUCN Gland, Switzerland and Cambridge, UK, pp. 25-28.
- Roberts, C.P.R. 1982. Environmental implications of the proposed Palmiet River water and power development projects. *Veld & Flora* 68(1): 4-6.
- Roberts, D. 2002. Langebaan footprints: A walk with Eve. *The Cape Odyssey*. URL: <http://www.sawestcoast.com/fossileve.html> (accessed on 2010/08/12).
- Roberts, C.M., Andelman, S., Branch, G., Bustamante, R.H., Castilla, J.C., Dugan, J., Halpern, B.S., Lafferty, K.D., Leslie, H., Lubchenco, J., McArdle, D., Possingham, H.P., Ruckelshaus, M. & Warner, R.R. 2003a. Ecological criteria for evaluating candidate sites for marine reserves. *Ecological Applications* 13(1), Supplement 2003: S199-S214.
- Roberts, C.M., Branch, G., Bustamante, R.H., Castilla, J.C., Dugan, J., Halpern, B.S., Lafferty, K.D., Leslie, H., Lubchenco, J., McArdle, D., Ruckelshaus, M. & Warner, R.R. 2003b. Application of ecological criteria in selecting marine reserves and developing reserve networks. *Ecological Applications* 13(1), Supplement 2003: S215-S228.

- Robertson, D.P. 2002. Public ecology: Linking people, science and the environment. Doctoral dissertation. Virginia Polytechnic Institute and State University, Blacksburg, Virginia.
- Robertson Vernhes, J. (ed.) 2007. The Biosphere Reserve Handbook: Guidance to Implementing the Seville Strategy and the Statutory Framework. Paris: UNESCO.
- Robson, C. 2002. Real World Research, 2<sup>nd</sup> edition. Oxford: Blackwell.
- Rodrigues, A.S.L., Akçakaya, H.R., Andelman, S.J., Bakarr, M.I., Boitani, L., Brooks, T.M., Chanson, J.S., Fishpool, L.D.C., Da Fonseca, G.A.B., Gaston, J., Hoffmann, M., Marquet, P.A., Pilgrim, J.D., Pressey, R.L., Schipper, J., Sechrest, W., Stuart, S.N., Underhill, L.G., Waller, R.W., Watts, M.E.J. & Yan, X. 2004. Global gap analysis: priority regions for expanding the global protected-area network. *Bioscience* 54(12): 1092-1100.
- Roe, D., Thomas, D., Smith, J., Walpole, M & Elliott, J. 2011. Biodiversity and Poverty: Ten frequently asked questions – Ten policy implications. *Gatekeeper* 150, July 2011. URL: <http://pubs.iied.org/pdfs/14612IIED.pdf?> (accessed on 2011/10/18).
- Rouget, M., Cowling, R.M., Lombard, A.T., Knight, A.T. & Kerley, G.I.H. 2006. Designing large-scale conservation corridors for pattern and process. *Conservation Biology* 20(2): 549-561.
- Rousseau, L. 1974. *Die Groot Verlange*. Cape Town: Human & Rousseau.
- Ruoss, E. 2001. Biosphere Reserves in Switzerland. In: UNESCO. 2001. Seville +5: International meeting of experts. MAB Report Series No. 69. Paris: UNESCO, pp. 150-151.
- Sahler, G. 2007. Biosphere reserves, a response to infrastructural challenges. *UNESCO Today* 2(2007): 8-9.
- Sahou, J-J. 2001. Sustainable use in “W” Parks in Benin, Burkina Faso and Niger: What is needed, management or co-ordination? In: UNESCO. 2001. Seville +5: International meeting of experts. MAB Report Series No. 69. Paris: UNESCO, pp. 113-117.
- Sala, O.E., Stuart Chapin III, F., Armesto, J.J., Berlow, E., Bloomfield, J., Dirzo, R., Huber-Sanwald, E., Huenneke, L.F., Jackson, R.B., Kinzig, A., Leemans, R., Lodge, D.M., Mooney, H.M., Oesterheld, M., LeRoy Poff, N., Sykes, M.T., Walker, B.H., Walker, M. & Wall, D.H. 2000. Global biodiversity scenarios for the year 2100. *Science* 287: 1770-1774.
- Sanderson, S.E. & Redford, K.H. 2003. Contested relationships between biodiversity conservation and poverty alleviation. *Oryx* 37(4): 389-390.
- Sandström, E. 2008. Reinventing the commons. Doctoral dissertation. Department of Urban and Rural Development, Swedish University of Agricultural Sciences, Uppsala. *Acta Universitatis Agriculturae Sueciae* Vol. 2008:48. URL: <http://diss-epsilon.slu.se/archive/00001798/> (accessed on 2010/11/04).
- Schliep, R. & Stoll-Kleemann, S. 2010. Assessing governance of biosphere reserves in Central Europe. *Land Use Policy* 27: 917-927.
- Schliep, R., Bertzky, M., Hirschnitz, M. & Stoll-Kleemann, S. 2008. Changing climate in Protected Areas? Risk perception of climate change by biosphere reserve managers. *GAIA* 17/S1: 116-124.
- Scholz, R.W. & Tietje, O. 2002. *Embedded case study methods. Integrating quantitative and qualitative knowledge*. London: Sage Publications.
- Schultz, L. & Lundholm, C. 2010. Learning for resilience? Exploring learning opportunities in biosphere reserves. *Environmental Education Research* 16(5-6): 645-663.
- Schultz, L., Duit, A. & Folke, C. 2011. Participation, adaptive co-management and management performance in the World Network of Biosphere Reserves. *World Development* 39(4): 662-671.

- Selman, P. 2010. Landscape planning – preservation, conservation and sustainable development. *Town Planning Review* 81(4): 381-406.
- Senyolo, M.P. 2010. A game-theoretic approach of self governance in communal areas: A case of Moepel Farms in Limpopo Province, South Africa. Master thesis, Wageningen University, Netherlands. URL: <http://edepot.wur.nl/142712> (accessed on 2013/09/24).
- Sewall, B.J., Freestone, A.L., Moutui, M.F.E., Toilibou, N., Saïd, I., Toumani, S.M., Attoumane, D. & Ibouira, C.M. 2011. Reorienting systematic conservation assessment for effective conservation planning. *Conservation Biology* 25(4): 688-696.
- Shafer, C.L. 1999. National park and reserve planning to protect biological diversity: some basic elements. *Landscape and Urban Planning* 44: 123-153.
- Shearer, K.S. & Xiang, W-N. 2009. Representing multiple voices in landscape planning: A land suitability assessment study for a park land-banking program in Concord, North Carolina, USA. *Landscape and Urban Planning* 93: 111-222.
- Singh, S. 1999. Assessing management effectiveness of wildlife protected areas in India. *Parks* 9: 34-49.
- Skelton, P.H. 1993. A complete guide to the freshwater fishes of southern Africa. South Africa: Southern Book Publishers, Halfway House.
- Smith, W. 2009. Personal communication. Spatial Planning, Department of Environmental Affairs and Development Planning, Cape Town.
- Smith, P.G.R. & Theberge, J.B. 1986. A review of criteria for evaluating natural areas. *Environmental Management* 10(6): 715-734.
- Smith, R.J., Goodman, P.S. & Matthews, W.S. 2006. Systematic conservation planning: a review of perceived limitations and an illustration of the benefits, using a case study from Maputaland, South Africa. *Oryx* 40(4): 400-410.
- Smith, R.J., Veríssimo, D., Leader-Williams, N., Cowling, R.M. & Knight, A.T. 2009. Let the locals lead. *Nature* 462: 280-281.
- Smuts, W. 2010. Personal communication. Kleinmond.
- South African Biosphere Reserve Working Group. 2008. South African Biosphere Reserve Position Paper. Unpublished document. National Biosphere Reserve Workshop, 28-29 May 2008, Bela Bela, South Africa.
- Stake, R.E. 2006. Multiple case study analysis. New York: The Guildford Press.
- Stanvliet, R., Gilder, A. & Naude, K. 2004a. UNESCO MAB: Background and Guidelines for Implementation of the Biosphere Reserve Concept in South Africa. Unpublished report, Department of Environmental Affairs and Tourism, Pretoria.
- Stanvliet, R., Jackson, J., Davis, G., De Swardt, J., Mokhoele, J., Thom, Q. & Lane, B.D. 2004b. The UNESCO biosphere reserve concept as a tool for urban sustainability: The CUBES Cape Town case study. *Annals of the New York Academy of Sciences* 1023: 80-104.
- Stanvliet, R. & Parnell, S. 2006. The contribution of the UNESCO biosphere reserve concept to urban resilience. *Management of Environmental Quality* 17(4): 437-449.
- Steenkamp, K. 2011. Personal communication. Manager, Environment Special Programs. Limpopo Department of Economic Development, Environment and Tourism. Polokwane.
- Steinberg, F. & Miranda, L. 2005. Local agenda 21. capacity building and the cities of Peru. *Habitat International* 29: 163-182.

- Stevens, T. 2002. Rigor and representativeness in marine protected area design. *Coastal Management* 30: 237-248.
- Stoll-Kleemann, S. 2005a. Voices for biodiversity management in the 21st century. *Environment* 47(10): 24-36.
- Stoll-Kleemann, S. 2005b. Indicators and Evaluation of Sustainable Natural Resource Management and Governance in Biosphere Reserves. In: *Global Change Impacts in Mountain Biosphere Reserves: UNESCO*, p. 237-245. Paris, France.
- Stoll-Kleemann, S. 2007. Success factors for biosphere reserve management. *UNESCO Today* 2/2007. pp. 37-39.
- Stoll-Kleemann, S. 2008. The Governance of Biodiversity Research Project (GoBi): Assessing biodiversity governance and management approaches in protected areas and biosphere reserves. *GLP News* (Newsletter of the Global Land Project International Project office) No. 3: 20-22.
- Stoll-Kleemann, S. 2010. Evaluation of management effectiveness in protected areas: Methodologies and results. *Basic and Applied Ecology* 11: 377-382.
- Stoll-Kleemann, S. & Job, H. 2008. The relevance of effective protected areas for biodiversity conservation: An introduction. *GAIA* 17/S1: 86-89.
- Stoll-Kleemann, S. & O’Riordan, T. 2002. From participation to partnership in biodiversity protection: Experience from Germany and South Africa. *Society and Natural Resources* 15: 161-177.
- Stoll-Kleemann, S. & Welp, M. 2008. Participatory and integrated management of biosphere reserves. Lessons from case studies and a global survey. *GAIA* 17/S1: 161-168.
- Stoll-Kleemann, S., Bertzky, M., De la Vega-Leinert, A.C., Fritz-Vietta, N., Leiner, N., Hirschnitz-Garbers, M., Mehring, M., Reinhold, T. & Schliep, R. 2008. *The Governance of Biodiversity (GoBi) Project: A vision for protected area management and governance*. GoBi Research Group, Greifswald, Germany.
- Stoll-Kleemann, S., De La Vega-Leinert, A.C. & Schultz, L. 2010. The role of community participation in the effectiveness of UNESCO Biosphere Reserve management: evidence and reflections from two parallel global surveys. *Environmental Conservation* 37(3): 227-238.
- Stoll-Kleemann, S., Buer, C. & Solbrig, F. 2011. Socio-economic monitoring in protected areas in Germany – what do local people and their mayors think about their biosphere reserve? In: Wesemüller, H., Kuschniok, N., Shünemann, J. & Kreft, V. (eds.) *Progress report 2009-2011. National Nature Landscapes. EUROPARC Germany*, pp. 30-33.
- Strauss, A. & Corbin, J. 1998. *Basics of qualitative research. Techniques and procedures for developing grounded theory*. 2nd edition. London: Sage.
- Swart, S. 2004. The Construction of Eugène Marais as an Afrikaner Hero. *Journal of Southern African Studies* 30(4): 847-867.
- Tabah, L. 1982. Population Growth. Chapter 8: 175-205. In: Faaland, J. 1982. *Population and the World Economy in the 21st Century*. England: Basil Blackwell Publishers, Oxford.
- Takhtajan, A. 1986. *Floristic regions of the world*. California: University of California Press, Berkeley.
- Taylor, W., Hinde, G. & Holt-Biddle, D. 2003. *The Waterberg: the natural splendours and the people*. Cape Town: Struik Publishers.
- Terborgh, J. & Winter, B. 1983. A method for siting parks and reserves with special reference to Colombia and Ecuador. *Biological Conservation* 27:45-58.

- The Presidency of South Africa. 2010. Guide to the Outcomes Approach. URL: <http://www.thepresidency.gov.za/dpme/docs/guideline.pdf> (accessed on 2013/04/26).
- Thompson, D. 2011. Personal communication. Project Manager, K2C. Tzaneen, February 2011.
- Tucker, C.M. 2013. Developing sustainability indicators for the Kogelberg and Cape West Coast Biosphere Reserves, South Africa. M.Sc. thesis, Faculty of AgriSciences, Department of Conservation Ecology and Entomology, University of Stellenbosch, South Africa.
- Tuhus-Dubrow, R. 2010. Seeing Double-Green: Can biodiversity conservation reduce poverty? Slate. URL: <http://www.slate.com/id/2271366/> (accessed on 2011/10/18).
- Tumusiime, D. & Vedeld, P. 2012. False promise or false premise. Using tourism revenue sharing to promote conservation and poverty reduction in Uganda. *Conservation and Society* 10: 15-28.
- Turtle Conservation Coalition [Rhodin, A.G.J., Walde, A.D., Horne, B.D., van Dijk, P.P., Blanck, T., and Hudson, R. (eds.)] 2011. *Turtles in Trouble: The World's 25+ Most Endangered Tortoises and Freshwater Turtles-2011*. Lunenburg, MA: IUCN/SSC Tortoise and Freshwater Turtle Specialist Group, Turtle Conservation Fund, Turtle Survival Alliance, Turtle Conservancy, Chelonian Research Foundation, Conservation International, Wildlife Conservation Society, and San Diego Zoo Global, 54 pp. URL: <http://www.iucn-tftsg.org/top-25-2011/> (accessed on 2011/03/18).
- Udvardy, M.D.F. 1975. A classification of the biogeographical provinces of the World. IUCN Occasional Paper No. 18. Morges, Switzerland: IUCN.
- UNEP. 2002. Report on the 6th meeting of the Conference of the Parties to the Convention on Biological Diversity (UNEP/CBD/COP/6/20/Part 2) Strategic Plan Decision VI/26. URL: <http://www.cbd.int/decision/cop/?id=7200> (accessed on 2013/05/03).
- UNESCO. 1974a. Report of the Task Force on Criteria and Guidelines for the Choice and Establishment of Biosphere Reserves. ICC 3rd session, 17-29 September 1974. Paris: UNESCO.
- UNESCO. 1974b. MAB Task Force on Criteria and Guidelines for the Choice and Establishment of Biosphere Reserves. MAB Report Series No. 22. Paris: UNESCO.
- UNESCO. 1984. The Action Plan for Biosphere Reserves. *Nature & Resources* 20(4): 11-22.
- UNESCO. 1996a. Biosphere Reserves: The Seville Strategy and the Statutory Framework of the World Network. Paris: UNESCO.
- UNESCO. 1996b. Man and the Biosphere Programme: International Conference on Biosphere Reserves, Seville, Spain, 20-25 March 1995. Final Report. MAB Report Series No. 65. Paris: UNESCO.
- UNESCO. 2000. Solving the Puzzle: The Ecosystem Approach and Biosphere Reserves. Paris: UNESCO.
- UNESCO. 2001. Seville +5: International meeting of experts. MAB Report Series No. 69. Paris: UNESCO.
- UNESCO. 2002a. Biosphere reserves: Special places for people and nature. Paris: UNESCO.
- UNESCO. 2002b. Periodic Review of Biosphere Reserves, January 2002. Paris: UNESCO. URL: <http://www.unesco.org/mab/doc/brs/PerRevE.doc> (accessed on 2010/05/25).
- UNESCO. 2004. Biosphere reserve nomination form, February 2004. URL: <http://www.unesco.org/mab/doc/brs/BRnomformE.pdf> (accessed on 2011/11/03).
- UNESCO. 2008. Madrid Action Plan for Biosphere Reserves (2008 - 2013). UNESCO, Paris. URL: <http://unesdoc.unesco.org/images/0016/001633/163301e.pdf> (accessed on 2010/05/23).
- UNESCO. 2010. Lessons from Biosphere Reserves in the Asia-Pacific region, and a way forward. A regional review of biosphere reserves in Asia and the Pacific to achieve sustainable

- development. UNESCO office, Jakarta. URL:  
<http://unesdoc.unesco.org/images/0018/001883/188345e.pdf> (accessed on 2011/06/29).
- UNESCO. 2012. UNESCO MAB Publications. URL: <http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/related-info/publications/> (accessed 2012/05/30).
- UNESCO. 2013. Biosphere reserves: Learning sites for sustainable development. URL:  
<http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/> (accessed on 2013/05/08).
- UNESCO MAB. 1996. National criteria for biosphere reserves developed in Germany. Biosphere Reserves Bulletin of the World Network, No. 4, December 1996. Paris: UNESCO.
- UNESCO Press. 2004. West African environment ministers want NEPAD to use biosphere reserves as laboratories for sustainable development. Press release No. 2004-06, 26 January 2004. Paris: UNESCO.
- UNESCO Today. 2007. UNESCO Biosphere Reserves: Model regions with a global reputation. Journal of the German Commission for UNESCO, 2/2007.
- United Nations (UN). 2000. Millennium Development Goals. URL:  
<http://www.un.org/millenniumgoals/> (accessed on 2012/04/18).
- United Nations (UN). 2001. World Population Monitoring 2001: Population, environment and development. The Concise Report. New York: UN. URL:  
<http://www.un.org/esa/population/publications/publications.htm> (accessed on 2013/04/09).
- University of Vienna. 2008. Biodiversity and Ecosystem Services as scientific foundation for the sustainable implementation of the redesigned Biosphere Reserve “Neusiedler See”, Final report, October 2008 – January 2012. URL: <http://dx.doi.org/10.1553/bioserv-neusiedler-see> Online-ISBN: 978-3-7001-7289-5 (accessed on 2013/06/06).
- Uys, M-T. 2011. Personal communication. Chair, EXCO, K2C. Tzaneen, February 2011.
- Vane-Wright, R.I. 1996. Identifying priorities for the conservation of biodiversity: systematic biological criteria within a socio-political framework. In: Gaston, K.J. (ed.) Biodiversity. A biology of numbers and difference. Oxford: Blackwell Science, pp. 309-344.
- Van Wyk, A. E. & Smith, G. F. 2001. Regions of Floristic Endemism in Southern Africa. A review with emphasis on succulents. p. 19. South Africa: Umdaus Press, Hatfield.
- Vennesson, P. 2008. Case studies and process tracing: theories and practices. Chapter 12: 223-239. In: Della Porta, D. & Keating, M. (eds.) Approaches and methodologies in the social sciences. A pluralist perspective. Cambridge: Cambridge University Press.
- Victor, R.A.B.M., Neto, J.d.B.C, Ab’Saber, A.N., Serrano, O., Domingos, M, Pires, B.C.C., Amazonas, M. & Victor, M.A.M. 2004. Application of the biosphere reserve concept to urban areas. The case of São Paulo City Green Belt Biosphere Reserve, Brazil - São Paulo Forest Institute: A case study for UNESCO. Annals of the New York Academy of Sciences 1023: 237-281.
- Volschenk, T. 2010. Personal communication. Dennis Moss Partnership, Stellenbosch.
- Von Droste, B. 1995. Biosphere Reserves: A comprehensive approach. Chapter 8, pp. 58-62. In: McNeely, J.A. (ed.) Expanding Partnerships in Conservation, IUCN. Washington DC: Island Press.
- Walker, R. 1985. Applied qualitative research. UK: Gower Publishing Company.
- Walker, C. & Bothma, J. du P. 2005. The Soul of the Waterberg. Houghton: Waterberg Publishers and African Sky Publishing.

- Walker, R.T. & Solecki, W.D. 1999. Managing land use and land-cover change: The New Jersey Pinelands Biosphere Reserve. *Annals of the Association of American Geographers* 89(2): 220-237.
- Waterberg Biosphere Reserve (WBR). 2010. Draft Management Plan Report, December 2010. Waterberg District Municipality.
- Waterberg Biosphere Reserve (WBR) Committee. 1998. The evaluation and registration of the proposed Waterberg Biosphere Reserve under the Man and the Biosphere (MAB) Programme. Unpublished document, 9 November 1998. Submission to UNESCO.
- Waterberg Meander. 2009. Volume 1. Unpublished document, July 2009. Waterberg Biosphere Reserve. URL: <http://www.waterbergmeander.co.za> (accessed on 2011/03/08).
- Waterberg Nature Conservancy (WNC). 2011. A History of the Waterberg Nature Conservancy. URL: [http://www.waterbergnatureconservancy.com/history\\_of\\_the\\_conservancy.10.html](http://www.waterbergnatureconservancy.com/history_of_the_conservancy.10.html) (accessed on 2011/03/09).
- Watson, J. & Wilkins, P. 1999. The Western Australian South Coast Macro Corridor project – a bioregional strategy for nature conservation. *Parks* 9(3): 7-16.
- Watts, M. & Ebbutt, D. 1987. More than the Sum of the Parts: research methods in group interviewing. *British Educational Research Journal* 13(1): 25-34.
- Weimarck H. 1941. Phytogeographical groups, centres and intervals within the Cape flora. *Lunds University, Arssk. Avd. 2. 37: 1-143.*
- Wells, M., Brandon, K. & Hannah, L. 1992. *People and Parks: Linking protected area management with local communities.* Washington, DC: World Bank.
- White, M.J. 1998. Land claims and restitution in South Africa - The valuation perspective. 4th Pacific Rim Real Estate Society Conference, 19-21 January 1998. Perth, Australia. URL: [http://scnc.ukzn.ac.za/doc/GEOG/Land\\_Claims/White-MJ\\_Land\\_claims.pdf](http://scnc.ukzn.ac.za/doc/GEOG/Land_Claims/White-MJ_Land_claims.pdf) (accessed on 2011/06/15).
- Williams, J.C., Reville, C.S. & Levin, S.A. 2005. Spatial attributes and reserve design models: A review. *Environmental Modeling and Assessment* 10: 163-181.
- Wilmink, T. & Zange, C. 2010. Lessons Learnt Report: Organisational Development in the Kruger2Canyon Biosphere Region Project. Unpublished report. German Development Service (DED), South Africa and Lesotho.
- Wilson, K.A., Cabeza, M. & Klein, C.J. 2009. Fundamental concepts of spatial conservation prioritization. In: Moilanen, A., Wilson, K.A. & Possingham, H.P. (ed.) *Spatial Conservation Prioritisation: Quantitative Methods and Computational Tools.* UK: Oxford University Press, Oxford, pp. 16-27.
- World Bank. 2011. World Bank Country and Lending Groups. URL: <http://data.worldbank.org/about/country-classifications/country-and-lending-groups> (accessed on 2011/02/03).
- World Commission on Environment and Development (WCED; Brundtland Commission). 1987. *Our Common Future.* Oxford: Oxford University Press.
- Xu, Y. 1995. Sense of Place and Identity. Unpublished document. University of Illinois, East St. Louis Action Research Project. URL: <http://www.eslarp.uiuc.edu/la/la437-f95/reports/yards/main.html> (accessed on 2011/06/22).
- Yin, R.K. 2009. *Case study research: Design and methods.* 4th edition. Applied Social Research Methods Vol. 5. USA: Sage Publications.

- Younge, A. & Fowkes, S. 2003. The Cape Action Plan for the Environment: overview of an ecological planning process. *Biological Conservation* 112: 15-28.
- Zafra-Calvo, N., Cerro, R., Fuller, T., Lobo, J.M. Rodriguez, M.A. & Sarkar, S. 2010. Prioritizing areas for conservation and vegetation restoration in post-agricultural landscapes: A biosphere reserve plan for Bioko, Equatorial Guinea. *Biological Conservation* 143: 787-794.
- Zimmerer, K.S. 2000. The reworking of conservation geographies: Nonequilibrium landscapes and nature-society hybrids. *Annals of the Association of American Geographers* 90(2): 356-369.
- Zube, E.H. 1995. No park is an island. Chapter 20, pp. 169-177. In: McNeely, J.A. (ed.) *Expanding Partnerships in Conservation*. IUCN. Washington D.C: Island Press.

## Eidesstattliche Erklärung

Hiermit erkläre ich, dass diese Arbeit bisher von mir weder an der Mathematisch-Naturwissenschaftlichen Fakultät der Ernst-Moritz-Arndt-Universität Greifswald noch einer anderen wissenschaftlichen Einrichtung zum Zwecke der Promotion eingereicht wurde.

Ferner erkläre ich, dass ich diese Arbeit selbständig verfasst und keine anderen als die darin angegebenen Hilfsmittel und Hilfen benutzt und keine Textabschnitte eines Dritten ohne Kennzeichnung übernommen habe.

Ruida Pool-Stanvliet

Datum

## Acknowledgements

I would like to convey my most sincere thanks to my supervisor, Susanne Stoll-Kleemann, for taking me on as a student although I am based very far-off at the southern end of Africa. Thank you for your constant support, advice and quick responses to my many electronic communications.

In addition I would like to extend my sincerest gratitude towards my locally based academic advisor, Prof. Dr. J.H. (Jan) Giliomee, for his advice and support, especially during the final and difficult stretches of the writing process.

Throughout my research I had the privilege to request inputs from Dr. Andrew Knight who, at the time, was based at the University of Stellenbosch, and Prof. Dr. Tim O’Riordan, professor emeritus of the University of East Anglia. Please accept my sincere thanks.

To my employer, CapeNature, as well as my supervisor at Scientific Services, Dr. Andrew Turner, thank you for allowing me the freedom and time to conduct this research.

My most sincere gratitude to the biosphere reserve fraternity of South Africa for granting access to information, taking part in discussions and meetings, and for sharing their most valuable time and expertise.

I would like to acknowledge Earth Photos and the Waterberg Biosphere Reserve for the use of the image on the front page of this dissertation.

The Kogelberg Biosphere Reserve provided some financial support for which I would like to extend my sincere thanks.

During the long process of writing, various colleagues provided input. In this regard, I would like to thank John Rosmarin, Karen Steenkamp, Peter Lloyd, Colin Tucker, Rhett Smart, Kevin Shaw, Therese Forsyth and Melanie Simpson.

Love and gratitude to my two sisters, Aletta and Elrina, for walking this road with me.

Lastly I would like to acknowledge the best family in the world, Etienne, Mika, Emma and Jana. You have loved and supported me throughout the years. Thanks and a group hug to you, for being my ever-present supporting structure.

Praise to the Lord for issuing me with a decent mind.

## Annexure 1: Literature review on biosphere reserve criteria: Suites of criteria

## Annexure 1: Literature Review on Biosphere Reserve Criteria: Suites of Criteria

<b>Criterion Suite</b>	<b>Detailed Criteria</b>	<b>References</b>
<b>Ecological/Biological</b>	Representativeness (biogeographical regions/ecoregions/habitats/vegetation types/etc.)	Branquart <i>et al.</i> 2008, Gilman 1997, Gilman <i>et al.</i> 2011, Hockey & Branch 1997, JANIS 1997, Kuo & Yu 1999, McNeill 1994, Pressey <i>et al.</i> 2000, Roberts <i>et al.</i> 2003a; 2003b; Stevens 2002
	Replication/Vegetation type	Bourgeron <i>et al.</i> 2000, Funch & Harley 2007, Gilman <i>et al.</i> 2011, JANIS 1997, Moffett & Sarkar 2006, Pressey <i>et al.</i> 2000
	Biological significance/Species diversity/Ecosystem diversity/Habitat diversity/Refugia for rare/endemic species	Brandon <i>et al.</i> 2005, Branquart <i>et al.</i> 2008, Diaz-Balteiro & Romero 2008, Fuller <i>et al.</i> 2006, Gilman 1997, Gilman <i>et al.</i> 2011, Hockey & Branch 1997, Ianni & Geneletti 2010, JANIS 1997, Kelleher & Kenchington 1992, Kim 2008, Kuo & Yu 1999, Lü <i>et al.</i> 2003, McGregor 2003, McNeill 1994, Moffett & Sarkar 2006, Phua & Minowa 2005, Roberts <i>et al.</i> 2003a, 2003b, Shafer 1999, Stoms <i>et al.</i> 2002, Williams <i>et al.</i> 2005, Zafra-Calvo <i>et al.</i> 2010
	Ecological connectivity	Beger <i>et al.</i> 2010, Branquart <i>et al.</i> 2008, Calder 2007, Funch & Harley 2007, Gilman <i>et al.</i> 2011, JANIS 1997, Kim 2008, Moffett & Sarkar 2006, Roberts <i>et al.</i> 2003a, 2003b, Shafer 1999
	Size (total and individual zones)	Branquart <i>et al.</i> 2008, Gilman 1997, Gilman <i>et al.</i> 2011, Hockey & Branch 1997, Ishwaran <i>et al.</i> 2008, JANIS 1997, Kelleher & Kenchington 1992, Kuo & Yu 1999, McNeill 1994, Moffett <i>et al.</i> 2006, Roberts <i>et al.</i> 2003a, 2003b
	Threats to loss of biodiversity	Gaston <i>et al.</i> 2002, Moore <i>et al.</i> 2004, Rouget <i>et al.</i> 2006, Sewall <i>et al.</i> 2011
	Ecological resilience	Ianni & Geneletti 2010, Stoms <i>et al.</i> 2002
	Availability of ecological data	Bertsky 2008
	Land cover/Land use	Calder 2007, Ohl <i>et al.</i> 2007
	Naturalness	Gilman 1997, Kelleher & Kenchington 1992, Kuo & Yu 1999, McNeill 1994
<b>Social</b>	Stakeholder support/attitudes	Fee <i>et al.</i> 2009, Gilman 1997, Gilman <i>et al.</i> 2011, Kim 2008, Lü <i>et al.</i> 2003, McGregor 2003, Roberts <i>et al.</i> 2003b, Shafer 1999, Shearer & Xiang 2009
	Recreation value	Diaz-Balteiro & Romero 2008, Gilman 1997, Hockey & Branch 1997, Kelleher & Kenchington 1992, Moffett & Sarkar 2006, Roberts <i>et al.</i> 2003a
	Total population/ demography	Brandon <i>et al.</i> 2005, Fuller <i>et al.</i> 2006, Moffett & Sarkar 2006, Moffett <i>et al.</i> 2006, Ohl <i>et al.</i> 2007, Shafer 1999
	Scenic quality/Aesthetic appeal	Hockey & Branch 1997, Moffett & Sarkar 2006, Roberts <i>et al.</i> 2003a
	Human alteration (present and future)/Existing settlements	Diaz-Balteiro & Romero 2008, Funch & Harley 2007, Phua & Minowa 2005, Polasky <i>et al.</i> 2008, Shafer 1999

	Provision of ecosystem services	Roberts <i>et al.</i> 2003a, 2003b
	Educational value	Gilman 1997, Hockey & Branch 1997, Kuo & Yu 1999, Lü <i>et al.</i> 2003, Roberts <i>et al.</i> 2003a
<b>Economic</b>	Sustainable financing	Fee <i>et al.</i> 2009, Gilman <i>et al.</i> 2011, McGregor 2003
	Tourism opportunities	Hockey & Branch 1997, Makeddah 2010, Roberts <i>et al.</i> 2003a, Zimmerer & Carter 2002
	Establishment costs	Bourgeron <i>et al.</i> 2000, McGregor 2003, Stoms <i>et al.</i> 2002, Williams <i>et al.</i> 2005
	Contribution of protection to maintaining economic value	Roberts <i>et al.</i> 2003a
	Operational costs	Ianni & Geneletti 2010, Lü <i>et al.</i> 2003
<b>Political</b>	Level of political support/acceptability	Fee <i>et al.</i> 2009, Gilman <i>et al.</i> 2011, Ishwaran <i>et al.</i> 2008, Kelleher & Kenchington 1992, McGregor 2003, Roberts <i>et al.</i> 2003a
	Enforceability	Hockey & Branch 1997, Roberts <i>et al.</i> 2003a
	National/international importance	Kelleher & Kenchington 1992, Roberts <i>et al.</i> 2003a
	Political visibility/degree of exposure	Ianni & Geneletti 2010
	Integration in land-use planning	Fee <i>et al.</i> 2009
	Political resilience	Ianni & Geneletti 2010
	Local conflict	Ohl <i>et al.</i> 2007
	Need for conservation action	Kuo & Yu 1999, Pressey <i>et al.</i> 2000
<b>Governance/Management</b>	Persistency	Branquart <i>et al.</i> 2008, Gilman <i>et al.</i> 2011
	Legal implications	Gilman <i>et al.</i> 2011, Ianni & Geneletti 2010, Kuo & Yu 1999, McNeill 1994
	Management plan/framework	Gilman <i>et al.</i> 2011
	Logistics of management	Ianni & Geneletti 2010
	Site spatial design/Core, buffer zonation	Branquart <i>et al.</i> 2008, Kuo & Yu 1999, Shafer 1999, Zafra-Calvo <i>et al.</i> 2010
	Compatibility with existing uses	Roberts <i>et al.</i> 2003a
	Institutional collaboration	Fee <i>et al.</i> 2009, Ishwaran <i>et al.</i> 2008, McGregor 2003
	Organization/manageability	Gilman 1997, Ianni & Geneletti 2010, McGregor 2003, Sewall <i>et al.</i> 2011, Stoms <i>et al.</i> 2002
<b>Scientific</b>	Presence of current research	Gilman 1997, Roberts <i>et al.</i> 2003a
	Potential/value for scientific research	Kelleher & Kenchington 1992, Kuo & Yu 1999, Lü <i>et al.</i> 2003, Moffett & Sarkar 2006, Stoms <i>et al.</i> 2002

## Annexure 2: List of components to be used in semi-structured interviews on the effectiveness of South African biosphere reserves

COMPONENT		DETAILED QUESTIONS AND DESCRIPTION
Three functions according to UNESCO's Seville Strategy		To what extent does the biosphere reserve reflect the three functions of conservation, development and logistic support? (UNESCO 1996a; 2002b) Please expand on collaborations and projects covering the three functions. Does the biosphere reserve have specific programs and/or projects for scientific research, biodiversity monitoring and environmental education? (Lü <i>et al.</i> 2003; Queensland Parks and Wildlife Service 2002; UNESCO 1996a, 2002b)
Zonation system of three elements according to UNESCO's Seville Strategy		Does the biosphere reserve reflect the three zones of core, buffer and transition? (UNESCO 1996a, 2002b, 2008) Were guidelines drafted in relation to management objectives and appropriate land uses for each zone?
Seven criteria according to the Statutory Framework of the World Network of Biosphere Reserves		Which biogeographical regions or biomes is this biosphere reserve representing? (Pressey & Taffs 2001; UNESCO 1996a, 2002b) What is the total size of the biosphere reserve? (Ervin 2003; Pressey & Taffs 2001; UNESCO 1996a, 2002b) What is the extent of the three individual zones that make up the biosphere reserve?
Nomination history		Please expand on historical aspects of the UNESCO nomination. Why was the biosphere reserve concept selected for this specific area? Is the biosphere reserve being perceived as somewhat different to another type of protected area/landscape initiative? (Robertson Vernhes 2007) If yes, please discuss. Has the biosphere reserve taken part in a periodic review process? (UNESCO 1996a; Price 2002) If yes, please expand on benefits of this process.
Aspects of Implementation	Institutional authority	Does the biosphere reserve have a designated institutional authority? (Corbett 1995; UNESCO 1996a, 2002b) If yes, what form of authority? Please explain the representivity of the authority within the region.
	Financial resources	Does the biosphere reserve have secure long-term financial resources to operate efficiently? (Corbett 1995; Pasquini 2003; Stoll-Kleemann & Job 2008; UNESCO 2002b)
	Regional planning	Has the biosphere reserve zonation been taken up in regional planning frameworks and legislation? (UNESCO 2008) If yes, please explain. Has any specific land-use guidelines or performance standards been drafted for each zone? (UNESCO 2008) If yes, please provide details.
	Management framework	Does the biosphere reserve have an approved management plan or framework? (Ervin 2003; Pressey & Taffs 2001; Stoll-Kleemann & Job 2008; UNESCO 1996a, 2002b) How many staff members are designated to the biosphere reserve, responsible for implementing the management plan? (Pasquini 2003) Is there an independent office space from where the biosphere reserve is being coordinated? Does the biosphere reserve have a clearly defined vision and objectives? (Hockings <i>et al.</i> 2000) Does the management framework address the complementarity and

		responsibilities of stakeholders relating to biosphere reserve objectives? (Hakizumwami 2000; UNESCO 2002b)
	Legislation and government support	How are biosphere reserves being reflected in national legislation? (Hakizumwami 2000, Stoll-Kleemann & Job 2008) What kind of support is being given to biosphere reserves from local, regional and national authorities? (Dudley <i>et al.</i> 1999; Stoll-Kleemann & Job 2008)
	Partners/Stakeholders	Is the biosphere reserve actively pursuing partnerships with specific stakeholders such as public authorities, local communities, private landowners and visitors? (Hakizumwami 2000; Queensland Parks and Wildlife Service 2002; UNESCO 1996a, 2002b) According to you, which benefits are being derived for the general public as a result of the existence of the biosphere reserve?
	Threats/Challenges	Please expand on major threats to the biosphere reserve, such as extractive industries, poaching, pollution, political changes, changes in land-use, etc. (Dudley <i>et al.</i> 1999; Pasquini 2003; UNESCO 1996a, 2002b) Are there adaptive management policies in place to address these challenges?

---

### Annexure 3: Questionnaire survey for stakeholders represented on the management entity of individual biosphere reserves

---

Dear

NOTE: You are Interviewee no. X

You are herewith invited to please complete this questionnaire (comprising 4 boxes) as part of the methodology for a research project in collaboration with the Ernst-Moritz-Arndt-Universität in Greifswald, Germany, under supervision of Prof Dr Susanne Stoll-Kleemann. The research topic is: The UNESCO MAB Program in South Africa: new criteria for future designation based on empirical studies of existing biosphere reserves.

The research takes the form of a multicase study of which the XXX Biosphere Reserve forms one of the cases.

The questionnaire is being sent electronically and could be completed and returned in the same format. Alternatively, the questionnaire can be printed, completed by hand and faxed to 021 866 1523 (attention Ruida Stanvliet).

Please provide your personal details in box 1 for completeness. The final data will be dealt with anonymously.

We thank you for your time spent on the questionnaire. Please indicate whether you would like to receive final documentation on the research project.

Yes, please send information electronically \_\_\_\_\_

Yes, please post information to the address provided below \_\_\_\_\_

No, I will obtain information in another way \_\_\_\_\_

Thank you and warm regards.



Ruida Stanvliet  
Researcher  
CapeNature

Contact details:      *Private Bag X 5014*  
                                 *Stellenbosch*  
                                 *7599*  
                                 *Cell: 082 485 8993*  
                                 *Email: [rstanvliet@capenature.co.za](mailto:rstanvliet@capenature.co.za)*  
                                 *[stanr@webmail.co.za](mailto:stanr@webmail.co.za)*

**Box 1**

Personal Information	
Name	
Affiliation	
Position	
Postal Address	
Email	
Contact Number	
Fax Number	
Years of involvement with the XXX Biosphere Reserve	From ----- to -----

**Box 2**

Questions		Answers (Please tick one)
1	In your opinion, is the biosphere reserve concept a valuable tool with which to do landscape management in South Africa?	Yes
		Maybe
		No
2	In your specific biosphere reserve, do you think the designation is adding value to the area?	Yes
		Somewhat
		No
3	Is the organization that you represent in support of the biosphere reserve in your area?	Yes
		Not fully
		No
4	Are you of the opinion that the management entity of your biosphere reserve is doing a good job of managing the biosphere reserve effectively?	Yes
		Somewhat
		No
5	Do you truly agree with the statement "biosphere reserves are special places for people and nature"?	Yes
		Sometimes
		No
Please add any comments on the UNESCO biosphere reserve concept <i>per se</i> .		
You are welcome to provide further insight or explanations with regards to your selected choices.		

**Box 3**

<b>List of problems/challenges faced by your biosphere reserve</b>	<b>Interviewee no:</b>
<b>Please rank the following elements in order of priority from 1 (highest) to 10 (lowest)</b>	<b>Ranking</b>
Support (buy-in) from local authorities (municipalities)	
Too little benefits perceived by local communities resulting in a lack of support	
Lack of long-term vision and objectives	
Insufficient long-term financial resources	
Lack of dedicated biosphere reserve personnel	
Insufficient legal means (lack of 'teeth') to implement the biosphere reserve concept	
Not enough insight into the value of implementing the biosphere reserve concept	
Too much of a conservation (green) focus and not enough emphasis on other issues such as development	
Biosphere reserve concept not strongly supported by national government	
Too little awareness amongst roleplayers and local communities	
Any other challenges:	
You are welcome to provide further insight or explanations with regards to your rankings.	

**Box 4**

<b>List of positive elements linked to your biosphere reserve</b>	<b>Interviewee no:</b>
<b>Please rank the following elements in order of priority from 1 (highest) to 10 (lowest)</b>	<b>Ranking</b>
The biosphere reserve creates international visibility for the area	
The biosphere reserve concept is a tool with which to facilitate collaborative management to the benefit of the region	
A biosphere reserve is much different (in a positive way) to a traditional protected area such as a national park or nature reserve	
The biosphere reserve creates an opportunity for communities to be involved in management decisions about the future of their area	
The biosphere reserve attracts more tourists/visitors	
The biosphere reserve provides a means to attract international funding to the region	
The biosphere reserve creates awareness about sustainable development	
The biosphere reserve has resulted in people becoming more aware of their interconnectedness to the natural environment	
The biosphere reserve created more jobs in the area	
The biosphere reserve resulted in increased property values	
Any other positive elements:	
You are welcome to provide further insight or explanations with regards to your rankings.	

## Annexure 4: Questionnaire on Criteria for South African Biosphere Reserves

### QUESTIONNAIRE

#### CRITERIA FOR SOUTH AFRICAN BIOSPHERE RESERVES

*This questionnaire forms part of a research study on criteria for South African Biosphere Reserves. The study is conducted in collaboration with the Ernst-Moritz-Arndt University in Greifswald, Germany under supervision of Prof. Dr. Susanne Stoll-Kleemann.*

---

1) What is the name of the biosphere reserve that you are involved in?

2) What is your position within your biosphere reserve (e.g. coordinator, chairperson, director, member of committee)?

3) Please state your name, occupation and institution affiliation:

Name: [ ]

Occupation: [ ]

Institution: [ ]

4) Please state your current contact details:

Address: [ ]

City/Town: [ ]

Province: [ ]

Postal Code: [ ]

Contact number: [ ]

Email address: [ ]

5) What is your academic/professional background?

( ) Social sciences

( ) Natural sciences

( ) Engineering

Economics

Other

6) What is the total size of the biosphere reserve that you are involved in (ha)?

7) What is the approximate population size of your biosphere reserve?

Core zone:

Buffer zone:

Transition zone:

Do not know:

8) Do you agree with the following statement: *South Africa needs country specific criteria which can be used in the evaluation of new sites for UNESCO biosphere reserves.*

Yes

No

Unsure

9) In your opinion, what are the three biggest challenges to the effective management of your biosphere reserve?

Challenge 1:

Challenge 2:

Challenge 3:

10) Below is a list of potential criteria to be considered in the selection of sites for biosphere reserve status. Please reflect on these criteria and indicate their significance where (1) is “low significance”, (2) is “moderately significant”, and (3) is “high significance”.

*10.1) Ecological/Biological:*

Need to be representative of a biogeographic region: 1  2  3

Replication of vegetation types between BRs: 1  2  3

Biological significance of BR: 1  2  3

Ecological connectivity with other protected areas: 1  2  3

Certainty of long-term persistence of BR: 1  2  3

Sustainable land use practices in place: 1  2  3

*10.2) Social:*

Wide stakeholder support: 1  2  3

Need to have aesthetic appeal: 1  2  3

Negative impact of human settlements on persistence of BR: 1  2  3

Play a role in the provision of ecosystem services: 1  2  3

High educational value: 1  2  3

*10.3) Economic:*

Sustainable financing of BR: 1  2  3

BR offers tourism opportunities: 1  2  3

Consider BR establishment costs: 1  2  3

Consider long-term operational costs: 1  2  3

*10.4) Political:*

Need high level of political support: 1  2  3

BR concept needs to be enforceable: 1  2  3

BR is integrated in land use planning: 1  2  3

*10.5) Governance:*

Consider legal implications of BR establishment: 1  2  3

Existence of a management framework: 1  2  3

Spatial design in place (core, buffer, transition): 1  2  3

Good institutional collaboration within BR area: 1  2  3

Consider manageability of BR: 1  2  3

Dedicated BR staff: 1  2  3

BR management independent from government structures: 1  2  3

11) Do you think there should be a size limit for future South African biosphere reserves?

Minimum size limit:

Maximum size limit:

Yes

Yes

No

No

Unsure

Unsure

If Yes, please give your opinion on size limits for South African biosphere reserves (ha):

Minimum:

Maximum:

12) Please provide your opinion on what should have been put in place at the outset of the nomination process of your biosphere reserve that would make the running of the BR more efficient now?

---

## Thank You!

*Ruida Stanvliet*

*rstanvliet@capenature.co.za*

*Researcher*

*CapeNature, Stellenbosch, South Africa*

---

## Annexure 5: Results from semi-structured interviews on the effectiveness of the Kogelberg Biosphere Reserve

COMPONENT		DESCRIPTIVE RESULTS	RATING 23/33
<b>Three functions</b> according to UNESCO's Seville Strategy (Lü et al. 2003, Queensland Parks and Wildlife Service 2002, UNESCO 1996, 2002b)		Conservation function is well established with good collaboration between land owners related to fire management, alien vegetation control, conservation stewardship, and marine conservation. Development function is limited and developments in the buffer zone are especially controversial. Logistic support is covered quite well, e.g. education projects with Harold Porter Botanical Gardens; research projects with two universities; studies on the marine conservation project; Table Mountain Aquifer projects including climatic monitoring; population dynamics; post-fire monitoring; SASS monitoring; and well-developed awareness projects.	2
Zonation system of <b>three elements</b> according to UNESCO's Seville Strategy (UNESCO 1996, 2002b, 2008)		Elements are clearly reflected in the zonation map. Urban sprawl and edge effects are transforming rural areas beyond the urban edge. The KBR is to embark upon a BR Framework Plan. Good co-operation with municipalities will be much needed to implement the Framework Plan across municipal boundaries. The BR zones are well known amongst developers. Some transition areas should be zoned as buffer.	3
<b>Seven criteria</b> according to the Statutory Framework of the World Network of Biosphere Reserves (Ervin 2003, Pressey & Taffs 2001, UNESCO 1996, 2002b)		The KBR reflects well on these criteria. Of sufficient size - 100 000 hectares of which 25 000 is core (25%), 41 000 (41%) is buffer and 34 000 (34%) forms the transition.	3
<b>Nomination</b> history (Price 2002, Robertson Vernhes 2007, Stanvliet 2009, UNESCO 1996)		The KBR started out as a controversy against the building of a major dam in the Palmiet River. The BR was therefore not really proposed for the rights reasons. KOBIO was established as the public arm, supporting the biosphere reserve process. BRs are very different to other protected areas, <i>inter alia</i> in the way it is being managed and operated, different kinds of activities, very different from a community involvement perspective as well as the need for more landowner involvement. Megaparks in SA are being managed on BR co-management principles. KBR has completed the first 10 yr periodic review. It made the BR take stock and think of the road ahead. There is a definite need for more feedback and inputs from UNESCO through official national channels.	2
Aspects of Implementation	Institutional authority (Corbett 1995, UNESCO 1996, 2002b)	Management entity is a not-for-profit company with a Board of Directors and supporting Management Committee. There is an ongoing need to have more representivity, but the feeling was to not waste time on people who do not want to be involved (not interested). Organs of state that form part of the Management Committee perform constitutional mandates according to delegated legal procedures and regulations.	3
	Financial resources (Corbett 1995, Pasquini 2003, Stoll-Kleemann & Job 2008, UNESCO 2002b)	Future financial challenges with no long-term secure financial resources. Do need sustainable funding - preferably either through local or national government. But local authorities can only function within their tax base. A comparison was made to national parks with large budgets and large staff complements. Possible "adopt the biosphere reserve" project for future funding.	1
	Regional planning (UNESCO 2008)	Zones will be instilled in regional planning through the BR Framework Plan - important for zonation to be inscribed into planning documentation at local government level and formalized in legislation. Need a heavier hand to implement the BR principles. Guidelines for each zone will be addressed in Framework Plan.	1

Management framework (Ervin 2003, Hakizumwami 2000, Hockings, Stolton & Dudley 2000, Pasquini 2003, Pressey & Taffs 2001, Stoll-Kleemann & Job 2008, UNESCO 1996, 2002b)	Approved strategic management framework. Could be positive to do a revision after a 10 year review. One designated staff member (administration officer). Position of coordinator is vacant since June 2010. The management entity is an effective structure. Must however be careful about stagnation. Vision and objectives in place. Need more detail on responsibilities between administrations. In addition there are management plans for Kogelberg Nature Reserve, Palmiet River, and Bot River Vlei.	3
Legislation and government support (Dudley et al. 1999, Hakizumwami 2000, Stoll-Kleemann & Job 2008)	Soft law approach. Not embedded in PA Act, therefore no national legislative support. Only Western Cape provincial act - will be an enabling act on processes, funding and drafting of framework plans. Designation with UNESCO should result in national legislation, but do need to retain the flexibility. Too little support from government. Need buy-in, also financial.	1
Partners/Stakeholders (Hakizumwami 2000, Queensland Parks and Wildlife Service 2002, UNESCO 1996, 2002b)	Need to pursue partnerships more rigorously. Kogelberg lacks with this. Benefits of BR - brings prestige to an area, environmental protection, tourism opportunities, ecosystem services. Much more with an environmental focus. Need local electorate to be vociferous on support for the BR.	2
Threats/Challenges (Dudley et al. 1999, Pasquini 2003, UNESCO 1996, 2002b)	Small-scale subsistence fisheries one of the biggest challenges. Also best implementation vehicle for marine conservation issues. Poaching to be an even bigger threat in future, loss of habitat through bad planning, political changes (fluctuating political environment), demands on resources, extractive industries through minerals act (prospecting permits), integrity of buffer zone due to development pressures. Population growth and resulting urban sprawl pose a huge challenge. Direction on dealing with changes should be incorporated into management framework.	2

## Annexure 6: Results from semi-structured interviews on the effectiveness of the Cape West Coast Biosphere Reserve

COMPONENT		DESCRIPTIVE RESULTS	RATING 26/33
<b>Three functions</b> according to UNESCO's Seville Strategy (Lü <i>et al.</i> 2003; Queensland Parks and Wildlife Service 2002; UNESCO 1996, 2002)		The BR is very active with the conservation and development functions. Logistic support is being dealt with by doing planning in conjunction with municipalities. Currently not so great on research but do have a project on sustainability indicators in collaboration with Stellenbosch University and SAEON's Fynbos Node.	2
Zonation system of <b>three elements</b> according to UNESCO's Seville Strategy (UNESCO 1996, 2002, 2008)		CWCBR covers 378 000 hectares, stretching from the City of Cape Town in the south to the mouth of the Berg River in the north. Initial identification of the core zones and buffer areas was based on biological criteria based on the fact that some vegetation communities are under-represented in the existing protected area system. The zonation of the biosphere reserve includes a designated core area (the West Coast National Park) of 33 685 hectares, an area earmarked as a future southern core of 13 805 hectares, buffer zones of 172 643 hectares and transition zones of 157 867 hectares. Zonation land-use guidelines included in the biosphere reserve framework plan.	3
<b>Seven criteria</b> according to the Statutory Framework of the World Network of Biosphere Reserves (Ervin 2003; Pressey & Taffs 2001; UNESCO 1996, 2002)		CWCBR encompasses an area that is characterized by a unique mosaic of diverse ecosystems, including marine areas, wetlands, dune fields, plains covered with indigenous vegetation, and rocky outcrops. It falls within the Cape Floristic Region. As subunits, three distinct bioregions, namely the West Coast Renosterveld Bioregion (the most threatened bioregion in the Western Cape Province), the Southwest Fynbos Bioregion and the West Strandveld Bioregion, are being realized within the land area of the CWCBR. Sufficient size - 378 000 hectares.	3
<b>Nomination</b> history (Price 2002; Robertson Vernhes 2007; UNESCO 1996)		City of Cape Town was fast expanding northwards and people lobbied for a good support structure to direct future development. Decided on a BR as the best co-management approach. 3 reasons for the BR were: to support good governance; good collaborative management; and good direction for future development. In the process of doing the 10 year review.	3
Aspects of Implementation	Institutional authority (Corbett 1995; UNESCO 1996, 2002)	Cape West Coast Section 21 Company - Board of Directors supported by technical people. In the board meetings the technical members have a vote but directors have a last say. Board members take advice strongly from technical members. 5 municipalities within the domain of CWCBR - West Coast District Municipality, City of Cape Town, local municipalities of Berg River, Saldanha Bay and Swartland. Municipal involvement on CWCBR Company - some are councilors, in addition at least one technical person from each municipality. Attendance of Company meetings by municipalities is not adequate and is often project related.	2
	Financial resources (Corbett 1995; Pasquini 2003; Stoll-Kleemann & Job 2008; UNESCO 2002)	CWCBR has access to local and international funding sources. They do need to keep sourcing more options in order to secure long-term funding. It is only now that long-term secure funding start coming into place. A local business has committed to 5 years of funding. Provincial government is providing a small amount annually. CWCBR is convinced that long-term funding needs to be either government or business based which they are actively pursuing.	2
	Regional planning (UNESCO 2008)	BR has completed a Framework Plan that incorporates Spatial Planning Categories according to relevant legislation. The details of the FP have been fed into municipality plans - this was facilitated by the consultant who also did work for the municipalities. Framework plan includes detailed land-use guidelines.	3
	Management framework (Ervin 2003; Hakizumwami 2000; Hockings, Stolton & Dudley 2000; Pasquini 2003; Pressey & Taffs 2001; Stoll-Kleemann & Job 2008; UNESCO 1996, 2002)	Approved management framework and business plan. BR has a staff complement of 4 - coordinator; conservation stewardship officer; conservation officer (EE and communication); administration officer; in addition 5 interns during 2010 (2 South Africa, 1 Germany, 2 France). Biosphere reserve has an independent office space. Also clearly identified vision and objectives.	3
	Legislation and government support (Dudley <i>et al.</i> 1999;	Presently the biosphere reserve concept in SA is being legislated using a soft law approach. It is not embedded in the Protected Areas Act, therefore no national legislative support. The Western Cape has a proposed provincial biosphere reserve	1

	Hakizumwami 2000; Stoll-Kleemann & Job 2008)	act that will be an enabling act on processes, funding and drafting of framework plans. Designation with UNESCO should result in national legislation, but do need to retain the flexibility. Too little support from government. Need buy-in from national government, also financial support to biosphere reserves. Biosphere reserves need to given “teeth” to implement the principles.	
	Partners/Stakeholders (Hakizumwami 2000; Queensland Parks and Wildlife Service 2002; UNESCO 1996, 2002)	Need to have more community people involved in BR - awareness amongst stakeholders is somewhat lacking. Support from local authorities is somewhat lacking. Land owners are seeking more benefits from the biosphere reserve.	2
	Threats/Challenges (Dudley <i>et al.</i> 1999; Pasquini 2003; UNESCO 1996, 2002)	Success of the CWCBR is very much personality based. Concern about what will happen when the project manager leaves. No real career pathing for current staff members. Mining (sand and clay) is a big issue and a threat - linked to biodiversity. Challenge to provide sufficient input into new development applications with regards to biosphere reserve principles. Biological threats such as alien invasive species and availability of sufficient water resources are being addressed. Social issues (breakdown of social infrastructure; crime); economic issues (unemployment) are pressing challenges.	2

## Annexure 7: Results from semi-structured interviews on the effectiveness of the Waterberg Biosphere Reserve

COMPONENT		DESCRIPTIVE RESULTS	RATING 25/33
<p><b>Three functions</b> according to UNESCO's Seville Strategy (Lü <i>et al.</i> 2003; Queensland Parks and Wildlife Service 2002; UNESCO 1996, 2002b)</p>		<p>Conservation function is being very effectively executed across 2 elements - Marakele national park and large private conservation areas. This function is well resourced and interacts efficiently with WBR.</p> <p>Development function: WBR is doing reasonably well - no mining, no manufacturing, no forestry, little agriculture, mainly tourism. WBR has actively promoted tourism and created a community tourism brand through a new tourism route. Skills training are offered. Only one town - Vaalwater (22 000 people) and about 30 rural villages on periphery. Possibility exists for WBR to have a direct impact on development. WBR is involved in developing a network of NGOs working together on human development.</p> <p>Logistics function: Environmental education has always been very strong in the Waterberg mainly through Lapalala Wilderness School, although not necessarily directly related to the biosphere reserve.</p> <p>New management plan has looked at research been done within the WBR. Although there is no direct research strategy for WBR <i>per se</i>, it has been included in the management plan - but has not been implemented yet.</p>	2
<p>Zonation system of <b>three elements</b> according to UNESCO's Seville Strategy (UNESCO 1996, 2002b, 2008)</p>		<p>All 3 elements well represented in WBR. Original size of biosphere reserve is 655 000 ha, but new plan will extend the WBR to 1.7 million ha. At the first onset there was no logic for original zonation and exclusion of the rest. Waterberg massif is a geological feature and should be included in its entirety. Because of the wilderness quality and conservation evolution to large game farms and reintroduction of species, the new proposal is for inclusion of large areas and the entire mountain massif. Another consideration that led to the larger size was branding - difficult with exclusion of certain areas. All 3 zones will be expanded and more emphasis to be placed on core and buffer. New Protected Areas Act will be used.</p>	3
<p><b>Seven criteria</b> according to the Statutory Framework of the World Network of Biosphere Reserves (Ervin 2003; Pressey &amp; Taffs 2001; UNESCO 1996, 2002b)</p>		<p>WBR is known as the world's only Savanna biosphere reserve.</p> <p>It is the only biosphere reserve in South Africa wholly within the Savanna Biome of the Bushveld district.</p> <p>It is of great biodiversity importance with large numbers of endemic species. The WBR covers a large, virtually unspoilt contiguous area that is being conserved by public and private landowners.</p>	3
<p><b>Nomination</b> history (Price 2002; Robertson Vernhes 2007; UNESCO 1996)</p>		<p>UNESCO biosphere reserve concept was identified in the mid 1990s as the best land-use model to achieve a most needed balance between conservation and development.</p> <p>Logical reasons were set out for identifying the Waterberg area as a biosphere reserve and the process was spearheaded by government, resident landowners as well as local communities.</p> <p>WBR was understood as being about integration of conservation and development with the view to facilitate economic opportunities for local communities.</p>	3
Aspects of Implementation	<p>Institutional authority (Corbett 1995; UNESCO 1996, 2002b)</p>	<p>WBR Section 21 company registered 2006. Stakeholder forum has 50/50 split between government and associations including private sector or community organizations or NGOs. As inclusive as possible. At AGM directors get elected for a 2 year period. Organizations that could be represented are voted on or off at AGM. A balance is needed between different kinds of interests. New management plan proposes an open forum.</p> <p>All 4 local municipalities (in future there will be 6) have representatives but the only district municipality has more representatives due to its intimate involvement in management of the WBR.</p> <p>All municipalities are regarded as stakeholders. Currently there are 4 directors of which one is from Marakele National Park. The WBR usually identifies a champion for biosphere reserve cause in each municipality.</p>	3
	<p>Financial resources (Corbett 1995; Pasquini 2003; Stoll-Kleemann &amp; Job 2008; UNESCO 2002b)</p>	<p>Financial security remains a challenge although the WBR is in a better position now that during the first 8 years. Signed a MoU with district municipality. They have already provided quite substantial funding to the WBR.</p> <p>A MoU with LEDET is in the process that will provide the WBR with operational</p>	2

	<p>expenses. Project financing is important to grow the biosphere reserve. Have made an agreement with a fund raiser. Administration funding to come from project budgets. There is currently no membership fee. Trying to cash in on advertising through the web site. Advertising was sold through Waterberg Meander. WBR wants to be an effective marketing platform for the area.</p>	
Regional planning (UNESCO 2008)	Waterberg district municipality has done an Environmental Management Framework (EMF). WBR management plan fits directly into that and it went through a full public participation process. WBR has 3 avenues to ensure integration into planning processes: provincial legislation; national legislation; local legislation. Will pursue all avenues.	2
Management framework (Ervin 2003; Hakizumwami 2000; Hockings, Stolton & Dudley 2000; Pasquini 2003, Pressey & Taffs 2001; Stoll-Kleemann & Job 2008; UNESCO 1996, 2002b)	WBR has a new management plan, approved in 2010. Only one staff member, a local resident working part time from home. Currently no office space. Vision and objectives clearly identified in management plan. Responsibilities of stakeholders still need to be done.	2
Legislation and government support (Dudley <i>et al.</i> 1999; Hakizumwami 2000; Stoll-Kleemann & Job 2008)	Presently the biosphere reserve concept in SA is being legislated using a soft law approach. It is not embedded in the Protected Areas Act, therefore no national legislative support. Designation with UNESCO should result in national legislation, but do need to retain the flexibility. Too little support from government. Need buy-in from national government, also financial support to biosphere reserves. Biosphere reserves need to be given "teeth" to implement the principles.	1
Partners/Stakeholders (Hakizumwami 2000; Queensland Parks and Wildlife Service 2002; UNESCO 1996, 2002b)	Currently still too few benefits to stakeholders. Biggest benefit is certainly around land use planning. WBR could act as a catalyst between landowners and could be influential in the creation of open systems. The area is a large open effective conservation system.	2
Threats/Challenges (Dudley <i>et al.</i> 1999; Pasquini 2003; UNESCO 1996, 2002b)	Apathy is the biggest threat. Also extensive poaching of wild life, especially Rhino. Political changes remain a challenge. Only 15% of the area is under conventional agriculture, rest under conservation or wildlife. Area should stay a source of clean water. Some threats have receded through EMF. Land claims currently dampen economic activity. High level of unemployment among youth that is why BR is implementing skills training. Not sufficient growth in tourism industry. Other major threat - area is within pleasure periphery of Gauteng (3 hours drive) - therefore maybe subdivision of properties and residential developments. Current national financial crisis puts a break on future developments.	2

## Annexure 8: Lessons learnt and recommendations for the future of the Kruger to Canyons Biosphere Region from the Lessons Learnt Workshop in 2010

TOPIC	LESSONS LEARNT	RECOMMENDATIONS
<b>Rhön Partnership</b>	1. Need for common understanding of the partnership	1. Ensure access to core information especially for new staff members 2. Introduce induction programme
	2. Good, open and productive communication and personal relationships are critical for a fruitful partnership	1. Repeat exchange visits 2. Visits must be well prepared 3. Follow up the exchange 4. Expand fundraising collaboration
<b>Advocacy and Education</b>	1. Involving all stakeholders such as municipalities, traditional authorities, etc. is a key factor for a successful awareness campaign	1. Get broad buy-in from all stakeholders for future campaigns
	2. The K2C website is not owned by the K2C, resulting in irregular updates and difficulties in communication	1. Host own website
	3. Newsletters that are only available as soft copies only reach a limited audience	1. Use hard copies and local newspapers to spread information
<b>Demonstration Projects</b>	1. The formalisation of roles and responsibilities of each stakeholder is needed in internal partnership initiated and externally supported projects	1. Develop a project roll-out protocol
	2. To ensure the quality of the work of service providers good TORs must be established and the process of calling for tenders must be clarified	1. Establish specific TORs 2. Clarify process of calling for tenders in the MoU
	3. Donor commitments should be clarified before embarking on a process	1. Fix donor commitments before implementation
<b>Management Framework</b>	1. The institutional structure of K2C as a non-governmental association with very limited accountability and no clear mandate is not appropriate for managing the K2C Biosphere Region	1. Establish a new legal formation that allows for support funding to be received from government bodies and to allow for joint understanding and support of the unified management of the region from all sectors and stakeholders 2. All relevant stakeholders need to have a common understanding about set-up and mandate of K2C
	2. For the implementation of a management framework it is necessary to provide extensive information and communication about this framework and furthermore the buy-in of all stakeholders	1. Establish a revised operational plan and communications strategy based on the newly developed Management Framework and incorporating the requirements of the newly established S21 and the resultant transformation process 2. Clarify the mandate of K2C
<b>Stakeholders</b>	1. All stakeholders must be involved and their roles and responsibilities must be defined	1. Develop project protocol 2. Increase involvement of private sector 3. Accept differences between various stakeholders 4. Clarify roles and responsibilities of stakeholders for each project

<b>Resources</b>	1. Opportunism in project funding often leads to misguided activities and unsustainable short term project funding	1. Prepare ad framework of fundable activities 2. Consultative process for joint (multi-stakeholder) project implementation 3. Budget for long term operational sustainability
	2. If funding opportunities require activities that are not in line with the common goals and the program, there is a risk of losing effectiveness and impact through scattered activities mainly guided by donor organization and politics	1. Screen funding opportunities against the operational and strategic plan and take a conscious decision
	3. Voluntary contribution needs to be included into the common management framework and guided by the common vision in order to be efficient for the common goals	1. Consultative meetings with voluntary stakeholders for awareness raising

## Annexure 9: Results from semi-structured interviews on the effectiveness of the Kruger to Canyons Biosphere Region

COMPONENT		DESCRIPTIVE RESULTS	RATING 24/33
<p><b>Three functions</b> according to UNESCO's Seville Strategy (Lü <i>et al.</i> 2003; Queensland Parks and Wildlife Service 2002; UNESCO 1996, 2002b)</p>		<p>Conservation function – well implemented. Good communication with Kruger NP, private nature reserves, wildlife college, etc.</p> <p>Development function – progressing well. Latest breakthrough with new Zandspruit development that has implemented sustainable principles because of good communication with developers.</p> <p>Logistic function - research in area is implemented through SAEON, Witz rural facility, wildlife college. As stated SAEON is not in full support of the BR. With regards to education the connection is mainly with a school in Hoedspruit that is supporting the “Schools in Biospheres” project in liaison with UNESCO. K2C is hosting an annual Sustainable Living Festival in Hoedspruit.</p>	2
<p>Zonation system of <b>three elements</b> according to UNESCO's Seville Strategy (UNESCO 1996, 2002b, 2008)</p>		<p>Core, buffer, transition well established (there was a slight reduction in the extent of the core according to the management framework).</p> <p>Guidelines for development within K2C were compiled in 2008 and presented to municipalities in 2009. Will be redone following municipal elections.</p>	3
<p><b>Seven criteria</b> according to the Statutory Framework of the World Network of Biosphere Reserves (Ervin 2003; Pressey &amp; Taffs 2001; UNESCO 1996, 2002b)</p>		<p>The K2C is one of the largest biosphere reserves in the world. It encompasses biogeographical zones that are not yet sufficiently covered in biosphere reserves. It is at the interface of the Eastern Transvaal Drakensberg Escarpment and the Central Lowveld. Sections of three of the country's seven biomes are included in the K2C, namely Grasslands and Afro-montane forests of the escarpment and the Savanna of the lowveld. This combination linked to geological features makes it a unique area.</p>	3
<p><b>Nomination</b> history (Price 2002; Robertson Vernhes 2007; UNESCO 1996)</p>		<p>Started in the late 1980s with the Central Lowveld Development Forum that was bringing communities together. Consultants were appointed to come up with a framework for managing development in area and the BR concept was selected as ideal after research into different frameworks.</p> <p>Nomination was done in-house with MELISSA funding through the World Bank, submitted in 2001, designated Sept 2001.</p> <p>Specific area was selected based on water catchments considered as the Lowveld. Kruger to Canyons name has a geographical connotation and refers to the escarpment to the Blyde River Canyon.</p>	3
Aspects of Implementation	<p>Institutional authority (Corbett 1995; UNESCO 1996, 2002b)</p>	<p>Management entity consists of an EXCO elected from a stakeholder's council. Stakeholder's council - 70 representatives, 10 from core, 20 buffer, 40 from transition, 10 ex-officios (government, not elected). Representatives are from different roles within each zone.</p> <p>K2C goes across 2 provinces: 50% Limpopo 50% Mpumalanga (changed in 2005) (at first 90% and 10%)</p> <p>LEDET provides legal guidance. K2C is aiming at registering a non-profit company. Funding was the main reason for this decision. Company will report to the two provinces.</p> <p>Meetings with stakeholder council approximately once a year.</p> <p>EXCO = 5 people elected from within stakeholder council (committed people) who meet as required.</p> <p>K2C is very much linked to individual people who work on a voluntary basis.</p>	2
	<p>Financial resources (Corbett 1995; Pasquini 2003; Stoll-Kleemann &amp; Job 2008; UNESCO 2002b)</p>	<p>Monetary security is a constant challenge. Received German funding for a 2 year contract for project manager. Contract was ended Dec 2010.</p> <p>No funding currently for appointing a coordinator.</p> <p>Limpopo Province promised funding of R100 000. Maruleng municipality is contributing to the office building.</p> <p>Future funding: business plan with vision and objectives; BR will build a BR constituency and identifying gaps that is not fulfilled by anybody else - look strategically at website, newsletter, meetings, festival with stakeholders, etc. One major project has been identified for funding application (river corridor project).</p> <p>MoA between provinces is in the pipeline but has not progressed in 3 years - both provinces have to sign the registration of the non-profit company and will only do it once they have signed their MoA.</p>	1

Regional planning (UNESCO 2008)	Land use planning in municipalities is being done on the basis of the K2C management framework. IDPs are also taking into account the BR zonation. Municipalities contact K2C in connection with developments. Integration into regional planning is not yet optimal.	2
Management framework (Ervin 2003; Hakizumwami 2000; Hockings, Stolton & Dudley 2000; Pasquini 2003; Pressey & Taffs 2001; Stoll-Kleemann & Job 2008; UNESCO 1996, 2002b)	A Management Framework has been completed. Management framework is in the form of an EMF and should be signed off by the ministers of Limpopo and Mpumalanga because it was compiled according to national legislation. LEDET paid for the document but now K2C has to get support from Mpumalanga - first focus on signing of MoA, then adoption of management plan. Current staff of 2 voluntary persons. No permanent staff. An office building was completed with funding channeled from the European Union through Maruleng municipality. A coordinator, office assistant and tourism officer were all appointed for 7 months. At end of project all positions fell away (June 2009) because could not secure funding for continuation. The K2C Nodal Centre was officially opened in September 2011. Will house the K2C office in future.	2
Legislation and government support (Dudley <i>et al.</i> 1999; Hakizumwami 2000; Stoll-Kleemann & Job 2008)	Presently the biosphere reserve concept in SA is being legislated using a soft law approach. It is not embedded in the Protected Areas Act, therefore no national legislative support. Designation with UNESCO should result in national legislation, but do need to retain the flexibility. Too little support from government. Need buy-in from national government, also financial support to biosphere reserves. Biosphere reserves need to be given “teeth” to implement the principles.	1
Partners/Stakeholders (Hakizumwami 2000; Queensland Parks and Wildlife Service 2002; UNESCO 1996, 2002b)	K2C has very good relationships with partners and stakeholders. A once-off Biodiversity Day and the annual Sustainable Living Festival is funded by partners. Very good partnerships - local and international – especially with Germany through the link to Rhön Biosphere Reserve; with Limpopo Province; with local and district municipalities; and with the Cape West Coast Biosphere Reserve in the Western Cape.	3
Threats/Challenges (Dudley <i>et al.</i> 1999; Pasquini 2003; UNESCO 1996, 2002b)	Sustainability of management entity is an ongoing challenge because it is very much dependent on volunteer capacity. Institutional threats are most pressing. A great need to create an organization that can run itself – therefore the plan for a non-profit company. Communication is good with EXCO but lack otherwise because of no funding for basic office support. Lack of operational funding. Have to communicate within limits, therefore mainly electronically which excludes certain stakeholders. There is a good relationship with land claimants.	2

## Annexure 10: Results form semi-structured interviews on the effectiveness of the Cape Winelands Biosphere Reserve

COMPONENT		DESCRIPTIVE RESULTS	RATING 24/33
<b>Three functions</b> according to UNESCO's Seville Strategy (Lü <i>et al.</i> 2003; Queensland Parks and Wildlife Service 2002; UNESCO 1996, 2002)		The CWBR is not yet fully operational. Conservation function is ongoing and executed by conservation officials. A biosphere reserve marketing campaign is active. Discussions with the University of Stellenbosch on strengthening the research function have been initiated. Development function is to relate to evaluation of development proposals specifically in buffer zones to reflect biosphere reserve principles.	2
<b>Zonation system of three elements</b> according to UNESCO's Seville Strategy (UNESCO 1996, 2002, 2008)		All three elements covered in the total size of 322 030 hectares. The biosphere reserve is delimited into core areas of 99 459 ha (31% of total area), buffer zones of 133 844 ha (42%) and transition areas of 88 727 ha (27%). Guidelines for land uses within the distinct zones are incorporated as part of the CWBR framework plan.	3
<b>Seven criteria</b> according to the Statutory Framework of the World Network of Biosphere Reserves (Ervin 2003; Pressey & Taffs 2001; UNESCO 1996, 2002)		The CWBR lies within the Cape Floristic Region that is regarded as a hot-spot for biodiversity conservation worldwide. The biosphere reserve slopes across elevations from 20 m to 1860 m above sea level. It is of sufficient size (322 030 ha) and is representative of a biogeographical zone that is not yet sufficiently covered in a biosphere reserve.	3
<b>Nomination history</b> (Price 2002; Robertson Vernhes 2007; UNESCO 1996)		Designation of the CWBR (previously known as the Boland BR) followed onto a process of a proposed Fynbos Biome cluster BR. The CWBR had its origins in 1998 with the Stellenbosch Municipality and University of Stellenbosch and was grounded in the Stellenbosch structure plan. In June 2005, the then Executive Mayor of the Cape Winelands District Municipality and other representatives visited UNESCO in Paris, France, to discuss key aspects of the biosphere reserve proposal. A team of consultants was appointed to compile the formal nomination to UNESCO. The process included an extensive public participation process, focusing mainly on private landowners with the view to obtain increasing support for the biosphere reserve.	3
Aspects of Implementation	<b>Institutional authority</b> (Corbett 1995; UNESCO 1996, 2002)	The designated institutional authority is a private company without share capital, incorporated under section 21 of the Companies Act. The institutional authority is earmarked to operate in close collaboration with government departments, local authorities, landowners and communities. Currently the biosphere reserve is being managed by an interim management committee in collaboration with the Board of Directors of the Company. However, some communities still feel excluded from the management process.	2
	<b>Financial resources</b> (Corbett 1995; Pasquini 2003; Stoll-Kleemann & Job 2008; UNESCO 2002)	During the previous political dispensation the CWBR was generously supported with sufficient financial means to compile the nomination and relevant documentation, including awareness materials. Recently, however, the district municipality is not nearly supporting the biosphere reserve to the same financial extent although they still provide most needed secretarial services to the biosphere reserve. Despite their rather bleak financial situation at present, the CWBR is planning for a most secure financial future with very innovative tools.	2
	<b>Regional planning</b> (UNESCO 2008)	The CWBR has an approved Framework Plan, based on bioregional principles, that includes a system of Spatial Planning Categories across all three zonation elements. The final CWBR Framework Plan was adopted in 2010 by the Cape Winelands District Municipality as biosphere reserve custodians and provides detailed spatial guidance for future land-use management. The Plan is integrated into spatial planning documentation of relevant municipalities. However, there is concern about ad hoc urban development on rural land that tends to erode the unique character of the area.	3
	<b>Management framework</b> (Ervin 2003; Hakizumwami 2000; Hockings, Stolton & Dudley 2000; Pasquini 2003; Pressey & Taffs 2001; Stoll-Kleemann & Job 2008; UNESCO 1996, 2002)	The CWBR does not have a management framework, although it is a high priority on the agenda of the management entity. The biosphere reserve is currently being championed by private persons in a voluntary capacity, albeit with strong administrative support from the Winelands District Municipality. The CWBR Company currently has no permanent staff members and no dedicated office space.	1

		The biosphere reserve has a clearly defined vision and objectives.	
	Legislation and government support (Dudley <i>et al.</i> 1999; Hakizumwami 2000; Stoll-Kleemann & Job 2008)	Presently the biosphere reserve concept in SA is being legislated using a soft law approach. It is not embedded in the Protected Areas Act, therefore no national legislative support. The Western Cape has a proposed provincial biosphere reserve act that will be an enabling act on processes, funding and drafting of framework plans. Designation with UNESCO should result in national legislation, but do need to retain the flexibility. Too little support from government. Need buy-in from national government, also financial support to biosphere reserves. Biosphere reserves need to given “teeth” to implement the principles.	1
	Partners/Stakeholders (Hakizumwami 2000; Queensland Parks and Wildlife Service 2002; UNESCO 1996, 2002)	Strategic partners are represented in the management entity of the CWBR. However, many people are still not aware of the existence of the CWBR. Collaboration with partners and stakeholders is still a problem due to the recent designation of the biosphere reserve. Local communities still need to be convinced of benefits of the CWBR.	2
	Threats/Challenges (Dudley <i>et al.</i> 1999; Pasquini 2003; UNESCO 1996, 2002)	Population growth and resulting urban sprawl pose a huge challenge. Direction on dealing with changes should be incorporated into the planned management framework. People are not really aware of sustainable development issues and their interconnectedness with the natural environment. Also too little benefits for local communities and private landowners. Lack of secure monetary resources is a pressing problem. The need for greater collaborative management has been identified as a challenge, thus more buy-in from stakeholders is needed.	2

## Annexure 11: Significance rating of possible criteria

<b>Annexure 11: Significance rating of possible criteria</b>					
<b>South African Biosphere Reserve Criteria (Questionnaire)</b>					
<b><i>Ecological/Biological</i></b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>Not rated</b>	<b>SUM</b>
Need to be representative of a biogeographical region	1	7	10		18
Replication of vegetation types between BRs	9	7	1	1	18
Biological significance of BR	1	2	15		18
Ecological connectivity with other protected areas	2	6	10		18
Certainty of long-term persistence of BR	3	2	12	1	18
Sustainable land use practices in place	1	4	13		18
<b><i>Social</i></b>					
Wide stakeholder support		4	14		18
Need to have aesthetic appeal	6	9	2	1	18
Negative impact of human settlements on persistence of BR	2	6	9	1	18
Play a role in the provision of ecosystem services		3	15		18
High educational value		3	15		18
<b><i>Economic</i></b>					
Sustainable financing of BR	1	3	14		18
BR offers tourism opportunities		12	6		18
Consider BR establishment costs	5	8	5		18
Consider long-term operational costs		5	13		18
<b><i>Political</i></b>					
Need high level of political support	2	3	13		18
BR concept needs to be enforceable	7	5	6		18
BR is integrated in land use planning		1	17		18
<b><i>Governance</i></b>					
Consider legal implications of BR establishment	2	11	5		18
Existence of a management framework	3	5	10		18
Spatial design in place (core, buffer, transition):	1	9	8		18
Good institutional collaboration within BR area		8	10		18
Consider manageability of BR		9	9		18
Dedicated BR staff	1		17		18
BR management independent from government structures	2	7	8	1	18